Quality of Surface Waters of the United States 1952

Parts 5–6

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

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PREFACE

This report was prepared by the Geological Survey in cooperation with the State of Iowa and other agencies by personnel of the Water Resources Division under the direction of:

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QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1952

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, 1951, to September 30, 1952. 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, hardness, sediment loads, water temperature, and other pertinent data.

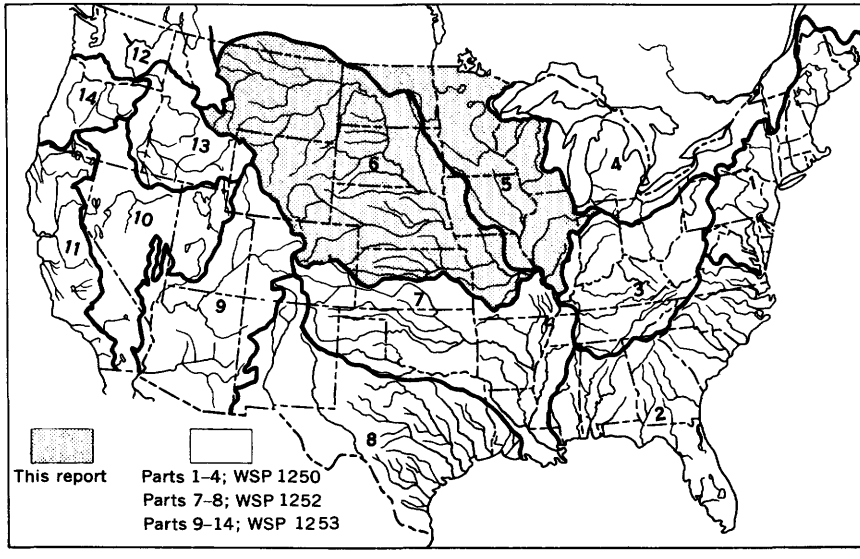

Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1952. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

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.

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, 1952, 64 regular sampling stations on 64 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 64 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 19.

Quantities of suspended sediment are reported for 80 stations during the year ended September 30, 1952. 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 88 of the stations. As noted under "Remarks" in the table headings, suspended-sediment concentrations also were determined from the samples collected for chemical analyses 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. Some characteristics of the bed material at 16 locations are shown in the tables of particle-size distribution. All other undissolved material in transport is termed suspended sediment and generally constitutes the major part of the total sediment load. At the present time no reliable method has been developed for determining bed load on a routine basis.

COLLECTION AND EXAMINATION OF SAMPLES

CHEMICAL QUALITY

Samples for chemical analyses 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.

SUSPENDED 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 sediment 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 or pipette cylinder was often different from the concentration in the original suspension. The concentration at which analyses were made is indicated in the appropriate tables.

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 quan-

tity 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 ($CaCO_3$), is calculated from the equivalents of calcium and magnesium except for a few samples for which the reported values also include equivalents of free mineral acid, aluminum, iron, and manganese when present in significant quantities. The hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

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

Specific conductance values are expressed in reciprocal ohms times 10^6 (micromhos at 25°C). The discharge of the streams is reported in cubic feet-per second (see Stream Flow, p. 19) 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 is expressed in terms of pH units. By definition the pH value of a solution is the negative logarithm of the concentration of gram ions of hydrogen. However, the pH meter which is generally used in Survey laboratories, determines the activity of the hydrogen ions as distinguished from concentration.

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

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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.

Size determinations of bed material were made by sieve 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 increasing the corrosiveness of waters that contain large quantities of calcium and magnesium.

Fluoride (F)

Fluoride has been reported as being present in some rocks to about the same extent as chloride. However, the quantity of fluoride in natural surface waters is ordinarily very small compared to that of chloride. 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 dis-

solved 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 units usually passes unnoticed. Some swamp waters have natural color of 200 to 300 units 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. 7 .) Waters in which the percent sodium is more than 60 may be injurious when applied to certain types of soils, particularly when adequate drainage is not provided (Magistad and Christiansen, 1944, p. 8-9; Wilcox, 1948, p. 6).

Sodium-adsorption-ratio

Sodium-adsorption-ratio (SAR) is the relative proportion of sodium to other cations in an irrigation water.

$$SAR = \frac{Na^{+}}{\sqrt{(Ca^{++}+Mg^{++})/2}}$$

where the ionic concentrations are expressed in milliequivalents per liter (or equivalents per million for most irrigation waters).

The term is used for soil extracts and irrigation waters to ex-

press the relative activity of sodium ions in exchange reactions with soil. SAR provides an estimate of the sodium or alkali hazard and reportedly is more significant for interpreting water quality than percent sodium because it relates more directly to the exchangeable sodium percentage the soil will attain when it and the water are in equilibrium.

The U. S. Salinity Laboratory diagram for classifying waters for irrigation divides water into four classes with respect to sodium hazard, the dividing points being at SAR values of 10, 18, and 26. They range from low-sodium water that can be used for irrigation on almost all soils to very high-sodium water which is generally unsatisfactory for irrigation.

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 charac-

teristics, 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, 1950, and 1951, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, 1102, 1132, 1162, 1187, and 1198.

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 Geo-

logical 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 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 are either daily mean discharges or 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 1951 to September 1952.
Water temperatures: January 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 740 ppm July 9-13; minimum, 238 ppm Apr. 1-5.
Hardness: Maximum, 361 ppm Jan. 28 to Feb. 9; minimum, 97 ppm Apr. 6-13.
Specific conductance: Maximum daily, 1,170 micromhos July 11; minimum daily, 281 micromhos Apr. 7.
Water temperatures: Maximum, 80°F Aug. 18; minimum, freezing point Dec. 12.
EXTREMES, January 1951 to September 1952.--Dissolved solids: Maximum 740 ppm July 9-13, 1952; minimum, 180 ppm Mar. 29, 1951.
Hardness: Maximum, 363 ppm Mar. 27, 1951; minimum, 86 ppm Mar. 29, 1951.
Specific conductance: Maximum daily, 1,170 micromhos July 11, 1952; minimum daily, 244 micromhos Mar. 29, 1951.
Water temperatures: Maximum, 80°F Aug. 18, 1952; minimum, freezing point Dec. 12, 1951.
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 1951 to September 1952 given in WSP 1238.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951.....	7.8	--		50	28	98		403	0	95	14	--	1.9	0.25	516	0.70	10.9	240	0	47	2.7	809	7.8
Nov. 1-30.....	8.9	--		59	28	70		394	0	85	14	--	2.1	.18	496	.67	11.9	263	0	35	1.9	768	8.0
Dec. 1-31.....	6.7	--		69	29	68		419	0	88	14	--	2.1	.15	506	.69	9.15	292	0	32	1.7	798	8.0
Jan. 1-27, 1952	2.0	--		77	30	76		457	0	98	15	--	2.1	.18	564	.77	3.05	317	0	33	1.9	872	7.8
Jan. 28-Feb. 9	2.7	--		85	36	102		532	0	123	19	--	1.0	.22	670	.91	4.88	361	0	38	2.3	1,030	7.8
Feb. 10-25.....	3.4	--		98	24	93		--	--	118	--	--	2.4	.16	--	--	--	343	--	37	2.2	--	--
Feb. 26-Mar. 31 ...	5.9	--		74	33	69		445	0	87	17	--	2.4	.13	538	.73	8.57	319	0	31	1.7	843	7.9
Apr. 1-5	388	--		25	12	31		149	0	53	10	--	2.5	.10	238	.32	249	113	0	35	1.3	379	7.4
Apr. 6-13.....	535	--		22	10	40		149	0	57	8.0	--	3.0	.12	242	.33	350	97	0	45	1.8	377	7.5
Apr. 14-30.....	135	--		36	20	79		272	0	115	14	--	2.7	.25	435	.59	159	174	0	47	2.6	669	7.9
May 1-June 2.....	41.6	--		47	29	97		372	0	125	16	--	1.7	.29	550	.75	61.8	236	0	46	2.8	836	8.1
June 3-July 6.....	8.8	--		48	29	88		357	10	102	15	--	1.2	.22	506	.69	12.0	238	0	44	2.5	786	8.3
July 7-8	133	--		48	27	82		376	0	94	15	--	1.9	.26	492	.67	177	233	0	42	2.3	754	8.0
July 9-13	111	--		49	34	153		467	0	194	24	--	2.8	.39	740	1.01	222	261	0	54	4.1	1,100	7.8
July 14-Aug. 16	14.2	--		38	21	84		310	0	102	12	--	2.2	.23	458	.62	17.6	180	0	48	2.7	688	7.8
Aug. 17-31.....	3.5	25		45	20	62		303	0	73	9.0	0.2	2.0	.17	402	.55	3.80	194	0	40	1.9	615	7.7
Sept. 1-30.....	1.4	20		49	19	37		256	7	54	6.0	.2	1.2	.07	328	.45	1.24	202	0	28	1.1	512	8.3
Weighted average a	34.6	--		35	18	64		b250	--	87	12	--	2.5	0.19	377	0.51	35.2	162	0	44	2.2	581	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

RED RIVER OF THE NORTH BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952
[Once-daily temperature measurement between 10 a. m. and 1 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	35	39	--	35	--	38	69	--	73	72	58
2	53	36	--	a 34	35	--	39	69	60	72	70	a 57
3	58	35	39	a 33	--	34	37	71	62	68	--	62
4	52	--	39	35	36	a 34	33	--	64	--	67	60
5	49	40	40	34	35	35	33	--	67	--	67	57
6	48	40	40	--	35	35	--	60	71	--	69	56
7	--	39	37	35	37	--	38	60	71	69	70	--
8	53	41	--	39	37	a 36	36	60	--	70	63	60
9	52	42	--	33	39	--	35	58	65	78	66	61
10	59	42	--	35	39	35	33	55	65	72	--	65
11	50	--	36	36	39	35	45	--	67	71	62	68
12	51	--	32	34	38	36	38	57	69	68	64	70
13	54	41	a 36	--	--	35	--	57	72	--	73	68
14	--	40	34	35	39	37	42	56	68	66	72	--
15	a 52	39	34	a 35	39	35	49	58	--	69	68	62
16	45	38	--	37	38	--	48	54	--	79	68	61
17	43	36	33	a 37	--	35	51	52	67	77	--	58
18	43	--	a 33	37	36	35	56	--	64	72	80	58
19	42	39	33	34	34	35	58	56	67	73	69	54
20	41	38	33	--	34	35	--	58	65	--	68	53
21	--	35	a 34	a 33	33	35	--	59	59	70	64	--
22	39	--	35	--	--	33	55	63	--	70	72	54
23	40	35	--	34	37	--	56	65	63	67	66	54
24	41	36	34	a 34	--	35	66	65	61	78	--	56
25	40	--	--	36	35	33	--	--	64	70	72	56
26	36	37	--	--	37	35	61	65	65	73	76	60
27	37	37	--	--	39	--	--	52	63	--	70	64
28	--	39	36	35	39	35	--	54	65	69	61	--
29	39	38	37	33	35	--	67	58	--	69	67	--
30	36	38	--	35	--	--	69	--	68	68	71	54
31	35	--	33	38	--	35	--	58	--	73	--	--
Average	46	38	--	--	37	--	--	60	66	71	69	59

a Observation made between 2 p. m. and 5 p. m.

MISCELLANEOUS ANALYSES OF STREAMS IN THE RED RIVER OF THE NORTH BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
SOURIS RIVER NEAR VERENDRYE																							
Jan. 11, 1952	112	--	--	--	--	68		312	0	110	17	--	--	--	--		--	246	0	38	1.9	736	7.3
Feb. 7	134	--	--	--	--	64		307	0	101	18	--	--	--	--		--	243	0	36	1.8	719	7.6
Mar. 5	55	--	--	--	--	99		394	0	137	31	--	--	--	--		--	293	0	42	2.5	933	7.4
Apr. 3	a1,700	7.0	0.12	14	5.6	17	9.4	80	0	34	4.0	0.1	4.2	0.03	150		0.20	58	0	35	1.0	219	7.1
Apr. 11	630	11	.06	28	10	38		141	0	63	6.0	.1	4.7	.04	250		.34	111	0	43	1.6	382	7.5
Aug. 19	26	38	.02	69	35	166		484	5	167	66	.5	2.5	.28	792		1.08	315	0	53	4.1	1,210	8.2
Sept. 11	18	24	.01	62	28	137		399	0	165	44	.5	5.1	.17	666		.91	268	0	53	3.7	1,030	7.6

a Mean daily discharge.

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IOWA RIVER BASIN

IOWA RIVER AT IOWA CITY, IOWA

LOCATION.--At Benton Street Bridge in Iowa City, Johnson County, 0.5 mile downstream from the university dam 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 1952.
Water temperatures: January 1944 to September 1952.
Sediment records: October 1943 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 342 ppm May 1-22; minimum, 163 ppm Mar. 11-18.
Hardness: Maximum, 272 ppm July 1-31; minimum, 107 ppm Mar. 11-18.
Specific conductance: Maximum daily, 623 micromhos Dec. 25; minimum daily, 202 micromhos Mar. 12.
Water temperatures: Maximum, 84°F June 19; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 4,310 ppm June 17; minimum daily, 6 ppm Jan. 6, 7.
Sediment loads: Maximum daily, 55,900 tons May 23; minimum daily, 12 tons Jan. 6, 7.
EXTREMES, 1943-52.--Dissolved solids (1944-52): Maximum, 436 ppm Jan. 26 to Feb. 17, 1948; minimum, 96 ppm Jan. 5-10, 1946.
Hardness (1944-52): Maximum, 345 ppm Dec. 21-31, 1944; minimum, 54 ppm Jan. 5-10, 1946.
Specific conductance (1945-52): Maximum daily, 739 micromhos Feb. 3, 1948; minimum daily, 108 micromhos Jan. 9, 1946.
Water temperatures (1944-52): Maximum, 89°F July 4, 1949; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 5,700 ppm June 18, 1950; minimum daily, 4 ppm Feb. 10-12, 1945, Feb. 5, 1947.
Sediment loads: Maximum daily, 177,000 tons May 23, 1944; minimum daily, 2 tons Jan. 28, Feb. 2-8, 10, 1951.
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 1951 to September 1952 given in WSP 1238.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	1,643			--	--			182	14	42	6.0				266	0.36	1,180	212	40			420	8.2
Nov. 1-30	1,698			--	--			195	9	52	6.2				272	.37	1,250	223	49			444	8.2
Dec. 1-31	991			--	--			242	0	55	6.3				300	.41	803	252	54			498	7.8
Jan. 1-14, 1952	717			--	--			245	0	57	8.3				308	.42	596	254	53			509	7.8
Jan. 15-Feb. 11	2,553			--	--			178	0	37	3.5				232	.32	1,600	184	38			378	8.0
Feb. 12-Mar. 10....	2,044			--	--			201	10	45	6.0				279	.38	1,540	226	45			444	8.5
Mar. 11-18.....	9,224			--	--			94	0	27	8.0				163	.22	4,060	107	30			242	7.9
Mar. 19-31.....	5,877			--	--			171	6	43	5.0				254	.35	4,030	197	47			398	8.4
Apr. 1-30.....	3,946			--	--			231	5	50	5.5				317	.43	3,380	252	54			491	8.3
May 1-22	2,007			67	23			254	0	51	6.0				342	.47	1,850	263	55			515	8.1
May 23-27.....	4,692			44	13			154	0	32	3.5				224	.30	2,840	163	37			334	7.6
May 28-June 5.....	2,512			67	21			245	0	46	5.5				324	.44	2,200	252	51			497	8.1
June 6-30	2,462			--	--			204	0	44	5.0				258	.35	1,720	209	42			425	7.6
July 1-31	1,950			--	--			275	0	45	5.5				336	.46	1,770	272	46			527	8.1
Aug. 1-31	588			--	--			244	0	53	8.0				295	.40	468	242	42			481	8.0
Sept. 1-30	261			--	--			262	0	60	11				320	.44	226	263	48			525	7.8
Weighted average [a]	2,126			--	--			b 209	--	44	5.7				274	0.37	1,570	216	45			432	--

a Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

IOWA RIVER AT IOWA CITY, IOWA--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily measurement between 7 a. m. and 8 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	45	40	a 32	38	37	50	68	a 67	78	74	a 74
2	64	42	--	a 32	38	a 34	49	68	67	79	74	76
3	65	37	47	33	a 37	37	48	67	67	78	a 77	67
4	68	34	46	33	37	33	46	a 64	69	a 80	74	68
5	67	36	46	33	35	34	46	72	69	78	69	67
6	66	35	48	a 34	37	37	a 48	68	--	a 79	70	70
7	a 58	a 35	44	34	38	34	48	65	77	79	69	a 68
8	54	36	45	34	36	36	48	61	a 79	71	73	67
9	56	33	40	34	37	a 37	53	60	79	73	73	69
10	62	37	34	33	a 38	36	52	58	74	75	a 74	69
11	56	a 43	36	35	37	37	48	a 56	73	76	78	70
12	67	46	36	36	34	38	47	53	75	77	77	73
13	57	52	34	a 35	--	38	46	54	80	a 78	70	67
14	a 64	47	34	36	34	37	43	56	76	77	75	a 74
15	58	44	33	37	36	38	46	58	a 81	73	75	72
16	--	43	a 32	36	36	a 38	46	58	76	75	74	72
17	64	42	32	36	a 38	40	48	57	75	76	a 78	72
18	52	a 37	33	36	38	43	52	a 60	80	75	76	71
19	50	36	33	36	38	44	55	57	84	--	73	66
20	50	36	34	a 33	36	43	a 56	59	75	80	75	64
21	a 51	37	34	34	34	42	62	59	69	81	74	a 66
22	50	a 34	34	35	a 33	42	62	59	a 73	82	72	62
23	51	37	--	33	34	a 36	58	59	72	78	70	61
24	51	34	35	33	a 35	37	55	64	74	77	--	--
25	50	a 36	34	35	35	38	56	a 67	77	76	70	--
26	53	35	34	35	37	41	56	67	78	78	71	--
27	57	36	34	33	36	42	a 63	67	--	a 78	71	72
28	a 57	36	36	a 32	37	41	62	62	77	82	74	a 70
29	48	36	36	32	36	43	64	61	a 83	78	76	66
30	51	39	a 34	--	--	a 52	67	--	79	77	76	66
31	48	--	35	--	--	51	--	64	--	75	a 78	--
Average	57	39	37	34	36	39	53	62	75	77	74	69

a Observation made between 9 a. m. and 12 m.

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	787	42	89	1,740	82	385	1,420	43	165
2.....	774	46	96	1,620	64	280	1,460	58	229
3.....	756	45	92	1,540	50	208	1,500	68	a 275
4.....	738	64	128	1,420	62	238	1,460	62	244
5.....	625	76	128	1,300	76	267	1,460	47	185
6.....	774	92	192	1,180	78	249	1,460	46	181
7.....	1,430	78	301	1,100	50	148	1,380	55	205
8.....	1,900	160	821	1,140	58	179	1,340	36	130
9.....	1,540	240	s 1,000	1,140	42	129	1,300	29	102
10.....	1,340	120	434	1,220	24	79	1,260	29	99
11.....	1,220	85	280	1,220	38	125	1,220	29	a 96
12.....	1,140	97	299	1,620	74	324	1,100	28	83
13.....	1,060	118	338	2,660	283	2,030	702	27	51
14.....	955	107	276	3,140	542	s 4,620	486	21	a 28
15.....	920	79	196	3,140	774	6,560	389	18	19
16.....	955	104	268	2,740	677	s 5,000	355	18	17
17.....	1,580	192	s 861	2,420	354	2,310	520	18	25
18.....	2,340	284	1,790	2,180	206	1,210	635	21	36
19.....	1,900	209	1,070	1,980	138	738	774	16	33
20.....	1,540	158	657	1,820	110	541	857	14	32
21.....	1,940	164	s 939	1,700	86	395	927	14	35
22.....	2,980	542	4,360	1,700	80	367	920	10	25
23.....	2,740	548	4,050	1,700	72	330	948	11	28
24.....	2,980	492	3,960	1,540	67	279	948	14	36
25.....	2.980	510	4,100	1,210	60	196	955	15	39
26.....	2,580	424	2,950	1,340	71	257	934	16	40
27.....	2,340	222	1,400	1,140	44	135	843	17	39
28.....	2,180	166	977	1,380	52	194	815	17	37
29.....	2,100	132	748	1,460	77	304	794	17	36
30.....	1,980	112	599	1,460	46	181	780	17	36
31.....	1,860	102	512	--	--	--	768	15	31
Total.	50,934	--	33,911	50,950	--	28,258	30,710	--	2,617
	January			February			March		
1.....	762	12	25	1,900	63	323	2,260	228	1,390
2.....	878	11	26	2,180	94	553	2,180	246	1,450
3.....	801	10	22	2,500	97	655	1,940	200	1,050
4.....	774	9	19	2,980	160	1,290	1,540	160	665
5.....	732	7	14	3,310	202	1,810	1,380	74	276
6.....	726	6	12	3,220	170	1,480	1,380	41	153
7.....	720	6	12	2,820	125	952	1,500	46	186
8.....	690	8	15	2,340	84	531	1,700	58	266
9.....	666	9	16	2,100	66	374	1,700	60	275
10.....	650	8	14	1,940	51	267	3,120	437	s 4,640
11.....	655	8	14	1,980	59	315	6,940	1,730	a 32,700
12.....	660	9	16	2,020	63	344	8,360	1,830	a 41,500
13.....	655	13	23	2,020	74	404	8,850	1,220	29,200
14.....	666	15	27	2,020	100	545	9,370	778	19,700
15.....	1,220	46	152	2,100	82	465	10,300	714	19,900
16.....	1,340	94	340	2,020	70	382	10,300	540	15,000
17.....	1,780	102	490	2,100	71	403	10,300	448	12,500
18.....	2,100	112	635	2,180	76	447	9,370	420	10,600
19.....	3,490	543	a 6,050	2,180	76	447	9,240	400	9,980
20.....	4,390	730	a 8,820	2,180	67	394	7,840	284	6,010
21.....	4,030	428	4,660	2,180	76	447	6,280	500	8,480
22.....	3,850	460	4,780	2,100	72	408	5,830	530	8,340
23.....	3,500	262	2,480	2,100	90	510	6,160	470	7,820
24.....	3,200	166	1,430	2,020	78	425	5,940	324	5,200
25.....	2,900	132	1,030	1,940	63	330	5,940	294	4,710
26.....	2,500	88	594	1,940	100	524	5,720	280	4,320
27.....	2,300	59	366	2,420	384	2,510	5,390	276	4,020
28.....	2,100	49	278	2,580	556	3,870	4,880	290	3,820
29.....	1,900	36	185	2,420	266	1,740	4,580	300	3,710
30.....	1,800	37	180	--	--	--	4,300	340	3,950
31.....	1,800	42	204	--	--	--	4,300	340	3,950
Total.	54,235	--	32,929	65,790	--	23,145	168,890	--	265,761

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	4,390	386	4,580	2,420	120	784	2,340	262	1,660
2.....	4,580	526	6,500	2,340	108	682	2,180	210	1,240
3.....	4,680	526	6,650	2,180	90	530	2,020	182	993
4.....	4,780	494	6,380	2,100	79	448	2,020	168	916
5.....	4,880	340	4,480	2,020	73	398	2,180	304	1,790
6.....	5,080	260	3,570	1,980	71	380	2,020	624	3,400
7.....	5,280	230	3,280	2,100	78	442	1,820	470	2,310
8.....	5,390	204	2,970	2,180	107	630	2,080	464	3,200
9.....	5,390	220	3,200	2,100	100	567	2,240	938	s 5,870
10.....	4,580	214	2,650	2,100	111	629	1,980	326	1,740
11.....	3,670	214	2,120	2,100	80	454	2,100	642	3,640
12.....	3,310	210	1,880	2,100	93	527	1,740	647	3,040
13.....	3,400	206	1,890	2,020	78	425	1,580	320	1,370
14.....	3,670	214	2,120	1,980	62	331	2,580	618	4,300
15.....	3,760	190	1,930	1,940	60	314	2,260	726	s 4,580
16.....	3,760	180	1,830	1,860	58	291	2,980	2,460	19,800
17.....	3,760	192	1,950	1,860	63	316	3,310	4,310	38,500
18.....	3,850	239	2,480	1,860	54	271	3,060	3,200	26,400
19.....	3,760	264	2,680	1,780	54	260	2,660	1,140	8,190
20.....	3,670	237	2,350	1,700	50	230	2,500	690	4,660
21.....	3,490	225	2,120	1,660	49	220	2,820	760	5,790
22.....	3,760	442	a 4,490	1,780	90	433	3,140	1,150	9,750
23.....	3,670	360	3,570	4,830	4,170	s 55,900	3,220	1,750	15,200
24.....	3,580	262	2,530	4,880	2,540	33,500	2,980	1,160	9,330
25.....	3,490	237	2,230	4,680	3,080	38,900	2,580	680	4,740
26.....	3,310	224	2,000	4,680	2,200	27,800	2,340	466	2,940
27.....	3,140	190	1,610	4,390	1,060	12,600	2,610	756	s 5,390
28.....	2,980	175	1,410	3,490	672	6,330	2,500	1,020	6,880
29.....	2,740	151	1,120	2,980	482	3,880	2,340	1,260	7,960
30.....	2,580	146	1,020	2,820	416	3,170	2,100	770	4,370
31.....	--	--	--	2,580	398	2,770	--	--	--
Total.	118,380	--	87,590	79,490	--	194,412	72,280	--	209,949

	July			August			September		
1.....	2,180	562	3,310	836	98	221	344	133	124
2.....	2,100	478	2,710	780	75	158	409	117	129
3.....	2,020	333	1,820	806	70	s 160	328	126	112
4.....	2,100	510	2,890	1,100	150	446	331	107	96
5.....	2,100	666	3,780	750	148	300	309	98	82
6.....	1,980	805	4,300	768	126	261	330	114	102
7.....	1,780	404	1,940	780	135	284	227	104	64
8.....	1,620	332	1,450	720	128	249	358	130	126
9.....	1,580	218	930	768	129	267	306	118	97
10.....	1,540	190	790	815	134	295	287	113	88
11.....	2,100	364	2,060	690	110	205	227	104	64
12.....	2,580	708	4,930	660	102	182	360	79	77
13.....	2,580	688	4,790	605	104	170	156	89	37
14.....	2,580	674	4,700	533	104	150	349	120	113
15.....	2,660	814	5,850	660	101	180	233	110	69
16.....	2,500	640	4,320	690	109	203	317	94	80
17.....	2,420	490	3,200	635	95	163	226	84	51
18.....	2,580	548	3,820	546	88	130	237	88	56
19.....	2,580	576	4,010	515	106	147	162	82	36
20.....	2,580	490	3,410	449	113	137	283	97	a 74
21.....	2,420	414	2,710	432	120	140	178	110	a 53
22.....	2,100	360	2,040	423	120	137	232	109	68
23.....	1,860	298	1,500	412	120	133	196	97	51
24.....	1,700	246	1,130	412	104	116	347	117	110
25.....	1,540	222	923	408	108	119	98	118	31
26.....	1,420	206	790	389	113	119	239	105	68
27.....	1,300	181	635	385	118	123	116	115	36
28.....	1,050	150	s 438	271	117	86	256	94	65
29.....	1,020	111	306	396	109	117	115	92	29
30.....	990	117	313	309	120	100	275	101	75
31.....	885	97	232	300	129	104	--	--	--
Total.	60,445	--	76,027	18,243	--	5,602	7,831	--	2,263

Total discharge for year (cfs-days) 778,178
Total load for year (tons) 962,464

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA

LOCATION.--At gaging etation on upstream side of bridge on State Highway 1, at east edge of Iowa City, Johnson County, and 2.8 miles upstream from mouth.
DRAINAGE AREA.--3.01 square miles.
RECORDS AVAILABLE.--Sediment records: April to September 1952.
EXTREMES, April to September 1952.--Sediment concentrations: Maximum daily, 4,850 ppm June 14; minimum daily, not determined.
Sediment loads: Maximum daily, 1,430 tons June 14; minimum daily, less than 0.050 ton on many days.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1238.

Suspended sediment, April to September 1952

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.....	2.8	51	0.4	1.4	34	0.1	1.2	18	0.1
2.....	2.3	33	.2	1.3	37	.1	1.2	36	.1
3.....	2.0	30	.2	1.3	79	.3	1.3	65	.2
4.....	1.9	32	.2	1.1	98	.3	1.1	25	.1
5.....	1.8	35	.2	1.0	106	.3	.88	43	.1
6.....	1.7	38	.2	.98	105	.3	.66	78	.1
7.....	1.5	36	.1	4.4	338	s7.3	.60	83	.1
8.....	1.5	32	.1	1.9	112	.6	8.6	3,260	s343
9.....	1.6	28	.1	2.6	178	sa2.2	1.4	483	sa2.5
10.....	1.4	21	.1	2.0	83	.4	.88	135	.3
11.....	1.3	19	.1	1.8	52	.3	.69	127	.2
12.....	1.6	25	.1	1.5	40	.2	.69	103	.2
13.....	5.9	276	sa5.7	1.4	41	.2	1.1	216	s1.7
14.....	2.4	63	.4	1.3	41	.1	21	4,850	sa1,430
15.....	2.0	28	.2	1.2	50	.2	1.6	99	.4
16.....	1.8	23	.1	1.6	63	.3	1.1	107	.3
17.....	1.7	25	.1	1.3	45	.2	.80	87	.2
18.....	1.7	27	.1	1.1	61	.2	.63	56	.1
19.....	1.6	37	.2	.98	70	b.2	.55	58	.1
20.....	1.4	30	.1	.98	46	.1	2.7	738	sa12
21.....	1.6	38	s.2	.98	40	b.1	9.0	1,060	sa42
22.....	5.2	381	sa8.8	7.9	512	sa197	2.3	68	.4
23.....	6.1	188	sa3.2	27	3,040	s1,220	1.7	90	.4
24.....	4.2	112	1.3	5.8	223	3.5	1.7	160	.7
25.....	3.2	66	.6	3.8	73	.8	.98	102	.3
26.....	2.4	65	b.4	2.6	54	.4	.88	90	b.2
27.....	2.2	69	.4	2.2	47	.3	4.7	4,080	sa154
28.....	1.8	61	.3	1.9	35	b.2	1.0	35	b.1
29.....	1.7	42	.2	1.7	22	.1	.72	30	.1
30.....	1.5	33	.1	1.6	17	b.1	.60	84	.1
31.....	--	--	--	1.4	17	.1	--	--	--
Total.	69.8	--	24.4	88.02	--	1,436.5	72.26	--	1,990.1

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, April to September 1952--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	0.57	74	0.1	0.10	57	(t)	0.20		
2	.50	59	.1	.11	40	(t)	.20		
3	.43	46	.1	4.2	998	sa 55	.12		
4	.36	43	(t)	.50	268	.4	.13		
5	.34	42	(t)	.23	45	(t)	.12		
6	.31	37	(t)	.19			.09		
7	.29	58	(t)	.16			.05	--	(t)
8	.31	37	(t)	.21			.04		
9	.31	57	(t)	.19			.02		
10	.26	52	(t)	.12	--	(t)	.01		
11	.24	50	(t)	.18			.01		
12	.20	56	(t)	.13			.01		
13	.23	81	.1	.11			.01		
14	2.6	1,020	s 22	.11			.22	206	s 0.1
15	.48	218	s .3	2.1	1,200	sa 16	.05	--	
16	.36	87	.1	.36			.01	--	
17	.41	164	sa .3	.16			.01	--	
18	3.0	934	sa 14	.13			.01	--	
19	.66	53	.1	.10			.01	--	
20	.41	46	.1	.12			.01	--	
21	.31	49	(t)	.14			.01	--	
22	.23	54	(t)	.09			.01	--	(t)
23	.27	85	.1	.07			.02	--	
24	.19	34	(t)	.06	--	(t)	.01	50	
25	.19	48	(t)	.06			.01	--	
26	.15	74	(t)	.12			.01	--	
27	.14	60	(t)	.23			.02	--	
28	.15	63	(t)	.21			.01	--	
29	.14	60	(t)	.21			.01	--	
30	.12	30	(t)	.19			.01	--	
31	.11	19	(t)	.14			--	--	--
Total	14.27	--	38.0	11.03	--	71.9	1.45	--	.2

Total discharge for period Apr. 1 to Sept. 30, 1952 (cfs-days) 256.83
Total load for period Apr. 1 to Sept. 30, 1952 (tons) 3,561.1

s Computed by subdividing day.
t Less than 0.050 ton.
a 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, in Cedar Rapids, Linn County, 500 feet downstream from gaging station and 2.7 miles upstream from Prairie Creek.
DRAINAGE AREA.--6,640 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, January 1944 to September 1952.
Water temperatures: January 1944 to September 1952.
Sediment records: October 1943 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 356 ppm Dec. 19-31; minimum, 194 ppm Apr. 5.
Hardness: Maximum, 284 ppm Dec. 19-31; minimum, 135 ppm Apr. 5.
Specific conductance: Maximum daily, 607 micromhos Dec. 19; minimum daily, 283 micromhos Apr. 5.
Water temperatures: Maximum, 83°F July 22; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 558 ppm Mar. 11; minimum daily, 2 ppm Dec. 24, 27, Jan. 2.
Sediment loads: Maximum daily, 21,600 tons Apr. 4; minimum daily, 7 tons Dec. 16.
EXTREMES, 1943-52.--Dissolved solids (1944-52): Maximum, 400 ppm Jan. 1-31, 1950; minimum, 98 ppm Mar. 31 to Apr. 3, 1951.
Hardness (1944-52): Maximum, 334 ppm Jan. 17 to Feb. 1, 1948; minimum, 68 ppm Mar. 31 to Apr. 3, 1951.
Specific conductance (1945-52): Maximum daily, 689 micromhos Jan. 24, 1950, Feb. 6, 1951; minimum daily, 138 micromhos Jan. 9, 1946, Mar. 31, 1951.
Water temperatures (1944-52): Maximum, 89°F July 4, 1949; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 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 regional office at Lincoln, Nebr. Flow affected by ice Dec. 18 to Jan. 17, Jan. 27 to Feb. 3. Records of discharge for water year October 1951 to September 1952 given in WSP 1238.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951....	3,647							267	0	39	12				280	0.38	2,760	222	3			464	7.7
Nov. 1-30	3,079							255	0	43	13				308	.42	2,560	253	44			513	8.0
Dec. 1-18.....	2,344							263	0	44	15				324	.44	2,050	261	45			529	8.1
Dec. 19-31.....	2,023							286	0	50	19				356	.48	1,940	284	49			585	8.0
Jan. 1-27, 1952....	3,061							214	0	38	16				274	.37	2,260	214	39			461	7.7
Jan. 28-Feb. 29 ...	4,031							192	0	35	12				249	.34	2,710	192	35			412	7.7
Mar. 1-31	7,973							165	0	35	8.5				228	.31	4,910	171	36			364	7.8
Apr. 1-2.....	10,980							160	2	33	6.5				246	.33	7,290	172	38			354	8.3
Apr. 3-4.....	19,900							132	6	26	4.5				214	.29	11,500	145	27			308	8.5
Apr. 5.....	26,600							124	4	26	4.0				194	.26	13,930	135	27			286	8.4
Apr. 6-7.....	21,250							150	0	27	5.0				222	.30	12,740	155	32			329	7.9
Apr. 8-9.....	12,500							188	0	37	6.5				266	.36	8,980	193	39			403	7.8
Apr. 10-30.....	8,320							214	0	41	9.0				306	.42	6,870	220	45			454	7.8
May 1-31	4,362							205	0	42	11				272	.37	3,200	208	40			439	7.8
June 1-30	3,451							216	0	42	12				270	.37	2,520	216	39			449	7.6
July 1-31.....	2,880							212	0	42	13				268	.36	2,080	209	35			439	8.2
Aug. 1-31.....	1,472							171	0	32	20				217	.30	862	163	23			383	7.4
Sept. 1-30	1,016							176	0	34	22				219	.30	601	165	21			396	7.4
Weighted average [a]	4,020							[b] 204	--	38	11				264	0.36	2,870	202	35			425	--

a Represents 100 percent of runoff for water year October 1951 to September 1952.

b Includes carbonate as bicarbonate.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily measurement between 4 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	40	32	32	a32	a32	45	65	a60	78	74	64
2	62	38	a34	32	--	--	42	65	62	80	75	63
3	64	38	40	32	31	--	42	68	64	78	a75	64
4	67	34	42	32	31	--	a40	68	62	a78	70	64
5	62	32	40	32	32	--	a38	67	66	a79	68	66
6	a60	31	40	32	32	--	a38	64	70	--	68	66
7	a58	32	38	33	31	--	41	56	65	74	72	a64
8	52	31	38	33	32	--	45	53	66	72	70	64
9	54	36	a36	32	a32	a31	43	50	--	72	70	68
10	55	38	32	32	a32	33	42	51	--	74	a70	70
11	56	40	--	34	32	--	41	a48	68	75	71	71
12	58	46	--	32	--	a32	37	48	71	77	70	72
13	--	49	--	32	32	a33	38	52	72	76	71	72
14	a56	45	--	a32	--	a33	39	52	--	74	73	a71
15	58	42	--	a33	--	a32	41	54	--	72	74	--
16	56	40	--	a33	--	a32	44	52	73	75	75	63
17	54	a39	--	a33	--	a35	46	a52	73	74	74	62
18	50	35	--	a35	--	36	49	a53	71	75	74	66
19	50	34	--	a32	--	36	56	54	70	78	74	65
20	a48	35	--	a32	--	37	56	55	63	a80	73	66
21	49	35	--	a32	--	34	56	55	63	82	72	67
22	50	35	--	a32	--	a34	54	54	--	83	70	65
23	48	34	32	--	--	--	50	a58	67	80	70	60
24	48	a34	32	a32	--	31	50	a60	72	76	70	57
25	48	a34	31	a32	--	32	54	a60	74	78	68	59
26	a47	34	32	a32	--	37	a54	63	72	80	68	59
27	a46	34	32	a32	--	--	a56	60	74	80	70	59
28	a46	34	33	--	--	36	60	58	74	78	72	60
29	46	32	a35	--	--	a36	63	58	a80	76	73	62
30	46	32	34	--	--	44	65	a58	81	75	72	60
31	42	--	34	a32	--	46	--	--	--	74	73	--
Average	53	36	--	32	--	--	48	57	69	77	72	64

a Observation made between 10 a. m. and 3 p. m.

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	2,320	40	251	3,710	37	371	3,160	43	367
2.....	2,270	54	331	3,680	35	348	2,720	36	264
3.....	2,200	55	327	2,890	29	226	2,670	38	274
4.....	2,320	56	351	2,810	39	296	2,720	37	272
5.....	2,980	70	563	2,270	40	245	2,840	33	253
6.....	3,780	71	725	2,180	54	318	2,920	40	315
7.....	4,100	63	697	2,200	46	273	3,040	31	254
8.....	3,640	56	550	2,720	22	162	3,160	20	171
9.....	3,220	47	409	3,030	38	311	3,190	29	250
10.....	3,010	50	406	3,040	36	295	3,070	19	157
11.....	2,890	63	492	2,840	48	342	2,890	31	242
12.....	2,840	59	452	3,070	42	348	2,290	35	216
13.....	2,720	80	588	3,780	62	633	2,110	17	97
14.....	2,620	110	778	4,270	68	784	1,380	9	34
15.....	2,490	69	464	4,340	51	598	1,060	7	20
16.....	2,510	53	359	4,160	45	505	850	3	7
17.....	2,590	50	350	3,820	36	371	928	9	23
18.....	2,750	41	304	3,820	35	361	1,200	19	62
19.....	2,860	36	278	3,850	37	385	1,500	11	45
20.....	2,860	37	286	3,440	55	511	1,900	17	87
21.....	3,440	71	659	3,220	29	252	2,100	8	45
22.....	4,520	83	1,010	3,220	20	174	2,200	5	30
23.....	5,220	88	1,240	3,010	21	171	2,200	9	53
24.....	6,120	122	2,020	2,560	14	97	2,300	2	12
25.....	6,480	123	2,150	2,560	31	214	2,300	4	25
26.....	6,300	84	1,430	2,090	78	440	2,200	7	42
27.....	5,760	72	1,120	2,130	64	368	2,100	2	11
28.....	5,220	52	733	2,340	34	215	2,000	4	22
29.....	4,690	65	823	2,560	42	290	1,900	4	21
30.....	4,340	65	762	2,950	26	207	1,800	4	19
31.....	3,990	56	603	--	--	--	1,800	5	24
Total.	113,050	--	21,511	92,360	--	10,111	68,498	--	3,714
	January			February			March		
1.....	1,900	3	15	2,500	13	88	3,710	29	290
2.....	1,800	2	10	2,900	49	384	4,300	34	395
3.....	1,700	8	37	3,700	34	340	4,520	46	561
4.....	1,700	18	83	4,520	29	354	4,160	43	a483
5.....	1,600	33	143	4,340	32	375	3,190	33	284
6.....	1,600	30	130	4,100	28	310	3,280	26	230
7.....	1,500	21	85	3,570	18	174	3,680	26	a258
8.....	1,500	34	138	3,100	19	159	3,410	26	239
9.....	1,500	29	117	3,010	15	122	3,190	28	241
10.....	1,400	31	117	3,070	21	174	5,220	139	s2,620
11.....	1,400	26	98	3,340	26	234	10,600	558	16,000
12.....	1,400	10	38	3,820	42	433	11,400	372	11,500
13.....	1,400	20	76	4,520	44	537	11,000	306	9,090
14.....	1,500	38	154	5,220	42	a592	11,400	307	9,450
15.....	1,700	28	129	5,580	43	648	10,600	274	7,840
16.....	2,200	23	137	5,760	45	700	9,860	230	6,120
17.....	3,000	35	284	6,120	34	562	8,530	178	4,100
18.....	3,960	28	299	6,120	42	694	7,020	129	2,450
19.....	4,860	63	827	6,120	41	677	7,960	152	3,270
20.....	6,840	120	2,220	5,760	34	529	8,530	168	3,870
21.....	7,390	92	1,840	4,860	23	302	9,480	215	5,500
22.....	6,300	98	1,670	4,340	53	621	11,800	240	7,650
23.....	5,760	47	731	3,880	47	492	13,300	181	6,500
24.....	5,940	39	625	3,570	49	472	14,000	160	6,050
25.....	5,220	34	479	3,820	37	382	13,700	120	4,440
26.....	3,990	21	226	3,440	22	204	10,600	99	2,830
27.....	3,600	16	156	3,380	29	265	8,340	85	1,910
28.....	3,200	13	112	3,740	29	293	7,440	75	1,510
29.....	2,900	13	102	3,510	25	237	7,390	84	1,680
30.....	2,700	17	124	--	--	--	7,390	82	1,640
31.....	2,500	22	148	--	--	--	8,150	116	2,550
Total.	93,960	--	11,350	121,710	--	11,354	247,150	--	121,551

s Computed by subdividing day.
a Computed from estimated concentration graph.

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	9,860	188	5,000	4,690	80	1,010	3,710	83	831
2.....	12,100	185	6,040	4,340	74	867	3,850	76	790
3.....	16,300	260	11,400	4,160	72	809	3,880	74	775
4.....	23,500	340	21,600	3,820	87	897	3,540	94	898
5.....	26,600	218	15,700	3,640	67	658	3,570	119	1,150
6.....	23,900	115	7,420	3,480	49	460	3,340	105	947
7.....	18,600	85	4,270	3,440	56	520	3,160	200	1,710
8.....	14,000	91	3,440	3,710	57	571	3,540	421	4,020
9.....	11,000	88	2,610	3,880	48	503	4,690	462	5,850
10.....	9,480	70	1,790	4,520	41	500	3,380	376	3,430
11.....	8,720	70	1,650	4,860	47	617	2,840	159	1,220
12.....	8,530	61	1,400	5,220	56	789	2,690	102	741
13.....	8,720	62	1,460	5,220	59	832	2,520	95	646
14.....	9,100	68	1,670	4,860	62	814	3,040	190	1,560
15.....	9,480	68	1,740	4,520	71	866	3,130	293	2,480
16.....	9,860	69	1,840	4,270	71	819	2,980	160	1,290
17.....	10,200	90	2,480	4,020	61	662	3,710	122	1,220
18.....	11,000	92	2,730	3,680	59	586	4,270	112	1,290
19.....	11,000	79	2,350	3,510	60	569	4,690	113	1,430
20.....	10,200	82	2,260	3,340	57	514	4,130	127	1,420
21.....	9,290	87	2,180	3,100	52	435	3,920	105	1,110
22.....	8,530	87	2,000	3,610	94	s 999	3,510	80	758
23.....	7,580	86	1,760	5,760	525	s 8,200	3,220	78	678
24.....	7,390	75	1,500	6,300	283	4,810	2,980	89	716
25.....	6,840	72	1,330	5,940	237	3,800	2,720	97	712
26.....	6,660	67	1,200	5,580	252	3,800	2,640	88	627
27.....	6,300	76	1,290	4,860	175	2,300	2,560	71	491
28.....	5,760	87	1,350	4,520	105	1,280	2,750	68	505
29.....	5,220	90	1,270	4,340	92	1,080	3,880	80	838
30.....	4,860	90	1,180	4,160	80	899	4,690	99	1,250
31.....	--	--	--	3,880	84	880	--	--	--
Total.	330,580	--	113,910	135,230	--	42,346	103,530	--	41,383
	July			August			September		
1.....	4,270	108	1,250	1,520	31	127	1,260	40	136
2.....	3,850	114	1,190	1,520	49	201	1,270	39	134
3.....	3,710	106	1,060	1,520	46	189	1,220	40	a 132
4.....	33,280	88	779	1,740	62	291	1,220	45	148
5.....	2,980	99	797	1,650	82	365	1,120	44	133
6.....	2,670	90	649	1,480	67	268	1,330	44	158
7.....	2,460	93	618	1,410	58	221	1,300	54	190
8.....	2,460	98	651	1,390	53	199	1,160	46	144
9.....	2,460	90	598	1,480	57	204	1,200	42	136
10.....	3,190	87	749	1,630	68	299	1,140	42	129
11.....	4,020	78	847	1,410	74	282	1,050	46	130
12.....	3,820	76	784	1,410	68	259	1,040	43	121
13.....	3,540	78	746	1,270	73	250	1,010	45	123
14.....	3,190	77	663	1,350	87	317	1,050	43	122
15.....	3,010	74	601	1,360	67	246	850	46	106
16.....	2,720	79	580	1,430	56	216	967	49	128
17.....	3,280	110	974	1,470	51	202	1,110	40	120
18.....	3,540	86	822	1,350	56	204	954	38	98
19.....	3,570	69	665	1,630	65	286	967	39	102
20.....	3,250	95	a 834	1,520	67	275	902	38	93
21.....	2,810	107	812	1,380	72	268	902	41	100
22.....	2,540	100	686	1,360	58	213	850	44	101
23.....	2,540	88	604	1,430	50	193	889	48	115
24.....	2,670	90	649	1,740	59	277	863	66	154
25.....	2,390	107	690	1,450	67	262	766	52	108
26.....	2,220	75	450	1,590	68	292	889	47	113
27.....	2,040	70	386	1,520	63	259	790	67	143
28.....	1,900	63	323	1,540	60	249	814	58	127
29.....	1,760	49	233	1,450	68	266	802	46	100
30.....	1,610	48	209	1,330	65	233	790	41	87
31.....	1,540	39	162	1,290	49	171	--	--	--
Total.	89,290	--	21,061	45,620	--	7,584	30,475	--	3,731

Total discharge for year (cfs-days) 1,471,453
Total load for year (tons)..... 409,606

s Computed by subdividing day.
a Computed from estimated concentration graph.

DES MOINES RIVER BASIN

EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA

LOCATION.--At gaging station on upstream side of highway bridge, 4.4 miles upstream from mouth and 6.5 miles southeast of Churdan, Greene County.
DRAINAGE AREA.--22.7 square miles.
RECORDS AVAILABLE.--Sediment records: July to September 1952.
EXTREMES, July to September 1952.--Sediment concentrations: Maximum daily, 241 ppm Sept. 4; minimum daily, 35 ppm Aug. 27.
Sediment loads: Maximum daily, 1.7 tons July 25; minimum daily, less than 0.050 ton Sept. 28-30.
REMARKS.--Records of water discharge for July to September 1952 given in WSP 1238.

Suspended sediment, July to September 1952

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	--	--	--	2.9	97	0.8	0.57	54	0.1
2	--	--	--	2.5	112	.8	.50	142	a.2
3	--	--	--	2.5	115	.8	.43	230	.3
4	--	--	--	2.3	138	.9	.36	241	a.2
5	--	--	--	2.2	126	.7	.29	210	a.2
6	--	--	--	1.9	120	.6	.36	191	a.2
7	--	--	--	1.8	120	a.6	.36	178	a.2
8	--	--	--	2.9	118	.9	.36	170	.2
9	--	--	--	2.2	110	a.7	.29	160	a.1
10	--	--	--	1.8	105	.5	.26	152	a.1
11	--	--	--	1.7	108	a.5	.24	147	.1
12	--	--	--	1.6	112	a.5	.24	153	a.1
13	--	--	--	1.4	111	.4	.22	161	a.1
14	--	--	--	1.6	98	.4	.24	167	.1
15	--	--	--	1.3	89	a.3	.19	151	a.1
16	--	--	--	1.2	85	.3	.16	130	a.1
17	--	--	--	1.1	97	a.3	.24	112	.1
18	--	--	--	.98	107	.3	.29	113	a.1
19	--	--	--	.98	93	a.2	.29	117	a.1
20	--	--	--	.98	78	.2	.16	123	a.1
21	--	--	--	.84	66	a.1	.16	128	a.1
22	--	--	--	.77	55	.1	.24	132	a.1
23	6.5	78	1.4	.70	48	a.1	.24	138	a.1
24	6.0	60	1.0	.77	45	a.1	.19	142	.1
25	5.7	110	1.7	.70	41	a.1	.16	143	a.1
26	4.7	104	1.3	.70	37	a.1	.19	145	.1
27	4.5	120	1.5	1.2	35	.1	.14	146	a.1
28	3.8	75	.8	.84	41	.1	.12	145	(t)
29	3.6	103	1.0	1.3	48	.2	.06	135	(t)
30	3.3	122	1.1	.77	54	a.1	.04	120	(t)
31	2.7	114	.8	.57	42	a.1	--	--	--
Total	40.8	--	10.6	45.00	--	11.9	7.59	--	3.6

Total discharge for period July 23 to Sept. 30, 1952 (cfs-days) 93.39
Total load for period July 23 to Sept. 30, 1952 (tons) 26.1

t Less than 0.05 ton.
a Computed from estimated concentration graph.

GALLATIN RIVER BASIN

GALLATIN RIVER AT LOGAN, MONT.

LOCATION.--At gaging station at highway bridge, half a mile west of Logan, Gallatin County, and 5 miles upstream from confluence with Jefferson and Madison Rivers.
DRAINAGE AREA.--1,805 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952 (discontinued).
REMARKS.--Records of dicharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, September 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 20, 1951	749	24	0.04	50	14	10	2.8	193	9	30	4.5	0.1	1.7	0.22	258	0.35		183	10	10	--	383	8.5
Dec. 3	890	19	.04	50	13	12		196	0	34	4.5	.3	2.5	.09	233	.32		180	19	12	0.4	381	7.5
Jan. 28, 1952	a700	21	.04	50	13	11		192	0	35	4.0	.2	3.2	.03	233	.32		178	21	12	.4	374	8.0
Feb. 18	a600	19	.04	52	13	11		201	0	33	4.0	.2	2.3	.05	235	.32		184	19	11	.3	387	7.9
Mar. 3	a650	19	.04	52	14	10		202	0	35	4.0	.2	2.3	.04	241	.33		188	22	10	.3	393	8.0
Apr. 2	960	18	.04	49	14	12		198	0	34	4.5	.3	2.8	.06	242	.33		182	20	12	.4	390	7.7
May 7	4,260	14	.13	31	7.9	5.1		122	0	16	1.5	.2	2.3	.00	155	.21		110	10	9	.2	229	7.8
June 3	4,950	14	.06	30	7.3	5.1		119	0	15	1.0	.1	1.3	.02	138	.19		105	7	9	.2	219	7.6
July 4	1,610	14	.04	40	10	7.8		157	0	22	4.0	.1	1.8	.00	180	.24		142	13	11	.3	301	7.5
Aug. 5	566	21	.04	50	15	14		210	3	29	5.0	.1	1.5	.02	242	.33		186	9	14	.4	393	8.3
Sept. 18	792	20	.05	52	14	16		213	5	30	4.0	.2	2.2	.04	250	.34		188	5	15	.5	398	8.3

a Mean daily discharge.

MISSOURI RIVER MAIN STEM

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 1952.
Sediment records: March 1949 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 78°F July 23; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 582 ppm Apr. 7; minimum daily, 8 ppm Nov. 29, 30.
Sediment loads: Maximum daily, 16,100 tons May 5; minimum daily, not determined.
EXTREMES, 1949-52.--Water temperatures: Maximum, 78°F July 25, 1949, July 31, 1951, July 23, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 670 ppm Mar. 22, 25, 1951; minimum daily, 5 ppm July 12, 1951.
Sediment loads: Maximum daily, 16,100 tons May 5, 1952; minimum daily, 51 tons Feb. 1, 1951.
REMARKS:--Flow affected by ice Nov. 20-24, Dec. 7, 8, Dec. 16 to Jan. 20, Feb. 16-24, Mar. 1-3. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains. Discharge records for gaging station at Toston, Mont., for water year October 1951 to September 1952 given in Water-Supply Paper 1239.

Temperature (°F) of water, water year October 1951 to September 1952
(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	56	32	40			--	43	a 55	61	62	72	a 63
2	54	33	37			--	--	58	62	65	72	a 56
3	a 54	36	35			35	a 40	55	72	68	74	a 58
4	54	38	--			--	--	59	66	--	70	a 60
5	52	39	--			--	51	55	65	66	70	a 60
6	53	36	--			38	a 50	52	65	64	a 66	--
7	56	a 37	--			38	40	55	60	65	a 67	60
8	58	40	--			37	42	a 52	63	65	a 63	65
9	57	40	--			40	47	54	66	75	a 67	66
10	59	42	--			a 35	51	55	61	--	a 66	69
11	55	--	--			--	52	a 56	--	--	a 66	63
12	53	40	--			34	--	a 58	63	--	a 63	57
13	52	39	--			39	62	57	62	--	a 67	57
14	53	38	--			39	48	55	65	70	a 69	58
15	47	37	--			36	48	--	--	a 68	65	68
16	a 45	33	--			40	a 45	--	--	a 69	a 61	63
17	41	32	--			40	a 53	--	59	a 68	a 63	--
18	43	34	--			38	55	a 55	a 61	a 66	a 63	--
19	--	35	--			37	55	--	65	65	a 65	a 59
20	44	34	--			37	45	--	65	65	a 63	61
21	42	33	--			--	48	--	a 65	63	a 70	60
22	43	32	--			39	50	60	a 59	67	a 64	--
23	44	35	--			37	54	58	a 60	78	72	a 53
24	43	35	--			32	58	60	58	72	a 66	a 55
25	55	35	--	32	32	36	59	57	56	73	a 64	a 54
26	40	35	--			41	a 55	60	a 58	70	a 62	a 56
27	43	37	--			44	60	54	a 68	70	a 60	--
28	--	35	--			49	60	64	a 62	71	a 60	a 53
29	40	40	--			43	54	55	68	72	a 61	a 53
30	38	42	--			42	a 57	60	a 62	75	a 55	56
31	33	--	--			42	--	61	--	75	a 55	--
Average	49	36	--			39	51	57	63	69	65	59

a Measurement made between 6 a.m. and 12 m.

MISSOURI RIVER MAIN STEM--Continned

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

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3,820	21	216	4,360	14	165	4,190	12	136
2	3,870	20	209	4,340	18	211	4,310	9	105
3	4,000	22	238	4,340	19	223	4,270	9	104
4	4,010	22	238	4,360	17	200	4,160	14	157
5	4,120	21	234	4,440	16	192	4,090	--	e130
6	4,120	24	267	4,520	14	171	3,850	--	e110
7	4,070	23	253	4,520	12	146	3,700	--	e100
8	3,960	22	235	4,460	17	205	3,500	--	e100
9	4,000	23	248	4,500	13	158	3,180	--	e100
10	4,050	21	230	4,500	15	182	3,160	--	e100
11	4,090	22	243	4,460	--	e200	3,640	--	e120
12	4,050	20	219	4,460	35	421	4,050	--	e150
13	4,010	18	195	4,500	10	122	3,890	--	e130
14	3,980	16	172	4,480	11	133	3,210	--	e110
15	3,980	16	172	4,440	10	120	2,510	--	e100
16	3,520	13	124	4,270	10	115	2,400	--	e100
17	3,780	11	112	3,920	9	95	2,800	--	e110
18	4,000	10	108	3,960	13	139	3,300	--	e130
19	4,120	--	e140	3,760	30	305	3,400	--	e110
20	4,290	16	185	3,700	54	539	2,300	--	e100
21	4,440	18	216	3,800	33	339	2,300	--	e90
22	4,520	21	256	3,900	17	179	2,700	--	e100
23	4,750	25	321	4,000	21	227	3,000	--	e110
24	4,770	23	296	4,000	14	151	3,100	--	e120
25	4,770	27	348	4,050	10	109	3,100	--	e120
26	4,100	19	210	4,120	11	122	3,100	--	e110
27	3,980	17	183	4,120	9	100	3,000	--	e110
28	4,340	--	e200	4,120	11	122	2,900	--	e110
29	4,320	19	222	4,160	8	90	2,800	--	e100
30	4,500	21	255	4,160	8	90	2,800	--	e100
31	4,500	18	219	--	--	--	2,600	--	e100
Total	128,830	--	6,764	126,720	--	5,571	101,510	--	3,472

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,800			4,090			3,600	--	e500
2	2,800			4,180			3,600	--	e500
3	2,800			4,190			3,600	52	505
4	2,800			4,120			3,570	50	482
5	2,800			4,210			3,640	--	e500
6	2,800			4,140			3,620	53	518
7	2,800			4,140			3,640	61	599
8	2,800			4,120		e200	3,660	70	692
9	2,900			4,210			3,670	66	654
10	2,900			4,210			3,780	69	704
11	2,900		e100	4,180			3,760	--	e740
12	2,900			4,090			3,740	77	778
13	2,900			4,180			3,690	62	618
14	2,900			4,030			3,740	68	687
15	2,900			3,920			3,960	85	909
16	2,900			3,900			4,120	85	946
17	2,900			3,800			4,230	115	1,310
18	2,900			3,800			4,460	157	1,890
19	3,000			3,800			4,570	138	1,700
20	3,100			3,800		e150	4,590	77	954
21	3,200		e120	3,700			4,440	--	e920
22	3,200		e130	3,700			4,310	76	884
23	3,200		e150	3,700			4,320	72	840
24	3,400		e500	3,700		e300	4,420	78	931
25	3,670	147	1,460	3,710	32	320	4,650	81	1,020
26	3,690		e500	3,570		e300	4,890	135	1,780
27	3,710			3,570		e300	5,140	353	4,900
28	3,820			3,690		e300	5,240	307	4,340
29	3,850		e150	3,640		e300	5,510	381	5,670
30	4,000			--		--	5,310	187	2,660
31	4,100			--		--	5,240	95	1,340
Total	97,340		5,610	114,090		6,020	130,710	--	41,491

e Estimated.

MISSOURI RIVER MAIN STEM--Continued

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

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	5,310	109	1,560	13,100	223	7,890	17,100	148	6,830
2	5,260	78	1,110	12,900	200	6,970	16,900	145	6,620
3	5,260	75	1,070	13,200	218	7,770	17,200	135	6,270
4	5,440	89	1,310	14,300	302	11,700	17,200	132	6,130
5	6,020	270	4,390	16,200	368	16,100	17,400	133	6,250
6	6,660	361	6,490	16,500	279	12,400	18,000	206	10,000
7	8,220	582	12,900	15,400	207	8,610	19,400	234	12,300
8	7,650	312	6,440	14,900	159	6,400	20,400	247	13,600
9	7,170	153	2,960	14,100	146	5,560	19,800	199	10,600
10	6,740	102	1,860	13,600	139	5,100	18,400	148	7,350
11	6,660	150	2,700	13,300	126	4,520	16,700	136	6,130
12	6,840	--	e 3,100	12,800	122	4,220	14,200	111	4,260
13	6,950	160	3,000	12,600	113	3,840	12,700	103	3,530
14	7,340	179	3,550	12,700	113	3,870	10,600	91	2,600
15	7,760	242	5,070	13,700	--	e 4,500	9,500	80	2,050
16	8,160	259	5,710	14,700	--	e 5,300	8,700	69	1,620
17	8,460	267	6,100	14,900	--	e 6,000	7,540	54	1,100
18	8,730	230	5,420	14,700	149	5,910	7,000	40	756
19	9,590	238	6,160	14,500	--	e 5,400	6,530	30	529
20	10,600	329	9,420	13,800	--	e 5,000	6,070	27	442
21	11,700	349	11,000	14,600	--	e 9,000	5,780	26	406
22	11,000	224	6,650	16,700	302	13,600	5,760	25	389
23	9,300	153	3,840	16,700	270	12,200	5,900	20	319
24	8,460	135	3,080	15,300	193	7,970	5,970	20	322
25	8,700	141	3,310	14,400	158	6,140	6,560	27	478
26	9,430	196	4,990	14,500	143	5,600	8,250	51	1,140
27	10,500	258	7,310	15,000	151	6,120	9,300	60	1,510
28	11,700	272	8,590	15,800	143	6,100	10,400	68	1,910
29	12,900	308	10,700	16,400	143	6,330	10,800	68	1,980
30	13,200	257	9,160	17,000	179	8,220	9,560	51	1,320
31	--	--	--	17,700	164	7,840	--	--	--
Total	251,710	--	158,950	456,000	--	226,180	359,620	--	118,741

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	8,640	41	956	2,720			3,230		
2	8,820	33	786	2,640			3,400		
3	9,030	31	756	2,830			3,490		
4	8,190	27	597	2,960			3,520		
5	7,730	22	459	2,840			3,540		
6	7,140	22	424	2,760	14	104	3,590	16	152
7	6,530	18	317	2,750			3,620		
8	5,760	17	264	2,670			3,620		
9	5,050	18	245	2,670			3,590		
10	4,440	11	132	2,670			3,540		
11	4,180	10	a 110	2,830			3,550		
12	4,550	16	197	2,910			3,550		
13	6,400	27	466	2,970			3,600		
14	6,530	32	564	3,020			3,640		
15	5,760	23	358	3,040			3,740		
16	5,030	19	258	2,890	14	112	3,800	13	130
17	4,360	19	224	2,920			3,850		
18	4,050	14	153	3,050			3,820		
19	4,190	12	136	3,000			3,780		
20	4,420	16	191	2,990			3,710		
21	4,360			2,990			3,710		
22	4,160			2,960			3,690		
23	4,160			2,890			3,710		
24	4,090			2,860			3,670		
25	3,820	14	135	2,810	16	125	3,620	13	127
26	3,400			2,760			3,590		
27	3,280			2,750			3,540		
28	3,180			2,750			3,520		
29	3,050			2,760			3,540		
30	2,910			2,970			3,540		
31	2,800			3,130			--	--	--
Total	160,010	--	9,078	88,760	--	3,535	108,310	--	4,090

Total discharge for year (cfs-days)---------- 2,123,610
Total load for year (tons)---------- 589,502

e Estimated.
a Computed from estimated concentration graph

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

Particle-size analyses of suspended sediment, March 1952 to June 1953

(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	Water 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. 3, 1952	4:25 p.m.	a 3,600	35	96	--	--	--	--	--	--	89	--	--		--		S
Apr. 2	4:05 p.m.	5,260	--	62	408	--	20	--	32	--	50	--	--		--		SPWCM
Apr. 4	11:30 a.m.	5,480	--	65	512	--	26	--	34	--	58	--	--		--		SPWCM
Apr. 6	12:15 p.m.	6,840	50	258	401	19	27	32	47	59	89	75	93		99		BWCM
Apr. 7	11:20 a.m.	8,700	46	619	922	19	32	43	56	69	78	84	96		99		BWCM
Apr. 14	4:00 p.m.	7,680	48	270	2,240	--	56	--	59	--	94	--	--		--		SPWCM
Apr. 29	5:55 p.m.	13,400	54	288	453	32	40	45	56	67	82	93	96		99		BWCM
May 6	7:35 p.m.	16,200	--	229	1,340	--	26	--	44	--	67	83	96		100		SPWCM
May 22	9:55 a.m.	16,700	--	251	3,240	--	28	--	45	--	70	82	96		99		SPWCM
June 3	10:50 a.m.	17,300	61	132	1,150	24	30	34	43	54	64	74	89		96		BWCM
June 19, 1953	8:25 a.m.	20,800	61	125	1,150	21	29	35	46	57	71	84	94		100		BWCM

a Mean daily discharge.

MARIAS RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN THE MARIAS RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
MARIAS RIVER NEAR SHELBY																							
Nov. 6, 1951	1,100			--	--	--		192	0	80	--							194	37	--	--	463	8.0
Jan. 9, 1952	348			--	--	--		234	0	113	--							260	68	--	--	576	7.9
Feb. 13	665			59	26	55		224	0	170	7.0							252	68	32	1.5	688	7.6
Mar. 17	383			--	--	--		248	0	137	--							287	84	--	--	682	7.8
May 9	2,580			37	15	22		147	5	70	1.0							156	27	23	.8	391	8.4
June 17	1,260			34	13	16		134	0	56	2.0							137	27	20	.6	329	7.5
Sept. 9	321			--	--	--		174	--	108	--							198	55	--	--	469	--

MARIAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE MARIAS RIVER BASIN IN MONTANA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
MARIAS RIVER NEAR SHELBY, MONT.			
Oct. 2, 1951	1,750	68	321
Nov. 6	1,060	51	146
Dec. 4	773	27	56
Jan. 9, 1952	348	128	120
Feb. 13	665	42	75
Apr. 3	1,720	370	1,720

MILK RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN THE MILK RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
MILK RIVER BELOW FRESNO DAM																							
Oct. 3, 1951.....	a 94,900			30	11	36		177	4	46	0.5			0.06				121	0	40	1.4	377	8.3
Aug. 29, 1952....	a 49,810			30	13	33		183	0	49	1.0							130	0	36	1.3	372	8.1
MILK RIVER AT NASHUA																							
Jan. 8, 1952.....	b 170			72	34	136		368	0	278	18							321	19	48	3.3	1,120	7.7
Mar. 26.....	b 210			71	33	127		335	0	275	21				724			314	39	47	3.1	1,080	7.8
Sept. 8.....	210			92	49	217		390	0	513	35							431	111	52	4.6	1,560	8.1

a Reservoir storage, in acre-feet.
b Mean daily discharge.

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 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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)	Chlorids (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 (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 5, 1951		14	0.02	32	12	29		136	64	7.5	0.4	1.0		238	0.32		128	16	33	1.1	369	7.5	0.002
Dec. 3																							.000
Jan. 2, 1952																							.000
Feb. 4																							.006
Mar. 4																							.002
Apr. 1																							.001
May 6																							.003
June 2																							.002
July 7																							.002
Aug. 5																							.002
Sept. 2																							.003
Sept. 30																							.003

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 1952.
Water temperatures: December 1950 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 402 ppm Jan. 2; minimum, 108 ppm June 1-24.
Hardness: Maximum, 231 ppm Feb. 4; minimum, 60 ppm May 7.
Specific conductance: Maximum daily, 637 micromhos Feb. 4; minimum daily, 142 micromhos June 11.
Water temperatures: Maximum, 73°F July 31, Aug. 24, 25; minimum, freezing point on many days during November to March.
EXTREMES, 1950-52.--Dissolved solids: Maximum, 868 ppm Feb. 2, 1951; minimum, 96 ppm June 19, 1951.
Hardness: Maximum, 476 ppm Feb. 2, 1951; minimum, 53 ppm June 19, 1951.
Specific conductance: Maximum daily, 1,210 micromhos Feb. 2, 1951; minimum daily, 140 micromhos June 19, 1951.
Water temperatures: Maximum, 75°F July 22, 1951; minimum, 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 1951 to September 1952 given in WSP 1239

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material (c)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-31, 1951	5,098			38	11	26	--	145	72	6.1		1.2	0.15	250	0.34	3,440	140	21	28	1.0	395	7.8	--
Nov. 1-30	4,431			39	12	26	--	150	76	6.7		1.6	.15	256	.35	3,060	148	25	27	.9	407	7.8	--
Nov. 5a	5,170	13	0.02	36	14	30		150	77	6.5	0.2	1.7	--	256	.35	3,570	148	25	31	1.1	404	7.6	0.000
Dec. 1-31	2,948			44	14	30	--	165	87	7.7		2.0	.22	298	.41	2,370	168	33	27	1.0	457	7.7	--
Dec. 3a	3,830			39	13	29		148	79	6.5		--	--	266	.36	2,750	149	28	30	1.0	414	7.8	.000
Jan. 1-31, 1952	2,634			47	13	29	--	162	86	8.0		2.4	.27	294	.40	2,090	170	37	27	1.0	459	8.1	--
Jan. 2a	2,170			55	22	45		189	150	11		--	--	402	.55	2,360	228	73	30	1.3	625	7.4	.046
Feb. 1-29	2,726			46	11	29	--	151	89	8.0		2.0	.23	284	.39	2,090	160	36	28	1.0	446	8.0	--
Feb. 4a	3,100			55	23	44		171	160	15		--	.25	--	--	--	231	91	29	1.3	637	7.2	.016
Mar. 1-31	3,027			43	12	31	--	150	91	8.5		1.5	.23	282	.38	2,300	158	35	29	1.1	448	7.8	--
Mar. 4a	2,300			--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	.002
Apr. 1-20	5,333			37	12	24	--	147	59	8.0		2.5	.17	254	.35	3,660	142	21	27	.9	378	7.9	--
Apr. 1a	3,920			39	12	30		148	76	7.5		--	--	--	--	--	145	24	31	1.1	420	7.6	.002
Apr. 21-26	7,150			34	9.2	18	--	134	46	5.5		2.1	.13	222	.30	4,290	123	13	23	.7	318	8.0	--
Apr. 27-30	14,230			27	6.4	10	--	106	25	3.0		3.0	.10	174	.24	6,690	94	7	18	.4	232	7.9	--
May 1-4	17,930			22	5.4	8.8	--	86	22	3.0		1.7	.10	130	.18	6,290	77	6	19	.4	188	7.3	--
May 5-10	20,030			19	5.0	7.7	--	77	21	2.0		2.1	.06	120	.16	6,490	68	5	18	.4	167	7.4	--
May 7a	20,000			17	4.3	8.3		70	17	2.0		--	--	--	--	--	60	3	23	.5	154	7.5	.002
May 11-21	15,630			21	5.2	11	--	84	28	3.5		1.6	.10	138	.19	5,820	74	5	23	.6	196	7.5	--
May 22-25	25,000			29	7.7	16	--	119	39	3.0		2.4	.08	184	.25	12,420	104	6	24	.7	272	7.6	--

a Not included in weighted average.
c Phenolic material as C_6H_5OH.

May 26-29, 1952..	26,580			24	5.1	9.9	--	94	22	3.0		1.8	0.07	140	0.19	10,050	81	4	20	0.5	202	7.5	--
May 30-31.....	30,350			21	4.5	8.5	--	83	19	2.0		1.8	.04	126	.17	10,330	71	3	20	.4	178	7.7	--
June 1-24	29,650			18	4.1	8.4	--	75	18	2.0		1.9	.10	108	.15	8,650	62	0	22	.5	165	7.4	--
June 2a	29,600			18	4.4	8.7		74	18	2.0		--	--	--	--	--	63	2	23	.5	164	7.3	0.002
June 25-July 22 ...	14,870			22	5.6	14	--	90	32	5.5		1.5	.10	139	.19	5,580	78	4	26	.7	221	7.5	--
July 7a	14,600			20	4.4	12		80	24	3.0		--	--	114	.16	4,490	68	2	28	.6	189	7.5	.002
July 23-31.....	8,301			25	8.1	18	--	105	45	5.5		1.3	.13	169	.23	3,790	96	10	27	.8	275	7.2	--
Aug. 1-31	6,088			31	10	25	--	130	63	6.0		1.4	.15	211	.29	3,470	119	12	30	1.0	341	7.9	--
Aug. 5a	7,760			39	16	34		137	112	7.0		--	--	292	.40	6,120	165	53	31	1.2	466	7.2	.035
Sept. 1-30	3,721			41	13	32	--	161	91	7.5		1.3	.18	285	.39	2,860	156	24	29	1.1	447	8.2	--
Sept. 2a	4,160			38	13	37		153	92	6.5		--	--	--	--	--	149	24	35	1.3	427	7.7	.000
Sept. 30a	2,890			--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	.000
Weighted average [b]	8,135			28	7.5	17	--	108	44	4.6		1.8	0.13	177	0.24	3,890	101	12	26	0.7	272	--	--

a Not included in weighted average.
b Represents 100 per cent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement at approximately 4 p. m./

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

a Includes estimated temperature, 32°F, on missing days.

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 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 5, 1951		13	0.02	41	14	32		156	87	6.5	0.4	2.4		274	0.37		160	32	31	1.1	439	7.6	0.008
Dec. 3																							.005
Jan. 2, 1952																							.000
Feb. 4																							.000
Mar. 4																							.018
Apr. 1																							.007
May 7																							.001
June 2																							.007
July 7																							.004
Aug. 5																							.004
Sept. 2																							.004
Sept. 30																							.003

YELLOWSTONE RIVER BASIN--Continued

NORTH FORK WIND RIVER NEAR DUBOIS, WYO.

LOCATION.--At gaging station, 1¼ 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, May to July 1952.
EXTREMES, May to July 1952.--Sediment concentrations: Maximum daily, 5,500 ppm June 6; minimum daily, not determined.
Sediment loade: Maximum daily, 50,000 tons June 6; minimum daily, not determined.
EXTREMES, 1951, 1952.--Sediment concentrations: Maximum daily, 5,500 ppm June 6, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 50,000 tons June 16, 1951, June 6, 1952; minimum daily, not determined.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, May to July 1952

Day	May			June			July		
	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.....	646	130	230	1,190	240	770	704	320	610
2.....	910	340	840	1,530	1,200	5,000	646	210	370
3.....	1,190	600	1,900	1,640	1,200	5,300	599	120	190
4.....	1,310	600	2,100	1,660	980	s 5,200	684	300	550
5.....	1,000	210	570	2,340	2,900	sa 22,000	694	250	470
6.....	770	100	210	3,220	5,500	sa 50,000	710	190	360
7.....	742			2,550	4,000	28,000	480	55	72
8.....	722			1,880	1,800	s 10,000	488		
9.....	563	66	110	2,090	1,800	s 11,000	546	100	150
10.....	450			1,810	1,400	6,800	580	50	78
11.....	512			1,380	1,200	sa 5,000	572	35	54
12.....	760	150	310	1,440	1,200	s 5,500	618	400	sa 790
13.....	914	220	540	1,250	750	2,500	860	950	sa 2,400
14.....	870	160	380	1,220	800	2,600	704	170	320
15.....	780	80	170	1,200	850	2,800	572	50	77
16.....	554	60	90	800	250	540	580		
17.....	414			800	300	650	512		
18.....	355			909	550	1,300	458		
19.....	381			935	280	710	458		
20.....	538	19	24	860	280	650	420	22	26
21.....	546			790	240	510	381		
22.....	465			628	130	220	362		
23.....	414			546	50	74	355		
24.....	656			529	600	860	374		
25.....	790	80	170	563	940	s 1,600	407		
26.....	914	300	740	563	100	150	362		
27.....	694	350	660	628	280	470	338	19	17
28.....	770	270	560	538	380	550	322		
29.....	1,060	310	890	780	400	b 840	311		
30.....	1,070	240	690	955	430	sb 1,200	285		
31.....	991	290	780	--	--	--	285		
Total.	22,751	--	12,572	37,224	--	172,794	15,667	--	6,907

Total discharge for period May 1 to July 31, 1952 (cfs-days) 75,642
Total load for period May 1 to July 31, 1952 (tons) 192,273

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from 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.--2,320 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1947 to September 1949.
Water temperatures: April 1947 to September 1949.
Sediment records: October 1948 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 3,100 ppm Aug. 4; minimum daily, not determined.
Sediment loads: Maximum daily, 24,000 tons June 7; minimum daily, not determined.
EXTREMES, 1948-52.--Sediment concentrations: Maximum daily 3,100 ppm Aug. 4, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 30,100 tons June 17, 1951; minimum daily, not determined.
REMARKS.--Flow affected by ice Dec. 18 to Mar. 24. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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.....	490	130	sa 200	292			537	--	
2.....	777	200	420	308	--	e 65	473	--	
3.....	1,090	300	sa 950	951	220	sa 660	473	33	
4.....	1,320	370	sa 1,500	2,060	--	e 1,500	461	--	
5.....	1,120	154	466	2,060	190	1,060	455	44	e 65
6.....	1,110	119	357	718	--	e 200	455	--	
7.....	1,040	85	239	544	27		410	55	
8.....	1,020	74	204	544	--		367	--	
9.....	1,000	74	200	565	27		355	--	
10.....	937	64	162	544	--		359	168	
11.....	1,620	610	sa 3,400	544	--		375	--	
12.....	2,690	680	4,940	544	20		455	192	e 190
13.....	2,760	340	2,530	550	--		455	--	
14.....	2,760	260	1,940	537	19	e 30	400	--	
15.....	2,720	200	1,470	558	--		375	--	
16.....	2,740	180	1,330	480	--		385	--	
17.....	2,710	170	1,240	405	--		455	18	
18.....	2,470	160	1,070	390	--		440	--	
19.....	2,470	150	1,000	425	--		440	15	e 20
20.....	2,580	180	1,250	455	--		430	--	
21.....	2,630	110	781	580	24		410	17	
22.....	2,410	130	846	537	--		430	--	
23.....	871	100	235	537	82		440	--	
24.....	673	80	145	504	--		440	37	
25.....	689			498	--		430	--	
26.....	673			492	80	e 140	430	31	e 35
27.....	681	47	84	511	--		440	--	
28.....	649			550	112		450	29	
29.....	665			602	--		450	--	
30.....	633			602	--		440	--	
31.....	495	133	178	--	--	--	430	--	
Total.	46,493	--	27,557	18,887	--	5,260	13,345	--	2,305

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	410	--		480	--		450	--	
2	410	--		480	--		450	--	
3	420	--		480	--		430	--	
4	410	--		470	--		440	--	
5	410	--		500	--		460	20	
6	420	--		480	--		450	--	
7	450	--		470	--		450	--	
8	460	--		460	--		460	--	e 35
9	460	--		460	--		460	--	
10	470	--		470	--		450	--	
11	470	26		470	--		400	--	
12	470	--		470	--		370	38	
13	470	--		470	--		360	--	
14	470	--		470	29		360	--	
15	470	--		450	--	e 40	360	--	
16	480	24	e 30	430	--		370	--	
17	500	--		450	--		380	--	
18	540	--		450	--		390	248	
19	520	--		420	--		380	--	
20	500	--		430	--		370	240	
21	500	--		450	33		350	--	e 210
22	490	--		430	--		330	--	
23	500	16		450	--		320	--	
24	540	--		460	--		330	--	
25	500	--		470	--		329	136	
26	490	--		480	--		320		
27	490	--		480	--		326		
28	500	--		450	--		339		
29	500	--		450	--		347	31	29
30	490	--		--	--	--	363		
31	480	--		--	--	--	351		
Total	14,690	--	930	13,380	--	1,160	11,945	--	2,799

Day	April			May			June		
1	329	13	12	1,660	278	1,250	2,080	232	1,300
2	329			1,820	304	1,490	2,440	510	3,360
3	335			2,350	626	s 4,320	2,820	780	5,940
4	347			3,010	946	s 8,270	2,800	714	5,400
5	335	3	3	3,290	950	8,440	3,220	1,200	sa 11,000
6	351			2,820	495	3,770	4,150	1,700	s 20,200
7	385	54	sa 62	2,400	338	2,180	4,770	1,860	24,000
8	695	374	702	2,180	228	1,340	4,560	1,420	17,500
9	705	282	537	1,900	172	882	4,130	1,290	14,400
10	937	485	1,230	1,520	129	529	3,860	1,230	12,800
11	1,190	460	1,480	1,220	106	349	2,720	992	7,290
12	1,240	216	723	1,220	142	468	2,220	713	4,270
13	1,230	183	608	1,420	189	725	1,980	675	3,610
14	1,250	172	580	1,660	234	1,050	1,440	587	2,280
15	1,300	236	828	1,770	209	999	1,310	678	2,400
16	1,480	422	1,690	1,830	148	731	1,030	321	893
17	1,390	285	1,070	1,340	79	286	558	400	603
18	1,340	455	1,650	948	62	159	513	748	s 1,360
19	1,480	354	1,410	777	51	107	555	470	sa 800
20	1,660	563	2,520	795	63	135	586	280	443
21	1,760	472	2,240	1,110	105	315	637	180	310
22	1,670	745	s 3,680	1,300	101	355	506	180	246
23	1,230	333	1,110	1,130	79	241	392	230	sa 280
24	1,400	290	1,100	979	79	209	254	150	103
25	1,450	338	1,320	1,210	92	301	616	245	s 356
26	1,720	504	2,340	1,540	180	748	755	510	1,040
27	1,980	679	3,630	1,860	316	1,590	595	330	530
28	2,240	880	s 5,770	1,580	229	977	638	180	310
29	2,080	650	3,650	1,730	160	747	520	260	365
30	1,890	384	1,960	2,110	320	1,820	735	243	s 522
31	--	--	--	2,120	281	1,610	--	--	--
Total	35,728	--	41,926	52,599	--	46,393	53,390	--	143,911

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	688	190	353	103	13	3	350		
2.....	521			92			340		
3.....	403			218	210	sa 180	282		
4.....	335	108	130	609	3,100	sa 5,700	246		
5.....	428			542	2,400	3,510	243		
6.....	546			500	220	297	380		
7.....	558			472	116	148	375		
8.....	393			462			385	32	33
9.....	447			494			423		
10.....	429	63	79	506			423		
					63	87			
11.....	476			512			440		
12.....	478			595			524		
13.....	916	280	sa 830	512			462		
14.....	1,190	448	1,440	450			467		
15.....	820	142	314	512			440		
16.....	616			489			385		
17.....	508			434			340		
18.....	417			385	36	39	325		
19.....	382	50	58	315			365		
20.....	330			300			350		
21.....	330			295			370		
22.....	250			278			412	24	26
23.....	179			266			434		
24.....	105			254	28	20	440		
25.....	61			254			445		
26.....	109	33	16	254			434		
27.....	250			254	93	64	434		
28.....	282			390			434		
29.....	256			418			445		
30.....	204			396	42	43	423		
31.....	148			330			--	--	--
Total.	13,055	--	4,569	11,891	--	11,055	11,816	--	878

Total discharge for year (cfs-days).....297,219
Total load for year (tons).....288,743

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, October 1951 to August 1952
(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	Water 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, 1951	3:00 p.m.	1,120		225	628	36	45	51	58	69	76	80	86		90		BWCM
Oct. 11	9:00 a.m.	1,730		628	1,290	19	20	26	32	46	61	76	93		97		BWCM
Oct. 12	9:50 a.m.	2,660		678	1,650	17	21	28	36	50	68	78	90		94		BWCM
Apr. 9, 1952	11:10 a.m.	723		276	567	17	26	33	39	49	58	71	82		88		BWCM
Apr. 24	10:15 a.m.	1,330		222	1,110	12	14	16	21	27	37	46	83		97		BWCM
May 4	6:25 p.m.	3,570		1,560	1,630	13	18	22	30	43	62	77	97		--		BWCM
June 6	9:20 a.m.	3,130		878	2,420	--	19	--	37	--	61	74	91		98	100	SPWCM
June 10	1:50 p.m.	4,020		1,190	1,810	--	9	--	22	--	51	64	79		95		SPWCM
June 13	10:20 a.m.	1,660		344	1,840	21	27	32	41	49	57	63	78		91		BWCM
Aug. 4	9:00 a.m.	554		4,910	5,590	53	71	83	92	94	96	98	99		--		BWCM
Aug. 5	7:40 a.m.	602		3,400	1,920	--	80	94	98	--	--	--	--		--		BWCM

YELLOWSTONE RIVER BASIN--Continued

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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 35,000 tons (estimated) July 13; minimum daily, 0 ton on many days.
EXTREMES, 1950-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 35,000 tons (estimated) July 13, 1952; minimum daily 0 ton on many days each year.
REMARKS.--Maximum observed concentration during water year, 29,700 ppm May 23. Flow affected by ice Nov. 1-5, Nov. 14 to Apr. 8. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October	117.0	232	a 170	5.5	--	0	538	721
November	135.3	268	a 130	4.3	--	--	356	348
December	79.4	157	a 33	1.1	--	(t)	154	168
January	3.8	7.5	a 1	.03	--	(t)	97	102
February	134.7	267	a 23	.8	--	(t)	63	160
March	443.2	879	a 110	3.5	--	(t)	92	86
April	1,254	2,490	a 23,600	787	2,300	38	6,970	12,300
May	4,002	7,940	b 141,000	4,550	e 28,000	608	13,000	29,700
June	1,216	2,410	b 12,500	417	2,030	23	3,810	9,120
July	424.0	841	a 40,600	1,310	e 35,000	0	34,200	9,400
August	0	0	0	0	0	0	--	78
September	4.1	8.1	a 4	0.1	--	0	361	271
Water year 1951-52	7,813.5	15,500	b 218,171	596	e 35,000	0	10,300	29,700

e Estimated.
t Sediment discharge less than 0.50 ton.
a Mostly estimated.
b Includes estimated loads for many days.

YELLOWSTONE RIVER BASIN--Continued

BEAVER CREEK NEAR ARAPAHOE, WYO.--Continued

Particle-size analyses of suspended sediment, May 1951 to June 1952
(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	Water 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	4:12 p.m.	170	--	34,100	8,630	45	56	66	75	82	89	--	--		--		SPWCM
Apr. 9, 1952	5:00 p.m.	57	38	4,800	5,220	--	49	--	67	--	83	--	--		--		SPWCM
May 8	4:00 p.m.	128	64	3,750	5,150	--	42	--	59	--	90	--	--		--		SPWCM
May 22	4:15 p.m.	285	59	20,200	19,100	--	1	--	68	--	82	90	97		100		SPNM
May 22	4:15 p.m.	285	59	20,200	9,360	--	45	--	63	--	81	--	--		--		SPWCM
June 18	3:30 p.m.	16	--	628	907	--	58	--	69	--	85	--	--		--		SPWCM
June 25	10:55 a.m.	18	--	536	1,550	43	49	54	61	66	75	82	97		100		BWCM

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 1¼ 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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 3,650 ppm May 23; minimum daily, not determined.
Sediment loads: Maximum daily, 24,000 tons May 23; minimum daily, not determined.
EXTREMES, 1949-52.--Sediment concentrations: Maximum daily, 3,650 ppm May 23, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 24,000 tons May 23, 1952; minimum daily, not determined.
REMARKS.--Flow affected by ice Dec. 11 to Apr. 3. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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.....	269			290			326		
2.....	277			216			312		
3.....	298	27	23	355	35	a31	290		
4.....	340			390			294		
5.....	360			375			312		
								24	a18
6.....	540	90	131	335			285		
7.....	480	87	113	303			265		
8.....	441	58	69	326	19	a16	228		
9.....	468			326			195		
10.....	474			312			249		
11.....	480	37	48	316			270		
12.....	490			308			300		
13.....	480			298			290		
14.....	460			281	40	a31	270		
15.....	450			273			230		
								30	a20
16.....	430			294			230		
17.....	410			217			235		
18.....	395	13	14	224			230		
19.....	390			281			210		
20.....	410			330			195		
21.....	380			375	22	a19	205		
22.....	350			330			215		
23.....	320			395			200		
24.....	340			316			210		
25.....	355			312			190		
								18	a9
26.....	350	14	13	326	43	a38	175		
27.....	345			335			170		
28.....	320			321			180		
29.....	335			345			200		
30.....	330			316			190		
31.....	321			--	--	--	175		
Total.	12,088	--	911	9,381	--	813	7,326	--	479

a Computed from partly-estimated concentration graph.

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YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	170	--		220	--		220	---	
2	160	--		220	--		210	--	
3	170	--		220	--		200	--	
4	185	--		220	--		200	--	
5	185	58		220	13		205	21	
6	185	--		220	--		210	--	
7	185	--		220	--		210	--	
8	185	--		220	--		215	--	
9	185	--		220	--		220	--	
10	185	--		220	--		220	--	
11	200	38		220	--		230	--	
12	210	--		220	--		235	--	e 20
13	220	--		220	---		240	--	
14	225	--		220	--	e 10	240	--	
15	230	--	e 20	220	--		240	--	
16	240	42		220	--		250	--	
17	215	--		220	--		260	--	
18	190	--		220	--		265	38	
19	215	--		180	--		260	--	
20	220	--		185	--		260	--	
21	210	--		190	16		255	--	
22	180	--		190	--		245	--	
23	180	28		190	--		260	--	
24	220	--		190	--		270	--	
25	220	--		185	--		280		
26	220	--		190	--		285	20	16
27	220	--		220	--		300		
28	220	--		210	--		330		
29	220	--		210	--		400	64	69
30	220	--		--	--	--	385	159	165
31	220	---		--	--	--	330	178	159
Total	6,290	--	620	6,100	--	290	7,930	--	937

Day	April			May			June		
1	330	95	85	1,400	975	3,690	2,930	572	4,530
2	370	79	79	1,590	1,020	4,380	3,390	636	5,820
3	350	170	161	1,790	935	4,520	3,790	654	6,690
4	345	160	149	2,170	1,100	6,440	4,060	582	6,380
5	335	190	172	2,540	980	6,720	4,240	524	6,000
6	330	150	134	2,520	825	5,610	4,880	554	7,300
7	345	240	224	2,560	755	5,220	5,700	601	9,250
8	400	340	367	2,420	590	3,860	6,840	428	7,900
9	400	440	475	2,220	485	2,910	7,180	345	6,690
10	365	640	631	1,950	420	2,210	6,390	323	5,570
11	312	460	388	1,680	375	1,700	5,020	274	4,160
12	303	330	270	1,680	380	1,720	4,440	358	4,330
13	285	280	215	1,770	355	1,700	4,020	322	3,490
14	285	235	181	1,980	390	2,080	3,550	344	3,300
15	298	205	165	2,080	400	2,250	3,250	321	2,820
16	440	260	309	2,460	540	3,590	2,920	263	2,070
17	509	395	543	2,270	740	4,540	2,380	260	1,670
18	405	320	350	1,930	390	2,030	2,060	235	1,310
19	400	240	259	1,810	285	1,390	2,080	230	1,290
20	441	215	256	1,820	300	1,470	2,160	240	1,400
21	503	290	394	1,990	598	3,210	2,080	200	1,120
22	527	405	576	2,210	1,580	s10,300	1,820	160	786
23	480	630	816	2,440	3,650	24,000	1,460	130	512
24	485	860	1,130	2,100	1,280	7,260	1,400	150	567
25	545	740	1,090	2,060	830	4,620	2,030	270	1,480
26	659	590	1,050	2,340	1,600	sb11,000	1,910	200	1,030
27	850	810	1,860	2,450	1,420	9,390	2,240	310	1,870
28	1,000	940	2,540	2,330	760	4,780	2,020	245	1,340
29	1,300	1,100	3,860	2,540	720	4,940	1,690	240	1,100
30	1,520	1,040	4,270	2,880	788	6,130	1,640	160	708
31	--	--	--	2,920	694	5,470	--	--	--
Total	15,117	--	22,999	66,900	--	159,130	100,210	--	102,483

e Estimated.
s Computed by subdividing day.
b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	1,700			338			150		
2.....	1,690			343	32	31	165		
3.....	1,570			395			168		
4.....	1,510	103	449	475	56	72	165		
5.....	1,530			480	102	132	159		
								38	15
6.....	1,610			445			153		
7.....	1,680			430			144		
8.....	1,480			385	51	56	138		
9.....	1,260			370			135		
10.....	1,100	62	198	366			130		
11.....	1,020			395			122		
12.....	1,040			380			118		
13.....	1,420	1,600	sb 6,800	356			115		
14.....	1,500	420	1,700	312			128		
15.....	1,380	160	596	256			130		
								29	10
16.....	1,170	110	347	236			135		
17.....	1,050	72	204	224	40	28	135		
18.....	950			216			130		
19.....	846	54	128	216			132		
20.....	830			224			130		
21.....	802			204			132		
22.....	712	34	62	190			141		
23.....	628			179			144		
24.....	556			172			141		
25.....	505			162			141		
								24	9
26.....	485			156			135		
27.....	455	23	27	150	4	2	128		
28.....	470			150			125		
29.....	430			150			125		
30.....	395			138	30	11	125		
31.....	352			138			--	--	--
Total	32,126	--	14,601	8,631	--	999	4,119	--	340

Total discharge for year (cfs-days) 276,218
Total load for year (tons)..... 304,602

s Computed by subdividing day.
b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, April to June 1952
(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	Water 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. 8, 1952	11:30 a.m.	395		320	539	32	56	68	78	85	88	93	97		98		BWCM
Apr. 24	11:20 a.m.	480		913	2,290	--	70	--	90	--	99	--	--		--		SPWCM
May 19	2:25 p.m.	1,820		264	1,300	30	36	40	49	56	71	81	--		--		BWCM
June 5	2:20 p.m.	4,210		519	1,280	22	27	30	37	51	64	73	--		--		BWCM
June 10	11:10 a.m.	6,210		358	1,950	19	25	29	34	40	50	58	75		89		BWCM
June 11	11:40 a.m.	5,520		288	1,910	21	26	28	34	40	44	51	57		75		BWCM
June 13	11:40 a.m.	3,970		307	1,430	20	27	32	39	47	61	68	86		98		BWCM
June 24	10:50 a.m.	1,290		115	493	--	37	--	51	--	74	--	--		--		SPWCM

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 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,700 tons (estimated) May 23; minimum daily, 0 ton on many days.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 1,700 tons (estimated) May 23, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Maximum observed concentration during water year, 38,400 ppm Aug. 4. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	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	0	0	0	0	0	0	--	--
March	0	0	0	0	0	0	--	--
April	0	0	0	0	0	0	--	--
May	23.2	46	a 4,200	135	e 1,700	0	64,700	4,680
June	.2	.4	10	.3	--	0	18,500	--
July	0	0	0	0	0	0	--	--
August	6.5	13	a 1,600	52	e 1,300	0	87,900	38,400
September	0	0	0	0	0	0	--	--
Water year 1951-52	29.9	59	5,810	16	e 1,700	0	69,400	38,400

e Estimated.
a Mostly estimated.

YELLOWSTONE RIVER BASIN--Continued

MUSKRAT CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1 3/4 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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 350 tons (estimated) June 27; minimum daily, 0 ton on many days.
EXTREMES, 1950-52.--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 concentration during water year, 646 ppm June 27. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs - days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	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	0	0	0	0	0	0	--	--
March	0	0	0	0	0	0	--	--
April	3	6.0	e 300	10	e 200	0	35,700	--
May	12.9	26	e 940	30	e 300	0	27,000	--
June	4.1	8.1	e 350	12	e 350	0	31,600	646
July	0	0	0	0	0	0	--	--
August	0	0	0	0	0	0	--	--
September	0	0	0	0	0	0	--	--
Total for year	20.0	40	e 1,590	4.3	e 350	0	--	646

e Estimated.

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 November 1951 (discontinued).
Water temperatures: October 1950 to September 1951.
Sediment records: October 1949 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 44,000 ppm Oct. 4; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 12,000 tons Oct. 4; minimum daily, 0 ton on many days.
EXTREMES, 1949-52.--Sediment concentrations: Maximum daily, 77,400 ppm Sept. 20, 1950; minimum daily, no flow 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 regional office in Lincoln, Nebr. Flow affected by ice Nov. 1, 3, 4, 6-8, 13-20, Dec. 3-5, Feb. 5-21, Mar. 9-25. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, October to November 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 5-19, 1951	1.88					492		190	0	2,510	57									38	5.1	4,250	7.5
Nov. 4-8.....	1.24					558		197	0	2,630	64									41	5.8	4,550	7.7

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.1	24		0.2			0		0
2	.1	--	(t)	.1	--	(t)	0		0
3	.1	--		.4			.1		
4	48	44,000	sa12,000	1.5	1,550	6	.1	135	(t)
5	5	19,000	256	1.2	900	3	.1		
6	4.7	6,000	76	.7	--	e 2	0		0
7	3.8	3,350	34	.8	--	e 2	0		0
8	2.9	2,200	17	2.0	3,400	18	0		0
9	2.3	1,700	a11	1.1	2,200	7	0		0
10	1.0	1,600		1.2	--	e 7	0		0
11	.9	--	e 4	.6			0		0
12	.9	--		.4			0		0
13	.8	--		.2	--	e 1	0		0
14	.8	--		.2			0		0
15	.8	1,400		.1	--		0		0
16	.8	--	e 3	.1	13		0		0
17	.9	--		.1	--	(t)	0		0
18	1.1	--		.1	--		0		0
19	1.5	900		.1	--		0		0
20	1.3	--	e 4	.1	--		0		0
21	1.3	--		0	--	0	0		0
22	.8	750		0	--	0	0		0
23	.8	--		0	--	0	0		0
24	1.2	--		0	--	0	0		0
25	1.1	--	e 2	0	--	0	0		0
26	1.3	650		0	--	0	0		0
27	1.2	--		0	--	0	0		0
28	1.3	--	e 5	0	--	0	0		0
29	1.5	2,900	12	0	--	0	0		0
30	1.2	--	e 5	0	--	0	0		0
31	1.2	--	e 2	--	--	--	0		0
Total	90.7	--	12,473	11.2	--	51	0		(t)

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1				0	--	0	0	--	0
2				0	--	0	0	--	0
3				0	--	0	0	--	0
4				0	--	0	0	--	0
5				1.0	194	1	0	--	0
6				3.0	430	s 6	0	--	0
7				6.0	225	4	0	--	0
8				4.0	218	2	0	--	0
9				4.8	640	s 13	.3	--	(t)
10				5.0	332	s 6	.4	295	(t)
11				5.5	252	4	5.0	275	s 6
12				1.6	398	2	4.3	688	s 16
13				.7	348	1	3.8	--	e 10
14				.5			4.3	1,260	s 20
15				.4	242	(t)	7.6	1,260	s 34
16				.4			8.8	2,320	s 89
17				.8	240	1	10	2,810	s 97
18				.7	--		9.3	2,870	s 106
19				.7	152		8.3	3,730	s 116
20				.2	--	(t)	7.4	--	e 45
21				.1	--		6.1	867	s 22
22				0	--	0	2.2	421	3
23				0	--	0	6.3	346	a 6
24				0	--	0	6.2	1,800	s 40
25				0	--	0	9.9	2,560	s 102
26				0	--	0	12	4,110	s 218
27				0	--	0	12	4,620	s 220
28				0	--	0	13	5,720	s 317
29				0	--	0	6.3	--	e 60
30				--	--	--	2.6	--	e 40
31				--	--	--	2.0	4,100	s 28
Total	0	--	0	35.4	--	42	148.1	--	1,596

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952--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.....	4.3	4,950	s80	1.5	5,000	a20	0.2	--	e3
2.....	10	--	e270	1.0	3,800	10	0	--	0
3.....	8.7	6,250	s242	.8	2,250	5	0	--	0
4.....	14	8,250	s385	0	--	0	0	--	0
5.....	8.0	8,510	s224	0	--	0	0	--	0
6.....	3.6	8,810	s120	..5	1,200	a2	0	--	0
7.....	2.2	7,800	s50	1.0	4,400	sa33	0	--	0
8.....	3.0	5,980	s57	3.1	10,200	s93	0	--	0
9.....	2.0	5,680	s48	4.8	10,900	141	0	--	0
10.....	.9	6,480	s24	2.7	8,700	63	0	--	0
11.....	.7	5,050	s12	1.4	5,300	20	0	--	0
12.....	.8	5,250	s15	1.0	4,200	11	0	--	0
13.....	.5	6,700	9	.8	3,500	8	0	--	0
14.....	.5	7,290	10	.2	2,700	a1	0	--	0
15.....	4.6	5,020	s98	1.9	4,900	s42	0	--	0
16.....	28	16,200	s1,660	6.0	14,000	227	0	--	0
17.....	7.0	14,000	265	2.9	8,200	64	0	--	0
18.....	3.0	8,060	65	1.9	7,400	a38	0	--	0
19.....	2.7	7,900	58	1.6	7,400	32	0	--	0
20.....	2.5	7,100	48	1.7	8,400	a39	0	--	0
21.....	2.4	8,850	57	10	16,000	sa490	0	--	0
22.....	2.1	6,000	34	14	22,200	839	0	--	0
23.....	1.6	4,500	19	4.8	13,200	171	0	--	0
24.....	1.2	4,800	16	2.8	6,500	49	0	--	0
25.....	1.0	4,350	12	1.7	4,800	22	0	--	0
26.....	.3	1,500	1	4.7	11,000	s200	.7	9,180	s19
27.....	.2	--	(t)	3.2	6,500	56	.4	3,550	s6
28.....	.1	--	(t)	1.6	2,900	13	0	--	0
29.....	3.5	6,880	s89	.9	1,620	4	0	--	0
30.....	3.2	8,300	72	0	--	0	0	--	0
31.....	--	--	--	0	--	0	--	--	--
Total.	122.6	--	4,040	78.5	--	2,693	1.3	--	28

Day	July			August			September		
1.....	0		0	0	--	0			
2.....	0		0	0	--	0			
3.....	0		0	33	23,000	sb11,000			
4.....	0		0	1.0	6,000	sa50			
5.....	0		0	0	--	0			
6.....	0		0	0	--	0			
7.....	0		0	0	--	0			
8.....	0		0	0	--	0			
9.....	0		0	0	--	0			
10.....	0		0	0	--	0			
11.....	0		0	0	--	0			
12.....	.2		e7	0	--	0			
13.....	.5	9,500	13	0	--	0			
14.....	.1		e3	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	0	--	0			
23.....	0		0	0	--	0			
24.....	0		0	0	--	0			
25.....	0		0	0	--	0			
26.....	0		0	0	--	0			
27.....	0		0	0	--	0			
28.....	0		0	0	--	0			
29.....	0		0	0	--	0			
30.....	0		0	0	--	0			
31.....	0		0	0	--	0			
Total.	0.8		23	34.0	--	11,050	0		0

Total discharge for year (cfs-days) 522.9
Total load for year (tons) 31,996

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

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

Particle-size analyses of suspended sediment, April to June 1952
(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	Water 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. 7, 1952	1:25 p.m.	1.3	52	7,180	4,950		33	--	64	--	87	--	--		--	--	SPWCM
May 2.....	12:15 p.m.	1.6		6,600	4,470		68	--	85	--	94	--	--		--	--	SPWCM
May 10.....	8:15 a.m.	4.7		9,960	8,030		--	0	23	75	84	--	--		--	--	SPNM
May 10.....	8:15 a.m.	4.7		9,960	5,140	38	46	58	67	76	87	--	--		--	--	SPWCM
May 15.....	6:40 p.m.	3.8		9,830	6,260		41	--	56	--	76	90	99		100	--	SPWCM
May 22.....	6:40 p.m.	16		23,700	7,180		40	--	57	--	77	88	93		98	100	SPWCM
May 26.....	4:30 p.m.	9.0		20,400	6,710		38	--	55	--	72	80	87		96	99	SPWCM
June 26.....	8:40 a.m.	.9		11,900	9,650		84	--	94	--	95	--	--		--	--	SPWCM

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 November 1951 (discontinued).
Water temperatures: October 1950 to September 1951.
Sediment records: October 1949 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 57,000 ppm May 1; minimum daily, not determined.
Sediment loads: Maximum daily, 38,000 tons Aug. 4; minimum daily, not determined.
EXTREMES, 1949-52.--Specific conductance (1950-51): Maximum daily, 4,720 micromhos Apr. 27, 1951; minimum daily, 1,090 micromhos June 28, 1951.
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 (1949-51), 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. 3, 4, Nov. 11 to Mar. 27. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, October to November 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 5-31, 1951.....	37.9					552		148		1,630	76									62	8.9	3,370	7.7
Nov. 2-30.....	8.17					672		195		1,850	82									66	11	3,810	7.8

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	74	19,400	3,880	3.9	5,700	a 60	30	--	
2	63	13,900	2,360	6.8	5,500	101	32	--	
3	42	16,000	1,800	10	--	e 150	31	564	
4	97	--	e 16,000	9.0	--	e 110	34	--	e 40
5	78	38,000	sb 9,000	7.0	4,300	81	31	236	
6	50	18,800	2,540	6.0	6,300	102	29	--	
7	47	13,200	1,680	7.0	8,000	151	27	318	
8	45	10,300	1,250	7.4	6,700	a 130	26	--	
9	44	10,300	1,220	7.6	7,200	148	26	--	
10	43	11,300	1,310	5.8	--		26	124	e 10
11	42	9,000	1,020	4.0	--	e 90	26	--	
12	41	9,300	1,030	4.2	--		29		
13	40	9,700	a 1,000	4.2	7,300		32		
14	40	9,600	a 1,000	4.2			32		
15	41	10,600	1,170	3.4	4,970	47	30	342	27
16	39	8,800	927	2.9			29		
17	35	9,200	869	2.0	--		28		
18	37	9,000	a 900	2.0	--	e 5	27		
19	37	7,400	739	3.4	322		27		
20	40	7,000	a 760	4.8	--		10		
21	36	7,200	a 700	6.4	622		11	482	16
22	27	9,000	656	8.6	--	e 10	12		
23	34	8,900	a 820	11	703		15		
24	36	8,100	787	10	--		18		
25	31	7,800	a 650	9.4	--		21		
26	30	7,800	632	9.8	204	e 5	20	852	47
27	27	8,000	a 580	10	--		21		
28	27	7,900	a 580	10	196		23		
29	27	7,300	532	25	--	e 30	30	1,380	e 110
30	32	6,700	a 580	35	326		28	--	
31	16	6,000	259	--	--	--	28	--	
Total	1,298	--	57,241	240.8	--	1,679	789	--	1,165

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	28			28			17	--	
2	28			28			17	--	
3	28			26			17	2,000	
4	28			27			18	--	
5	28	1,560	118	26	3,020	215	18	2,180	e 110
6	28			25			19	--	
7	28			25			20	2,180	
8	28			24			22	--	
9	28			24			24	--	
10	26			23			26	3,180	
11	25			23	2,750	169	30	--	e 240
12	23			23			26	3,400	
13	23			22			23	--	
14	23			22			26	3,300	
15	24	2,970	184	21			28	--	e 400
16	25			19			29	--	e 600
17	21			23	--	e 150	28	7,430	s 616
18	20			19			26	--	e 600
19	21			12			23	8,200	s 595
20	22			14	2,350	87	18	--	e 450
21	22			15			17	6,980	s 399
22	22			17	--		17	--	e 400
23	22			18	--		18	--	e 500
24	18			19	--		23	11,000	s 844
25	21			18	1,930	e 100	37	16,100	s 1,810
26	22	3,140	184	17	--		43	16,300	s 2,100
27	22			18	2,100		45	18,200	s 2,330
28	22			19	--		33	16,400	s 1,600
29	22			18	2,440		35	16,000	sa 1,700
30	22			--	--	--	43	--	e 2,000
31	24			--	--	--	39	16,900	s 1,890
Total	744	--	5,110	613	--	4,368	805	--	21,154

e Estimated.
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 RIVERTON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	15,800	1,580	69	57,000	sb 15,000	73	14,000	a 2,800
2.....	36	15,400	1,500	57	41,000	6,540	70	14,000	2,650
3.....	37	17,500	1,750	46	20,000	a 2,500	57	11,300	1,740
4.....	32	19,200	1,660	44	18,000	a 2,100	61	11,500	1,890
5.....	33	19,000	sa 1,800	56	30,000	sb 5,800	57	11,800	1,820
6.....	37	21,000	sa 2,200	127	56,000	b 20,000	65	12,000	2,110
7.....	40	22,000	2,380	121	52,000	17,600	80	11,000	a 2,400
8.....	33	18,000	1,600	102	43,000	sb14,000	87	12,000	a 2,800
9.....	30	13,000	1,050	74	28,500	5,690	94	15,500	3,930
10.....	29	14,900	s 1,270	68	23,000	a 4,200	94	17,500	4,440
11.....	27	15,500	1,130	67	16,000	a 2,900	85	18,100	4,150
12.....	25	12,000	a 810	60	15,200	2,460	91	16,500	4,050
13.....	24	11,000	a 710	47	14,400	1,830	107	17,000	4,910
14.....	22	12,000	713	50	17,000	2,300	123	20,000	a 6,600
15.....	30	13,400	s 1,150	60	16,000	2,590	119	20,000	a 6,400
16.....	62	24,500	4,100	85	17,500	4,020	125	19,700	6,650
17.....	36	19,000	1,850	80	17,000	a 3,700	135	18,100	6,600
18.....	29	14,500	1,140	82	15,000	a 3,300	146	20,000	7,880
19.....	24	11,000	a 710	92	18,000	4,470	127	21,000	7,200
20.....	21	11,000	a 620	93	17,000	4,270	111	20,000	5,990
21.....	21	10,800	612	117	24,000	a 7,600	127	21,000	a 7,200
22.....	24	12,500	810	144	26,900	10,500	135	21,000	a 7,700
23.....	22	9,000	535	97	22,000	5,760	139	21,200	7,960
24.....	21	8,500	482	85	15,600	3,580	178	23,200	11,100
25.....	21	8,100	a 460	76	8,200	1,680	184	23,000	11,400
26.....	20	8,000	a 430	81	16,500	3,610	225	25,000	15,200
27.....	17	8,000	a 370	82	17,000	3,760	230	26,000	16,100
28.....	18	7,800	379	80	15,000	3,240	174	23,000	a 11,000
29.....	48	31,000	sb 6,800	85	17,000	3,900	149	20,000	a 8,000
30.....	80	35,000	b 7,900	73	15,500	3,060	153	19,200	7,930
31.....	--	--	--	80	15,000	a 3,200	--	--	--
Total.	936	--	48,501	2,480	--	175,160	3,601	--	190,600
	July			August			September		
1.....	154	19,100	7,940	195	19,200	10,100	149	16,200	6,520
2.....	142	17,500	6,710	217	--	e 12,000	121	14,700	4,800
3.....	142	19,000	7,280	264	28,000	sb23,000	107	12,900	3,730
4.....	143	19,700	7,610	324	37,000	sb38,000	103	12,500	3,480
5.....	159	20,000	8,590	218	25,100	14,800	98	14,200	3,760
6.....	137	19,000	a 7,000	188	20,700	10,500	113	16,000	a 4,900
7.....	147	18,900	7,500	187	18,700	9,440	111	16,000	a 4,800
8.....	142	18,700	7,170	169	18,500	8,440	123	13,700	4,550
9.....	140	19,000	7,180	172	20,400	9,470	125	9,500	3,210
10.....	155	20,000	8,370	173	19,000	a 8,900	125	15,200	5,130
11.....	146	21,000	8,280	184	19,100	9,490	116	16,300	5,110
12.....	164	26,000	a 12,000	178	18,200	8,750	119	17,700	5,690
13.....	218	26,000	a 15,000	155	18,000	b 7,500	112	18,500	5,590
14.....	191	24,500	12,600	124	17,000	5,690	106	18,300	5,240
15.....	165	21,900	9,760	111	18,100	5,420	106	17,900	5,120
16.....	146	22,000	8,670	134	18,000	a 6,500	109	18,500	5,440
17.....	110	21,500	6,390	139	18,000	a 6,800	151	18,200	7,420
18.....	70	21,700	4,100	137	15,400	5,700	139	16,000	6,000
19.....	79	21,000	a 4,500	149	14,100	5,670	128	15,100	5,220
20.....	103	20,000	a 5,600	146	13,700	5,400	121	15,400	5,030
21.....	118	18,800	5,990	142	13,500	5,180	125	14,600	4,930
22.....	115	17,200	5,340	153	14,200	5,870	135	14,800	5,390
23.....	134	18,200	6,580	155	--	e 6,300	128	13,300	4,600
24.....	137	19,500	7,210	163	--	e 7,000	117	13,700	4,330
25.....	139	19,500	7,320	154	14,600	6,070	106	12,900	3,690
26.....	157	20,000	a 8,500	106	12,200	3,490	112	14,300	4,320
27.....	191	21,000	a 11,000	88	10,200	2,420	124	13,700	4,590
28.....	186	19,500	9,790	93	10,000	a 2,500	124	13,900	4,650
29.....	186	20,300	10,200	97	11,000	2,880	122	12,500	4,120
30.....	179	23,000	11,100	100	11,700	3,160	136	13,000	4,770
31.....	174	19,000	8,930	131	14,000	a 5,000	--	--	--
Total.	4,569	--	254,210	4,946	--	261,440	3,611	--	146,130

Total discharge for year (cfs-days)..... 24,632.8

Total load for year (tons)..... 1,166,758

e Estimated.

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 RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 2, 1951	10:40 a.m.	63	51	12,800	4,190	17	22	26	31	36	47	66	85	94	97		SPWCM
Mar. 27, 1952	1:50 p.m.	63	--	24,500	5,700		24	--	38	--	61	80	95	98	99		SPWCM
Apr. 8	3:00 p.m.	45	48	18,000	4,260		27	--	38	--	63	78	91	99	--		SPWCM
Apr. 17	10:30 a.m.	37	--	18,800	5,450		38	--	55	--	77	87	95	99	--		SPWCM
May 6	1:25 p.m.	125	70	48,600	8,640		36	--	53	--	81	92	98	100	--		SPWCM
June 18	9:00 a.m.	159	--	21,000	6,900		27	--	39	--	62	79	93	99	100		SPWCM
June 24	1:40 p.m.	209	--	22,500	15,100		1	--	39	--	66	82	94	99	100		SPNM
June 24	1:40 p.m.	209	--	22,500	7,500		29	34	41	49	66	--	--	--	--		SPWCM
June 30	1:55 p.m.	159	--	19,200	9,060		28	--	41	--	63	80	94	99	100		SPWCM
July 14	2:10 p.m.	209	--	27,000	18,500		0	--	40	--	65	82	95	100	--		SPNM
July 14	2:10 p.m.	209	--	27,000	10,500		26	--	41	--	65	--	--	--	--		SPWCM
Aug. 6	10:55 a.m.	205	--	20,700	7,430		24	--	34	--	55	77	92	99	100		SPWCM
Aug. 6	12:20 p.m.	201	--	21,200	8,750		23	--	35	--	55	88	92	99	100		SPWCM
Aug. 6	3:00 p.m.	192	--	20,200	--		25	--	40	--	64	80	93	98	99	100	SPWCM
Aug. 6	3:55 p.m.	196	--	21,900	9,630		25	--	40	--	62	79	92	99	100		SPWCM
Aug. 13	5:10 p.m.	153	--	16,100	15,700		24	--	38	--	58	75	91	98	100		SPWCM
Aug. 26	11:45 a.m.	118	--	11,700	5,630		1	--	25	--	45	67	87	97	99		SPNM
Aug. 26	11:45 a.m.	118	--	11,700	5,530		24	--	33	--	50	--	--	--	--		SPWCM
Sept. 22	11:50 a.m.	140	--	12,600	6,890		8	--	30	--	49	70	90	98	100		SPNM
Sept. 22	11:50 a.m.	140	--	12,600	6,370		20	--	30	--	48	--	--	--	--		SPWCM

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1 mile upstream from normal high-water line of Boysen Reservoir and 5 miles west of Shoshoni, Fremont County.
DRAINAGE AREA.--397 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1949 to November 1951
Water temperatures: December 1948 to September 1952.
Sediment records: August 1948 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 75°F June 6; minimum, freezing point on several days during November, December, and March.
Sediment concentrations: Maximum daily, 49,900 ppm May 6; minimum daily, 250 ppm Dec. 20, 27.
Sediment loads: Maximum daily, 55,000 tons Aug. 4; minimum daily, 11 tons Dec. 20.
EXTREMES, 1948-52.--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, Nebr. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, October to November 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 5-31, 1951 ...	67.6					560		191		1,610	72									63	9.1	3,370	7.7
Nov. 2-30.....	36.1					624		265		1,770	70									63	9.6	3,720	7.9

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurements generally made between 7 a. m. and 10 a. m. except October to February measurements made between 6 a. m. and 7 p. m.)

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	153	13,400	5,040	53	3,500	501	56	4,120	s665
2.....	120	15,200	4,920	55	3,530	s504	58	4,940	774
3.....	86	12,400	2,880	71	4,480	s1,030	50	4,100	554
4.....	142	31,000	sa16,000	42	7,500	s876	56	4,680	s772
5.....	120	30,800	s10,400	34	6,330	581	45	4,120	s544
6.....	79	14,800	3,160	37	6,550	654	48	4,600	596
7.....	84	11,600	2,630	38	5,470	561	45	900	109
8.....	81	9,600	2,100	38	5,180	531	41	700	77
9.....	84	8,900	2,020	39	5,480	s633	40	600	65
10.....	79	8,600	1,830	38	6,920	710	40	700	76
11.....	79	7,700	1,640	35	5,690	s568	43	700	81
12.....	77	7,700	1,600	34	6,270	s605	48	1,320	s192
13.....	75	8,100	1,640	30	4,600	373	50	1,590	215
14.....	69	8,600	1,600	28	7,180	s564	44	650	77
15.....	65	8,200	1,440	25	6,500	439	41	600	66
16.....	67	8,200	1,480	19	2,800	144	37	1,000	100
17.....	67	9,000	1,630	15	1,880	s83	38	500	51
18.....	63	10,600	1,800	14	900	34	35	550	52
19.....	65	11,400	2,000	13	858	30	29	450	35
20.....	67	11,000	1,990	20	800	43	17	250	11
21.....	71	10,200	1,960	29	1,300	s110	17	260	12
22.....	71	10,500	2,010	34	2,790-	s268	20	270	15
23.....	71	7,400	1,420	39	2,770	s302	25	300	b20
24.....	71	8,800	1,690	44	2,350	279	31	500	42
25.....	73	6,200	1,220	33	1,350	120	34	380	b35
26.....	65	8,900	1,560	39	2,620	276	32	340	29
27.....	63	8,400	1,430	39	3,280	s400	32	250	22
28.....	63	8,300	1,410	44	1,990	s252	33	270	24
29.....	65	8,600	1,510	59	3,600	s640	38	380	39
30.....	59	8,100	1,290	61	4,650	s888	34	--	e35
31.....	51	6,600	909	--	--	--	30	--	e35
Total.	2,445	--	84,209	1,099	--	12,999	1,187	--	5,420
	January			February			March		
1.....	30	--	e35	37	2,700	270	29	2,100	164
2.....	31	450	38	37	--	e290	30	4,000	324
3.....	32	450	39	35	--	e280	29	3,050	239
4.....	32	330	29	37	3,000	300	32	2,500	216
5.....	32	280	24	35	3,000	284	33	2,300	205
6.....	31	410	b34	35	2,300	217	37	2,500	250
7.....	33	780	69	35	1,500	142	39	2,600	274
8.....	35	1,020	96	37	2,600	260	44	3,800	451
9.....	35	1,080	102	37	3,700	370	51	4,300	592
10.....	34	1,210	111	38	5,000	513	53	3,700	529
11.....	33	1,280	114	35	3,700	350	56	4,200	635
12.....	33	--	e120	37	4,100	410	44	4,200	499
13.....	35	--	e140	39	2,200	232	41	4,000	443
14.....	38	1,550	159	35	4,800	454	51	6,030	s863
15.....	40	1,850	200	33	4,800	428	50	4,920	s692
16.....	41	2,190	242	32	3,380	s265	56	5,350	s873
17.....	35	1,550	146	37	4,930	s513	56	8,350	1,260
18.....	35	1,700	161	32	800	69	53	6,440	s1,030
19.....	37	--	e160	23	850	53	51	8,500	s1,230
20.....	37	--	e160	25	1,200	81	41	6,800	753
21.....	38	1,600	164	28	1,000	76	39	3,950	s435
22.....	33	1,290	115	28	2,100	159	40	1,900	205
23.....	34	1,350	124	30	2,000	162	42	1,970	.s282
24.....	34	1,350	124	33	2,350	209	47	5,980	s832
25.....	37	1,650	165	30	1,800	146	51	9,640	s1,500
26.....	35	--	e160	30	2,100	170	57	12,900	s2,080
27.....	34	--	e150	31	2,400	201	72	15,500	s3,440
28.....	35	2,030	192	32	2,350	203	70	19,000	s4,090
29.....	35	2,400	227	29	2,200	172	73	20,000	sb4,300
30.....	35	2,600	246	--	--	--	59	18,000	b2,900
31.....	35	2,950	279	--	--	--	51	19,500	2,690
Total.	1,074	--	4,125	962	--	7,279	1,477	--	34,276

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	54	19,200	s2,980	55	39,000	sa9,300	158	14,500	6,190
2.....	49	19,300	s2,650	68	38,400	s8,310	141	12,800	4,870
3.....	56	23,200	3,510	44	24,000	b2,900	109	10,200	3,000
4.....	51	18,600	s2,840	50	22,000	b3,000	102	9,500	2,620
5.....	53	22,600	s3,470	56	22,000	3,330	77	9,500	1,980
6.....	59	24,600	s4,160	147	49,900	20,500	105	9,200	2,610
7.....	59	23,100	3,680	206	41,000	23,600	108	11,000	3,210
8.....	53	18,500	2,650	219	36,000	22,100	141	13,500	5,140
9.....	55	19,700	2,930	178	27,000	13,000	170	14,500	6,660
10.....	59	18,500	2,950	141	19,000	b7,200	184	17,000	8,450
11.....	55	15,500	2,300	158	17,000	7,250	196	14,100	7,460
12.....	47	11,800	1,500	147	15,500	6,150	172	15,000	6,970
13.....	41	11,700	1,300	114	13,800	4,250	198	16,000	8,560
14.....	37	10,500	1,050	68	13,000	2,390	256	16,200	11,200
15.....	38	12,300	s1,350	92	14,000	3,480	261	17,300	12,200
16.....	98	26,000	6,880	178	22,000	10,600	264	19,800	14,100
17.....	43	20,600	2,390	144	17,200	6,690	261	20,100	14,200
18.....	35	13,000	1,230	141	17,200	6,550	258	20,900	14,600
19.....	33	10,300	918	161	17,200	7,480	241	21,000	13,700
20.....	29	9,400	736	153	17,000	7,020	212	18,500	10,600
21.....	32	10,100	873	221	21,200	12,700	231	19,300	12,000
22.....	32	10,000	864	275	25,800	19,200	238	20,500	13,200
23.....	28	9,300	703	193	20,000	10,400	254	20,800	14,300
24.....	28	8,500	643	164	16,300	7,220	300	21,000	17,000
25.....	27	8,000	583	141	15,600	5,940	311	22,300	18,700
26.....	26	7,000	491	156	16,000	6,740	380	26,000	26,700
27.....	28	8,200	620	155	16,800	7,030	404	31,000	33,800
28.....	28	7,400	560	158	14,800	6,310	373	24,000	24,200
29.....	48	19,000	sa3,500	164	15,400	6,820	358	20,800	20,100
30.....	96	47,000	sa14,000	164	15,600	6,910	377	20,100	20,500
31.....	--	--	--	178	14,000	6,730	--	--	--
Total.	1,377	--	74,311	4,489	--	271,100	6,840	--	358,820

Day	July			August			September		
1.....	362	18,800	18,400	340	18,700	17,200	254	17,000	11,700
2.....	296	16,000	12,800	381	20,800	21,400	238	14,000	9,000
3.....	258	17,000	11,800	416	21,600	24,300	234	14,700	9,290
4.....	258	17,200	12,000	484	39,000	sa55,000	231	12,000	7,480
5.....	307	18,200	15,100	412	22,500	25,000	212	10,400	5,950
6.....	278	18,000	13,500	389	19,900	20,900	231	11,800	7,360
7.....	272	16,900	12,400	381	17,800	18,300	228	11,000	6,770
8.....	231	18,500	11,500	351	17,300	16,400	234	12,500	7,900
9.....	254	17,000	11,700	332	18,700	16,800	234	12,800	8,090
10.....	296	17,800	14,200	332	19,000	17,000	238	12,200	7,840
11.....	300	18,000	14,600	332	19,200	17,200	231	12,200	7,610
12.....	351	20,300	19,200	318	18,900	16,200	231	13,200	8,230
13.....	428	21,500	24,800	300	17,400	14,400	224	13,000	7,860
14.....	416	22,800	25,600	254	14,000	9,600	218	13,300	7,830
15.....	408	21,000	23,100	244	13,600	8,960	218	14,500	8,530
16.....	369	17,800	17,700	261	15,500	10,900	209	13,200	7,450
17.....	289	16,800	13,100	258	13,500	9,400	258	14,600	10,200
18.....	241	16,000	10,400	254	15,100	10,400	241	13,600	8,850
19.....	244	17,500	11,500	268	15,200	11,000	238	13,100	8,420
20.....	282	16,800	12,800	268	13,900	10,100	241	13,000	8,460
21.....	311	19,000	16,000	251	14,100	9,560	244	13,100	8,630
22.....	296	18,700	14,900	247	12,100	8,070	250	12,400	8,370
23.....	286	18,000	13,900	247	12,600	8,400	244	12,800	8,430
24.....	282	16,500	12,600	254	15,000	10,300	224	12,400	7,500
25.....	264	16,200	11,500	261	15,000	10,600	209	12,600	7,110
26.....	304	18,000	14,800	231	12,100	7,550	218	12,200	7,180
27.....	358	18,700	18,100	202	11,200	6,110	228	13,100	8,060
28.....	355	18,500	17,700	209	11,000	6,210	221	12,300	7,340
29.....	340	19,000	17,400	215	11,200	6,500	218	12,200	7,180
30.....	332	19,500	17,500	202	12,900	7,040	231	13,200	8,230
31.....	325	18,000	15,800	224	13,600	8,230	--	--	--
Total.	9,593	--	476,400	9,118	--	439,030	6,930	--	242,850

Total discharge for year (cfs-days) 46,591
Total load for year (tons) 2,010,819

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 1, 1951	12:20 p. m.	153	--	14,200	11,300	--	19	--	26	--	47	70	90	97	99	--	SPWCM
Oct. 8	10:50 a. m.	77	51	10,400	1;390	--	24	--	37	--	61	82	98	100	--	--	SPWCM
Oct. 15	10:35 a. m.	67	--	9,130	9,380	--	19	--	29	--	54	84	99	100	--	--	SPWCM
Oct. 22	4:20 p. m.	71	46	9,850	9,320	--	16	--	25	--	45	72	93	99	100	--	SPWCM
Nov. 5	11:10 p. m.	37	--	7,350	6,380	--	15	--	22	--	44	80	98	100	--	--	SPWCM
Nov. 13	3:10 p. m.	37	42	7,590	7,530	--	19	--	30	--	51	81	99	100	--	--	SPWCM
Nov. 26	3:35 p. m.	48	34	5,180	2,480	--	10	--	14	--	25	57	97	100	--	--	SPWCM
Dec. 3	3:10 p. m.	58	35	5,970	2,220	--	15	--	21	--	39	82	91	98	99	--	SPWCM
Jan. 11, 1952	1:55 p. m.	33	37	1,410	580	--	37	--	52	--	54	--	--	--	--	--	SPWCM
Feb. 4	2:55 p. m.	38	34	3,660	1,510	--	24	--	35	--	51	72	93	99	--	--	SPWCM
Mar. 17	1:20 p. m.	55	--	9,240	6,960	--	27	--	34	--	60	79	97	100	--	--	SPWCM
Mar. 24	10:40 a. m.	41	--	5,160	4,390	--	31	--	47	--	67	79	97	100	--	--	SPWCM
Apr. 1	3:20 p. m.	65	--	25,800	21,400	--	0	1	29	46	66	89	99	100	--	--	SPNM
Apr. 1	3:20 p. m.	65	--	25,800	6,380	--	23	29	36	47	68	--	--	--	--	--	SPWCM
Apr. 21	2:45 p. m.	34	48	9,940	5,710	--	27	--	42	--	68	88	98	100	--	--	SPWCM
May 6	10:20 a. m.	139	59	47,000	8,130	--	40	--	59	--	84	--	--	--	--	--	SPWCM
May 13	1:15 p. m.	125	--	9,820	6,440	--	1	5	35	41	58	81	97	100	--	--	SPNM
May 13	1:15 p. m.	125	--	9,820	6,490	20	25	30	36	43	59	--	--	--	--	--	SPWCM
June 10	2:30 p. m.	187	--	15,800	9,510	--	1	3	36	44	58	79	95	99	100	--	SPNM
June 10	2:30 p. m.	187	--	15,800	3,110	19	33	32	38	46	57	--	--	--	--	--	SPWCM
June 17	1:05 p. m.	286	--	13,300	4,750	--	28	--	41	--	63	81	94	98	99	--	SPWCM
June 24	12:45 p. m.	344	--	19,800	6,240	--	25	--	38	--	64	82	95	100	--	--	SPWCM
June 26	2:40 p. m.	440	--	23,800	15,600	--	0	--	36	--	63	80	93	99	100	--	SPNM
June 26	2:40 p. m.	440	--	23,800	7,770	--	23	--	35	--	62	--	--	--	--	--	SPWCM
July 1	4:00 p. m.	355	--	16,900	7,420	--	24	--	35	--	56	74	94	100	--	--	SPWCM
July 8	2:10 p. m.	234	--	14,500	6,810	--	28	--	43	--	68	82	95	99	100	--	SPWCM
July 15	1:00 p. m.	448	74	19,200	12,000	--	1	--	38	--	63	79	92	98	100	--	SPNM
July 15	1:00 p. m.	448	74	19,200	6,240	--	26	--	38	--	64	--	--	--	--	--	SPWCM
July 29	2:20 p. m.	347	--	15,600	2,000	--	28	--	39	--	66	81	94	99	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952--Continued
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in dietilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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	
Aug. 4, 1952.....	2:00 p. m.	444	77	24,800	8,150	--	27	--	42	--	64	79	91	99	100	--	SPWCM
Aug. 7.....	3:50 p. m.	389	--	16,200	--	--	22	--	37	--	64	85	96	100	--	--	SPWCM
Aug. 22.....	11:15 a. m.	268	--	10,800	6,390	--	1	--	30	--	54	77	93	99	100	--	SPNM
Aug. 22.....	11:15 a. m.	268	--	10,800	6,280	--	23	--	34	--	56	--	--	--	--	--	SPWCM
Aug. 26.....	5:10 p. m.	238	73	11,600	8,040	--	17	--	25	--	43	67	90	98	100	--	SPWCM
Sept. 3.....	1:00 p. m.	254	--	12,100	--	--	17	--	25	--	45	67	89	99	100	--	SPWCM
Sept. 3.....	3:20 p. m.	251	--	12,000	--	--	19	--	28	--	47	69	91	100	--	--	SPWCM
Sept. 4.....	12:00 m.	234	--	10,600	--	--	22	--	32	--	52	71	92	98	100	--	SPWCM
Sept. 4.....	3:20 p. m.	224	--	12,700	--	--	19	--	28	--	48	64	86	96	98	100	SPWCM
Sept. 15.....	2:20 p. m.	231	--	14,200	9,680	--	1	--	25	--	42	63	86	96	98	99	SPNM
Sept. 15.....	2:20 p. m.	231	--	14,200	9,360	--	18	--	28	--	45	--	--	--	--	--	SPWCM
Sept. 29.....	10:15 a. m.	228	--	11,000	11,500	--	20	--	28	--	50	75	94	100	--	--	SPWCM

Particle-size analyses of bed material, August to September 1952
(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	Water discharge (cfs)	Water temperature (°F)	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
Aug. 13, 1952 ...	6	309								2	6	23	61	80	90	96	S
Sept. 9.....	5	247								1	4	20	46	57	62		S

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, half a mile upstream from normal high-water line of Boysen Reservoir and 1 mile west of Shoshoni, Fremont County.
DRAINAGE AREA.--519 square miles.
RECORDS AVAILABLE.--Water temperatures: March to June 1949.
Sediment records: March 1949 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, not determined; minimum daily, 0 ton on many days.
EXTREMES, 1949-52.--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 concentration during water year, 16,200 ppm May 22. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Monthly and annual summary of water and suspended sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October	10.8	21	e1	0.03		--	34	36
November	7.5	15	e1	.03		--	49	122
December	4.6	9.1	e1	.03		--	81	118
January	1.6	3.2	(t)	.01		0	93	84
February	10.1	20	e3	.1		--	110	136
March	14.0	28	e10	.3		--	265	830
April	36.0	71	e700	23		--	7,200	9,490
May	49.5	98	e1,800	58		--	13,500	16,200
June	18.1	36	e2,000	67		--	39,500	950
July	.5	1.0	(t)	.003		0	74	61
August	0	0	0	0	0	0	--	--
September	2.1	4.2	(t)	.01		0	71	68
Water year 1951-52	154.8	306	e4,500	12		0	--	16,200

e Estimated.
t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.

LOCATION.--At gaging station at Bonneville, Fremont County, 3 miles upstream from normal high-water line of Boysen Reservoir.
DRAINAGE AREA.--790 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: October 1947 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 59,600 ppm July 14; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 19,300 tons June 27; minimum daily, 0 ton on many days.
EXTREMES, 1947-52.--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.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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	0		0						
6	3	56,300	473						
7	0		0						
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	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	3		473	0		0	0		0

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: 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	.2	675	s 2
8				0	--	0	.5	2,000	3
9				0	--	0	3.6	950	9
10				.2	225	(t)	8.5	1,810	s 73
11				1.6	4,660	s 42	6.2	3,660	s 88
12				2.2	5,710	s 51	3.8	5,450	s 71
13				1.2	4,250	s 22	5.3	5,580	s 131
14				.6	1,810	3	5.2	4,080	s 89
15				.5	375	1	6.3	4,910	s 111
16				.9	--	e 5	8.6	5,900	s 218
17				6.8	--	e 100	14	5,610	s 226
18				6.3	--	e 70	9.4	5,040	s 216
19				.4	--	e 1	5.0	650	9
20				0	--	0	4.0	750	8
21				0	--	0	6.0	1,300	s 77
22				0	--	0	6.4	600	s 30
23				0	--	0	7.5	333	s 16
24				0	--	0	13	4,670	s 213
25				0	--	0	13	4,960	s 325
26				0	--	0	15	4,190	s 247
27				0	--	0	11	3,830	s 186
28				0	--	0	19	4,740	s 408
29				0	--	0	15	6,530	s 399
30				--	--	--	18	7,580	s 396
31				--	--	--	14	8,060	s 359
Total	0		0	20.7	--	295	218.5	--	3,910

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	21	9,840	s 745	3.0	1,500	12	0	--	0
2	32	9,980	s 955	1.9	750	4	0	--	0
3	36	9,040	s 965	1.4	600	2	6.9	4,030	s 305
4	27	6,640	s 607	0	--	0	.6	--	e 13
5	42	4,900	556	0	--	0	0	--	0
6	36	7,420	721	0	--	0	0	--	0
7	36	10,400	1,010	0	--	0	0	--	0
8	44	13,400	s 1,690	2.6	--	e 110	0	--	0
9	49	14,100	1,870	34	7,300	670	0	--	0
10	40	11,200	1,210	22	12,200	s 792	0	--	0
11	29	7,900	619	4.6	12,000	149	0	--	0
12	28	7,400	559	.4	6,000	6	0	--	0
13	24	8,200	531	.4	4,600	5	0	--	0
14	21	6,500	369	.5	2,800	4	0	--	0
15	21	7,000	397	.3	1,600	1	0	--	0
16	23	7,200	447	5.4	4,820	s 89	0	--	0
17	19	6,200	318	5.0	5,200	70	0	--	0
18	18	6,200	301	3.5	2,900	27	0	--	0
19	17	4,300	197	2.2	2,400	14	0	--	0
20	19	4,100	210	3.0	5,600	45	0	--	0
21	18	3,800	185	40	9,000	s 920	0	--	0
22	18	4,000	194	60	18,300	2,960	0	--	0
23	11	3,200	95	55	27,900	s 4,380	0	--	0
24	7.5	3,000	61	50	16,200	2,190	.2	3,120	s 8
25	4.4	2,500	30	45	15,500	1,880	0	--	0
26	4.7	2,800	36	25	9,100	614	.5	4,900	s 13
27	4.1	1,250	14	21	17,200	975	99	49,400	s 19,300
28	3.8	2,100	22	14	20,500	775	.4	--	e 16
29	4.8	2,450	32	9.0	10,600	s 272	0	--	0
30	4.7	1,650	21	2.2	3,980	s 32	0	--	0
31	--	--	--	0	--	0	--	--	--
Total	663.0	--	14,967	411.4	--	16,998	107.6	--	19,655

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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			
2.....	0	--	0	0		0			
3.....	0	--	0	23	3,840	s 1,450			
4.....	0	--	0	.8		e 40			
5.....	0	--	0	0		0			
6.....	0	--	0	0		0			
7.....	0	--	0	0		0			
8.....	0	--	0	0		0			
9.....	0	--	0	0		0			
10.....	0	--	0	0		0			
11.....	0	--	0	0		0			
12.....	0	--	0	0		0			
13.....	0	--	0	0		0			
14.....	1.4	59,600	s 518	0		0			
15.....	1.1	50,000	s 319	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	0		0			
23.....	0	--	0	0		0			
24.....	0	--	0	0		0			
25.....	0	--	0	0		0			
26.....	0	--	0	0		0			
27.....	0	--	0	0		0			
28.....	0	--	0	0		0			
29.....	0	--	0	0		0			
30.....	0	--	0	0		0			
31.....	0	--	0	0		0			
Total	2.5	--	837	23.8		1,490	0		0

Total discharge for year (cfs-days) 1,450.5
Total load for year (tons) 58,625

e Estimated.
s Computed by subdividing day.

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Particle-size analyses of suspended sediment, March to June 1952
(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	Water 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, 1952 ..	12:00 m.	16	40	7,850	9,600		29	--	55	--	87						SPWCM
Mar. 25	6:25 p. m.	36	41	14,300	18,900		36	--	69	--	90	97	100				SPWCM
Mar. 26	3:45 a. m.	22	--	2,230	3,020		64	--	77	--	84						SPWCM
Mar. 26	5:15 p. m.	28	--	11,600	16,500		43	--	75	--	92						SPWCM
Apr. 7	10:00 a. m.	34	--	10,800	7,830		40	--	60	--	84						SPWCM
May 16	2:00 p. m.	6.5	53	8,480	8,000		1	2	65	84	92						SPNM
May 16	2:00 p. m.	6.5	53	8,480	7,980		60	--	79	--	92						SPWCM
June 27.....	2:30 p. m.	32	--	44,600	5,590		66	74	82	84	95						SPWCM

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.

LOCATION.--270 feet upstream from Wyoming Canal siphon, three-quarters of a mile downstream from gaging station, 3¾ miles downstream from Sheep Creek, and 9½ miles northeast of Pavillion, Fremont County. Prior to May 1, 1952, samples were taken at gaging station.
DRAINAGE AREA.--257 square miles.
RECORDS AVAILABLE.--Water temperatures: March to July 1949.
Sediment records: March 1949 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.
Sediment loads: Maximum daily, 60,000 tons (estimated) Oct. 4; minimum daily, less than 0.50 ton on many days during December, January, February, and July.
EXTREMES, 1949-52.--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 concentration during water year, 86,800 ppm Apr. 16. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff. Flow affected by ice Nov. 1-4, 6, Nov. 15 to Apr. 10. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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	280	1	1.5	--		6.2	--	
2.....	1.4	310	a 1	1.0	206	e 1	5.4	--	
3.....	46	14,000	sa 9,600	2.8	--		4.8	522	e 6
4.....	202	--	e 60,000	15	--	e 200	3.9	--	
5.....	60	11,000	1,780	9.2	2,130	53	2.6	--	
6.....	20	3,000	a 160	7.4	1,880	a 38	1.4	--	
7.....	10	1,600	a 43	12	2,200	sa 130	.8	298	
8.....	4.2	950	11	11	3,200	a 96	.7	--	
9.....	4.2	780	a 9	10	3,500	94	.8	--	
10.....	3.8	690	7	7.4	--	e 50	.8	178	
11.....	3.4	--		4.2	--	e 20	1.3	--	e 1
12.....	3.1	--		4.6	--	e 25	1.8	--	
13.....	3.0	--		3.8	1,220	13	1.8	--	
14.....	3.0	--		2.6	--	e 5	1.6	154	
15.....	3.0	476	e 4	1.6	--	e 2	1.4	--	
16.....	3.8	--		.6	689		1.2	--	
17.....	3.4	--		.5	--		1.1	123	
18.....	3.4	--		.6	--	e 1	.5	--	
19.....	3.8	584		.8	260		.2	--	
20.....	3.8	--		1.8	--			--	
21.....	3.8	--	e 8	2.5	--			33	
22.....	3.8	866		2.7	--			--	
23.....	5.0	--		2.5	316			--	(t)
24.....	5.0	--		2.2	--	e 2		--	
25.....	5.0	--		2.1	--		.1	--	
26.....	4.2	510		2.2	382			18	
27.....	3.4	--		2.5	--			--	
28.....	3.4	--	e 6	3.2	--			--	
29.....	3.0	860		5.0	--	e 5		--	
30.....	3.0	--		6.8	493		.2	--	
31.....	2.2	--		--	--	--		--	
Total.	428.1	--	71,736	130.1	--	763	39.8	--	42

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1		--			--		4.3	--	
2	0.2	724			--		4.6	--	
3		--		0.4	--	(t)	5.5	185	e 3
4		--			173		7.0	--	
5		--		.6	--		8.6	--	
6	.1	--		1.0	--		9.7	--	
7		--		1.6	--	e 2	11	209	e 6
8		--		2.5	508		13	--	
9		--		7.1	--		11	--	
10		--		7.1	--		6.7	230	
11		--		6.3	336	e 6	6.5	--	
12		--		5.9	--		6.4	--	
13	.2	--		5.6	--		6.5	--	e 5
14		--		5.6	--		6.6	275	
15		---		5.7	246		7.1	--	
16		--	(t)	6.1	--	e 4	7.9	--	
17		--		6.8	--		9.4	441	11
18		--		6.8	--		11	--	e 15
19	.4	--		5.0	196		11	533	16
20		--		4.0	--		7.2	--	
21		133		2.0	172		5.0	509	e 7
22		--		1.4	--	e 1	7.8	--	
23		--		1.3	--		12	--	
24		--		1.5	--		12	448	e 15
25	.3	--		3.0	174		13	--	
26		--		4.5	--		13	620	sb 25
27		--		5.0	--		13	--	e 35
28		100		4.3	--	e 3	16	1,000	sb 61
29		--		4.3	220		16	--	e 60
30	.4	--		--	--	--	9.0	--	e 30
31		--		--	--	--	12	1,600	sb 63
Total	7.9	--	3	106.6	--	77	289.8	--	459

Day	April			May			June		
	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	14	1,800	sa 80	56	12,700	1,920	19	1,520	78
2	16	2,300	sb 150	56	12,600	1,910	17	1,420	65
3	10	3,600	sa 140	53	15,100	2,160	12	1,200	39
4	16	3,600	sb 260	41	14,200	1,570	10	1,480	40
5	18	--	e 400	24	6,900	447	6.8	1,130	21
6	22	--	e 600	20	5,600	302	5.6	2,130	32
7	40	16,000	sb 2,500	14	3,950	149	5.0	1,260	17
8	25	12,000	sa 1,200	12	4,200	136	3.8		
9	20	10,000	sb 700	16	9,600	415	4.2		
10	18	9,500	sa 590	11	5,000	a 150	3.8	1,080	11
11	17	8,900	409	6.2	3,900	65	3.4		
12	18	12,000	a 580	7.4	3,350	67	3.0		
13	14	10,000	a 380	8.6	4,200	98	2.6		
14	10	13,000	351	9.2	4,000	99	2.2		
15	19	15,000	a 770	7.4	2,700	54	2.2		
16	54	65,000	sb 12,000	6.2	3,250	54	1.8		
17	30	29,000	s 2,760	6.8	2,150	39	1.8	700	4
18	17	15,000	688	5.6	1,850	28	2.2		
19	18	11,000	a 540	7.4	2,250	45	2.2		
20	23	12,000	a 740	7.4	1,600	32	2.6		
21	30	12,400	1,000	32	24,100	s 2,480	3.8		
22	25	9,800	a 660	90	42,000	sb 14,000	4.6	660	8
23	20	9,500	513	40	15,200	s 2,040	5.6	770	12
24	20	12,000	a 650	25	4,150	280	8.6	1,000	23
25	55	44,000	sb 7,100	27	3,900	284	11	1,740	52
26	83	47,000	sa 13,000	30	5,500	446	11	1,900	56
27	96	56,000	sa 17,000	32	5,500	475	9.2	2,990	74
28	101	61,000	sa 20,000	30	3,300	267	5.6	2,440	37
29	92	48,000	sb 14,000	25	3,900	263	3.4	1,170	11
30	58	13,000	a 2,000	24	2,600	168	3.0	1,090	9
31	--	--	--	20	1,540	83	--	--	--
Total	999	--	101,761	750.2	--	30,526	177.0	--	665

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

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	3.0			17	10,000	sb3,300	6.2		
2.....	3.4			34	17,000	sb3,600	5.6		
3.....	3.4	708	6	18	14,000	sb890	5.6	680	10
4.....	2.6			59	33,000	sa20,000	5.0		
5.....	2.6	339	2	39	22,000	sb4,400	5.0		
6.....	2.2	480	3	4.2	2,350	27	5.0		
7.....	2.2	714	s5	3.8			4.6		
8.....	2.2	315	2	3.4	610	6	4.6		
9.....	1.4	400	2	3.4			4.2	347	4
10.....	.9	205	(t)	3.8			3.8		
11.....	1.3	1,600	sb24	12	10,000	sb370	3.8		
12.....	1.0	7,700	sb26	4.6	2,700	34	4.6		
13.....	1.4	5,400	20	4.2	1,600	18	4.6		
14.....	.8	2,650	6	4.6	880	11	4.6	952	12
15.....	.7			4.6	590	7	4.6		
16.....	.7			4.6			4.6		
17.....	.6			4.2	276	3	4.2		
18.....	.7	457	1	3.8			4.2		
19.....	.8			3.4			4.2	733	9
20.....	.8			4.2	1,200	sb25	4.2		
21.....	.9			3.8	3,800	39	4.6		
22.....	.7			3.8	790	8	4.6		
23.....	.8			3.4			4.6		
24.....	.8			3.8			4.6		
25.....	.3			3.8	348	4	4.2		
26.....	.1	148	(t)	4.2			4.2	514	6
27.....	.5			8.7	4,100	sb170	4.2		
28.....	.6			12	9,900	sb390	4.6		
29.....	.4			4.2	2,720	31	4.2		
30.....	.6			4.2	740	8	4.2		
31.....	1.4			4.2	520	6	--	--	--
Total.	39.8	--	124	291.9	--	33,386	137.3	--	222

Total discharge for year (cfs-days) 3,397.4
Total load for year (tons) 239,764

s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 7, 1952	3:30 p.m.	55	43	33,200	3,000		24		38		59	72	93		99		SPWCM
Apr. 25	9:55 a.m.	84	47	73,700	5,760		32		49		81						SPWCM
Aug. 29	7:30 p.m.	3.8	--	1,330	1,850		78		92		93						SPWCM

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1½ miles upstream from normal high-water line of Boysen Reservoir and 9 miles northwest of Shoshoni, Fremont County.
DRAINAGE AREA.--340 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: March to July 1949.
Sediment records: March 1949 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 91,000 ppm Oct. 4; minimum daily, no flow on many days during December, January, and February.
Sediment loads: Maximum daily, 94,000 tons Oct. 4; minimum daily, 0 ton on many days during December, January, and February.
EXTREMES, 1949-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 200,000 tons (estimated) July 5, 1950; minimum daily, 0 ton on many days each year.
REMARKS.--Maximum observed concentration during water year, 112,000 ppm Aug. 5. Flow affected by ice Nov. 1, 2, 7-17, Nov. 19 to Dec. 18, Feb. 10 to Mar. 16, Mar. 19. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

	October			November			December		
1	49	7,700	1,020	1.7	630	a 3	1.3	--	e 1
2	80	16,700	3,610	.9	385	1	1.0	--	
3	83	18,000	4,030	1.0	540	a 1	.9	226	
4	260	91,000	sb 94,000	1.0	1,300	a 4	.8	--	
5	95	50,900	s 16,000	4.0	2,000	22	.7	214	
6	31	10,200	854	1.3	1,700	a 6	.6	--	(t)
7	15	5,000	202	1.6	1,190	5	.5	255	
8	9.9	3,500	94	2.4	1,200	a 8	.5	--	
9	9.9	3,500	94	3.3	1,260	11	.6	--	
10	7.0	2,590	49	4.3	1,300	a 15	.8	317	
11	6.0	2,400	a 39	5.0	1,400	a 19	.9	--	e 1
12	5.0	2,400	32	5.6	1,500	a 23	1.0	264	
13	4.0	2,200	a 24	6.0	1,510	24	1.0	--	
14	4.0	1,500	a 16	5.4	520	8	.4	190	
15	3.7	1,050	10	2.1	380	a 2	.1	--	
16	3.5	920	a 9	.8	350	1	.1	--	(t)
17	3.5	1,300	12	.5	--		.1	9	
18	4.3	1,500	a 17	.1	--		.1	--	
19	4.3	1,790	21	.3	50		0	--	0
20	4.7	1,800	a 23	1.3	--	(t)	0	--	0
21	5.3	1,800	a 26	1.3	22		0	--	0
22	4.7	1,550	20	1.1	--		0	--	0
23	4.7	1,300	a 16	1.0	256		0	--	0
24	5.3	1,720	25	1.0	--		0	--	0
25	5.0	1,800	a 24	1.0	--		0	--	0
26	4.7	1,580	20	1.1	234	e 1	0	--	0
27	4.7	1,500	a 19	1.2	--		0	--	0
28	4.7	1,600	a 20	1.3	219		0	--	0
29	5.0	1,620	22	1.4	--		0	--	0
30	3.7	1,800	a 18	1.5	159		0	--	0
31	3.5	1,280	12	--	--	--	0	--	0
Total	734.1	--	120,378	60.5	--	162	11.4	--	10

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

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1				0	--	0	0.3	--	
2				0	--	0	.2	--	
3				0	--	0	.2	140	(t)
4				0	--	0	.5	--	
5				0	--	0	2.6	158	1
6				0	--	0	6.6	--	e 10
7				0	--	0	9.5	1,130	
8				0	--	0	12	--	
9				0	--	0	15	--	
10				.3	--	(t)	11	852	e 30
11				1.8	379		10	--	
12				2.3	--		10	494	
13				2.6	--		10	--	
14				2.3	--		10	--	
15				1.5	224	e 2	10	--	
16				2.2	--		11	--	e 45
17				2.9	--		12	1,760	
18				2.5	--		12	--	
19				1.8	178	1	9.8	1,750	
20				.6	226		4.7	1,600	sa 40
21				.4	205		12	1,600	sb 70
22				.3	--		22	1,800	sa 150
23				.3	--	(t)	21	1,800	sa 130
24				.3	--		14	2,240	s 117
25				.4	187		22	3,880	s 246
26				.6	--		17	5,840	s 330
27				.9	--		13	10,500	s 624
28				1.5	--		17	14,000	sb 830
29				1.5	212	e 1	18	18,000	sa 1,000
30				--	--	--	18	20,000	a 970
31				--	--	--	7.8	15,000	sb 360
Total	0	--	0	27.0	--	21	339.2	--	5,373

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	12	16,000	sb 620	55	21,600	3,210	21	--	e 350
2	15	18,000	sb 840	50	23,800	3,210	19	6,100	313
3	16	21,000	sb 980	40	21,000	a 2,300	19	7,800	400
4	10	20,000	540	36	18,000	a 1,700	12	4,600	149
5	15	20,000	a 810	24	13,400	868	19	8,300	sb 540
6	17	20,000	a 920	15	10,200	413	11	4,200	125
7	23	21,500	1,340	11	8,400	249	14	4,600	a 170
8	41	32,100	3,690	13	10,000	351	14	5,000	a 190
9	23	21,700	1,350	19	14,400	739	21	7,100	403
10	18	20,000	972	33	22,000	sa 2,200	33	11,000	980
11	17	15,900	730	15	16,000	a 650	29	9,000	705
12	16	16,000	a 690	68	27,000	s 5,270	46	13,900	1,730
13	18	17,000	a 830	72	25,000	4,860	26	7,000	491
14	13	16,400	576	50	20,200	2,730	11	5,100	a 150
15	19	19,900	1,020	28	14,000	sb 1,200	19	8,800	sa 610
16	50	41,400	s 6,330	26	10,300	723	46	10,800	1,340
17	49	59,700	8,190	21	10,000	a 570	40	10,900	1,180
18	22	28,100	1,670	18	9,300	a 450	46	11,800	1,470
19	19	19,000	a 970	21	10,000	567	64	14,700	s 2,790
20	19	18,000	a 920	19	6,600	339	52	11,200	1,570
21	24	21,100	1,370	64	37,000	sa 7,600	33	9,300	a 830
22	27	30,600	2,230	134	51,600	s 20,900	40	10,000	a 1,100
23	18	17,800	865	98	58,000	sb 18,000	52	12,200	1,710
24	16	13,800	596	39	16,000	1,680	47	9,800	1,240
25	23	19,900	s 1,480	25	12,000	a 810	52	11,800	1,660
26	73	64,000	sa 14,000	28	10,500	794	83	16,800	3,760
27	93	66,000	sa 19,000	32	10,500	907	108	22,800	6,650
28	98	68,700	s 20,400	28	8,700	658	105	17,000	a 4,800
29	97	70,000	sb 20,000	26	7,800	548	100	16,000	a 4,300
30	62	39,100	s 7,180	23	6,600	410	100	16,300	4,400
31	--	--	--	26	--	e 450	--	--	--
Total	963	--	121,109	1,157	--	85,356	1,282	--	46,106

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

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	112	16,200	4,900	70	8,400	1,590	36	6,630	s707
2	112	15,800	4,780	123	20,000	sa7,600	41	7,860	870
3	99	14,700	3,930	151	19,000	sb9,300	49	6,500	860
4	99	16,900	4,520	211	51,000	sb36,000	61	8,400	1,380
5	99	15,800	4,220	255	85,000	sb77,000	66	9,900	1,760
6	76	13,000	a2,700	163	38,700	17,700	46	8,500	a1,100
7	75	12,100	2,450	146	26,000	10,200	31	5,700	a480
8	75	10,600	2,150	118	24,000	7,650	30	4,400	356
9	60	10,500	1,700	94	17,100	4,340	28	3,700	280
10	49	8,600	1,140	103	16,000	a4,400	31	3,900	326
11	25	6,100	412	112	16,000	4,840	21	3,100	176
12	25	5,000	a340	107	16,100	4,650	18	2,400	117
13	41	7,900	a870	120	17,200	5,570	18	2,400	a120
14	48	9,600	1,240	114	14,500	4,460	20	2,500	a140
15	52	10,800	1,520	120	16,800	5,440	20	2,600	140
16	78	13,100	2,760	121	16,000	a5,200	15	2,710	110
17	93	13,100	3,290	125	15,000	a5,100	13	2,650	93
18	99	13,800	3,690	123	14,200	4,720	12	2,620	85
19	112	15,000	a4,500	114	14,400	4,430	14	2,680	101
20	95	13,000	a3,300	119	15,600	5,010	11	2,400	a71
21	105	12,700	3,600	115	16,000	4,970	6.2	2,000	a33
22	114	12,300	3,790	87	15,200	3,570	8.9	1,740	42
23	108	9,900	2,890	83	14,000	a3,100	8.9	1,630	39
24	101	10,200	2,780	83	13,000	a2,900	8.9	1,620	39
25	99	10,200	2,730	89	11,300	2,720	7.1	1,480	28
26	76	9,900	a2,000	95	12,700	3,260	6.7	1,360	25
27	59	7,300	a1,200	102	14,000	3,860	8.3	1,400	a31
28	47	4,700	596	90	13,000	a3,200	8.9	1,500	a36
29	32	2,800	242	63	10,100	1,720	8.9	1,540	37
30	31	3,200	268	24	4,520	s376	13	1,580	55
31	45	5,540	673	20	3,400	a180	--	--	--
Total	2,341	--	75,181	3,460	--	255,056	666.8	--	9,637

Total discharge for year (cfs days) 11,042.0
Total load for year (tons) 718,389

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

(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	Water 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. 1, 1951	3:55 p.m.	47	--	6,810	4,620	--	17	--	25	--	49	74	96	--	--		SPWCM
Nov. 5	1:00 p.m.	4.7	--	2,300	1,620	--	27	--	38	--	64	88	99	--	--		SPWCM
Mar. 17, 1952	3:35 p.m.	11	--	3,590	5,000	14	19	22	28	35	52	--	--	--	--		BWCM
Mar. 26	11:00 a.m.	17	--	6,650	9,080	17	24	28	39	51	68	78	98	100	--		BWCM
Apr. 8	12:45 p.m.	30	39	27,000	7,880	--	48	--	66	--	81	--	--	--	--		SPWCM
Apr. 17	3:45 p.m.	45	--	61,200	5,270	--	51	--	71	--	85	--	--	--	--		SPWCM
Apr. 28	6:15 p.m.	141	62	93,600	7,940	--	34	--	49	--	81	--	--	--	--		SPWCM
May 6	11:30 a.m.	15	67	9,620	6,440	--	0	4	50	58	73	88	98	100	--		SPNM
May 6	11:30 a.m.	15	67	9,620	3,900	29	41	46	53	50	71	--	--	--	--		SPWCM
May 22	4:50 p.m.	189	--	84,500	7,090	--	23	--	33	--	61	80	95	100	--		SPWCM
June 18	9:35 a.m.	47	--	12,400	3,750	--	26	--	35	--	66	92	99	100	--		SPWCM
June 23	4:45 p.m.	57	--	13,600	7,130	--	17	--	25	--	54	79	95	100	--		SPWCM
July 7	2:35 p.m.	80	--	14,200	6,460	--	15	--	21	--	34	65	91	99	100		SPWCM
July 14	11:20 a.m.	49	--	9,800	6,100	--	17	--	24	--	43	68	91	99	100		SPWCM
July 17	10:00 a.m.	96	--	12,600	8,130	--	17	--	24	--	46	70	93	99	100		SPWCM
July 22	11:30 a.m.	119	67	14,400	7,360	--	12	--	17	--	33	54	85	98	99	100	SPWCM
Aug. 4	4:20 p.m.	149	--	34,400	4,760	--	4	--	40	--	72	90	98	100	--		SPNM
Aug. 4	4:20 p.m.	149	--	34,400	4,380	--	29	--	43	--	70	--	--	--	--		SPWCM
Sept. 5	11:40 a.m.	66	--	10,200	4,260	--	1	--	19	--	34	57	89	99	100		SPNM
Sept. 5	11:40 a.m.	66	--	10,200	4,210	--	18	--	25	--	39	--	--	--	--		SPWCM

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YELLOWSTONE RIVER BASIN--Continued

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.

LOCATION.--At gaging station, 2 miles upstream from normal high-water line of Boysen Reservoir and 13 miles northwest of Bonneville, Fremont County. Prior to May 9, 1952, at site 3 miles downstream.
DRAINAGE AREA.--170 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: March 1949 to September 1949, October 1950 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 44,000 ppm May 22; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 100,000 tons May 22; minimum daily, 0 ton on many days.
EXTREMES, 1949, 1950-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 100,000 tons May 22, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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	14	8,900	sa 4,000						
4	120	30,000	sa 20,000						
5	13	9,800	344						
6	8.0	9,100	197						
7	1.0	3,700	sa 18						
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	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	156.0	--	24,559	0	--	0	0	--	0

s Computed by subdividing day.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: 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

Day	April			May			June		
1	0		0	0	--	0	8.9	3,000	a 72
2	0		0	0	--	0	10	2,400	65
3	0		0	0	--	0	6.0	1,800	29
4	0		0	0	--	0	0	--	0
5	0		0	0	--	0	0	--	0
6	0		0	0	--	0	7.0	2,400	s 57
7	.1		(t)	0	--	0	8.0	2,800	a 60
8	0		0	0	--	0	1.2	1,800	a 6
9	0		0	2.0	14,000	s 154	1.2	1,200	4
10	0		0	4.0	16,000	a 170	.4	1,600	2
11	0		0	5.0	8,500	a 110	6.9	2,500	s 50
12	0		0	5.0	3,200	43	6.3	2,000	34
13	0		0	0	--	0	5.7	2,300	35
14	0		0	4.9	3,400	45	4.5	2,000	a 24
15	0		0	6.9	1,800	34	4.9	2,300	a 30
16	108	21,000	sa 14,000	7.5	1,800	a 36	8.2	2,300	51
17	1.9		e 18	6.9	1,900	a 35	5.7	1,700	26
18	0		0	8.2	2,500	a 55	1.2	500	2
19	0		0	8.2	3,300	73	.2	120	sa 1
20	0		0	9.6	3,400	a 88	2.1	1,600	sa 13
21	0		0	498	42,000	sa 79,000	4.5	1,800	a 22
22	0		0	625	44,000	sb 100,000	2.2	700	a 4
23	0		0	22	9,000	535	8.9	2,400	58
24	0		0	10	2,000	54	12	3,300	107
25	0		0	4.7	1,700	a 22	12	3,100	100
26	0		0	8.2	5,400	sa 420	14	3,800	144
27	0		0	9.9	7,700	s 290	58	13,000	sb 3,200
28	0		0	2.0	400	2	15	3,000	a 120
29	0		0	.3	450	(t)	12	2,000	a 65
30	0		0	0	--	0	11	1,900	56
31	--		--	1.1	900	sa 12	--	--	--
Total	110.0	--	14,018	1,249.4	--	181,178	238.0	--	4,437

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

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	11	2,100	62	4.5	1,900	23	20	3,900	211
2	10	2,000	54	7.0	6,200	a 120	16	4,000	173
3	7.6	2,100	43	14	12,000	sb 530	17	--	e 240
4	2.5	2,100	a 14	8.9	4,000	sb 110	16	5,300	229
5	2.0	2,200	a 12	11	6,800	202	16	4,800	207
6	2.0	2,200	a 12	8.9	3,700	89	14	4,700	a 180
7	2.5	2,100	14	8.2	2,700	a 60	13	4,700	a 160
8	3.0	1,900	15	8.2	2,700	a 60	16	4,500	194
9	2.0	1,800	9	8.2	2,800	a 62	16	4,000	173
10	0	--	0	8.2	2,800	a 62	18	3,600	175
11	1.8	3,400	sa 32	8.9	2,700	65	18	3,300	160
12	9.6	5,300	a 140	7.5	2,200	45	16	2,300	99
13	14	5,100	a 190	7.5	2,600	53	13	2,400	a 84
14	15	4,600	186	11	3,300	sb 110	10	2,100	a 57
15	13	3,600	126	9.6	3,000	78	9.6	1,700	44
16	10	2,900	78	11	2,700	a 80	7.5	1,600	32
17	9.6	2,600	67	13	2,500	a 88	7.5	1,900	38
18	10	2,700	73	11	2,300	68	5.7	2,100	32
19	10	4,000	a 110	11	2,300	68	8.2	1,900	42
20	11	4,400	a 130	13	2,500	88	4.5	2,000	a 24
21	9.3	4,400	110	13	2,500	88	4.0	2,000	a 22
22	3.0	1,500	12	12	2,700	87	4.0	2,000	22
23	.7	1,500	s 7	12	2,700	a 87	2.5	1,900	13
24	2.1	2,200	s 15	14	3,500	a 130	2.5	270	2
25	5.1	3,300	45	13	4,300	151	1.2	270	1
26	4.0	3,100	a 33	8.9	4,500	108	.8	370	1
27	4.5	2,500	a 30	8.9	4,100	99	1.6	--	e 5
28	5.1	2,400	33	13	3,600	a 130	6.9	1,970	37
29	2.9	1,500	s 14	14	3,400	129	8.2	1,900	a 42
30	0	--	0	13	3,400	a 120	7.5	1,900	38
31	3.8	2,000	s 24	20	3,600	a 190	--	--	--
Total	187.1	--	1,690	332.4	--	3,370	301.2	--	2,737

Total discharge for year (cfs days) 2,574.1
Total load for year (tons) 231,989

e Estimated
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly estimated concentration graph.

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.--Continued

Particle-size analyses of suspended sediment, September to June 1952
(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	Water 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.....	12:55 a.m.	230		46,700	8,030		61	--	82	--	92						SPWCM
May 22, 1952	5:50 p.m.	195		29,800	25,400		1	60	67	74	82	92	98		100		SPNM
May 22	5:50 p.m.	195		29,800	6,590	40	52	58	66	72	81						SPWCM
June 23	11:00 a.m.	8.9		2,220	4,650		56	--	92	--	100						SPWCM
June 27	10:50 a.m.	57		15,500	9,150		59	--	78	--	86						SPWCM
June 2, 1949.....	7:30 p.m.	64		26,400	1,120	46	75	81	88	91	94	96	98		99		BW

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.

LOCATION (revised).--At Broadway Street Bridge at Thermopolis, Hot Springs County, just downstream from Thermopolis Creek and about a quarter of a mile upstream from gaging station, which is upstream from principal hot spring inflow.
DRAINAGE AREA.--8,080 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1952.
Water temperatures: April 1947 to September 1952.
Sediment records: March 1946 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 574 ppm Apr. 1-30; minimum, 327 ppm July 1-31.
Hardness: Maximum, 314 ppm Apr. 2; minimum, 164 ppm July 1-31.
Specific conductance: Maximum daily, 997 micromhos Oct. 1, 2; minimum daily, 487 micromhos July 2, 6.
Water temperatures: Maximum, 67°F June 10, Aug. 7; minimum, 34°F Dec. 20, Jan. 6, 7, 10.
Sediment concentrations: Maximum daily, 5,950 ppm Oct. 5; minimum daily, not determined.
Sediment loads: Maximum daily, 32,600 tons Oct. 5; minimum daily, not determined.
EXTREMES, 1946-52.--Dissolved solids (1947-49, January 1951 to September 1952): Maximum, 728 ppm Aug. 1-31, 1948; minimum, 176 ppm July 7-15, 1947.
Hardness (1947-49, January 1951 to September 1952): Maximum, 346 ppm Apr. 1-10, 11-20, 1947; minimum, 104 ppm June 22-24, 1951.
Specific conductance (1947-49, January 1951 to September 1952): Maximum daily, 1,270 micromhos Apr. 26, 1947; minimum daily, 245 micromhos June 10, 1948.
Water temperatures (1947-52).--Maximum, 76°F July 16, 30, 1951; minimum, freezing point on many days during winter months 1947-51.
Sediment concentrations: Maximum daily, 30,800 ppm Sept. 20, 1948; minimum daily, not determined.
Sediment loads: Maximum daily, 330,000 tons Sept. 21, 1950; minimum daily, not determined.
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 Dec. 21 to Jan. 11, Jan. 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-31,1951	649			--	--	60	--	--	--	--			--	554	0.75	971	285	--	31	1.5	791	--	--
Nov. 1-30	446			--	--	43	--	--	--	--			--	404	.55	486	210	--	31	1.3	596	--	--
Nov. 5 a	290	6.4	0.02	55	18	44		153	150	17	0.2	0.5	--	372	.51	291	211	86	31	1.3	581	7.7	0.000
Dec. 1-31.....	515			--	--	58	--	--	--	--			--	476	.65	662	248	--	34	1.6	708	--	--
Dec. 5 a.....	512			59	19	55		167	182	13			--	432	.59	597	225	88	35	1.6	657	7.4	.000
Jan. 1-31, 1952	446			--	--	59	--	--	--	--			--	501	.68	603	262	--	33	1.6	735	--	--
Jan. 8 a.....	480			66	22	61		189	205	13			--	494	.67	640	254	99	34	1.7	730	7.6	.000
Jan. 31 a.....	388			69	23	59		198	203	15			0.09	--	--	--	267	105	32	1.6	761	7.6	.001
Feb. 1-29.....	276			--	--	58	--	--	--	--			--	518	.70	386	282	--	31	1.5	765	--	--
Mar. 1-31	279			--	--	61	--	--	--	--			--	548	.75	399	291	--	31	1.6	804	7.9	--
Mar. 4 a	275			77	24	62		210	219	18			--	--	--	--	290	118	32	1.6	805	7.7	.001
Apr. 1-30.....	437			--	--	69	--	--	--	--			--	574	.78	677	290	--	34	1.8	837	8.1	--
Apr. 2 a.....	285			81	27	74		214	261	20			--	--	--	--	314	139	34	1.8	898	7.6	.002
May 1-31	849			--	--	65	--	--	--	--			--	500	.68	1,150	267	--	35	1.7	728	--	--
May 13 a	880			62	22	65		174	217	13			--	--	--	--	245	102	37	1.8	739	7.5	.001
June 1-30.....	1,225			--	--	45	--	--	--	--			--	373	.51	1,230	185	--	35	1.4	561	--	--
June 10 a	1,490			53	17	54		150	174	11			--	--	--	--	202	79	37	1.7	616	7.5	
June 11 a	3,390			--	--	--	--	--	--	--			--	--	--	--	--	--	--	--	--	--	.002

a Not included in weighted average.
b Represents 100 percent of runoff for water year October 1951 to September 1952.

July 1-31, 1952 .	1,436			--	--	41	--	--	--	--			--	327	0.44	1,270	164	--	35	1.4	505	--	--
July 2 a	1,130			45	13	40		126	133	8.5			--	--	--	--	167	64	34	1.3	502	7.3	0.000
Aug. 1-31.....	1,253			--	--	44	--	--	--	--			0.04	352	.48	1,190	176	--	35	1.4	538	--	--
Aug. 5 a.....	1,340			48	13	44		131	143	8.0			--	342	.47	1,240	172	65	36	1.5	525	7.4	.001
Sept. 1-30	1,141			--	--	47	--	--	--	--			.05	388	.53	1,200	195	--	34	1.5	583	--	--
Sept. 2 a	1,020			49	14	47		137	149	9.5			--	--	--	--	179	67	36	1.5	546	7.4	.000
Sept. 30 a.....	1,030			51	16	54		146	169	9.5			--	--	--	--	192	72	38	1.7	594	7.8	--
Weighted average b.....	747			--	--	51	--	--	--	--			--	423	0.58	853	217	--	34	1.5	630	--	--

a Not included in weighted average.
b Represents 100 percent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement made at 7 a.m. or 8 a.m., except December to May made at 1 p.m./

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

a Observation made at 1 p.m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water October 1951 to September 1952

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.....	950	540	1,390	255			504		
2.....	982	640	1,700	260			512		
3.....	1,230	1,160	3,850	275			512		
4.....	1,800	4,270	20,800	285			512		
5.....	2,030	5,950	32,600	290			512		
					19	18			
6.....	1,800	2,120	10,300	374			504		
7.....	1,720	1,100	5,110	435			504	9	12
8.....	1,600	646	2,790	435			512		
9.....	1,670	573	2,580	442			504		
10.....	1,630	546	2,400	450			504		
11.....	970	326	s1,190	465			495		
12.....	101	64	17	480			504		
13.....	144	39	15	472			504		
14.....	180	28	14	488			504		
15.....	176	23	11	495			529		
					19	25			
16.....	184			495			520		
17.....	188			488			520		
18.....	196			480			520		
19.....	196			488			529		
20.....	204			495			538		
21.....	218			504			520		
22.....	200			504			520	20	28
23.....	200	15	8	495			520		
24.....	232			504			520		
25.....	176			504			520		
					10	14			
26.....	128			504			520		
27.....	168			504			520		
28.....	184			504			520		
29.....	204			504			520		
30.....	209			504			520		
31.....	236			--	--	--	520		
Total.	20,106	--	84,895	13,378	--	570	15,963	--	660

	January			February			March		
1.....	470			374			270		
2.....	480			285			265		
3.....	500	39	52	275			270		
4.....	520			275			275		
5.....	520			275			270		
6.....	520			275	5	4	270		
7.....	520			275			270	5	4
8.....	480	79	106	275			270		
9.....	480			275			275		
10.....	480			275			270		
11.....	480			275			270		
12.....	480			275			270		
13.....	450			290			270		
14.....	458	29	36	280			270	57	42
15.....	442			255	3	2	270		
16.....	435			250			270		
17.....	428			265			270		
18.....	435			275			270		
19.....	435			270			270		
20.....	435	17	20	265	9	7	265		
21.....	442			270			265	8	6
22.....	435			270			265		
23.....	420			270			260		
24.....	407			270			260		
25.....	394			285			260		
26.....	388			270	3	2	270		
27.....	374	6	6	270			270		
28.....	368			270			270	40	29
29.....	374			270			275	250	a190
30.....	381			--	--	--	295	430	a340
31.....	388			--	--	--	290	70	a55
Total.	13,819	--	1,194	8,004	--	105	8,380	--	786

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	280			632			983		
2	285			640			983	119	316
3	280			640			983		
4	280	14	11	640	43	74	992		
5	280			632			983		
6	280			632			992	.95	256
7	290	400	a310	640			1,000		
8	301	450	a370	728	130	sa290	1,010		
9	285	123	95	872	213	502	1,020		
10	280	85	64	864	170	396	1,490	847	s4,890
11	280	71	54	872			3,390	3,360	30,800
12	280	18	14	872			3,440	2,130	19,800
13	285	7	5	880	139	330	1,030	360	1,000
14	465	66	83	880			1,060		
15	458			896			1,070	291	856
16	495			896			1,100		
17	465			896			1,100		
18	465			904	103	251	1,120		
19	520			904			1,100		
20	554			904			1,060	221	639
21	563			965	170	a440	1,060		
22	554	24	36	992	723	1,940	1,060		
23	546			929	410	1,030	1,070	198	572
24	554			912			1,080	177	516
25	563			938	102	258	1,080		
26	625			947			1,090		
27	643			947			1,110	227	670
28	652			938			1,090		
29	652			956			1,090		
30	652			983	134	352	1,100		
31	--	--	--	983			--	--	--
Total	13,112	--	1,637	26,314	--	10,367	36,736	--	70,978

	July			August			September		
1	1,100			1,310	145	513	1,040		
2	1,130			1,250	120	a400	1,020		
3	1,060			1,360	260	a950	1,030		
4	1,060			1,350			1,020	43	120
5	1,060	230	671	1,340			1,030		
6	1,060			1,310	95	336	1,030		
7	1,070			1,290			1,050		
8	1,060			1,260			1,100	70	208
9	1,070			1,240	330	a1,100	1,240	160	a540
10	1,080			1,250	73	246	1,280	92	318
11	1,430	400	a1,500	1,340	410	sa1,700	1,280		
12	1,650	700	3,120	1,320	840	a3,000	1,290		
13	1,660	680	3,050	1,560	854	s4,000	1,300	79	275
14	1,700	710	3,260	1,300	360	1,300	1,290		
15	1,760	740	a3,500	1,300			1,190		
16	1,770	450	a2,200	1,360	185	679	1,060	35	102
17	1,790	490	a2,400	1,390			1,030		
18	1,780	464	2,230	1,380			1,050		
19	1,770	419	2,000	1,360	126	463	1,300		
20	1,740	426	2,000	1,350	110	401	1,310		
21	1,720	343	1,590	1,220	86	283	1,340	68	235
22	1,710	302	1,390	1,210	35	114	1,230		
23	1,610	316	1,370	1,220	85	280	1,290		
24	1,540	237	985	1,200	103	334	1,210		
25	1,520	250	1,030	1,180	78	248	1,050		
26	1,500	161	652	1,140	73	225	1,030		
27	1,470	133	528	1,000			1,030	19	53
28	1,470	167	663	992			1,040		
29	1,450	164	642	1,000	41	112	1,050		
30	1,390	230	863	1,020			1,030		
31	1,340	183	662	1,030			--	--	--
Total	44,520	--	42,345	38,832	--	20,513	34,240	--	5,142

Total discharge for year (cfs-days) 273,404
Total load for year (tons) 239,192

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Particle-size analyses of suspended sediment, October 1951 to June 1952
(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 disperzed)

Date of collection	Time	Water 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, 1951	6:25 p.m.	950	58	584	1,370	55	65	76	86	90	93	98	100		--		BWCM
Apr. 7, 1952	1:15 p.m.	295	54	973	1,380	36	53	80	91	97	98	98	99		100		BWCM
May 22	5:15 p.m.	965	52	1,880	2,730	23	37	52	75	94	95	96	99		100		BWCM
June 11	6:40 p.m.	3,660	--	3,100	2,130	--	1	5	14	25	58	89	99		100		SPNM
June 11	6:40 p.m.	3,660	--	3,100	2,440	9	10	12	14	24	53	--	--		--		SPWCM

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.

LOCATION.--At gaging station, a quarter of a mile north of Pulliam, Washaskie County, and three-quarters of a mile upstream from mouth.
DRAINAGE AREA.--371 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1951 to September 1952.
Sediment records: March 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 52,400 ppm May 22; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 48,400 tons May 22; minimum daily, 0 ton on many days.
EXTREMES, March 1951 to September 1952.--Sediment concentrations: Maximum daily, 52,400 ppm May 22, 1952; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 48,400 tons May 22, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Flow affected by ice Oct. 30 to Nov. 5, Nov. 16-18, Nov. 21 to Mar. 27. Records of discharge for water year October 1951 to September 1952 given in WSP 1239

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 6 p. m. and 9 p. m. No flow on many days/

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

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	--	0	0.1		(t)	0.4		
2	0	--	0	.1		(t)	.4		
3	0	--	0	.1		(t)	.4		
4	0	--	0	.2		(t)	.4		
5	67	7,400	sa3,100	.3			.4		
6	26	10,400	s820	.4			.3		
7	3.3	5,520	s53	.4			.3		
8	1.5	1,630	6	.4			.3		(t)
9	1.1	450	1	.4			.3		
10	1.0	200	b1	.4		(t)	.3		
11	.8	200	(t)	.4			.3		
12	.8	200	(t)	.4			.3		
13	.8	--	(t)	.4			.3		
14	.8	--	(t)	.4			.3		
15	.7			.4			.3		
16	.6			.3			.2		(t)
17	.6			.2			0		0
18	.5			.3			0		0
19	.5			.4			0		0
20	.5	--	(t)	.4			0		0
21	.5			.4			0		0
22	.6			.2			0		0
23	.6			.2		(t)	0		0
24	.7			.2			0		0
25	.7			.2			0		0
26	.5			.3			0		0
27	.4	--	(t)	.4			0		0
28	.4			.4			0		0
29	.4			.4			0		0
30	.3	--	(t)	.4			0		0
31	.2		(t)	--		--	0		0
Total	111.8	--	3,987	9.5		4	5.2		2

Day	January			February			March		
				Mean discharge (cfs)		Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: 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	.2	--	(t)
8				0		0	.5	--	e1
9				0		0	.7	--	e1
10				0		0	1	--	e1
11				.5			2	--	e2
12				1			1	--	e1
13				2			.5	--	e1
14				2		e1	.3	--	e1
15				1			1	--	e1
16				.5			2	--	e2
17				0		0	3	--	e4
18				0		0	4	--	e4
19				0		0	5	--	e4
20				0		0	3	190	2
21				0		0	2	200	1
22				0		0	.8	320	1
23				0		0	.5	350	1
24				0		0	.5	1,300	2
25				0		0	1	1,550	4
26				0		0	2	780	4
27				0		0	5	2,100	28
28				0		0	9.6	3,420	89
29				0		0	12	--	e150
30				--		--	13	--	e200
31				--		--	6.6	2,090	s44
Total	0	0	0	7.0		6	77.2	--	549

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

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	3.6	1,070	10	72	10,500	2,040	113	6,900	2,110
2.....	3.1	1,420	12	59	23,000	a3,700	99	6,450	1,720
3.....	2.9	1,420	11	58	21,200	s3,550	82	3,600	a800
4.....	2.2	1,200	7	82	20,500	4,540	57	4,300	b660
5.....	2.4	850	5	73	18,600	s4,300	21	3,080	175
6.....	2.0	530	3	40	6,670	s807	11	3,100	b90
7.....	1.4	470	2	11	3,100	92	6.9	1,750	33
8.....	14	9,240	s551	9.6	2,420	63	5.6	730	11
9.....	54	15,300	s2,510	18	2,920	142	5.3	1,470	21
10.....	6.6	3,800	68	11	2,700	80	3.6	600	6
11.....	3.1	2,000	17	4.6	1,720	21	3.1	600	5
12.....	.8	810	2	2.2	750	4	1.2	850	3
13.....	2.6	300	2	1.5	310	1	1.0	175	1
14.....	.7	150	(t)	1.4	320	1	.5	150	(t)
15.....	3.0	920	s18	2.7	1,000	sa25	.3	--	(t)
16.....	63	17,500	s4,050	21	3,000	170	.2	--	(t)
17.....	86	27,100	s6,970	11	1,780	53	.1	--	(t)
18.....	12	6,320	s280	5.6	1,480	22	0	--	0
19.....	5.3	4,080	s74	6.9	2,220	41	0	--	0
20.....	10	8,200	sa410	7.2	2,100	41	0	--	0
21.....	49	18,100	2,390	56	13,800	s3,050	0	--	0
22.....	46	10,600	s1,700	330	52,400	48,400	0	--	0
23.....	16	2,980	s170	243	44,900	30,600	0	--	0
24.....	4.8	3,090	s141	152	17,100	7,020	0	--	0
25.....	82	26,100	s7,730	137	13,300	4,920	1	--	e1
26.....	110	44,700	s14,600	169	21,400	9,760	2	--	e2
27.....	146	43,600	17,800	231	33,400	21,600	1	--	e1
28.....	131	42,500	15,600	157	19,200	8,140	.5	--	e1
29.....	123	28,000	sa10,000	144	13,000	5,050	0	--	0
30.....	127	27,000	b9,300	144	11,800	4,590	0	--	0
31.....	--	--	--	135	9,000	b3,300	--	--	--
Total.	1,113.5	--	94,433.	2,395.7	--	166,123	415.3	--	5,641

Day	July			August			September		
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.....	0		0						
11.....	0		0						
12.....	.5								
13.....	1		e1						
14.....	.5								
15.....	0		0						
16.....	0		0						
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.	2.0		3	0		0	0		0

Total discharge for year (cfs-days) 4,137.2
Total load for year (tons) 270,748

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.

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Particle-size analyses of suspended sediment, March to June 1952
(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	Water 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. 28, 1952...	10:45 a.m.	8.6	--	3,300	1,390	--	17	--	28	--	54	70	98		100		SPWCM
Mar. 28	11:50 a.m.	8.2	--	3,170	1,300	--	21	--	34	--	55	70	94		100		SPWCM
Apr. 8.....	5:10 p.m.	19	42	14,400	18,400	--	55	--	85	--	92	--	--		--		SPWCM
Apr. 9....	3:40 p.m.	41	--	13,200	8,330	--	44	--	64	--	80	86	90		100		SPWCM
Apr. 9.....	5:05 p.m.	36	--	10,600	7,800	--	51	--	73	--	88	---	--		--		SPWCM
Apr. 10.....	11:35 a.m.	7.2	--	4,080	6,020	--	62	--	83	--	93	--	--		--		SPWCM
Apr. 16.....	9:20 a.m.	47	--	11,800	7,390	--	34	--	57	--	81	91	98		100		SPWCM
Apr. 22	11:20 a.m.	44	49	10,800	7,090	--	42	--	62	--	79	--	--		--		SPWCM
Apr. 29	3:30 p.m.	89	--	21,100	15,800	1	1	9	54	63	77	96	99		100		SPNM
Apr. 29.....	3:30 p.m.	89	--	21,100	3,620	27	33	41	49	60	76	--	--		--		SPWCM
May 5	11:55 a.m.	67	--	15,900	6,390	--	35	--	53	--	78	92	99		100		SPWCM
May 16	1:45 p.m.	24	--	3,250	1,910	--	25	--	37	--	68	90	100		--		SPWCM
May 21	10:55 a.m.	69	--	34,600	9,750	--	24	--	38	--	70	88	99		100		SPWCM
May 22	4:10 p.m.	246	52	55,200	6,240	--	18	--	28	--	52	75	96		100		SPWCM
May 23	10:30 a.m.	273	--	53,000	3,300	--	22	--	33	--	62	80	97		100		SPWCM
June 2	12:30 p.m.	97	--	8,940	4,630	2	2	11	23	31	46	70	95		100		SPNM
June 2	12:30 p.m.	97	--	8,940	4,640	12	16	20	25	32	47	--	--		--		SPWCM

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.

LOCATION.--At gaging station, 1 3/4 miles upstream from mouth and 2 3/4 miles west of Worland, Washakie County.
DRAINAGE AREA.-- 500 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: March 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 125,000 ppm Apr. 16; minimum daily no flow on many days.
Sediment loads: Maximum daily, 418,000 tons May 22; minimum daily, 0 ton on many days.
EXTREMES, March 1951 to September 1952.--Sediment concentrations: Maximum daily, 125,000 ppm Apr. 16, 1952; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 418,000 tons May 22, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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.....	522	75,800	s147,000						
6.....	42	53,600	s6,950						
7.....	5.5	39,000	601						
8.....	1.4	29,500	112						
9.....	.4	24,000	a25						
10.....	.1	22,000	a6						
11.....	0	--	0						
12.....	0	--	0						
13.....	0	--	0						
14.....	0	--	0						
15.....	0	--	0						
16.....	0	--	0						
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.	571.4	--	154,694	0		0	0		0

s Computed by subdividing day.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: 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

Day	April			May			June		
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	0	--	0
7.....	0	--	0	0	--	0	0	--	0
8.....	0	--	0	0	--	0	0	--	0
9.....	0	--	0	13	44,900	s 2,370	0	--	0
10.....	0	--	0	7.0	45,800	898	0	--	0
11.....	0	--	0	2.2	26,900	s 172	0	--	0
12.....	0	--	0	.6	16,000	a 25	0	--	0
13.....	0	--	0	0	--	0	0	--	0
14.....	0	--	0	0	--	0	0	--	0
15.....	0	--	0	0	--	0	0	--	0
16.....	768	125,000	278,000	141	53,500	s 38,100	0	--	0
17.....	168	72,800	s 42,000	15	39,700	1,670	0	--	0
18.....	17	51,100	2,430	5.0	40,200	563	0	--	0
19.....	5.5	41,000	631	2.2	26,300	s 175	0	--	0
20.....	1.9	28,000	a 140	1.7	9,100	s 72	0	--	0
21.....	.6	16,000	26	657	78,200	s 165,000	0	--	0
22.....	0	--	0	1,980	79,700	s 418,000	0	--	0
23.....	0	--	0	117	49,500	s 18,400	0	--	0
24.....	0	--	0	15	32,100	1,350	0	--	0
25.....	0	--	0	5.5	17,500	a 260	30	31,300	s 3,990
26.....	0	--	0	92	26,000	sa 27,000	15	34,800	1,460
27.....	0	--	0	99	57,200	s 18,400	19	31,600	s 2,020
28.....	0	--	0	10	30,700	829	7.0	19,600	s 458
29.....	0	--	0	2.5	16,600	s 150	.4	12,000	a 15
30.....	0	--	0	.6	5,200	a 8	0	--	0
31.....	--	--	--	.2	4,000	a 2	--	--	--
Total.	961.0	--	323,227	3,166.5	--	693,444	71.4	--	7,943

s Computed by subdividing day.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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			
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	27	33,000	s 4,910			
12	28	23,400	s 5,230	21	37,500	2,210			
13	57	36,800	5,870	11	32,000	a 990			
14	26	28,200	1,980	.5	15,000	sa 40			
15	6.5	18,000	316	0	--	0			
16	.6	11,000	a 18	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	0	--	0			
23	0	--	0	0	--	0			
24	0	--	0	0	--	0			
25	0	--	0	0	--	0			
26	0	--	0	0	--	0			
27	0	--	0	0	--	0			
28	0	--	0	0	--	0			
29	0	--	0	0	--	0			
30	0	--	0	0	--	0			
31	0	--	0	0	--	0			
Total	118.1	--	13,414	59.5	--	8,150	0		0

Total discharge for year (cfs-days) 4,947.9
Total load for year (tons) 1,200,872

s Computed by subdividing day.
a Computed from estimated concentration graph.

FIFTEENMILE CREEK NEAR WORLAND, WYO.

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 17, 1952	5:55 a.m.	257		86,000	10,200		53		73		93						SPWCM
Apr. 17	9:45 a.m.	132		72,800	5,900		61		77		96						SPWCM
Apr. 17	2:35 p.m.	68		63,500	6,900	57	65	83	92	96	98						SPWCM
May 9	8:05 a.m.	32		82,200	9,090		79		99		100						SPWCM
May 11	5:00 p.m.	1.9		23,000	4,730		96		99		100						SPWCM
May 16	10:35 a.m.	268		79,900	7,820		50		72		93						SPWCM
May 17	8:55 a.m.	14		40,000	4,480		87		99		100						SPWCM
June 25	4:40 p.m.	94		46,400	9,040		64		87		97						SPWCM
July 13	9:40 a.m.	127		43,200	8,000		66		90		97						SPWCM
Aug. 11	2:00 p.m.	79		71,000	3,000		54		90		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, 1¼ miles downstream from Fivemile Creek, and 6 miles southeast of Manderson, Big Horn County.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1952.
Water temperatures: August 1949 to September 1952.
Sediment records: April 1949 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 82°F on several days during July and August; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 47,600 ppm May 22; minimum daily, 10 ppm Mar. 2.
Sediment loads: Maximum daily, 614,000 tons May 22; minimum daily, 9 tons Mar. 2.
EXTREMES, 1949-52.--Water temperatures: Maximum, 82°F on several days during summer months; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 47,600 ppm May 22, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 614,000 tons May 22, 1952; minimum daily, not determined.
REMARKS.--Flow affected by ice Dec. 15 to Jan. 31. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 8, 1951	535	9.3	0.02	94	32	124		231	383	34	0.4	0.8		814	1.11		368	179	42	2.8	1,160	7.4	0.000
Jan. 3, 1952	a370			101	31	114		256	358	31				790	1.07		378	216	40	2.5	1,140	7.7	.000
Feb. 1	518			85	32	99		210	330	31			0.14	--	--		343	171	39	2.3	1,070	7.5	.001
Mar. 3	327			101	39	126		246	410	40				--	--		412	210	40	2.7	1,280	7.8	.001
Apr. 1	450			128	41	147		243	540	33				--	--		487	288	40	2.9	1,460	7.7	.000
May 20	253			99	32	150		244	435	36				--	--		378	178	46	3.3	1,300	7.6	.002
June 17	434			70	24	93		187	277	23				--	--		272	119	43	2.5	898	7.7	.001
July 15	1,190			63	19	82		169	240	18				536	.73		235	96	43	2.3	793	7.6	.001
Aug. 5	730			68	20	89		182	258	20				572	.78		251	102	44	2.5	846	7.7	--
Sept. 2	596			76	23	103		204	296	24				--	--		286	119	44	2.6	948	7.9	.000
Sept. 30	806			72	22	93		196	272	21				--	--		271	110	43	2.5	880	7.5	--

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
[Twice-daily temperature measurements between 8 a. m. and 9 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	50	58	--	a32		a41			--	a36	--	40	39	50	--	69	67	70	69	77	74	82	58	67
2	54	59	a32	--		--			--	a35	--	--	41	51	62	72	65	72	64	72	72	74	57	71
3	53	55	--	a38		36	a32		--	--	--	38	43	48	66	69	62	74	67	78	a71	--	60	--
4	53	56	--	a39		38			--	a34	--	37	40	54	65	70	69	75	--	--	70	72	66	71
5	55	52	37	40		--			--	a36	--	a40	44	--	59	68	70	77	71	77	68	76	67	75
6	50	--	a36	40		33			--	a37	--	38	--	--	62	70	72	81	69	64	69	77	66	--
7	52	70	a38	42		32			--	a34	--	a41	48	59	58	67	72	74	60	75	71	73	69	--
8	51	56	a41	38		32			--	a38	--	38	--	47	60	66	a65	74	65	75	67	75	65	72
9	51	59	a39	42		--			a35	--	--	--	42	52	53	57	68	80	70	80	70	75	67	75
10	51	--	a38	--		32			--	--	--	38	42	56	52	62	69	71	71	78	--	--	65	75
11	--	--	--	42		34			--	a36	--	a35	49	62	--	--	65	75	68	70	62	69	66	74
12	52	55	a38	41		--			--	a37	--	a38	50	--	60	73	a70	72	--	--	65	75	63	68
13	51	55	a40	41		32			--	a33	--	a41	--	--	63	66	65	72	--	69	68	77	59	--
14	49	--	a37	39		32		a33	--	a33	a38	--	52	64	60	74	67	75	62	72	68	70	56	68
15	50	48	a35	36		--			--	a37	a38	--	55	--	59	60	70	67	65	77	66	78	55	68
16	45	47	a33	--		--			--	a39	--	--	49	a51	55	55	67	76	68	79	68	70	56	68
17	44	49	--	a37		--			--	--	a39	--	46	56	52	59	67	76	70	77	69	78	59	67
18	44	47	--	--		--			--	--	--	39	51	63	55	60	66	75	67	75	67	--	65	70
19	45	51	--	a35		--			--	a42	36	34	55	66	56	68	67	77	73	70	67	77	61	66
20	--	a48	--	a39		--			--	a43	--	34	57	58	62	67	67	75	--	--	68	77	60	66
21	a44	--	--	--		--			--	a41	a36	34	47	51	--	51	68	70	68	75	67	76	62	68
22	43	46	--	--		--			--	36	a33	--	48	55	--	--	65	--	66	75	68	82	57	68
23	40	--	--	a38		--			--	a37	--	36	50	62	a59	--	66	72	68	80	68	79	58	67
24	45	51	--	--		--			--	--	32	39	56	67	61	68	62	62	71	78	--	--	57	68
25	41	42	--	--		--			--	a40	36	41	58	69	59	66	60	65	70	82	68	78	58	70
26	40	46	--	a34		--			--	a35	40	38	60	68	60	59	61	67	71	78	68	75	57	69
27	39	--	--	39		--			--	--	38	51	61	69	52	61	65	70	74	--	67	71	58	67
28	40	50	--	a42		--			--	a33	41	51	62	68	59	68	63	72	70	82	60	75	--	--
29	40	46	--	38		--			a37	--	42	--	--	--	65	--	69	--	70	80	65	76	58	66
30	36	--	--	42		--			--	--	--	a51	--	--	60	66	68	80	70	82	63	--	57	a67
31	35	37	--	--		--			--	--	40	48	--	--	60	69	--	--	71	82	59	62	--	--
Average	46	--	--	--		--			--	--	--	--	50	--	59	65	67	73	68	76	67	75	61	69

a Observation made between 9 a. m. and 4 p. m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	759	662	1,360	299	57	46	574	95	147
2	794	682	1,460	320	62	54	560	90	a140
3	920	970	s2,630	340	110	b100	546	102	150
4	1,340	1,760	6,370	358	122	118	562	100	152
5	2,220	20,300	s151,000	371	86	86	560	85	a130
6	2,290	9,780	60,500	410	70	77	557	77	116
7	2,050	3,700	20,500	470	110	140	568	140	b210
8	2,010	1,900	10,300	524	141	199	535	112	162
9	1,760	1,300	6,180	513	138	191	370	80	a80
10	1,780	1,250	6,010	535	118	170	311	71	60
11	1,990	1,400	7,520	546	89	131	311	105	88
12	1,060	720	sb2,600	546	102	150	340	120	a110
13	299	137	110	557	116	174	385	180	b190
14	242	86	56	552	96	143	327	89	79
15	292	106	84	552	72	107	360	--	e100
16	278	112	84	562	118	179	410	--	e130
17	278	82	62	552	159	237	460	--	e160
18	278	69	52	560	160	a240	520		
19	288	59	46	562	129	196	580		
20	295	62	49	568	126	193	570		
21	311	45	38	560	120	a180	560		
22	311	130	109	562	110	a170	580		
23	299	67	54	562	91	138	580		
24	295	40	32	560	80	a120	580		
25	311	36	30	570	75	a120	580	--	e200
26	303	29	24	612	170	b280	560		
27	267	34	25	562	88	134	570		
28	248	39	26	562	88	134	580		
29	278	41	31	562	94	143	580		
30	288	48	37	562	99	150	580		
31	295	46	37	--	--	--	400		
Total	24,429	--	277,416	15,371	--	4,500	15,556	--	5,004

	January			February			March		
1	300	--		491	100	b130	380	32	33
2	320	--		380	66	68	340	10	a9
3	370	90	e90	370	55	a55	322	11	10
4	460	--		370	41	41	336	26	24
5	560	--		370	43	43	355	32	31
6	580			370	49	49	370	38	38
7	590			370	37	37	375	43	44
8	600	--	e250	360	33	32	406	59	65
9	600			365	36	35	410	70	a75
10	600			370	40	a40	412	72	80
11	600	--		375	45	46	417	61	69
12	600	--		390	44	46	390	51	54
13	600	--	e320	385	44	46	380	140	144
14	590	190		380	48	49	385	205	213
15	580	--		375	36	36	390	118	124
16	570			370	30	30	410	120	a130
17	560			360	30	a30	434	182	213
18	560	--	e200	340	25	a25	486	440	577
19	560			318	20	17	486	1,380	1,810
20	560			280	19	14	428	769	889
21	550			284	21	16	395	320	341
22	450			314	26	22	370	85	85
23	440			336	26	24	400	105	113
24	460			340	25	a25	400	102	110
25	480			322	25	22	395	108	115
26	530	--	e150	292	22	17	406	98	107
27	520			290	20	a15	406	93	102
28	520			322	29	25	417	150	169
29	500			375	52	53	450	710	863
30	500			--	--	--	498	990	1,330
31	500			--	--	--	530	1,530	2,190
Total	16,210	--	5,950	10,264	--	1,088	12,579	--	10,157

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	462	830	1,040	556	2,600	3,900	1,070	2,700	7,800
2.....	434	485	568	395	990	1,060	1,040	3,700	10,400
3.....	422	365	416	385	1,010	1,050	986	2,500	6,660
4.....	406	250	274	474	1,280	1,640	926	1,900	4,750
5.....	375	235	238	562	1,960	2,970	782	1,500	3,170
6.....	360	220	a210	365	1,320	1,300	790	1,500	3,200
7.....	336	700	635	242	510	333	870	1,900	4,460
8.....	406	2,700	sb3,200	180	280	136	934	2,300	5,800
9.....	556	3,790	5,690	556	10,300	s17,200	798	1,500	3,230
10.....	314	1,780	1,510	422	3,700	4,220	652	1,020	1,800
11.....	232	600	376	340	1,600	a1,500	1,540	7,970	s44,200
12.....	190	330	169	300	560	454	2,800	11,700	88,500
13.....	180	170	a85	253	390	266	2,010	4,500	s28,500
14.....	188	80	41	250	320	216	701	1,000	1,890
15.....	412	380	423	239	210	136	523	560	791
16.....	1,330	31,400	s164,000	379	11,100	s15,400	462	390	486
17.....	1,260	37,000	s148,000	327	10,500	s9,950	439	260	308
18.....	542	8,400	12,300	253	1,980	1,350	439	260	308
19.....	375	2,800	2,840	250	880	594	462	300	374
20.....	450	1,650	2,000	232	440	276	428	200	231
21.....	631	3,590	s6,490	1,840	19,800	s223,000	375	120	122
22.....	775	4,420	9,250	4,610	47,600	614,000	360	100	97
23.....	549	1,800	2,670	2,360	25,400	s176,000	375	140	142
24.....	412	670	745	1,290	8,600	30,000	395	200	213
25.....	468	820	1,040	1,070	5,400	15,600	603	2,590	s4,810
26.....	722	5,100	sb11,000	1,200	6,900	22,400	568	2,800	4,290
27.....	959	7,920	20,500	1,620	19,000	s88,300	958	11,300	s41,900
28.....	1,010	7,090	19,300	1,260	8,000	27,200	708	18,300	s39,500
29.....	1,060	6,650	19,000	1,090	5,000	14,700	516	2,850	3,970
30.....	1,070	6,000	17,300	1,110	4,900	14,700	549	1,080	1,600
31.....	--	--	--	1,140	4,000	12,300	--	--	--
Total.	16,886	--	451,310	25,550	--	1,302,151	24,059	--	313,502

	July			August			September		
1.....	510	1,000	1,380	782	700	1,480	536	300	434
2.....	456	610	751	790	570	1,220	575	300	466
3.....	422	390	444	752	620	1,260	582	305	479
4.....	400	230	a250	738	530	1,060	603	380	619
5.....	375	210	213	730	670	1,320	610	565	931
6.....	340	140	129	701	575	1,090	624	490	826
7.....	336	150	136	666	760	1,370	638	530	913
8.....	322	260	226	645	410	714	645	545	949
9.....	332	160	143	631	400	681	687	740	s1,590
10.....	322	140	122	710	600	a1,200	894	1,330	3,210
11.....	336	120	109	790	3,320	s7,730	968	1,120	2,930
12.....	345	150	a140	854	5,090	s11,000	959	1,120	2,900
13.....	983	4,630	s16,300	849	2,580	s6,950	959	1,090	2,820
14.....	1,240	8,640	28,900	1,080	3,700	sb15,000	995	1,080	2,900
15.....	1,210	3,550	11,600	760	1,040	2,130	995	1,150	3,090
16.....	1,280	2,620	9,050	715	690	1,330	775	740	1,550
17.....	1,300	1,990	6,980	854	1,220	2,810	659	470	836
18.....	1,260	2,220	7,550	838	875	1,980	652	480	845
19.....	1,260	1,800	6,120	814	710	1,560	722	630	s1,390
20.....	1,300	1,600	a5,600	798	790	1,700	934	1,200	3,030
21.....	1,240	1,300	4,350	745	640	1,290	977	1,230	3,240
22.....	1,160	1,350	4,230	568	410	629	995	1,260	3,380
23.....	1,150	1,280	3,970	617	520	866	878	1,000	2,370
24.....	1,040	1,120	3,140	640	540	a930	986	1,070	2,850
25.....	950	1,020	2,620	659	480	854	902	730	1,780
26.....	926	780	1,950	631	430	733	701	610	1,150
27.....	926	910	2,280	624	948	1,600	680	620	1,140
28.....	894	970	2,340	456	540	665	690	500	a930
29.....	870	950	2,230	439	235	279	745	690	1,390
30.....	830	870	1,950	422	175	199	775	760	1,590
31.....	806	790	1,720	462	230	287	--	--	--
Total.	25,121	--	126,923	21,760	--	71,917	23,341	--	52,528

Total discharge for year (cfs-days) 231,126
Total load for year (tons) 2,622,446

s Computed by subdividing day.
b Computed from partly-estimated concentration graph.
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 1951 to September 1952
(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	Water 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. 5, 1951	9:50 a.m.	1,730	55	7,530	9,400	--	21	--	41	--	78	94	99		--		SPWCM
Oct. 5	5:45 p.m.	2,820	52	42,500	7,220	44	55	66	78	88	94	--	--		--		SPWCM
Oct. 6	11:45 a.m.	2,300	59	7,860	5,560	--	58	--	78	--	94	--	--		--		SPWCM
Mar. 18, 1952 ..	3:55 p.m.	498	38	480	1,750	--	70	--	85	--	94	--	--		--		SPWCM
Mar. 19.....	8:55 a.m.	498	36	2,210	5,220	--	77	--	94	--	99	--	--		--		SPWCM
Apr. 7	2:20 p.m.	300	55	593	1,570	60	71	87	96	97	98	100	--		--		BWCM
Apr. 10	2:25 p.m.	284	--	1,440	4,490	--	80	--	99	--	100	--	--		--		SPWCM
Apr. 16.....	2:00 p.m.	1,690	--	50,400	9,010	--	56	--	78	--	94	--	--		--		SPWCM
Apr. 16	10:55 p.m.	2,320	--	67,800	6,790	--	54	--	74	--	93	--	--		--		SPWCM
Apr. 17.....	12:35 p.m.	1,180	--	37,300	34,700	6	6	82	88	95	97	--	--		--		SPNM
Apr. 17.....	12:35 p.m.	1,180	--	37,300	5,660	48	62	73	84	92	97	--	--		--		SPWCM
May 9	5:45 a.m.	1,160	--	7,020	8,540	--	16	--	32	--	84	--	--		---		SPWCM
May 21	7:10 p.m.	4,830	--	56,200	9,510	--	40	--	58	--	89	--	--		--		SPWCM
May 22	12:30 a.m.	3,680	--	45,400	8,750	--	49	--	69	--	90	--	--		--		SPWCM
May 22	10:05 p.m.	3,620	--	44,700	9,900	--	48	--	66	--	90	--	--		--		SPWCM
May 23.....	6:50 a.m.	2,740	--	28,900	25,800	--	0	2	72	85	92	--	--		--		SPNM
May 23	6:50 a.m.	2,740	--	28,900	11,800	37	47	58	69	82	93	--	--		--		SPWCM
June 11	2:40 p.m.	2,120	--	12,400	9,100	--	10	--	20	--	84	--	--		--		SPWCM
June 12	7:30 a.m.	2,900	--	12,200	7,910	--	14	--	25	--	82	--	--		--		SPWCM
June 13	10:55 a.m.	2,430	68	5,140	3,600	--	1	7	17	28	64	93	98		100		SPNM
June 13	10:55 a.m.	2,430	68	5,140	4,680	9	11	14	18	29	60	--	--		--		SPWCM
June 25	8:20 p.m.	631	--	5,090	6,780	44	55	66	72	76	83	--	--		--		SPWCM
July 17.....	2:50 p.m.	1,320	79	1,920	2,680	--	10	--	13	--	49	88	98		--		SPWCM
Sept. 2	4:20 p.m.	596	--	373	837	--	12	15	20	24	33	62	97		--		BWCM
Sept. 16.....	9:20 a.m.	959	58	816	1,140	--	10	--	12	--	22	71	95		99	100	SPWCM

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.
DRAINAGE AREA.--164 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 6, 1951	39			19	8.1	1.8		99	0	1.0	2.0		--	0.00				81	0	5	0.1	169	7.2
Dec. 7	26			24	9.7	.7		122	0	1.0	.5		--	.00				100	0	1	.0	198	7.6
Jan. 4, 1952	22			23	11	1.2		126	0	1.0	.5		--	.00				102	0	2	.0	206	7.8
Jan. 30	20			25	12	1.2		134	0	2.0	.5		--	.00				110	0	2	.0	219	7.8
Feb. 29	19			26	11	.9		136	0	1.0	1.0		--	.00				112	0	2	.0	220	8.0
Apr. 3	21			25	12	1.8		123	5	2.0	1.5		0.6	--				110	1	4	.1	217	8.4
May 29	422	2.8	0.04	7.0	3.3	.2		32	0	4.0	.5	0.1	.5	.00	40	0.05		31	5	2	.0	56.5	7.7
June 17	262			7.0	2.1	2.1		33	0	3.0	.5		--	--				26	0	15	.2	56.7	7.3
July 1	227			7.0	2.1	3.5		34	0	5.0	.5		--	--				26	0	22	.3	59.4	7.1
July 31	98.8			13	3.5	2.3		59	0	2.0	1.0		--	--				47	0	10	.1	102	7.2
Sept. 3	46.0			18	6.6	1.6		88	0	2.0	1.0		--	--				72	0	5	.1	158	7.9

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.--86 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 6, 1951	13	--	--	30	13	0.5		157	0	2.0	0.5	--	--	0.00	--	--		130	1	1	0.0	251	7.8
Dec. 7	12	7.5	--	--	--	--		163	0	--	--	--	--	--	--	--		133	0	--	--	259	7.5
Jan. 4, 1952	11	--	--	--	--	--		164	0	--	--	--	--	--	--	--		136	2	--	--	269	7.7
Jan. 30	11	--	--	--	--	--		158	5	--	--	--	--	--	--	--		138	0	--	--	266	8.4
Feb. 29	11	--	--	--	--	--		170	0	--	--	--	--	--	--	--		140	1	--	--	267	7.9
Apr. 3	10	--	--	--	--	--		170	0	--	--	--	--	--	--	--		141	2	--	--	272	7.9
May 29	145	4.6	0.04	11	4.9	.9		54	0	4.0	.5	0.1	0.6	.00	55	0.07		47	3	4	.1	91.4	7.8
June 17	78	6.5	.04	15	6.7	1.2		77	0	3.0	.5	.1	.5	.00	72	.10		65	2	4	.1	124	7.9
July 1	54	--	--	19	7.2	3.0		95	0	5.0	.5	--	--	--	--	--		77	0	8	.1	155	7.5
July 31	28	--	--	--	--	--		128	0	--	--	--	--	--	--	--		105	0	--	--	209	8.0
Sept. 3	15	--	--	--	--	--		150	3	--	--	--	--	--	--	--		128	0	--	--	248	8.3

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 1951 to September 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 6, 1951				112	39	48		204		358	3.0		--	0.08				440	273	19	1.0	970	8.0
Dec. 7				118	39	64		228		388	3.5		--	.08				456	269	23	1.3	1,060	7.8
Jan. 4				111	37	47		226		328	3.5		--	.07				430	245	19	1.0	948	7.8
Jan. 30				118	34	51		218		348	3.0		--	.06				434	255	20	1.1	979	8.1
Feb. 29				120	38	53		221		368	3.5		--	.05				454	273	20	1.1	1,010	8.0
Apr. 3				98	44	57		209		355	4.5		0.8	--				425	254	22	1.2	975	7.9
May 29		6.0	0.10	26	8.0	9.7		67		60	.5	0.1	.6	.02	159	0.22		98	43	18	.4	238	7.6
June 17				53	17	51		115		207	1.5		--	--				201	107	35	1.6	596	7.8
July 1				55	18	38		122		183	2.0		--	--				210	110	28	1.2	558	7.6
July 31				150	56	153		248		695	6.0		--	--				603	400	36	2.7	1,620	7.7
Sept. 3				111	129	121		284		795	6.5		--	--				806	573	25	1.9	1,740	7.9

YELLOWSTONE RIVER BASIN--Continued

GREYBULL RIVER AT MEETEETSE, WYO.

LOCATION.--At gaging station at Meeteetse, Park County, 3 miles upstream from Meeteetse Creek.
DRAINAGE AREA.--690 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 6, 1951	134	--	--	41	20	40		150	143	0.5	--	--	0.01	--	--		185	62	32	1.3	512	7.8	
Dec. 10	85.6	--	--	40	17	34		140	121	1.0	--	--	.01	--	--		169	54	30	1.1	468	7.6	
Jan. 7, 1952	89.8	--	--	37	16	33		135	113	1.0	--	--	.00	--	--		158	47	31	1.1	447	7.6	
Jan. 29	80.6	--	--	37	16	33		129	117	1.5	--	--	.09	--	--		158	52	31	1.1	449	8.2	
Feb. 28	93.3	--	--	37	15	33		125	117	1.5	--	--	.00	--	--		154	51	32	1.2	445	7.6	
Apr. 1	71.1	--	--	44	23	52		151	183	3.0	--	--	--	406	0.55		206	82	35	1.6	612	8.0	
Apr. 30	646	13	0.10	19	6.4	21		81	48	1.0	0.2	1.2	.02	166	.23		74	8	38	1.1	232	7.8	
May 21	1,090	13	.04	31	13	44		167	84	1.0	.1	.9	.03	269	.37		131	0	42	1.7	351	7.7	
June 9	2,490	12	.04	20	4.9	8.3		83	18	.5	.1	1.1	.01	117	.16		70	2	20	.4	159	7.8	
July 3	568	--	--	16	11	17		91	44	1.0	--	--	--	--	--		85	10	30	.8	242	7.5	
Aug. 7	614	--	--	32	12	24		121	77	1.5	--	--	--	--	--		129	30	29	.9	357	8.0	
Sept. 4	280	--	--	42	18	37		153	126	2.5	--	--	--	--	--		179	54	31	1.2	488	7.9	

GREYBULL RIVER NEAR BASIN, WYO.

LOCATION.--At gaging station at bridge on State Highway 130, 2 miles upstream from Dorsey Creek and 8 miles west of Basin, Big Horn County.
DRAINAGE AREA.--1,130 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 7, 1951	179	--	--	67	27	92		260	0	243	7.0	--	--	0.02	--	--		276	63	42	2.4	886	7.4
Dec. 6	180	--	--	68	28	85		264	0	235	6.0	--	--	.03	--	--		285	69	39	2.2	881	7.8
Jan 3, 1952	60.5	--	--	85	34	111		321	0	305	8.5	--	--	.05	--	--		352	89	41	2.6	1,070	7.7
Jan. 31	110	--	--	69	26	84		249	0	239	6.0	--	--	.03	--	--		279	75	40	2.2	854	7.9
Feb. 29	105	--	--	54	26	87		207	0	245	5.5	--	--	.03	--	--		243	73	44	2.4	804	7.8
Apr. 4	186	--	--	62	26	84		218	0	248	6.5	--	--	.09	570	0.78		262	83	41	2.3	841	7.9
May 21	1,390	15	0.04	52	14	69		201	0	156	5.5	0.2	3.7	.04	443	.60		189	24	44	2.2	636	7.7
June 17	565	14	.04	33	11	43		135	0	101	3.0	.1	1.5	.02	282	.38		128	17	42	1.6	431	7.9
July 3	36.0	--	--	45	22	132		166	10	305	13	--	--	--	--	--		202	49	59	4.1	993	8.5
July 31	34.0	--	--	46	40	138		274	0	320	14	--	--	--	--	--		278	53	52	3.6	1,070	8.1
Sept. 3	52.0	--	--	64	31	139		271	0	333	14	--	--	--	--	--		285	63	52	3.6	1,070	8.2

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.
Water temperatures: October 1951 to September 1952.
Sediment records: April 1951 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 79°F July 24; minimum, freezing point on many days during October to April.
Sediment concentrations: Maximum daily, 37,600 ppm May 22; minimum daily, not determined.
Sediment loads: Maximum daily, 39,100 tons May 22; minimum daily, less than 0.50 ton Jan. 1-6.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, 37,600 ppm May 22, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 39,100 tons May 22, 1952; minimum daily, less than 0.50 ton on several days each year.
REMARKS.--Flow affected by ice Nov. 3, 4, Nov. 16 to Apr. 2. Records of discharge for the water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, water year October 1951 to September 1952
/Twice-daily temperature measurements between 6 a.m. and 9 a.m. and between 5 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	50	57	32	32							--	--	33	35	55	62	59	68	63	61	70	75	59	61
2	49	58	31	32							--	--	34	42	57	67	59	--	57	70	68	72	58	61
3	50	55	32	33							--	--	35	42	59	68	62	70	61	72	65	71	56	65
4	48	54	32	33							--	--	34	35	60	65	68	70	65	75	64	68	60	72
5	--	53	33	33							--	--	32	38	52	60	65	70	65	76	62	70	62	68
6	47	54	32	33	32						--	--	39	48	55	66	65	69	62	57	64	74	60	68
7	48	48	33	34							--	--	45	50	56	69	61	68	53	60	64	--	60	69
8	47	59	32	37							--	--	33	40	55	62	67	71	58	68	60	70	60	68
9	46	59	32	38							--	--	39	40	50	55	62	74	62	73	64	71	60	69
10	46	59	35	36							--	--	--	--	49	62	69	73	67	73	--	65	60	70
11	48	60	34	35							--	--	42	46	54	63	63	70	62	70	58	62	62	67
12	45	50	34	39						32	--	--	44	46	52	63	64	72	62	63	60	71	58	60
13	46	50	37	40							--	--	39	--	54	60	60	68	56	59	64	74	53	54
14	--	52	32	34							--	--	48	--	54	69	58	72	58	65	64	75	50	52
15	45	45	32	33							--	--	--	46	55	57	60	67	68	74	65	74	50	58
16	37	46	32	33							--	--	45	50	48	52	58	--	64	75	63	75	52	54
17	38	46	32	33							--	--	--	58	48	50	61	70	65	72	62	76	50	60
18	37	45	35	34							--	--	49	56	49	52	60	72	61	76	62	76	55	61
19	40	50	32	33							--	--	49	60	--	64	62	73	65	75	62	75	51	56
20	42	45	32	34							--	--	52	56	49	59	61	63	62	74	62	75	58	63
21	39	42	32	33							--	--	41	--	53	48	64	64	61	70	63	76	54	64
22	39	--	33	34							--	--	42	45	45	53	60	68	60	72	64	74	52	60
23	38	45	32	34							--	--	43	64	50	58	58	60	61	78	65	75	52	58
24	40	44	32	34							--	--	50	60	57	62	58	60	65	79	63	74	51	60
25	38	41	33	33							--	--	55	62	61	63	59	--	64	73	62	76	53	60
26	37	45	32	34							--	--	55	65	54	53	57	60	65	72	64	76	52	61
27	35	42	34	--					32		--	--	50	62	51	58	59	60	63	73	60	75	52	62
28	36	46	--	--							--	33	59	60	56	62	59	71	64	74	60	72	51	60
29	36	42	--	--							32	34	52	52	60	62	62	71	63	73	62	73	52	59
30	33	36	--	--							31	--	48	60	58	62	62	74	65	75	58	70	50	58
31	32	34	--	--							33	34	--	--	55	65	--	--	66	76	56	60	--	--
Average	42	49	33	34	a 32		a 32		a 32		a 32		44	51	54	60	61	68	62	71	63	72	55	62

a Includes estimated values, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	40	50	5	8			19		e 7
2	46	100	12	7			20		e 10
3	50	220	30	8			19		e 10
4	57	546	84	10			17		e 10
5	66	420	75	13			16		e 10
					123	4			
6	74	2,440	s 463	13			16	232	10
7	31	5,540	s 497	17			16		e 10
8	23	1,690	105	22			16		e 10
9	21	280	16	15			13		e 7
10	18	80	4	16			13		
11	18			16			13		
12	17			15			13		
13	18			15	63	3	13		
14	17			15			13		e 5
15	17	32	2	14			13		
16	17			12			13		
17	17			10			13		
18	18			11			13		
19	17			12	143	5	12		
20	18	90	4	12			10		
21	28	11,200	s 1,020	13			10		
22	18	4,180	s 235	13			10		
23	12	1,190	39	12			10		
24	12	200	6	10			10		e 4
25	12	85	3	13	96	3	10		
26	12			15			10		
27	12			15			10		
28	12	69	2	15	--	e 3	10		
29	12			16	--	e 4	10		
30	12			17	--	e 5	9		e 3
31	12			--	--	--	7		e 1
Total	754	--	2,628	400	--	117	397		177

Day	January			February			March		
1	3		(t)	7			6		
2	2		(t)	7			6	--	e 1
3	2		(t)	7			7		
4	3	14	(t)	7			8	--	e 2
5	4		(t)	7			10	--	e 2
6	5		(t)	7			12	--	e 5
7	6			7			15	--	e 7
8	7			7			15	--	e 9
9	7			7			15	--	e 8
10	7			7			13	--	e 6
11	7			7			11	--	e 5
12	7			7			10	--	e 4
13	7			7			10	--	e 4
14	7			7			12	--	e 6
15	7			7			15	--	e 30
						e 1			
16	7			7			30	--	e 100
17	7			6			60	1,400	a 230
18	7			5			30	1,400	a 110
19	7		e 1	5			22	870	52
20	7			6			15	1,400	a 55
21	6			7			12	230	8
22	5			7			10	330	9
23	5			7			10	190	5
24	6			7			10	150	4
25	7			7			12	145	5
26	7			7			15	120	5
27	7			7			22	300	18
28	7			7			34	910	83
29	7			7			60	2,100	340
30	7			--			50	12,000	a 1,600
31	7			--			45	21,100	2,560
Total	187		26	197		29	602	--	5,275

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	9,100	860	10	200	5	60	810	131
2	28	3,300	249	52	4,140	s 650	60	970	157
3	22	2,100	125	50	1,390	188	54	1,080	157
4	21	850	48	41	1,080	120	50	925	125
5	19	1,000	51	52	1,320	185	40	630	68
6	19	1,200	62	54	2,660	s 410	38	1,200	sa 150
7	35	8,500	803	49	1,110	147	53	1,930	s 302
8	32	15,100	s 1,430	59	1,910	304	32	880	76
9	38	17,200	s 1,920	57	1,960	302	46	1,330	165
10	22	8,500	505	56	1,140	172	44	1,310	156
11	18	7,600	369	53	910	130	35	790	75
12	15	3,100	126	57	1,360	209	39	680	72
13	15	450	18	54	1,580	230	49	1,070	141
14	14	350	13	59	1,450	s 244	53	930	133
15	15	200	8	85	2,640	s 870	56	745	112
16	16	3,000	sa 150	74	3,540	707	60	1,040	168
17	57	13,400	2,060	68	2,020	371	56	600	91
18	44	9,200	1,090	54	1,150	168	54	325	48
19	36	4,800	467	63	1,430	243	49	530	70
20	30	3,300	267	66	1,760	314	57	480	74
21	26	1,380	97	89	3,040	s 789	56	410	62
22	24	560	36	345	37,600	s 39,100	57	370	57
23	22	440	26	221	27,300	s 18,600	47	280	36
24	20	190	10	102	7,010	1,930	49	720	95
25	18	180	9	76	2,650	544	68	675	124
26	17	150	7	74	2,080	416	62	660	110
27	16	100	4	76	2,300	472	76	1,220	s 310
28	15	90	4	78	2,300	484	78	2,270	478
29	28	1,800	sa 160	73	1,600	315	81	2,680	586
30	10	1,090	29	63	890	151	81	1,600	350
31	--	--	--	63	930	158	--	--	--
Total	727	--	11,003	2,373	--	68,928	1,640	--	4,679

Day	July			August			September		
1	70	1,230	232	65	280	49	63		
2	71	1,140	218	63	480	82	54		
3	65	722	127	80	980	212	52	188	25
4	60	578	94	98	1,210	320	42		
5	56	385	58	121	4,500	s 1,810	36		
6	44	338	40	94	4,580	1,160	34		
7	60	335	54	92	1,780	442	41		
8	42	160	18	87	1,000	235	47	166	19
9	45	126	15	70	510	96	46		
10	40	166	18	70	550	104	46		
11	50	255	35	96	4,300	s 1,530	46		
12	76	810	sa 190	112	9,700	s 3,200	38		
13	121	2,610	853	80	2,800	605	40		
14	98	1,390	368	80	1,890	408	52	153	17
15	98	1,050	278	57	820	126	41		
16	98	1,030	272	57	520	80	34		
17	92	770	191	54			29		
18	70	593	112	46	255	31	24		
19	83	750	168	40			20	84	6
20	102	940	259	41			27		
21	94	740	188	47			29		
22	81	390	85	46			28		
23	62	140	23	44	250	29	27		
24	62	130	22	40			28	48	4
25	53	120	17	38			25		
26	52	180	25	40			27		
27	56	230	35	45			25		
28	63	180	30	53	239	32	22	24	1
29	59	130	21	57			18		
30	54	75	11	54			14		
31	57	270	42	50			--	--	--
Total	2,134	--	4,099	2,017	--	10,920	1,055	--	376

Total discharge for year (cfs-days) 12,483
Total load for year (tons) 108,257

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

DRY CREEK AT GREYBULL, WYO.--Continued

Particle-size analyses of suspended sediment, October 1951 to August 1952
(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	Water 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, 1951	1:30 p.m.	12	--	1,030	2,130	--	88	--	93	--	99	--	--		--		SPWCM
Mar. 28, 1952	1:15 p.m.	a34	39	548	476	--	76	--	78	--	99	--	--		--		SPWCM
Mar. 31	4:00 p.m.	a45	32	20,900	19,400	--	0	2	94	99	100	--	--		--		SPNM
Mar. 31	4:00 p.m.	a45	32	20,900	10,800	51	66	80	94	98	99	--	--		--		SPWCM
Apr. 10	3:50 p.m.	19	--	6,890	7,980	--	90	--	100	--	--	--	--		--		SPWCM
Apr. 17	10:20 a.m.	63	48	16,800	16,800	0	1	2	92	96	98	--	--		--		SPNM
Apr. 17	10:20 a.m.	63	48	16,800	6,540	53	66	80	92	96	98	--	--		--		SPWCM
May 9	2:55 p.m.	68	--	2,540	3,600	--	42	--	63	--	89	--	--		--		SPWCM
May 17	5:55 a.m.	62	--	1,960	2,610	--	47	--	59	--	82	--	--		--		SPWCM
May 21	8:40 a.m.	80	53	2,180	5,000	--	35	--	49	--	77	92	98		100		SPWCM
May 22	8:24 a.m.	422	45	47,100	9,480	--	53	--	73	--	94	--	--		--		SPWCM
May 24	9:20 a.m.	118	58	8,020	8,640	--	0	2	72	76	88	--	--		--		SPNM
May 24	9:20 a.m.	118	58	8,020	5,500	43	54	63	69	77	89	--	--		--		SPWCM
June 13	2:45 p.m.	60	--	1,620	4,370	--	43	--	70	--	92	--	--		--		SPWCM
July 3	12:15 p.m.	74	66	1,020	3,030	23	32	38	44	54	68	84	93		99		BWCM
July 16	3:55 p.m.	102	75	1,140	2,440	--	24	--	32	--	65	86	96		100		SPWCM
Aug. 6	11:10 a.m.	96	65	4,800	5,350	--	62	--	82	--	91	--	--		--		SPWCM
Aug. 12	8:40 a.m.	163	60	17,600	8,420	--	2	--	84	--	91	--	--		--		SPNM
Aug. 12	8:40 a.m.	163	--	17,600	8,520	--	63	--	84	--	91	--	--		--		SPWCM
Aug. 20	2:35 p.m.	47	76	254	793	--	59	68	76	82	88	94	97		98		BWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.

LOCATION.--At gaging station at bridge on State Highway 14, half a mile upstream from Shoshone River and 1½ miles northeast of Kane, Big Horn County.
DRAINAGE AREA.--15,900 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1952.
Water temperatures: July to September 1949, October 1950 to September 1952.
Sediment records: March 1946 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 82°F July 31; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 30,500 ppm May 23; minimum daily, not determined.
Sediment loads: Maximum daily, 600,000 tons May 23; minimum daily, not determined.
EXTREMES, 1946-52.--Water temperatures (1950-52): Maximum, 82°F July 31, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 33,000 ppm Apr. 20, Sept. 21, 1948; minimum daily, not determined.
Sediment loads: Maximum daily, 972,000 tons June 25, 1946; minimum daily, not determined.
REMARKS.--Flow affected by ice Nov. 17, Nov. 21-24, Dec. 10-13, Dec. 16 to Mar. 15. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 7, 1951	1,080			--	--	99	--	--		--	--				825	1.12		--	--	--	--	1,150	--
Dec. 5	1,120			91	42	131		242		440	19				--	--		398	200	42	2.9	1,140	7.8
Jan. 7, 1952	a940			--	--	93	--	--		--	--				831	1.13		--	--	--	--	1,160	--
Jan. 31	a970			--	--	85	--	--		--	--				754	1.03		--	--	--	--	1,060	--
Feb. 28	804			--	--	93	--	--		--	--				824	1.12		--	--	--	--	1,140	--
Apr. 1	1,340			--	--	101	--	--		--	--				890	1.21		--	--	--	--	1,210	--
May 1	4,380			56	16		40	153		147	7.0		3.3		--	--		204	79	30	1.2	547	7.5
June 17	2,280			--	--		--	--		--	--				410	.56		--	--	--	--	603	--
July 1	2,040			--	--	71	--	--		--	--				593	.81		--	--	--	--	847	--
Aug. 6	1,290			--	--	110	--	--		--	--				768	1.04		--	--	--	--	1,080	--
Sept. 4	1,070			--	--	114	--	--		--	--				811	1.10		--	--	--	--	1,130	--

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Twice-daily temperature measurements between 8 a. m. and 11 a. m. and between 4 p. m. 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	49	--	--	--	34	38					--	--	41	45	55	62	62	--	67	72	76	78	51	74
2	53	58	--	--	--	34					--	--	43	47	--	63	65	65	68	72	75	77	57	69
3	49	56	--	32	32	--					--	--	45	41	--	65	66	63	64	76	71	78	59	72
4	53	55	--	34	32	36					--	--	45	49	61	62	68	68	68	72	--	--	66	70
5	53	--	34	37	34	39					--	--	49	53	57	60	--	70	72	76	70	71	67	74
6	54	55	--	37	--	--					--	--	54	--	57	61	68	70	66	--	71	76	66	74
7	53	57	--	--	--	--		32			--	--	54	53	--	59	67	--	59	72	73	74	67	73
8	52	59	--	43	--	--					--	--	40	45	57	60	63	61	65	75	67	76	66	72
9	55	58	41	41	--	--					--	--	44	48	54	56	63	--	68	79	70	72	--	73
10	51	60	35	42	--	--					--	--	45	53	54	--	--	68	--	78	72	67	62	--
11																								
12	55	59	38	41	--	--					--	--	51	54	55	--	67	--	68	73	--	70	--	74
13	52	55	40	41	--	--					--	--	41	52	--	63	66	70	65	63	68	75	65	68
14	50	--	40	40	--	--			32		--	--	43	55	61	67	64	71	60	68	68	78	59	60
15	51	--	40	40	--	--					--	--	55	57	59	--	67	73	63	69	73	72	61	63
16	49	47	36	--	--	--					--	--	53	52	60	59	70	66	67	72	62	74	50	66
17	42	46	32	--	--	--					--	--	50	54	54	56	--	70	67	75	68	77	51	66
18	45	47	32	--	--	--					32	40	--	55	51	58	66	72	70	72	72	76	58	67
19	41	47	--	--	--	--					38	38	50	58	53	56	65	73	--	74	68	77	61	--
20	43	42	35	33	--	--					33	36	55	63	--	--	67	72	71	72	71	76	63	--
21	43	--	33	37	--	--					36	36	54	54	--	62	67	75	--	73	71	78	60	--
22	42	--	--	32	--	--					33	34	48	51	53	55	68	70	70	73	68	80	--	--
23	41	46	--	--	--	--					32	35	52	53	50	53	65	68	68	72	73	80	51	--
24	41	40	--	--	--	--					38	37	--	58	56	--	64	71	68	--	73	78	51	--
25	44	40	32	--	--	--					35	43	--	64	--	--	62	56	--	--	75	--	58	--
26	40	41	--	--	--	--					35	37	57	65	63	67	59	63	69	78	--	79	64	--
27	39	44	--	35	--	--					34	41	--	64	60	60	62	65	68	70	69	--	61	--
28	37	44	33	35	--	--					35	43	59	66	49	61	65	69	74	73	70	72	58	--
29	44	47	34	--	--	--					37	43	65	61	58	50	65	69	71	77	66	75	60	--
30	43	44	38	37	--	--					39	44	57	55	63	65	69	71	71	81	--	72	58	--
31	35	40	38	38	--	--					41	42	53	59	58	64	--	--	78	--	63	64	58	--
	36	--	--	--	--	--					41	42	--	--	60	65	--	--	73	82	61	62	--	--
Average	46	--	--	--	--	--					--	--	50	55	--	60	65	68	68	74	70	74	60	--

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	1,520	972	3,990	910	280	a 690	1,200	720	2,330
2	1,560	905	3,810	900	360	a 870	1,200	150	486
3	1,570	1,160	4,920	920	428	1,060	1,150	600	b 1,900
4	1,650	1,100	4,900	950	580	1,490	1,150	490	1,520
5	2,160	1,770	10,300	980	520	1,380	1,120	310	937
6	3,410	7,550	69,500	1,000	700	1,890	1,120	--	e 1,000
7	2,690	9,150	66,500	1,060	540	1,550	1,160	--	e 1,000
8	2,560	4,560	31,500	1,100	450	1,340	1,070	--	e 900
9	2,840	2,320	17,800	1,190	550	1,770	980	--	e 800
10	2,640	1,370	9,770	1,170	520	1,640	800	--	e 700
11	2,640	1,500	10,700	1,170	390	1,230	550		
12	2,600	1,250	8,780	1,160	470	1,470	550		
13	1,850	963	4,810	1,160	660	2,070	600	--	e 400
14	1,130	546	1,670	1,190	580	1,860	715		
15	924	391	975	1,180	500	1,590	584		
16	956	550	1,420	1,150	440	1,370	650		
17	980	487	1,290	1,100	130	386	720		
18	980	405	1,070	1,060	80	a 230	800		
19	990	356	952	1,120	580	b 1,800	900		
20	1,000	504	1,360	1,230	380	1,260	1,000		
21	1,000	1,220	3,290	1,200	830	b 2,700	1,000	--	e 500
22	1,100	1,280	3,800	1,200	880	a 2,900	1,000		
23	1,100	623	1,850	1,200	470	1,520	1,050		
24	1,100	451	1,340	1,200	80	259	1,050		
25	1,060	446	1,280	1,200	120	389	1,050		
26	1,000	451	1,220	1,140	220	677	1,000	--	e 560
27	1,000	330	891	1,220	270	889	1,000	--	e 620
28	960	262	679	1,230	290	963	1,000	--	e 620
29	960	470	1,220	1,200	360	1,170	1,000	--	e 620
30	930	376	944	1,200	970	3,140	1,000	--	e 580
31	920	230	571	--	--	--	800	--	e 550
Total	47,780	--	273,102	33,690	--	41,553	28,969	--	22,123

Day	January			February			March		
1	580	--	e 400	960			840		
2	580	--		960			800		
3	650	--		870			770		
4	760	--		860			770	--	e 300
5	900	--	e 150	860			820		
6	920	--		860		e 150	860		
7	940	60		860			900	--	e 400
8	960			850			920	--	e 700
9	1,000			840			940	--	e 1,000
10	1,000			840			950	--	e 1,200
11	1,050			850			960	--	e 1,500
12	1,100			860			900	--	e 1,200
13	1,100			860	112		880	--	e 1,000
14	1,100			850		e 250	890	610	1,470
15	1,100	--	e 300	840			900	710	1,730
16	1,050			840			940	830	2,110
17	1,050			820			1,100	1,520	4,510
18	1,050			800			1,180	2,000	6,370
19	1,000			790			1,150	1,530	4,750
20	1,000			770			1,120	1,250	3,780
21	1,000			730		e 250	1,090	720	2,120
22	900			750			956	740	1,910
23	900	--		800			820	940	2,080
24	950	--		800			792	580	1,240
25	990	74		770			948	560	1,430
26	990	--	e 200	740			1,020	530	1,460
27	990	--		740		e 400	1,040	990	2,780
28	980	--		770		e 400	1,200	2,550	8,260
29	980	--		800		e 400	1,360	6,400	23,500
30	970	--		--		--	1,360	5,910	21,700
31	970	--	e 120	--		--	1,540	3,280	13,600
Total	29,510	--	7,520	23,940		6,600	30,716	--	113,600

e Estimated.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	1,470	3,640	14,400	4,430	4,510	53,900	3,760	2,590	26,300
2.....	1,170	3,180	10,000	4,360	3,500	41,200	4,170	1,950	22,000
3.....	1,070	2,070	5,980	4,540	3,130	38,400	4,710	2,870	34,000
4.....	1,080	1,870	5,450	5,140	3,970	55,100	5,900	2,580	34,100
5.....	1,050	980	2,780	5,540	4,110	61,500	5,190	2,840	39,800
6.....	1,120	1,060	3,210	4,710	2,740	34,800	5,750	4,180	64,900
7.....	1,240	1,160	3,880	3,640	2,170	21,300	7,180	7,180	139,000
8.....	1,420	1,550	5,940	3,050	1,770	14,600	8,470	6,700	153,000
9.....	1,400	1,450	5,480	2,620	1,580	11,200	6,730	4,440	80,700
10.....	1,380	1,870	6,970	2,460	1,640	10,900	5,460	4,520	66,600
11.....	1,150	1,980	6,150	1,880	3,290	16,700	4,780	4,100	52,900
12.....	1,080	1,500	4,370	1,560	1,530	6,440	5,460	3,150	46,400
13.....	1,020	911	2,510	1,590	1,490	6,400	5,670	4,490	68,700
14.....	940	673	1,710	1,860	2,060	10,300	3,780	3,150	32,100
15.....	924	558	1,390	1,980	1,600	8,550	2,950	1,980	15,800
16.....	1,290	1,040	3,620	2,380	2,840	18,300	2,800	1,940	14,700
17.....	2,870	12,900	s 112,000	1,919	2,660	13,700	2,280	1,610	9,910
18.....	2,070	26,700	s 155,000	1,550	2,340	9,790	1,760	1,190	5,650
19.....	1,650	12,600	56,100	1,310	2,500	a 8,800	1,740	1,360	6,390
20.....	1,640	5,400	23,900	1,200	1,040	3,370	1,430	980	3,780
21.....	1,980	3,950	21,100	1,260	1,130	3,840	1,380	980	3,600
22.....	2,090	2,580	14,600	6,050	24,400	s 473,000	1,230	890	2,960
23.....	1,900	2,580	13,200	6,990	30,500	s 600,000	1,100	830	2,470
24.....	1,650	2,470	11,000	3,620	17,000	s 172,000	1,070	820	2,370
25.....	1,850	2,010	10,000	3,120	5,000	42,100	1,120	910	2,750
26.....	2,440	3,920	25,800	3,620	3,700	36,200	1,560	1,660	6,990
27.....	3,010	4,640	37,700	4,750	6,910	88,600	1,740	1,610	7,560
28.....	3,520	5,860	55,700	3,890	9,100	95,600	2,930	3,130	24,800
29.....	4,310	6,730	78,300	3,640	4,900	48,200	2,360	20,600	131,000
30.....	4,800	5,850	75,800	4,220	3,460	39,400	2,030	5,640	30,900
31.....	--	--	--	4,380	3,270	38,700	--	--	--
Total.	54,584	--	774,040	103,250	--	2,082,890	105,470	--	1,132,130

	July			August			September		
1.....	1,990	1,960	10,500	1,110	470	1,410	836	335	756
2.....	1,740	1,340	6,300	1,070	600	1,730	1,020	298	821
3.....	1,420	837	3,210	1,150	515	1,600	1,100	326	968
4.....	1,220	616	2,030	1,230	480	1,590	1,100	288	855
5.....	1,030	488	1,360	1,300	588	2,060	1,060	263	753
6.....	940	478	1,210	1,350	1,110	4,050	1,090	329	968
7.....	868	488	1,140	1,240	892	2,990	1,030	256	712
8.....	868	340	797	1,130	605	1,850	1,090	374	1,100
9.....	799	248	535	1,090	518	1,520	1,110	369	1,110
10.....	736	285	566	1,160	394	1,230	1,040	363	1,020
11.....	694	316	592	1,220	1,200	3,950	1,240	460	1,540
12.....	701	494	935	1,560	2,420	10,200	1,290	390	1,360
13.....	1,980	3,930	s 24,500	1,640	2,860	12,700	1,260	410	1,390
14.....	4,400	6,760	80,300	1,510	2,220	9,050	1,240	500	1,670
15.....	3,520	6,570	62,400	1,600	1,840	7,950	1,310	520	1,840
16.....	3,130	3,000	25,400	1,220	827	2,720	1,310	710	2,510
17.....	2,900	1,780	13,900	1,170	611	1,930	1,220	510	1,680
18.....	2,660	1,220	8,760	1,180	423	1,350	1,050	380	1,080
19.....	2,350	1,190	7,550	1,180	456	1,450	1,060	370	1,080
20.....	2,260	1,800	b 11,000	1,100	381	1,130	1,040	350	983
21.....	2,220	1,090	6,530	1,090	232	683	1,310	460	1,630
22.....	1,960	820	4,340	1,090	223	656	1,390	610	2,290
23.....	1,750	280	b 1,300	964	251	653	1,390	710	2,660
24.....	1,600	230	a 990	836	279	630	1,350	663	2,420
25.....	1,440	830	3,230	972	335	879	1,380	465	1,730
26.....	1,290	260	906	998	288	776	1,330	431	1,550
27.....	1,260	410	1,390	948	288	737	1,100	363	1,080
28.....	1,280	260	899	980	381	1,010	1,120	349	1,060
29.....	1,240	410	1,370	860	363	843	1,130	307	937
30.....	1,170	610	1,930	792	446	954	1,190	290	a 930
31.....	1,180	650	2,070	778	400	840	--	--	--
Total.	52,596	--	287,940	35,518	--	81,121	35,186	--	40,463

Total discharge for year (cfs-days) 581,209
Total load for year (tons) 4,863,082

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, October 1951 to August 1952
(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	Water 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. 5, 1951	9:45 a. m.	2,020	53	1,360	3,960	27	29	33	44	49	56	67	87		96		BWCM
Mar. 17, 1952	12:35 p. m.	1,060	32	1,660	3,060	--	38	--	50	--	60	74	96		--		SPWCM
Apr. 1	5:20 p. m.	1,350	45	3,630	3,190	1	3	19	85	87	92	--	--		--		SPNM
Apr. 1	5:20 p. m.	1,350	45	3,630	5,060	53	67	77	85	88	92	--	--		--		SPWCM
Apr. 10	12:40 p. m.	1,390	--	1,930	4,200	--	51	--	69	--	76	82	96		100		SPWCM
Apr. 17	12:40 p. m.	3,560	--	9,320	8,690	1	2	5	62	75	85	--	--		--		SPNM
Apr. 17	12:40 p. m.	3,560	--	9,320	5,780	34	43	53	62	73	84	--	--		--		SPWCM
Apr. 17	7:05 p. m.	3,310	--	28,300	10,200	--	64	--	86	--	94	--	--		--		SPWCM
Apr. 18	9:40 a. m.	2,120	--	29,200	9,190	--	68	--	91	--	96	--	--		--		SPWCM
May 1	11:00 a. m.	4,430	57	4,450	5,340	--	37	--	56	--	78	--	--		--		SPWCM
May 20	12:50 p. m.	1,160	59	1,030	2,210	--	42	--	53	--	70	84	97		100		SPWCM
May 22	1:20 p. m.	7,940	51	25,800	8,360	--	50	--	72	--	90	--	--		--		SPWCM
May 23	2:00 a. m.	8,150	--	36,000	5,940	--	65	--	85	--	95	--	--		--		SPWCM
May 23	10:25 a. m.	8,060	--	31,800	5,870	--	60	--	79	--	94	--	--		--		SPWCM
May 24	3:40 p. m.	3,370	--	15,000	9,770	--	62	--	84	--	95	--	--		--		SPWCM
June 5	4:30 p. m.	5,070	68	2,160	4,310	--	19	--	30	--	65	85	97		100		SPWCM
June 12	1:00 p. m.	5,290	67	2,760	5,560	--	20	--	37	--	71	88	97		100		SPWCM
June 13	9:40 a. m.	5,590	--	4,090	3,560	3	7	24	41	60	80	92	99		100		SPNM
June 13	9:40 a. m.	5,590	--	4,090	4,600	19	24	32	39	61	79	92	99		100		SPWCM
July 1	12:10 p. m.	2,030	69	1,930	4,150	--	37	--	51	--	70	83	96		100		SPWCM
July 16	11:10 a. m.	3,200	69	2,320	4,740	--	40	--	52	--	75	86	94		100		SPWCM
Aug. 6	5:40 p. m.	1,320	72	1,800	2,220	--	6	--	77	--	80	88	99		100		SPNM
Aug. 6	5:40 p. m.	1,320	72	1,800	2,250	--	59	--	76	--	80	88	99		100		SPWCM
Aug. 20	10:00 a. m.	1,070	70	377	989	--	17	--	23	--	43	69	96		100		SPWCM

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 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
Nov. 1, 1951...		11	0.02	132	61	184		214	730	25	0.4	11		1,350	1,260	1.84		581	406	41	3.3	1,700	7.6	0.000
Nov. 6		12	.02	55	14	39		162	130	6.0	.2	.6		338		.46		193	60	30	1.2	527	7.5	.000
Dec. 3		--	--	55	14	37		165	127	5.5	--	--		344		.47		194	59	29	1.2	528	7.3	.000
Jan. 5, 1952 ...		--	--	58	14	35		182	118	5.5	--	--		340		.46		203	54	28	1.1	531	7.7	.000
Jan. 30.....		--	--	82	23	58		199	233	13	--	--	0.15	--		--		299	136	29	1.4	809	7.6	.000
Feb. 28.....		--	--	60	15	36		193	118	6.2	--	--		--		--		212	54	27	1.1	547	7.5	.005
Mar. 31.....		--	--	61	15	37		190	126	6.0	--	--		--		--		215	59	27	1.1	569	7.7	.000
May 21.....		--	--	30	7.5	20		105	57	3.0	--	--		--		--		106	20	29	.8	293	7.4	.000
June 10.....		--	--	23	6.2	13		82	39	2.0	--	--		--		--		83	16	25	.6	221	7.3	.000
July 1		--	--	32	8.3	18		102	64	3.0	--	--		--		--		114	30	26	.7	309	7.4	.001
Aug. 5.....		--	--	38	8.3	26		111	87	3.0	--	--		230		.31		129	38	30	1.0	368	7.4	.000
Sept. 5		--	--	46	11	34		132	115	5.0	--	--		--		--		160	52	32	1.2	456	7.4	--

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 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 15,100 ppm Apr. 30; minimum daily, not determined.
Sediment loads: Maximum daily, 6,930 tons Apr. 30; minimum daily, not determined.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, 16,700 ppm Apr. 26, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 14,800 tons July 11, 1951; minimum daily, not determined.
REMARKS.--Flow affected by ice Nov. 16-18, 21-23, Dec. 4 to Mar. 16, Mar. 21-24. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Water 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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Dec. 6, 1951...	27.4	--	--	260	183	725		390	2,490	46	--	--	0.43	--	--	--		1,400	1,080	53	8.4	4,770	7.8	
Feb. 27, 1952..	14.1	--	--	283	208	841		441	2,850	43	--	--	.45	--	--	--		1,560	1,200	54	9.3	5,230	7.9	
June 17.....	195	15	0.02	108	48	197		203	673	16	0.5	6.4	--	1,220	1,160	1.66		468	302	48	3.9	1,590	7.6	
Sept. 4.....	195	14	.04	117	62	230		223	800	18	.5	5.4	.25	1,420	1,360	1.93		546	363	48	4.3	1,820	7.8	
Sept. 17.....	191	--	--	112	61	250		193	855	19	--	--	.25	--	--	--		532	374	51	4.7	1,830	7.6	

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	174	997	468	56	277	42	33		
2	170	972	446	50	260	a 36	34	179	15
3	161	948	412	67	376	68	29		
4	168	1,190	540	65	414	73	29		
5	159	1,010	434	57			28	--	e 15
6	145	855	335	57			28	213	16
7	152	1,100	451	53			28		
8	164	1,110	492	56	271	42	28		
9	172	1,010	469	59			27		
10	166	902	404	58			25	--	e 15
11	164	761	337	58			28		
12	145	714	280	58			28		
13	104	451	127	56			28		
14	81			53	214	30	25	--	e 10
15	78			50			20		
		350	76						
16	78			45			20		
17	81			40			20		
18	80			50			20		
19	83	350	a 80	61			20		
20	117	498	157	66			15		
					422	57			
21	131	1,300	sb 500	55			16	--	e 5
22	89	869	209	40			18		
23	80	498	108	35			20		
24	76			40			20		
25	69			44			20		
26	69			46			20		
					175	19			
27	69	266	50	48			20		
28	69			39			20		
29	71			34			30		
30	66			33			18	--	e 3
31	67			--	--	--	10	--	e 1
Total	3,498	--	7,029	1,529	--	1,195	725	--	285

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	10	--		15			12		
2	10	--		15			11		
3	11	--	e 1	15	--	e 4	13		
4	12	34		15			15	--	e 7
5	13	--		15			15		
6	14			17			15		
7	15			17			15		
8	15			17	--	e 8	18		
9	15			17			20		
10	15			17			20		
11	15			18	--	e 10	18	--	e 15
12	15			18	290	14	15		
13	15			18	--	e 15	17		
14	15	--	e 2	15			20		
15	15			13			20		
16	12			15	--	e 7	23	--	e 50
17	14			15			25	1,000	68
18	15			13			25	1,150	s 84
19	15			11			24	1,190	77
20	15			10			20	630	34
21	12			10			17	740	34
22	10			11	--	e 5	15	800	32
23	12	--	e 3	10			16	700	30
24	14	--		10			18	1,020	50
25	14	--		11			20	700	38
26	14	--		13	--	e 6	21	820	46
27	14	--	e 4	15	175	7	26	1,470	s 109
28	14	--		14	--	e 7	31	1,620	136
29	14	119		13	--	e 7	36	1,750	170
30	14	--		--	--	--	34	1,560	143
31	14	--		--	--	--	32	1,520	131
Total	422	--	74	413	--	198	627	--	1,401

e Estimated
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	1,210	98	166	10,000	4,480	162	2,170	949
2.....	30	1,500	122	155	4,990	2,090	143	1,780	687
3.....	31	1,350	113	120	4,240	1,370	126	1,430	486
4.....	30	1,390	113	89	3,140	755	120	1,790	580
5.....	35	2,130	201	92	2,880	715	126	2,020	687
6.....	38	2,510	258	104	3,600	1,010	131	3,520	1,240
7.....	38	2,710	278	76	1,860	382	143	2,670	1,030
8.....	35	2,000	189	76	1,480	304	146	2,920	1,110
9.....	28	1,310	99	76	2,460	505	155	2,820	1,180
10.....	27	720	52	100	2,990	807	143	2,330	900
11.....	26	890	62	114	3,280	1,010	152	3,230	1,330
12.....	25	1,030	70	117	3,200	a1,000	161	2,570	1,120
13.....	25	620	42	109	3,570	1,050	152	2,130	874
14.....	25	720	49	110	3,950	1,170	143	1,140	440
15.....	35	2,400	s341	104	2,820	792	148	1,320	527
16.....	47	4,140	525	102	2,300	633	187	2,530	1,280
17.....	57	6,050	931	110	3,060	909	185	2,680	1,340
18.....	67	7,560	1,370	114	2,540	782	166	2,560	1,150
19.....	67	4,520	818	128	2,660	919	179	2,180	1,050
20.....	66	3,590	640	121	3,390	1,110	181	2,330	1,140
21.....	59	1,950	311	152	3,570	1,470	187	2,210	1,120
22.....	57	1,760	271	244	8,880	5,850	181	1,740	850
23.....	53	1,420	203	195	7,740	4,080	179	1,530	739
24.....	53	1,290	185	170	4,370	2,010	179	1,550	749
25.....	52	1,580	222	191	3,310	1,710	201	1,820	988
26.....	68	3,100	s639	189	2,470	1,260	209	1,910	1,080
27.....	72	4,200	816	183	2,320	1,150	218	1,460	859
28.....	97	7,960	2,080	189	2,250	1,150	207	1,220	682
29.....	123	12,000	sb4,300	187	2,270	1,150	191	1,290	665
30.....	170	15,100	6,930	179	3,200	1,550	185	1,360	679
31.....	--	--	--	166	2,470	1,110	--	--	--
Total.	1,566	--	22,328	4,228	--	44,283	4,986	--	27,511

	July			August			September		
1.....	166	1,330	596	145	861	337	195	968	510
2.....	157	1,180	500	175	1,640	775	193	924	481
3.....	150	1,360	551	176	1,620	770	189	1,060	541
4.....	150	894	362	187	1,480	747	185	766	383
5.....	155	959	401	199	1,460	784	181	669	327
6.....	136	738	271	195	1,560	821	168	590	268
7.....	153	738	305	201	1,480	803	168	572	259
8.....	150	738	299	205	1,910	1,060	193	590	307
9.....	136	631	232	228	1,340	825	195	783	412
10.....	140	951	359	273	2,300	sb2,000	189	625	319
11.....	134	886	321	285	2,800	2,150	191	600	a300
12.....	159	992	426	266	2,520	1,810	191	669	345
13.....	181	1,220	596	260	2,450	1,720	197	739	393
14.....	181	1,000	489	241	1,740	1,130	201	801	435
15.....	176	1,500	713	233	1,580	994	205	810	448
16.....	161	1,570	682	201	1,210	657	187	1,020	515
17.....	150	1,070	433	193	1,060	552	181	968	473
18.....	145	1,290	505	207	986	551	176	704	335
19.....	155	1,550	649	193	1,000	521	183	600	a300
20.....	157	1,320	560	159	1,000	429	179	550	a260
21.....	155	1,340	561	148	986	394	174	449	211
22.....	134	1,000	362	140	862	326	161	519	226
23.....	138	927	345	133	616	221	179	625	302
24.....	138	1,140	425	141	660	251	146	590	223
25.....	126	976	332	166	906	406	143	598	231
26.....	131	943	334	125	792	267	152	572	235
27.....	141	836	318	126	572	195	170	678	311
28.....	155	1,060	444	136	480	a180	181	669	327
29.....	148	1,070	428	166	600	a280	179	660	319
30.....	136	828	304	157	871	369	176	686	326
31.....	140	828	313	176	1,490	708	--	--	--
Total.	4,634	--	13,416	5,836	--	23,033	5,408	--	10,332

Total discharge for year (cfs-days) 33,872
Total load for year (tons) 151,085

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

SAGE CREEK NEAR LOVELL, WYO.--Continued

Particle-size analyses of suspended sediment, October 1951 to August 1952
(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	Water 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, 1951	5:45 p.m.	185	51	1,820	2,910	--	35	--	49	--	69	83	98		100		SPWCM
Nov. 8	4:20 p.m.	54	41	286	711	46	57	68	78	88	94	95	98		100		BWCM
Mar. 28, 1952	7:00 a.m.	29	--	1,470	1,040	52	56	64	78	86	90	95	99		100		BWCM
Apr. 2	9:05 a.m.	25	36	1,110	2,240	48	66	77	84	89	92	96	99		100		BWCM
Apr. 17	11:45 a.m.	53	52	4,460	6,060	--	47	--	67	--	92	--	--		--		SPWCM
May 20	4:10 p.m.	133	--	3,840	3,890	0	3	8	46	58	76	94	100		--		SPNM
May 20	4:10 p.m.	133	--	3,840	4,290	30	33	41	48	58	74	--	--		--		SPWCM
May 24	12:10 p.m.	177	--	5,080	4,610	--	34	--	48	--	73	92	99		100		SPWCM
June 5	2:35 p.m.	143	71	3,450	6,680	--	34	--	55	--	80	--	--		--		SPWCM
June 13	12:25 p.m.	134	--	2,600	2,270	--	0	16	38	49	66	88	99		100		SPNM
June 13	12:25 p.m.	134	--	2,600	3,420	22	27	33	39	49	65	--	--		--		SPWCM
July 1	3:20 p.m.	172	69	1,780	2,780	--	26	--	41	--	70	88	99		100		SPWCM
July 16	1:10 p.m.	179	71	2,170	5,020	--	28	--	43	--	75	--	--		--		SPWCM
Aug. 6	2:15 p.m.	207	--	1,860	3,340	--	27	--	37	--	70	88	98		100		SPWCM
Aug. 13	2:25 p.m.	266	--	2,880	2,960	--	4	--	36	--	68	90	99		100		SPNM
Aug. 13	2:25 p.m.	266	--	2,880	2,910	--	30	--	41	--	68	--	--		--		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 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 7, 1951 ...		14	0.02	82	27	114		214	353	12	0.4	3.5		736	1.00		317	142	44	2.8	1,030	7.5	0.000
Dec. 5				77	27	104		196	340	11				684	.93		305	144	42	2.6	985	7.5	.000
Jan. 4, 1952....				82	26	88		222	290	12				646	.88		310	128	38	2.2	932	7.8	.000
Jan. 31.....				77	24	81		203	273	11			0.16	--	--		290	124	38	2.1	884	7.4	.001
Feb. 28				76	26	88		213	288	11				--	--		298	123	39	2.2	917	7.8	.001
Apr. 1				81	27	100		214	325	13				--	--		315	140	41	2.5	997	8.1	.001
May 20.....				59	20	86		159	265	8.0				--	--		230	100	45	2.5	809	7.8	.000
June 17.....				65	19	89		164	275	8.0				--	--		240	106	45	2.5	837	7.4	.001
July 1				62	20	92		161	282	9.0				582	.79		237	105	46	2.6	846	7.6	.000
Aug. 6				75	26	118		190	365	11				730	.99		294	138	47	3.0	1,030	7.9	.000
Sept. 5.....				85	30	135		208	423	12				--	--		335	164	47	3.2	1,150	7.7	.000

BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At bridge on U. S. Highways 10 and 12, 1 mile 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 1952.
Water temperatures: April 1949 to September 1951.
Sediment records: July 1947 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 825 ppm Oct. 1-31; minimum, 412 ppm June 7-17.
Hardness: Maximum, 385 ppm Jan. 4-7; minimum, 160 ppm May 7.
Specific conductance: Maximum daily, 1,250 micromhos Apr. 15, 16; minimum daily, 450 micromhos May 7.
Sediment concentrations: Maximum daily, 23,200 ppm May 24; minimum daily, not determined.
Sediment loads: Maximum daily, 727,000 tons May 24; minimum daily, not determined.
EXTREMES, 1947-52.--Dissolved solids (January 1951 to September 1952): Maximum, 860 ppm Feb. 1-10, 1951; minimum, 304 ppm June 23, 1951.
Hardness (January 1951 to September 1952): Maximum, 432 ppm Feb. 1-10, 1951; minimum, 151 ppm June 23, 1951.
Specific conductance (January 1951 to September 1952): Maximum daily, 1,270 micromhos Feb. 2, 1951; minimum daily, 384 micromhos June 20, 1951.
Sediment concentrations: Maximum daily, 23,200 ppm May 24, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 727,000 tons May 24, 1952; 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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
Oct. 1-31, 1951	3,209			78	38	120	--	204	410	16		3.3	0.16	825		1.12	7,150	350	183	42	2.8	1,140	7.9	--
Nov. 1-30.....	2,719			92	32	102	--	c225	370	16		2.8	.14	776		1.06	5,700	362	177	37	2.3	1,090	8.3	--
Dec. 1-14.....	2,371			63	33	98	--	145	360	15		2.4	.13	691		.94	4,420	292	173	41	2.5	970	8.2	--
Dec. 7 a.....	2,460			92	32	97		226	353	15		--	--	744		1.01	4,940	362	177	37	2.2	1,060	7.7	0.000
Jan. 4-7, 1952..	2,030			95	36	98		c254	353	16		--	--	774		1.05	4,240	385	177	36	2.2	1,070	8.4	.000
Jan. 8-24.....	2,060			92	30	82	--	234	313	15		3.1	.14	696		.95	3,870	354	162	33	1.9	985	8.0	--
Feb. 4-7	2,495			87	26	81		215	293	14		--	.13	--		--	--	325	149	35	1.9	946	7.4	.000
Feb. 8-29.....	2,215			90	32	88	--	230	325	15		3.0	.14	720		.98	4,310	356	167	35	2.0	1,010	8.1	--
Mar. 1-19.....	2,572			87	31	86	--	222	328	15		3.1	.15	706		.96	4,900	344	162	34	2.0	997	8.1	--
Mar. 18 a.....	3,400			84	30	94		209	330	15		--	--	--		--	--	332	161	38	2.2	991	7.8	.000
Mar. 20-23....	3,300			80	29	90	--	204	323	13		3.5	.11	685		.93	6,100	320	153	37	2.2	973	8.2	--
Mar. 24-28....	4,240			84	30	92	--	c206	335	15		3.4	.12	719		.98	8,230	334	165	37	2.2	1,000	8.4	--
Mar. 29-Apr.28	3,541			82	30	96	--	c210	333	14		3.6	.12	718		.98	6,860	327	155	39	2.3	1,000	8.3	--

a Not included in weighted average.
c Includes carbonate as bicarbonate.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
Apr. 1, 1952 a	4,710			70	25	77		188	262	12		--	--	--		--	--	276	122	38	2.0	849	7.7	0.001
Apr. 29-30	6,470			61	20	66	--	c173	219	9.0		4.6	0.06	507		0.69	8,860	234	92	37	1.9	733	8.4	--
May 1-22	5,202			51	17	51	--	147	170	7.0		3.0	.08	458		.62	6,430	195	74	36	1.6	598	8.1	--
May 7 a	7,230			43	13	34		128	117	5.0		--	--	--		--	--	160	55	32	1.2	460	7.8	.001
May 23-28	8,847			62	18	104	--	180	285	10		6.6	.09	666		.91	15,910	230	82	49	3.0	885	8.1	--
May 29-June 6	7,631			50	17	57	--	149	182	7.0		2.3	.08	464		.63	9,560	195	73	38	1.8	621	8.1	--
June 3 a	7,480			54	16	55		155	176	7.0		--	--	--		--	--	201	74	37	1.7	619	7.7	.002
June 7-17	7,659			46	15	49	--	136	156	7.0		2.0	.08	412		.56	8,520	176	64	37	1.6	553	7.7	--
June 18-30	3,416			68	23	80	--	173	273	10		2.8	.14	660		.90	6,090	264	122	39	2.1	846	8.0	--
July 1-31	2,763			78	24	93	--	184	330	12		3.1	.10	666		.91	4,970	295	144	39	2.4	946	7.8	--
July 7 a	1,900			88	27	103		199	360	13		--	--	724		.98	3,710	332	169	40	2.5	1,030	7.8	.001
Aug. 1-31	2,287			81	30	113	--	196	388	15		2.7	.18	767		1.04	4,740	324	163	42	2.7	1,070	8.0	--
Aug. 5 a	2,410			83	28	115		194	378	14		--	--	756		1.03	4,920	323	164	44	2.8	1,080	7.8	.001
Sept. 1-30	2,535			89	31	121	--	211	418	16		2.4	.16	822		1.12	5,630	350	177	42	2.8	1,140	7.8	--
Sept. 2 a	2,160			93	34	136		216	450	16		--	--	--		--	--	372	195	44	3.1	1,200	7.7	.000
Weighted average[b]	3,332			73	26	89	--	c189	306	12		d3.1	d0.12	d663		d0.90	d5,960	289	134	39	2.3	915	--	--
Weighted average[e]	3,223			74	27	89	--	c190	307	13		3.1	0.12	666		0.91	5,800	296	140	39	2.3	919	--	--

a Not included in weighted average.
b Represents 95 percent of runoff for water year October 1951 to September 1952.
c Includes carbonate as bicarbonate.
d Includes estimated data for missing periods.
e Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1951 to September 1952

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	2,860	621	4,800	2,930	500	3,960	2,670	470	3,390
2	2,920	585	4,610	2,500	335	2,260	2,650	395	2,830
3	3,110	670	a 5,600	2,530	600	4,100	2,590	395	2,760
4	3,060	652	5,390	2,560	425	2,940	2,590	458	3,200
5	3,040	541	4,440	2,590	890	6,220	2,590	480	3,360
6	3,420	900	8,310	2,650	745	5,330	2,620	480	3,400
7	4,740	2,220	28,400	2,700	585	4,260	2,460	475	3,150
8	4,390	6,100	a 72,000	2,750	518	3,850	2,280	394	2,430
9	4,160	9,850	111,000	2,830	638	4,870	2,150	315	1,830
10	3,750	3,350	33,900	2,990	490	3,960	2,100	280	1,590
11	3,540	2,200	21,000	2,990	400	3,230	2,080	492	2,760
12	3,560	1,180	11,300	2,950	370	b 2,900	2,140	662	3,820
13	3,560	950	9,130	2,920	510	4,020	2,230	--	e 2,500
14	3,440	855	7,940	2,920	340	2,680	2,050	--	e 2,000
15	2,810	640	4,860	2,920	355	2,800	1,100	--	e 1,000
16	2,600	500	3,510	2,880	395	3,070	800	--	e 500
17	2,600	470	3,300	2,720	400	a 2,900	820	--	e 500
18	2,730	540	3,980	2,560	400	b 2,800	1,100	--	e 700
19	2,760	450	3,350	2,580	530	3,690	1,530	--	e 900
20	2,900	505	3,950	2,600	580	4,070	2,000	--	e 1,000
21	3,000	450	3,640	2,700	462	3,370	2,050		
22	3,360	1,000	a 9,100	2,700	380	2,770	2,100		
23	3,210	895	7,760	2,650	368	2,630	2,130		
24	3,080	945	7,860	2,600	590	4,140	2,100		
25	3,020	860	7,010	2,650	550	b 3,900	2,030		
26	3,040	850	6,980	2,670	510	b 3,700	1,950	--	e 600
27	2,990	615	4,960	2,600	480	3,370	2,050		
28	2,970	500	4,010	2,580	460	b 3,200	2,150		
29	2,930	440	3,480	2,680	440	3,180	2,250		
30	2,970	455	3,650	2,670	430	b 3,100	2,150		
31	2,950	430	3,420	--	--	--	2,050		
Total	99,470	--	412,640	81,570	--	107,270	63,560	--	50,220

	January			February			March		
1	2,000	--	e 500	2,460	--	e 700	2,220	83	498
2	2,000			2,480	--	e 600	2,160	100	583
3	2,000			2,490	--	e 500	2,100	110	624
4	2,020			2,470	58	387	2,110	102	581
5	2,020	--	e 400	2,510			2,180	132	777
6	2,030			2,510			2,280	140	862
7	2,050			2,490	--	e 400	2,400	140	907
8	2,050	--	e 500	2,430			2,500	113	763
9	2,040	--	e 600	2,470			2,550	130	b 900
10	2,050	115	637	2,510			2,570	172	1,190
11	2,020	110	600	2,520	202	1,370	2,600	220	1,540
12	2,020	120	654	2,540	200	b 1,400	2,600	230	1,610
13	1,980	108	577	2,520	275	1,870	2,620	165	1,170
14	1,900	120	616	2,450	135	893	2,550	168	1,160
15	1,950	120	632	2,100	140	794	2,580	207	1,440
16	2,020	260	a 1,400	2,000	240	a 1,300	2,750	220	1,630
17	2,100	270	1,530	2,050	120	664	2,900	340	2,660
18	2,200	278	1,650	2,000	90	486	3,400	575	5,280
19	2,150	300	1,740	1,900	75	385	3,800	827	8,480
20	2,120	258	1,480	1,830	45	222	3,600	922	8,960
21	2,100	--	e 1,200	1,750	50	236	3,400	815	7,480
22	2,070	--	e 900	1,880	70	355	3,200	510	4,410
23	2,100			1,980	60	321	3,000	410	3,320
24	2,150			2,270	65	399	3,600	400	3,890
25	2,250			2,300	50	310	4,000	685	7,400
26	2,300	--	e 700	2,350	130	825	4,200	842	9,550
27	2,330			2,300	180	1,120	4,600	880	10,900
28	2,350			2,300	143	888	4,800	3,310	42,900
29	2,370			2,270	107	656	5,000	5,000	a 68,000
30	2,410			--	--	--	5,270	5,340	76,000
31	2,440			--	--	--	5,330	3,520	50,700
Total	65,590	--	23,916	66,130	--	19,081	98,870	--	326,165

e Estimated.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1951 to September 1952--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	4,710	2,540	32,300	7,790	5,440	114,000	8,050	2,270	49,300
2	4,310	2,110	24,600	7,110	3,750	72,000	7,320	1,750	34,600
3	3,540	1,750	16,700	6,730	2,860	52,000	7,480	1,730	34,900
4	3,260	1,870	16,500	6,840	2,430	44,900	7,790	1,920	40,400
5	3,400	2,000	18,400	7,510	3,080	62,500	7,660	1,980	41,000
6	3,150	1,410	12,000	8,220	3,610	80,100	7,230	2,030	39,600
7	3,170	1,550	13,300	7,230	2,410	47,000	7,700	2,440	50,700
8	3,360	1,630	14,800	5,940	2,010	32,200	9,670	5,520	144,000
9	3,340	1,160	10,500	5,270	1,460	20,800	10,500	6,400	181,000
10	3,150	1,010	8,590	4,800	1,240	16,100	8,970	4,230	102,000
11	2,880	1,220	9,490	4,520	1,230	15,000	7,790	3,090	65,000
12	2,680	956	6,920	4,110	1,060	11,800	7,170	2,810	54,400
13	2,370	1,020	6,530	3,560	1,380	13,300	7,230	2,480	48,400
14	2,280	1,170	7,200	3,580	1,340	13,000	7,950	2,540	54,500
15	2,250	880	5,350	3,650	1,030	10,200	6,700	2,120	38,400
16	2,200	728	4,320	3,910	1,020	10,800	5,410	1,570	22,900
17	2,240	781	4,720	4,340	999	11,700	5,160	1,350	18,800
18	3,890	2,010	s23,500	4,080	1,190	13,100	4,290	1,030	11,900
19	4,290	3,400	39,400	3,710	2,510	25,100	3,380	1,010	9,220
20	3,560	15,600	150,000	3,480	1,300	12,200	3,090	1,100	9,180
21	3,480	11,200	105,000	3,560	2,140	20,600	2,750	845	6,270
22	3,540	4,650	44,400	4,500	4,880	59,300	2,800	860	6,500
23	3,820	2,470	25,500	11,900	13,300	s469,000	2,780	785	5,890
24	3,690	1,650	16,400	11,600	23,200	727,000	2,650	910	6,510
25	3,400	1,650	15,100	7,350	16,200	321,000	2,760	980	7,300
26	3,320	1,840	16,500	6,590	8,850	157,000	3,090	950	7,930
27	3,940	2,130	22,700	7,290	4,590	90,300	3,480	1,510	14,200
28	4,960	2,830	37,900	8,350	3,960	89,300	3,940	1,610	17,100
29	5,860	4,160	65,800	7,920	3,000	64,200	4,820	2,230	s31,600
30	7,080	5,820	111,000	7,440	4,210	84,600	4,580	2,890	35,700
31	--	--	--	7,790	3,020	63,500	--	--	--
Total	107,120	--	885,420	190,670	--	2,823,600	174,190	--	1,189,200

	July			August			September		
1	4,040	6,980	76,100	1,840	315	1,560	2,040	258	1,420
2	3,650	5,180	51,000	1,900	318	1,630	2,160	320	1,870
3	3,130	2,110	17,800	1,980	368	1,970	2,360	540	3,440
4	2,600	1,900	13,300	2,150	489	2,840	2,460	540	3,590
5	2,330	948	5,960	2,410	598	3,890	2,460	495	3,290
6	2,100	1,110	6,290	2,560	855	5,910	2,370	459	2,940
7	1,900	690	3,540	2,580	818	5,700	2,500	450	3,040
8	1,640	364	1,610	2,500	846	5,710	2,500	450	3,040
9	1,540	337	1,400	2,430	865	5,680	2,560	450	3,110
10	1,430	282	1,090	2,530	902	6,160	2,640	630	4,490
11	1,400	252	952	2,600	946	6,640	2,590	632	4,420
12	1,470	360	1,430	2,750	972	7,220	2,590	490	3,430
13	1,930	536	2,790	2,990	1,400	11,300	2,720	458	3,360
14	2,920	1,260	s11,200	2,930	1,210	9,570	2,750	563	4,180
15	6,310	3,820	65,100	2,670	1,400	10,100	2,800	522	3,950
16	5,660	3,140	48,000	2,800	1,480	11,200	2,830	533	4,070
17	4,500	3,380	41,100	2,410	1,000	6,510	2,810	578	4,390
18	3,910	1,600	16,900	2,290	736	4,550	2,750	504	3,740
19	3,420	999	9,220	2,230	500	3,010	2,590	415	2,900
20	3,190	801	6,900	2,190	488	2,880	2,530	394	2,690
21	3,170	828	7,090	2,100	392	2,220	2,500	376	2,540
22	3,150	783	6,660	2,040	437	2,410	2,530	382	2,610
23	2,850	630	4,850	1,990	407	2,190	2,600	393	2,760
24	2,530	603	4,120	2,000	380	2,050	2,650	450	3,220
25	2,330	504	3,170	1,970	343	1,820	2,590	355	2,480
26	2,170	522	3,060	2,000	312	1,680	2,430	324	2,130
27	2,040	378	2,060	2,120	295	1,690	2,480	287	1,920
28	2,120	522	2,990	2,030	269	1,470	2,400	272	1,760
29	2,150	513	2,980	1,920	255	1,320	2,390	264	1,700
30	2,100	436	2,470	1,980	252	1,350	2,460	256	1,700
31	1,970	495	2,630	2,020	238	1,300	--	--	--
Total	85,650	--	423,782	70,910	133,530	76,040	--	--	90,180

Total discharge for year (cfs-days) 1,179,770
Total load for year (tons) 6,485,004

s Computed by subdividing day.

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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, 1951	3:55 p.m.	2,900	57	441	1,460	28	37	42	47	50	54	63	92		100		BWCM
Oct. 9	7:00 a.m.	a4,160	53	11,800	7,530	--	70	--	89	--	92	95	99		100		SPWCM
Oct. 17	2:30 p.m.	2,590	45	401	1,380	24	28	31	35	37	41	50	81		94		BWCM
Mar. 19, 1952	8:00 a.m.	a3,800	--	804	696	63	70	76	80	83	86	90	96		100		BWCM
Mar. 21	8:30 a.m.	a3,400	--	887	422	54	61	65	70	74	78	83	94		100		BWCM
Mar. 25	8:00 a.m.	a4,000	--	614	314	49	57	66	70	71	73	77	93		100		BWCM
Mar. 29	8:00 a.m.	a5,000	--	4,100	2,830	32	40	49	60	68	80	86	97		100		BWCM
Apr. 3	12:15 p.m.	3,520	--	1,750	4,250	--	54	--	70	--	81	91	99		100		SPWCM
Apr. 16	11:25 a.m.	2,230	55	609	1,670	43	53	61	67	69	73	80	94		100		BWCM
Apr. 19	5:35 p.m.	3,840	--	3,860	10,300	--	55	--	78	--	87	--	--		--		SPWCM
Apr. 20	9:20 a.m.	3,560	--	17,200	16,300	1	1	3	93	97	97	--	--		--		SPNM
Apr. 20	9:20 a.m.	3,560	--	17,200	5,640	57	72	85	93	94	97	--	--		--		SPWCM
Apr. 20	4:50 p.m.	3,560	--	17,300	10,200	--	75	--	93	--	96	--	--		--		SPWCM
May 9	10:25 a.m.	5,270	54	1,440	2,700	--	30	--	42	--	61	79	98		100		SPWCM
May 21	9:00 a.m.	3,400	--	2,320	6,450	--	67	--	82	--	87	--	--		--		SPWCM
May 24	8:30 p.m.	9,360	--	23,100	8,910	--	64	--	84	--	95	--	--		--		SPWCM
May 25	5:10 p.m.	6,900	--	14,200	12,900	--	1	4	86	91	94	--	--		--		SPNM
May 25	5:10 p.m.	6,900	--	14,200	5,290	56	69	80	85	89	94	--	--		--		SPWCM
June 5	11:25 a.m.	7,700	--	1,840	4,000	--	29	--	44	--	71	86	99		100		SPWCM
June 17	12:30 p.m.	5,240	--	1,200	2,190	24	29	35	40	49	62	83	98		100		SPWCM

a Mean daily discharge.

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YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952--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	Water 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 3, 1952	12:30 p.m.	3,130	--	1,390	2,760	--	58	--	77	--	82	--	--		--		SPWCM
July 15	1:10 p.m.	6,390	--	4,130	3,580	--	2	15	54	65	78	--	--		--		SPNM
July 15	1:10 p.m.	6,390	--	4,130	4,720	--	36	--	56	--	79	--	--		--		SPWCM
Aug. 5	1:20 p.m	2,360	--	548	1,710	--	10	17	27	30	38	51	100		--		BNM
Aug. 21	9:15 p.m.	2,120	70	360	1,010	--	26	32	36	42	43	58	91		98		BWCM
Sept. 2	2:50 p.m.	2,170	66	267	709	--	20	26	29	31	38	46	91		98		BWCM
Sept. 17	9:35 a.m.	2,830	--	392	1,420	7	11	16	22	27	31	40	100		--		BNM

TONGUE RIVER NEAR ACME, WYO.

LOCATION.--At gaging station, just upstream from Ash Creek at highway bridge and 3.2 miles northeast of Acme, Sheridan County.
DRAINAGE AREA.--894 square miles.
RECORDS AVAILABLE.--Chemical analyses: January to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, January to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Jan. 14, 1952.....	a167	12	0.04	61	28	25		243	111	3.0	0.2	3.2	0.10	365	0.50		268	69	17	0.7	590	7.8	
Feb. 28	a150	10	.04	61	28	23		240	109	3.0	.2	4.2	.06	362	.49		268	71	16	.6	580	7.7	
Mar. 25	187	9.2	.04	58	34	28		250	128	3.5	.2	2.4	.06	394	.54		284	79	18	.7	623	7.8	
May 4	2,130	6.2	.16	26	6.6	6.0		98	20	1.0	.2	2.1	.01	130	.18		92	12	12	.3	201	7.6	
May 31	1,760	5.2	.04	25	7.7	6.4		96	27	.5	.1	.4	.03	122	.17		94	15	13	.3	209	7.6	
June 27	640	11	.04	48	19	18		187	80	1.0	.2	1.6	.01	280	.38		200	47	17	.6	447	7.6	
July 8	217	5.7	.10	50	30	25		220	115	2.0	.2	.6	.09	348	.47		249	69	18	.7	548	8.1	
Aug. 14.....	341	9.8	.04	57	34	28		256	121	2.5	.3	.6	.07	390	.53		281	71	18	.7	605	8.1	
Sept. 16	135	5.5	.01	60	38	37		272	149	4.5	.3	1.4	.11	440	.60		307	84	21	.9	697	8.2	

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 1951 to September 1952.
Water temperatures: April 1949 to September 1952.
Sediment records: June 1946 to September 1951.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 974 ppm Aug. 30; minimum, 214 ppm Mar. 29.
Hardness: Maximum, 376 ppm Feb. 20-29; minimum, 96 ppm Mar. 29.
Specific conductance: Maximum daily, 1,380 micromhos Aug. 30; minimum daily, 305 micromhos June 13.
Water temperatures: Maximum, 72°F June 6, 7; minimum, freezing point on many days during November, December, February, and March.
EXTEMES, 1949-52.--Dissolved solids (January 1951 to September 1952): Maximum, 974 ppm Aug. 30, 1952; minimum, 214 ppm Mar. 29, 1952.
Hardness (January 1951 to September 1952): Maximum, 432 ppm Jan. 4-31, 1951; minimum, 96 ppm Mar. 29, 1952.
Specific conductance (January 1951 to September 1952): Maximum daily, 1,380 micromhos Aug. 30, 1952; minimum daily, 305 micromhos June 13, 1952.
Water temperatures: Maximum, 78°F July 28, 29, 1951; minimum, 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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-31, 1951	328			60	35	42		243	184	3.0		2.1	0.08	466	0.63	413	295	96	23	1.1	716	7.9	
Nov. 1-5	166			73	45	77		328	260	4.6		.9	.12	650	.88	291	369	100	31	1.7	974	8.0	
Nov. 6-10	580			61	38	50		259	198	2.9		1.6	.10	510	.69	799	307	95	26	1.2	759	8.2	
Nov. 11-30	610			67	36	43		a275	205	3.0		.7	.10	506	.69	833	316	90	21	1.1	767	8.2	
Dec. 1-24	204			46	40	55		220	210	5.5		2.0	.09	489	.67	269	280	100	29	1.4	748	7.9	
Dec. 25-Jan. 15, 1952	142			57	53	67		269	271	5.0		1.5	.12	622	.85	238	360	139	29	1.5	918	8.1	
Jan. 16-Feb. 9	140			65	46	65		284	252	4.5		2.4	.09	600	.82	227	352	119	28	1.5	895	7.9	
Feb. 10-19	169			30	15	38		146	97	1.0		2.3	.08	286	.39	131	138	18	37	1.4	447	7.2	
Feb. 20-29	168			74	47	68		327	253	4.5		2.2	.10	641	.87	291	376	108	27	1.5	950	--	
Mar. 1-19	166			65	44	62		292	229	4.5		2.4	.07	578	.78	258	341	102	28	1.5	879	7.9	
Mar. 20-25	183			40	24	47		190	146	1.5		3.1	.05	384	.52	190	200	44	33	1.4	600	7.5	
Mar. 26-28	237			31	11	33		146	77	1.5		1.4	.03	264	.36	169	122	2	35	1.3	401	7.6	
Mar. 29	500			25	8.1	29		136	43	5.0		5.2	.13	214	.29	289	96	0	38	1.3	319	7.3	
Mar. 30-Apr. 1	4,920			35	13	31		165	73	1.0		1.8	.05	268	.36	3,560	139	4	32	1.1	406	7.6	
Apr. 2-3	2,810			43	14	30		173	89	1.0		3.1	.06	294	.40	2,230	166	24	27	1.0	453	7.7	
Apr. 4-23	1,570			55	32	40		205	181	4.0		4.1	.05	456	.62	1,930	267	99	24	1.1	673	7.8	
Apr. 24-May 4	381			68	49	81		291	307	6.0		1.5	.10	688	.94	708	373	134	31	1.8	1,000	8.2	
May 5-17	1,230			42	24	26		172	116	2.5		1.9	.04	326	.44	1,080	204	63	21	.8	504	8.1	
May 18-26	772			39	20	28		163	105	2.0		2.1	.05	300	.41	625	180	46	25	.9	470	8.1	
May 27-31	1,780			36	18	20		148	82	1.0		2.0	.02	258	.35	1,240	163	42	21	.7	402	7.9	

a Includes equivalent of 7 ppm of carbonate (CO_3).

June 1-15, 1952 .	1,670			35	14	16		140	67	1.0		1.4	0.07	221	0.30	996	146	31	19	0.6	351	8.0
June 16-30.....	436			43	20	39		184	119	2.0		1.6	.10	332	.45	391	188	37	30	1.2	521	8.0
July 1-17	170			54	26	55		221	175	3.0		2.0	.10	445	.61	204	240	59	32	1.5	677	7.8
July 18-31	417			48	23	38		a195	132	2.5		2.1	.13	355	.48	400	214	54	27	1.1	551	8.5
Aug. 1-29	99			58	36	67		268	228	4.0		1.7	.11	538	.73	144	292	72	31	1.7	809	8.1
Aug. 30	214			50	24	226		299	493	6.0		3.1	.19	974	1.32	563	224	0	64	6.6	1,380	7.3
Aug. 31-Sept. 30	120			63	38	65		272	226	5.0		1.5	.14	546	.74	177	315	92	30	1.6	831	7.8
Weighted average b.....	496			48	27	38		201	147	2.7		2.2	0.07	390	0.53	522	231	66	26	1.1	592	--

a Includes equivalent of 7 ppm of carbonate (CO_3).
b Represents 100 percent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement at approximately 8 a. m.)

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

a Includes estimated temperature, 32°F, on missing days.

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 1952 (discontinued).
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Dec. 6, 1951	7,250	--	--	--	--	--		189	0	316	--	--	--		--	--		254	99	--	--	759	7.6
Jan. 3, 1952	5,200	--	--	75	26	65		225	0	224	13	--	--		--	--		295	110	32	1.6	828	7.9
Feb. 4	4,560	--	--	--	--	--		189	0	192	--	--	--		--	--		248	93	--	--	712	7.5
Mar. 5	4,610	--	--	--	--	--		202	0	232	--	--	--		--	--		275	109	--	--	793	7.8
Apr. 3	15,920	--	--	--	--	--		159	0	187	--	--	--		--	--		205	75	--	--	634	7.6
May 9	26,170	13	0.08	31	6.0	19		103	0	51	2.5	0.2	2.1		184	0.25		102	18	29	.8	263	7.6
June 5	41,340	7.9	.12	30	7.1	22		93	7	56	3.0	.2	.7		184	.25		104	16	31	.9	282	8.5
July 3	23,360	--	--	--	--	--		115	0	93	--	--	--		--	--		131	37	--	--	390	7.9
Aug. 6	6,990	--	--	--	--	--		143	0	151	--	--	--		--	--		174	57	--	--	561	7.5
Sept. 4	6,580	--	--	--	--	--		179	0	227	--	--	--		--	--		230	83	--	--	745	7.9

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.
DRAINAGE AREA.--1,150 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952.
Water temperatures: April 1951 to September 1952.
Sediment records: May 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 86°F July 25; minimum, freezing point on many days during October to April.
Sediment concentrations: Maximum daily, 69,800 ppm May 23; minimum daily, not determined.
Sediment loads: Maximum daily, 1,270,000 tons May 22; minimum daily, less than 0.50 ton on many days.
EXTREMES, 1950-52.--Water temperatures (April 1951 to September 1952): Maximum, 90°F July 31, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 89,400 ppm Sept. 7, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 1,270,000 tons May 22, 1952; minimum daily, less than 0.50 ton on many days.
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. 2-4, 17-20, 22, 24, 25, Dec. 6 to Mar. 14. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, September 1949 to September 1952

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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 10, 1949 .	--	15	0.06	228	55	329		158	1,020	218	1.8	7.2	--	--	1,950	2.65	--	795	665	47	--	2,640	7.4	--
June 7, 1951...	a8.4	20	.02	300	82	523		158	1,330	488	2.2	19	0.45	2,990	2,840	4.07	--	1,090	960	51	--	3,960	7.4	--
Dec. 20, 1951..	9.0	18	.04	314	79	367		222	1,170	353	1.6	7.8	.29	2,580	2,420	3.51	62.7	1,110	928	42	4.8	3,290	7.7	--
Jan. 11, 1952..	10	19	.04	274	63	356		172	980	387	2.0	4.0	.30	2,300	2,170	3.13	62.1	942	801	45	5.0	3,100	7.6	--
Feb. 22.....	19	16	.04	256	65	300		184	960	278	1.6	14	.26	2,120	1,980	2.88	109	906	755	42	4.3	2,790	7.7	--
Mar. 28	55	12	.04	187	50	249		148	845	134	1.0	29	.20	1,650	1,580	2.24	245	674	553	45	4.2	2,180	7.5	--
Apr. 16.....	29	10	.10	221	64	293		112	1,020	199	1.2	17	.22	1,980	1,880	2.69	155	813	721	44	4.5	2,560	7.6	--
May 24.....	400	13	.10	274	51	294	9.8	158	1,310	35	.9	5.2	.24	2,170	2,070	2.95	2,340	894	764	41	4.3	2,630	7.6	10
May 25-26	272	19	.04	210	53	304	8.9	180	1,180	43	1.2	1.2	.21	1,960	1,910	2.67	1,440	743	595	47	4.8	2,410	7.6	8
May 27-30.....	109	16	.10	242	53	324	9.2	182	1,270	60	.9	4.6	.24	2,150	2,070	2.92	633	820	671	46	4.9	2,670	8.1	12
June 2-3.....	52.5	19	.04	304	74	430	13	184	1,520	203	1.4	21	.31	2,790	2,680	3.79	395	1,060	909	46	5.7	3,450	8.1	9
June 6-7	16.5	19	.10	335	71	408	13	164	1,560	195	1.4	7.4	.35	2,840	2,690	3.86	127	1,130	996	44	5.3	3,420	8.0	13
June 8-21	8.09	20	.04	318	78	512	18	89	1,510	442	2.4	9.3	.43	3,080	2,950	4.19	67.3	1,110	1,040	49	6.7	4,000	7.7	6
June 22-25	20.0	21	.04	312	80	469	15	151	1,530	308	2.0	30	.41	2,980	2,840	4.05	161	1,110	986	47	6.1	3,770	7.9	13
June 26-28	35.3	21	.04	254	64	402	11	162	1,290	232	1.8	9.9	.33	2,480	2,370	3.37	236	896	763	49	5.8	3,190	7.9	18
June 29-30.....	13.0	22	.04	320	78	450	15	172	1,510	305	2.0	17	.38	2,940	2,800	4.00	103	1,120	979	46	5.8	3,720	7.9	12
July 1-12.....	20.7	21	.04	329	80	476	18	126	1,460	437	2.4	16	.44	3,010	2,900	4.09	168	1,150	1,050	47	6.1	3,880	8.1	8
July 13,8:00 a. m.	175	19	.10	293	87	338	9.9	202	1,510	86	.8	1.0	.29	2,590	2,450	3.52	b1,160	1,090	924	40	4.5	3,050	7.6	8
July 13,5:00 p. m.	175	19	.06	273	69	310	10	252	1,340	38	.8	.9	.32	2,310	2,180	3.14	--	931	724	42	4.4	2,740	7.2	13

a Discharge at time of sampling.
b Mean for day.

July 14, 1952..	258	17	0.06	230	45	212	8.9	210	995	27	0.8	1.1	0.35	1,720	1,640	2.34	1,200	761	589	37	3.3	2,080	7.5	13
July 15.....	92	17	206	251	50	249	10	170	1,090	77	1.0	12	.35	1,940	1,840	2.64	482	831	692	39	3.8	2,360	7.6	14
July 16-31.....	8.08	24	.04	324	71	484	21	143	1,350	493	2.6	6.4	.52	3,010	2,850	4.09	65.7	1,100	983	48	6.3	3,940	7.7	7
Aug. 1-11.....	11.0	22	.06	353	75	528	17	202	1,540	414	2.2	3.7	.39	3,210	3,060	4.37	95.3	1,190	1,020	49	6.7	4,050	7.2	9
Aug. 12	85	33	.16	300	70	524	19	c 137	1,250	561	2.8	1.8	.48	2,940	2,830	4.00	675	1,040	928	52	7.1	3,920	8.4	--
Aug. 13-28	10.4	22	.01	315	71	468	17	156	1,350	430	2.2	2.8	.42	2,900	2,760	3.94	81.4	1,080	952	48	6.2	3,750	7.7	8
Aug. 29-Sept. 2	10.1	22	.04	319	68	492	16	170	1,410	418	2.0	6.4	.41	2,990	2,840	4.07	81.5	1,080	941	49	6.5	3,840	7.3	9
Sept. 3-30.....	6.41	25	.01	309	69	538	23	119	1,200	643	3.2	2.8	.46	3,030	2,870	4.12	52.4	1,050	952	52	7.2	4,130	7.9	6

c Includes equivalent of 5 parts per million carbonate (CO_3).

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952.
/Once-daily temperature measurement between 8 a.m. and 11 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	--	--	--	--	--	34	54	60	--	--	50
2	a64	a34	--	a32	--	--	32	56	62	71	--	50
3	46	32	a36	--	--	--	34	62	66	72	70	54
4	48	32	a36	--	--	--	32	68	--	63	70	56
5	48	a36	--	--	--	--	38	54	--	67	70	65
6	44	32	--	--	--	--	38	56	68	a65	62	--
7	46	32	--	--	--	--	44	48	62	--	65	67
8	--	34	--	--	a32	--	34	56	56	75	67	--
9	44	32	--	--	--	--	34	45	64	--	63	70
10	44	a40	--	--	--	a42	a60	44	64	--	72	--
11	46	35	--	a32	32	a34	a56	52	60	--	--	--
12	44	38	a32	--	--	a33	a48	54	72	--	65	60
13	45	32	--	--	--	a34	54	54	a82	--	--	70
14	a56	32	--	--	--	33	a62	54	a84	--	--	--
15	42	32	--	--	--	36	46	50	a76	--	65	55
16	38	a33	--	--	--	35	44	a49	a80	--	64	--
17	36	32	--	--	--	35	48	46	a82	--	66	--
18	38	32	--	--	--	32	60	50	a84	a85	a82	55
19	40	34	a32	--	--	34	58	--	a80	--	70	65
20	40	32	a32	--	--	a34	60	54	a81	--	69	60
21	40	32	--	--	--	--	38	52	a70	--	62	a65
22	35	32	--	--	a32	32	44	44	76	--	a75	50
23	34	32	--	--	--	a36	44	46	a76	--	68	55
24	38	32	--	a32	--	34	44	54	a56	--	68	52
25	a42	32	--	--	--	32	60	58	58	a86	67	a68
26	36	32	--	--	--	34	50	52	54	76	70	50
27	32	34	--	--	--	36	54	48	60	--	--	a70
28	34	a36	--	--	--	36	54	54	60	70	--	a72
29	38	a40	--	--	--	34	50	58	66	75	a60	a70
30	34	39	--	--	--	34	48	54	64	72	62	a62
31	32	--	--	--	--	34	--	56	--	70	57	--
Average	42	34	--	b32	b32	--	47	53	69	--	--	--

a Observation made between 1 p.m. and 5 p.m.
b Includes estimated temperatures, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952

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	21	100	6	13	110	a 4	20		
2	21	52	3	10	197	5	20	160	a 8
3	21	68	4	15	135	5	15		
4	28	530	sb 60	21	147	8	16	303	13
5	22	540	32	20	135	7	14		
6	21	199	11	18	198	10	14		
7	20	135	7	19	262	13	13		
8	19	98	5	22	445	26	12	--	e 7
9	18	66	3	18	400	a 19	10		
10	17			18	380	a 18	11		
11	17			18	165	8	12		
12	18			18	118	6	13	112	4
13	18			17	141	6	12		
14	18			14	240	a 9	11		
15	19	44	2	14	200	a 7	10		
16	20			14	207	8	11	--	e 2
17	21			10	207	a 5	11		
18	21			15	220	9	12		
19	21			17	116	5	11	38	1
20	21			20	91	5	9.0	76	2
21	21			19	100	5	10		
22	20			18	70	3	11		
23	20			17	68	3	11		
24	18			16	78	3	10		
25	18	48	2	15	86	3	9.0		
26	18			18	74	4	10	--	e 2
27	18			19	82	4	10		
28	18			19	200	a 10	11		
29	17			21	270	a 15	12		
30	19	155	8	20	128	7	11		
31	19	153	8	--	--	--	10		
Total	608	--	187	513	--	240	372.0	--	127

	January			February			March		
1	9.0			17			19		
2	9.5			18			18		
3	10			18	--	e 7	17		
4	10			19			18		
5	10			20			20	--	e 20
6	11		e 3	21			21		
7	12			21			21		
8	12			23			22		
9	11			24	150	9	23		
10	10			25			23	630	39
11	10	101	3	26			18	445	22
12	10			24			11	237	7
13	10			23			10	590	16
14	11			22			11	855	25
15	12			21			56	750	113
16	12			21			75	2,020	s 580
17	12			21	--	e 10	72	1,910	s 397
18	12			20			47	1,250	159
19	12			18			40	833	90
20	12			17			34	600	55
21	11		e 4	18			32	392	s 39
22	10			19	220	11	28	240	18
23	10			19			26	378	s 32
24	14			20			29	330	26
25	14			21			26	400	28
26	14			22	--	e 10	29	430	34
27	15			22			36	1,040	101
28	15			21			55	3,000	s 632
29	16			20			196	9,970	s 6,120
30	17			--	--	--	223	14,800	s 9,390
31	17			--	--	--	132	11,800	4,210
Total	370.5	--	113	601	--	270	1,388	--	22,311

e Estimated.
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 1951 to September 1952--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 1		Mean concentration (ppm)	Tons per day
1	67	7,900	1,430	8.7			34	700	64
2	54	3,400	498	7.8			25	350	24
3	47	4,800	609	6.6			80	10,000	sb15,000
4	37	2,950	295	6.1	19	(t)	118	22,000	sb9,800
5	39	2,700	284	5.7			25	3,000	b200
6	37	2,750	275	6.6			18	2,300	112
7	37	2,300	230	7.0			15	396	16
8	32	1,750	151	30	6,100	sb1,800	12	140	5
9	28	1,000	76	136	31,400	s13,000	10	62	2
10	26	700	49	134	44,300	s18,500	8.9		
11	26	660	46	44	25,200	s3,370	7.1		
12	26	570	42	21	11,700	663	6.1		
13	27	648	47	14	4,200	159	6.4		
14	26	542	38	11	3,100	92	6.4	15	(t)
15	28	570	43	86	18,200	s7,080	6.4		
16	29	618	48	125	32,800	s12,800	6.4		
17	24	468	30	75	34,500	s8,010	7.1		
18	22	410	24	36	13,400	1,300	7.8		
19	21	385	22	26	12,500	878	8.9		
20	21	435	25	26	8,500	s656	9.7	20	1
21	20	440	24	17	2,700	124	10	65	1
22	21	440	25	4,260	68,800	s1,270,000	16	165	7
23	19	360	18	1,980	69,800	s540,000	12	75	2
24	14	340	13	400	26,800	28,900	31	2,300	sa450
25	12	140	5	295	18,300	14,600	21	2,430	s170
26	10			249	10,500	7,060	46	8,020	s1,410
27	9.5			142	10,600	s5,570	34	6,200	569
28	9.1	49	1	153	15,100	6,240	26	740	52
29	9.5			82	10,500	2,320	14	2,910	110
30	7.8			57	4,090	629	12	900	29
31	--	--	--	45	2,410	293	--	--	--
Total	785.9	--	4,350	8,492.5	---	1,944,046	640.2	--	28,029

	July			August			September		
1	11	210	6	5.8	69	1	8.5	2,700	62
2	11	71	2	6.1	95	2	8.0	425	9
3	10			6.4	34	1	7.5	154	3
4	11			7.1	146	3	6.5	90	2
5	10			26	63,100	s5,060	5.8		
6	10			13	29,000	1,020	5.5		
7	10	39	1	9.7	2,250	59	5.5	90	1
8	9.3			8.9	410	10	5.5		
9	10			8.5	252	6	5.5		
10	9.3			16	7,100	sb1,100	5.5	310	a5
11	9.3			14	12,000	sa750	6.1	152	3
12	138	34,000	sb22,000	85	41,400	s16,000	6.1	117	2
13	175	47,600	s25,900	29	19,100	s2,120	6.1	390	a6
14	258	45,200	s34,700	13	13,900	488	6.8	180	3
15	92	17,400	4,320	11	725	22	6.8		
16	23	10,600	658	8.1	200	4	6.8	50	1
17	13	3,000	b100	6.8	160	3	6.8		
18	10	280	8	6.8	60	1	6.4		
19	8.5	136	3	6.4	90	2	6.4	12	(t)
20	8.1	66	1	40	14,000	sa6,290	6.8	36	1
21	6.8			7.1	1,700	33	7.4		
22	6.4			5.8	268	4	7.4		
23	6.4			5.1			7.4		
24	6.1	22	(t)	5.1			6.8	18	(t)
25	5.8			4.8	162	2			
26	5.8			4.3			6.8		
27	6.1			4.3			6.1		
28	5.8			8.0			6.1		
29	5.8	105	2	15	23,300	944	6.1	84	1
30	5.8			10	3,200	86	6.1	18	(t)
31	5.8			9.0	300	7	--	--	--
Total	903.1	--	87,719	406.1	--	34,028	195.9	--	109

Total discharge for year (cfs-days) 15,276.2
Total load for year (tons) 2,121,529

s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, March to July 1952
(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	Water 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. 10, 1952 ...	2:15 p.m.	a23	42	1,030	544		52	--	58	--	80						SPWCM
Mar. 16	4:45 p.m.	89	40	4,620	3,060		44	--	71	--	93						SPWCM
Mar. 28.....	1:30 p.m.	46	49	1,990	2,710		47	--	60	--	81	94	98		100		SPWCM
Apr. 8.....	12:35 p.m.	30	38	1,690	2,510		75	--	95	--	98						SPWCM
Apr. 10.....	10:35 p.m.	24	--	637	714		73	--	91	--	97						SPWCM
May 9	2:50 p.m.	84	84	22,600	6,920		72	--	90	--	97						SPWCM
May 16.....	1:20 p.m.	146	49	34,100	10,200		48	--	70	--	90						SPWCM
May 24.....	11:45 a.m.	313	--	25,000	23,700		1	1	92	96	98						SPNM
May 24.....	11:45 a.m.	313	--	25,000	8,360	53	69	84	90	94	98						SPWCM
June 24	5:00 p.m.	131	56	5,320	3,630		68	--	83	--	93						SPWCM
June 26.....	11:35 a.m.	47	--	17,200	16,100		0	99	99	99	100						SPNM
June 26	11:35 a.m.	47	--	17,200	5,440		70	87	97	98	100						SPWCM
July 16.....	9:00 a.m.	25	--	11,400	9,920		87	--	100	--	--						PWCM

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.--Chemical analyses: June to September 1952. Water temperatures: June 1949 to September 1952.
Sediment records: April 1949 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 78°F July 31; minimum, freezing point on many days during November to February.
Sediment concentrations: Maximum daily, 11,300 ppm May 22; minimum daily, not determined.
Sediment loads: Maximum daily, 6,940 tons May 22; minimum daily, not determined.
EXTREMES, 1949-52.--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.--Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Flow affected by ice Nov. 15-19, 24-26, Dec. 7-13, Dec. 15 to Mar. 8. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, September 1949 to September 1952.

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)	Chlorids (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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Sept. 10, 1949....	40	10	0.10	121	40	55		204	384	13	0.2	1.3	--	754	1.03	--	467	300	21	--	1,030	7.9	--
June 20-26, 1952 .	38.6	14	.08	92	30	21	1.9	180	234	13	.3	1.3	.11	512	.70	47	353	205	11	0.5	740	7.9	5
June 27-July 11...	32.5	16	.06	105	36	25	2.2	178	295	10	.3	1.4	.13	615	.84	54	409	263	12	.5	847	8.0	5
July 12	34	19	.10	159	33	69	8.6	229	475	9.0	1.0	.8	.21	932	1.27	86	533	345	22	1.3	1,210	7.1	14
July 13-31	26.7	15	.06	103	37	25	2.1	161	312	10	.3	1.1	.11	622	.85	45	411	279	12	.5	853	7.8	4
Aug. 1-31	24.5	13	.01	112	38	33	2.6	164	340	13	.3	1.4	.14	674	.92	45	434	300	14	.7	924	7.9	4
Sept. 1-3	32.7	12	.01	109	39	30	2.3	168	333	13	.3	.7	.10	662	.90	58	432	294	13	.6	893	7.9	4
Sept. 18-30.....	35.2	14	.01	122	40	29	2.4	187	338	14	.3	1.4	.11	706	.96	67	470	317	12	.6	949	8.0	4

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952
/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	--	--		--	--	--	47	55	64	73	74	58
2	a 58	33		32	--	--	47	53	64	72	68	64
3	--	a 34		--	--	--	44	a 52	61	72	70	62
4	--	a 33		--	--	--	49	56	--	a 66	68	68
5	46	33	32	--	--	--	54	54	69	68	74	a 58
6	a 50	33		--	--	--	55	53	70	--	a 63	--
7	56	33		--	--	--	55	53	--	--	a 64	--
8	a 49	--		--	32	--	42	55	--	--	a 63	--
9	60	37		--	--	--	49	47	71	--	71	--
10	60	36		--	--	39	49	54	68	--	63	--
11	--	35		a 32	--	--	53	57	71	--	66	--
12	60	37		--	--	--	51	61	--	--	73	--
13	--	33		--	--	--	53	57	69	--	74	--
14	--	34		--	--	a 33	56	60	71	--	70	--
15	58	--		--	--	--	46	49	66	--	a 65	--
16	42	32		--	--	--	49	47	65	--	73	--
17	55	31		--	--	--	58	49	69	--	--	--
18	a 58	33		--	--	--	60	55	70	a 63	73	60
19	57	--		--	--	--	59	57	70	71	a 63	--
20	56	34		--	--	--	54	58	a 64	72	69	--
21	a 40	33		--	--	--	44	52	68	68	73	a 52
22	41	a 33		--	32	--	49	46	68	a 62	67	a 48
23	--	a 34		--	--	--	a 42	54	64	72	68	--
24	--	34		32	--	--	--	58	55	--	a 67	60
25	--	a 31		--	--	--	--	58	65	75	a 64	a 53
26	43	a 31		--	--	--	--	50	60	77	70	--
27	47	--		--	--	--	--	55	64	a 69	67	--
28	a 43	31		--	--	49	--	60	70	77	a 58	--
29	a 40	--		--	--	48	a 44	62	a 63	75	a 58	--
30	a 38	38		--	--	46	52	62	a 72	77	66	59
31	a 33	--		--	--	46	--	58	--	78	a 53	--
Average	--	34	--	--	--	--	51	55	66	--	67	--

a Observation made between 8 a.m. and 11 a.m.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952

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	40			40			46		
2	39	7	1	39			45		
3	39			47			42		
4	44	80	a 10	47			44		
5	49	1,380	s 192	44			45		
6	48	270	35	42			47	--	e 7
7	45			41			45		
8	45			42	40	5	40		
9	44			42			35		
10	44			42			38		
11	44			42			40		
12	44			41			43	60	7
13	44			42			38		
14	44			39			35		
15	43			39			33		
								--	e 9
16	44			35	139	13	40		
17	45			30	50	4	43		
18	44			40	167	18	45		
19	44	41	5	45	220	a 25	42	96	11
20	44			49	214	28	35		
21	44			45	112	14	40		
22	44			44	98	12	45	--	e 10
23	44			45	82	10	44		
24	44			42	67	8	43		
25	46			40	42	5	42		
26	45			47	47	6	41	98	11
27	44			46	50	6	42		
28	44			47	44	6	45		
29	44			46	46	6	47	--	e 9
30	43			46	44	5	45		
31	43			--	--	--	40		
Total	1,362	--	365	1,276	--	241	1,295	--	265

Day	January			February			March		
1	37	--	e 6	46			45		
2	38	57	6	47			40		
3	40			46			35		
4	41			47	--	e 20	38		
5	42			45			42	--	e 20
6	43	--	e 4	47			43		
7	45			50			43		
8	44			52	152	21	43		
9	43			56			43		
10	45			56			41	202	22
11	46	15	2	56			40		
12	47			52			41	--	e 20
13	48			48			40		
14	50			46			39	132	14
15	50			42	--	e 20	39	142	15
16	49			45			42	141	16
17	47	--	e 8	46			45	165	20
18	47			40			44	140	17
19	47			38			44	108	13
20	46			44			41	130	a 15
21	40			48			46	140	a 15
22	35			48	155	20	46	152	19
23	40			48			52	130	a 20
24	43	120	14	48			63	110	a 20
25	45			50			45	93	11
26	44			52	--	e 20	44	122	14
27	44			52			44	110	a 15
28	44	--	e 15	50			47	200	b 25
29	45			47			51	263	36
30	46			--	--	--	50	192	26
31	47			--	--	--	50	152	21
Total	1,368	--	261	1,392	--	581	1,366	--	594

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

Suspended sediment, water year October 1951 to September 1952--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	46	137	17	240	908	588	120	115	37
2	44	104	12	274	1,090	806	114	105	32
3	46	126	16	260	952	668	111	88	26
4	44	93	11	274	868	642	107	78	23
5	45	120	15	237	720	461	99	75	20
6	47	118	15	206	438	244	90	60	15
7	54	184	27	186	391	196	81	50	11
8	66	392	70	190	520	267	75	40	8
9	56	165	25	200	841	454	74	42	8
10	52	131	18	170	313	144	68	140	26
11	56	130	20	152	208	85	63	68	12
12	57	120	18	140	208	79	59	35	6
13	58	130	20	140	200	76	59	37	6
14	58	143	22	146	219	86	56	30	5
15	69	268	50	163	1,980	s924	51	29	4
16	70	387	73	144	225	88	46	46	6
17	63	195	33	124	125	42	43	50	6
18	71	387	74	112	100	30	39	40	4
19	87	810	190	109	90	26	36		
20	99	925	247	111	400	120	33	21	2
21	114	965	297	124	985	330	37		
22	98	410	108	200	11,300	s6,940	35		
23	87	320	75	161	880	383	34		
24	103	540	150	180	650	316	40	67	7
25	128	1,180	408	173	430	201	46	62	8
26	178	2,190	1,050	170	370	170	45	170	sb 25
27	300	3,580	2,900	163	242	107	52	330	b45
28	400	3,740	4,040	148	202	81	40	79	9
29	408	2,660	s3,180	146	191	75	37	58	6
30	250	990	668	138	157	59	34	77	7
31	--	--	--	126	140	48	--	--	--
Total	3,254	--	13,849	5,307	--	14,736	1,824	--	372

Day	July			August			September		
1	33	80	7	22			33		
2	32	72	6	24			33		
3	32	70	6	25			32	41	4
4	27	77	6	26			31		
5	26	66	5	26	31	2	32		
6	27	109	8	24			32		
7	33	122	11	24			32		
8	30	46	4	22			31		
9	30	41	3	21			30		
10	28	36	3	27	2,500	sa 370	30		
11	27	35	3	28	4,520	342	30	--	e3
12	34	8,400	sb810	24	300	19	33		
13	41	170	19	24	213	14	34		
14	44	180	21	22	211	13	36		
15	37	160	16	22	130	8	36		
16	32	65	6	22	97	6	36		
17	30	35	3	24	135	9	36		
18	28	40	3	24	67	4	36		
19	27	52	4	24	88	6	36		
20	26	38	3	26	85	6	36		
21	26	42	3	26	324	23	36		
22	24	42	3	26	58	4	37	45	4
23	24	33	2	27			37		
24	24	55	4	26			36		
25	22			24			36		
26	21			24	43	3	34		
27	20	23	1	25			34		
28	20			26			34	--	e3
29	20			24			32		
30	20			24			33	14	1
31	21			27			--	--	--
Total	866	--	966	760	--	869	1,014	--	102

Total discharge for year (cfs-days) 21,084
Total load for year (tons) 33,201

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, October 1951 to August 1952

(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	Water 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. 5, 1951	2:50 p.m.	54	--	8,160	7,140	1	2	6	91	--	100	--	--		--		SPNM
Oct. 5	2:50 p.m.	54	--	8,160	4,720	58	71	87	96	98	100	--	--		--		SPWCM
Mar. 28, 1952	3:05 p.m.	48	49	144	339	31	39	57	71	82	88	92	--		--		BWCM
Apr. 8	11:00 a.m.	67	40	479	941	--	46	55	78	90	94	98	99		100		BWCM
Apr. 16	1:55 p.m.	70	47	423	698	2	18	38	66	91	95	96	98		99		BWCM
Apr. 25	11:45 a.m.	134	51	1,210	2,240	--	27	--	47	--	89	--	--		--		SPWCM
Apr. 29	10:35 a.m.	404	44	2,280	2,510	--	19	--	31	--	73	92	99		--		SPWCM
May 9	10:20 a.m.	208	46	781	1,280	18	30	40	49	62	78	89	95		98		BWCM
June 26	1:50 p.m.	46	58	48	470	28	43	58	70	84	96	98	99		100		BWCM
July 1	10:55 a.m.	34	67	83	396	21	52	65	68	81	91	97	100		--		
July 12	10:20 a.m.	36	--	20,200	7,200	--	80	--	100	--	--	--	--		--		PWCM
Aug. 11	7:25 a.m.	29	57	7,720	5,050	--	82	--	99	--	100	--	--		--		SPWCM
Aug. 21	6:50 a.m.	27	60	1,520	1,190	--	89	--	100	--	--	--	--		--		PWCM

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 Novsmber 1950, May to September 1952.
Water temperatures: March 1950 to September 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 79°F Aug. 11; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 16,800 ppm May 22; minimum daily, not determined.
Sediment loads: Maximum daily, 40,000 tons May 22; minimum daily, less than 0.50 ton on many days during summer months.
EXTREMES, 1950-52.--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.--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 Dec. 10 to Mar. 25. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, May to September 1952

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)	Chlorids (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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
May 24, 1952	313	19	0.04	86	29	57	2.4	184	268	23	0.2	2.4	0.11	596	0.81	504	335	184	27	1.4	863	8.0	8
May 25-26	299	17	.04	70	23	54	2.4	168	215	21	.4	2.2	.09	506	.69	408	268	130	30	1.4	759	8.1	7
May 27	332	17	.10	68	23	44	1.6	160	198	20	.2	1.4	.07	470	.64	421	263	132	26	1.2	687	8.2	7
May 28-31	252	25	.04	64	24	45	1.7	157	196	22	.2	1.3	.09	472	.64	321	258	129	27	1.2	698	8.1	8
June 1	212	16	.10	64	25	47	1.4	158	198	24	.1	.8	.08	468	.64	268	261	131	28	1.3	696	8.2	8
June 2-6	184	15	.04	67	25	49	1.6	164	208	25	.2	1.2	.09	496	.67	246	271	137	28	1.3	741	8.2	8
June 7-11	86.2	14	.04	76	28	62	1.7	176	250	32	.2	1.3	.10	580	.79	138	306	162	30	1.5	879	8.1	7
June 12-30	21.4	14	.04	105	41	108	2.8	214	410	52	.3	1.5	.18	890	1.21	51.4	432	257	35	2.3	1,280	8.1	8
July 1-31	2.15	16	.04	133	54	146	4.2	243	565	71	.4	1.4	.19	a 1,180	1.60	6.85	552	353	36	2.7	1,630	8.2	8
Aug. 1-31	2.07	15	.02	156	56	200	5.9	228	710	101	.5	1.1	.20	b 1,440	1.96	8.05	618	431	41	3.5	1,900	7.5	9
Sept. 1-30	1.40	10	.01	141	54	159	4.0	230	553	101	.4	.9	.16	c 1,250	1.70	4.73	576	387	37	2.9	1,670	7.9	5

a Sum of determined constituents, 1,110 parts per million.
b Sum of determined constituents, 1,360 parts per million.
c Sum of determined constituents, 1,140 parts per million.

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement between 9 a. m. and 5 p. m., October to April, and between 6 a. m. and 10 a. m. May to September)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	--	--	--		--	49	60	67	69	53
2	55	--	--	32	--		--	50	59	69	71	55
3	--	--	35	--	--		--	53	63	65	65	55
4	--	--	34	--	--		--	66	66	70	67	58
5	--	--	--	--	--		--	54	64	70	68	63
6	51	--	--	--	--		--	55	67	65	68	52
7	--	--	--	--	--		--	50	67	60	65	62
8	--	--	--	--	32		38	52	62	71	66	63
9	--	--	--	--	--		--	48	64	68	67	59
10	--	--	--	--	--	32	--	48	67	70	67	62
11	--	--	--	32	--		--	51	64	67	79	60
12	--	--	32	--	--		--	55	65	65	65	58
13	--	--	--	--	--		--	56	64	--	67	60
14	--	--	--	--	--		--	58	67	--	68	50
15	50	--	--	--	--		--	54	66	--	65	50
16	--	33	--	--	--		48	47	62	--	64	56
17	--	--	--	--	--		--	45	67	--	65	52
18	--	--	--	--	--		--	46	65	--	66	57
19	--	--	--	--	--		--	54	68	--	66	56
20	38	--	32	--	--		--	56	66	--	65	68
21	--	--	--	--	--		--	55	65	--	66	57
22	42	--	--	--	32		--	50	66	--	63	51
23	--	--	--	--	--		--	52	66	--	65	50
24	--	--	--	32	--		--	52	63	--	64	50
25	--	--	--	--	--		61	59	57	--	64	53
26	--	--	--	--	--		--	57	58	--	66	51
27	--	--	--	--	--		--	50	62	72	65	55
28	--	--	--	--	--		--	52	65	70	62	58
29	--	--	--	--	--		50	58	68	68	63	55
30	--	37	--	--	--		49	55	68	68	60	54
31	--	--	--	--	--		--	57	--	70	56	--
Average	--	--	--	--	--	--	--	53	64	--	66	56

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	53			87	170	a 40	102	--	e 25
2	55	68	10	60	199	s 35	100	--	e 20
3	54			102	222	61	93	71	18
4	55			128	287	99	91	152	37
5	67	110	20	104	195	55	94		
6	88	150	36	102	107	29	102		
7	106	152	44	108	107	31	82		
8	102	96	26	113	116	35	75	--	e 45
9	100	105	28	100	96	26	68		
10	96	68	18	100	67	18	75		
11	96	70	18	100			90		
12	96			100			100	194	52
13	98			100	39	10	90		
14	98			94			80		
15	98			94			70		
		57	16						
16	102			93	58	15	75	--	e 25
17	106			62	110	18	80		
18	104			91	108	27	76		
19	104			138	130	48	70		
20	104	97	27	128	227	78	60	108	17
21	106	80	a 25	117	186	59	65		
22	108	71	21	111	124	37	74		
23	102			115	140	43	70		
24	102			100	166	45	65	--	e 25
25	106			96	168	44	60		
26	106			115	190	59	66		
27	106	--	e 30	117	175	55	75	228	46
28	102			108	164	48	80		
29	102			102	131	36	84		
30	102			102	98	27	75	--	e 35
31	100			--	--	--	65		
Total	2,924	--	701	3,087	--	1,118	2,452	--	995

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	60	--	e 15	90			78		
2	64	112	19	95			74		
3	68			90	--	e 30	70	--	e 25
4	70			95			73		
5	70			94			76		
6	74	--	e 20	98	101	27	80		
7	78			100	--	e 30	85		
8	75			105	124	35	90	--	e 50
9	72			110			100		
10	76			115			110	340	101
11	80	120	26	110			105	325	92
12	85			105			100	173	47
13	86			100			95	200	51
14	88			95	--	e 35	90	270	66
15	90			90			92	372	92
16	86			90			100	630	170
17	84			90			110	818	243
18	82	--	e 30	80			120	593	192
19	80			76	116	24	115	620	193
20	78			70	--	e 20	110		
21	70			74	--	e 15	105	--	e 100
22	60			76	76	16	100		
23	62			76			105		
24	68	176	32	76			110	230	68
25	72			80			120	400	a 130
26	74			84	--	e 20	143	380	a 150
27	76			88			145	600	a 230
28	80	--	e 30	84			113	440	134
29	85			80			133	561	201
30	90			--	--	--	138	502	187
31	94			--	--	--	119	400	129
Total	2,377	--	822	2,616	--	807	3,204	--	3,201

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1951 to September 1952--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	111	210	63	505	3,700	5,040	212	614	351
2	106	275	79	533	3,960	5,700	249	510	343
3	108	356	104	509	3,300	4,540	200	390	211
4	104	350	98	526	3,430	4,870	168	450	b 200
5	104	340	95	494	3,160	4,210	173	849	s 424
6	108	320	93	390	2,000	2,110	131	360	127
7	108	287	84	313	1,500	1,270	113	278	85
8	115	140	43	284	1,100	843	102	228	63
9	131	90	32	326	2,500	2,200	89	250	60
10	111	80	24	300	1,750	1,420	75	172	35
11	108			236	820	523	62	137	23
12	106			197	620	330	51	94	13
13	108	71	21	171	570	263	43	80	9
14	108			160	578	250	35	75	7
15	113	380	a 120	191	2,240	s 1,290	28	70	5
16	158	1,960	836	227	2,350	1,440	19	68	3
17	145	1,670	654	171	1,000	b 460	11	62	2
18	122	600	198	148	1,800	719	6.4		
19	150	--	e 300	126	375	128	5.8		
20	191	--	e 600	115	300	93	6.1		
21	255	--	e 3,000	143	1,350	521	7.0	49	1
22	242	--	e 2,000	719	16,800	s 40,000	9.2		
23	185	--	e 500	477	8,570	s 12,500	5.8		
24	173	--	e 350	313	2,200	1,880	9.6	170	sb 8
25	206	1,760	s 1,120	297	1,580	1,270	18	850	41
26	326	5,000	a 4,400	300	2,720	2,200	24	350	23
27	533	9,140	s 14,500	332	1,510	1,350	49	3,550	s 519
28	768	9,400	s 20,500	287	1,040	806	38	1,000	103
29	855	8,790	20,300	262	821	581	24	257	17
30	624	4,920	8,290	242	756	494	16	120	5
31	--	--	--	215	655	380	--	--	--
Total	6,582	--	78,467	9,509	--	99,661	1,979.9	--	2,683

Day	July			August			September		
1	7.7	90	2	0.7			0.5		
2	4.2	47	1	.6	65	(t)	.7		
3	3.6	60	1	.5			.5		
4	2.9			30	1,420	s 894	.5		
5	1.4			12	2,250	s 265	.5		
6	1.3			.4			.5	126	(t)
7	2.9			.4			.6		
8	.7	70	(t)	.5	148	(t)	.7		
9	.4			.6			.7		
10	.4			.6			.7		
11	.4			4.3	880	s 13	.8		
12	.7			4.1	444	s 6	1.0		
13	3.2	230	s 3	3.4	353	s 4	1.3	146	1
14	16	3,370	146	.4			2.2		
15	11	347	s 14	.4			2.4		
16	2.0	107	1	.3			1.3		
17	.7			.3			1.1		
18	.4			.3	128	(t)	1.0		
19	.4			.3			1.0	106	(t)
20	.4	60	(t)	.3			1.0		
21	.4			.3			1.0		
22	.4			.3			1.4		
23	.4			.3			2.4		
24	.5			.3			3.8		
25	.5			.3			2.0		
26	.6			.3			2.5	95	1
27	.6			.4	96	(t)	2.7		
28	.6	64	(t)	.4			2.4		
29	.6			.4			2.4		
30	.7			.4			2.5		
31	.7			.4			--	--	--
Total	66.7	--	171	64.2	--	1,185	42.1	--	17

Total discharge for year (cfs-days) 34,903.9
Total load for year (tons) 189,828

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.

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

Particle-size analyses of suspended sediment, March to July 1952
(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	Water 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. 28, 1952	10:20 a.m.	111	--	359	752	40	49	58	70	83	92	96	98		100		BWCM
Apr. 8	1:45 p.m.	111	38	183	454	42	52	64	76	87	93	95	98		100		BWCM
Apr. 16	10:50 a.m.	158	48	1,800	2,890	--	71	--	90	--	99	--	--		--		SPWCM
Apr. 18	3:40 p.m.	111	--	351	281	15	42	54	74	86	90	93	98		100		BWCM
Apr. 25	2:05 p.m.	166	61	820	1,280	26	36	48	60	74	83	90	96		99		BWCM
Apr. 28	8:40 p.m.	904	--	10,900	4,620	--	30	--	48	--	82	--	--		--		SPWCM
Apr. 29	12:10 p.m.	967	50	10,500	7,050	--	24	--	38	--	76	92	98		100		SPWCM
May 9	11:55 a.m.	335	--	2,440	3,180	--	40	--	51	--	75	90	99		--		SPWCM
May 16	5:10 p.m.	212	--	1,610	2,590	--	56	--	72	--	88	--	--		--		SPWCM
May 24	2:40 p.m.	339	62	2,370	1,820	--	2	22	40	53	75	--	--		--		SPNM
May 24	2:40 p.m.	339	62	2,370	1,850	30	30	37	47	57	80	--	--		--		SPWCM
June 25	1:40 p.m.	17	--	1,620	3,010	76	87	94	98	98	99	--	--		--		BWCM
July 14	7:00 a.m.	21	--	3,760	2,640	72	80	87	90	91	91	--	--		--		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 1952.
Water temperatures: March 1950 to August 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 68,700 ppm July 13; minimum daily, not determined.
Sediment loads: Maximum daily, 2,850,000 tons May 23; minimum daily, not determined.
EXTREMES, 1950-52.--Water temperatures: Minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 68,700 ppm July 13, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 2,850,000 tons May 23, 1952; minimum daily, less than 1 ton on several days during August and September 1950.
REMARKS.--Flow affected by ice Nov. 17-20, Dec. 8 to Mar. 28. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Sum	Tons per acre-foot	Calcium, magnesium	Noncarbonate					
Nov. 2, 1951....	18			--	--	149	--	260	625	89		--							33	--	1,730	7.4	
Nov. 30.....	113			--	--	131	--	216	565	77		--							33	--	1,560	7.6	
Dec. 20.....	a66			192	64	157		305	645	114		--					742	492	31	2.5	1,900	7.8	
Jan. 11, 1952....	81			--	--	131	--	262	520	93		--					--	--	32	--	1,590	7.5	
Feb. 22.....	a105			--	--	188	--	250	695	131		--					--	--	37	--	1,980	7.6	
Mar. 28	a350	11	0.05	141	45	159		204	553	94	0.5	6.2	0.19	1,190	1,110	1.62	536	369	39	3.0	1,610	7.6	
Apr. 16.....	188			117	46	121		183	465	77		.7					481	331	35	2.4	1,390	7.8	
May 26	502			--	--	162	--	150	615	42		--					--	--	43	--	1,510	7.6	
June 20	38			--	--	322	--	235	1,210	198		--					--	--	40	--	2,920	7.5	
July 25	12			--	--	416	--	229	1,610	270		--					--	--	40	--	3,610	7.9	
Aug. 25.....	13			--	--	418	--	196	1,580	290		--					--	--	41	--	3,610	7.6	
Sept. 30	a9.5			--	--	364	--	216	1,210	295		--					--	--	43	--	3,210	7.7	

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Temperature (°F) of water, October 1951 to August 1952
[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	--	--	42	--	--	--	46	a 52	--	85	--	
2	a 59	33	--	32	--	--	48	60	--	--	--	
3	61	33	--	--	--	--	41	65	69	--	--	
4	57	32	39	32	a 34	34	51	a 63	72	--	72	
5	55	34	--	--	--	--	55	66	--	--	81	
6	58	37	--	--	a 34	--	60	66	--	--	77	
7	--	41	32	--	--	35	52	--	75	--	a 69	
8	--	43	--	32	32	--	41	--	--	--	--	
9	--	43	--	--	--	--	50	48	--	--	--	
10	60	43	35	--	36	39	54	a 50	--	--	--	
11	58	--	--	32	--	a 34	56	a 55	--	--	72	
12	58	40	32	--	35	32	51	a 58	76	--	73	
13	50	a 35	--	--	--	34	58	a 58	--	62	a 73	
14	--	--	--	--	33	a 33	62	67	--	72	--	
15	48	35	--	34	34	a 35	49	52	--	76	--	
16	46	32	--	--	--	34	54	50	--	81	--	
17	49	--	--	--	--	a 34	63	a 49	--	78	--	
18	48	--	--	--	a 32	35	64	62	--	75	--	
19	49	--	--	35	--	34	62	63	--	--	--	
20	45	33	--	--	32	33	53	65	75	--	--	
21	45	34	--	32	--	32	47	54	--	--	--	
22	43	--	--	--	32	32	54	50	--	--	--	
23	48	38	--	32	34	32	61	57	--	--	--	
24	42	35	--	32	--	33	--	a 58	a 68	--	--	
25	42	37	--	a 32	34	33	66	65	72	88	81	
26	43	--	--	--	--	a 35	a 58	55	59	--	--	
27	45	38	--	--	33	36	68	60	a 65	--	--	
28	--	--	--	35	--	44	65	65	a 60	--	--	
29	42	40	--	a 34	33	47	61	64	--	--	--	
30	41	42	--	--	--	45	67	65	--	--	--	
31	--	--	--	34	--	45	--	a 57	--	--	--	
Average	--	--	--	--	--	--	56	59	--	--	--	

a Observation made between 8 a.m. and 11 a.m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	66	550	a 100	106	320	a 90	123	630	b 210
2	64	200	35	18	200	10	123		
3	72	200	39	108	2,450	s 824	123		
4	75	225	46	179	2,450	1,180	113		
5	94	3,200	b 810	140	1,430	541	106	390	118
6	99	775	207	132	1,050	374	113		
7	130			123	1,500	498	118		
8	120	--	e 300	140	1,400	529	100	--	e 60
9	111			130	1,000	351	75		
10	113	390	119	128	910	314	100		
11	116	420	132	123	940	a 310	105	148	42
12	113	635	194	130	900	316	110		
13	111	480	144	132	720	257	100		
14	113	340	a 100	130	560	197	85		
15	113	300	92	123	400	133	77		
16	118	240	76	116	450	141	82	--	e 30
17	123	225	75	50			84		
18	123	245	81	150	--	e 600	82		
19	120	270	87	180			76		
20	125	250	84	170	2,820	1,290	66	100	18
21	125	180	61	159	1,980	850	74		
22	128	280	97	132	1,200	a 430	80		
23	120	450	146	140	803	304	76		
24	116	330	103	118	761	242	72		
25	111	370	111	113	1,060	323	68		
26	118	360	115	130	--	e 330	74	--	e 25
27	116	320	100	142	884	339	77		
28	116	300	a 95	125	--	e 220	82		
29	111	375	112	123	649	216	86		
30	108	500	146	120	649	210	82		
31	108	460	a 130	--	--	--	74		
Total	3,396	--	4,537	3,810	--	12,619	2,806	--	1,851

Day	January			February			March		
1	70			105			105		
2	74			105	--	e 25	100		
3	77			105			105		
4	78			105			112		
5	78			105	60	16	115	--	e 70
6	83			110			115		
7	86			115			120		
8	85			120	130	43	125		
9	80			125			130		
10	80			130			130	380	133
11	84			125			120	385	125
12	88			120			113	292	89
13	92			115			110	280	83
14	95			110			110	340	101
15	95			105			150	450	182
16	92	130	30	100	148	42	200	615	332
17	89			100			240	880	b 570
18	86			95			230	1,450	900
19	84			90			215	1,400	813
20	82			95			200	700	378
21	80			100			170	860	395
22	70			105			150	1,120	454
23	76			105			130	770	270
24	82			105			150	795	322
25	84			105	186	54	180	650	316
26	86			110			200	800	432
27	88			120			250	1,200	810
28	92			115			350	3,400	3,210
29	94			110			484	11,000	sb 24,000
30	97			--	--	--	508	24,300	33,300
31	100			--	--	--	348	14,100	13,200
Total	2,627	--	930	3,155	--	1,201	5,765	--	81,045

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 SUSSEX, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	249	7,600	5,110	476	4,650	5,980	262	1,700	a 1,200
2.....	204	4,900	2,700	562	4,820	s 7,820	296	2,500	a 2,000
3.....	208	3,850	2,160	520	4,720	s 7,490	257	1,080	749
4.....	173	2,700	1,260	600	3,760	6,090	719	45,000	s 105,000
5.....	176	1,930	917	577	3,460	5,390	496	22,800	s 32,000
6.....	170	1,610	739	451	2,920	3,560	334	7,300	6,580
7.....	173	1,390	649	348	2,400	a 2,300	257	950	659
8.....	164	1,250	554	325	2,100	a 1,800	190		
9.....	179	1,270	614	1,610	58,200	s 386,000	162		
10.....	162	1,070	468	476	25,200	32,400	142	--	e 200
11.....	150	864	349	380	12,000	12,300	131		
12.....	145	756	296	290	4,600	3,600	127	173	59
13.....	145	861	337	228	2,130	1,310	96	298	77
14.....	148	831	332	197	1,260	670	84		
15.....	148	845	337	268	6,750	s 5,140	72		
16.....	179	1,270	614	337	19,500	17,700	58	--	e 35
17.....	194	2,430	1,270	267	16,100	11,600	45		
18.....	164	1,530	677	208	7,220	4,050	41		
19.....	167	940	424	191	3,080	1,590	39		
20.....	188	1,650	836	179	2,410	1,160	39	90	10
21.....	236	3,670	2,340	194	4,050	2,120	38		
22.....	290	4,760	3,730	8,080	42,200	s 1,450,000	36	--	e 15
23.....	208	1,950	1,100	14,100	68,000	s 2,850,000	36		
24.....	185	1,400	a 700	1,080	25,300	s 97,200	36	252	24
25.....	188	1,390	706	618	18,400	30,700	56	250	38
26.....	254	3,760	2,580	522	9,630	13,600	76	1,580	324
27.....	414	8,100	9,050	528	11,600	16,500	259	28,900	s 22,700
28.....	634	10,700	s 20,100	444	5,910	7,080	139	16,900	s 6,870
29.....	912	10,700	26,300	363	6,380	6,250	84	4,200	a 950
30.....	626	8,360	14,100	318	3,410	2,930	62	1,200	a 200
31.....	--	--	--	301	2,230	1,810	--	--	--
Total.	7,433	--	101,349	35,038	--	4,996,140	4,669	--	180,495

	July			August			September		
1.....	54	155	23	11			13		
2.....	49			12	--	e 4	12		
3.....	33			12			12		
4.....	27			16	658	s 62	11		
5.....	27			156	20,700	s 14,100	10		
6.....	27	--	e 10	63	35,700	6,300	10		
7.....	27			23	15,800	s 1,090	10		
8.....	27			13			10		
9.....	20			13	--	e 80	10		
10.....	16			13			10		
11.....	16			47	5,340	s 1,160	11		
12.....	67	11,000	sa 11,000	238	59,700	s 63,800	11		
13.....	296	68,700	s 62,000	220	65,300	40,200	11		
14.....	490	53,500	s 81,400	99	40,000	a 11,000	11		
15.....	240	23,300	s 16,200	35	25,000	a 2,360	11		e 3
16.....	91	7,200	b 1,800	23	9,000	a 560	11		
17.....	42	4,670	530	18	800	a 40	11		
18.....	26	1,040	73	15			11		
19.....	21			14			11		
20.....	18			50			10		
21.....	17	--	e 8	35	--	e 20	9.4		
22.....	14			25			9.2		
23.....	14			17			9.5		
24.....	13			14			9.5		
25.....	12	118	4	13	241	8	9.5		
26.....	12			12			9.5		
27.....	12			11			9.5		
28.....	12			10			9.5		
29.....	12	--	e 4	20	--	e 5	9.5		
30.....	12			15			9.5		
31.....	12			14			--		--
Total.	1,756	--	173,202	1,277	--	141,102	311.6		90

Total discharge for year (cfs-days) 72,043.6
Total load for year (tons) 5,694,561

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 SUSSEX, WYO.--Continued

Particle-size analyses of suspended sediment, November 1951 to June 1952
(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	Water 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. 20, 1951 ..	5:05 p.m.	a 170	33	3,040	6,050	--	25	--	44	--	74	93	99		100		SPWCM
Mar. 18, 1952 ..	6:00 p.m.	a 230	35	3,390	2,330	--	57	--	84	--	94	--	--		--		SPWCM
Mar. 28.....	12:00 m.	a 350	35	3,460	7,990	--	26	--	56	--	90	--	--		--		SPWCM
Apr. 8	3:35 p.m.	164	38	1,150	1,570	36	45	52	59	65	70	76	86		93		BWCM
Apr. 25.....	4:50 p.m.	191	66	1,380	1,590	--	32	--	53	--	74	--	--		--		SPWCM
Apr. 29.....	4:00 p.m.	1,010	54	9,280	7,220	2	4	23	40	61	86	98	99		100		SPNM
Apr. 29.....	4:00 p.m.	1,010	54	9,260	4,500	21	27	34	45	63	86	--	--		--		SPWCM
May 16.....	6:30 p.m.	272	--	13,800	11,800	--	1	2	78	85	90	--	--		--		SPNM
May 16.....	6:30 p.m.	272	--	13,800	7,120	50	63	75	81	82	90	--	--		--		SPWCM
June 3	5:00 p.m.	241	69	832	1,450	22	27	31	37	44	61	74	88		95		BWCM
June 27.....	6:10 p.m.	252	--	32,700	5,710	--	65	--	91	--	97	--	--		--		SPWCM

a Mean daily discharge.

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 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 81°F Aug. 23; minimum, freezing point on many days during October to April.
Sediment concentrations: Maximum daily, 36,300 ppm Aug. 11; minimum daily, no flow Aug. 30 to Sept. 30.
Sediment loads: Maximum daily, 10,800 tons Apr. 21; minimum daily, 0 ton Aug. 30 to Sept. 30.
EXTREMES, 1950-52.--Water temperatures: Maximum, 84°F July 16 and 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. 1, 2, 6-9, Nov. 16 to Apr. 5. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, water year October 1951 to September 1952
/ Once-daily temperature measurement between 7 a.m. and 10 a.m. No flow Aug. 30 to Sept. 30/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a56	a32	a32	--	--	--	a33	54	61	--	--	
2	--	--	--	--	--	--	--	56	61	a75	--	
3	53	--	--	--	--	--	--	58	62	59	--	
4	--	31	--	--	--	--	--	61	63	65	--	
5	51	31	--	--	--	--	32	57	64	63	--	
6	47	--	--	--	--	--	33	58	--	63	63	
7	48	--	--	--	--	--	32	58	66	57	64	
8	47	--	--	--	--	--	32	--	62	59	65	
9	46	a34	--	--	--	--	32	--	63	61	64	
10	47	--	a32	--	--	--	32	a55	66	63	68	
11	--	a34	--	--	--	a32	33	53	64	68	64	
12	47	--	--	--	a32	--	32	57	60	59	58	
13	--	a32	--	--	--	--	37	60	61	58	66	
14	45	a31	--	a32	--	--	41	58	61	57	59	
15	--	31	--	--	--	--	46	52	68	62	64	
16	39	--	--	--	--	--	41	52	56	63	65	
17	40	--	a32	--	--	a32	40	52	61	67	65	
18	38	--	--	--	--	--	47	51	62	--	--	
19	39	a33	--	--	--	--	50	64	63	71	--	
20	--	32	--	--	--	--	50	--	63	64	64	
21	--	a31	--	--	--	--	44	57	62	66	--	
22	35	--	--	--	--	--	43	57	63	65	61	
23	34	31	--	--	--	--	46	51	62	62	a81	
24	40	--	--	--	--	--	47	59	61	67	--	
25	39	--	--	--	--	--	49	59	60	65	--	
26	36	32	--	--	--	--	52	56	56	67	--	
27	32	31	--	--	--	--	57	58	60	66	--	
28	33	32	--	--	--	--	52	54	60	68	--	
29	34	32	--	--	a32	--	57	58	66	65	--	
30	32	--	--	--	--	--	53	59	65	64	--	
31	--	--	--	a32	--	--	--	57	--	62	--	
Average	--	b32	b32	b32	b32	b32	41	57	62	64	--	

a Observation made between 11 a.m. and 4 p.m.
b Includes estimated temperature, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	20	149	8	8.0	69	1	37		
2.....	18			13	80	a3	35	135	13
3.....	17			18	90	a4	32		
4.....	15			17	93	4	30		
5.....	15	120	5	15	75	3	30		
6.....	14			18	98	5	25	--	e10
7.....	14			20	185	10	20		
8.....	17	187	s10	22	194	12	22		
9.....	20	205	11	25	180	12	24		
10.....	18	150	7	26	180	13	25	68	5
11.....	17	123	6	20	200	11	27		
12.....	15			33	200	18	25		
13.....	15			33	269	24	20		
14.....	15			27	230	17	15	--	e5
15.....	15			29	150	12	16		
16.....	16			20			18		
17.....	15			15			16	127	5
18.....	16	86	3	20			16		
19.....	15			25			10		
20.....	15			30			5.0		
					123	8		--	e4
21.....	16			25			6.0		
22.....	16			22			7.0		
23.....	15			22			7.0		
24.....	22	155	9	25			7.0	182	3
25.....	21	102	6	28			7.0		
26.....	19			30			7.0		
27.....	19			32			8.0		
28.....	18	70	3	34	120	11	8.5	--	e2
29.....	18			35			9.0		
30.....	17			37			5.0		
31.....	16			--	--	--	2.5		
Total.	519	--	141	724.0	--	284	522.0	--	180

Day	January			February			March		
1.....	3.0			11			14		
2.....	3.2			10			13		
3.....	3.2			10			15		
4.....	3.1			10			16		
5.....	3.1			10			17		
								--	e3
6.....	3.3			11	--	e1	16		
7.....	3.5			11			16		
8.....	3.2		(t)	12			17		
9.....	3.1			12			18		
10.....	3.2			13			17		
11.....	3.2			14			16		
12.....	3.5			13	35	1	15	110	5
13.....	4.0			12			16		
14.....	4.5			11			17		
15.....	5.0			11			20		
								--	e8
16.....	5.5			11			25		
17.....	6.0			11			30		
18.....	6.5			10			35		
19.....	7.0			9.0			32	120	10
20.....	8.0			10			30		
					--	e1			
21.....	7.0			11			28		
22.....	6.0		e1	12			25		
23.....	6.5			12			24	--	e8
24.....	6.7			12			25		
25.....	7.0			13			27		
26.....	7.5			16			28	65	5
27.....	8.0			17			32		
28.....	8.5			16			35		
29.....	9.0			15	22	1	45	--	e40
30.....	10	66	2	--	--	--	50		
31.....	12		e2	--	--	--	45		
Total.	173.3		20	346.0	--	29	759	--	354

e Estimated.
s Computed by subdividing day.
t Less that 0.50 ton.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	43	668	78	177	3,400	1,620	202	2,310	1,260
2	50	860	a120	119	2,320	745	201	5,030	2,730
3	70	1,000	b190	92	1,500	373	171	3,400	1,570
4	90	1,350	328	79	1,020	218	182	2,390	1,170
5	100	1,400	b380	81	870	190	182	2,100	1,030
6	108	2,050	598	103	870	242	201	2,300	1,250
7	92	4,820	s1,300	102	878	242	177	2,400	1,150
8	102	2,800	b770	86	600	a140	165	2,000	891
9	88	1,600	380	69	430	a80	171	1,920	886
10	139	4,800	sb2,300	64	400	69	154	1,860	773
11	118	4,900	1,560	63	409	70	125	1,380	466
12	85	2,450	562	59	516	82	103	1,140	317
13	76	1,400	287	46	283	35	93	550	138
14	73	1,010	199	39	169	18	78	580	122
15	68	717	132	33	178	16	67	375	68
16	62	579	97	35	156	15	58	395	62
17	81	1,430	s330	35	144	14	42	300	34
18	84	1,430	324	40	225	24	32	240	21
19	84	1,240	281	40	171	18	28	150	11
20	76	924	190	38	440	b45	25	152	10
21	248	13,200	s10,800	32	637	55	22	118	7
22	291	13,600	10,700	56	5,500	sb900	18	130	6
23	206	8,920	s5,500	150	7,630	3,090	16	140	6
24	136	4,480	1,650	280	8,060	6,090	16	103	4
25	128	3,310	s1,210	206	6,300	3,500	16	90	4
26	170	3,950	s1,920	199	4,600	2,470	16	100	4
27	174	4,350	2,040	206	4,600	2,560	34	3,000	sb430
28	185	4,430	2,210	244	4,410	2,910	32	6,330	s586
29	187	4,310	2,180	224	3,900	2,360	45	3,440	s472
30	185	3,750	1,870	195	3,100	1,630	51	2,400	330
31	--	--	--	194	2,550	1,340	--	--	--
Total	3,599	--	50,486	3,386	--	31,161	2,723	--	15,808

Day	July			August			September		
1	38	830	85	0.3					
2	26	590	41	.2	--	(t)			
3	20	350	19	.2					
4	16	255	11	.4					
5	13	160	6	16	260	s24			
6	11	128	4	13	225	8			
7	11	110	3	4.6	140	2			
8	9.1	102	3	2.0	130	1			
9	7.7	108	2	3.0	143	1			
10	6.3	85	1	26	4,700	sa1,600			
11	6.0	96	2	55	36,300	s7,070			
12	7.7	135	3	10	958	s32			
13	11	210	6	22	1,420	84			
14	13	171	6	29	1,930	s168			
15	8.8	100	2	24	1,100	s75			
16	77	2,630	s640	17	530	24			
17	69	1,360	253	12	370	12			
18	43	580	a65	9.1	250	a6			
19	36	320	b30	6.6	250	a4			
20	23	220	14	4.2	238	3			
21	19	175	9	2.0	200	a1			
22	17	135	6	1.1	187	1			
23	13	91	3	.6	143	(t)			
24	9.5	70	2	.4					
25	6.0	72	1	.3					
26	3.3	65	1	.2	--	(t)			
27	1.9			.2					
28	1.4			.2					
29	.9	57	(t)	.1					
30	.7			0	--	0			
31	.4			0	--	0			
Total	525.7	--	1,219	259.7	--	9,117	0	--	0

Total discharge for year (cfs-days) 13,536.7
Total load for year (tons) 108,799

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

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, April to August, 1952
(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	Water 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. 1, 1952	11:50 a.m.	a 43	33	668	871	52	64	78	88	96	98	99	100				BWCM
Apr. 7	3:20 p.m.	88	--	2,520	2,270	38	46	55	67	79	87	94	98		100		BWCM
Apr. 14	4:15 p.m.	76	54	1,060	2,340	--	53	--	73	--	90	--	--				SPWCM
Apr. 22	11:40 a.m.	309	--	15,300	14,100	2	3	10	56	79	90	--	--				SPNM
Apr. 22	11:40 a.m.	309	--	15,300	6,170	36	46	57	70	82	92	--	--				SPWCM
May 1	1:50 p.m.	171	62	3,090	3,410	--	43	--	61	--	80	--	--				SPWCM
May 10	11:10 a.m.	66	55	394	550	--	47	--	68	--	83	--	--				SPWCM
May 23	3:30 p.m.	a 150	--	13,700	7,260	--	58	--	88	--	99	--	--				SPWCM
May 27	12:45 p.m.	204	60	3,920	3,650	5	6	34	53	67	81	--	--				SPNM
May 27	12:45 p.m.	204	60	3,920	3,620	36	44	52	60	70	84	--	--				SPWCM
July 13	4:25 p.m.	12	--	270	1,250	56	67	76	79	86	90	--	--				BWCM
July 23	3:05 p.m.	13	83	83	551	72	76	81	86	92	95	--	--				BWCM
Aug. 5	4:20 p.m.	38	--	481	1,430	59	69	81	89	93	95	96	100				BWCM

a Mean daily discharge.

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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 half a mile downstream from gaging station.
DRAINAGE AREA.--6,050 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to July 1952.
Water temperatures: March 1949 to September 1952.
Sediment records: April 1946 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 84°F Aug. 13, 22; minimum, freezing point on many days during October to April.
Sediment concentrations: Maximum daily, 69,700 ppm May 11; minimum daily, no flow Sept. 19, 21-30.
Sediment loads: Maximum daily, 2,340,000 tons May 24; minimum daily, 0 ton Sept. 19, 21-30.
EXTREMES, 1946-52.--Water temperatures (1949-52): 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, 2,340,000 tons May 24, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--There is no appreciable runoff between gaging station and sampling point except during periods of intense local rainfall. Flow affected by ice Nov. 1-5, Nov. 17 to Apr. 1. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, October 1951 to July 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Sum	Tons per acre-foot	Calcium, magnesium	Noncarbonate				
Oct. 23, 1951	127	--	--	--	--	164	--	191	0	705	83	--	--	--	--		--	--	--	35	--	1,790	8.0
Nov. 28	a91	--	--	--	--	166	--	240	0	795	71	--	--	--	--		--	--	--	32	--	1,940	7.5
Dec. 31	a25	--	--	252	86	219		379	0	940	122	--	--	--	--		--	984	673	33	3.0	2,410	7.6
Jan. 14, 1952	a43	--	--	--	--	189	--	338	0	810	115	--	--	--	--		--	--	--	32	--	2,180	7.6
Feb. 12	a130	--	--	157	55	138		222	0	595	82	--	--	--	--		--	618	436	33	2.4	1,640	7.7
Mar. 31	a1,500	7.2	0.04	127	36	114		170	0	468	58	0.5	5.2	0.14	960		1.31	466	327	35	2.3	1,300	7.6
Apr. 14	230	--	--	--	--	151	--	208	0	693	67	--	--	--	--		--	626	455	33	2.6	1,690	7.6
May 27	1,100	9.4	.04	191	49	213		166	0	910	39	.7	4.3	.17	1,620	1,500	2.20	680	544	41	3.6	1,950	7.5
June 18	131	--	--	--	--	197	--	150	11	855	82	--	--	--	--		--	--	--	37	--	1,980	8.5
July 23	87	--	--	--	--	114	--	144	0	1,040	32	--	--	--	--		--	--	--	20	--	1,970	7.4

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Twice-daily temperature measurements between 6 a. m. and 9 a. m., and between 1 p. m. 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	50	64	32	32		33		32	--	--	--	--	32	33	52	--	62	61	68	82	69	--	50	
2	51	63	32	32		--		--	--	34	--	32	32	37	57	70	61	70	60	72	65	--	47	
3	52	56	32	32		34		32	--	--	--	--	32	36	58	--	63	73	60	82	65	--	54	
4	50	57	33	33		--		--	--	34	--	32	32	46	58	70	65	--	67	80	--	--	--	
5	49	58	32	32		35		32	--	--	--	--	32	--	54	67	65	78	70	79	64	--	62	
6	46	49	--	34		--		--	--	34	--	32	35	55	56	71	69	79	65	--	69	--	--	
7	47	58	32	36		--		32	--	--	--	--	36	48	54	63	69	--	59	75	66	--	63	
8	47	64	32	39		32		--	--	34	--	32	34	42	56	58	60	71	--	76	84	--	--	
9	--	--	32	38		--		32	--	--	--	--	32	48	50	52	63	77	--	83	64	74	60	
10	49	62	32	--		32		--	--	34	--	32	34	46	45	45	68	72	--	81	68	--	--	
11	50	62	32	39		32		32	--	--	32	--	38	52	52	65	62	74	--	--	59	71	61	
12	--	59	32	38		--		--	32	34	--	32	41	48	54	67	65	76	62	62	60	79	--	
13	48	58	32	38	32	--		34	--	--	--	--	38	56	59	65	63	74	57	64	64	84	56	
14	45	55	32	35		--		32	--	34	--	32	40	56	55	67	66	76	58	74	68	76	--	
15	45	43	32	32		32		34	--	--	--	--	46	53	56	57	66	67	61	--	64	79	48	
16	35	42	32	32		--		--	--	34	--	32	46	52	50	54	58	76	69	80	65	80	--	
17	38	49	32	--		32		33	--	--	32	--	44	60	50	--	64	72	68	83	67	--	54	
18	37	46	32	32		--		--	--	33	--	33	43	69	--	--	59	73	--	--	65	81	--	
19	47	49	32	32		--		33	--	--	--	--	42	--	--	64	62	--	68	67	63	77	--	
20	41	46	32	34		32		--	--	32	--	32	49	54	54	69	64	72	50	75	64	76	--	
21	--	--	32	32		--		32	--	--	--	--	41	48	57	54	64	73	65	77	64	82	--	
22	37	45	32	34		32		--	--	32	--	32	38	57	51	56	64	--	66	73	67	84	--	
23	--	45	32	34		--		32	--	--	--	--	44	62	52	59	64	75	60	75	65	--	--	
24	40	42	32	33		32		--	--	32	--	33	45	63	54	60	60	56	68	78	68	--	--	
25	39	40	32	34		--		32	--	--	--	--	51	68	57	66	56	62	62	--	65	77	--	
26	--	44	32	--		32		--	--	33	--	32	52	71	58	59	56	64	68	82	62	79	--	
27	34	46	32	34		--		32	--	--	--	--	59	--	51	62	60	70	60	--	61	75	--	
28	38	50	35	36		32		--	--	--	33	34	56	65	--	--	61	--	66	--	60	--	--	
29	38	40	--	35		--		32	32	32	34	35	53	56	58	66	69	77	66	--	62	--	--	
30	32	35	--	35		32		32	--	--	33	34	50	62	57	--	66	80	64	--	57	--	--	
31	32	33	--	--		32		33	--	--	33	34	--	--	55	69	--	--	66	--	52	--	--	
Average	43	50	32	34		--		--	--	--	--	--	42	53	54	--	63	72	64	--	64	--	--	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	76	3,300	677	60	1,110	180	150	3,660	1,480
2.....	80	3,190	689	25	250	17	250	3,900	a2,600
3.....	84	3,510	796	50	480	65	210	3,630	2,060
4.....	84	3,060	694	80	720	156	140	3,300	a1,200
5.....	84	2,700	612	110	3,410	1,010	130	2,900	1,020
6.....	92	2,860	710	194	8,840	s5,890	115	2,700	a840
7.....	100	3,020	816	158	7,260	3,100	100	--	e750
8.....	104	3,020	849	155	6,890	2,880	90	2,820	685
9.....	118	4,630	1,480	158	5,900	2,520	80	--	e50
10.....	132	6,810	2,430	146	5,490	2,160	90		
11.....	108	5,440	1,590	134	5,160	1,870	100		
12.....	103	4,690	1,300	121	5,070	1,660	105	230	56
13.....	108	4,580	1,340	129	5,500	1,920	90		
14.....	127	7,190	2,460	118	4,450	1,420	70		
15.....	111	6,050	1,810	104	4,840	1,360	50		
16.....	98	5,060	1,340	81	2,380	s567	55		
17.....	97	4,620	1,210	60	475	77	60	300	42
18.....	106	4,290	1,230	80	480	104	55		
19.....	109	4,330	1,270	100	1,040	281	40		
20.....	111	4,380	1,310	120	1,010	326	25		
21.....	132	4,550	1,620	110	610	181	28		
22.....	125	4,260	1,440	90	1,000	243	30		
23.....	121	4,420	1,440	80	1,450	313	31		
24.....	139	4,260	1,600	85	680	156	32		
25.....	165	4,180	1,860	88	725	172	27	260	20
26.....	149	4,540	1,830	90	475	116	25		
27.....	152	4,060	1,670	92	925	230	27		
28.....	162	4,670	2,040	91	1,300	320	30		
29.....	158	4,660	1,990	100	2,070	559	29		
30.....	146	4,180	1,650	110	2,160	642	27		
31.....	146	4,120	1,620	--	--	--	25		
Total.	3,627	--	43,373	3,119	--	30,495	2,316	--	11,415

Day	January			February			March		
1.....	20			70			95		
2.....	23			75			100		
3.....	25			80			110		
4.....	28			85			125	200	66
5.....	30			90	130	31	136		
6.....	33			95			140		
7.....	32	320	26	100			145		
8.....	31			100			160		
9.....	32			103			170		
10.....	33			110			165		
11.....	34			120			160		
12.....	35			130			150		
13.....	40	220	24	125			137	160	68
14.....	43	130	15	120			130		
15.....	35	205	19	120	280	89	140		
16.....	29			120			160		
17.....	30			120			200		
18.....	30			114			250		
19.....	28			100			270	250	175
20.....	25	270	20	80			257		
21.....	23			85			200		
22.....	22			90			170		
23.....	30			88			150		
24.....	38			88			160	230	106
25.....	40			90	160	40	170		
26.....	43			93			170		
27.....	47	350	47	110			200	--	e270
28.....	50			105			250	1,120	756
29.....	55			100			500	3,300	4,450
30.....	60			--	--	--	1,000	3,650	9,860
31.....	65			--	--	--	1,500	8,000	32,400
Total.	1,089	--	906	2,906	--	1,569	7,670	--	50,039

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	15,600	42,100	990	26,600	71,100	529	6,790	9,700
2	786	17,800	37,800	695	18,600	34,900	480	5,970	7,740
3	484	14,100	18,400	561	14,100	21,400	402	5,720	6,210
4	377	10,300	10,500	577	12,500	19,500	395	4,460	4,760
5	365	11,100	10,900	594	11,600	18,600	547	7,440	s 15,800
6	294	10,300	8,180	594	12,200	19,600	865	12,100	28,300
7	323	8,600	7,500	603	10,400	16,900	592	24,000	b 38,000
8	300	7,250	5,870	561	9,630	14,600	432	18,600	21,700
9	278	7,420	5,570	463	8,020	10,000	352	12,000	11,400
10	272	10,900	8,000	1,190	40,100	s 255,000	320	7,810	6,750
11	244	9,240	6,090	1,090	69,700	213,000	276	5,210	3,880
12	256	7,280	5,030	594	42,200	70,200	226	3,890	2,370
13	195	6,220	3,270	417	27,500	31,000	204	3,250	1,790
14	206	6,670	3,710	370	18,200	18,200	188	2,750	1,400
15	179	6,380	3,080	298	13,100	10,500	181	2,110	1,030
16	155	6,080	2,540	364	12,400	12,200	174	1,600	752
17	175	7,770	3,670	405	11,900	13,000	155	1,430	598
18	195	7,520	3,960	411	--	e 15,000	127	1,150	394
19	228	7,300	4,490	353	14,900	14,200	114	1,220	376
20	267	6,050	4,360	306	17,400	14,400	108	1,060	309
21	271	7,620	s 5,920	259	17,700	12,400	107	1,110	321
22	491	16,500	21,900	559	29,400	s 60,700	101	912	249
23	521	12,900	18,100	4,450	67,900	846,000	91	735	181
24	429	11,300	13,100	12,500	66,900	2,340,000	93	655	164
25	348	9,130	8,580	2,200	56,900	s 370,000	101	770	210
26	353	8,590	8,190	1,400	32,700	128,000	101	767	209
27	364	8,520	8,370	1,120	19,700	59,600	160	3,300	s 1,780
28	405	11,100	12,100	997	16,100	43,300	133	15,000	b 5,400
29	548	18,700	32,700	920	11,800	29,300	112	7,700	2,330
30	913	26,900	66,300	758	9,970	20,400	170	8,470	3,890
31	--	--	--	638	7,780	13,400	--	--	--
Total	11,322	--	390,280	37,237	--	4,796,400	7,836	--	177,993

	July			August			September		
1	155	3,320	1,390	20			9.7		
2	129	4,950	1,720	20			9.2		
3	102	6,130	1,690	20	110	6	8.4	144	3
4	91	2,660	654	17			7.4		
5	83	1,320	296	29	843	s 79	7.0		
6	72	850	165	29	--	e 80	5.2		
7	62	590	99	40	786	85	4.9		
8	54	500	73	30	--	e 80	4.9	190	2
9	45	500	61	38	9,010	s 1,350	4.2		
10	39	400	42	54	6,100	889	3.9		
11	35	400	38	85	10,200	s 2,690	3.6		
12	72	5,300	sb 2,000	51	6,900	950	3.0		
13	142	20,800	7,970	63	4,300	731	2.6	130	1
14	127	12,700	4,350	47	1,400	178	2.3		
15	154	12,000	sb 7,400	71	2,610	s 731	1.7		
16	306	42,400	36,300	93	4,500	1,130	1.1	100	(t)
17	240	30,300	19,600	78	6,500	1,370	.4		
18	160	20,900	9,030	59			.1		
19	2,330	79,000	s 684,000	46			0	--	0
20	495	39,800	s 65,800	35	--	e 300	.2	--	(t)
21	200	13,800	7,450	28			0	--	0
22	118	3,500	1,120	22	730	43	0	--	0
23	87	940	221	19	460	24	0	--	0
24	67	530	96	20	760	sb 65	0	--	0
25	53	360	52	38	1,530	157	0	--	0
26	44	260	31	25	1,770	120	0	--	0
27	37	215	21	19	830	43	0	--	0
28	30	210	17	18	1,300	sb 75	0	--	0
29	27	150	11	15	4,200	b 170	0	--	0
30	23	180	11	12	1,200	39	0	--	0
31	21	120	7	11	620	18	--	--	--
Total	5,600	--	851,715	1,152	--	12,321	79.8	--	30

Total discharge for year (cfs-days) 83,953.8
Total load for year (tons) 6,366,536

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.
b Computed from partly-estimated concentration graph.

POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, November to July 1952
(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	Water 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. 9, 1951	2:45 p.m.	168	32	5,910	12,900	--	39	--	60	--	76	89	99		100		SPWCM
Nov. 28	2:50 p.m.	a91	36	1,680	2,370	--	22	--	32	--	48	80	98		100		SPWCM
Mar. 31, 1952	3:30 p.m.	a1,500	34	19,000	5,520	--	26	--	42	--	75	89	97		100		SPWCM
Apr. 1	3:00 p.m.	a1,000	34	22,100	12,800	0	3	3	30	49	70	90	99		100		SPNM
Apr. 1	3:00 p.m.	a1,000	34	22,100	5,300	18	24	30	39	51	69	--	--		--		SPWCM
Apr. 7	1:40 p.m.	278	48	8,470	7,440	--	42	--	64	--	85	--	--		--		SPWCM
Apr. 9	12:55 p.m.	272	--	7,200	6,550	--	37	--	56	--	79	93	100		--		SPWCM
Apr. 14	2:30 p.m.	212	58	7,140	6,210	--	36	--	57	--	83	--	--		--		SPWCM
Apr. 22	2:55 p.m.	429	59	15,600	13,800	1	2	4	50	74	87	96	99		100		SPNM
Apr. 22	2:55 p.m.	429	59	15,600	5,960	34	44	53	63	73	85	--	--		--		SPWCM
Apr. 28	11:00 a.m.	470	64	13,700	6,660	--	29	--	46	--	81	95	99		--		SPWCM
May 10	12:30 p.m.	399	60	6,840	5,620	2	2	15	46	59	79	94	100		--		SPNM
May 10	12:30 p.m.	399	60	6,840	3,370	28	32	39	49	61	79	--	--		--		SPWCM
May 19	2:00 p.m.	336	64	19,200	5,280	--	52	--	67	--	80	88	95		99		SPWCM
May 23	7:15 p.m.	6,090	--	62,200	6,920	--	39	--	59	--	85	--	--		--		SPWCM
May 27	4:50 p.m.	1,080	62	16,900	6,250	--	51	--	68	--	84	--	--		--		SPWCM
June 11	1:55 p.m.	276	76	4,590	3,490	--	4	11	66	72	77	--	--		--		SPNM
June 11	1:55 p.m.	276	76	4,590	4,480	40	58	61	66	70	79	--	--		--		SPWCM
June 18	11:40 a.m.	131	72	892	1,070	25	34	41	46	53	71	89	97		99		BWCM
July 2	3:05 p.m.	122	74	5,390	7,050	--	77	--	91	--	94	--	--		--		SPWCM
July 10	11:10 a.m.	40	78	383	1,110	62	71	78	82	85	91	97	99		100		BWCM
July 13	5:40 p.m.	150	--	30,100	3,280	--	1	2	94	96	98	--	--		--		SPNM
July 13	5:40 p.m.	150	--	30,100	4,640	--	75	--	97	--	98	--	--		--		SPWCM
July 16	1:00 p.m.	313	77	53,700	10,100	--	71	--	95	--	97	--	--		--		SPWCM
July 19	7:45 a.m.	2,800	68	94,600	8,380	--	47	--	74	--	94	--	--		--		SPWCM
July 19	12:05 p.m.	4,920	69	120,000	5,140	--	47	--	71	--	92	--	--		--		SPWCM
July 20	8:35 a.m.	538	50	43,400	8,310	--	63	--	91	--	99	--	--		--		SPWCM

a Mean daily discharge.

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.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.
Water temperatures: March 1950 to September 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 79°F July 27; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 7,080 ppm July 19; minimum daily, not determined.
Sediment loads: Maximum daily, 11,200 tons July 19; minimum daily, not determined.
EXTREMES, 1950-52.--Water temperatures: Maximum, 79°F July 27, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 13,400 ppm Sept. 3, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 12,900 tons Sept. 3, 1951; minimum daily, less than 0.50 ton on many days during 1950-51.
REMARKS.--Flow affected by ice Nov. 3-7, Nov. 19 to Mar. 30. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chlorids (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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 23, 1951	134	--	--	101	51	72		228	0	408	5.0	--	--	--	--	--		463	276	25	1.4	1,090	7.7
Nov. 28	a130	--	--	--	--	--		234	0	395	--	--	--	--	--	--		462	270	--	--	1,080	8.2
Dec. 31	a70	--	--	--	--	--		292	0	460	--	--	--	--	--	--		558	319	--	--	1,230	7.7
Jan. 14, 1952	a66	--	--	121	57	73		279	0	440	4.5	--	--	--	--	--		535	306	23	1.4	1,230	7.6
Feb. 29	a70	--	--	--	--	--		250	0	413	--	--	--	--	--	--		493	288	--	--	1,140	7.9
Mar. 31	568	--	--	77	28	50		178	0	255	3.0	--	--	--	--	--		306	160	26	1.3	747	7.6
Apr. 22	333	13	0.04	44	19	29		131	0	132	1.0	0.1	2.4	0.03	314	0.43		187	80	25	.9	467	7.9
May 27	1,000	12	.07	38	13	18	1.3	111	0	92	1.0	.2	2.5	.09	244	.33		147	56	21	.6	364	7.5
June 18	110	--	--	--	--	--		148	11	275	--	--	--	--	--	--		311	172	--	--	788	8.5
July 23	136	--	--	68	35	52		181	0	262	3.0	--	--	--	--	--		312	164	27	1.3	797	7.8
Aug. 23	117	--	--	--	--	--		224	0	463	--	--	--	--	--	--		450	266	--	--	1,170	8.0
Sept. 19	68	--	--	--	--	--		254	0	648	--	--	--	--	--	--		605	397	--	--	1,540	8.0

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement between 6 a. m. and 9 a. m., except December to March between 11 a. m. and 3 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	a 32	--	--		--	33	51	59	68	70	54
2	56	a 33	--	--		--	32	55	a 69	64	68	--
3	54	--	--	--		--	34	57	62	62	69	55
4	53	--	--	--		--	33	56	63	67	64	55
5	51	56	--	--		--	33	55	63	71	67	62
6	46	a 58	--	--		--	39	55	65	64	66	64
7	51	a 59	--	--		--	42	--	66	58	68	66
8	48	a 37	--	--		--	39	--	61	61	65	60
9	49	a 38	--	--		--	36	--	59	65	66	--
10	--	34	33	--		--	38	a 62	62	70	67	63
11	a 59	32	--	--		32	42	--	62	68	62	63
12	--	32	--	--		--	41	51	64	a 62	62	48
13	49	32	--	--		--	42	60	64	59	66	57
14	46	--	--	32		--	47	58	65	58	68	48
15	47	32	--	--		--	49	59	65	59	65	50
16	36	--	--	--		--	50	53	60	64	67	52
17	40	--	32	--		--	47	51	63	66	66	54
18	41	--	--	--		--	50	50	63	66	68	59
19	40	--	--	--		--	52	56	63	68	67	57
20	42	--	--	--		--	54	56	63	62	65	--
21	39	--	--	--		--	a 51	a 57	63	66	66	55
22	38	--	--	--		--	45	58	62	65	67	--
23	a 44	--	--	--		--	47	56	64	65	67	51
24	a 41	--	--	--		--	--	58	64	69	66	--
25	40	--	--	--		--	55	59	58	68	65	52
26	38	--	--	--		--	54	58	57	69	65	--
27	a 43	--	--	--		--	59	53	61	a 79	66	55
28	39	a 38	--	--		--	a 66	55	63	67	64	--
29	--	--	--	--		--	58	59	67	--	65	55
30	a 37	--	--	32		--	51	60	66	--	63	--
31	33	--	32	--		34	--	62	--	71	65	--
Average	45	--	b 32	b 32	b 32	--	45	56	63	66	66	--

a Observation made between 3 p. m. and 6 p. m.
b Includes estimated temperature, 32° F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	126	42	14	98	22	6	140	28	11
2	122	40	13	60	28	5	135		
3	120	37	12	80	36	8	130		
4	122	29	9	100	130	35	125		
5	124	28	9	120	146	47	125		
								--	e9
6	136	45	16	130	136	48	120		
7	138	40	15	140	56	21	110		
8	136	36	13	141	53	20	100		
9	138	31	12	151	45	18	80		
10	134	22	8	144	28	11	90	31	8
11	129	19	7	136	20	7	110		
12	122	18	6	131	22	8	100		
13	120	18	6	134	43	16	90		
14	120			126	25	a8	80	--	e8
15	126			115	19	6	70		
16	124			96			75		
17	124			75			80	32	7
18	126			68	--	e5	75		
19	129	10	3	100			70		
20	134			120			65		
21	136			115			70		
22	138			110	--	e15	80		
23	136			110			78		
24	126			115			78	--	e6
25	124			120			76		
26	131			125	--	e30	72		
27	126	8	3	125			70		
28	124			130	85	30	72		
29	117			130	--	e25	74		
30	126			135	--	e20	72		
31	126			--	--	--	70	28	5
Total	3,960	--	194	3,480	--	524	2,782	--	229

Day	January			February			March		
1	66			62			68		
2	68			62			70		
3	66			62			65	--	e10
4	66			64			70		
5	64			66			73	90	18
6	64			75			80		
7	64	--	e3	85			90		
8	62			95			100	--	e20
9	62			105			110		
10	62			110			115		
11	61			105			110		
12	62			100			107	36	10
13	64			90			103		
14	66	15	3	88			100		
15	70			86		e8	105		
								--	e15
16	70			84			115		
17	70			80			130		
18	68			79			170	--	e25
19	66			75			190	--	e50
20	60			78			190	181	93
21	50			80			170	--	e50
22	45	--	e4	78			140		
23	40			76			110		
24	42			78			95		
25	45			80			85	--	e20
26	46			80			84		
27	47			78			100	--	e50
28	48			74			200	--	e400
29	50			70			500	--	e2,000
30	55	26	4	--		--	645	--	e4,500
31	60	--	e5	--		--	595	2,470	3,970
Total	1,829	--	111	2,345		232	4,885	--	11,486

e Estimated.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	423	1,050	s 1,280	685	1,660	3,070	595	466	749
2	312	675	569	645	1,140	1,990	595	435	699
3	259	588	411	705	1,210	2,300	740	1,520	3,040
4	245	725	480	910	1,620	3,980	839	892	2,020
5	240	724	469	1,090	2,080	6,120	844	747	1,700
6	302	1,070	872	910	1,440	3,540	828	648	1,450
7	299	931	752	685	720	a 1,300	1,040	1,110	3,120
8	274	510	377	550	560	a 830	1,460	2,080	8,200
9	336	1,770	s 1,750	478	360	a 460	1,080	995	2,900
10	213	425	244	406	232	254	730	640	1,280
11	182	160	79	326	180	a 140	590	412	656
12	172	112	52	265	122	87	466	302	380
13	169	112	51	208	290	sb 200	360	178	173
14	166	100	45	138	326	121	283	129	98
15	161	80	35	151	302	123	229	92	57
16	198	120	64	192	342	177	203	77	42
17	231	200	125	251	495	335	156	46	19
18	242	200	131	148	67	27	104	20	6
19	242	162	106	96	27	7	67	17	3
20	323	696	s 641	72	18	3	45	18	2
21	360	578	562	74	150	b 30	35	63	6
22	343	598	554	139	2,200	sb 1,300	22	53	3
23	268	237	171	705	2,960	5,630	19	35	2
24	234	150	a 95	695	1,090	2,050	21	45	3
25	240	151	98	665	882	1,580	27	39	3
26	268	218	158	715	840	1,620	43	48	6
27	346	614	574	970	1,140	2,980	120	2,900	sb 1,000
28	478	2,000	b 2,600	730	1,030	2,030	185	507	253
29	755	3,560	7,260	595	653	1,050	274	450	333
30	922	3,910	9,730	660	592	1,050	213	156	90
31	--	--	--	750	616	1,250	--	--	--
Total	9,203	--	30,335	15,609	--	45,634	12,213	--	28,273

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	164	96	42	20			81	17	4
2	126	58	20	22	30	2	92	17	4
3	104	56	16	28			102	44	12
4	94	58	15	52	40	6	100	46	12
5	84	58	13	113	74	23	94	49	12
6	72	50	10	110	110	33	84	39	9
7	58	44	7	98	88	23	75	31	6
8	45	48	6	92	76	19	72	29	6
9	53	60	9	90	59	14	70	30	6
10	45	48	6	102	90	25	72	30	6
11	47	483	s 84	148	132	53	110	900	sa 1,100
12	194	4,000	sb 2,300	164	149	66	131	2,700	s 1,340
13	389	2,850	s 4,600	182	238	117	61	145	24
14	1,600	2,260	9,760	166	175	78	56	62	9
15	1,160	1,160	s 2,980	177	134	64	62	75	13
16	675	475	866	172	110	51	68	82	15
17	486	291	382	172	92	43	72	56	11
18	374	188	190	166	72	32	68	56	10
19	352	7,080	s 11,200	161	50	22	70	46	9
20	240	719	466	136	32	12	75	45	a 9
21	213	245	141	126	38	13	83	77	17
22	187	125	63	148	32	13	79	60	a 15
23	141	32	12	122	34	11	77	55	11
24	115	25	8	113	35	11	74	50	a 10
25	106	21	6	108	32	9	66		
26	86			96	23	6	62		
27	67			92	66	16	66	42	8
28	50	19	3	88	24	6	70		
29	45			86	20	4	74		
30	35			84	22	5	77		
31	26			79	20	4	--	--	--
Total	7,433	--	33,220	3,513	--	785	2,343	--	2,718

Total discharge for year (cfs-days) 69,595
Total load for year (tons) 153,741

s Computed by subdividing day.
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, March to September 1952
(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	Water 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. 31, 1952...	11:40 a.m.	745	34	2,270	5,570	--	41	--	57	--	86	--	--		--		SPWCM
Apr. 7.....	5:00 p.m.	292	47	676	1,630	41	49	57	72	84	92	95	99		100		BWCM
Apr. 22.....	4:00 p.m.	336	56	534	911	17	31	47	60	75	88	96	98		100		BWCM
Apr. 28.....	3:35 p.m.	454	67	1,900	4,300	--	39	--	68	--	88	--	--		--		SPWCM
May 1.....	3:25 p.m.	645	61	1,300	887	25	34	43	51	63	76	89	98		100		BWCM
May 10.....	2:25 p.m.	395	58	233	583	26	38	46	54	65	76	87	97		99		BWCM
May 23.....	10:40 a.m.	745	--	3,140	2,350	6	7	28	43	54	70	86	96		100		SPNM
May 23.....	10:40 a.m.	745	--	3,140	3,030	26	34	41	50	59	73	--	--		--		SPWCM
May 27.....	6:30 p.m.	1,010	59	1,380	1,480	24	32	39	46	54	66	78	98		100		BWCM
June 2.....	2:05 p.m.	590	67	405	863	32	39	44	53	64	76	86	97		--		BWCM
June 11.....	3:10 p.m.	595	--	362	868	31	41	49	58	70	82	89	95		98		BWCM
July 13.....	2:10 p.m.	216	--	1,170	3,180	--	64	--	88	--	98	--	--		--		SPWCM
July 14.....	11:10 a.m.	1,730	60	1,930	3,770	--	34	--	49	--	75	84	94		99		SPWCM
July 19.....	6:30 p.m.	559	53	30,100	5,080	--	47	--	71	--	90	--	--		--		SPWCM
Sept. 12.....	7:00 a.m.	166	48	4,610	3,160	--	79	--	100	--	--	--	--		--		PWCM

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 1951 to September 1952.
Water temperatures: February 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Minimum, 418 ppm May 1-8.
Hardness: Maximum, 924 ppm July 17-31; minimum, 220 ppm May 1-8.
Specific conductance: Minimum daily, 485 micromhos May 6.
Water temperatures: Maximum, 84°F July 24, 30; minimum, freezing point on many days during November to March.
EXTREMES, February 1951 to September 1952.--Dissolved solids: Maximum (February to September 1951), 1,850 ppm Sept. 4-10, 1951; minimum, 418 ppm May 1-8, 1952.
Hardness: Maximum, 1,040 ppm Sept. 4-10, 1951; minimum, 220 ppm May 1-8, 1952.
Specific conductance: Maximum daily (February to September 1951), 2,600 micromhos Sept. 10, 1951; minimum daily, 485 micromhos May 6, 1952.
Water temperatures: Maximum, 90°F July 7, 1951; minimum, 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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-14, 1951...	224			122	52	126		158	585	39		1.4	0.15	1,110	1.51	671	518	388	34	2.4	1,420	7.9	
Oct. 15-31	282			141	51	124		221	578	42		3.2	.14	1,160	1.58	883	562	381	32	2.3	1,500	7.8	
Nov. 1-30	302			149	59	127		251	610	43		3.6	.14	1,230	1.67	1,000	616	410	31	2.2	1,570	7.8	
Dec. 1-8	345			230	80	143		--	635	--		--	--	--	--	--	902	--	26	2.1	--	--	
Dec. 9-21	172			174	69	144		--	770	--		--	--	--	--	--	718	--	30	2.3	--	--	
Dec. 22-Jan. 2, 1952	116			222	57	147		--	730	--		--	--	--	--	--	788	--	29	2.3	--	--	
Jan. 3-12	104			193	63	139		--	610	--		--	--	--	--	--	742	--	29	2.2	--	--	
Jan. 13-Feb. 2....	94.9			200	56	142		--	655	--		--	--	--	--	--	728	--	30	2.3	--	--	
Feb. 3-12.....	167			164	70	140		--	660	--		--	--	--	--	--	698	--	30	2.3	--	--	
Feb. 13-29.....	193			144	56	118		--	555	--		--	--	--	--	--	588	--	30	2.1	--	--	
Mar. 1-18.....	200			150	50	118		--	595	--		2.2	.12	--	--	--	579	--	31	2.1	--	--	
Mar. 19-31.....	754			113	38	88		170	433	35		3.1	.08	880	1.20	1,790	440	301	30	1.8	1,170	7.6	
Apr. 1-30	801			114	41	105		182	465	36		2.9	.08	954	1.30	2,060	453	304	33	2.1	1,260	7.8	
May 1-8	1,600			61	17	37		141	168	13		3.6	.17	418	.57	1,810	220	104	26	1.1	605	8.0	
May 11-12	1,610			176	54	188		263	730	78		5.2	.23	1,480	2.01	6,430	330	114	37	3.2	1,900	7.8	
May 13-22	645			109	35	135		184	498	37		2.2	.14	992	1.35	1,730	416	265	41	2.9	1,320	7.8	
May 27-June 13 ...	1,630			92	27	90		137	395	22		2.4	.09	768	1.04	3,380	340	228	35	2.1	1,020	7.7	
June 14-30	264			142	50	144		181	640	49		2.2	.16	1,270	1.73	905	562	414	35	2.6	1,580	8.0	
July 1-13.....	203			164	68	170		189	820	56		2.8	.16	1,470	2.00	806	690	535	34	2.8	1,860	7.3	
July 14-16	1.290			89	32	61		159	328	14		2.8	.11	652	.89	2,270	353	223	27	1.4	906	7.8	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
July 17-31, 1952 ...	497			260	67	120		179	995	29		4.6	0.13	1,710	2.33	2,290	924	777	21	1.7	1,970	6.8	
Aug. 1-31	138			156	69	175		223	800	41		2.9	.18	1,480	2.01	551	673	490	35	2.9	1,860	7.8	
Sept. 1-30	76.6			114	65	131		216	635	12		2.6	.14	1,130	1.54	234	551	374	33	2.4	1,490	7.9	
Weighted average [a]	405			127	43	108		--	515	--		--	--	--	--	--	494	--	32	2.1	--	--	
Weighted average [b]	462			133	44	114		182	541	33		2.9	0.12	1,030	1.40	1,280	513	364	33	2.2	1,330	--	

a Represents 87 percent of runoff for water year October 1951 to September 1952.
b Includes estimates for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
[Once-daily temperature measurement between 3 p. m. and 6 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	34	38	32	34	33	a 34	58	63	78	80	68
2	63	35	36	33	36	33	a 34	69	63	73	71	75
3	59	34	35	33	35	32	41	69	--	80	78	80
4	55	35	36	32	36	34	a 36	70	74	79	79	78
5	56	36	37	34	35	34	a 42	65	76	79	80	76
6	56	36	38	34	36	35	a 50	66	76	76	79	77
7	55	38	36	33	35	35	a 46	61	74	80	75	70
8	62	40	38	32	36	36	a 40	57	70	78	73	75
9	63	45	35	33	37	36	a 36	--	72	78	70	76
10	64	45	36	34	37	36	a 38	--	71	80	65	76
11	61	42	38	35	37	33	a 43	63	70	--	72	75
12	60	43	37	34	37	34	a 47	66	75	--	76	73
13	61	45	33	34	34	35	46	60	74	68	79	72
14	--	35	34	34	--	--	a 42	58	75	70	75	64
15	46	33	33	33	34	--	a 50	58	73	72	--	69
16	45	33	35	35	36	--	a 48	59	75	76	75	70
17	48	32	34	34	--	37	a 48	60	74	81	78	71
18	43	33	32	36	33	37	a 50	61	74	79	80	68
19	48	35	32	36	32	36	a 50	63	75	75	77	65
20	46	35	32	33	33	35	a 52	61	--	79	78	63
21	45	34	33	32	32	35	a 49	--	75	76	80	62
22	46	33	32	32	33	33	a 48	--	78	--	80	60
23	47	34	32	32	34	34	a 51	--	77	80	81	80
24	42	35	32	34	35	35	a 56	--	75	84	79	75
25	42	37	33	35	34	36	58	--	73	--	80	71
26	40	35	32	36	36	36	59	--	72	83	81	69
27	41	36	32	36	38	36	72	65	74	79	80	72
28	42	34	34	38	36	38	74	64	75	83	81	68
29	42	36	32	35	32	38	59	63	81	82	--	71
30	35	--	32	--	--	37	--	--	82	84	--	66
31	35	--	--	--	--	a 35	--	62	--	83	--	--
Average	50	36	34	34	35	35	48	--	74	78	77	71

a Observation made between 8 a. m. and 10 a. 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.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1952.
Water temperatures: February 1951 to September 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,960 ppm July 22-26; minimum, 278 ppm Mar. 29.
Hardness: Maximum, 986 ppm July 22-26; minimum, 108 ppm Mar. 29.
Specific conductance: Maximum daily, 2,460 micromhos July 23; minimum daily, 407 micromhos Feb. 14.
Water temperatures: Maximum, 85°F July 31; minimum, freezing point on many days during October to March.
Sediment concentrations: Maximum daily, 54,800 ppm July 22; minimum daily, not determined.
Sediment loads: Maximum daily, 1,020,000 tons May 26; minimum daily, not determined.
EXTREMES, 1950-52.--Dissolved solids (January 1951 to September 1952): Maximum, 2,270 ppm Aug. 16, 1951; minimum, 278 ppm Mar. 29, 1952.
Hardness (January 1951 to September 1952): Maximum, 1,170 ppm Aug. 16, 1951; minimum, 108 ppm Mar. 29, 1952.
Specific conductance (January 1951 to September 1952): Maximum daily 2,590 micromhos Aug. 16, 1951; minimum daily, 407 micromhos Feb. 14, 1952.
Water temperatures (February 1951 to September 1952): Maximum, 85°F July 31, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 54,800 ppm July 22, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 1,020,000 tons May 26, 1952; minimum daily, less than 1 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, Nebr. Flow affected by ice Nov. 1-8, Nov. 16 to Dec. 5, Dec. 9 to Mar. 29. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-21, 1951.....	266			134	51	160		181	0	660	36		5.0	0.17	1,240	1.69	891	543	395	39	3.0	1,600	8.2
Dec. 7-31.....	373			103	47	157		207	0	548	30		3.3	.14	1,070	1.46	1,080	450	280	44	3.2	1,430	8.0
Jan. 1-31, 1952	81.4			169	75	203		327	0	820	45		4.1	.14	1,600	2.18	352	729	461	37	3.3	2,010	8.1
Feb. 1-10.....	171			143	56	174		299	0	635	37		3.9	.11	1,300	1.77	600	586	341	39	3.1	1,700	7.8
Feb. 11-14.....	368			30	11	44		95	0	122	6.5		4.6	.10	302	.41	300	120	42	44	1.7	451	7.2
Feb. 15-29.....	204			89	34	97		191	0	380	26		3.1	.13	784	1.07	432	363	206	36	2.2	1,100	7.7
Mar. 1-13.....	188			158	59	161		299	0	660	51		3.2	.16	1,350	1.84	685	636	391	35	2.8	1,710	8.0
Mar. 14-21	291			89	33	100		192	0	390	27		3.5	.09	778	1.06	611	358	201	36	2.3	1,080	8.0
Mar. 22-27	415			58	22	63		132	4	239	15		2.9	.10	499	.68	559	234	119	35	1.8	731	8.4
Mar. 28.....	500			47	16	54		110	4	195	9.0		4.0	.04	410	.56	554	184	87	37	1.7	600	8.3
Mar. 29.....	7,000			29	8.6	43		98	4	112	4.0		5.0	.05	278	.38	5,250	108	21	44	1.8	409	8.3
Mar. 30.....	22,100			34	8.5	41		118	6	103	2.0		2.6	.05	282	.38	16,830	120	13	41	1.6	420	8.4
Mar. 31-Apr. 1	14,950			43	12	44		123	3	139	5.0		5.1	.06	334	.45	13,480	155	49	37	1.5	506	8.3
Apr. 2-3.....	6,580			58	16	54		149	0	190	8.0		3.3	.08	434	.59	7,710	211	89	35	1.6	635	8.1
Apr. 4-7.....	3,140			66	21	79		154	0	262	21		3.6	.10	572	.78	4,850	249	123	40	2.2	831	8.1
Apr. 8-30.....	794			117	44	145		213	0	560	32		3.1	.13	1,080	1.47	2,320	473	298	39	2.9	1,430	8.1
May 1-2.....	1,500			95	34	97		198	0	385	24		2.1	.18	808	1.10	3,270	378	216	35	2.2	1,090	8.2

May 5-12, 1952.....	1,390			66	19	53		165	0	204	12		4.0	0.04	508	0.69	1,910	244	109	31	1.5	702	8.0
May 14-24	724			138	43	172		215	0	640	50		3.5	.12	1,250	1.70	2,440	523	347	41	3.3	1,650	7.6
May 25-26.....	5,310			181	54	158		224	0	760	39		2.2	.13	1,430	1.94	20,500	672	488	33	2.7	1,780	7.7
May 27-30.....	2,540			212	63	226		195	0	1,050	37		1.5	.17	1,860	2.53	12,760	788	628	38	3.5	2,210	7.7
May 31-June 15.....	1,420			95	30	106		142	0	430	24		3.2	.06	860	1.17	3,300	362	246	38	2.4	1,130	7.7
June 16-30	401			104	32	134		181	0	498	26		2.0	.09	1,000	1.36	1,080	393	245	41	2.9	1,290	8.0
July 1-16	246			166	63	206		215	0	880	49		1.9	.16	1,580	2.15	1,050	675	499	39	3.4	1,990	7.9
July 17-21.....	1,120			114	40	115		179	0	500	25		2.1	.11	950	1.29	2,870	448	301	36	2.4	1,270	7.4
July 22-26.....	674			269	77	164		209	0	1,110	31		6.4	.16	1,960	2.67	3,570	986	815	26	2.3	2,220	6.9
July 27-Aug. 29	124			191	63	186		190	0	935	34		2.5	.14	1,620	2.20	542	734	578	34	3.0	1,960	7.7
Aug. 30.....	207			81	23	152		250	0	410	12		1.2	.25	832	1.13	465	296	91	51	3.8	1,150	7.3
Aug. 31-Sept. 11 ...	77.0			153	60	213		232	0	860	32		1.5	.17	1,510	2.05	314	630	440	41	3.7	1,960	7.7
Sept. 12-30.....	46.2			152	69	235		257	0	930	30		.4	.17	1,620	2.20	202	662	451	42	4.0	2,070	7.6
Weighted average [a]	710			96	32	106		b171	--	424	22		3.4	0.10	839	1.14	1,610	371	231	37	2.4	1,110	--
Weighted average [c]	671			97	33	109		b173	--	431	22		3.4	0.10	853	1.16	1,550	378	236	38	2.4	1,120	--

a Represents 92 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

[Twice-daily temperature measurements between 5 a.m. and 7 a.m., and between 5 a.m. and 7 p.m., except once-daily November to March between 1 and 6 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	50	57		--		36		--		--		32	--	38	56	62	58	62	65	82	67	78	--	--
2	54	65		--		36		--		--		32	36	--	60	--	58	62	64	68	70	74	--	--
3	55	58		--		36		32		--		32	38	41	--	--	58	68	60	--	65	--	--	72
4	52	52		--		36		--		--		32	38	46	--	--	65	70	66	82	57	--	62	75
5	50	50		--		36		--		--		32	38	50	--	--	65	72	70	77	65	65	60	68
6	44	57		32		36		--		--		32	42	48	--	--	70	80	62	62	64	80	55	73
7	45	58		32		36		--		--		32	42	42	--	60	70	78	55	74	64	74	62	73
8	45	57		34		35		--		--		32	42	45	55	52	65	73	58	78	63	74	58	65
9	44	58		38		34		--		--		34	38	45	45	48	62	76	64	80	60	76	60	82
10	48	56		40		34		--		--		32	37	48	44	52	68	73	65	78	63	64	60	75
11	48	60		41		36		--		--		32	40	52	45	52	63	75	64	70	53	74	63	70
12	48	59		42		34		--		34		32	40	50	50	--	65	74	61	65	60	74	60	74
13	50	57		34		36		--		34		32	45	--	--	--	62	73	60	70	61	74	57	54
14	44	59		35		34		--		34		34	45	50	--	51	64	77	--	--	62	72	48	58
15	44	--		32		32		--		34		34	46	57	55	58	68	69	--	--	62	72	46	70
16	33	--		32		--		--		32		32	50	60	52	55	58	68	60	75	62	77	52	67
17	35	--		32		--		--		32		34	46	--	48	60	60	67	67	76	63	77	55	--
18	35	--		32		--		--		32		34	48	60	50	62	58	70	64	75	63	75	54	55
19	--	--		32		--		--		32		32	50	60	55	62	61	70	67	71	64	75	54	--
20	--	--		34		--		--		--		--	55	50	55	66	63	75	60	70	64	76	55	--
21	--	--		--		--		--		--		34	45	48	55	58	63	75	65	73	64	78	48	--
22	--	--		--		--		--		--		34	44	48	55	65	63	75	--	--	64	80	45	--
23	--	--		32		--		--		--		34	43	61	54	61	64	76	60	78	68	78	46	--
24	--	--		32		--		--		--		34	48	65	57	70	60	70	68	78	65	80	46	--
25	--	--		34		--		--		31		--	54	65	61	68	62	65	67	80	66	78	48	--
26	44	40		34		--		--		32		34	58	--	61	60	57	62	65	78	64	76	48	--
27	32	--		34		--		--		--		--	58	70	55	56	60	62	78	78	64	70	54	--
28	--	42		34		--		--		32		35	60	66	50	60	60	69	63	79	60	71	55	--
29	40	40		36		--		--		32		36	55	60	56	62	65	--	65	75	61	72	47	--
30	--	34		34		--		--		--		36	52	61	55	61	65	76	61	79	55	62	50	--
31	--	34		--		--		--		--		37	--	--	55	65	--	--	65	85	51	--	--	--
Average	--	--		a 34		a 34		a 32		a 32		33	46	53	--	--	63	71	64	75	62	74	54	--

a Includes estimated temperature, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	235	9,120	5,790	250	--	e 500	260	470	330
2.....	241	7,450	4,850	230	206	128	300	405	328
3.....	253	5,690	3,890	250	204	138	350	448	423
4.....	253	4,520	3,090	240	232	150	400	443	478
5.....	247	3,350	2,230	250	372	251	500	1,200	a 1,600
6.....	247	2,720	1,810	270	649	473	769	1,470	3,050
7.....	241	2,210	1,440	290	524	410	499	510	687
8.....	235	2,040	1,290	320	482	416	259	280	196
9.....	225	1,950	1,180	1,560	5,000	sa 27,000	350	107	101
10.....	230	1,960	1,220	915	3,530	8,720	400	144	156
11.....	235	2,060	1,310	745	2,440	4,910	450	122	148
12.....	241	2,020	1,310	688	3,200	a 5,800	750	1,200	a 2,400
13.....	271	3,400	s 2,680	615	4,100	6,810	2,500	1,120	7,560
14.....	429	11,500	13,300	555	3,300	4,950	500	620	837
15.....	365	8,760	8,630	499	1,840	2,480	450	61	74
16.....	295	4,450	3,540	200	910	491	400	110	119
17.....	247	2,590	1,730	100	247	67	300	67	54
18.....	259	2,380	1,660	90	250	61	250	33	22
19.....	283	2,690	2,060	80	192	42	280	144	109
20.....	271	2,100	1,540	75	178	36	260	203	143
21.....	289			90	165	40	230	192	119
22.....	295	--	e 1,600	120	136	44	200	86	46
23.....	295			100	260	70	180		
24.....	283			90	229	56	160		
25.....	283			100	303	82	150		
26.....	289			150	487	197	120		
27.....	271	1,950	1,450	200	576	311	130	46	17
28.....	265			240	472	306	140		
29.....	265			240	442	286	140		
30.....	277			240	349	226	120		
31.....	277			--	--	--	100		
Total.	8,392	--	81,100	9,772	--	65,451	11,897	--	19,133

	January			February			March		
1.....	85			120			160	51	22
2.....	80			140			160	54	23
3.....	80	102	23	130	193	67	160	60	26
4.....	85			120			170	56	26
5.....	85			130			180	64	31
6.....	80			150	222	90	180	62	30
7.....	75			170	418	192	190	66	34
8.....	80			200	540	292	200	58	31
9.....	75			250	550	371	220	66	39
10.....	75			300	--	e 470	210	95	54
11.....	75	178	36	400	--	e 600	200	56	30
12.....	70			390	724	762	200	65	35
13.....	70			350	488	461	210	67	38
14.....	75			330	345	307	220	138	82
15.....	75			310	156	131	250	232	157
16.....	70			300	173	140	300	126	102
17.....	75			250	80	54	320	142	123
18.....	75			220	68	40	310	125	105
19.....	80			200	49	26	320	97	84
20.....	80			190	130	67	310	94	79
21.....	80	194	41	190	30	15	300	226	183
22.....	80			200	305	165	350	486	460
23.....	80			170	65	30	400	264	285
24.....	85			160	54	23	420	254	288
25.....	85			170	46	21	440	154	183
26.....	85			180	54	26	430	396	460
27.....	90			185	46	23	450	228	277
28.....	90	160	41	170	40	18	500	1,700	2,300
29.....	95			170	48	22	7,000	6,400	121,000
30.....	100			--	--	--	22,100	6,660	397,000
31.....	110			--	--	--	17,100	8,830	408,000
Total.	2,525	--	1,131	6,245	--	4,681	53,960	--	931,587

e Estimated.

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	12,800	10,400	359,000	1,200	6,000	s 21,500	1,670	9,570	43,200
2.....	7,630	11,800	243,000	1,790	9,400	a 45,000	1,690	8,360	38,100
3.....	5,520	9,810	146,000	1,940	--	e 80,000	1,380	6,160	23,000
4.....	4,020	7,580	82,300	1,670	--	e 50,000	1,270	5,170	17,700
5.....	3,560	6,980	67,100	1,420	--	e 25,000	1,210	4,620	15,100
6.....	2,830	6,740	51,500	1,530	--	e 30,000	1,260	4,760	16,200
7.....	2,150	6,130	35,600	1,740	7,800	a 37,000	1,420	5,460	20,900
8.....	1,490	5,230	21,000	1,640	7,200	31,900	1,720	7,540	35,000
9.....	1,200	4,320	14,000	1,420	5,480	21,000	1,740	8,420	39,600
10.....	932	3,480	8,760	1,230	4,400	14,600	1,900	12,400	63,600
11.....	872	2,670	6,290	1,070	3,990	11,500	1,580	11,100	47,400
12.....	794	2,350	5,040	1,100	12,000	sa 53,000	1,260	7,600	25,900
13.....	710	1,850	3,550	1,530	30,000	b 120,000	1,010	5,380	14,700
14.....	740	1,730	3,460	1,190	19,000	a 61,000	896	4,390	10,600
15.....	660	1,520	2,710	993	24,800	66,500	783	3,160	6,680
16.....	626	1,590	2,690	740	21,600	43,200	660	2,310	4,120
17.....	610	1,520	2,500	634	15,300	26,200	564	1,760	2,680
18.....	586	1,300	2,060	610	11,900	19,600	488	1,320	1,740
19.....	586	1,150	1,820	626	10,600	17,900	422	1,070	1,220
20.....	618	1,290	2,150	730	9,100	17,900	380	836	858
21.....	660	1,460	2,600	690	6,800	12,700	340	627	576
22.....	650	1,530	2,680	626	5,300	8,960	304	466	383
23.....	740	1,780	3,560	570	5,400	8,310	266	289	208
24.....	794	2,170	4,650	550	5,900	8,760	222	198	119
25.....	968	2,990	7,810	3,610	37,100	s 452,000	238	191	123
26.....	908	2,960	7,260	7,010	52,100	1,020,000	271	378	276
27.....	838	3,820	8,640	3,210	41,000	369,000	489	9,740	s 21,900
28.....	720	3,650	7,100	2,500	33,900	237,000	690	22,300	41,500
29.....	710	3,380	6,480	2,320	24,400	153,000	406	9,900	10,900
30.....	860	3,550	8,240	2,130	15,100	86,800	279	2,890	2,180
31.....	--	--	--	1,880	10,600	53,800	--	--	--
Total.	56,782	--	1,119,550	49,899	--	3,203,130	26,808	--	506,463

	July			August			September		
1.....	226	689	420	140	510	193	74	525	105
2.....	314	1,270	s 1,190	110	400	119	68	390	72
3.....	385	1,290	1,340	103	370	103	77	350	73
4.....	327	943	833	87	250	59	105	580	164
5.....	314	1,460	1,240	77	195	41	96	1,140	295
6.....	283	1,220	932	76	275	56	87	3,220	756
7.....	238	1,030	662	69	345	64	68	1,570	288
8.....	203	809	443	53	195	28	59	1,220	194
9.....	184	551	274	51	160	22	65	1,020	179
10.....	161	374	163	44	135	16	56	630	95
11.....	148	330	132	63	220	38	55	375	56
12.....	143	316	122	69	285	53	49	270	36
13.....	132	232	83	74	275	55	49	260	34
14.....	124	175	59	81	275	60	60	220	36
15.....	126	180	61	88	225	54	42	180	20
16.....	629	9,600	sa 24,000	110	350	104	42	180	20
17.....	1,300	11,800	41,400	132	660	235	49	360	a 50
18.....	908	7,400	18,100	140	725	274	56	320	48
19.....	920	5,900	14,700	145	760	298	55	180	27
20.....	805	4,900	10,700	143	650	251	49	110	15
21.....	1,690	21,500	s 114,000	167	960	433	43		
22.....	1,330	54,800	204,000	161	780	339	42		
23.....	794	50,900	113,000	140	665	251	40		
24.....	500	36,800	51,500	126	490	167	40		
25.....	406	24,900	27,300	116	390	122	42		
								71	8
26.....	340	14,900	13,700	112	590	178	43		
27.....	275	8,000	5,940	105	1,050	298	44		
28.....	222	4,000	2,400	105	1,090	309	42		
29.....	188	2,150	1,090	330	13,900	s 16,200	44		
30.....	167	1,320	595	207	9,250	s 6,210	46		
31.....	140	840	318	114	1,420	437	--	--	--
Total.	13,922	--	650,697	3,538	--	27,067	1,687	--	2,643

Total discharge for year (cfs-days)..... 245,427
Total load for year (tons)..... 6,612,633

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

POWDER RIVER NEAR LOCATE, MONT.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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, 1951	11:25 a.m.	241	--	7,680	7,640	2	3	6	89	95	97	--	--		--		SPNM
Oct. 2	11:25 a.m.	241	--	7,680	3,010	72	82	93	94	95	96	97	99		100		BWCM
Mar. 22, 1952	12:20 p.m.	a350	34	486	328	74	80	86	91	94	96	97	99		100		BWCM
Mar. 29	7:55 a.m.	a7,000	36	2,380	1,930	72	81	88	93	95	96	100	--		--		BWCM
Mar. 31	11:55 a.m.	16,500	37	7,590	4,910	--	49	--	70	--	91	--	--		--		SPWCM
Apr. 2	9:20 a.m.	7,200	37	11,100	7,000	1	4	31	42	53	71	87	98		99	100	SPNM
Apr. 2	9:20 a.m.	7,200	37	11,100	6,900	27	32	37	44	54	70	--	--		--		SPWCM
Apr. 15	4:50 p.m.	670	57	1,580	4,300	--	72	--	91	--	93	--	--		--		SPWCM
May 8	5:30 p.m.	1,520	55	7,280	9,050	--	40	--	61	--	87	--	--		--		SPWCM
May 20	7:40 p.m.	740	--	8,880	7,080	--	2	6	78	89	90	--	--		--		SPNM
May 20	7:40 p.m.	740	--	8,880	6,830	51	66	77	86	88	90	--	--		--		SPWCM
June 4	5:25 p.m.	1,270	--	4,910	4,560	--	3	10	73	80	91	--	--		--		SPNM
June 4	5:25 p.m.	1,270	--	4,910	6,180	42	56	67	74	76	88	--	--		--		SPWCM
June 17	6:40 p.m.	531	67	1,630	3,960	--	65	--	78	--	85	--	--		--		SPWCM
July 7	11:25 a.m.	238	--	1,020	2,730	--	81	--	94	--	96	--	--		--		SPWCM
July 15	6:00 p.m.	126	--	194	725	73	80	85	90	97	99	100	--		--		BWCM
July 21	5:15 a.m.	690	65	7,470	3,070	--	74	--	92	--	95	--	--		--		SPWCM
July 21	6:15 p.m.	2,360	73	27,200	10,800	--	50	--	73	--	93	--	--		--		SPWCM
July 22	10:15 a.m.	1,420	61	58,900	23,800	--	59	--	90	--	97	--	--		--		SPWCM
July 23	12:45 p.m.	710	74	49,400	6,770	--	15	--	88	--	98	--	--		--		SPNM
July 23	12:45 p.m.	710	74	49,400	5,560	--	69	--	95	--	98	--	--		--		SPWCM
Aug. 20	5:40 p.m.	143	77	622	1,970	--	65	--	96	--	98	--	--		--		SPWCM
Aug. 29	12:10 p.m.	610	72	11,800	4,300	--	61	--	89	--	96	--	--		--		SPWCM
Aug. 29	6:15 p.m.	461	72	31,200	6,500	--	74	--	95	--	99	--	--		--		SPWCM
Aug. 30	2:15 p.m.	158	63	6,720	4,850	--	87	--	98	--	99	--	--		--		SPWCM
Aug. 31	6:40 a.m.	119	51	1,720	1,290	--	76	90	93	--	--	--	--		--		BWCM
Sept. 3	9:30 a.m.	83	--	326	1,520	--	87	--	98	--	98	--	--		--		SPWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At bridge on State Highway 23, 2 miles south of Sidney, Richland County, 4.5 miles downstream from gaging station, 2 miles downstream from Fox Creek, and 30 miles upstream from mouth.
DRAINAGE AREA.--69,450 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.
Water temperatures: January 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 774 ppm Dec. 7-31; minimum, 208 ppm June 11-13.
Hardness: Maximum, 370 ppm Dec. 7-31; minimum, 112 ppm June 14-27.
Specific conductance: Maximum daily, 2,270 micromhos Jan. 21; minimum daily, 284 micromhos June 14.
Water temperatures: Maximum, 77°F July 11, Aug. 25; minimum, freezing point on many days during November to March.
EXTREMES, January 1951 to September 1952.--Dissolved solids: Maximum, 774 ppm Dec. 7-31, 1951; minimum, 208 ppm June 11-13, 1952.
Hardness: Maximum, 370 ppm Dec. 7-31, 1951; minimum, 110 ppm June 17-25, 1951.
Specific conductance: Maximum daily, 2,780 micromhos Jan. 14, 1951; minimum daily, 284 micromhos June 14, 1952.
Water temperatures: Maximum, 80°F July 30, 31, 1951; minimum, 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. No appreciable inflow between gaging station and sampling station. Discharge records for gaging station near Sidney for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951.....	8,730			64	24	73		194		238	11		2.0	0.17	540	0.73	12,730	258	99	37	2.0	804	7.5
Nov. 1-23.....	8,195			67	24	72		205		232	11		1.9	.18	542	.74	11,990	265	97	37	1.9	800	7.7
Nov. 24-Dec. 6.....	8,231			67	25	67		206		229	11		2.0	.17	558	.76	12,400	270	99	34	1.8	793	7.7
Dec. 7-31.....	3,056			93	34	104		288		343	16		3.2	.24	774	1.05	6,390	370	134	37	2.3	1,100	7.8
Jan. 1-29, 1952	5,397			86	31	81		258		279	15		3.3	.24	658	.89	9,590	342	130	33	1.9	963	8.1
Jan. 30-Feb. 29	6,855			62	21	61		184		196	13		10	.21	480	.65	8,880	242	91	35	1.7	734	7.6
Mar. 1-29	6,169			71	24	68		201		237	14		3.3	.20	542	.74	9,030	274	109	34	1.8	808	7.8
Mar. 30-31	67,750			43	11	36		159		93	1.5		4.5	.06	287	.39	52,500	152	22	34	1.3	464	7.9
Apr. 1.....	110,000			51	10	41		158		121	6.0		5.8	.09	336	.46	99,790	170	40	33	1.4	528	7.5
Apr. 2.....	79,200			38	9.5	34		140		85	3.0		5.1	.06	268	.36	57,310	134	19	35	1.3	429	7.4
Apr. 3-6.....	41,830			44	12	42		152		117	4.5		3.7	.08	320	.44	36,140	160	35	36	1.4	503	7.9
Apr. 7-10.....	26,450			49	16	52		158		159	7.0		3.4	.10	389	.53	27,780	190	60	37	1.6	601	8.0
Apr. 11-15	13,280			55	21	61		176		199	11		3.2	.12	468	.64	16,780	224	80	36	1.8	694	8.0
Apr. 16-21	10,820			62	23	64		196		214	12		2.6	.19	509	.69	14,870	251	90	35	1.8	759	8.1
Apr. 22-30.....	12,480			56	21	60		181		194	11		2.8	.13	467	.64	15,740	226	78	35	1.7	701	8.0
May 1-28	24,560			35	9.8	27		118		86	4.5		2.4	.05	249	.34	16,510	128	31	30	1.0	388	8.0
May 8 a	33,400			--	--	--		114		--	--		--	--	--	--	--	120	27	--	--	342	8.0
May 29-31	37,270			46	11	42		b124		139	5.0		2.3	.06	332	.45	33,410	160	58	36	1.4	505	8.3

a Not included in weighted average.
b Includes equivalent of 2 ppm of carbonate (CO_3).

June 1-9, 1952	41,830			35	8.4	23		116		74	4.0		1.8	0.06	226	0.31	25,520	122	27	28	0.9	345	7.5
June 10.....	56,200			40	12	37		132		114	5.0		1.7	.09	296	.40	44,920	150	42	34	1.3	450	7.7
June 11-13	54,670			35	7.4	20		120		61	3.5		1.9	.06	208	.28	30,700	118	20	26	.8	323	7.7
June 14-27	27,110			32	7.8	24		106		71	5.0		1.4	.07	214	.29	15,660	112	25	31	1.0	332	7.6
June 28-July 7	21,850			37	10	36		c122		108	6.0		1.5	.08	282	.38	16,640	135	35	35	1.4	432	8.3
July 8	16,000			45	15	50		148		151	7.0		1.2	.12	374	.51	16,160	176	55	37	1.6	563	8.0
July 9-22	15,690			35	11	38		123		107	5.5		1.0	.09	282	.38	11,950	133	32	37	1.4	435	7.9
July 23-Aug. 9	10,130			46	18	51		154		164	8.0		1.7	.13	386	.52	10,560	189	63	36	1.6	591	7.7
Aug. 10-Sept. 11 ...	7,001			51	22	67		173		211	9.5		1.2	.17	472	.64	8,920	216	74	39	2.0	705	7.9
Sept. 12-30.....	5,669			61	26	82		196		259	11		1.0	.19	562	.76	8,600	257	96	40	2.2	833	7.9
Weighted average d	13,070			48	16	47		155		148	7.5		2.7	0.11	371	0.50	13,090	186	59	35	1.5	561	--

c Includes equivalent of 3 ppm of carbonate (CO_3).
d Represents 100 percent of runoff for water year October 1951 to September 1952.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 5 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	a34	a34	a32	a32	32	36		--	70	--	a61
2	--	a35	a34	a32	32	32	37		--	71	a73	62
3	a54	33	a34	a32	a32	32	39		--	73	71	64
4	55	34	33	a32	a32	32	40		69	74	72	68
5	58	--	a33	a32	a32	a32	48		70	74	72	a69
6	54	--	--	a32	32	32	a51		72	74	a73	68
7	a54	a32	32	a32	a32	32	51		72	73	71	66
8	a58	a34	32	a32	a32	32	49		72	73	71	67
9	a58	31	32	a32	32	32	48		71	74	73	68
10	54	--	a32	a32	a32	32	46		71	75	72	68
11	a54	a36	a32	a32	a32	32	48		70	77	71	--
12	42	a38	a32	a32	a32	a32	48		69	76	72	--
13	59	a34	a32	a32	a32	a32	51		68	69	72	65
14	45	a33	a32	a32	32	32	53		68	--	--	a56
15	43	32	a32	a32	a32	32	55		67	75	--	57
16	--	a32	--	a32	a32	32	55		67	72	--	59
17	43	33	a32	a32	32	32	55		65	--	--	58
18	a42	32	a32	a32	32	32	--		68	--	--	58
19	a42	33	a32	a32	32	32	52		--	71	a72	50
20	a41	--	a32	a32	a32	32	52		a70	73	73	--
21	--	32	--	a32	32	32	53		70	72	73	--
22	47	a32	a32	a32	32	32	54		71	70	74	--
23	a41	--	a32	32	32	32	56		70	74	76	--
24	a40	32	a32	a32	32	a32	56		--	73	76	--
25	a40	32	32	32	32	32	56		66	71	77	--
26	a40	a33	a32	a32	--	32	--		63	72	a75	--
27	--	a33	a32	--	32	32	--		62	71	73	--
28	a43	a35	a32	32	a32	a33	--		65	71	a72	--
29	a41	a36	--	32	32	a33	--		69	72	--	--
30	a38	a34	a32	a32	--	a35	--		70	72	65	--
31	--	--	a32	32	--	a36	--		--	72	63	--
Average	48	33	32	32	32	32	50		69	72	--	--

a Observation made between 12 m. and 4 p. m.

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN IN WYOMING

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chlorids (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 (micromhos at 25°C)	pH
															Parts per million	Sum	Tons per acre-foot	Calcium, magnesium	Noncarbonate				
ALKALI CREEK AT RALSTON																							
Dec. 3, 1951		--	--	75	57	241	285	0	608	56	--	--	0.19	--		--	421	187	55	5.1	1,740	7.8
Feb. 27, 1952		--	--	72	55	248	281	0	613	53	--	--	.21	--		--	404	174	57	5.4	1,740	8.0
June 6		15	0.02	41	14	77	150	0	174	16	0.3	2.4	--	420		0.57	162	39	51	2.6	637	7.9
Sept. 5		15	.04	32	19	84	138	4	189	17	.4	1.9	--	431		.59	159	39	53	2.9	665	8.5
BITTER CREEK NEAR GARLAND																							
Dec. 3, 1951	30.6	--	--	64	33	317	323	0	670	17	--	--		--		--	297	32	70	8.0	1,840	8.0
Feb. 27, 1952	20.0	--	--	77	26	280	337	0	583	16	--	--		--		--	297	21	67	7.1	1,700	7.8
June 17	285	17	0.04	50	14	109	193	0	233	8.0	0.6	6.9		538		0.73	183	25	56	3.5	803	7.6
Sept. 4	330	18	.04	61	18	122	214	0	280	11	.7	8.2		627		.85	226	51	54	3.5	922	7.4
SALT CREEK, 2 MILES WEST OF SUSSEX																							
Sept. 11, 1949	--	7.6	0.10	258	113	792	292	0	2,280	152	1.0	0.0	--	--	3,750	5.10	1,110	871	61	--	4,410	7.8
May 26, 1952	20	5.6	.04	151	54	419	179	6	1,180	86	.7	2.6	0.22	2,080	1,990	2.83	599	442	60	7.4	2,660	8.3
June 3	15	8.1	.04	296	121	898	245	0	2,460	302	.8	.8	.66	4,450	4,210	6.05	1,240	1,040	61	11	5,310	7.8
June 12	.3	10	.04	310	139	967	204	6	2,800	250	.8	1.0	.56	4,870	4,580	6.62	1,340	1,160	61	11	5,610	8.2
June 27	101	16	.04	266	95	630	323	0	1,930	106	.8	1.4	.32	3,370	3,200	4.58	1,060	795	56	8.4	3,990	7.1

YELLOWSTONE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN IN WYOMING--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
WIND RIVER BELOW DUBOIS [a]			
May 26, 1952	1,330	714	2,560
June 23	840	39	88
July 23	607	21	34
BIGHORN RIVER BELOW HOT SPRINGS AND ABOUT 3 MILES NORTHEAST OF THERMOPOLIS			
Oct. 12, 1951	148	116	46
ALKALI CREEK AT RALSTON			
Oct. 5, 1951	63	690	117
HARLAN IRRIGATION DITCH, 1 MILE DOWNSTREAM FROM HARLAN DAM			
July 1, 1952	4.5	156	1.9
Aug. 4	4	47	.5
Aug. 25	5	43	.6
RED FORK NEAR BARNUM			
Apr. 25, 1952	104	1,460	410
UNNAMED TRIBUTARY TO NORTH FORK POWDER RIVER, 7½ MILES WEST OF KAYCEE			
Aug. 4, 1952	6	149,000	2,680
NORTH FORK POWDER RIVER, 4½ MILES NORTH OF KAYCEE			
Aug. 4, 1952	100	10,800	2,920
SAHARA IRRIGATION DITCH, 6 MILES EAST OF KAYCEE			
July 1, 1952	58	100	16
Aug. 8	51	1,980	273
Aug. 25	23.5	94	6.0
SALT CREEK, 2 MILES WEST OF SUSSEX			
May 26, 1952	20	1,820	98
June 12	.3	282	.2
June 27	101	51,600	14,600

a Daily suspended sediment concentration data from May 1 to July 31, 1952, on file at regional office at Lincoln, Nebraska.

MISCELLANEOUS ANALYSES OF STREAMS IN THE YELLOWSTONE RIVER BASIN IN WYOMING--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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	
WIND RIVER BELOW DUBOIS																	
May 7, 1951.....	1:40 p.m.	630		526	1,260	24	29	33	40	51	67	85	93		98		BWCM
May 26, 1952....	4:05 p.m.	1,330		714	3,250		50		78		90						SPWCM
July 12	5:00 p.m.	e840		4,840	3,940		41		69		95						SPWCM
ALKALI CREEK AT RALSTON																	
Oct. 5, 1951	2:04 p.m.	63		690	1,080	24	27	30	36	42	53	65	81		88		BWCM

e Estimated.

MISSOURI RIVER MAIN STEM--Continued

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 1952.
Water temperatures: May 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 576 ppm May 28-29; minimum, 272 ppm June 2-30.
Hardness: Maximum, 264 ppm Dec. 12-17; minimum, 131 ppm June 2-30.
Specific conductance: Maximum daily, 815 micromhos Jan. 2, 5, 6; minimum daily, 327 micromhos June 15.
Water temperatures: Maximum, 72°F July 27, Aug. 24.
EXTREMES, 1950-52.--Dissolved solids: Maximum, 576 ppm May 28-29, 1952; minimum, 272 ppm June 1-30, 1951, June 2-30, 1952.
Hardness: Maximum, 272 ppm Dec. 5, 1950; minimum, 127 ppm June 1-30, 1951.
Specific conductance: Maximum daily, 864 micromhos Mar. 20, 1951; minimum daily, 320 micromhos June 24, 1951.
Water temperatures (May 1951 to September 1952): Maximum, 78°F Aug. 1, 1951.
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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	37,050			55	21	52		186		169	9.5		1.6	0.08	428	0.58	42,820	223	70	33	1.5	650	7.9
Oct. 29,Sta. 420 a ..	37,100			--	--	--		--		--	--		--	--	--	--	--	--	--	--	--	647	--
Oct. 29, Sta. 670 a..	37,100			--	--	--		--		--	--		--	--	--	--	--	--	--	--	--	647	--
Oct. 29,Sta. 780 a ..	37,100			--	--	--		--		--	--		--	--	--	--	--	--	--	--	--	648	--
Oct. 29, Sta. 962 a .	37,100			--	--	--		--		--	--		--	--	--	--	--	--	--	--	--	645	--
Nov. 1-30	29,700			55	21	53		190		168	9.7		1.5	.13	434	.59	34,800	224	68	33	1.5	657	7.5
Dec. 1-6	19,680			58	22	57		194		184	10		1.6	.13	464	.63	24,660	237	78	34	1.6	690	7.6
Dec. 12-17	10,920			66	24	63		214		203	12		2.1	.13	508	.69	14,980	264	89	34	1.7	760	7.8
Jan. 2-29, 1952	14,860			66	24	60		214		199	11		2.4	.18	494	.67	19,820	262	87	33	1.6	749	7.7
Jan. 30, Sta. 430 ...	16,200			59	20	51		196		168	9.5		1.3	.12	428	.58	b19,460	231	70	32	1.5	653	7.7
Jan. 30, Sta. 840 ...	16,200			52	28	54		202		180	9.0		2.1	.13	458	.62	--	244	78	32	1.5	691	7.7
Jan. 30, Sta. 980....	16,200			61	22	53		201		178	10		1.6	.14	442	.60	--	241	76	31	1.5	683	7.8
Jan. 30, Sta. 1080...	16,200			61	22	55		201		180	11		1.8	.13	452	.61	--	244	79	32	1.5	691	7.8
Jan. 31-Feb. 29....	15,860			59	22	56		195		180	11		2.8	.10	453	.62	19,400	237	77	33	1.6	690	7.5
Mar. 1-28	11,510			62	23	60		195		204	12		3.1	.10	480	.65	14,920	248	88	33	1.7	726	7.9
Mar. 29-31	17,500			54	20	55		172		182	11		3.2	.23	426	.58	20,130	215	74	34	1.6	656	8.2
Apr. 1-5.....	107,500			41	10	35		149		92	4.5		3.4	.01	279	.38	80,980	144	22	33	1.3	443	7.7
Apr 6-30.....	56,640			37	13	39		145		102	5.5		2.8	.02	288	.39	44,040	144	25	36	1.4	457	7.7

a Not included in weighted average.
b Mean for cross section.

May 1-27, 1952	36,660			43	13	39	153	111	5.5		2.5	0.08	336	0.46	33,260	159	34	34	1.3	484	8.0
May 28-29	42,900			65	20	69	184	223	11		6.0	.11	576	.78	66,720	244	93	37	1.9	759	8.0
May 30-June 1	43,270			49	14	45	152	142	6.5		2.9	.09	390	.53	45,560	182	57	35	1.5	548	8.2
June 2-30	41,340			35	11	29	123	84	5.0		1.9	.07	272	.37	30,360	131	30	32	1.1	389	7.9
July 1-31.....	23,640			42	14	44	143	142	7.0		2.1	.33	358	.49	22,850	164	47	35	1.5	528	7.9
July 3, Sta. 540 a ...	28,700			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	483	--
July 3, Sta. 810 a ...	28,700			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	485	--
July 3, Sta. 1020 a ..	28,700			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	476	--
Aug. 1-31	29,330			51	18	51	175	164	9.0		1.4	.12	396	.54	31,360	202	58	35	1.6	607	8.0
Sept. 1-30	27,590			54	20	53	183	176	9.0		1.3	.11	420	.57	31,290	216	66	33	1.6	639	8.0
Sept. 25, Sta. 600 a .	27,100			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	625	--
Sept. 25, Sta. 800 a .	27,100			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	628	--
Sept. 25, Sta. 810 a.	27,100			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	628	--
Sept. 25, Sta. 1025 a	27,100			--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	629	--
Weighted average c	29,870			48	17	46	165	143	7.7		2.2	0.10	373	0.51	30,080	190	54	34	1.5	563	--
Weighted average d	29,000			48	17	46	167	143	7.9		2.2	0.10	377	0.51	29,520	190	53	33	1.5	568	--

a Not included in weighted average.
c Represents 98 percent of runoff for water year October 1951 to September 1952.
d Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER NEAR WILLISTON, N. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 8 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	41	36	--	35	a35	--	61	60	63	70	57
2	55	40	35	a34	36	35	a38	63	60	63	69	57
3	57	38	37	a34	--	a34	38	60	60	65	69	59
4	56	34	35	a35	35	a35	38	62	60	66	69	61
5	53	34	35	35	36	a35	38	61	64	--	69	60
6	57	40	35	a35	a35	36	40	59	64	66	70	61
7	53	38	--	34	36	a36	41	59	62	66	69	63
8	53	39	--	35	36	37	a40	59	64	67	68	64
9	53	39	--	a34	a36	a37	38	58	65	68	69	64
10	56	38	--	34	a36	--	38	56	62	71	68	64
11	54	39	--	34	--	35	39	55	64	71	66	65
12	55	39	34	35	36	a36	41	56	64	69	66	64
13	53	39	35	--	a36	a36	--	57	64	69	67	65
14	54	39	--	34	36	37	44	59	64	69	68	64
15	54	38	--	a34	37	a35	46	58	64	68	67	63
16	46	34	--	35	a37	a37	48	56	64	68	65	56
17	46	34	34	a34	--	a37	48	58	65	67	67	59
18	43	33	--	a35	37	37	48	58	64	68	68	57
19	43	35	--	--	a37	37	53	59	66	69	68	57
20	42	35	--	a35	--	a36	56	59	--	69	67	56
21	42	33	--	a35	a35	--	54	60	--	68	67	58
22	42	34	--	--	a36	a36	54	63	66	67	67	57
23	43	34	--	a34	a36	--	--	63	66	68	67	57
24	43	34	--	a35	--	a37	55	63	66	69	72	58
25	41	--	--	35	a36	38	54	63	66	71	71	56
26	39	34	--	34	36	38	56	62	64	71	70	58
27	40	35	--	--	36	--	58	58	64	72	69	58
28	42	34	--	--	37	--	60	56	63	70	66	59
29	43	34	--	a35	a36	38	60	56	63	69	67	58
30	41	35	--	a35	--	38	62	58	63	68	66	58
31	42	--	--	35	--	--	--	60	--	69	62	--
Average	48	36	--	35	36	36	48	59	64	68	68	60

a Observation made between 1 p. m. and 5 p. m.

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 December 1951 (discontinued).
Sediment records: March 1949 to December 1951 (discontinued).
EXTREMES, October to December 1951.--Water temperatures: Minimum, freezing point on many days during October to December.
Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days during November and December.
Sediment loads: Maximum daily, not determined; minimum daily, 0 ton on many days during November and December.
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 ton on many days each year.
REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of discharge for gaging station near Alzada for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, October to December 1951
/Once-daily temperature measurement made between 8 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Jnly	Aug.	Sept.
1	50	32	35									
2	50	35	35									
3	55	34	34									
4	50	33	35									
5	50	35	32									
6	48	35	--									
7	50	34	--									
8	--	40	--									
9	50	38	32									
10	48	38	--									
11	49	35	35									
12	48	35	--									
13	45	33	--									
14	45	35	34									
15	48	32	--									
16	45	32	32									
17	40	32	--									
18	38	32	--									
19	45	35	--									
20	40	34	--									
21	33	32	--									
22	38	32	--									
23	35	33	--									
24	45	32	--									
25	38	34	--									
26	40	34	--									
27	38	36	32									
28	40	35	--									
29	42	34	33									
30	32	35	--									
31	32	--	--									
Aver-age	44	34	a33									

a Includes estimated temperature, 32°F, on missing days after December 15.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT ALZADA, MONT.--Continued

Suspended sediment, October to December 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	0.2			1.0			0.1		
2	.2			.9			.1	99	(t)
3	.2			.9			0	--	0
4	.3			.7			0	--	0
5	.3			.5			0	--	0
6	.3			.1	40	0.1	0	--	0
7	.3			.1			0	--	0
8	.3			.4			0	--	0
9	.3			.7			0	--	0
10	.3			1.0			0	--	0
11	.2	84	0.1	.5			.1		
12	.2			.4			.1		
13	.3			.3			.1	132	(t)
14	.3			.3			.1		
15	.3			.2			.1		
16	.3			.1	127	.1	0	--	0
17	.3			.1			0	--	0
18	.3			.1			0	--	0
19	.3			.1			0	--	0
20	.6			.1			0	--	0
21	1.0			.1	--	0	0	--	0
22	1.0			0			.1		
23	1.1			.1			.1	33	(t)
24	1.1			.1			.1		
25	1.1			.1	154	(t)	0	--	0
26	1.1	63	.2	.1			0	--	0
27	1.1			0	--	0	0	--	0
28	1.1			0	--	0	0	--	0
29	1.1			.1	170	(t)	.2	36	(t)
30	1.2			.1			.1		
31	1.1			--	--	--	0	--	0
Total	17.8	--	4.2	9.2	--	2.4	1.3	--	0.3

Total discharge for period Oct. 1 to Dec. 31, 1951 (cfs-days) 28.3
Total load for period Oct. 1 to Dec. 31, 1951 (tons) 6.9

t Less than 0.050 ton.

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MARMARTH, N. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 12 in Marmarth, 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.
Water temperatures: August to September 1952.
Sediment records: August to September 1952.
EXTREMES, August to September 1952.--Sediment concentrations: Maximum daily, 6,320 ppm Aug. 22; minimum daily, not determined.
Sediment loads: Maximum daily, 2,210 tons Aug. 20; minimum daily, not determined.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, August to September 1952
/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											--	60
2											--	72
3											--	76
4											--	75
5											--	71
6											--	78
7											--	79
8											--	72
9											--	77
10											--	79
11											--	80
12											--	78
13											--	61
14											--	59
15											--	71
16											--	65
17											--	63
18											--	68
19											--	58
20											--	67
21											79	62
22											--	62
23											84	66
24											90	68
25											82	--
26											84	69
27											72	71
28											72	65
29											83	66
30											68	59
31											--	--
Average											--	69

LITTLE MISSOURI RIVER BASIN--Continued

LITTLE MISSOURI RIVER AT MARMARTH, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge, December 1951 to August 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Dec. 3, 1951	55	100	15
Jan. 11, 1952	1	100	.3
Feb. 15	900	294	714
Feb. 25	350	11	10
Feb. 29	270	9	6.6
Mar. 7	101	20	5.5
Mar. 26	55	12	1.8
Apr. 1	20,700	2,440	136,000
Apr. 2	21,800	2,180	128,000
Apr. 5	16,400	5,140	228,000
Apr. 9	7,830	2,950	62,400
Apr. 10	5,270	2,690	38,300
Apr. 11	3,600	2,790	27,100
Apr. 12	3,260	2,750	24,200
Apr. 14	1,930	2,720	14,200
Apr. 17	1,170	1,130	3,570
Apr. 26	260	166	117
May 12	206	3,260	1,810
June 9	50	65	8.8
July 14	60	214	35
Aug. 13	9.4	44	1.1

Suspended sediment, August to September 1952

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				--	--	--	6.8		
2				--	--	--	9.4		
3				--	--	--	12	110	4
4				--	--	--	14		
5				--	--	--	14		
6				--	--	--	4.2		
7				--	--	--	5.5		
8				--	--	--	4.2		
9				--	--	--	4.2		
10				--	--	--	1.1		
11				--	--	--	2.5		
12				--	--	--	3.6	124	1
13				--	--	--	4.2		
14				--	--	--	3.2		
15				--	--	--	4.2		
16				--	--	--	4.9		
17				--	--	--	3.2		
18				--	--	--	3.6		
19				--	--	--	15		
20				160	4,560	s2,210	10		
21				80	5,360	s1,080	8.7	151	4
22				45	6,320	768	6.8		
23				25	3,620	177	10		
24				19	950	49	8.1		
25				13	300	11	8.1		
26				17			8.1	38	1
27				7.4			8.1		
28				24	178	8	7.4		
29				19			8.1		
30				16			5.5		
31				13			--	--	--
Total				438.4	--	4,343	208.7	--	60

Total discharge for period Aug. 20 to Sept. 30, 1952 (cfs-days) 647.1
Total load for period Aug. 20 to Sept. 30, 1952 (tons) 4,403

s Computed by subdividing day.

LITTLE MISSOURI RIVER AT MARMARTH, N. DAK.--Continued

Particle-size analyses of suspended sediment, February to August 1952
(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	Water 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
Feb. 15, 1952	1:50 p.m.	900		294	759	96	98	98	99	100	--						BWCM
Apr. 1	1:00 p.m.	20,700		2,440	5,730	--	60	--	80	--	99						SPWCM
Apr. 2	3:30 p.m.	21,800		2,180	5,200	--	65	--	86	--	99						SPWCM
Apr. 5	3:00 p.m.	16,400		5,140	5,550	--	49	--	65	--	89						SPWCM
Apr. 5	3:00 p.m.	16,400		5,140	5,300	--	44	--	63	--	89						SPWCM
Apr. 9	6:25 p.m.	7,830		2,950	6,090	--	64	--	82	--	97						SPWCM
Apr. 10	5:00 p.m.	5,270		2,690	6,200	--	69	--	90	--	99						SPWCM
Apr. 11	3:45 p.m.	3,600		2,790	6,010	--	70	--	89	--	98						SPWCM
Apr. 12	9:10 a.m.	3,260		2,750	4,910	--	64	--	80	--	85						SPWCM
Apr. 14	2:45 p.m.	1,930		2,720	6,020	--	69	--	83	--	92						SPWCM
Apr. 17	9:45 a.m.	1,170		1,130	2,470	68	85	91	96	98	99	100					BWCM
Aug. 20	11:00 a.m.	160		4,600	3,460	--	84	--	95	--	99						SPWCM

HEART RIVER BASIN

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, approximately.
RECORDS AVAILABLE.--Sediment records: March 1946 to September 1952 (discontinued).
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 6,500 ppm Aug. 27; minimum daily, not determined.
Sediment loads: Maximum daily, 55,200 tons Apr. 4; minimum daily, 1 ton on many days.
EXTREMES, 1946-52.--Sediment concentrations: Maximum daily, 6,500 ppm Aug. 27, 1952; minimum daily, no flow Jan. 6 to Mar. 3, 1950.
Sediment loads: Maximum daily, 152,000 tons Apr. 17, 1950; minimum daily, 0 ton Jan. 6 to Mar. 3, 1950.
REMARKS.--Flow affected by ice Nov. 1 to Apr. 1. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Suspended sediment, water year October 1951 to September 1952

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	8.5			14	60		15	81	
2	8.5	43	1	15	--		15	--	
3	9.0			14	--	e4	15	--	
4	11			11	153		14	--	e3
5	11			9.8	153		15	--	
		71	2						
6	11			11			13	--	
7	11			11	37	1	7.9	--	
8	13			12			6.3	48	
9	15			14			8.5	--	
10	15			15			9.8	--	
		77	3		114				
11	15			15		5	8.5	--	
12	15			15			8.5	--	
13	18			15			8	--	
14	19			12	35		9.0	--	
15	22	68	4	6.8	42		8.5	--	
16	23			13	--		7.4	--	
17	58	59	9	13	--		6.3	--	
18	65	82	14	11	--		5.8	--	
19	49	69	9	9.8	--		5.8	--	e1
20	38	63	6	11	--		5.8	--	
21	26			11	--		5.8	--	
22	23	55	3	9.0	--	e1	5.2	--	
23	18			9.0	--		5.2	--	
24	17			8.5	65		4.7	--	
25	16			8.5	--		4.7	--	
		46	2						
26	15			8.5	--		4.7	--	
27	15			9.0	--		4.7	--	
28	14			11	--		4.7	--	
29	48	69	9	14	--		4.7	92	
30	41	75	8	15	56		5.2	--	
31	23	70	4	--	--	--	5.2	--	
Total	691.0	--	119	351.9	--	65	248.9	--	43

e Estimated.

HEART RIVER BASIN--Continued

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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	4.7	--		3.3	--		14	--	
2	4.7	--		3.3	93		13	--	
3	4.1	--		3.6	--		12	--	
4		--		3.6	--		11	--	
5	4.1	60		4.1	--		10	--	e4
6	3.6	--		4.7	--	e1	10	--	
7	3.6	--		5.2	--		9	--	
8	3.6	--		5.2	--		9	142	
9	3.6	--		5.2	69		8	--	
10	3.6	--		5.8	--		8	--	
11	3.6	--		6.3	--		8	--	
12	3.6	112		11	145	4	7	--	
13	3.6	--		86	--	e10	7	--	
14	3.6	--		160	36	16	7	--	
15	3.6	--		122	22	7	7	131	
16	3.6	--	e1	75	37	8	7	--	
17	3.6	--		50	38	5	7	--	
18	3.6	--		43	30	3	6	--	
19	3.6	116		37	--	e3	6	--	
20	3.6	--		32	23	2	6	--	e1
21	3.6	--		29			6	--	
22	3.6	--		26	28	2	6	30	
23	3.6	--		23			6	--	
24	3.6	--		21			6	--	
25	3.6	--		19			6	--	
26	3.6	81		18	23	1	6	--	
27	3.6	--		16			6	--	
28	3.3	--		16			11	21	
29	3.3	--		15			22	29	2
30	3.3	--		--	--	--	1,160	200	sa800
31	3.3	--		--	--	--	3,960	1,450	s16,800
Total	114.1	--	31	849.3	--	82	5,369	--	17,660

Day	April			May			June		
1	6,920	2,110	39,400	43			20		
2	7,190	2,160	41,900	44			19		
3	7,700	2,510	52,200	40			18		
4	6,950	2,940	55,200	37			18		
5	6,220	2,220	37,300	31	53	5	18	102	5
6	6,300	2,910	49,500	31			16		
7	6,460	2,920	50,900	35			15		
8	4,860	2,830	37,100	34			15		
9	2,680	1,720	12,400	28			15		
10	1,260	1,060	3,610	25			33	180	sa40
11	675	693	1,260	25			47	438	56
12	444	470	563	22			49	186	s27
13	328	354	314	20			73	127	25
14	262	269	190	22			112	146	44
15	218	204	120	22			79	77	16
16	180	196	95	21	63	4	48	80	10
17	154	148	61	20			29	120	9
18	139	130	49	21			22	172	10
19	123	104	34	22			15	232	9
20	113	83	25	21			11	248	7
21	99	72	19	21			9.8	146	4
22	88	62	15	19			14		
23	81	60	13	15			18		
24	74	50	10	15			15	138	6
25	71	46	9	15	71	3	11		
26	65	51	9	15			18		
27	60	44	7	15			23		
28	54	37	5	15			32	92	6
29	44	33	4	18			26		
30	41	37	4	20	96	5	25		
31	--	--	--	21			--	--	--
Total	59,853	--	382,316	753	--	129	863.8	--	356

e Estimated.

a Computed from partly-estimated concentration graph.

s Computed by subdividing day.

HEART RIVER BASIN--Continued

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	23			8.5			15	470	19
2.....	23	144	9	9.0			9.0	338	8
3.....	21			8.5			7.9	252	5
4.....	15	322	13	7.9			9.0	194	5
5.....	14	288	11	7.4			8.5	182	4
6.....	13	170	6	6.8			7.4	162	3
7.....	11	122	4	9.0			6.8	110	2
8.....	9.8			9.0			5.8	99	2
9.....	9.0			8.5			6.3	82	1
10.....	9.0			9.0	89	2	5.2		
11.....	8.5			9.0			5.2		
12.....	8.5			8.5			4.7		
13.....	8.5			8.5			4.1		
14.....	8.5	114	3	9.0			3.6		
15.....	8.5			7.4			3.6		
16.....	8.5			6.3			3.3		
17.....	8.5			6.3			3.3		
18.....	8.5			7.4			4.1		
19.....	8.5			29	95	sa 18	3.6		
20.....	24	164	11	93	109	s 34	3.3	70	1
21.....	228	340	sa 220	24	174	11	3.3		
22.....	93	694	174	13	116	4	4.1		
23.....	43	470	55	8.5	86	2	4.7		
24.....	22	308	18	6.8	70	1	5.2		
25.....	15	217	9	6.8	64	1	5.2		
26.....	14	174	7	60	3,600	sa 1,800	5.2		
27.....	12	156	5	826	6,500	s 16,000	5.2		
28.....	9.8	108	3	184	2,830	s 1,570	5.2		
29.....	9.8	99	3	76	760	156	4.7		
30.....	9.0	77	2	40	622	67	3.6		
31.....	8.5	67	2	23	588	36	--	--	--
Total	712.4	--	606	1,536.1	--	19,736	166.1	--	70

Total discharge for year (cfs-days) 71,508.6
Total load for year (tons) 421,213

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

HEART RIVER NEAR RICHARDTON, N. DAK.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 31, 1952...	7:00 p. m.	4,620		2,700	3,130	--	35	--	55	--	85	--	--	99	100		SPWCM
Apr. 3.....	1:50 p. m.	7,640		2,400	3,700	--	40	--	58	--	79	88	96				SPWCM
Apr. 6.....	1:15 p. m.	6,020		2,540	4,120	--	39	--	55	--	74	--	--				SPWCM
Apr. 9	6:25 p. m.	2,100		1,690	3,060	--	41	--	58	--	78	--	--				SPWCM
Apr. 11	5:25 p. m.	589		644	1,380	55	70	75	85	92	97	99	100				BWCM
Apr. 14.....	6:35 p. m.	248		245	581	75	78	85	94	98	99	99	100				BWCM
Aug. 27.....	7:20 a. m.	1,500		7,200	2,920	--	69	--	92	--	98	--	--				SPWCM
Aug. 27.....	12:45 p. m.	846		6,380	16,300	--	66	--	98	--	99	--	--				SPWCM

HEART RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE HEART RIVER BASIN IN NORTH DAKOTA

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
HEART RIVER BELOW HEART BUTTE DAM NEAR GLEN ULLIN			
Oct. 1, 1951	56	11	1.7
Oct. 5	56	47	7.1
Oct. 12	56	24	3.6
Oct. 20	56	14	2.1
Oct. 25	56	17	2.6
Nov. 3	56	14	2.1
Nov. 10	56	6	.9
Nov. 15	56	8	1.2
Nov. 25	56	4	.6
Nov. 30	11	3	.1
Dec. 15	11	2	.1
Dec. 21	11	2	.1
Dec. 28	11	1	(t)
Dec. 29	11	117	3.5
Jan. 4, 1952	11	3	.1
Jan. 12	11	1	(t)
Jan. 18	11	1	(t)
Jan. 25	11	2	.1
Feb. 1	11	25	.7
Feb. 2	11	1	(t)
Feb. 11	11	2	.1
Feb. 11	11	2	.1
Feb. 19	11	1	(t)
Feb. 26	11	1	(t)
Feb. 29	13	3	.1
Mar. 4	13	14	.5
Mar. 6	13	1	(t)
Mar. 6	13	1	(t)
Mar. 11	13	14	.5
Mar. 18	13	11	.4
Mar. 28	110	3	.9
Apr. 3	3,260	19	167
Apr. 9	4,090	274	3,030
Apr. 11	3,990	230	2,480
Apr. 14	3,770	283	2,880
Apr. 17	3,480	260	2,440
Apr. 22	2,820	221	1,680
Apr. 29	376	137	139
May 28	43	49	5.7
June 30	90	83	20
July 31	76	51	10

t Less than 0.050 ton.

NORTH FORK GRAND RIVER AT HALEY, N. DAK.

LOCATION (revised).--At gaging station at highway bridge, about 300 feet south of post office at Haley, Bowman County, and 1 mile north of South Dakota State line.
DRAINAGE AREA.--509 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1952 (discontinued).
Water temperatures: March 1951 to September 1952 (discontinued).
EXTREMES, 1951-52.--Dissolved solids: Maximum, 3,130 ppm Feb. 1-4; minimum, 112 ppm Mar. 30, Apr. 6-8.
Hardness: Maximum, 452 ppm Jan. 28-31; minimum, 30 ppm Mar. 30.
Specific conductance: Maximum daily, 4,270 micromhos Feb. 4; minimum daily, 140 micromhos Mar. 30.
Water temperatures: Maximum, 82°F Aug. 25, 26; minimum, freezing point on many days during November to April.
EXTREMES, February 1951 to September 1952.--Dissolved solids: Maximum, 3,130 ppm Feb. 1-4, 1952; minimum, 112 ppm Mar. 30, Apr. 6-8, 1952.
Hardness: Maximum, 452 ppm Jan. 28-31, 1952; minimum, 30 ppm Mar. 30, 1952.
Specific conductance: Maximum daily, 4,270 micromhos Feb. 4, 1952; minimum daily, 140 micromhos Mar. 30, 1952.
Water temperatures (March 1951 to September 1952): Maximum, 82°F Aug. 25, 26, 1952; minimum, 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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	5.62					333		456	0	555	4.5			0.71	1,230	1.67	18.7	213	0	76	9.9	1,800	8.0
Nov. 1-28	5.79					436		544	0	745	6.3			.70	1,590	2.16	24.9	245	0	77	12	2,260	8.1
Nov. 29-Dec. 15	5.5					503		--	--	840	--			.64	1,920	2.61	28.5	324	--	77	12	2,870	8.1
Dec. 16-23	3.6					622		--	--	1,000	--			.41	2,220	3.02	21.6	354	--	79	14	3,170	--
Dec. 24-31	3.3					652		798	0	1,030	10			.85	2,290	3.11	20.4	378	0	79	15	3,070	8.1
Jan. 1-5, 1952	2.0					672		842	0	1,110	8.5			.86	2,380	3.24	12.9	409	0	78	14	3,210	7.9
Jan. 6-11	1.5					685		860	0	1,110	8.5			1.0	2,430	3.30	9.84	420	0	78	15	3,260	8.0
Jan. 12-20	1.2					654		858	0	1,110	8.5			1.0	2,420	3.29	7.84	414	0	76	14	3,240	8.0
Jan. 21-25	1.0					662		842	0	1,080	8.5			1.0	2,390	3.25	6.45	404	0	78	14	3,190	8.1
Jan. 26-27	1.0					672		828	16	1,100	9.0			.92	2,330	3.17	6.29	412	0	78	14	3,140	8.2
Jan. 28-31	1.8					758		944	0	1,230	9.5			1.1	2,720	3.70	13.2	452	0	78	16	3,530	8.0
Feb. 1-4	3.0					924		922	33	1,490	12			1.3	3,130	4.26	25.4	400	0	83	20	4,020	8.4
Feb. 5-11	3.0					610		759	0	990	7.5			.85	2,190	2.98	17.7	368	0	78	14	2,980	7.8
Feb. 12-14	2.7					64		132	0	103	10			.15	302	.41	2.20	84	0	61	3.0	466	7.2
Feb. 15-16	2.0					141		237	0	228	1.0			.15	602	.82	3.25	137	0	69	5.2	847	7.4
Feb. 17-20	1.8					552		649	0	922	7.5			.30	1,940	2.64	9.43	328	0	79	13	2,640	7.9
Feb. 21-28	1.8					396		477	0	648	6.0			.64	1,420	1.93	6.90	232	0	79	11	1,970	7.7
Feb. 29-Mar. 5	4.8					379		484	0	622	6.0			.59	1,410	1.92	18.3	236	0	78	11	1,930	7.6
Mar. 6-10	4.0					388		506	0	648	5.5			.62	1,450	1.97	15.7	252	0	77	11	1,970	7.8
Mar. 11-29	2.2					435		548	0	720	6.5			.68	1,550	2.11	9.21	268	0	78	12	2,160	8.0
Mar. 30	48.0			8.0	2.4	16		42	0	26	.2			.00	112	.15	14.5	30	0	54	1.3	140	7.9
Mar. 31	164					90		136	0	163	.0			.10	358	.49	159	89	0	69	4.1	559	7.8

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 1-2, 1952	860					34		72	0	57	0.4			0.05	176	0.24	409	44	0	62	2.2	258	7.5
Apr. 3	1,200					18		52	0	32	.4			.00	128	.17	415	36	0	51	1.3	166	7.1
Apr. 4-5	2,450					22		50	0	36	1.0			.01	124	.17	820	34	0	58	1.6	194	7.4
Apr. 6-8	11,080					13		62	0	18	1.3			.28	112	.15	3,350	47	0	38	.8	149	7.3
Apr. 9-13	1,351					21		70	0	32	.7			.25	132	.18	481	50	0	48	1.3	201	7.0
Apr. 14-20	307					68		133	0	127	.5			.11	306	.42	254	94	0	61	3.1	493	7.4
Apr. 21-29	56.4					166		271	0	307	2.5			.23	696	.95	106	179	0	66	5.4	1,020	7.7
Apr. 30-May 16	25.8					272		396	0	489	4.5			.53	1,040	1.41	72.4	236	0	70	7.7	1,530	8.1
May 17-June 4	14.3					358		462	0	628	5.5			.70	1,320	1.80	51.0	259	0	75	9.7	1,890	8.1
June 5-13	6.88					384		498	0	647	7.0			.68	1,410	1.92	26.2	258	0	76	10	2,040	8.2
June 14-19	3.58					406		512	0	716	6.5			.76	1,520	2.07	14.7	258	0	75	11	2,180	8.1
June 20-23	2.35					434		518	0	745	6.0			.92	1,520	2.07	9.64	250	0	78	12	2,180	8.0
June 24-July 6	6.91					433		411	36	752	8.0			.65	1,510	2.05	28.2	237	0	79	12	2,150	8.7
July 7-31	2.00					463		508	0	790	2.0			1.0	1,580	2.15	8.53	236	0	81	13	2,280	8.1
Aug. 1-31	.60					452		488	12	742	7.0			.91	1,520	2.07	2.46	214	0	82	13	2,230	8.3
Sept. 1-30	.50					476		484	24	762	7.0			1.2	1,580	2.15	2.13	195	0	84	15	2,210	8.2
Weighted average [a]	143					32		b81	--	49	1.3			0.24	174	2.37	67.2	56	0	58	1.9	247	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement at 2 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	33	--	32	32	32	32	64	69	76	76	--
2	59	33	34	32	32	32	a 34	67	67	69	72	68
3	60	33	33	32	32	32	a 35	68	65	72	73	65
4	53	34	33	32	32	32	a 34	68	70	76	70	68
5	53	34	--	32	32	32	a 36	67	75	76	75	66
6	55	34	32	32	32	32	a 36	68	76	72	74	66
7	55	34	32	32	32	32	a 38	67	76	68	73	68
8	57	34	32	32	32	32	a 34	66	77	74	69	70
9	57	35	32	--	32	32	--	63	73	74	68	73
10	56	34	32	32	32	32	34	--	74	74	68	72
11	57	35	32	32	32	--	38	--	74	--	68	72
12	55	35	32	32	32	--	38	--	75	70	67	74
13	54	34	32	32	32	32	39	--	72	70	68	64
14	54	33	32	32	32	32	42	--	72	68	72	62
15	52	33	32	32	32	32	40	64	74	71	69	64
16	45	33	32	32	32	32	43	66	66	76	70	64
17	44	33	32	32	32	32	50	64	73	76	71	62
18	43	33	32	32	32	32	52	68	72	77	72	60
19	43	34	32	32	32	32	57	68	66	75	73	60
20	38	33	32	32	32	32	54	64	72	75	74	60
21	39	33	32	32	32	32	52	64	69	76	69	58
22	40	33	32	32	32	32	53	62	68	68	76	58
23	42	32	32	32	32	32	54	68	69	72	74	58
24	43	32	32	32	32	32	57	69	69	75	78	61
25	39	33	32	32	32	32	60	64	64	73	82	62
26	39	32	32	32	32	32	64	59	61	75	82	64
27	40	32	32	32	32	32	65	55	58	75	80	62
28	39	33	32	32	32	32	65	56	66	75	74	61
29	43	33	32	32	32	32	64	67	66	74	72	63
30	35	34	32	32	--	32	66	58	74	74	70	61
31	34	--	32	32	--	32	--	59	--	75	68	--
Average	48	33	32	32	32	32	47	64	70	73	72	64

a Observation made at 1 p.m.

GRAND RIVER BASIN--Continued

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge, October 1951 to July 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 9, 1951	4.4	47	0.6
Nov. 5	5.4	53	.8
Dec. 4	6.1	51	.8
Jan. 10, 1952	1.4	136	.5
Feb. 11	2.6	68	.5
Mar. 7	4.3	22	.3
Apr. 4	1,240	118	395
Apr. 8	7,400	1,150	23,000
Apr. 9	2,500	518	3,500
Apr. 10	1,130	342	1,040
Apr. 11	1,060	252	721
Apr. 12	1,160	378	1,180
Apr. 14	550	334	496
Apr. 16	322	222	193
Apr. 25	50	47	6.3
May 12	30	76	6.2
June 9	6.2	41	.7
July 14	3.6	240	2.3

NORTH FORK GRAND RIVER AT HALEY, N. DAK.--Continued

Particle-size analyses of suspended sediment, April 1952
(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	Water 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. 8, 1952	7:40 p.m.	7,400		1,150	2,030	46	54	62	69	75	84	93	98		99	100	BWCM
Apr. 9	11:05 a.m.	2,500		518	1,300	66	75	88	95	98	99	99	100				BWCM
Apr. 10	10:00 a.m.	1,130		342	852	78	82	92	97	98	99	99	100				BWCM
Apr. 14	5:30 p.m.	550		334	721	74	82	88	94	99	100	--	--				BWCM

GRAND RIVER BASIN--Continued

GRAND RIVER NEAR SHADEHILL, S. DAK.

LOCATION.--At spillway and irrigation outlets of Shadehill Reservoir, three-quarters of a mile west of Shadehill, Perkins County, and 4 miles downstream from confluence of North and South Forks of Grand River.
DRAINAGE AREA.--3,120 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April to September 1952.
REMARKS.--Flow is regulated by an ungated spillway and by a regulated irrigation outlet. Samples collected at spillway stilling basin from April to July 1952 and at irrigation outlet from August to September 1952. Reservoir spills at elevation 2,272. Gaging station, Grand River at Shadehill, is 1 mile downstream. Records of elevations furnished by U. S. Bureau of Reclamation.

Chemical analyses, in parts per million, April to September 1952

Date of collection	Gage height (ft)	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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Apr. 5, 1952	2,274.5	--	--	--	--	77	4.8	--	--	--	--	--	--	310	0.42		52	--	74	4.6	472	--	
Apr. 6	2,278.1	--	--	--	--	64	4.5	--	--	--	--	--	--	270	.37		47	--	72	4.1	392	--	
Apr. 7	2,285.3	--	--	--	--	50	5.2	--	--	--	--	--	--	216	.29		46	--	67	3.2	333	--	
Apr. 8	2,292.0	--	--	--	--	54	5.5	--	--	--	--	--	--	236	.32		53	--	66	3.2	362	--	
Apr. 9-11	--	4.4	0.04	15	5.5	56	5.6	120	87	1.0	0.2	2.5	0.10	244	.33		60	0	65	3.2	388	7.6	
Apr. 12	2,295.94	--	--	--	--	56	6.0	--	--	--	--	--	--	256	.35		59	--	65	3.2	377	--	
Apr. 13	2,295.35	--	--	--	--	61	5.3	--	--	--	--	--	--	276	.38		59	--	67	3.5	413	--	
Apr. 16	2,293.2	--	--	--	--	57	4.6	--	--	--	--	--	--	250	.34		53	--	68	3.4	370	--	
Apr. 18	2,291.4	4.6	.04	13	4.5	53	4.4	112	73	1.0	.2	.2	.08	220	.30		51	0	67	3.2	346	7.6	
Apr. 19	2,290.4	--	--	--	--	54	--	--	--	--	--	--	--	248	.34		54	--	69	3.2	359	--	
Apr. 22	2,287.3	--	--	--	--	53	--	--	--	--	--	--	--	266	.36		54	--	68	3.1	354	--	
Apr. 26	2,282.8	--	--	--	--	50	--	--	--	--	--	--	--	248	.34		53	--	67	3.0	334	--	
Apr. 30	2,278.1	--	--	--	--	51	--	--	--	--	--	--	--	238	.32		54	--	67	3.0	340	--	
May 4	2,274.2	--	--	--	--	52	--	--	--	--	--	--	--	244	.33		59	--	66	2.9	359	--	
May 9	2,272.6	--	--	--	--	65	--	--	--	--	--	--	--	294	.40		65	--	69	3.5	430	--	
May 13	2,272.15	--	--	--	--	63	--	--	--	--	--	--	--	288	.39		67	--	67	3.3	426	--	
May 17	2,271.86	--	--	--	--	63	--	--	--	--	--	--	--	298	.41		69	--	67	3.3	435	--	
May 20	2,271.74	--	--	--	--	66	--	--	--	--	--	--	--	278	.38		70	--	67	3.4	452	7.5	
May 23, 26	--	--	--	--	--	68	--	--	--	--	--	--	--	--	--		78	--	65	3.4	471	--	
May 29, June 2, 6, 8	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--		86	--	67	3.8	536	--	
June 11, 13	--	--	--	--	--	85	--	--	--	--	--	--	--	--	--		91	--	67	3.9	563	--	
June 20	2,272.05	--	--	--	--	87	--	--	--	--	--	--	--	--	--		93	--	67	3.9	575	--	
June 27	2,272.09	--	--	--	--	87	--	--	--	--	--	--	--	--	--		94	--	67	3.9	583	--	
July 4	2,272.25	--	--	--	--	87	--	--	--	--	--	--	--	--	--		95	--	67	3.9	586	--	
July 11	2,272.2	--	--	--	--	89	--	--	--	--	--	--	--	--	--		98	--	66	3.9	596	--	
July 18	2,272.15	--	--	--	--	91	--	--	--	--	--	--	--	--	--		99	--	67	4.0	610	--	

July 25, 1952	2,272.1	--	--	--	--	98	--	--	--	--	--	--	--	408	0.55		100	--	68	4.3	643	8.4	
Aug. 1	--	--	--	25	9.4	100	--	--	--	--	--	--	0.17	410	.56		101	--	68	4.3	650	7.8	
Aug. 3	--	--	--	25	9.4	100	--	--	--	--	--	--	.16	408	.55		101	--	68	4.3	650	8.0	
Aug. 4	--	--	--	26	9.2	101	--	--	--	--	--	--	.17	406	.55		103	--	68	4.3	650	8.0	
Aug. 6	--	--	--	26	9.2	100	--	--	--	--	--	--	.15	416	.57		103	--	68	4.3	655	7.9	
Aug. 8	2,271.88	--	--	--	--	101	--	--	--	--	--	--	--	416	.57		104	--	68	4.3	657	7.9	
Aug. 14	2,271.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	651	--	
Aug. 18	2,271	--	--	--	--	104	--	--	--	--	--	--	--	419	.57		103	--	69	4.5	656	--	
Aug. 22	2,271.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	662	--	
Aug. 28	2,271.9	--	--	--	--	106	--	--	--	--	--	--	--	435	.59		105	--	69	4.5	673	--	
Aug. 29	2,272.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	668	--	
Sept. 5	2,271.82	--	--	--	--	106	--	--	--	--	--	--	--	439	.60		108	--	68	4.4	679	--	
Sept. 12	2,271.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	704	--	
Sept. 19	2,271.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	719	--	
Sept. 26	2,271.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	713	--	

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 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,510 ppm Jan. 1-12; minimum, 218 ppm Apr. 1-9.
Hardness: Maximum, 544 ppm Jan. 1-12; minimum, 68 ppm Oct. 5-12.
Specific conductance: Maximum daily, 2,090 micromhos Jan. 8; minimum daily, 308 micromhos Apr. 1.
EXTREMES, March 1951 to September 1952.--Dissolved solids: Maximum, 1,510 ppm Jan. 1-12, 1952; minimum, 184 ppm Mar. 24-25, 1951.
Hardness: Maximum, 544 ppm Jan. 1-12, 1952; minimum, 43 ppm Mar. 24-25, 1951.
Specific conductance: Maximum daily, 2,090 micromhos Jan. 8, 1952; minimum daily, 181 micromhos Mar. 24, 1951.
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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)	Chlorids (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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-4, 1951	52.3			55	17	174		299	0	325	7.4		0.6	0.12	772	1.05	109	208	0	64	5.2	1,120	8.1
Oct. 5-12	367			19	5.0	102		209	0	118	4.3		1.4	.09	388	.53	384	68	0	74	5.4	591	7.9
Oct. 13-15.....	79.0			31	7.4	128		246	0	184	4.0		1.3	.11	514	.70	110	108	0	70	5.4	772	8.0
Oct. 16-Nov. 1	64.4			50	15	162		318	0	276	8.5		1.4	.13	726	.99	126	187	0	63	5.1	1,090	8.0
Nov. 2-16.....	52.3			68	20	211		414	0	356	9.5		1.2	.15	914	1.24	129	251	0	63	5.8	1,320	8.1
Nov. 17-21.....	41.0			61	25	281		458	0	460	14		1.5	.16	1,150	1.56	127	256	0	70	7.6	1,560	7.7
Nov. 22-24	35.0			62	24	285		460	0	464	12		1.5	.17	1,120	1.52	106	252	0	71	7.8	--	7.8
Nov. 25-Dec. 3....	32.8			78	24	236		450	0	418	11		1.1	.14	1,040	1.41	92.1	292	0	63	6.0	1,510	8.0
Dec. 4-7	27.5			111	33	298		638	0	495	3.0		.6	.66	1,420	1.93	105	413	0	63	6.4	1,840	7.2
Dec. 8-12.....	23.0			107	36	307		783	0	402	7.0		.6	.74	1,340	1.82	83.2	415	0	62	6.6	1,870	7.3
Jan. 1-12, 1952 ...	.23			130	53	303		601	0	660	14		5.2	.27	1,510	2.05	.94	544	52	55	5.6	2,020	7.8
Mar. 31.....	1,000			30	5.4	36		146	0	50	.4		1.2	.05	236	.32	637	97	0	45	1.6	309	7.3
Apr. 1-9.....	14,180			26	5.5	35		146	0	39	1.2		1.2	.05	218	.30	8,350	87	0	46	1.6	334	7.2
Apr. 10-25	5,474			29	7.4	65		176	0	97	1.3		1.2	.12	310	.42	4,580	103	0	57	2.8	484	8.1
Apr. 26-May 2.....	3,963			27	5.5	59		157	0	86	1.0		1.8	.08	290	.39	3,100	90	0	58	2.7	425	7.8
May 3-7	2,360			26	7.3	68		163	0	101	2.0		2.5	.10	308	.42	1,960	95	0	61	3.0	479	7.8
May 8-17	976			37	4.9	105		202	0	159	4.0		1.9	.11	434	.59	1,140	113	0	67	4.3	662	7.8
May 18-22	416			38	10	127		244	0	202	4.0		1.2	.11	524	.71	589	137	0	66	4.7	806	7.9
May 23-June 8	199			40	12	135		259	4	221	5.0		.8	.15	572	.78	307	150	0	64	4.8	876	8.3
June 9-27.....	102			48	15	172		299	0	304	6.5		1.0	.16	714	.97	197	181	0	65	5.6	1,060	8.1
June 28-30.....	380			40	13	166		244	0	289	5.0		1.5	.19	708	.96	726	152	0	70	5.9	983	8.0

July 1-3, 1952.....	288			24	5.1	152		250	0	185	5.5		1.5	0.20	528	0.72	411	81	0	80	7.3	794	7.8
July 4	170			28	6.3	178		274	0	232	3.0		3.6	.20	652	.89	299	96	0	80	7.9	937	7.9
July 5	165			26	7.1	158		240	0	225	6.0		3.8	.22	556	.76	248	94	0	78	7.1	846	7.8
July 6-18	104			34	7.8	168		274	0	250	5.0		1.3	.20	614	.84	172	117	0	74	6.8	932	7.9
July 19-31	50.4			44	12	214		336	0	323	7.0		1.4	.27	784	1.07	107	161	0	74	7.3	1,160	8.0
Aug. 1-12.....	20.3			48	18	222		306	0	403	8.0		.4	.21	880	1.20	48.2	195	0	71	6.9	1,290	7.9
Aug. 13-21.....	16.2			47	22	242		310	0	464	11		.5	.24	978	1.33	42.8	207	0	70	7.3	1,410	8.1
Aug. 22-29.....	38.8			30	7.3	223		292	0	312	9.0		.6	.27	750	1.02	78.6	105	0	82	9.5	1,110	8.1
Aug. 30-Sept. 6	22.4			44	13	268		344	10	413	11		1.3	.33	940	1.28	56.9	164	0	78	9.1	1,390	8.3
Sept. 7-10.....	19.3			39	9.4	212		294	0	321	9.6		2.0	.19	736	1.00	38.4	136	0	77	7.9	1,120	8.2
Sept. 11-24	11.8			48	20	250		347	0	440	10		.8	.24	968	1.32	30.8	201	0	72	7.7	1,430	8.1
Sept. 25-30	6.80			53	26	274		341	0	541	11		.6	.26	1,090	1.48	20.0	240	0	69	7.7	1,570	8.2
Weighted average [a]	778			28	6.6	59		b168	--	82	1.7		1.3	0.09	293	0.40	615	97	0	57	2.6	447	--

a Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

GRAND RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Sum	Tons per acre-foot	Calcium, magnesium	Noncarbonate				
NORTH FORK GRAND RIVER NEAR WHITE BUTTE																							
Oct. 23, 1951	a12	--	--	--	--	285	--	377	8	540	6.0	--	--	--	--	--	--	--	--	69	7.5	1,660	8.3
Apr. 18, 1952	406	6.0	0.04	31	14	88	6.5	176	0	190	1.5	0.2	1.2	0.19	434	--	0.59	134	0	57	3.3	648	7.9
May 18	a57	4.9	.09	61	34	280	8.1	383	7	568	7.0	.4	.4	.55	1,190	1,160	1.62	293	0	67	7.1	1,700	8.3
July 22	4.1	--	--	--	--	389	--	--	--	--	--	--	--	.79	1,550	--	2.11	308	--	73	9.6	2,150	8.4
SOUTH FORK GRAND RIVER NEAR CASH [b]																							
Oct. 23, 1951	26	--	--	--	--	346	--	523	24	355	6.5	--	--	--	--	--	--	--	--	89	15	1,610	8.6
Apr. 18, 1952	a239	7.1	0.06	26	13	138	5.0	220	0	229	1.5	0.2	1.2	0.16	546	--	0.74	118	0	71	5.5	806	8.0
May 18	a35	5.7	.05	31	19	400	7.4	518	19	575	7.0	.2	.4	.33	1,350	1,320	1.84	155	0	84	14	1,970	8.5
July 22	a40	--	--	--	--	433	--	--	--	--	--	--	--	.40	1,330	--	1.81	75	--	93	22	1,950	8.7

a Mean daily discharge.

b Revisions.--The suspended-sediment discharge for July 23, 1951 for South Fork Grand River Near Cash in Water-Supply Paper 1198 has been revised as follows: Date: July 23; Water discharge (cfs): 7.9; Mean concentration of suspended sediment (ppm): 115; Discharge of suspended sediment (tons per day): 2.5.

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LANCE CREEK AT SPENCER, WYO.

LOCATION.--At cableway 150 feet downstream from gaging station, three-eights 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.
RECORDS AVAILABLE.--Chemical analyses: November 1951 to July 1952.
Sediment records: April 1950 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 281,000 tons June 27; minimum daily, 0 ton on many days.
EXTREMES, 1950-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 281,000 tons June 27, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Maximum observed suspended-sediment concentration during water year, 73,600 ppm Aug. 21. Flow affected by ice Dec. 8-14, Jan. 14-16. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to July 1952

Date of collection	Water discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chlorids (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Sum	Tons per acre-foot	Calcium, magnesium	Noncarbonate					
Nov. 1, 1951	0.1	13	0.02	142	44	238		324	0	728	18	0.6	0.5	1,390	1,340	1.89	534	268	49	4.5	1,810	7.6	0.000
Dec. 4	1.0			139	44	258		340	0	755	17			1,440		1.96	528	249	51	4.9	1,920	7.8	.000
Feb. 4, 1952	a.7			155	49	313		374	0	895	21			1,680		2.28	588	281	54	5.6	2,140	8.0	.000
Mar. 4	a3.1			160	55	290		426	0	840	23			--		--	625	276	50	5.0	2,260	7.9	.001
Apr. 2	1.1			123	46	305		298	14	791	49			--		--	496	229	57	6.0	1,980	8.3	.002
May 6	.2			143	56	346		288	8	1,010	27			--		--	586	337	56	6.2	2,320	8.2	.002
June 3	3.4			128	41	282		320	0	764	33			--		--	490	228	56	5.5	1,890	7.9	.001
June 27	3,380			61	12	106		204	0	242	9.0			--		--	202	35	53	3.2	808	7.6	.001
July 1	54			79	22	153		180	0	432	17			--		--	288	140	54	3.9	1,130	7.6	.001

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.5	--		0.1	37	(t)	1.0	--	
2	.4	79		0		0	1.3	--	
3	1.0	--		.2			1.3	21	
4	3.0	--		.2		(t)	1.0	15	
5	1.1	--		.1			1.1	--	
6	.8	--		0		0	1.3	--	
7	.8	--		0		0	.6	--	
8	.8	--		0		0	.5	--	
9	.6	--		0		0	.4	--	
10	.6	--		0		0	.4	--	
11	.6	--		.1			.5	--	(t)
12	.8	--		.1			.5	--	
13	1.3	--		.2			.4	--	
14	.8	--		.2			.3	--	
15	.6	--		.2			.2	--	
16	.4	55	(t)	.1			.2	--	
17	.4	--		.3			.3	--	
18	.5	--		1.0			.3	--	
19	.3	--		1.0			.2	--	
20	.3	--		1.3			.1	--	
21	.3	--		.6		(t)	0	--	0
22	.3	--		.9			0	--	0
23	.2	--		1.0			0	--	0
24	.2	--		1.1			0	--	0
25	.2	--		1.3			0	--	0
26	.2	--		1.6			0	--	0
27	.2	--		1.8			0	--	0
28	.1	--		1.3			0	--	0
29	.1	--		1.3			0	--	0
30	.2	--		1.1			0	--	0
31	.1	--		--		--	0	--	0
Total	17.7	--	3	17.1		1	11.9	--	1

Day	January			February			March		
	Mean discharge (cfs)		Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	0		0	0.8	--		3.5	--	
2	0		0	.7	--		3.0	--	
3	0		0	.7	--		2.7	--	
4	0		0	.7	53		3.1	17	(t)
5	0		0	.7	--		3.5	--	
6	0		0	.7	--		3.7	--	
7	0		0	.8	--		4.0		
8	0		0	1.0	--		4.2		
9	0		0	1.5	--		4.3		
10	0		0	2.5	69		4.3	--	e 1
11	0		0	3.5	--		4.2		
12	0		0	3.0	--		4.0		
13	0		0	2.8	--		4.0		
14	.1			2.7	--		5.0		
15	1.3			2.6	--	(t)	7.0	150	3
16	.9			2.5	--		10	133	4
17	.8			3.0	--		15	162	7
18	.7			2.8	--		17	231	11
19	.6			2.5	--		22	233	14
20	.5			2.5	--		19	275	14
21	.3			2.6	--		13	298	10
22	.2		(t)	2.7	--		10	239	6
23	.1			2.7	--		8.0	165	4
24	.2			2.7	--		9.0		
25	.3			3.0	--		9.0		
26	.4			3.5	--		9.0	171	4
27	.5			4.0	--		9.4		
28	.6			3.5	--		9.6		
29	.7			3.5	--		9.9		
30	.8			--	--		6.8	120	a 2
31	.8			--	--		6.8	97	2
Total	9.8	--	1	66.2	--	12	244.0	--	110

e Estimated.
t Less than 0.50 ton.
a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	5.4	90	1	0.3	--	(t)	9.1	150	4
2	2.8	55	(t)	.2	--	(t)	6.1	150	2
3	6.8	241	4	0	--	0	5.4	198	s 4
4	4.6	147	2	0	--	0	48	5,310	s 961
5	4.7	140	a 2	0	--	0	47	2,180	s 292
6	1.8	--	e 1	.1	53	(t)	47	1,740	221
7	1.0	320	1	0	--	0	25	1,380	a 95
8	1.0	203	1	.5			16	520	22
9	3.4	148	1	5.4			11	250	7
10	3.5			2.1			6.8	240	4
11	2.8	--	e 1	.4			3.4	200	2
12	2.4			.5	--	(t)	2.1	150	1
13	2.1	130	1	.2			1.1		
14	1.8	121	1	.1			.6		
15	1.8	77	(t)	.2			.4	--	(t)
16	2.1			.9			.2		
17	2.1	77	(t)	1.6	--		.1	48	(t)
18	2.1			2.4	--	(t)	0	--	0
19	1.8			1.8	--		0	--	0
20	1.3			1.9	61		0	--	0
21	.9			14	1,200	sa 140	0	--	0
22	.9			381	17,100	s 19,600	0	--	0
23	.9			1,680	38,200	s 186,000	0	--	0
24	.8			460	22,200	s 29,700	0	--	0
25	.6	--	(t)	171	8,850	s 4,210	.4	--	e 1
26	.5			89	5,750	s 1,440	20	--	e 460
27	.3			50	2,200	297	3,620	27,100	s 281,000
28	.1			32	970	84	1,760	21,300	s 115,000
29	.1			24	480	31	182	8,500	s 4,460
30	.2			18	300	15	91	3,200	786
31	--	--	--	13	210	7	--	--	--
Total	60.6	--	21	2,950.6	--	241,527	5,902.7	--	403,322

Day	July			August			September		
1	58	1,200	188	0	--	0			
2	38	500	51	0	--	0			
3	25	270	18	0	--	0			
4	17			0	--	0			
5	14			0	--	0			
6	9.9	--	e 7	33	--	e 180			
7	11			16	--	e 35			
8	8.3			6.8	--	e 4			
9	8.3			1.3	--	(t)			
10	8.3			1.0	--	(t)			
11	11	--	e 65	177	--	e 18,000			
12	796	27,200	s 88,700	496	--	e 73,000			
13	416	26,200	s 31,100	101	--	e 5,600			
14	121	11,000	s 3,780	49	--	e 1,000			
15	78	3,800	800	22	--	e 60			
16	37	1,270	127	9.1	--	e 7			
17	22	280	a 17	1.8					
18	11	200	a 6	.6					
19	5.4	150	a 2	.2	--	(t)			
20	2.4	150	1	.1					
21	.9			537	31,200	s 100,000			
22	.3			237	33,200	s 24,900			
23	.1			73	16,000	s 3,220			
24	.1	--	(t)	32	7,000	s 726			
25	.1			7.5	1,500	sa 38			
26	.1			1.8	745	4			
27	0	--	0	.8	420	a 1			
28	0	--	0	.1	180	(t)			
29	0	--	0	0	--	0			
30	0	--	0	0	--	0			
31	0	--	0	0	--	0			
Total	1,699.2	--	124,904	1,804.1	--	226,777	0		0

Total discharge for year (cfs-days) 12,783.9
Total load for year (tons) 996,679

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Particle-size analyses of suspended sediment, May to July 1952
(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 disperzed)

Date of collection	Time	Water 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 23, 1952	11:20 a.m.	2,420	--	44,700	8,150		47		65		86	--	--	--	--		SPWCM
May 23	11:20 a.m.	2,420	--	44,700	18,400		1		63		84	--	--	--	--		SPNM
May 24	10:30 a.m.	405	--	23,200	5,820		59		77		88	94	97	98	98	99	SPWCM
May 26	2:50 p.m.	80	--	4,680	5,530		47		89		91	--	--	--	--		SPWCM
June 27	5:40 p.m.	3,450	62	45,300	6,530		47		65		85	94	99	99	100		SPWCM
June 28	10:45 a.m.	1,400	--	26,300	6,440		47		66		85	95	99	100	--		SPWCM
July 1	1:00 p.m.	54	84	1,180	2,320	66	76	79	80	81	84	90	98	--	100		BWCM
July 13	10:25 p.m.	213	60	22,200	4,300		73		88		93	--	--	--	--		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 1952.
Sediment records: March 1950 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 14,600 ppm June 29; minimum daily, no flow on many days during August and September.
Sediment loads: Maximum daily, 23,000 tons May 24; minimum daily, 0 ton on many days in August and September.
EXTREMES, 1950-52.--Sediment concentrations: Maximum daily, 14,600 ppm June 29, 1952; minimum daily, no flow on many days during summer months of 1950 and 1952.
Sediment loads: Maximum daily, 23,000 tons, May 24, 1952; minimum daily, 0 ton on many days during summer months of 1950 and 1952.
REMARKS.--Flow affected by ice Nov. 15-26, Dec. 7, Dec. 13 to Mar. 31. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chlorides (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Nov. 1, 1951	0.8			472	130	438		185	0	1,680	540							1,710	1,560	36	4.6	4,430	7.4
Dec. 4	11			496	144	560		127	0	1,800	758							1,830	1,730	40	5.7	5,200	7.6
Jan. 3, 1952	a .3			723	291	724		439	0	2,850	884							3,000	2,640	34	5.7	6,950	7.4
Feb. 4	a 9.6			538	166	282		312	0	1,810	352							2,020	1,760	23	2.7	4,110	7.7
Mar. 4	a 16			515	130	323		268	0	1,660	407							1,820	1,600	28	3.3	3,910	7.7
Apr. 2	76			224	47	299		146	0	785	331							752	632	46	4.8	2,400	7.3
May 6	.4			450	156	661		248	0	1,970	673							1,770	1,570	45	6.8	5,310	7.5
June 3	4.8			251	108	538		162	0	1,300	535							1,070	937	52	7.2	4,010	7.3
June 27	112			60	14	138		196	0	265	50							206	45	59	4.2	1,050	7.3
July 1	13			127	46	273		93	0	694	213							505	429	54	5.3	2,070	7.0
Sept. 4	.5			538	266	1,390		105	0	3,100	1,520							2,440	2,350	55	12	8,670	7.1

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	5.2	44	1	0.7	33	(t)	11	--	e 2
2	5.2	48	1	.5	30	(t)	11		
3	9.8	160	sa 5	3.8	--	e 1	9.7	89	2
4	6.8	160	b 3	9.0			8.4	62	1
5	.8	90	(t)	11	120	a 4	7.8	55	1
6	1.6			14			5.5		
7	5.3			22	130	sa 8	5.0		
8	6.0			18			4.4		
9	3.8	60	a 1	23			3.8	75	c 1
10	2.5			21	120	c 6	4.0		
11	2.0			18			3.8		
12	1.4			14			6.0		
13	.8	44	(t)	14	160	c6	5.0	78	c 1
14	.9			13			3.0		
15	.5			10			1.0		
16	.7			7.6			1.5		
17	.7	30	(t)	5.5	90	c 2	2.0	--	(t)
18	.6			7.0			2.0		
19	.4			9.0			1.5		
20	.3			11	117	c 4	.5		
21	.2			15			.6		
22	.2	22	(t)	12			.8		
23	.2			11			.8		
24	.2			10			.6		
25	.4			10			.5	70	(t)
26	1.8			10	65	c2	.6		
27	3.3			11			.7		
28	3.8	30	(t)	13			.7		
29	4.2			13			.7		
30	3.8			11			.3		
31	1.3	31	(t)	--	--	--	.2		
Total	74.7	--	18	348.1	--	109	103.4	--	19

Day	January			February			March		
1	0.3			10			20		
2	.3			9.8			17		
3	.3	60	(t)	9.6	65	c 2	15	60	c 3
4	.3			9.6			16		
5	.3			9.6			18		
6	.4			11			20		
7	.4			16			22		
8	.4			20			25		
9	.4			21			24		
10	.5	--	(t)	22	70	c 4	24	65	c 4
11	.5			22			23		
12	.6			20			22		
13	.8			18			22		
14	.9			17			25		
15	1.0			15			30		
16	1.5	--	e 1	14			50	--	e 15
17	1.5			15			70		
18	1.4			17			100		
19	1.3			15	100	c 4	120	160	c 46
20	1.0			15			100		
21	.7	95	(t)	16			90		
22	.5			16			80	110	c 26
23	.2	110	(t)	16			90		
24	.4			16			100		
25	1.5	110	(t)	20			110		
26	3.0			25	--	e 10	120	220	c 75
27	6.0			26			130		
28	8.0			22			140		
29	9.5	140	c 3	20			160		
30	10			--	--	--	250	--	e 4,000
31	10			--	--	--	400	6,100	a 6,600
Total	63.9	--	30	483.6	--	136	2,433	--	11,373

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.
c Computed from samples collected about three times per week.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	206	8,100	a 4,500	0.8			5.7	90	b 1
2	92	6,160	s 1,580	.6	--	(t)	4.8	69	1
3	70	3,720	s 749	.6			4.5	71	1
4	48	880	114	.6			25	4,900	sa 360
5	43	390	b 46	.5	106	(t)	9.6	1,300	b 34
6	40	370	b 40	.4	98	(t)	5.7	85	a 1
7	37	344	34	.4	103	(t)	4.8	42	b 1
8	37	300	b 30	.6			15	160	sb 15
9	32			1.2			14	150	sa 6
10	29	240	a 18	.9	90	(t)	7.2		
11	26			.6			4.8	50	a 1
12	23			.4			4.0		
13	18			.4			3.2		
14	14	160	a 6	.3	85	(t)	2.0		
15	13			.4			1.8	38	(t)
16	12	156	5	.5			1.5		
17	11	94	3	.8			1.0		
18	10	90	2	.8	65	(t)	1.0	34	(t)
19	7.6	90	b 2	.5			1.0		
20	2.8			4.5	117	s 2	1.3		
21	2.2	75	(t)	3.2	1	1	1.3	38	(t)
22	1.3			457	11,800	sb 17,000	1.3		
23	1.0			418	7,710	s 9,010	1.3		
24	.9	80	(t)	761	11,000	a 23,000	1.3		
25	.8			216	11,000	sa 6,900	1.8	1,900	a 9
26	.5			43	6,500	s 794	6.8	4,700	sb 100
27	.5			24	2,800	b 180	92	9,100	sa 2,700
28	.5	90	(t)	16	950	41	115	4,200	sa 1,600
29	.5			12	240	b 8	148	14,600	s 6,070
30	.4			10	150	b 4	27	4,450	s 374
31	--	--	--	7.6	110	2	--	--	--
Total	780.0	--	7,197	1,983.6	--	56,942	513.7	--	11,279

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	13	243	9	0.2			0	--	0
2	7.6	130	3	.2	30	(t)	0	--	0
3	4.3	100	b 1	.1			0	--	0
4	2.6			0	--	0	.6		
5	1.6			0	--	0	.3		
6	1.3	65	(t)	0	--	0	.1	12	(t)
7	2.6			0	--	0	.1		
8	1.3			0	--	0	.3		
9	1.5			0	--	0	.8		
10	1.3			0	--	0	2.0		
11	3.6	300	sb 26	.8			1.3		
12	92	11,000	sb 3,200	.1			2.8		
13	165	6,500	sa 4,800	.9			3.2		
14	300	7,600	sa 9,300	.9	28	(t)	3.2		
15	415	8,520	s 10,800	.2			3.5	--	(t)
16	396	7,970	s 9,490	.1			3.5		
17	32	2,100	sb 220	0	--	0	3.7		
18	14	377	s 15	0	--	0	3.2		
19	8.4	210	b 5	0	--	0	3.0		
20	5.4	110	b 2	1.2			2.2		
21	3.2	82	1	.3			.6		
22	2.0	70	(t)	2.5	24	(t)	.2	12	(t)
23	1.2			1.3			.1		
24	.8			.3			.1		
25	.9	55	(t)	.1			0	--	0
26	.8			0	--	0	0	--	0
27	.6			0	--	0	0	--	0
28	.5			0	--	0	0	--	0
29	.3	32	(t)	0	--	0	0	--	0
30	.4			0	--	0	0	--	0
31	.1			0	--	0	--	--	--
Total	1,479.3	--	37,875	9.2	--	1	34.8	--	1

Total discharge for year (cfs-days) 8,307.3

Total load for year (tons) 124,980

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

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Particle-size analyses of suspended sediment, March to July 1952
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in diatilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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. 28, 1952....	11:50 a. m.	a 140	--	362	1,050	72	83	91	96	97	99	99	100				BWCM
Mar. 31.....	10:10 a. m.	a 400	--	5,850	4,140	--	83	--	99	--	100						SPWCM
Apr. 2	4:00 p. m.	74	--	5,150	5,890	--	84	--	98	--	100						SPWCM
Apr. 4	10:55 a. m.	47	45	827	1,320	76	88	96	98	99	100						BWCM
May 23	5:00 p. m.	387	--	6,060	7,130	--	77	--	94	--	99						SPWCM
May 23	5:00 p. m.	387	--	6,060	7,000	--	2	--	94	--	99						SPNM
May 24	2:20 p. m.	867	63	11,500	6,030	--	80	--	97	--	100						SPWCM
May 26	10:50 a. m.	44	--	6,720	7,250	--	88	--	100	--	--						PWCM
June 27.....	11:45 a. m.	108	--	10,600	6,820	--	77	--	97	--	100						SPWCM
July 13	5:00 p. m.	242	--	6,260	6,850	--	78	--	94	--	99						SPWCM
July 15	11:55 a. m.	376	--	11,000	6,280	--	83	--	99	--	100						SPWCM
July 15	6:45 p. m.	648	--	10,400	7,870	--	81	--	96	--	100						SPWCM

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDGEMONT, 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 1951 to August 1952.
Sediment records: October 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum 87°F July 31; minimum, freezing point on several days during December to February.
Sediment concentrations: Maximum daily, 14,700 ppm May 24; minimum daily, no flow on several days during August and September.
Sediment loads: Maximum daily, 22,600 tons June 5; minimum daily, 0 ton on several days during August and September.
EXTREMES, 1950-52.--Water temperatures (April 1951 to August 1952): Maximum 87°F July 31, 1952; minimum, freezing point on several days during December 1951 to February 1952.
Sediment concentrations: Maximum daily, 23,400 ppm July 23, 1951; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 28,500 tons July 29, 1951; minimum daily, 0 ton on many days.
REMARKS.--Flow affected by ice or by backwater from obstructions on control Dec. 8 to Mar. 17, Mar. 21-24. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature.(°F) of water, October 1951 to August 1952
/Once-daily temperature measurement between 12 m. and 7 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	67	a33	44	--	40	--	--	65	75	a68	a74	
2	66	35	--	--	--	33	--	69	78	77	77	
3	60	--	38	--	35	--	a38	71	a60	a62	71	
4	a52	37	34	32	--	a35	a43	80	74	85	72	
5	50	--	37	--	--	38	--	--	--	68	73	
6	a53	a37	--	34	--	36	48	66	a65	67	77	
7	a51	--	--	--	35	--	51	63	a70	69	--	
8	59	a89	--	a32	--	39	43	a58	a67	75	--	
9	64	--	33	--	40	--	46	53	a66	78	75	
10	60	45	--	35	38	36	47	60	a68	75	73	
11	a54	--	33	--	40	34	--	a50	76	71	67	
12	a62	42	--	35	--	33	52	65	85	73	a67	
13	57	--	--	--	--	--	54	72	78	a63	--	
14	60	38	--	--	--	a34	51	69	80	a62	--	
15	55	--	32	--	a37	33	50	54	--	a65	--	
16	48	a35	--	34	36	34	--	a58	69	a65	--	
17	49	--	32	--	37	35	--	55	78	a69	--	
18	--	--	--	33	--	40	73	59	67	a70	--	
19	--	--	32	--	35	36	67	65	a62	75	--	
20	45	35	--	34	--	35	60	67	70	75	--	
21	--	--	32	--	a35	--	55	--	75	80	--	
22	50	37	--	32	--	a33	--	a55	75	70	--	
23	--	--	32	--	--	34	69	--	a75	75	--	
24	50	42	--	a32	--	--	70	--	69	81	a54	
25	--	--	32	--	--	35	68	57	70	80	a62	
26	--	--	--	a35	--	34	47	a66	a65	77	a60	
27	58	43	--	--	32	36	70	a55	--	--	--	
28	--	38	--	38	--	a37	60	a52	a67	--	--	
29	53	--	32	--	38	a40	a53	a65	75	72	--	
30	--	43	--	38	--	40	60	a60	74	a61	--	
31	40	--	--	--	--	a40	--	69	--	87	--	
Average	--	--	--	--	--	--	--	62	72	72	--	

a Observation made between 6 a.m. and 12 m.

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDGEMONT, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	3.4	69	0.6	4.3	29		3.3	86	
2	3.2	68	.6	4.3	68		4.5	--	
3	3.1	68	.6	3.4	--		4.7	50	
4	3.2	80	.7	3.4	50		4.9	88	
5	14	261	s15	3.3	--		6	88	
6	13	200	7.0	3.3	68		6	--	
7	11	125	3.7	3.6	--		4.5	64	
8	5	67	.9	3.2			4.4	--	a0.8
9	3.2	76	.6	3.2	101		4.2	96	
10	2.3	82	.5	3.1			3.8	113	
11	1.7	77	.4	3.2	--		3.6	74	
12	1.1	63	.2	3.4	94		3.6	--	
13	1.0	54	.1	4.5	122		2.2	70	
14	.8	44	.1	3.8	90		2.2	--	
15	.6	65	.1	3.2	--		2	55	
16	.7	65	.1	3.1	97	a0.8	1.5	--	
17	1.3	34	.1	3.4	--		1	72	
18	1.4	--		3.3	73		1	--	
19	1.9	--		3.1	--		1	52	
20	2.1	31		3.0	79		.8	--	
21	2.3	--		3.0	--		.6	66	
22	2.6	29		3.0	65		.7	--	
23	2.7	--		2.6	--		.7	81	a.2
24	3.0	41		2.1	240		.5	--	
25	3.0	--	a.2	3.3	--		.5		
26	3.1	--		3.0	--		.5	59	
27	3.2	20		4.3	77		.4		
28	3.2	--		4.3	77		.3		
29	3.3	46		4.1	--		.4		
30	3.2	--		3.2	70		.6	--	
31	3.4	45		--	--	--	.8	212	
Total	107.0	--	34.1	102.0	--	24.0	71.2	--	15.2

Day	January			February			March		
1	0.6	--		0.3	34		9	--	
2	.5	92		.3	--		7	46	
3	.5	--		.3	100	a0.1	7	--	a1.5
4	.5	94		.3	--		7	91	
5	.5	--		.8	86		7	90	
6	.6	186		1	--		20	110	sb13
7	.7	--		2	182		65	200	c36
8	.7	122		2	--		30	85	69
9	.7	--		2	106		35	160	c15
10	.7	129		2	61	a.7	200	1,600	b850
11	.7			3	55		110	1,150	342
12	.7			4	--		80	1,060	229
13	.7	--		5	--		50	380	c50
14	.7	128		8	--		45	220	27
15	.7	--	a0.2	10	51		45	410	50
16	.7	89		12	53		50	420	57
17	.7	--		13	50		70	250	47
18	.7	102		13	--		92	170	c42
19	.7	--		13	50		94	600	sb160
20	.7	--		12	--		184	3,100	1,540
21	.5	--		10	32	a1.2	150	1,100	c440
22	.3	110		9	--		130	1,670	586
23	.3	--		9	--		110	1,200	356
24	.3	64		9	--		100	1,790	483
25	.3	--		9	28		75	1,320	267
26	.3	114		10	--		59	740	118
27	.3	--		10	29		65	790	139
28	.3	62		10	--		75	810	164
29	.3	--		10	46		83	1,000	224
30	.3	102		--	--	--	76	850	174
31	.3	--		--	--	--	88	1,300	309
Total	16.5	--	6.2	190.0	--	25.3	2,218	--	6,794.5

s Computed by subdividing day.
a Computed on basis of samples obtained about 4 times per week.
b Computed from partly-estimated concentration graph.
c Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDGEMONT, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	70	920	174	3.8	116	1.2	17	29	1.3
2	57	710	109	3.1	122	1.0	12	23	.7
3	47	560	71	2.5	107	.7	14	36	c 1.4
4	20	225	12	2.1	98	.6	28	220	sb 30
5	13	112	3.9	3.4	110	c 1.0	758	7,270	s 22,600
6	11	98	2.9	3.4	125	1.1	752	3,250	s 7,580
7	12	98	3.2	2.8	131	1.0	139	1,520	s 623
8	15	75	3.0	3.3	135	1.2	82	700	155
9	11	52	1.5	4.3	129	1.5	61	850	140
10	7	130	b 2.4	34	210	s 41	34	252	23
11	4.9	100	1.3	69	222	41	24	212	14
12	4.1	70	.8	39	120	13	21	112	6.4
13	4.1	81	.9	16	92	4.0	17	86	3.9
14	4.3	80	.9	9	85	2.1	12	67	2.2
15	3.3	95	.8	4.7	79	1.0	9	80	1.9
16	5	100	1.4	6	97	1.6	9	83	2.0
17	4.5	76	.9	4.9	82	1.1	7	104	2.0
18	2.5	68	.5	4.5	62	.8	6	103	1.7
19	2.6	85	.6	6	75	1.2	6	116	1.9
20	3.0	92	.7	3.6	76	.7	4.9	112	1.5
21	2.2	101	.6	11	180	c 5.5	4.6	112	1.4
22	1.8	80	c .4	142	3,690	s 1,720	4.0	92	1.0
23	1.7	75	.3	457	10,400	12,800	3.8	56	.6
24	1.8	77	.4	417	14,700	16,600	4.3	70	.8
25	2.0	85	.4	229	9,180	5,680	5	73	1.0
26	2.5	90	.6	113	6,880	s 1,910	6	75	1.2
27	2.7	90	.6	52	2,900	407	16	130	c 5.5
28	2.1	111	.6	38	830	s 89	15	97	3.9
29	2.3	117	.7	27	286	21	261	8,300	sb 13,000
30	3.0	109	.9	21	113	6.4	638	5,470	s 10,800
31	--	--	--	20	53	2.9	--	--	--
Total	323.4	--	397.2	1,752.4	--	39,358.6	2,970.6	--	55,007.3

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	49	2,620	s 381	0.1	45		0.4		
2	21	382	s 23	.1	75		.4		
3	12	185	6.0	.1	116		.4		
4	10	132	3.6	.1	105		.3		
5	7	106	2.0	.1	90		.2		
6	5	120	1.6	.1	56	(t)	.2		
7	4.0	140	1.5	.1	40		.2		
8	3.0	118	1.0	.1	43		.1		
9	2.3	119	.7	.1	68		.2		
10	1.6	162	.7	.1	78		.1		
11	1.5	140	.6	.1	61		.1		
12	1.6	147	.6	.1	20		.1		
13	99	2,200	sb 1,600	0	--	0	.1		
14	193	7,340	s 4,570	0	--	0	.1		
15	19	1,290	s 75	0	--	0	.1		(t)
16	12	272	8.8	0	--	0	.1		
17	9	190	4.6	0	--	0	.1		
18	6	153	2.5	0	--	0	.1		
19	4.9	146	1.9	0	--	0	.1		
20	2.7	109	.8	0	--	0	.1		
21	1.4	87	.3	0	--	0	.1		
22	1.1	98	.3	0	--	0	.1		
23	1.0	104	.3	167	5,200	sc 3,200	.1		
24	.6	99	.2	113	2,300	sb 1,400	.1		
25	.5	100	.1	12	180	5.8	.1		
26	.3	113	.1	6	92	1.5	.1		
27	.2	120	c .1	3.6	69	.7	.1		
28	.1	110	(t)	2.1	40	.2	0		0
29	.1	106	(t)	1.2	18	c .1	0		0
30	.1	100	(t)	.6	7	(t)	0		0
31	.1	75	(t)	.5	10	(t)	--		--
Total	469.1	--	6,687.4	307.2	--	4,608.6	4.2		0.3

Total discharge for year (cfs-days) 8,531.6
Total load for year (tons) 112,958.7

s Computed by subdividing day.
b Computed from partly-estimated concentration graph.
t Less than 0.050 ton.
c Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

HAT CREEK NEAR EDGEMONT, S. DAK.--Continued

Particle-size analyses of suspended sediment March to July 1952

(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	Water 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. 27, 1952....	4:55 p.m.	88	36	838	2,280	67	81	86	92	94	98	100					BWCM
Apr. 2	9:10 a.m.	56	34	782	1,260	68	91	97	99	99	100	--					BWCM
May 22	9:30 p.m.	175	--	4,490	4,820	--	64	--	85	--	94	--					SPWCM
May 22	9:30 p.m.	175	--	4,490	4,620	--	1	--	77	--	91	--					SPN
May 23	8:50 a.m.	435	--	5,070	6,020	--	69	--	89	--	96	--					SPWCM
May 24	7:15 a.m.	435	--	18,800	6,860	--	74	--	97	--	100	--					SPWCM
May 24	3:35 p.m.	402	--	14,600	5,520	--	75	--	95	--	100	--					SPWCM
May 26	10:15 a.m.	100	66	7,550	7,790	--	84	--	98	--	99	--					SPWCM
June 30	6:00 a.m.	1,100	67	6,180	4,400	--	83	--	96	--	99	--					SPWCM
June 30	9:30 a.m.	1,030	--	4,380	2,980	--	89	--	97	--	99	--					SPWCM
June 30	2:45 p.m.	485	74	3,680	2,690	--	75	--	87	--	99	--					SPWCM
June 30	4:30 p.m.	269	--	3,820	3,060	73	84	94	96	99	100	--					BWCM
July 1	6:15 a.m.	59	68	3,540	2,130	73	91	97	99	100	--	--					BWCM
July 13	9:45 p.m.	326	--	7,380	6,400	--	80	--	97	--	99	--					SPWCM
July 15	9:10 a.m.	20	65	1,240	1,580	73	89	93	95	95	98	99	100				BWCM

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, approximately.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1951.
Water temperatures: July 1947 to September 1949, April 1951 to September 1952.
Sediment records: April 1946 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 89°F June 12; minimum, 35°F Feb. 16, Mar. 2, 11, 22.
Sediment concentrations: Maximum daily, 49,200 ppm Aug. 13; minimum daily, not determined.
Sediment loads: Maximum daily, 612,000 tons June 28; minimum daily, 0.2 ton Apr. 29, Sept. 17.
EXTREMES, 1946-52.--Water temperatures (1947-49, 1951-52): Maximum, 89°F June 12, 1952; minimum, freezing point on many days during winter months 1947-49.
Sediment concentrations: Maximum daily, 55,000 ppm June 19, 1950; minimum daily, 1 ppm Sept. 30, 1949.
Sediment loads: Maximum daily, 612,000 tons June 28, 1952; minimum daily, 0.1 ton or less on several days during 1946-47, 1949.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 10 a.m. and 7 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	50	57	--	57	--	40	67	71	a70	a74	--
2	69	51	50	45	--	35	50	69	75	76	73	--
3	59	50	51	--	50	--	43	73	a58	a64	70	--
4	--	48	52	50	--	40	46	76	70	a67	73	a61
5	57	50	52	--	51	40	49	68	--	a70	71	a63
6	54	55	--	54	--	50	52	69	a66	a66	77	a62
7	53	53	47	--	51	--	56	62	a70	--	69	a65
8	65	55	--	50	--	47	47	57	a67	77	67	a63
9	70	55	48	--	45	--	51	57	a64	80	a64	a64
10	66	54	--	53	45	--	50	61	a66	74	69	a62
11	a60	54	50	--	44	35	53	a48	a61	73	60	a64
12	66	--	--	54	40	36	60	65	89	75	71	a63
13	63	49	--	--	36	36	59	70	--	60	a67	a62
14	63	50	--	55	40	a40	--	a55	76	65	a68	65
15	64	50	40	--	40	40	55	a55	78	69	a75	a62
16	57	50	--	55	35	37	--	61	68	a67	a65	73
17	63	49	45	--	40	38	70	57	75	a68	a65	a57
18	a55	50	--	55	36	46	75	60	76	a70	--	a62
19	50	55	45	--	38	41	71	a50	a61	a69	a64	a64
20	57	53	--	54	--	40	67	69	68	a64	a67	65
21	55	47	45	--	37	38	58	55	73	a62	72	62
22	60	45	--	45	40	35	59	60	72	a64	75	68
23	60	47	50	--	--	37	67	a56	67	a63	a68	a67
24	60	47	--	47	--	40	66	a56	65	82	a69	a65
25	55	53	48	--	45	40	66	a59	68	83	a65	--
26	53	52	--	55	--	50	a51	a62	a62	80	--	a60
27	59	53	50	--	46	--	67	a57	--	75	--	69
28	59	50	--	57	--	40	65	a54	a60	71	--	a59
29	58	--	49	--	44	48	a58	61	75	71	--	64
30	57	52	--	55	--	50	62	57	a69	a64	--	a58
31	52	--	--	--	--	45	--	a58	--	81	--	--
Average	59	51	--	--	--	41	58	--	69	71	--	63

a Observation made between 5 a.m. and 10 a.m.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	28	20	1.5	27			37		
2	28	22	1.7	29			36		
3	29	19	1.5	30			34		
4	35	22	2.1	32			34		
5	37	37	3.7	32			34		
6	66	284	s55	32	31	2.8	38		
7	58	144	22	32			27	18	1.6
8	44	75	8.9	35			31		
9	38			36			33		
10	34			41			32		
11	32			41			31		
12	31	38	3.3	42	37	4.2	31		
13	31			41	16	1.8	32		
14	31			50	45	6.1	30		
15	31			47	47	6.0	29		
16	30			36			29		
17	29			34			29		
18	29			34			26		
19	31			35	10	1.0	24		
20	32			37			24		
21	32			38			25		
22	32			43	16	1.8	25	16	1.1
23	31			48	28	3.6	24		
24	29	24	1.9	45	27	3.3	24		
25	27			37			24		
26	28			37			24		
27	29			41	20	2.1	23		
28	30			42			23		
29	29			39			23		
30	28			39			22		
31	28			--	--	--	22		
Total	1,027	--	151.3	1,132	--	76.2	880	--	41.1

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	22			33			44		
2	23			32			42	17	1.9
3	22			32			41		
4	22			33	23	2.0	42		
5	21			33			38	--	e2.0
		18	1.0						
6	21			31			38	55	5.6
7	21			35	45	4.2	45	40	a4.8
8	20			45	65	a8.0	54	22	3.2
9	21			50	73	9.8	49	14	a1.8
10	21			47	73	9.3	70	260	sb60
11	21			56	85	13	169	972	444
12	21			56	75	11	122	930	306
13	21			48	60	a8.0	97	700	183
14	21			48	52	6.7	60	167	s38
15	21			54	75	11	60	162	26
16	21			55	65	9.6	74	240	48
17	22			60	46	a7.5	81	240	52
18	22			56	33	5.0	111	406	s128
19	22			54	44	6.4	150	538	218
20	22	6	.4	55	80	a12	174	700	sb390
21	22			56	98	15	210	950	a550
22	21			47	--	e11	162	575	252
23	22			42	--	e7.0	114	440	b140
24	24			41	--	e3.0	156	720	303
25	25			38			200	960	518
26	25			38	23	2.6	221	1,270	758
27	24			41			232	720	451
28	27			44			189	750	sb460
29	27			47			186	770	387
30	36	39	3.8	--	--	--	186	570	286
31	34	--	e3.0	--	--	--	236	1,920	s1,400
Total	715	--	24.4	1,307	--	182.5	3,653	--	7,423.0

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	510	8,920	12,300	18	10	0.5	164	412	182
2.....	353	5,850	5,580	18	10	.5	136	304	112
3.....	251	3,650	2,470	17	9	.4	136	260	95
4.....	176	2,300	1,090	16	7	.3	1,910	19,300	s 146,000
5.....	144	1,650	642	16	9	.4	1,260	17,100	58,200
6.....	119	850	273	15	20	.8	1,380	6,720	s 27,900
7.....	97	510	134	14	20	.8	505	1,680	2,290
8.....	85	394	90	14	27	1.0	309	630	526
9.....	79	292	62	14	23	.9	284	389	298
10.....	72	173	34	15	16	.6	244	274	180
11.....	62	158	26	32	345	30	197	265	141
12.....	52	140	20	23	148	9.2	150	160	a 65
13.....	50	120	16	24	8,080	524	114	80	25
14.....	52	90	13	19	4,950	s 265	82	56	12
15.....	49	62	8.2	17	436	s 21	64	40	6.9
16.....	44	47	5.6	16	145	6.3	46	38	4.7
17.....	41	32	3.5	15	96	3.9	43	66	7.7
18.....	36	34	3.3	15	118	4.8	32	42	3.6
19.....	33	19	1.7	15	89	3.6	35	18	1.7
20.....	32	11	1.0	14	75	2.8	36	12	1.2
21.....	31	10	.8	16	328	s 16	36	11	1.1
22.....	28	13	1.0	83	3,510	s 998	33	12	1.1
23.....	28	10	.8	3,370	23,100	s 283,000	35	14	1.3
24.....	24	8	.5	5,740	27,800	s 456,000	39	21	2.2
25.....	23	9	.6	2,250	16,300	99,000	39	18	1.9
26.....	22	9	.5	1,100	9,500	28,200	39	50	5.3
27.....	21	10	.6	554	5,700	8,530	788	10,100	s 52,700
28.....	19	7	.4	399	3,500	3,770	7,320	29,900	s 612,000
29.....	19	5	.2	288	1,800	1,400	2,250	16,100	97,800
30.....	19	8	.4	248	1,100	737	1,500	9,500	s 40,200
31.....	--	--	--	216	628	366	--	--	--
Total.	2,571	--	22,779.1	14,611	--	882,893.8	19,206	--	1,038,764.7

	July			August			September		
1.....	565	5,700	8,700	11	20	0.6	12	37	1.2
2.....	364	2,900	2,850	10	18	.5	12	27	.9
3.....	252	1,500	1,020	10	14	.4	12	20	.6
4.....	197	913	486	10	34	.9	13	17	.6
5.....	160	612	264	9	32	.8	13	13	.4
6.....	133	400	144	9	18	.4	13	14	.5
7.....	96	215	56	9	17	.4	14	13	.5
8.....	74	168	34	9	14	.3	14	9	.3
9.....	51	110	15	10	13	.4	15	14	.6
10.....	39	116	12	10	14	.4	14	10	.4
11.....	38	99	10	10	15	.4	14	11	.4
12.....	38	73	7.5	25	4,100	sb 1,300	13	13	.4
13.....	849	23,900	s 70,400	375	49,200	51,700	13	12	.4
14.....	1,140	22,400	68,900	224	24,300	14,700	13	17	.6
15.....	822	14,100	s 33,100	126	11,900	4,050	13	18	.6
16.....	627	8,920	s 15,800	84	5,020	1,140	13	17	.6
17.....	725	10,500	s 21,400	60	970	157	13	7	.2
18.....	330	3,300	2,940	41	222	24	13	11	.4
19.....	244	2,300	1,520	30	152	12	12	12	.4
20.....	193	1,000	521	26	72	5.0	14	10	.4
21.....	133	400	144	26	50	3.5	15	8	.3
22.....	98	219	58	444	44,200	s 75,900	16	7	.3
23.....	62	142	24	505	35,700	50,500	17	7	.3
24.....	43	125	14	492	20,300	27,000	16	7	.3
25.....	30	80	6.5	204	15,000	8,260	16	7	.3
26.....	24	53	3.4	114	5,800	1,780	17	8	.4
27.....	19	67	3.4	69	1,630	304	16	8	.3
28.....	16	34	1.5	39	445	47	17	7	.3
29.....	13	17	.6	21	180	10	18	8	.4
30.....	13	20	.7	15	72	2.9	18	6	.3
31.....	11	22	.6	13	35	1.2	--	--	--
Total.	7,399	--	228,436.2	3,040	--	236,902.1	429	--	13.6

Total discharge for year (cfs-days)..... 55,970

Total load for year (tons)..... 2,417,688.0

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Particle-size analyses of suspended sediment, March to July 1952
(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	Water 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. 19, 1952	5:05 p.m.	156	--	1,170	2,800	--	44	--	57	--	84	--	--		--		SPWCM
Mar. 26	6:30 p.m.	232	--	1,270	2,190	47	58	66	71	78	84	90	97		99	100	BWCM
Mar. 28	2:40 p.m.	196	--	837	1,320	54	70	77	84	88	93	95	98		100		BWCM
Apr. 1	6:00 a.m.	675	--	9,520	6,920	--	55	--	72	--	87	--	--		--		SPWCM
Apr. 2	12:40 p.m.	376	--	5,880	6,380	--	76	--	92	--	94	--	--		--		SPWCM
Apr. 2	6:30 p.m.	310	50	5,760	3,790	--	80	--	95	--	95	--	--		--		SPWCM
Apr. 2	6:30 p.m.	310	50	5,760	3,380	--	0	--	94	--	95	--	--		--		SPNM
May 22	7:00 p.m.	132	--	5,220	7,320	--	85	--	97	--	98	--	--		--		SPWCM
May 23	6:00 a.m.	1,110	56	13,500	4,190	--	56	--	70	--	87	--	--		--		SPWCM
May 23	10:00 a.m.	1,720	--	21,300	5,840	--	62	--	78	--	92	--	--		--		SPWCM
May 24	5:50 a.m.	6,950	--	32,400	4,470	--	52	--	69	--	85	--	--		--		SPWCM
May 24	4:35 p.m.	4,910	--	24,200	6,290	--	55	--	68	--	81	--	--		--		SPWCM
May 26	3:20 p.m.	875	--	8,300	5,140	--	72	--	84	--	89	--	--		--		SPWCM
June 4	5:00 p.m.	4,700	70	35,100	3,590	--	60	--	77	--	88	93	99		100		SPWCM
June 28	7:30 a.m.	6,950	60	34,800	3,160	--	55	--	76	--	84	--	--		--		SPWCM
June 30	7:30 p.m.	1,020	--	6,510	4,490	--	74	--	87	--	92	--	--		--		SPWCM
July 13	9:00 p.m.	1,110	--	31,000	3,090	--	67	--	90	--	96	--	--		--		SPWCM
July 15	10:00 a.m.	875	69	14,300	5,270	--	70	--	87	--	95	--	--		--		SPWCM
July 17	4:00 p.m.	692	--	7,830	4,730	--	77	--	89	--	95	--	--		--		SPWCM

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER AT ANGOSTURA RESERVOIR OUTLET, S. DAK.

LOCATION.--At outlet to power plant below Angostura Dam, 4 miles upstream from gaging station, and 6½ miles southeast of Hot Springs, Fall River County.
RECORDS AVAILABLE.--Sediment records: October 1951 to September 1952.
REMARKS.--Maximum observed concentration during water year, 55 ppm June 17. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Discharge records for gaging station below Angostura Dam for water year October 1951 to September 1952 given in WSP 1239.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum daily
October	31.5	62	1.2	0.04		(t)	14	
November	29.8	59	1.2	.04		(t)	15	
December	646.1	1,280	8.4	.27		--	5	
January	1,344	2,670	40.3	1.3		--	11	
February	5,087	10,090	40.6	1.4		--	3	
March	5,278	10,470	185.1	6.0		--	13	
April	5,636	11,180	243.0	8.1		--	16	
May	2,713.3	5,380	196.3	6.3		--	27	
June	1,726.1	3,420	186.5	5.6		--	36	
July	4,633	9,190	223.2	7.2		--	18	
August	4,668	9,260	176.7	5.7		--	14	
September	4,755	9,430	90.0	3.0		--	7	
Water year 1951-52	36,547.5	72,490	1,372.5	3.7		(t)	14	

t Less than 0.050 ton.

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 1952.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 2, 1951				270	122	133		198		1,230	15							1,180	1,020	20	1.7	2,420	7.9
Dec. 5				225	101	108		314		900	11							975	718	19	1.5	1,910	7.5
Feb. 4, 1952				203	102	62		232		820	12							925	735	13	.9	1,800	7.7
Mar. 7				239	105	84		264		930	20							1,030	814	15	1.1	1,960	7.1
Apr. 2				113	38	37		160		365	6.0							440	309	15	.8	973	7.2
May 2				124	57	33		186		435	8.0							545	392	12	.6	1,120	7.3
June 3				170	70	63		194		651	8.0							710	551	16	1.6	1,400	7.6
July 2				239	90	101		220		955	9.5							968	788	19	1.4	1,880	7.6
Aug. 6				246	95	106		193		1,020	11							1,010	852	19	1.4	1,960	7.7
Sept. 2				261	94	100		230		1,010	9.0							1,040	851	17	1.3	1,980	7.4

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 1952.
Water temperatures: October 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 2,510 ppm Dec. 17 to Jan. 24; minimum, 524 ppm Apr. 4-9.
Hardness: Maximum, 1,180 ppm Dec. 17 to Jan. 24; minimum, 264 ppm Apr. 4-9.
Specific conductance: Maximum daily, 2,980 micromhos Jan. 23; minimum daily, 701 micromhos Apr. 4.
Water temperatures: Maximum, 85°F July 5; minimum, freezing point on many days during November to March.
EXTREMES, 1950-52.--Dissolved solids: Maximum, 2,510 ppm Dec. 17, 1951, to Jan. 24, 1952; minimum, 524 ppm Apr. 4-9, 1952.
Hardness: Maximum, 1,190 ppm Jan. 17-31, 1951; minimum, 264 ppm Apr. 4-9, 1952.
Specific conductance: Maximum daily, 3,080 micromhos Feb. 1, 1951; minimum daily, 701 micromhos Apr. 4, 1952.
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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-3, 1951	322			210	80	141		148		960	28		3.3	0.22	1,650	2.24	1,430	855	734	26	2.1	1,900	7.7
Oct. 5-10	564			155	48	120		152		680	20		3.7	.17	1,220	1.66	1,860	584	459	30	2.2	1,520	7.9
Oct. 12-Nov. 1	209			195	83	166		173		940	37		2.6	.22	1,700	2.31	959	838	686	30	2.5	1,950	7.7
Nov. 2-5	130			250	113	237		--		1,290	--		1.1	.27	--	--	--	1,090	--	32	3.1	--	--
Nov. 6-10	172			228	98	186		--		1,110	--		.8	.21	--	--	--	970	--	29	2.6	--	--
Nov. 12-16	223			204	85	148		--		920	--		.5	.19	--	--	--	857	--	27	2.2	--	--
Nov. 17-29	118			243	105	203		--		1,190	--		.5	.23	--	--	--	1,040	--	30	2.7	--	--
Nov. 30-Dec. 8	127			215	101	175		233		1,020	44		3.6	.21	1,890	2.57	648	950	759	29	2.5	2,150	7.5
Dec. 9-16	61.3			254	97	209		256		1,140	47		3.2	.21	2,110	2.87	349	1,030	820	31	2.8	2,440	7.7
Dec. 17-Jan. 24, 1952	16.8			251	135	256		307		1,340	53		2.0	.25	2,510	3.41	114	1,180	928	32	3.2	2,760	7.7
Jan. 25-Feb. 8	7.5			275	91	227		265		1,220	46		1.2	.20	2,230	3.03	45.2	1,060	843	32	3.0	2,580	7.7
Feb. 10-17	1,764			108	33	104		134		450	20		3.9	.09	834	1.13	3,970	405	295	36	2.2	1,110	7.4
Feb. 18	995			75	25	67		106		310	10		4.3	.07	628	.85	1,690	288	201	34	1.7	898	7.2
Feb. 22-24	483			118	37	132		144		547	24		4.0	.10	944	1.28	1,230	445	327	39	2.7	1,320	7.5
Feb. 26-Mar. 1	430			167	62	156		196		730	42		5.2	.13	1,330	1.81	1,540	670	509	34	2.6	1,710	7.4
Mar. 2-16	348			194	61	121		212		750	48		2.4	.13	1,450	1.97	1,360	733	559	26	1.9	1,690	7.6
Mar. 18-21	450			155	45	118		177		608	33		3.0	.10	1,180	1.60	1,430	570	425	31	2.1	1,550	7.7
Mar. 22-28	561			124	37	124		165		514	28		4.1	.22	980	1.33	1,480	460	325	37	2.5	1,310	7.5
Mar. 31-Apr. 3	29,430			101	19	79		186		328	6.0		1.3	.08	660	.90	52,440	330	177	34	1.9	935	7.3

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR EAGLE BUTTE, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 4-9, 1952	19,490			83	14	57		157		245	6.0		3.7	0.02	524	0.71	27,570	264	135	31	1.5	740	7.6
Apr. 11	4,000			98	24	100		156		413	11		3.3	--	732	1.00	7,910	345	217	38	2.3	1,040	7.5
Apr. 14-23	1,502			126	35	145		166		568	21		1.8	.10	1,040	1.41	4,220	460	324	41	2.9	1,350	7.6
Apr. 24-May 22	632			175	57	219		180		882	41		1.7	.19	1,530	2.08	2,610	670	522	42	3.7	1,920	7.6
May 23	4,950			190	48	216		204		880	34		1.9	.18	1,540	2.09	20,580	670	503	41	3.6	1,940	7.9
May 26-31	3,062			100	23	63		164		318	9.0		4.3	.06	648	.88	5,360	343	209	28	1.5	903	7.6
June 1-8	1,685			96	26	114		182		415	14		3.3	.34	800	1.09	3,640	346	197	51	2.7	1,090	7.6
June 9-18	642			146	47	140		154		684	23		1.3	.15	1,180	1.60	2,050	558	432	35	2.6	1,480	7.7
June 19-27	509			178	73	172		144		915	28		.7	.16	1,480	2.01	2,030	745	627	33	2.7	1,820	7.5
June 28-29	2,785			168	35	151		156		694	18		1.7	.23	1,210	1.65	9,100	562	434	37	2.8	1,520	7.6
June 30-July 2	1,367			102	19	179		159		568	17		5.5	--	1,040	1.41	3,840	332	202	52	4.3	1,390	7.8
July 3-7	619			170	56	153		152		780	27		1.9	.20	1,370	1.86	2,290	655	530	34	2.6	1,680	7.6
July 8-12	436			180	71	165		129		935	35		1.2	.16	1,520	2.07	1,790	740	634	32	2.6	1,810	7.5
July 13-15	572			178	60	161		130		848	34		3.6	.48	1,450	1.97	2,240	690	583	34	2.7	1,750	7.7
July 16-21	872			146	40	164		157		691	20		1.6	.20	1,220	1.66	2,870	528	399	40	3.1	1,540	7.6
July 22-26	355			176	57	168		126		835	37		1.9	.17	1,400	1.90	1,340	675	572	35	2.8	1,750	7.6
July 27-Aug. 2	272			199	70	191		126		983	43		1.3	.14	1,670	2.27	1,230	785	682	35	3.0	1,980	7.5
Aug. 3-19	363			200	76	180		121		990	38		.8	.20	1,700	2.31	1,670	810	711	33	2.8	1,950	7.6
Aug. 20	709			165	36	235		212		704	104		.2	.32	1,420	1.93	2,720	559	385	48	4.3	1,910	7.3
Aug. 21-30	562			193	73	169		118		938	37		.6	.27	1,610	2.19	2,440	783	686	32	2.6	1,910	7.7
Aug. 31	1,040			150	34	135		140		638	22		5.4	.18	1,070	1.46	3,000	515	400	36	2.6	1,420	7.4
Sept. 1-30	321			212	77	180		131		1,010	38		1.2	.24	1,700	2.31	1,470	844	737	32	2.7	2,030	7.6
Weighted average [a]	1,181			117	30	102		b167		460	b15		2.5	b0.10	b866	b1.18	b2,760	416	b279	35	2.2	b1,140	--
Weighted average [c]	1,231			117	30	103		168		460	15		2.5	0.10	865	1.18	2,880	416	278	35	2.2	1,140	--

a Represents 92 percent of runoff for water year October 1951 to September 1952.
b Includes estimated data for missing periods.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR EAGLE BUTTE, S. DAK.--Continued

/Once-daily temperature measurement between 8:00 a. m. and 11:00 a. m./
Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	--	--	--	32	--	--	--	a67	75	a82	a61
2	61	32	--	a32	--	--	a35	62	67	75	72	57
3	59	--	34	--	--	32	--	--	65	69	75	--
4	--	--	--	32	32	--	a35	--	64	70	a70	68
5	50	33	33	--	--	a32	--	61	70	a85	--	a71
6	--	--	--	--	32	--	--	--	73	64	a79	62
7	--	35	33	32	--	--	36	--	72	68	a77	68
8	50	--	--	--	32	--	--	--	68	a76	a70	a74
9	--	34	--	32	--	--	a37	53	a73	70	--	a81
10	54	--	32	--	--	32	--	--	71	70	74	74
11	--	--	--	32	35	--	38	--	a78	71	67	70
12	57	--	32	--	--	--	--	54	a80	71	a79	70
13	--	34	--	--	33	a32	--	--	73	67	a75	a67
14	--	33	--	32	--	--	43	61	80	65	73	57
15	52	--	--	--	34	--	--	--	a83	66	69	a64
16	--	32	--	32	--	a32	48	54	a62	a75	--	--
17	41	--	32	--	--	--	--	--	74	a77	a73	a65
18	--	--	--	32	32	--	51	--	66	a78	68	61
19	40	33	--	--	--	a32	--	55	67	--	71	a62
20	--	--	a32	--	--	--	--	--	64	73	69	58
21	--	33	a32	32	--	--	51	61	a77	a77	70	58
22	38	--	--	--	--	--	--	--	71	67	a75	50
23	--	32	--	a32	a32	--	52	--	71	a74	68	55
24	43	--	--	--	a32	--	--	--	71	--	a78	58
25	--	--	--	a32	--	a32	57	--	60	73	a84	59
26	39	32	--	--	32	--	--	a68	68	70	78	60
27	--	--	32	--	a32	--	--	61	63	--	a79	65
28	--	32	--	--	--	32	64	54	a78	a76	a79	72
29	44	--	--	a32	a32	--	61	a63	68	a80	67	61
30	--	33	--	32	--	--	--	54	73	70	72	59
31	35	--	a32	--	--	a34	--	58	--	a84	63	--
Average	--	--	--	--	--	--	--	--	71	73	73	64

a Observation made between 12 m. and 4 p. m.

CHEYENNE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE CHEYENNE RIVER BASIN

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
CHEYENNE RIVER NEAR WASTA, S. DAK.																							
Nov. 2, 1951	80			193	99	63	222	726	61								888	706	13	0.9	1,810	--	
Feb. 4, 1952	455			158	41	120	202	572	44								562	396	31	2.2	1,470	7.7	
Mar. 31	2,330			67	16	72	110	272	11								233	143	40	2.0	721	7.6	
June 18	114			116	39	100	180	462	27								450	302	32	2.0	1,160	7.8	
Sept. 4	153			184	44	165	139	765	62								640	526	36	2.8	1,670	7.7	
BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.																							
Dec. 5, 1951	a0.1			114	52	244	480	597	9.0								496	102	52	4.8	1,800	7.5	
Feb. 4, 1952	a .1			150	65	333	598	825	11								640	150	53	5.7	2,350	7.4	
Mar. 5	a .4			81	41	202	350	489	9.0								370	83	54	4.6	1,450	7.1	
Apr. 4	5.4			33	17	73	144	183	2.5								154	36	51	2.5	620	7.1	
June 4	11			112	49	207	348	608	8.0								480	195	48	4.1	1,650	7.6	
July 2	2.4			50	23	96	164	278	4.0								220	86	49	2.8	841	7.4	
BELLE FOURCHE RIVER NEAR ELM SPRINGS, S. DAK.																							
Oct. 29, 1951	90			248	134	176	220	1,280	29				0.09				1,170	990	25	2.2	2,580	7.5	
Nov. 26	77			314	140	206	380	1,400	28				.32				1,360	1,050	25	2.4	2,810	7.4	
Jan. 28, 1952	7			510	269	370	619	2,500	53				.45				2,380	1,870	25	3.3	4,520	7.3	
Mar. 28	2,470			118	58	136	158	643	21				.22				532	402	36	2.6	1,490	7.3	
Apr. 1	12,200			52	16	54	82	225	7.0				.19				194	127	38	1.7	626	--	
Apr. 22	147			196	96	191	190	1,060	29				--				885	729	32	2.8	2,140	7.8	
May 12	204			183	79	147	164	900	20				--				780	646	29	2.3	1,850	7.7	
June 2	395			190	70	135	176	835	21				.19				760	616	28	2.0	1,730	7.6	
Aug. 4	180			226	105	155	152	1,130	22				--				995	870	25	2.1	2,130	7.7	

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE CHEYENNE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
CHEYENNE RIVER NEAR SPENCER, WYO. (FORMERLY PUBLISHED AS SOUTH FORK CHEYENNE RIVER NEAR SPENCER)			
Mar. 20, 1952	a7.0	162	3.1
Apr. 2	1.2	29	.09
May 23	7,010	26,500	502,000
May 24	2,080	22,200	125,000
May 26	435	6,100	7,160
June 3	70	322	61
June 27	8,180	39,000	893,000
June 28	5,430	26,300	386,000
July 1	174	3,180	1,490
July 14	450	18,400	22,400
Aug. 19	1.1	144	.4
Sept. 3	.2	62	.03
BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.			
Dec. 3, 1951	0.1	153	0.04
Dec. 4	.1	100	.03
Dec. 5	.1	93	.03

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE CHEYENNE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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	
CHEYENNE RIVER NEAR SPENCER, WYO. (FORMERLY PUBLISHED AS SOUTH FORK CHEYENNE RIVER NEAR SPENCER)																	
May 23, 1952	7:45 p.m.	7,010		26,500	4,340		58		73		85						SPWCM
May 23	7:45 p.m.	7,010		26,500	9,070		4		69		82						SPN
May 24	12:30 p.m.	2,080		22,200	7,910		57		70		87						SPWCM
May 26	12:00 m.	435		6,100	7,140		72		84		91						SPWCM
June 28	9:50 a.m.	5,430		26,300	4,200		47		60		78	87	98	99	100		SPWCM
July 1	11:45 a.m.	174		3,180	4,930		82		91		91						SPWCM

MISSOURI RIVER AT PIERRE, S. DAK.

LOCATION.--At bridge on U. S. Highway 14 at Pierre, Hughes County, 0.3 mile upstream from gaging station and 1.5 miles upstream from Bad River (revised).
DRAINAGE AREA.--243,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.
Water temperatures: March 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 676 ppm Apr. 1; minimum, 264 ppm June 18-26.
Hardness: Maximum, 326 ppm Apr. 1; minimum, 135 ppm Apr. 12-13.
Specific conductance: Maximum daily, 946 micromhos Apr. 1; minimum daily, 403 micromhos June 26.
Water temperatures: Maximum, 80°F Aug. 2; minimum, freezing point Nov. 4, 5, 7, and probably on many other days during winter months.
EXTREMES, January 1951 to September 1952.--Dissolved solids: Maximum, 676 ppm Apr. 1, 1952; minimum, 264 ppm June 18-26, 1952.
Hardness: Maximum, 326 ppm Apr. 1, 1952; minimum, 134 ppm July 9, 1951.
Specific conductance: Maximum daily, 975 micromhos Mar. 28, 1951; minimum daily, 394 micromhos July 3, 1951.
Water temperatures (March 1951 to September 1952): Maximum, 80°F Aug. 2, 1952; minimum, freezing point on several days in March 1951, Nov. 4, 5, 7, 1952, and probably on many other 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 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-5, 1951	40,580			61	19	63		178	0	212	9.0		0.6	0.16	478	0.65	52,370	232	86	36	1.8	707	7.8
Oct. 6-17	37,960			58	20	51		186	0	180	9.0		1.0	.15	432	.59	44,280	226	73	31	1.5	645	7.9
Oct. 18-23	41,380			58	25	48		185	0	182	9.2		2.3	.15	430	.58	48,040	246	94	29	1.3	658	7.8
Oct. 24-Nov. 1	37,890			61	19	53		189	0	180	9.3		2.0	.16	426	.58	43,350	229	74	32	1.5	649	7.8
Nov. 2-10	37,780			60	21	53		196	0	180	9.7		2.1	.08	426	.58	43,450	236	75	32	1.5	671	8.0
Nov. 11-24	35,320			57	21	48		192	0	160	9.0		2.6	.09	436	.59	41,580	228	71	31	1.4	653	7.9
Nov. 25-27	15,870			64	23	56		207	0	195	11		2.3	.08	490	.67	21,000	254	84	31	1.5	721	8.0
Nov. 28-30	10,400			68	24	60		209	0	198	11		1.9	.08	488	.66	13,700	262	91	33	1.6	736	7.7
Dec. 1-2	16,000			64	22	65		219	0	191	9.0		1.6	.14	476	.65	20,560	252	72	36	1.8	718	7.9
Dec. 3-4	44,000			64	23	65		222	0	188	9.0		1.7	.09	492	.67	58,450	256	74	36	1.8	725	7.6
Dec. 30-Jan. 4, 1952	7,167			63	29	82		226	0	238	13		1.4	.11	558	.76	10,800	276	91	39	2.2	823	7.6
Jan. 14-17	16,600			70	24	61		225	0	202	11		1.9	..10	490	.67	21,960	272	87	32	1.6	736	7.8
Jan. 24-27	14,880			72	27	55		235	0	220	12		3.1	.11	542	.74	21,780	290	97	27	1.4	811	7.6
Jan. 31-Feb. 2	15,470			67	26	58		215	0	198	11		2.5	.11	506	.69	21,140	272	96	32	1.5	749	7.8
Feb. 3-6	16,530			64	25	56		213	0	189	11		2.5	.10	488	.66	21,780	262	87	31	1.5	724	7.6
Feb. 7-9	17,270			63	23	60		208	0	185	11		1.8	.09	466	.63	21,730	252	81	34	1.7	706	7.3
Feb. 28-Mar. 1	16,900			57	21	56		189	0	174	9.0		1.3	.02	426	.58	19,440	230	75	35	1.6	651	7.4
Mar. 2-5	13,430			40	28	60		183	0	174	9.5		2.3	.03	432	.59	15,660	216	66	38	1.8	641	7.4
Mar. 6-9	12,330			55	20	60		188		175	9.0		1.6	.11	444	.60	14,780	220	66	37	1.8	654	7.3
Mar. 14-17	13,150			61	22	64		202	0	194	11		1.4	.14	470	.64	16,690	244	78	36	1.8	708	7.4

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 1-3, 1952	58,330			80	18	77		163	0	278	8.0		3.1	0.10	578	0.79	91,030	275	141	38	2.0	814	7.2
Apr. 1 a	45,000			93	23	90		182	0	328	10		3.5	.02	676	.92	82,130	326	177	37	2.2	946	7.4
Apr. 4-7	172,300			58	13	54		154	0	170	5.0		3.0	.09	398	.54	185,200	197	71	37	1.7	591	7.4
Apr. 8-9	333,500			50	9.2	41		161	0	111	3.0		3.0	.06	320	.44	288,100	163	31	35	1.4	478	7.7
Apr. 10-11	421,500			43	11	39		162	0	93	3.0		3.7	.06	300	.41	341,400	152	19	36	1.4	478	7.8
Apr. 12-13	279,000			38	9.7	41		144	0	97	33.0		3.5	.06	282	.38	212,400	135	17	39	1.5	430	7.3
Apr. 14-16	127,300			43	11	43		162	0	98	2.5		3.0	.02	302	.41	103,800	151	18	38	1.5	472	7.6
Apr. 17-28	76,060			43	11	47		162	0	117	4.0		2.0	.06	324	.44	66,540	154	21	39	1.6	497	7.8
Apr. 29-May 14	47,780			41	14	54		164	0	134	5.5		1.5	.06	366	.50	47,220	160	26	42	1.9	528	7.6
May 15-24	35,720			40	12	47		150	0	116	5.0		1.5	.07	296	.40	28,550	150	27	40	1.7	489	7.8
May 25-31	36,860			40	15	57		154	0	144	6.5		3.7	.13	366	.50	36,420	162	36	43	1.9	549	7.6
June 1-5	45,720			48	15	53		169	0	148	8.0		2.4	.09	366	.50	45,180	183	44	38	1.7	590	7.7
June 6-7	43,450			68	21	72		191	0	234	11		4.2	.11	522	.71	61,240	256	99	37	2.0	793	7.7
June 8-10	41,330			51	15	57		164	0	168	7.5		2.5	.19	410	.56	45,750	190	56	39	1.8	620	7.7
June 11-14	46,580			42	13	44		151	0	119	6.5		2.0	.11	318	.43	39,990	160	36	37	1.5	511	7.5
June 15-17	62,270			41	13	39		154	0	105	5.5		1.7	.24	302	.41	50,780	154	28	35	1.4	470	7.7
June 18-26	42,340			39	10	34		142	0	89	5.0		1.8	.11	264	.36	30,180	138	22	34	1.3	426	7.7
June 27	34,800			56	13	61		166	0	174	6.0		3.5	.08	432	.59	40,590	192	56	40	1.9	578	7.4
June 28-29	41,700			51	13	57		154	0	164	7.0		2.1	.13	406	.55	45,710	182	56	40	1.8	600	7.6
June 30-July 3	34,600			49	12	55		148	0	153	7.0		2.1	.16	364	.50	34,000	170	49	41	1.8	569	7.7
July 4-9	30,730			38	11	49		140	0	123	6.0		1.1	.12	312	.42	25,890	139	24	42	1.8	494	7.4
July 10-20	25,930			42	13	54		149	0	143	7.0		1.1	.12	360	.49	25,200	162	40	42	1.9	553	7.8
July 21-23	18,400			43	14	53		152	0	147	8.0		.6	.11	358	.49	17,790	166	41	40	1.8	557	8.2
July 24-29	24,470			42	13	54		143	5	139	7.0		.6	.12	352	.48	23,260	160	35	42	1.9	543	8.2
July 30-Aug. 9	22,850			49	15	62		153	0	177	8.0		1.7	.11	404	.55	24,920	183	58	42	2.0	625	8.2
Aug. 10-15	28,830			49	18	59		166	0	170	9.0		1.0	.16	408	.55	31,760	194	58	39	1.8	623	8.0
Aug. 16-20	31,480			50	17	56		154	5	165	9.0		.7	.25	402	.55	34,170	195	61	38	1.7	606	8.3
Aug. 21-31	28,010			51	18	58		170	0	172	9.5		.6	.13	420	.57	31,760	202	63	38	1.8	619	8.0
Sept. 1-30	27,860			54	19	59		178	0	176	9.5		.7	.11	426	.58	32,040	212	66	37	1.8	650	8.0
Weighted average b	42,760			50	15	51		c167	--	146	6.5		2.1	0.10	375	0.51	43,290	187	50	37	1.6	568	--
Weighted average d	36,490			51	16	52		c170	--	152	6.9		2.1	0.10	385	0.52	37,930	193	54	37	1.6	583	--

a Not included in weighted average.
b Represents 92 percent of runoff for water year October 1951 to September 1952.
c Includes carbonate as bicarbonate.
d Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 6:30 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	34					34	a68	60	75	79	a70
2	--	33					a38	--	63	72	80	a70
3	56	33	a34				a40	a67	63	71	a78	68
4	a53	a32					a38	a68	65	a73	a78	a68
5	--	a32					36	a72	a75	75	a77	a68
6	a54	33					40	72	70	73	77	a67
7	a56	32					40	62	72	72	a76	--
8	a58	a34					--	a68	69	72	--	68
9	52	a38					--	a59	70	71	76	70
10	a58	a39					a42	60	72	71	76	a70
11	a60	--					40	59	--	72	75	69
12	56	36					a42	a58	a78	a78	a74	a71
13	a58	37					40	56	a78	a78	a76	70
14	a56	a35					47	57	a78	a78	a76	a68
15	a52	a35					43	58	76	78	73	a68
16	48	35					48	60	76	78	71	68
17	48	33					48	57	78	a78	72	a70
18	a46	a34					49	59	a76	a78	78	a68
19	46	35					43	58	76	a78	78	a62
20	46	35					a43	60	a76	a78	a78	62
21	a46	34					44	60	76	a78	a78	62
22	a44	a35					48	61	a76	a78	78	a62
23	a50	--					55	a66	a76	78	78	a62
24	a48	--					56	66	76	77	a78	64
25	a47	a35					63	a65	a74	77	a78	63
26	a42	34					64	66	a72	78	77	63
27	a42	35					66	--	a72	76	76	--
28	a48	a38					65	64	a72	78	71	62
29	a46	a36					64	a63	a72	79	71	62
30	43	36					a65	60	73	78	a78	61
31	36	--					--	58	--	78	a78	--
Average	50	35					48	62	73	76	76	66

a Observation made between 1 p. m. and 5:30 p. m.

BAD RIVER BASIN

BAD RIVER NEAR MIDLAND, S. DAK.

LOCATION.--At gaging station at highway bridge, three-quarters of a mile downstream from nearest tributary, 1 mile downstream from Mitchell Creek, and 1¼ miles east of Midland, Haakon County.
RECORDS AVAILABLE.--Chemical analyses: March 1950 to September 1952.
REMARKS.--No flow during November to February and September. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, March to August 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Mar. 4, 1952	21			112	32	174		200		573	21			0.20				412	248	48	3.7	1,410	7.5
Mar. 31	9,760			55	6.4	26		158		84	2.0			.00				164	34	25	.9	440	7.4
May 1	38			175	41	217		238		810	28			.25				606	411	44	3.8	1,860	7.6
May 16	20			245	67	368		270		1,340	48			.27				885	664	47	5.4	2,830	7.5
June 5, 1:00 p. m.	1,260			87	15	61		166		256	6.0			.14				278	142	32	1.6	795	7.4
June 5, 6:20 p. m.	1,410			78	13	83		185		258	5.0			.15				247	95	42	2.3	805	7.5
July 1	393			70	9.1	77		168		223	7.0			.12				212	74	44	2.3	720	7.5
Aug. 5	3.0			183	34	280		214		985	37			.48				595	420	51	5.0	2,230	7.4

MISCELLANEOUS ANALYSES OF STREAMS IN THE BAD RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
BAD RIVER NEAR FORT PIERRE																							
Dec. 5, 1951	1.7			295	84	433	146			1,620	152							1,080	960	47	5.7	3,570	7.8
Mar. 4, 1952	51			180	51	345	200			1,130	49							660	496	53	5.8	2,480	7.7
Apr. 1	11,700			76	12	63	180			216	4.0							240	92	37	1.8	725	7.4
July 1	2,570			58	12	62	157			185	4.0							192	63	41	1.9	642	7.6

BAD RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE BAD RIVER BASIN IN SOUTH DAKOTA--Continued

Periodic determinations of suspended-sediment discharge, October to December 1951

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
BAD RIVER NEAR FORT PIERRE			
Oct. 5, 1951	872	26,400	62,200
Nov. 2	1.9	61	.3
Dec. 5	1.7	59	.3

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.
RECORDS AVAILABLE.--Chemical analyses: November 1946 to August 1947, December 1949 to September 1952 (discontinued).
Water temperatures: April 1949 to September 1952 (discontinued).
Sediment records: March 1947 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 80°F on July 26, 31, and Aug. 7; minimum, freezing point on many days during December to April.
Sediment concentrations: Maximum daily, 31,600 ppm May 13; minimum daily, no flow Sept. 25-30.
Sediment loads: Maximum daily, 20,100 tons June 28; minimum daily, 0 tons Sept. 25-30.
EXTREMES, 1947-52.--Water temperatures (1949-52): 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, no flow Sept. 25-30, 1952.
Sediment loads: Maximum daily, 36,400 tons May 24, 1949; minimum daily, 0 ton Sept. 25-30, 1952.
REMARKS.--Flow affected by ice Nov. 1-4, Nov. 16 to Mar. 28. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 2, 1951....	24			100	22	141		336	335	16				800	1.09		340	64	47	3.3	1,100	7.6	
Dec. 6	16			70	10	129		294	228	12				648	.88		266	25	56	3.8	875	7.7	
Jan. 4, 1952	12			75	24	78		342	151	12				582	.79		286	6	37	2.0	819	7.4	
Feb. 5.....	116			73	14	68		286	131	10				494	.67		238	3	38	1.9	706	7.4	
Mar. 5	49			72	13	69		278	134	11				--	--		234	6	39	1.9	699	7.9	
Apr. 1	469			67	7.5	50		248	92	5.0				--	--		198	0	35	1.5	585	7.3	
May 7.....	39			73	14	84		276	174	11				--	--		239	13	43	2.4	791	7.5	
June 4.....	78			63	9.7	71		257	124	8.5				--	--		197	0	44	2.2	661	7.6	
July 2	64			44	4.6	95		264	105	6.0				--	--		129	0	61	3.6	625	7.4	
Aug. 6	12			104	12	44		154	262	4.0				--	--		309	183	24	1.1	764	7.5	
Sept. 3	13			46	8.5	54		207	82	8,5				--	--		150	0	44	1.9	517	7.6	

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Twice-daily temperature measurements between 6 a.m. and 9 a.m., and between 4 p.m. 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	55	62	34	--	--	--	--	32	--	35	--	33	33	36	56	62	60	61	69	76	67	78	59	61
2	58	61	--	33	--	--	32	--	33	--	--	33	32	36	58	67	63	69	72	74	71	79	54	60
3	58	56	--	34	--	--	34	--	34	--	33	--	33	36	62	69	65	65	66	75	72	77	56	66
4	54	--	--	34	--	34	33	--	34	--	32	--	34	39	65	70	64	70	69	79	66	74	60	72
5	52	52	--	34	34	--	--	34	--	33	33	--	34	39	64	68	65	71	72	--	69	74	63	69
6	48	52	--	35	--	34	--	35	--	34	--	34	34	39	63	67	67	74	72	74	69	72	64	--
7	49	51	--	39	--	34	--	33	--	--	--	34	42	54	61	65	70	76	64	--	72	80	61	74
8	48	52	--	35	--	33	--	34	34	--	34	--	48	47	59	56	68	72	63	73	69	72	68	75
9	49	53	--	35	34	--	--	34	--	35	--	35	43	46	52	50	65	73	64	75	66	73	67	78
10	49	54	--	35	33	--	--	33	33	--	34	--	42	46	49	55	68	77	66	75	68	72	68	72
11	48	53	--	37	--	35	--	34	32	--	--	34	43	48	51	58	68	75	69	75	64	69	68	74
12	51	56	--	36	--	35	--	32	--	--	--	32	48	49	54	57	71	78	70	75	62	74	67	72
13	54	60	--	38	33	--	--	34	32	--	--	33	47	50	55	61	69	--	69	65	67	75	65	64
14	52	55	--	37	32	--	--	34	33	--	33	--	44	52	57	62	70	76	60	68	70	78	60	63
15	50	50	--	34	31	--	--	34	--	33	32	34	48	52	57	57	72	73	65	71	70	76	53	64
16	46	--	--	33	--	32	33	--	--	34	33	34	48	53	55	52	--	74	68	76	68	73	55	65
17	43	47	--	33	--	32	--	33	--	35	34	34	50	55	54	57	61	74	70	68	66	75	55	64
18	45	--	--	35	--	31	--	--	33	--	--	35	51	59	52	58	67	70	71	73	69	77	59	60
19	42	45	--	35	--	31	--	--	--	32	33	34	52	60	58	60	65	71	--	77	67	75	56	--
20	43	45	--	36	31	--	--	34	--	33	34	33	54	60	--	62	66	72	--	65	70	76	--	62
21	41	--	--	35	--	33	--	33	--	33	33	33	53	59	59	61	66	73	66	75	69	75	53	58
22	40	44	--	35	31	--	--	--	--	33	32	33	50	60	57	58	67	75	69	69	69	74	49	60
23	40	--	--	34	33	--	--	32	--	32	33	34	49	56	58	61	68	70	65	74	69	75	50	61
24	41	46	--	37	--	--	--	33	32	--	34	34	51	58	58	63	69	70	--	--	72	70	50	63
25	42	44	--	37	--	32	--	34	--	--	33	34	58	60	58	63	66	71	72	78	70	76	52	65
26	40	41	--	37	--	33	--	--	33	--	34	34	57	63	64	--	67	67	69	80	68	75	52	63
27	37	43	--	35	35	--	--	--	34	--	34	34	60	66	59	62	61	65	75	75	69	74	54	65
28	38	44	33	--	--	35	34	--	32	--	34	37	60	67	--	61	64	--	70	75	68	73	56	64
29	39	45	34	--	--	34	34	--	--	32	35	37	59	65	58	62	65	71	66	76	68	74	57	66
30	38	--	--	--	33	--	34	--	--	--	34	38	60	59	59	59	69	72	65	79	68	71	54	63
31	36	37	--	--	--	33	33	--	--	--	34	36	--	--	55	63	--	--	65	80	62	64	--	--
Average	46	50	--	35	--	--	--	--	--	--	--	34	47	52	57	61	66	72	68	74	68	74	58	66

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952

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	14			20			19	59	3
2	14			20	164	9	20	63	3
3	12			20			20		
4	13	75	3	20			19		
5	16			22			18	163	8
6	14			22	178	11	18		
7	56	712	s 168	24			17	160	7
8	53	1,230	176	22			16	111	5
9	30	1,260	102	23			15	98	4
10	23	510	32	27	254	19	15		
11	20	12,300	664	36	315	31	16		
12	18	9,500	462	32	320	a 28	17	70	3
13	18	3,500	170	26	232	16	17		
14	18	522	25	22	161	10	16		
15	16	292	13	21			15		
16	15	188	8	19	103	5	13		
17	16	230	10	15			13	88	3
18	16	201	9	15			14		
19	15	170	a 7	16			14		
20	27	318	s 26	20	82	4	12		
21	27	490	36	18	59	3	11		
22	24	460	a 30	15			12	62	2
23	23	400	25	15			14		
24	22	326	19	15			15		
25	21	245	14	15	58	2	14		
26	22			15			13		
27	22	241	14	15			12		
28	20			17			12	56	2
29	19	260	a 13	17	48	2	13		
30	19	182	9	18			15		
31	21	134	8	--	--	--	13		
Total	664	--	2,086	602	--	245	468	--	108

Day	January			February			March		
1	10			31	360	30	50		
2	10			45	120	15	50		
3	11			64	72	21	50		
4	12	58	2	85	75	17	50	45	6
5	12			113	65	20	50		
6	12			130	50	18	51		
7	13			114			52		
8	13			99	72	19	53		
9	13			94			58	262	42
10	12			90			68		
11	12			87			90	229	56
12	13	31	1	84			128	204	71
13	14			81	60	13	173	390	182
14	15			78			200	289	156
15	14			76			185	310	155
16	14			73			155	280	117
17	14			71			137	271	100
18	14			69	57	11	133	270	97
19	13			67			137	650	240
20	12			64			158	1,160	495
21	12			62			198	470	251
22	11			59			240	250	162
23	10	24	1	57			300	550	445
24	10			55			400	1,150	1,240
25	12			54			355	1,250	1,200
26	13			52	55	8	320	1,150	994
27	13			51			293	1,500	1,190
28	15			50			267	1,980	1,430
29	16	55	2	50			241	2,160	1,410
30	18	95	5	--	--	--	247	2,300	1,530
31	22	85	5	--	--	--	406	4,820	s 5,520
Total	405	--	46	2,105	--	389	5,295	--	17,209

s Computed by subdividing day.
a Computed from estimated concentration graph.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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	478	5,220	6,740	55	1,300	193	45	720	87
2	310	5,150	4,310	53	570	82	41	670	74
3	220	5,600	3,330	55	431	64	70	2,100	s 408
4	157	4,800	2,030	53	410	59	75	1,510	306
5	123	4,100	1,360	44	316	38	75	1,440	292
6	108	4,670	1,360	41	285	32	70	1,200	227
7	87	2,750	646	39	262	28	46	500	62
8	76	1,490	306	55	11,200	s 1,820	40	311	34
9	68	930	171	149	18,300	s 7,840	37	283	28
10	66	758	135	66	4,920	s 924	34	245	22
11	59	630	100	84	1,420	s 360	33	230	20
12	64	700	121	216	24,600	s 15,200	33	245	22
13	70	667	126	118	31,600	s 10,800	32	240	21
14	70	585	111	61	16,700	2,750	31	251	21
15	70	572	108	49	12,700	1,680	29	277	22
16	68	533	98	47	7,700	977	28	258	20
17	68	510	94	43	3,770	438	23	232	14
18	66	484	86	41	1,820	201	19	235	12
19	66	538	96	49	1,600	212	16	238	10
20	67	522	94	48	1,290	167	18	261	13
21	66	468	83	51	1,000	s 148	18	290	14
22	62	408	68	180	12,200	s 6,660	17	295	14
23	56	336	51	360	10,300	10,000	21	360	20
24	50	275	37	312	9,400	7,920	20	500	s 29
25	46	308	38	299	16,300	13,200	33	2,560	s 225
26	46	296	37	193	16,300	8,490	49	2,250	298
27	45	288	35	102	13,600	3,750	114	16,600	s 6,140
28	45	281	34	73	7,800	1,540	298	25,000	20,100
29	42	270	31	69	5,000	932	203	20,900	s 11,800
30	45	297	36	64	2,330	403	247	16,700	s 11,500
31	--	--	--	50	1,200	162	--	--	--
Total	2,864	--	21,872	3,119	--	97,070	1,815	--	51,855

	July			August			September		
1	166	27,600	12,400	6	209	3	13	168	6
2	57	14,000	2,150	3.9	206	2	13	155	5
3	37	10,500	1,050	7	236	4	12	158	5
4	25	7,500	506	38	2,140	s 355	11		
5	21	2,900	164	26	4,820	338	11		
6	16	850	37	13	3,260	114	11	152	5
7	12	537	17	9	850	21	11		
8	10	360	10	6	692	11	11		
9	8	280	6	4.2	593	7	11		
10	8	261	6	4.0	490	5	13	126	4
11	10	273	7	4.0	380	4	13	118	4
12	10	245	7	4.2	252	3	10	117	3
13	12	340	s 15	4.2	190	2	3.8	120	1
14	28	752	s 62	4.9	170	2	6	98	2
15	14	1,670	63	4.4	182	2	7	102	2
16	20	1,260	68	3.5	200	2	7	95	2
17	20	1,060	57	4.4	188	2	4.1	110	1
18	18	694	34	4.6	173	2	1.9	118	1
19	16	518	22	1.7	194	1	.1	191	(t)
20	13	442	16	6	228	4	.1	130	(t)
21	14	477	18	8	265	6	.2	120	(t)
22	15	542	22	7	192	4	1.7	135	1
23	15	445	18	8	169	4	1.6	106	(t)
24	13	370	13	8	220	5	.1	81	(t)
25	10	291	8	7	180	3	0	--	0
26	7	258	5	7	171	3	0	--	0
27	6	230	4	9	228	6	0	--	0
28	6	220	4	9	200	5	0	--	0
29	4.9	216	3	10	180	5	0	--	0
30	3.9	219	2	12	270	9	0	--	0
31	3.5	210	2	12	188	6	--	--	--
Total	619.3	--	16,796	256.0	--	940	173.6	--	68
Total discharge for year (cfs-days)									18,385.9
Total load for year (tons)									208,684

s Computed by subdividing day.
t Less than 0.50 ton.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR OGLALA, S. DAK.--Continued

Particle-size analyses of suspended sediment, October 1951 to July 1952
(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	Water 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. 11, 1951	7:30 a.m.	21	48	12,000	5,640		89		100		--						PWCM
Oct. 11	6:00 p.m.	19	53	16,200	7,250		90		99		100						SPWCM
Oct. 12	6:00 p.m.	19	56	7,200	3,310		92		100		--						PWCM
Mar. 27, 1952	11:45 a.m.	a 293	--	1,450	5,380		44		58		95						SPWCM
Mar. 31	4:00 p.m.	426	36	5,610	4,920		52		75		96						SPWCM
Apr. 1	8:00 a.m.	490	33	4,860	4,410		68		88		98						SPWCM
Apr. 1	6:15 p.m.	472	36	5,140	6,260		57		87		98						SPWCM
Apr. 5	12:15 p.m.	108	--	3,400	4,380		61		91		99						SPWCM
May 12	7:00 p.m.	224	57	42,300	9,640		60		88		100						SPWCM
May 12	7:00 p.m.	224	57	42,300	19,500		0		90		99						SPNM
May 13	5:45 a.m.	145	55	36,400	8,430		61		90		100						SPWCM
May 13	5:30 p.m.	91	61	27,400	6,600		69		95		100						SPWCM
May 14	6:00 a.m.	66	57	17,800	6,620		79		98		100						SPWCM
May 15	7:00 p.m.	47	57	11,300	5,140		85		96		100						SPWCM
May 20	12:30 p.m.	48	63	2,200	3,340		73		95		100						SPWCM
May 22	7:30 a.m.	178	57	8,830	7,710		45		64		98						SPWCM
May 23	8:15 a.m.	478	58	9,320	8,290		61		81		99						SPWCM
May 23	2:15 p.m.	383	--	7,340	8,530		54		81		99						SPWCM
May 23	2:15 p.m.	383	--	7,340	8,550		1		81		99						SPNM
June 4	8:45 a.m.	76	64	1,520	3,050		28		60		99						SPWCM
June 27	7:30 p.m.	256	65	22,200	10,100		28		57		98						SPWCM
June 28	8:00 a.m.	339	64	24,000	5,270		75		86		98						SPWCM
June 28	1:15 p.m.	307	72	26,600	7,880		68		87		99						SPWCM
July 1	7:00 a.m.	220	69	27,900	6,560		53		84		99						SPWCM
July 1	12:15 p.m.	157	--	33,000	5,590		63		89		100						SPWCM
July 1	12:15 p.m.	157	--	33,000	10,600		3		91		99						SPNM
July 1	7:00 p.m.	96	76	25,000	5,270		63		91		100						SPWCM

a Mean daily discharge.

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 1952.
Water temperatures: April 1949 to September 1952.
Sediment records: April 1949 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,430 ppm Sept. 20-21; minimum, 238 ppm Mar. 29-30.
Hardness: Maximum, 470 ppm Jan. 3-9; minimum, 16 ppm July 15-19.
Specific conductance: Maximum daily, 2,110 micromhos Sept. 20; minimum daily, 241 micromhos Mar. 30.
Water temperatures: Maximum, 83°F July 10, 23; minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 62,400 ppm May 22; minimum daily, no flow on several days during September.
Sediment loads: Maximum daily, 1,370,000 tons May 22; minimum daily, 0 ton on several days during September.
EXTREMES, 1949-52.--Dissolved solids: Maximum, 1,600 ppm Jan. 1-31, 1950; minimum, 238 ppm Mar. 29-30, 1952.
Hardness: Maximum, 470 ppm Jan. 3-9, 1952; minimum, 13 ppm Sept. 21-23, 24-30, 1950.
Specific conductance: Maximum daily, 2,880 micromhos Feb. 5, 1950; minimum daily, 241 micromhos Mar. 30, 1952.
Water temperatures: Maximum, 84°F Aug. 11, 1949, July 28, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 76,200 ppm June 2, 1951; minimum daily, no flow on several days during January 1950 and September 1952.
Sediment loads: Maximum daily, 1,370,000 tons May 22, 1952; minimum daily, 0 ton several days during January 1950 and September 1952.
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. 1-8, 16-26, Dec. 7 to Mar. 28. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Selenium (Se)	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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 7-14, 1951....	53.6		--	10	0.7	123		240	12	75	7.0				410	0.56	59	28	0	88	10	581	8.3
Oct. 15-22.....	29.6		--	50	5.8	138		302	0	186	12				584	.79	47	149	0	66	4.9	810	8.0
Oct. 23-26.....	23.3		--	64	9.4	130		310	0	224	12				662	.90	42	198	0	56	4.0	926	8.0
Oct. 27-Nov. 1....	24.0		--	48	7.3	113		342	0	119	10				546	.74	35	150	0	59	4.0	762	8.1
Nov. 2-7.....	27.7		--	63	8.5	123		386	0	148	12				628	.85	47	192	0	55	3.9	864	8.1
Nov. 8-15.....	47.3		--	50	7.2	105		300	0	131	9.0				522	.71	67	154	0	58	3.7	723	8.1
Nov. 16-24.....	48.1		--	62	9.6	120		336	8	154	10				604	.82	78	194	0	56	3.3	812	8.2
Nov. 25-28	112		--	52	9.0	103		302	6	127	10				516	.70	156	167	0	56	3.5	739	8.2
Nov. 29-Dec. 4....	76.2		--	52	8.0	106		290	0	144	9.0				502	.68	103	163	0	58	3.6	708	8.1
Dec. 5	23		--	58	8.6	126		336	14	147	11				596	.81	37	180	0	59	4.1	840	8.4
Dec. 6-13.....	22.0		--	61	9.5	123		364	0	153	12				602	.82	36	191	0	56	3.9	854	8.2
Dec. 14-17	21.0		--	48	6.6	159		376	8	168	13				668	.91	38	147	0	67	5.7	957	8.2
Dec. 18-19	20.0		--	47	6.9	163		388	0	175	13				662	.90	36	146	0	68	5.9	945	8.0
Dec. 20-26.....	19.4		--	57	9.2	185		507	6	151	13				766	1.04	40	180	0	67	6.0	1,070	8.2
Dec. 27-31.....	18.0		--	105	16	149		529	0	205	18				836	1.14	41	328	0	48	3.6	1,150	8.1
Jan. 1-2, 1952.....	16.0		0.06	105	18	154		542	0	183	15				834	1.13	36	334	0	50	3.7	1,170	8.1
Jan. 3-9.....	9.43		.10	147	25	222		782	0	263	24				1,200	1.63	31	470	0	51	4.5	1,630	7.8
Jan. 10-22.....	14.5		.11	90	15	120		486	0	124	14				704	.96	28	288	0	48	3.1	985	7.9
Jan. 23-Feb. 2....	43.5		--	93	15	122		484	0	134	14				710	.97	83	295	0	47	3.1	994	7.9

Feb. 3-18, 1952...	526		0.11	23	2.1	67		204	0	38	4.0			278	0.38	395	66	0	69	3.6	406	7.9
Feb. 19-23.....	265		--	31	2.6	83		242	0	58	6.0			348	.47	249	88	0	67	3.8	513	7.9
Feb. 24-Mar. 2...	172		.11	56	6.0	90		318	0	86	16			414	.56	192	164	0	52	3.1	670	8.0
Mar. 3-9	156		.10	36	2.9	84		254	0	57	2.0			372	.51	157	102	0	64	3.6	541	8.0
Mar. 10-11.....	375		--	27	2.3	68		204	0	46	2.0			292	.40	296	77	0	66	3.4	426	6.8
Mar. 12-26	890		.09	19	.5	59		170	0	32	3.0			244	.33	586	49	0	72	3.7	339	7.8
Mar. 27 a	951		.21	19	2.1	64		182	10	22	4.0			276	.38	--	56	0	71	3.7	373	8.4
Mar. 27-28	2,226		--	16	1.5	71		178	0	47	1.0			272	.37	1,630	46	0	77	4.6	390	8.1
Mar. 29 a	7,340		--	53	5.0	16		170	0	52	.4			256	.35	--	153	14	18	.6	376	7.5
Mar. 29-30	6,605		--	9.2	.7	62		151	0	28	2.0			238	.32	4,240	26	0	84	5.3	304	7.9
Mar. 31	3,500		--	12	1.9	69		168	0	38	1.0			256	35	2,420	38	0	80	4.9	332	7.8
Apr. 1-2	2,015		.17	16	.5	68		188	0	37	4.0			260	.35	1,410	42	0	75	4.6	375	7.8
Apr. 3-9	841		.17	25	1.6	78		216	0	59	3.0			316	.43	718	69	0	70	4.1	462	7.8
Apr. 10-14.....	270		--	37	3.0	87		258	0	74	6.5			388	.53	283	105	0	64	3.7	560	7.8
Apr. 15-May 8	133		.14	40	5.8	102		286	0	96	9.0			450	.61	162	124	0	64	4.0	654	8.1
May 9-15.....	336		.17	12	1.5	123		272	0	72	7.5			404	.55	367	36	0	87	8.9	583	8.1
May 16-21.....	764		.16	10	.5	119		258	0	72	5.0			404	.55	833	27	0	88	10	553	8.0
May 22	7,310		--	6.0	.5	123		236	6	69	5.0			404	.55	7,970	17	0	94	13	520	8.5
May 23	8,670		--	6.5	1.0	113		233	15	39	5.0			--	--	--	20	0	92	11	470	8.7
May 24.....	2,150		--	3.4	2.0	107		210	20	39	2.5			352	.48	2,040	117	0	93	11	442	8.9
May 25-27	861		--	6.5	1.8	129		244	0	96	5.0			440	.60	1,020	24	0	91	12	600	8.0
May 28-June 3.....	369		.14	36	3.2	154		232	0	232	8.5			622	.85	620	103	0	76	6.6	880	7.7
																						7.7
June 4	433		.25	29	.9	180		266	0	235	9.6			648	.88	758	76	0	82	9.0	893	7.7
June 5-6	638		--	9.0	.5	130		238	0	96	6.4			420	.57	723	25	0	92	11	576	8.1
June 7-8	238		--	6.0	1.2	130		242	6	79	5.6			432	.59	278	20	0	93	13	586	8.3
June 9-10	126		--	12	1.0	155		280	0	137	8.0			534	.73	182	34	0	88	12	746	--
June 11-12	81.5		--	31	3.0	180		233	0	263	6.4			674	.92	148	90	0	81	8.3	955	7.9
June 13-21	54.1		.17	26	3.6	145		268	--	151	9.7			540	.73	79	80	0	80	7.1	766	8.3
June 22-23	75.0		--	7.5	1.3	106		242	0	42	6.0			334	.45	68	24	0	91	9.4	479	8.1
June 24-26	258		--	7.0	1.6	127		250	0	75	9.0			350	.48	244	24	0	92	11	567	7.4
June 27	1,310		--	8.0	1.0	142		268	6	85	10			430	.58	1,520	24	0	93	13	599	8.3
June 28-29	4,715		--	--	--	112		222	14	54	--			--	--	--	24	0	91	9.9	498	8.8
June 30-July 2	610		--	5.0	1.8	114		210	12	57	4.0			--	--	--	20	0	93	11	487	8.3

a Not included in weighted average.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 3-4, 1952	240		0.15	45	4.5	175		184	0	352	4.0				736	1.00	477	131	0	73	6.6	1,040	7.9
July 5-8	91.8		.11	34	2.7	122		208	0	183	7.0				516	.70	128	96	0	72	5.4	720	7.9
July 9-13	32.4		.09	22	2.2	130		224	0	150	7.0				490	.67	43	64	0	81	7.1	687	8.1
July 14	85		--	24	2.9	137		256	0	148	8.0				516	.70	118	72	0	79	7.0	710	7.8
July 15-19	185		--	6.0	.2	119		232	10	63	4.0				408	.55	204	16	0	93	13	641	8.4
July 29-31	10.7		.06	9.5	3.3	202		366	0	155	11				640	.87	18	37	0	92	14	882	8.1
Aug. 1-3	5.67		.15	12	2.1	220		343	11	178	13				698	.95	11	38	0	93	15	982	8.4
Aug. 4	53		--	24	1.9	205		262	0	278	10				704	.96	101	68	0	86	11	1,000	8.1
Aug. 5	40		--	6.0	1.9	150		236	--	135	7.0				484	.66	52	23	0	93	14	669	8.3
Aug. 14-15	48.0		--	16	1.9	213		287	0	242	13				628	.85	81	48	0	91	13	967	8.0
Aug. 16-25	19.1		.11	7.0	.9	143		248	8	100	6.0				442	.60	23	21	0	94	14	646	8.3
Aug. 26-27	16.0		--	11	.1	174		303	0	133	9.6				532	.72	23	28	0	93	14	762	8.1
Aug. 28-31	3.45		.14	6.4	1.0	158		302	6	88	5.4				496	.67	4.6	20	0	94	15	690	8.3
Sept. 1-19	.10		.14	14	1.7	277		368	28	258	20				846	1.15	.2	42	0	93	19	1,200	8.7
Sept. 20-21	.90		--	18	2.1	466		418	12	639	18				1,430	1.94	3.5	54	0	95	28	2,020	8.2
Sept. 22-30	.72		.10	11	1.6	355		452	20	360	21				1,070	1.46	2.1	34	0	95	26	1,500	8.5
Weighted average [b]	336		--	18	1.7	94		c 223	--	62	4.6				d 345	d 0.47	d 313	52	0	80	5.7	480	--

b Represents 99 percent of runoff for water year October 1951 to September 1952.
c Includes carbonate as bicarbonate.
d Includes estimated dissolved solids for period May 23, June 28-July 2.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 8 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a73	32		--	a35	a32	38	--	--	78	70	66
2	a71	40		--	37	--	43	--	66	75	78	59
3	--	45		34	a33	a34	41	--	65	70	78	60
4	a54	49	a34	a33	36	33	40	--	--	73	--	60
5	49	49		a33	33	a32	45	--	70	80	74	65
6	50	--		a33	34	a34	48	66	--	73	72	58
7	50	49		--	35	a35	53	59	75	63	--	--
8	48	a43		--	34	a35	a45	--	--	72	--	--
9	50	a43		--	37	--	40	51	70	73	--	--
10	58	a49		--	34	--	48	54	75	83	--	a77
11	48	50		--	37	a34	42	55	72	72	--	--
12	54	47		a33	38	--	44	57	78	73	--	--
13	55	--		--	32	a32	--	64	75	a61	--	--
14	59	55		--	31	32	54	61	75	70	77	--
15	a55	--		--	32	33	a55	58	80	68	73	--
16	--	--		a34	--	34	50	57	68	73	74	--
17	a46	--		34	a34	33	55	56	70	76	74	--
18	--	--		--	--	35	57	--	75	77	75	--
19	a46	--		a34	33	--	60	53	a75	70	75	--
20	a43	--		a34	32	32	65	62	65	75	77	58
21	43	a66		--	--	33	57	64	67	80	73	56
22	42	--		--	a33	a32	54	57	--	70	68	48
23	46	--		--	a33	33	52	59	77	83	75	54
24	48	--		34	a33	33	58	63	74	--	74	50
25	45	--		--	36	32	59	64	68	--	--	56
26	45	--		a34	36	a34	--	66	65	75	78	54
27	47	--		--	--	37	--	58	65	--	--	64
28	50	--		--	35	35	--	55	--	68	--	65
29	48	--		34	a33	34	--	64	70	75	69	61
30	43	--		--	--	35	--	62	75	76	73	--
31	38	--		36	--	36	--	61	--	77	66	--
Average	50	--	--	--	34	34	50	--	--	74	--	59

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

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952

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	56	5	15	157	6	89	422	101
2	24	74	5	23	150	9	76	510	105
3	18	100	a 5	34	230	21	62	458	77
4	683	31,400	s 67,500	33			51	430	59
5	340	18,800	s 22,600	30			23		
6	272	18,800	s 14,400	23	56	4	22	72	b 4
7	74	19,000	3,800	23			22		
8	74	18,500	3,700	32			22		
9	53	16,000	2,290	49	351	38	22		
10	36	14,200	1,380	49			22		
11	36	10,900	1,060	55	398	56	22		
12	51	6,440	887	64	654	113	22	41	b 2
13	56	5,760	871	45	1,010	123	22		
14	49	3,350	443	42	366	42	22		
15	37	820	82	42			22		
16	31	300	25	41			20		
17	31	155	13	33			20		
18	27			33	121	12	20		
19	27			34			20		
20	31	86	6	37			20	--	e 2
21	26			45	165	20	20		
22	27			62	132	22	20		
23	31			72	144	29	20		
24	12	132	9	76			20		
25	23			87	499	117	18		
26	27			113	556	170	18		
27	27			139	451	169	18	--	e 2
28	27			108	590	172	18		
29	26	182	13	96	471	122	18		
30	26			83	416	93	18		
31	23			--	--	--	18		
Total	2,258	--	119,200	1,618	--	1,580	827	--	406

Day	January			February			March		
1	18			100	190	62	150	1,250	506
2	14			140			150	1,610	652
3	8			450	1,670	2,030	150	2,240	907
4	8			550	1,900	2,820	150	2,140	867
5	8		e 1	900	3,000	7,290	150	1,600	648
6	10			770	3,250	6,760	150	1,060	429
7	10			900	3,080	7,480	150	1,010	409
8	10			750	2,800	5,670	160	1,200	518
9	12			500	2,300	3,110	180	1,300	632
10	12			500	2,500	3,380	300	1,900	1,540
11	14			500	3,650	4,930	450	2,800	3,400
12	14			575	3,660	5,680	700	3,800	a 7,200
13	14			525	3,380	4,790	1,250	3,050	10,300
14	15			325	1,880	1,650	668	1,900	3,430
15	15		e 2	300	1,340	1,090	450	1,600	1,940
16	15			300	1,080	875	325	1,530	1,340
17	15			300	1,480	1,200	350	1,370	1,290
18	15			275	843	626	600	1,920	3,110
19	15			275	368	273	1,000	1,550	4,190
20	15			275	296	220	1,500	2,420	9,800
21	15			275	342	254	2,000	2,520	13,600
22	15			250	328	221	1,600	2,100	9,070
23	15			250	402	271	1,400	2,300	8,690
24	15			250	352	238	700	1,920	3,630
25	16		e 2	225	470	286	450	1,980	2,410
26	18			150	524	212	360	1,780	1,730
27	18			150	538	218	951	2,400	6,160
28	18			150	520	211	3,500	16,600	157,000
29	18			150	1,120	454	7,340	19,400	s 402,000
30	40		e 10	--	--	--	5,870	19,400	307,000
31	80		e 40	--	--	--	3,500	16,800	s 163,000
Total	525		98	11,060	--	62,363	36,654	--	1,127,398

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	2,320	10,700	67,000	93	210	53	341	7,100	6,540
2.....	1,710	7,350	33,900	95	144	37	282	6,100	4,640
3.....	1,440	6,400	24,900	93	224	56	213	4,800	2,760
4.....	1,110	6,180	18,500	88	208	49	433	30,000	s40,900
5.....	862	5,650	13,100	88	165	39	798	33,300	74,400
6.....	745	4,900	9,860	88	148	35	478	30,600	s42,000
7.....	682	5,200	9,580	81	196	43	269	18,700	13,600
8.....	609	4,780	7,860	93	220	a55	206	12,100	6,730
9.....	441	4,060	4,830	329	24,900	s23,800	140	6,400	2,420
10.....	345	3,020	2,810	453	25,100	s31,400	111	3,700	1,110
11.....	302	2,140	1,740	510	23,000	31,700	90	1,700	413
12.....	261	1,460	1,030	332	21,000	18,800	73	408	80
13.....	231	960	599	244	11,800	7,770	57	234	36
14.....	212	800	458	159	6,600	2,830	57	214	33
15.....	197	650	346	324	9,300	sb14,000	57	240	37
16.....	190	700	359	987	27,600	s78,500	51	242	33
17.....	204	720	397	936	39,600	104,000	46	184	23
18.....	227	900	552	446	28,700	s35,700	43	162	19
19.....	235	1,820	1,150	863	38,600	s95,300	42	150	17
20.....	193	3,560	1,860	960	46,200	s133,000	34	108	10
21.....	163	3,400	1,500	393	26,700	s29,200	100	14,300	s5,260
22.....	154	1,180	491	7,310	62,400	s1,370,000	104	16,600	s5,130
23.....	139	580	218	8,670	48,000	s1,250,000	46	12,400	1,540
24.....	131	405	143	2,150	26,000	s156,000	83	5,800	1,300
25.....	126	368	125	1,200	20,900	s69,500	252	16,000	s15,200
26.....	119	308	99	806	12,400	s27,600	440	25,200	29,900
27.....	114	294	90	577	7,800	12,200	1,310	46,700	s193,000
28.....	103	264	73	535	4,500	6,500	7,100	56,900	s1,160,000
29.....	93	228	57	430	3,500	4,060	2,330	40,800	s279,000
30.....	90	188	46	360	3,000	2,920	918	23,700	s60,200
31.....	---	--	--	420	7,400	8,390	--	--	--
Total.	13,748	--	203,673	30,113	--	3,513,537	16,504	--	1,946,331

	July			August			September		
1.....	547	16,800	24,800	6	241	4	0.6	1,000	a2
2.....	365	9,400	9,260	5	236	3	.4	692	1
3.....	256	8,500	5,880	6	312	5	.2		
4.....	224	8,600	5,200	53	6,260	s1,470	.2		
5.....	143	9,500	3,670	40	24,700	s2,530	.2	488	(t)
6.....	95	5,600	1,440	29	22,000	1,720	.2		
7.....	76	2,100	431	26	16,700	1,170	0	--	0
8.....	53	676	97	19	15,000	770	0	--	0
9.....	42	254	29	15	2,200	89	0	--	0
10.....	34	159	15	12	1,200	39	.1	697	(t)
11.....	30	153	12	19	5,800	298	0	--	0
12.....	28	141	11	15	9,700	393	0	--	0
13.....	28	136	10	18	8,520	s394	0	--	0
14.....	85	2,720	s1,010	36	4,400	428	0	--	0
15.....	493	33,500	s48,800	60	20,000	sb4,100	0	--	0
16.....	218	30,300	s18,700	36	22,000	s2,200	0	--	0
17.....	103	22,600	s6,460	20	14,300	772	0	--	0
18.....	61	17,800	2,930	20	16,500	891	0	--	0
19.....	48	14,300	1,850	54	16,900	2,460	0	--	0
20.....	37	12,500	1,250	28	19,500	1,470	1.0		
21.....	32	10,200	881	13	13,800	484	.8		
22.....	31	8,000	670	8	13,000	281	.8	144	(t)
23.....	22	4,400	261	5	14,800	200	.8		
24.....	22	4,000	a240	3.8	13,200	135	.6		
25.....	19	4,100	210	19	9,000	a80	.8		
26.....	15	1,800	73	19	14,000	sb750	.5		
27.....	13	900	32	13	16,000	a550	.4	144	(t)
28.....	13	358	13	6	14,000	a220	.4		
29.....	13	300	11	4.0	13,000	140	.8		
30.....	11	272	8	2.2	10,000	59	1.4	160	a1
31.....	8	248	5	1.6	2,400	10	--	--	--
Total.	3,165	--	134,259	595.8	--	24,115	10.2	--	8

Total discharge for year (cfs-days) 117,078.0
Total load for year (tons) 7,132,968

s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

WHITE RIVER BASIN--Continued

WHITE RIVER NEAR KADOKA, S. DAK.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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, 1951	10:00 a.m.	698	--	37,600	6,940	--	61	--	80	--	97	--	--		--		SPWCM
Oct. 4	4:00 p.m.	915	54	37,300	7,200	--	59	--	78	--	98	--	--		--		SPWCM
Oct. 5	12:30 p.m.	257	50	13,200	10,300	--	78	--	95	--	98	--	--		--		SPWCM
Oct. 11	8:15 a.m.	36	48	11,700	4,800	--	100	--	--	--	--	--	--		--		PWCM
Feb. 13, 1952	1:00 p.m.	a525	--	3,160	6,140	--	75	--	85	--	94	--	--		--		SPWCM
Mar. 13	3:00 p.m.	a1,250	32	2,570	1,800	78	81	82	86	89	96	98	99		100		BWCM
Mar. 14	1:10 p.m.	a668	32	2,100	4,020	--	81		--	--	98	--	--		--		SPWCM
Mar. 27	2:45 p.m.	a951	38	2,930	3,910	65	74	76	81	86	93	97	99		100		BWCM
Mar. 27	5:00 p.m.	a951	--	3,040	3,020	--	75	--	82	--	91	--	--		--		SPWCM
Mar. 28	7:10 p.m.	a3,500	--	18,400	6,630	--	32	--	45	--	86	--	--		--		SPWCM
Mar. 29	6:30 p.m.	6,760	--	24,200	6,640	--	30	--	45	--	88	--	--		--		SPWCM
Mar. 31	4:45 p.m.	3,020	--	13,900	8,170	--	39	--	57	--	87	--	--		--		SPWCM
Apr. 1	4:45 p.m.	2,070	39	9,670	5,670	--	47	--	66	--	90	--	--		--		SPWCM
Apr. 3	3:30 p.m.	1,370	--	6,580	4,450	--	54	--	74	--	90	--	--		--		SPWCM
Apr. 15	2:00 p.m.	197	--	638	1,660	--	80	90	94	96	97	98	99		100		BWCM
May 19	3:35 p.m.	746	--	30,500	5,500	--	68	--	84	--	97	--	--		--		SPWCM
May 22	10:00 a.m.	6,040	57	64,500	5,500	--	43	--	61	--	95	--	--		--		SPWCM
May 22	8:30 p.m.	13,000	--	70,900	5,530	--	48	--	67	--	97	--	--		--		SPWCM
May 23	1:30 a.m.	13,500	--	62,600	6,840	--	46	--	63	--	93	--	--		--		SPWCM
May 23	1:00 p.m.	7,690	--	49,100	8,050	--	46	--	64	--	95	--	--		--		SPWCM
May 25	8:45 p.m.	1,020	--	17,300	6,600	--	81	--	94	--	99	--	--		--		SPWCM
May 25	8:45 p.m.	1,020	--	17,300	19,000	--	85	--	94	--	99	--	--		--		SPNM
June 2	6:15 p.m.	269	--	5,510	9,190	--	92	--	100	--	--	--	--		--		PWCM
June 4	6:50 a.m.	278	62	34,600	6,560	--	70	--	95	--	99	--	--		--		SPWCM
June 5	8:15 p.m.	768	--	34,000	7,580	--	70	--	92	--	99	--	--		--		SPWCM
June 7	9:00 a.m.	228	75	19,900	7,960	--	88	--	97	--	100	--	--		--		SPWCM
June 28	6:30 a.m.	11,300	--	68,500	6,180	--	51	--	70	--	97	--	--		--		SPWCM
June 28	6:30 a.m.	11,300	--	68,500	12,600	--	12	--	70	--	96	--	--		--		SPNM
Sept. 2	10:30 a.m.	.5	59	559	958	95	96	97	98	99	100	--	--		--		BWCM

a Mean daily discharge.

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 2 miles (revised) north of White River, Mellette County.
DRAINAGE AREA.--1,570 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1952.
Water temperatures: February 1951 to September 1952.
Sediment records: December 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 89°F Aug. 26; minimum, freezing point on several days during November to March.
Sediment concentrations: Maximum daily, 11,600 ppm Aug. 10; minimum daily, not determined.
Sediment loads: Maximum daily, 99,600 tons Mar. 29; minimum daily, not determined.
EXTREMES, 1950-52.--Water temperatures (February 1951 to September 1952): Maximum, 89°F Aug. 26, 1952; minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 19,300 ppm May 29, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 99,600 tons Mar. 29, 1952; minimum daily, not determined.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water charge (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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 1, 1951	106			45	1.7	30		188		28	2.0							120	0	35	1.2	365	7.6
Dec. 4	7			46	6.6	24		188		35	2.0							142	0	27	.9	415	7.6
Jan. 3, 1952	80			39	11	32		224		25	2.0							142	0	33	1.2	408	7.6
Feb. 5	130			39	6.4	28		185		30	1.0							124	0	33	1.1	365	7.9
Mar. 4	135			51	6.9	37		208		58	3.0							156	0	34	1.3	448	7.6
Mar. 28	1,500			56	6.0	27		180		70	1.5							164	16	26	.9	424	7.5
May 7	134			59	8.3	45		232		79	4.0							181	0	35	1.4	530	7.4
June 3	148			51	8.0	46		235		61	2.0							160	0	38	1.6	487	7.3
July 1	130			40	5.8	37		194		41	3.5							124	0	39	1.4	386	7.6
Aug. 5	78			38	5.6	32		184		34	.5							118	0	37	1.3	346	7.4
Sept. 2	10			42	5.4	27		191		27	1.0							127	0	32	1.0	356	7.9

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(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	61	33	--	--	--	34	36	60	60	78	77	57
2	60	33	--	36	34	--	36	60	66	75	73	52
3	57	33	--	a35	--	33	37	62	68	66	76	57
4	55	33	a40	32	35	a32	38	70	68	75	65	64
5	51	a33	a36	--	--	33	40	60	70	--	67	65
6	47	a36	--	34	35	--	45	60	77	a72	70	58
7	45	a40	34	--	33	33	34	58	74	68	68	74
8	47	--	--	a33	35	--	46	56	67	60	70	66
9	47	--	35	--	--	a34	35	53	65	65	64	a81
10	50	--	--	35	--	--	33	47	71	71	66	64
11	51	--	34	--	--	33	39	48	71	70	71	65
12	54	--	--	33	35	--	42	51	73	72	70	64
13	--	--	33	--	--	--	41	57	74	a65	70	66
14	52	--	--	33	33	33	44	61	75	69	74	63
15	51	--	a34	--	--	--	46	58	83	66	69	52
16	41	--	--	32	34	33	49;	57	65	70	71	a71
17	a43	--	a34	--	--	--	49	55	65	75	72	a71
18	39	a35	--	33	35	33	48	59	67	74	69	57
19	a46	40	a34	--	--	--	53	57	65	74	69	a58
20	44	32	--	34	33	a34	60	60	65	71	72	--
21	40	32	--	--	--	--	52	61	66	a82	67	a66
22	36	32	--	--	33	--	48	60	77	67	66	a68
23	38	32	a35	--	--	a33	47	61	75	64	66	52
24	a39	32	--	33	33	--	50	62	a75	70	77	--
25	43	a32	33	--	--	a33	53	69	66	67	--	a67
26	a40	32	--	a33	34	--	55	64	65	78	a89	54
27	39	32	a34	--	--	35	64	60	67	83	a81	a72
28	a47	--	--	33	34	37	61	54	68	68	67	a70
29	a49	--	a35	--	--	35	59	58	76	70	66	a71
30	39	32	--	--	--	34	61	59	74	64	69	a76
31	35	--	a34	38	--	36	--	56	--	--	66	--
Average	46	--	--	--	--	--	47	58	70	71	71	64

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

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	90	99	24	87	380	89	39		
2	87	89	21	68	944	s 187	40	436	49
3	250	5,100	sa12,000	90	1,630	s 417	45		
4	487	10,900	s 17,000	101	610	166	33		
5	110	3,650	s 1,420	148	842	336	36	472	44
6	52	1,000	140	142	641	s 265	35		
7	54	282	41	146			17	550	25
8	55	200	30	116	587	187	19	500	a 26
9	57	175	27	93			64	380	66
10	58	174	27	85	680	156	55	400	a 60
11	80	155	33	85	560	129	50	431	58
12	85	129	30	78	748	s 178	50		
13	101	121	33	89			50	258	33
14	100	121	33	75			40		
15	109	1,300	sb 480	80	572	117	30		
16	98	400	106	60			30		
17	112	350	106	49	460	61	20		
18	129			39	300	b 32	20		
19	119	238	76	35	280	b 26	20	132	8
20	109			75	500	101	20		
21	89	158	38	75	590	119	20		
22	106	182	51	52	180	25	20		
23	101			38	80	8	30		
24	109			40	170	18	40		
25	112	120	36	48	320	41	40		
26	112			39	400	42	50		
27	106			43			50	146	21
28	96	110	29	48	398	47	50		
29	122	150	49	48			60		
30	115	100	31	38			70		
31	119	190	61	--	--	--	70		
Total	3,529	--	32,233	2,210	--	3,613	1,213	--	853

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	70			90			140		
2	80	70	15	90	60	16	130		
3	80			100			120		
4	90			110			110		
5	100			130			110	172	57
6	100			130			110		
7	100			135			120		
8	100	92	25	135	187	74	140		
9	100			150			160		
10	100			160			180		
11	100			180			200		
12	110			230	460	286	190		
13	110			370	952	951	180	327	164
14	110	115	34	190	635	326	180		
15	110			160			180		
16	120	130	42	140	116	41	220		
17	120			130			350		
18	110			120			480		
19	110			110			530		
20	100	121	34	100			500		
21	100			100			450	356	428
22	80			100			410		
23	60			100	70	19	400		
24	50			100			410		
25	50			100			480		
26	60	93	21	100			630	--	e 800
27	60			110			880	476	1,130
28	90			120	160	52	1,660	3,850	17,300
29	90			130			5,220	7,070	99,600
30	90			--	--	--	4,060	5,100	55,900
31	90			--	--	--	1,990	4,790	25,050
Total	2,840	--	801	3,920	--	2,639	20,920	--	206,050

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

WHITE RIVER BASIN--Continued

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	1,470	3,930	15,600	306	180	149	214	293	169
2.....	1,200	3,570	11,600	274	180	133	192	319	165
3.....	1,020	2,890	7,960	248	175	117	167	305	138
4.....	763	2,000	4,120	208	175	98	203	296	162
5.....	785	2,080	4,410	186	190	95	197	316	168
6.....	862	2,300	5,350	197	2,050	s1,560	186	252	127
7.....	1,140	3,290	10,100	125	960	324	192	287	149
8.....	1,090	2,690	7,920	162	1,090	477	157	355	150
9.....	512	1,160	1,600	300	3,250	2,630	117	280	88
10.....	378	880	898	199	2,700	s1,620	111	282	85
11.....	371	780	781	134	990	358	132	371	132
12.....	364	750	737	125	700	236	122	318	105
13.....	300	600	486	129	1,600	s666	143	451	174
14.....	274	580	429	152	1,170	480	109	420	124
15.....	280	810	612	201	1,080	s907	130	328	115
16.....	313	680	575	217	3,120	1,830	115	382	119
17.....	335	1,020	923	194	1,910	1,000	113	295	90
18.....	418	560	632	214	732	423	125	8,230	s4,210
19.....	306	430	355	225	660	401	109	1,600	471
20.....	208	380	213	268	456	330	96	690	179
21.....	274	350	259	342	336	310	143	756	292
22.....	342	310	286	386	778	s1,480	162	715	313
23.....	320	280	242	622	4,540	s7,890	157	558	237
24.....	231	250	156	306	2,160	1,780	130	490	172
25.....	342	270	249	274	646	478	145	1,520	s746
26.....	287	210	163	318	508	436	138	800	298
27.....	335	180	163	313	334	282	134	650	235
28.....	342	190	175	261	362	255	194	8,100	s4,570
29.....	300	200	162	274	635	470	167	2,500	1,130
30.....	300	180	146	242	364	238	149	2,000	s972
31.....	--	--	--	236	306	195	--	--	--
Total.	15,462	--	77,302	7,638	--	27,648	4,449	--	16,085

	July			August			September		
1.....	147	909	s388	25	176	s19	7		
2.....	144	983	s426	36	140	14	10		
3.....	121	530	173	52	334	47	12		
4.....	117	380	120	67	291	53	13	113	4
5.....	130	420	147	73	222	44	14		
6.....	162	540	236	55	260	39	14		
7.....	181	610	298	123	1,210	402	28	151	11
8.....	134	490	177	172	1,730	s980	9	105	3
9.....	104	330	93	71	697	s220	51	114	16
10.....	127	412	s182	350	11,600	s11,900	28		
11.....	95	2,800	sb850	113	7,280	s2,820	37	135	12
12.....	74	290	58	65	596	s121	26		
13.....	84	565	s175	57	317	s62	41		
14.....	85	250	57	58	738	116	31		
15.....	92	222	55	38	450	46	61	213	35
16.....	75	194	39	47	486	62	37	146	15
17.....	82	165	37	39	405	43	52		
18.....	70	150	28	43			50	138	19
19.....	83	122	27	49			54		
20.....	67	150	27	53	253	34	36	81	8
21.....	100	107	29	51			22		
22.....	102	101	28	36	153	15	20	35	2
23.....	48	108	14	36			20		
24.....	54	134	20	22			38	41	4
25.....	34	170	16	27	171	12	52	95	13
26.....	56	224	34	25			44		
27.....	53	93	13	28			47	77	9
28.....	49	130	17	37	252	25	48		
29.....	40	95	10	25	184	12	59	123	20
30.....	8	90	2	16	119	5	30	130	11
31.....	7	90	a2	7	199	4	--	--	--
Total.	2,725	--	3,778	1,896	--	17,248	991	--	310

Total discharge for year (cfs-days) 67,793
Total load for year (tons) 388,560

s Computed by subdividing day.
b Computed from partly-estimated concentration graph.
a Computed from estimated concentration graph.

SOUTH FORK WHITE RIVER BELOW WHITE RIVER, S. DAK.--Continued

Particle-size analyses of suspended sediment, October 1951 to July 1952
(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	Water 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, 1951	1:30 p.m.	424	54	7,880	4,160	--	62	--	76	--	89	--	--		--	--	SPWCM
Oct. 4	5:30 p.m.	400	54	7,610	4,040	--	72	--	85	--	92	--	--		--	--	SPWCM
Oct. 5	8:15 a.m.	116	51	4,800	3,010	--	87	--	94	--	98	--	--		--	--	SPWCM
Mar. 27, 1952	10:00 p.m.	a880	--	1,390	1,170	55	67	80	86	90	92	95	99		100	--	BWCM
Mar. 28	1:00 p.m.	a1,660	--	5,540	4,280	--	36	--	51	--	74	85	96		100	--	SPWCM
Mar. 29	4:00 p.m.	a5,220	--	6,290	7,680	--	39	--	54	--	76	87	97		100	--	SPWCM
Mar. 31	5:20 p.m.	1,700	40	4,580	4,300	--	50	--	63	--	84	--	--		--	--	SPWCM
Apr. 1	8:35 a.m.	1,540	36	4,090	3,100	--	37	--	52	--	69	76	92		100	--	SPWCM
Apr. 4	3:00 p.m.	719	46	2,040	2,830	--	52	--	69	--	86	--	--		--	--	SPWCM
May 6	6:35 p.m.	334	68	5,510	4,190	--	15	--	28	--	80	--	--		--	--	SPWCM
May 8	4:10 p.m.	162	--	861	2,950	--	19	--	30	--	59	75	95		99	100	SPWCM
May 20	10:30 a.m.	204	60	469	1,810	24	30	34	37	40	44	46	80		97	100	BWCM
May 23	6:00 p.m.	594	--	1,990	2,260	--	49	--	59	--	66	78	95		100	--	SPWCM
June 3	12:00 m.	153	--	356	2,210	--	25	32	35	36	42	44	94		99	100	BWCM
June 18	10:50 a.m.	571	--	23,200	7,790	--	41	--	65	--	97	--	--		--	--	SPWCM
June 28	8:10 a.m.	163	70	15,900	8,840	--	80	--	87	--	96	--	--		--	--	SPWCM
July 1	4:50 p.m.	134	88	552	2,830	28	31	36	39	42	49	70	86		100	--	BWCM

a Mean daily discharge.

WHITE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE WHITE RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chlorids (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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
WHITE RIVER NEAR OACOMA																							
Nov. 8, 1951	100			75	10	111	271		215	16			0.10	626	0.85		228	6	51	3.2	891	7.8
Feb. 6, 1952 a	45			66	13	89	256		178	11			.08				217	7	47	2.6	803	7.5
June 25	232			58	8.1	144	241		266	11			.18				178	0	64	4.7	933	7.6
Aug. 7	79			59	6.8	164	233		303	18			.21				175	0	67	5.4	1,020	7.6
Aug. 26	87			61	8.0	170	236		323	17			.25				185	0	67	5.4	1,050	7.7

a Sample collected 11 miles upstream.

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 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 4,400 ppm Mar. 30; minimum daily, 9 ppm Sept. 11, 28, 30.
Sediment loads: Maximum daily, 20,000 tons Mar. 30, 31; minimum daily, less than 0.050 ton on many days during September.
EXTREMES, February 1951 to September 1952.--Sediment concentrations: Maximum daily, 12,200 ppm June 19, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 48,900 tons June 25, 1951; minimum daily, less than 0.050 ton on many days in 1952.
REMARKS.--Flow affected by ice Nov. 1-7, 16-25, Dec. 8 to Feb. 13, Feb. 21-23, Mar. 2-7. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, September 1951 to August 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Sept. 12, 1951.....	195	13	0.02	74	20	27		178		159	8.5	0.2	2.9	0.06	414	0.56		267	121	18	--	617	7.3
Feb. 14, 1952.....	928	12	.07	52	15	20		148		96	5.5	.4	5.7	.10	318	.43		191	70	19	0.6	447	7.5
Aug. 16	2.7	22	.07	136	40	42		225		378	9.0	.3	2.8	.19	776	1.06		502	317	15	.8	1,040	7.8

PONCA CREEK BASIN--Continued

PONCA CREEK AT ANOKA, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	140	8.3	42	240	27	56	180	27
2	22	140	8.3	40	180	19	63	220	37
3	24	110	7.1	45	220	27	64	380	66
4	30	96	7.8	44	320	38	55	300	45
5	30	110	8.9	42	240	27	52	180	25
6	28	120	9.1	44	170	20	73	490	s 110
7	26	150	11	45	180	22	81	530	116
8	24	130	8.4	44	240	29	30	200	16
9	22	100	a 6.0	55	460	68	40	72	7.8
10	22	90	5.3	44	310	37	40	49	5.3
11	21	90	5.1	40	180	19	38	34	3.5
12	19	110	5.6	38	160	16	35	18	a 1.7
13	19	74	3.8	44	210	25	21	15	.8
14	70	590	s 130	41	180	20	22	18	1.1
15	59	340	54	37	140	14	18	23	1.1
16	56	220	33	27	110	8.0	17	24	1.1
17	50	120	16	18	78	3.8	18	24	1.2
18	50	170	23	27	91	6.6	18	24	1.2
19	54	240	35	35	130	12	20	24	1.3
20	53	240	34	31	130	11	19	24	1.2
21	48	190	25	35	190	18	18	28	1.4
22	50	220	30	27	100	7.3	18	50	2.4
23	56	270	41	31	92	7.7	18	34	1.7
24	59	250	40	33	85	7.6	18	38	1.8
25	54	170	25	30	100	8.1	21	39	2.2
26	51	160	22	42	94	11	20	44	2.4
27	46	170	21	40	64	6.9	21	55	3.1
28	45	190	23	42	110	12	20	44	2.4
29	40	280	30	50	140	19	20	41	2.2
30	40	320	35	58	180	28	20	54	2.9
31	38	300	31	--	--	--	20	57	3.1
Total	1,228	--	742.7	1,171	--	575.0	994	--	494.9
	January			February			March		
1	20	48	2.6	20	72	3.9	228	820	500
2	20	47	2.5	22	73	4.3	141	360	a 140
3	20	47	2.5	25	110	7.4	142	200	77
4	20	53	2.9	28	150	11	125	180	61
5	20	46	2.5	30	140	11	115	320	99
6	21	39	2.2	33	82	7.3	114	480	150
7	20	54	2.9	36	110	11	95	520	130
8	20	59	3.2	40	120	13	81	440	96
9	19	59	3.0	50	220	30	110	420	120
10	19	56	2.9	80	400	86	201	740	400
11	20	58	3.1	135	800	a 290	240	850	550
12	19	60	3.1	240	1,200	a 780	187	550	280
13	20	50	2.7	400	1,500	a 1,600	141	340	130
14	22	56	3.3	748	1,200	a 2,400	148	370	150
15	22	38	2.3	589	580	920	163	360	160
16	22	34	2.0	460	450	560	123	150	50
17	24	53	3.4	355	320	310	299	2,400	s 2,900
18	29	72	5.6	285	200	a 150	574	1,900	s 3,100
19	29	66	5.2	195	160	a 84	360	2,100	2,000
20	29	53	4.1	128	200	69	448	1,800	2,200
21	25	60	4.0	95	220	56	380	1,000	1,000
22	22	44	2.6	120	220	71	187	430	220
23	19	14	.7	150	240	97	159	370	160
24	19	29	1.5	195	110	58	134	650	240
25	18	38	1.8	155	240	100	125	920	310
26	18	37	1.8	183	440	220	123	900	300
27	19	49	2.5	209	820	460	155	1,400	590
28	18	51	2.5	290	640	500	219	3,600	s 2,300
29	18	46	2.2	260	940	660	535	4,200	6,100
30	18	62	3.0	--	--	--	1,800	4,400	s 20,000
31	19	70	3.6	--	--	--	2,520	3,000	20,000
Total	648	--	88.2	5,556	--	9,569.9	10,372	--	64,513

s Computed by subdividing day.
a Computed from estimated concentration graph.

PONCA CREEK BASIN--Continued

PONCA CREEK AT ANOKA, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	2,160	2,600	15,000	70	250	47	52	110	15
2.....	1,440	2,500	9,700	76	320	66	50	210	28
3.....	1,090	2,700	7,900	97	600	160	44	220	26
4.....	831	2,200	4,900	82	460	100	49	320	42
5.....	719	2,200	4,300	68	360	66	56	410	62
6.....	542	2,700	4,000	65	330	58	45	540	66
7.....	457	1,700	2,100	63	300	51	42	440	50
8.....	411	1,300	1,400	62	360	60	66	810	140
9.....	355	1,100	1,100	127	970	330	121	1,500	490
10.....	265	930	670	136	890	330	101	1,400	380
11.....	218	760	450	120	520	170	60	880	140
12.....	191	870	450	102	470	130	45	430	52
13.....	193	760	400	100	500	140	39	320	34
14.....	170	610	280	81	500	110	35	300	28
15.....	151	600	240	77	400	83	31	310	26
16.....	141	500	190	101	450	120	33	310	28
17.....	132	390	140	107	500	140	26	240	17
18.....	136	390	140	95	470	120	35	350	33
19.....	125	430	150	85	380	87	29	320	25
20.....	117	1,500	470	93	350	88	25	200	14
21.....	135	1,200	440	87	340	80	27	420	31
22.....	170	920	420	93	330	83	31	400	33
23.....	141	1,500	570	124	660	220	52	1,000	140
24.....	118	890	280	136	970	360	41	990	110
25.....	108	410	120	97	500	130	26	470	33
26.....	101	350	95	82	320	71	22	300	18
27.....	86	310	72	87	370	87	19	280	14
28.....	79	290	62	77	360	75	18	250	12
29.....	74	280	56	67	310	56	16	220	9.5
30.....	68	280	51	64	250	43	14	160	6.0
31.....	--	--	--	60	220	36	--	--	--
Total.	10,924	--	56,146	2,781	--	3,697	1,250	--	2,102.5

	July			August			September		
1.....	14	110	4.2	1.8	22	0.1	1.1	25	0.1
2.....	12	130	4.2	1.9	28	.1	1.2	35	.1
3.....	10	110	3.0	2.1	31	.2	1.0	52	.1
4.....	10	100	2.7	1.6	21	.1	1.0	34	.1
5.....	8.8	82	1.9	2.3	18	.1	1.0	28	.1
6.....	9.1	86	2.1	2.3	26	.2	.7	47	.1
7.....	8.8	110	2.6	3.6	40	.4	.9	47	.1
8.....	8.4	94	2.1	3.8	43	.4	.2	34	(t)
9.....	7.6	66	1.4	3.0	38	.3	.1	54	(t)
10.....	7.6	57	1.2	4.8	59	.8	.1	24	(t)
11.....	7.2	47	.9	5.1	47	.6	.2	9	(t)
12.....	6.5	42	.7	4.0	52	.6	.2	16	(t)
13.....	8.4	85	1.9	6.8	57	1.0	.1	27	(t)
14.....	9.1	70	1.7	4.6	44	.5	.1	17	(t)
15.....	8.4	84	1.9	3.0	35	.3	.4	15	(t)
16.....	7.6	85	1.7	2.3	33	.2	.4	46	(t)
17.....	6.5	57	1.0	2.5	39	.3	.4	38	(t)
18.....	5.7	46	.7	2.7	36	.3	.4	17	(t)
19.....	5.4	47	.7	18	430	s24	2.1	31	.2
20.....	4.6	34	.4	14	1,000	38	1.4	29	.1
21.....	4.3	24	.3	9.9	500	s15	.9	16	(t)
22.....	3.8	18	.2	6.2	120	2.0	.9	12	(t)
23.....	3.6	15	.1	4.6	70	.9	.6	13	(t)
24.....	3.6	13	.1	3.6	54	.5	.9	11	(t)
25.....	3.2	12	.1	3.2	44	.4	.6	11	(t)
26.....	2.7	14	.1	2.7	38	.3	.6	17	(t)
27.....	2.7	20	.1	2.3	34	.2	.7	11	(t)
28.....	2.5	29	.2	2,7	30	.2	.5	9	(t)
29.....	2.7	36	.3	2.3	28	.2	.5	11	(t)
30.....	2.3	32	.2	2.5	40	.3	.6	9	(t)
31.....	1.8	26	.1	1.8	49	.2	--	--	--
Total.	198.9	--	38.8	132.0	--	88.7	19.8	--	1.4

Total discharge for year (cfs-days) 35,274.7
Total load for year (tons) 138,057.6

s Computed by subdividing day.
t Less than 0.050 ton.

PONCA CREEK BASIN--Continued

PONCA CREEK AT ANOKA, NEBR.--Continued

Particle-size analyses of suspended sediment, October 1951 to August 1953
(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	Water 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. 10, 1951 ...	12:00 m.	23	55	94	--	--	--	--	--	--	48	61	87		98	100	S
Apr. 12, 1952 ...	3:00 p. m.	193	41	850	2,720	34	41	47	57	63	67	71	89		100	--	SPWCM
Apr. 14.....	1:55 p. m.	168	--	662	--	--	--	--	--	--	66	70	86		99	100	S
May 11	11:15 a. m.	124	52	624	2,450	--	--	53	71	76	79	83	94		100	--	SPWCM
May 25	6:10 p. m.	95	74	400	--	--	--	--	--	--	72	75	90		100	--	S
June 7	3:15 p. m.	41	87	182	--	--	--	--	--	--	90	94	100		--	--	S
June 22	8:05 a. m.	29	67	318	900	68	75	77	82	90	94	96	98		100	--	SPWCM
July 3	7:10 a. m.	10	61	102	--	--	--	--	--	--	92	96	100		--	--	S
July 22	1:30 p. m.	4.0	82	26	--	--	--	--	--	--	92	100	--		--	--	S
Aug. 16	5:45 p. m.	2.7	81	32	--	--	--	--	--	--	96	100	--		--	--	S

PONCA CREEK AT ANOKA, NEBR.--Continued

Particle-size analyses of bed material, November 1951 to September 1952
(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 disperzed)

Date of collection	Number of sampling points	Water discharge (cfs)	Water temperature (°F)	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	8.000	
Nov. 13, 1951	2	44								0	16	54	79	90	96	98	S
Feb. 14, 1952	2	736							0	1	8	35	68	82	90	96	S
Apr. 12	3	193								0	10	53	74	86	92	97	S
May 11	3	124								0	6	57	82	92	97	100	S
May 25	3	95								0	9	49	72	85	94	100	S
June 7	3	41								0	8	46	77	89	96	99	S
June 22	3	29								0	10	52	83	94	98	100	S
July 22	3	4.0								0	10	46	71	85	94	99	S
Aug. 16	3	2.7								0	9	49	79	92	98	100	S
Aug. 30	3	2.3								0	7	42	74	87	94	98	S
Sept. 15	1	.4								0	5	35	69	86	97	99	S

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 December 1951 (discontinued).
Sediment records: February to December 1951 (discontinued).
EXTREMES, October to December 1951.--Water temperatures: Minimum, freezing point on many days during November and December.
Sediment concentrations: Maximum daily, 581 ppm Nov. 22; minimum daily, not determined.
Sediment loads: Maximum daily, 53 tons Nov. 22; minimum daily, not determined.
EXTREMES, February to December 1951.--Water temperatures: Maximum, 90°F July 18; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 16,600 ppm Sept. 4; minimum daily, not determined.
Sediment loads: Maximum daily 68,700 tons July 28; minimum daily 1 ton on several days.
REMARKS.--Flow affected by ice Dec. 6 to 31. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, October to December 1951
(Once-daily temperature measurement between 1 and 7 p. m.)

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

a Observation made between 8 a. m. and 12 m.
b Includes estimated temperature, 32°F on missing days.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, October to December 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	11	77	2	31			30		
2	25	63	4	31	124	11	30		
3	28	124	9	38			28	109	9
4	38	157	16	50	326	44	31		
5	25			40	477	52	36	427	41
6	24			31			20	160	9
7	27			34			16		
8	20			30			23	15	1
9	22			27			28		
10	22			28			31		
		78	5						
11	23			30			31		
12	23			24	151	11	32		
13	28			24			26		
14	22			20			20		
15	24			31			23	74	5
16	25			23			25		
17	24			25			24		
18	25			27			25		
19	30			36	142	14	27		
20	28			34	230	21	25		
21	30			44	303	36	28		
22	24			34	581	53	29		
23	18			40	386	42	30		
24	19	58	4	36	393	38	31		
25	23			23			32		
26	23			18			28	58	5
27	25			25	122	8	29		
28	17			28			31		
29	19			33			34		
30	27			30			33		
31	27			--	--	--	28		
Total	746	--	151	925	--	524	864	--	199

Total discharge for period Oct. 1 to Dec. 31, 1951 (cfs-days) 2,535
Total load for period Oct. 1 to Dec. 31, 1951 (tons) 874

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.

LOCATION.--At highway bridge, a quarter of a mile downstream from gaging station, 3 miles upstream from Medicine Creek, 5 miles downstream from Bear Creek, and 10 miles south of Cody, Cherry County.
RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1952.
Sediment records: April 1948 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 90°F June 12; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 4,700 ppm Mar. 12; minimum daily, 240 ppm Jan. 23.
Sediment loads: Maximum daily, 11,000 tons Mar. 30; minimum daily, 190 tons Jan. 23.
EXTREMES, 1948-52.--Water temperatures: Maximum, 90°F June 12, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations (1949-52): 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 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, water year October 1951 to September 1952
/Twice-daily temperature measurements between 5 a.m. and 9 a.m. and between 3 p.m. 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	54	70	a33	33	a38	45	a33	32	33	37	32	40	39	49	55	69	57	75	72	85	68	80	57	60
2	58	70	a33	34	a42	44	32	33	34	34	32	32	38	50	55	78	61	70	72	73	69	80	49	66
3	55	62	34	34	38	40	a33	--	34	34	32	32	40	44	60	78	62	67	60	82	67	77	53	75
4	55	55	a34	33	a34	39	33	33	a34	35	32	32	41	54	61	79	60	79	67	87	63	80	60	77
5	50	50	a33	36	a35	40	a33	33	34	34	32	39	39	59	60	73	63	83	70	85	66	81	63	a79
6	46	55	36	41	--	33	33	34	33	35	35	45	42	63	58	70	66	82	72	72	68	a83	60	72
7	46	58	33	42	--	33	33	35	35	37	34	38	47	69	56	69	68	a88	58	72	70	75	a70	68
8	46	60	34	45	--	33	33	33	--	39	38	46	a45	43	57	58	65	--	56	80	65	73	68	80
9	46	62	35	47	--	33	33	34	35	a41	a42	45	35	50	54	a52	60	80	60	85	64	80	67	73
10	46	62	35	48	a33	35	32	35	35	39	37	48	34	50	46	60	67	84	65	85	67	82	62	72
11	48	62	40	a49	a35	35	32	33	35	44	a38	40	39	54	45	66	68	80	67	79	62	72	64	75
12	52	65	39	50	34	35	32	32	35	43	35	32	43	49	50	71	68	90	66	85	64	80	62	78
13	52	54	46	49	a33	33	33	33	a38	35	32	34	42	a52	54	70	70	82	67	65	67	83	64	67
14	47	a60	36	41	--	--	34	34	33	34	32	37	40	60	58	71	72	83	57	a72	70	87	53	64
15	49	58	a35	34	--	--	32	36	32	--	32	44	43	54	60	55	74	--	60	80	70	82	50	70
16	44	46	a35	32	--	--	32	35	32	39	35	46	48	56	53	57	62	80	66	87	68	83	56	70
17	40	50	a33	35	--	--	32	34	35	40	41	a41	47	63	51	58	62	85	70	--	67	75	55	70
18	43	a44	a33	39	--	--	33	36	32	32	a37	47	47	70	49	57	63	79	--	--	67	78	58	65
19	40	48	a33	36	--	--	35	33	32	a32	35	a49	50	70	50	69	62	79	--	--	70	82	56	60
20	44	51	a33	42	--	--	32	33	32	32	36	a41	53	70	55	72	64	79	70	80	71	80	55	66
21	43	43	a36	a34	--	--	33	32	32	32	a34	32	51	49	49	--	61	81	65	85	65	75	54	64
22	40	51	a33	34	--	--	a32	32	32	35	32	32	45	53	56	64	67	82	67	77	63	79	49	65
23	38	53	a33	36	--	--	a32	32	32	32	32	38	43	65	58	66	70	83	63	78	65	72	51	63
24	43	55	a33	36	--	--	33	35	32	32	33	37	47	70	50	74	68	74	67	85	69	80	50	69
25	45	45	35	40	--	--	33	34	32	37	35	44	51	72	58	74	63	80	70	84	70	84	52	65
26	41	a41	a34	39	--	--	33	33	32	41	34	46	54	75	61	74	66	67	64	81	67	82	52	72
27	36	52	a39	42	--	--	34	33	34	38	35	50	--	--	56	64	64	76	70	81	69	79	55	a71
28	38	54	a40	43	--	--	36	33	34	36	40	51	58	70	51	69	63	82	67	70	66	78	57	70
29	42	53	35	43	--	35	33	35	32	41	41	54	55	70	59	65	65	84	64	77	65	79	55	78
30	40	38	42	50	a37	--	33	35	--	--	42	55	58	64	68	68	69	84	61	79	65	78	55	72
31	34	36	--	--	a36	--	35	35	--	--	43	49	--	--	49	71	--	--	66	83	60	69	--	--
Average	45	54	35	40	--	--	33	34	33	36	35	42	45	59	55	67	65	80	66	80	67	78	57	70

a Observation made between 9 a.m. and 3 p.m.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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.....	294	1,300	1,000	324	1,800	1,600	324	1,900	1,700
2.....	310	1,400	1,200	302	1,800	1,500	324	2,500	2,200
3.....	332	1,400	1,300	319	1,900	1,600	324	2,500	2,200
4.....	332	1,800	1,600	302	2,300	1,900	328	1,800	1,600
5.....	337	1,900	1,700	328	2,000	1,800	324	1,600	1,400
6.....	328	1,500	1,300	350	2,200	2,100	310	1,700	1,400
7.....	319	1,500	1,300	332	1,900	1,700	302	1,400	1,100
8.....	310	1,300	1,100	328	1,600	1,400	278	1,500	1,100
9.....	319	1,200	1,000	328	1,800	1,600	168	1,800	820
10.....	306	1,400	1,200	328	2,100	1,900	179	1,600	770
11.....	302	1,700	1,400	324	1,600	1,400	242	2,200	1,400
12.....	302	1,300	1,100	324	1,900	1,700	314	2,000	1,700
13.....	328	1,600	1,400	328	1,800	1,600	324	1,300	1,100
14.....	319	1,700	1,500	324	1,800	1,600	200		
15.....	319	1,900	1,600	319	1,900	1,600	165		
16.....	314	1,800	1,500	306	1,800	1,500	200		
17.....	310	1,400	1,200	306	1,800	1,500	266		
18.....	324	1,400	1,200	298	1,800	1,400	346		
19.....	332	1,600	1,400	306	1,400	1,200	350		
20.....	324	1,500	1,300	342	2,800	2,600	350	--	e1,400
21.....	324	1,600	1,400	360	2,500	2,400	332		
22.....	328	1,900	1,700	342	3,000	2,800	355		
23.....	324	1,900	1,700	328	2,500	2,200	375		
24.....	319	1,700	1,500	324	2,700	2,400	370		
25.....	310	2,000	1,700	332	2,600	2,300	370		
26.....	310	1,500	1,300	319	1,900	1,600	360		
27.....	314	1,500	1,300	324	1,800	1,600	355		
28.....	324	1,500	1,300	319	1,800	1,500	350	1,300	1,200
29.....	324	1,500	1,300	324	2,000	1,700	355	1,100	1,100
30.....	319	1,900	1,600	324	1,900	1,700	360	1,000	970
31.....	324	1,600	1,400	--	--	--	355	1,100	1,100
Total.	9,881	--	42,500	9,714	--	53,400	9,555	--	42,460

Day	January			February			March		
1.....	306	500	410	400	930	1,000	350	2,100	2,000
2.....	324	390	340	415	970	1,100	294	2,800	2,200
3.....	328	710	630	410	1,100	1,200	250	1,800	1,200
4.....	337	650	590	410	1,100	1,200	242	1,400	910
5.....	342	740	680	430	1,600	1,900	310	2,400	2,000
6.....	365	620	610	400	1,400	1,500	400	2,600	2,800
7.....	350	600	570	390	1,400	1,500	415	2,900	3,200
8.....	328	610	540	390	1,400	1,500	390	2,400	2,500
9.....	302	600	490	390	1,500	1,600	380	2,100	2,200
10.....	319	520	450	395	2,000	2,100	390	2,000	2,100
11.....	342	590	540	405	2,300	2,500	400	2,300	2,500
12.....	342	520	480	405	1,900	2,100	400	4,700	5,100
13.....	332	600	540	435	2,000	2,300	355	3,200	3,100
14.....	355	640	610	415	2,000	2,200	298	1,900	1,500
15.....	337	640	580	370	2,000	2,000	319	1,600	1,400
16.....	350	690	650	365	2,100	2,100	375	2,200	2,200
17.....	342	630	580	375	2,200	2,200	405	2,500	2,700
18.....	346	740	690	365	2,200	2,200	390	2,300	2,400
19.....	342	740	680	328	2,700	2,400	395	2,100	2,200
20.....	332	630	560	294	2,200	1,700	405	2,400	2,600
21.....	314	640	540	278	1,800	1,400	400	2,700	2,900
22.....	278	260	200	266	1,700	1,200	375	3,200	3,200
23.....	298	240	190	262	2,500	1,800	258	2,400	1,700
24.....	328	500	440	270	2,800	2,000	350	2,500	2,400
25.....	342	1,100	1,000	274	2,000	1,500	415	3,400	3,800
26.....	350	940	890	302	1,900	1,500	425	3,000	3,400
27.....	350	900	850	420	2,100	2,400	430	2,800	3,200
28.....	350	890	840	435	2,600	3,100	510	2,500	s3,800
29.....	355	840	800	400	2,900	3,100	786	3,600	7,600
30.....	400	880	950	--	--	--	968	4,400	11,000
31.....	390	960	1,000	--	--	--	818	3,600	8,000
Total.	10,476	--	18,920	10,694	--	54,300	12,898	--	97,810

e Estimated

s Computed by subdividing day.

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	650	4,100	7,200	400	1,600	1,700	294	1,600	1,300
2.....	590	4,000	6,400	390	1,800	1,900	294	1,400	1,100
3.....	544	3,400	5,000	375	1,700	1,700	298	1,800	1,400
4.....	500	3,100	4,200	380	1,500	1,500	306	2,000	1,700
5.....	475	2,900	3,700	365	1,400	1,400	286	1,600	1,200
6.....	450	2,900	3,500	350	1,700	1,600	286	1,400	1,100
7.....	430	3,000	3,500	355	1,800	1,700	274	1,500	1,100
8.....	425	2,900	3,300	410	1,700	1,900	274	1,500	1,100
9.....	415	2,900	3,200	430	1,800	2,100	270	1,200	870
10.....	415	2,400	2,700	430	1,900	2,200	274	1,000	740
11.....	405	2,300	2,500	390	2,100	2,200	258	980	680
12.....	400	2,500	2,700	370	1,900	1,900	254	740	510
13.....	395	2,300	2,500	332	1,900	1,700	250	860	580
14.....	390	2,300	2,400	342	2,000	1,800	250	690	470
15.....	395	1,900	2,000	380	1,800	1,800	246	710	470
16.....	410	2,100	2,300	420	1,700	1,900	234	880	560
17.....	405	2,100	2,300	500	1,900	2,600	234	790	500
18.....	405	2,300	2,500	475	2,400	3,100	226	630	380
19.....	400	1,900	2,100	425	2,100	2,400	230	680	420
20.....	395	1,600	1,700	400	1,600	1,700	234	770	490
21.....	410	2,100	2,300	415	1,800	2,000	274	870	s 790
22.....	405	2,100	2,300	415	2,100	2,400	480	2,400	3,100
23.....	395	1,900	2,000	490	2,000	2,600	410	2,500	2,800
24.....	375	1,900	1,900	445	2,200	2,600	370	1,800	1,800
25.....	360	1,700	1,700	385	2,400	2,500	350	1,600	1,500
26.....	355	1,700	1,600	370	2,200	2,200	370	1,500	1,500
27.....	360	1,700	1,700	355	2,100	2,000	400	2,800	3,000
28.....	360	1,600	1,600	355	1,700	1,600	405	1,900	2,100
29.....	350	1,500	1,400	324	1,800	1,600	365	1,400	1,400
30.....	380	1,800	1,800	332	1,800	1,600	350	1,800	1,700
31.....	--	--	--	306	1,400	1,200	--	--	--
Total.	12,644	--	84,000	12,111	--	61,100	9,046	--	36,360

	July			August			September		
1.....	310	1,700	1,400	212	510	290	204	550	300
2.....	270	1,600	1,200	219	490	290	215	560	320
3.....	270	1,100	800	278	1,000	750	230	590	370
4.....	260	1,100	770	238	730	470	234	590	370
5.....	242	930	610	238	590	380	230	620	380
6.....	246	700	460	226	520	320	234	580	370
7.....	242	760	500	234	570	360	234	590	370
8.....	230	660	410	223	540	330	230	490	300
9.....	223	620	370	226	560	340	223	490	290
10.....	226	580	350	250	760	510	223	540	330
11.....	219	540	320	270	820	600	223	510	310
12.....	230	580	360	262	720	510	215	410	240
13.....	262	760	540	270	740	540	226	470	290
14.....	250	760	510	262	840	590	234	640	400
15.....	246	550	370	246	750	500	246	750	500
16.....	230	690	430	242	670	440	258	740	520
17.....	226	730	450	234	660	420	242	830	540
18.....	223	650	a 390	258	790	550	230	690	430
19.....	223	550	a 330	254	950	650	230	770	480
20.....	215	500	290	219	760	450	230	710	440
21.....	215	540	310	212	610	350	234	750	470
22.....	208	410	230	200	630	340	234	740	470
23.....	204	470	260	204	1,200	660	238	650	420
24.....	208	480	270	204	700	390	234	710	450
25.....	204	400	220	200	470	250	234	750	470
26.....	200	440	240	197	490	260	234	720	450
27.....	204	480	260	200	510	280	226	590	360
28.....	208	480	270	197	530	280	238	820	530
29.....	212	530	300	200	520	280	230	740	460
30.....	204	520	290	204	520	290	234	590	370
31.....	212	460	260	204	510	280	--	--	--
Total.	7,122	--	13,770	7,083	--	12,950	6,927	--	12,000

Total discharge for year (cfs-days) 118,151
Total load for year (tons) 529,570

s Computed by subdividing day.
a Computed from estimated concentration graph.

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 24, 1951	11:40 a.m.	319	--	1,590							9	22	65	96	98	100	S
Apr. 10, 1952	2:00 p.m.	420	--	2,120							13	32	71	98	100		S
May 24	12:30 p.m.	460	--	2,750							14	29	70	98	100		S
June 5	3:05 p.m.	262	--	1,200							15	30	70	97	100		S
June 19	11:00 a.m.	234	68	754							11	25	70	97	100		S
July 4	11:50 a.m.	262	78	934							9	20	56	95	100		S
July 20	8:40 a.m.	223	70	503							12	26	68	97	100		S
July 31	3:40 p.m.	212	83	392							13	29	68	97	100		S
Aug. 16	7:45 a.m.	262	69	820							14	33	69	98	100		S
Aug. 29	11:05 a.m.	208	73	429							23	40	77	99	100		S
Sept. 12	8:30 a.m.	223	--	454							11	25	71	98	100		S
Sept. 26	12:00 m.	234	61	736							9	23	71	98	100		S

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER AT MEADVILLE, NEBR.

LOCATION.--At gaging station at bridge on State Highway 7, half a mile downstream from Plum Creek and half a mile south of Meadville, Keyapaha County.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1952 (discontinued).
Sediment records: October 1950 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 87°F June 7; minimum, freezing point Dec. 14 and probably on many other days during December to March.
Sediment concentrations: Maximum daily, 8,700 ppm Mar. 24; minimum daily, 200 ppm Jan. 24.
Sediment loads: Maximum daily, 35,900 tons Mar. 24; minimum daily, 420 tons Jan. 24.
EXTREMES, 1950-52.--Water temperatures: Maximum, 87°F July 20, 24, 29, Aug. 5, 1951, June 7, 1952; minimum, freezing point probably on many days during winter months.
Sediment concentrations: Maximum daily, 8,700 ppm Mar. 24, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 40,300 tons July 30, 1951; minimum daily, 240 tons Dec. 6, 1950.
REMARKS.--Records of discharge for water year October 1950 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, August 1950 to August 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 28, 1950	1,860	46	0.02	46	2.7	17		177		15	1.0	0.3	0.7	0.07	232	0.32		126	0	23	--	293	7.5
July 30, 1951	3,740	48	.05	43	4.5	15		178		10	.5	.4	.8	.05	230	.31		126	0	21	--	305	7.5
Feb. 14, 1952	a1,890	39	.06	33	4.7	16		156		2.0	2.5	.5	1.6	.06	204	.28		102	0	25	0.7	280	7.9
June 21	a1,020	54	.04	30	4.6	14		139		7.0	1.0	.4	1.1	.19	202	.27		94	0	25	.6	243	8.0
Aug. 14	a880	56	.08	30	2.9	12		129		4.0	.5	.4	1.1	.04	178	.24		87	0	22	.5	228	7.7

a Mean daily discharge.

NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Twice-daily temperature measurements between 7 a. m. and 9 a. m. and between 4 p. m. 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	55	72	37	37	35	41	--	--	33	34	33	34	33	44	58	68	63	72	65	78	54	54	58	61
2	57	68	33	34	34	45	--	--	33	34	33	33	36	54	58	76	63	78	68	74	73	--	39	57
3	54	61	33	35	37	42	--	---	33	34	--	33	40	48	60	79	60	68	64	78	--	71	40	53
4	56	56	--	--	33	40	--	--	34	48	--	--	37	48	53	81	59	73	62	78	51	--	--	--
5	50	55	33	35	33	37	--	--	34	34	33	33	39	56	59	72	63	81	63	79	49	70	52	68
6	47	55	36	38	33	33	34	34	33	35	33	33	43	58	61	68	65	76	--	74	49	76	52	56
7	43	65	--	42	33	33	33	34	33	35	33	33	45	57	58	71	67	87	64	68	--	68	51	68
8	45	62	35	48	33	33	33	33	34	35	33	33	45	43	--	58	66	73	55	73	56	61	--	--
9	45	65	36	47	33	34	33	33	33	35	33	33	36	42	48	58	61	78	56	74	--	72	54	69
10	47	65	35	45	33	34	--	--	34	34	33	34	38	51	53	58	64	77	62	81	--	--	40	64
11	48	65	--	50	33	33	33	35	34	38	33	33	39	49	--	67	--	79	64	75	56	67	58	71
12	52	54	40	56	34	33	34	34	34	34	33	--	43	46	47	69	68	81	61	80	52	69	56	61
13	56	55	40	45	33	33	33	34	34	34	--	33	43	54	52	70	71	86	--	--	49	74	49	55
14	50	60	37	42	--	32	--	34	34	34	33	33	43	63	59	82	69	81	55	68	59	--	42	58
15	55	62	35	36	--	--	33	34	34	34	33	33	40	63	52	55	--	81	58	76	59	70	48	74
16	45	--	--	--	--	--	33	34	34	34	33	33	49	53	51	58	59	73	62	--	54	73	48	59
17	42	48	35	45	--	--	33	34	34	--	33	33	47	60	53	61	61	78	61	81	60	65	46	65
18	42	46	35	46	--	--	33	35	34	34	33	33	49	66	53	61	59	71	63	83	--	--	48	68
19	41	42	34	40	--	--	33	33	33	33	33	34	51	68	51	80	61	69	75	81	--	74	44	63
20	42	50	36	38	--	--	33	33	33	33	33	33	54	64	52	67	58	76	--	--	63	72	42	58
21	42	42	35	38	--	--	33	--	33	33	--	--	49	53	57	63	69	70	63	79	54	76	41	48
22	38	46	34	36	--	--	--	--	33	33	33	33	47	53	54	67	69	76	68	79	48	--	40	49
23	38	52	--	34	--	--	--	--	33	34	33	33	52	65	56	61	68	79	63	--	61	78	--	--
24	42	55	33	34	--	--	--	33	33	33	33	34	47	67	57	71	74	78	--	--	--	--	--	
25	42	45	34	44	--	--	33	33	--	34	33	33	51	75	--	73	69	--	--	72	56	81	--	71
26	42	45	34	37	--	--	33	33	33	34	33	--	54	74	61	73	58	69	--	78	--	--	--	--
27	35	50	--	--	--	--	33	34	33	34	33	34	64	73	60	64	61	69	--	83	--	--	--	--
28	--	55	34	47	--	--	33	33	33	34	33	33	57	74	61	64	62	77	57	67	--	74	--	--
29	42	--	38	40	--	--	33	34	33	34	33	33	57	73	57	68	69	--	53	74	--	75	42	56
30	37	37	35	43	--	--	33	34	--	--	33	34	58	69	56	71	64	74	49	--	58	68	41	52
31	36	40	--	--	--	--	34	33	--	--	34	34	--	--	58	71	--	--	53	76	56	63	--	--
Average	46	55	--	41	--	--	--	--	33	34	33	33	46	59	56	67	64	76	--	--	--	--	--	--

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,050	1,150	3,260	1,130			1,160	--	e3,100
2	1,100	750	2,230	1,120			1,130	1,200	3,660
3	1,130	850	2,590	1,120	--	e4,000	1,120	1,900	5,750
4	1,160	1,350	4,230	1,120			1,130	2,700	8,240
5	1,150	1,050	3,260	1,140			1,160	4,500	14,100
6	1,120	1,350	4,080	1,200	1,850	5,990	1,200	3,650	11,800
7	1,100	1,750	5,200	1,220	2,500	8,230	1,170	4,200	13,300
8	1,090	1,400	4,120	1,170			980	2,000	5,290
9	1,060	1,650	4,720	1,110	--	e3,500	745	1,450	2,920
10	1,050	2,100	5,950	1,120			800	1,850	4,000
11	1,080	2,000	5,830	1,180	1,750	5,580	875	2,950	6,970
12	1,100	1,650	4,900	1,230	2,600	8,630	1,030	3,300	9,180
13	1,130	1,500	4,580	1,260	1,900	6,460	1,070	3,000	8,670
14	1,160	1,600	5,010	1,270	1,950	6,690	915	2,250	5,560
15	1,190	1,100	3,530	1,200	2,250	7,250	720	--	e1,300
16	1,130	1,800	5,490	1,100	1,800	a5,300	585	--	e800
17	1,110	1,950	5,840	1,050	1,450	4,110	680	--	e1,100
18	1,120	1,700	5,140	1,050	1,000	2,840	770	--	e1,500
19	1,130	2,600	7,930	1,100	650	1,930	850	--	e1,800
20	1,130	2,950	9,000	1,170	700	2,210	925	--	e2,200
21	1,150	1,650	5,120	1,180			910	--	e2,100
22	1,160	2,000	6,260	1,130			1,060	--	e2,900
23	1,170	1,600	5,050	1,100			1,180		
24	1,170	1,750	5,530	1,080			1,260		
25	1,160	1,800	5,640	1,150			1,280		
					--	e3,600			
26	1,170	1,250	3,950	1,130			1,270	--	e3,700
27	1,180	1,300	4,140	1,100			1,230		
28	1,180	2,250	7,170	1,110			1,180		
29	1,170	2,510	7,930	1,120			1,140		
30	1,160	1,680	5,260	1,150			1,140		
31	1,150	2,120	6,580	--	--	--	1,150		
Total	35,110	--	159,520	34,310	--	131,760	31,815	--	149,540

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,130	--	e3,300	1,380	900	3,350	1,560	2,350	9,900
2	1,070	--	e2,900	1,410	800	3,050	1,420	2,200	a8,430
3	985	--	e2,500	1,460	550	2,170	1,260	2,050	6,970
4	1,030	--	e2,700	1,520	650	2,670	1,100	1,800	a5,350
5	1,000	550	1,480	1,560	1,750	7,370	1,150	1,700	5,280
6	1,060	600	1,720	1,550	2,250	9,420	1,280	1,650	5,700
7	1,060	1,330	3,810	1,570	1,800	7,630	1,330	2,200	7,900
8	1,060	560	1,600	1,580	950	4,050	1,430	900	3,470
9	1,070	900	2,600	1,660	1,100	4,930	1,650	800	3,560
10	1,110	850	2,550	1,760	1,200	5,700	1,900	900	4,620
11	1,140	750	2,310	1,810	1,500	1,500	7,330	1,100	5,320
12	1,150	700	2,170	1,790	1,500	7,250	1,680	1,350	6,120
13	1,150	1,250	3,880	1,800	2,000	9,720	1,570	1,100	4,660
14	1,150	1,600	4,970	1,890	1,900	9,700	1,460	1,600	6,310
15	1,150	1,050	3,260	1,820	1,850	9,090	1,320	1,250	4,460
16	1,150	600	1,860	1,610	1,450	6,300	1,360	1,400	5,140
17	1,160	520	1,630	1,590	1,800	7,730	1,390	1,800	6,760
18	1,190	900	2,890	1,520	1,300	5,340	1,440	2,450	9,530
19	1,160	650	2,040	1,430	450	1,740	1,450	1,600	6,260
20	1,170	450	1,420	1,330	300	a1,100	1,500	2,400	9,720
21	1,180	900	2,870	1,200	250	810	1,600	--	e7,000
22	1,080	550	a1,600	1,080	1,800	5,250	1,500	700	2,840
23	860	250	a580	1,020	3,300	9,090	1,300	5,850	20,500
24	780	200	420	1,070	2,800	8,090	1,530	8,700	35,900
25	885	250	600	1,250	1,550	5,230	1,620	3,700	16,200
26	930	500	1,260	1,350	2,100	7,650	1,650	2,100	9,360
27	1,000	750	2,020	1,490	1,700	6,840	1,770	3,300	15,800
28	1,130	400	1,220	1,580	1,250	5,330	2,080	4,400	24,700
29	1,400	1,000	3,780	1,600	1,050	4,540	2,630	5,000	35,500
30	1,380	1,400	5,220	--	--	--	3,100	2,900	24,300
31	1,360	850	3,120	--	--	--	3,260	3,200	28,300
Total	34,130	--	74,280	43,680	--	168,470	51,100	--	345,860

e Estimated.
a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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.....	2,920	3,000	23,700	1,310	950	3,360	1,210	1,100	3,590
2.....	2,400	3,800	24,600	1,330	850	3,050	1,170	950	3,000
3.....	2,080	2,850	16,000	1,300	750	2,630	1,240	1,000	3,350
4.....	1,890	1,900	9,700	1,250	700	2,360	1,300	900	3,160
5.....	1,780	1,900	9,130	1,190	800	2,570	1,120	750	2,270
6.....	1,690	2,600	11,900	1,150	1,000	3,100	1,040	600	1,680
7.....	1,600	1,900	8,210	1,250	1,000	3,380	1,010	600	1,640
8.....	1,510	1,800	7,340	1,320	1,250	4,460	1,070	700	2,020
9.....	1,440	3,450	13,400	1,350	1,350	4,920	975	650	1,710
10.....	1,400	2,300	8,690	1,340	1,150	4,160	915	750	1,850
11.....	1,380	1,850	6,890	1,320	1,650	5,880	900	550	1,340
12.....	1,360	1,800	6,610	1,290	1,850	6,440	890	650	1,560
13.....	1,350	1,900	6,930	1,230	1,200	3,990	935	600	1,510
14.....	1,330	2,000	7,180	1,300	1,100	3,860	905	600	1,470
15.....	1,390	3,170	s13,700	1,500	1,400	5,670	875	600	1,420
16.....	1,450	2,000	7,830	1,700	1,400	6,430	890	650	1,560
17.....	1,460	1,950	7,690	1,770	1,700	8,120	850	700	1,610
18.....	1,470	1,800	7,140	1,820	2,650	13,000	825	750	1,670
19.....	1,420	1,200	4,600	1,830	1,850	9,140	860	750	1,740
20.....	1,450	1,700	6,660	1,740	1,050	4,930	940	1,050	2,660
21.....	1,490	1,700	6,840	1,730	1,300	6,070	1,020	1,150	3,170
22.....	1,450	2,200	8,610	1,970	2,250	12,000	1,090	600	1,770
23.....	1,410	1,400	5,330	2,130	2,400	13,800	1,160	1,100	3,450
24.....	1,380	1,000	3,730	2,240	2,700	16,300	1,120	1,350	4,080
25.....	1,320	1,550	5,520	2,200	2,050	12,200	1,150	1,800	5,590
26.....	1,280	950	3,280	2,120	1,400	8,010	1,120	1,200	3,630
27.....	1,240	1,000	3,350	1,930	1,900	9,900	1,100	1,000	2,970
28.....	1,220	1,300	4,280	1,720	1,300	6,040	1,120	1,500	4,540
29.....	1,210	1,400	4,570	1,550	850	3,560	1,120	2,000	6,050
30.....	1,270	1,300	4,460	1,430	1,800	6,950	1,060	1,300	3,720
31.....	--	--	--	1,340	1,050	3,800	--	--	--
Total.	46,040	--	257,870	48,650	--	200,080	30,980	--	79,780

Day	July			August			September		
1.....	1,030	1,650	4,590	880	800	1,900	700	--	
2.....	980	1,250	3,310	890	500	1,200	705	--	
3.....	930	1,550	3,890	930	550	1,380	710	--	
4.....	910	1,650	4,050	930	1,400	3,520	730	--	
5.....	915	1,200	2,960	910	1,400	3,440	760	--	
6.....	895	1,500	3,620	970	1,100	2,880	775	--	
7.....	895	2,450	5,920	1,040	4,660	s15,900	765	--	
8.....	845	1,150	2,620	985	2,600	6,910	690	--	e1,600
9.....	850	800	1,850	910	2,000	4,910	720	--	
10.....	890	700	1,680	865	2,500	5,840	710	--	
11.....	865	700	1,630	895	1,750	4,230	720	--	
12.....	870	700	1,640	900	1,050	2,550	740	--	
13.....	910	750	a1,800	870	600	1,410	760	--	
14.....	930	670	1,680	880	1,000	2,380	785	727	
15.....	925	650	1,620	890	600	1,440	795	804	
16.....	905	600	1,470	630	600	1,390	815	--	
17.....	895	1,000	2,420	860	950	2,210	830	--	
18.....	880	650	1,540	890	950	a2,300	800	--	
19.....	880	900	2,140	915	850	2,100	815	--	
20.....	885	880	2,100	935	750	1,890	845	--	
21.....	835	1,250	2,820	920	1,200	2,980	855	--	
22.....	795	670	1,440	850	1,300	2,980	825	1,360	
23.....	830	850	1,900	805	--		825	--	e2,500
24.....	850	750	a1,700	800	--		820	--	
25.....	845	550	1,250	780	--		810	836	
26.....	870	550	1,290	755	--		820	--	
27.....	845	800	1,830	740	--	e1,600	825	--	
28.....	855	1,200	2,770	720	--		845	--	
29.....	875	1,050	2,480	715	869		880	--	
30.....	885	1,050	2,510	705	--		915	--	
31.....	880	1,450	3,450	700	--		--	--	
Total.	27,450	--	75,960	26,695	--	90,140	23,590	--	61,500

Total discharge for year (cfs-days) 433,550
Total load for year (tons) 1,794,760

e Estimated.
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 1951 to October 1952
(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	Water 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. 23, 1951	10:40 a.m.	1,080	45	1,920	--	--	--	--	--	--	10	31	78	98	100		S
Mar. 17, 1952	3:45 p.m.	a1,390	34	1,870	--	--	--	--	--	--	7	19	76	99	100		S
Mar. 31	5:20 p.m.	3,270	--	3,090	--	--	--	--	--	--	29	50	81	99	100		S
Apr. 1	4:05 p.m.	2,800	--	2,880	3,500	6	8	10	13	18	30	51	86	99	100		SPWCM
Apr. 17	6:05 p.m.	1,460	60	1,760	--	--	--	--	--	--	17	41	76	98	100		S
May 10	3:10 p.m.	a1,340	60	1,120	--	--	--	--	--	--	20	51	91	100	--		S
May 25	9:30 a.m.	a2,200	69	2,210	6,000	4	5	5	9	13	26	48	82	99	100		SPWCM
June 7	9:00 a.m.	a1,010	74	1,220	--	--	--	--	--	--	15	42	88	99	100		S
June 12	1:00 p.m.	864	81	488	--	--	--	--	--	--	23	59	94	100	--		S
June 21	2:15 p.m.	a1,020	83	655	--	--	--	--	--	--	29	58	93	100	--		S
July 5	11:20 a.m.	a915	90	1,110	--	--	--	--	--	--	12	28	67	97	100		S
July 19	2:50 p.m.	a880	89	863	--	--	--	--	--	--	11	29	58	84	92	95	S
Aug. 2	12:15 p.m.	a890	76	645	--	--	--	--	--	--	15	47	91	99	100		S
Aug. 14	1:10 p.m.	a880	85	1,270	--	--	--	--	--	--	20	48	94	100	--		S
Aug. 22	1:45 p.m.	850	80	776	--	--	--	--	--	--	22	50	88	100	--		S
Aug. 29	7:30 p.m.	a715	74	869	--	--	--	--	--	--	15	36	74	98	100		S
Sept. 14	6:00 p.m.	786	69	727	--	--	--	--	--	--	29	57	95	100	--		S
Sept. 25	5:15 p.m.	810	71	836	--	--	--	--	--	--	24	54	91	100	--		S
Oct. 1	12:50 p.m.	938	--	1,020	--	--	--	--	--	--	18	44	88	100	--		S

a Mean daily discharge.

NIOBRARA RIVER AT MEADVILLE, NEBR.--Continued

Particle-size analyses of bed material, water year October 1951 to September 1952
(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 disperzed)

Date of collection	Number of sampling points	Water discharge (cfs)	Water temperature (°F)	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
Oct. 23, 1951....	3	1,080								1	5	56	97	99	100	--	S
Nov. 14.....	1	1,290								0	4	71	100	--	--	--	S
Dec. 11.....	3	911								1	2	45	96	100	--	--	S
Jan. 10, 1952 ...	3	1,110								1	4	39	83	94	97	98	S
Jan. 30.....	3	1,380								1	4	43	92	98	98	99	S
Mar. 31	6	3,270								0	2	19	75	86	89	94	S
May 10	3	1,340								1	4	46	92	99	100	--	S
May 25	3	2,200								0	6	59	97	100	--	--	S
June 7	3	1,010								0	4	45	97	100	--	--	S
June 21	3	1,020								2	13	67	98	100	--	--	S
July 5	3	915								0	3	41	88	95	96	97	S
July 19	3	880								0	8	50	91	98	99	99	S
Aug. 2	3	890								0	1	15	61	76	81	86	S
Aug. 14.....	3	880								0	3	39	84	93	96	98	S
Aug. 29.....	3	715								0	2	21	74	88	92	94	S
Sept. 14	3	786								0	3	35	90	97	98	99	S
Sept. 25	3	810								0	3	39	94	99	99	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.--Water temperatures: January to September 1952.
Sediment records: April to September 1951.
EXTREMES, January to September 1952.--Water temperatures: Maximum, 81°F July 20; minimum, not determined.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Temperature (°F) of water, January to September 1952
/Once-daily temperature measurement between 8 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	38	37	a 51	59	66	73	66	62
2				--	39	34	a 46	59	63	71	61	59
3				--	a 40	33	46	--	62	63	72	56
4				--	a 41	a 35	50	69	63	66	61	61
5				--	--	--	a 55	59	75	78	64	67
6				--	38	a 47	49	60	75	77	--	63
7				--	--	a 42	56	64	78	a 66	60	a 74
8				a 34	a 40	a 47	49	--	69	56	66	68
9				--	a 44	41	41	55	61	62	64	a 74
10				a 36	a 44	43	47	50	61	64	71	--
11				--	42	a 42	49	51	67	67	66	69
12				--	a 44	--	44	47	69	67	62	62
13				--	38	37	46	58	--	71	--	64
14				--	37	40	48	59	69	63	73	a 66
15				--	39	41	50	55	--	62	66	59
16				--	40	39	51	53	63	72	69	61
17				--	40	47	54	55	60	70	a 76	59
18				--	a 39	a 40	55	54	--	71	66	57
19				--	36	38	57	55	61	78	69	57
20				--	--	38	55	53	63	a 81	68	61
21				36	a 36	a 35	51	57	70	63	63	59
22				--	--	--	49	60	69	64	67	55
23				--	--	--	50	59	68	--	--	56
24				--	--	41	51	59	68	65	--	52
25				--	35	a 46	52	a 75	65	68	--	63
26				35	42	46	57	64	64	65	--	63
27				--	--	42	67	61	64	--	71	--
28				36	a 41	43	58	56	68	a 67	66	56
29				--	38	44	--	--	69	69	67	a 67
30				a 42	--	52	65	58	78	74	67	a 66
31				42	--	a 51	--	--	--	64	a 74	--
Average				--	--	42	52	58	67	68	67	62

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

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 27, 1951	145	962	377
Nov. 14	132	938	334
Nov. 28	140	629	238
Jan. 8, 1952 a	130	599	210
Jan. 10	118	837	267
Jan. 30 a	114	656	202
Feb. 13	370	2,820	2,820
Mar. 4	122	1,580	520
Apr. 2	168	682	310
Apr. 9	132	551	196
May 2 a	269	1,030	748
May 10 a	211	694	395
May 17	800	4,900	10,600
May 25 a	351	1,220	1,160
June 5 a	125	401	135
June 7 a	112	420	127
June 21 a	118	392	125
July 15 a	116	376	118
July 19 a	114	372	114
Aug. 2 a	104	350	98
Aug. 7	867	11,300	26,400
Aug. 14 a	127	568	195
Aug. 22	110	746	222
Aug. 30 a	110	370	110
Sept. 15 a	110	458	136
Sept. 19 a	102	458	126

a Samples collected one-fourth mile downstream from gage.

NIOBRARA RIVER BASIN--Continued

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Particle-sise analyses of suspended sediment, April to September 1952
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled wnter; C, chemically dispersed; M, mechanically disperzed)

Date of collection	Time	Water discharge (cfs)	Wnter tem-per-nture (°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. 2, 1952.....	2:00 p. m.	168	46	682	--	--	--	--	--	--	25	57	97	100	--		S
Apr. 9.....	8:14 p. m.	132	43	551	--	--	--	--	--	--	21	47	93	100	--		S
May 2 a.....	5:15 p. m.	269	74	1,030	--	--	--	--	--	--	32	60	93	99	100		S
May 10 a.....	7:45 p. m.	211	55	694	--	--	--	--	--	--	22	53	95	100	--		S
May 17.....	3:30 p. m.	800	59	4,900	6,310	7	9	11	14	19	32	50	78	95	98	100	SPWCM
May 25 a.....	2:20 p. m.	351	75	1,220	--	--	--	--	--	--	32	64	94	100	--		S
June 5 a.....	4:15 p. m.	125	80	401	--	--	--	--	--	--	21	48	92	100	--		S
June 7 a.....	11:25 a. m.	112	75	420	--	--	--	--	--	--	22	57	96	100	--		S
June 21 a.....	6:35 p. m.	118	74	392	--	--	--	--	--	--	25	58	96	100	--		S
July 19 a.....	12:00 m.	114	78	372	--	--	--	--	--	--	15	39	90	99	100		S
Aug. 2 a.....	5:35 p. m.	104	73	350	--	--	--	--	--	--	14	33	82	99	100		S
Aug. 7.....	5:00 p. m.	867	--	11,300	15,800	22	27	32	38	49	69	85	96	99	100		SPWCM
Aug. 14 a.....	11:25 a. m.	127	73	568	--	--	--	--	--	--	36	73	98	100	--		S
Aug. 22.....	4:45 p. m.	110	74	746	--	--	--	--	--	--	30	62	95	100	--		S
Aug. 30 a.....	11:40 a. m.	110	71	370	--	--	--	--	--	--	20	67	96	100	--		S
Sept. 15 a.....	8:30 a. m.	110	51	458	--	--	--	--	--	--	16	45	95	100	--		S

a Samples collected one-fourth mile downstream from gage.

LONG PINE CREEK NEAR RIVERVIEW, NEBR.--Continued

Particle-size analyses of bed material, November 1951 to September 1952
(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	Water discharge (cfs)	Water temperature (°F)	Bed material											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.062	0.125	0.250	0.500	1.000	2.000	4.000			
Nov. 14, 1951....	2	--				0	1	28	78	94	98	100			S
Jan. 10, 1952....	3	--				0	2	45	81	90	96	99			S
Feb. 13	3	--				0	4	49	83	88	92	95			S
Apr. 9	3	--				0	1	31	72	87	94	98			S
May 10 a	3	211				0	2	37	89	98	99	100			S
May 25 a	3	351				0	2	29	67	80	87	94			S
June 7 a	3	112				0	2	34	79	88	93	96			S
June 21 a	3	118				0	2	36	82	92	96	99			S
July 19 a	3	114				0	2	33	72	83	89	94			S
Aug. 2 a.....	3	104				0	1	26	70	81	87	92			S
Aug. 14 a	3	127				0	3	38	76	85	91	95			S
Aug. 30 a	3	110				0	2	26	67	83	91	96			S
Sept. 15 a	3	110				0	4	39	75	85	91	96			S

a Samples collected one-fourth mile downstream from gage.

NIOBRARA RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE NIOBRARA RIVER BASIN IN NEBRASKA

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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)	Fluorids (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
SNAKE RIVER NEAR BURGE																							
Feb. 23, 1952	248	45	0.05	22	2.4	7.1		89		2.0	1.5	0.3	3.4	--	140	0.19		65	0	19	0.4	173	7.8
June 20	206	56	.10	23	3.3	7.1		100		2.0	.5	.3	1.0	0.06	162	.22		71	0	18	.4	178	7.9
Sept. 18	217	48	.04	22	3.2	10		98		7.0	.5	.3	1.1	.03	155	.21		68	0	25	.5	174	7.9

MISCELLANEOUS ANALYSES OF STREAMS IN THE NIOBRARA RIVER BASIN IN NEBRASKA--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
SNAKE RIVER NEAR BURGE			
Oct. 1, 1951	236	312	199
Oct. 24	236	520	331
Nov. 10	267	619	446
Jan. 9, 1952	252	536	365
Feb. 23	248	896	600
Mar. 27	283	718	549
Apr. 11	244	852	561
Apr. 22	275	600	446
May 2 a	259	714	499
May 9 a	328	646	572
May 21	328	751	665
May 23 a	371	2,290	2,290
June 6 a	236	700	446
June 18	209	484	273
June 20 a	209	462	261
July 3 a	221	388	232
July 21	209	410	231
Aug. 1	206	279	155
Aug. 15	225	394	239
Aug. 21	217	300	176
Aug. 28	206	258	143
Sept. 10	194	468	245
Sept. 13	225	306	186
Sept. 25	225	263	160
NIOBRARA RIVER NEAR SPARKS			
Oct. 2, 1951	804	620	1,350
Oct. 9	770	566	1,180
Nov. 11	850	1,040	2,390
Nov. 26	816	1,300	2,860
Dec. 12	981	2,080	5,510
Apr. 4, 1952	1,420	1,560	5,980
May 13	921	924	2,300
June 11	760	635	1,300
June 21	828	540	1,210
July 16	718	500	969
July 20	395	210	224
July 25	608	448	735
Aug. 14	718	512	993
Aug. 20	793	571	1,220
Sept. 12	618	531	886
Sept. 17	676	634	1,160
NIOBRARA RIVER NEAR NORDEN			
Aug. 25, 1952	728	1,100	2,160
Sept. 14	745	1,080	2,170
Sept. 15	731	940	1,860
Sept. 22	837	1,120	2,530
Sept. 25	732	870	1,720

a Samples collected by U. S. Bureau of Reclamation personnel.

MISCELLANEOUS ANALYSES OF STREAMS IN THE NIOBRARA RIVER BASIN IN NEBRASKA--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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
SNAKE RIVER NEAR BURGE																
Oct. 24, 1951	6:45 p.m.	236	52	520							10	33	82	100	--		S
Mar. 27, 1952	2:00 p.m.	283	44	718							16	45	92	100	--		S
Apr. 11	10:50 a.m.	244	43	852							12	34	85	99	100		S
Apr. 22	2:15 p.m.	275	50	600							10	39	95	100	--		S
May 2 a	1:30 p.m.	259	--	714							15	44	94	100	--		S
May 9 a	1:40 p.m.	328	--	646							14	39	85	100	--		S
May 23 a	1:40 p.m.	371	64	2,290							5	13	46	98	100		S
June 6 a	11:30 a.m.	236	74	700							12	32	77	100	--		S
June 18	12:45 p.m.	209	--	484							14	38	87	100	--		S
June 20 a	12:35 p.m.	209	72	462							13	35	88	100	--		S
July 3 a	12:32 p.m.	221	72	388							14	35	89	100	--		S
July 21	10:35 a.m.	209	72	410							11	29	84	100	--		S
Aug. 1	12:35 p.m.	206	87	279							13	29	83	99	100		S
Aug. 15	9:50 a.m.	225	70	394							7	20	76	99	100		S
Aug. 28	11:20 a.m.	206	70	258							8	22	81	100	--		S
Sept. 13	9:55 a.m.	225	64	306							10	23	75	100	--		S
NIOBRARA RIVER NEAR SPARKS																
Oct. 2, 1951	12:40 p.m.	804	--	620							19	47	96	100			S
Apr. 4, 1952	2:35 p.m.	1,420	--	1,560							16	41	92	100			S
May 13	4:35 p.m.	921	--	924							19	50	93	100			S
June 11	11:45 a.m.	760	--	635							11	40	92	100			S
June 21	11:00 a.m.	828	72	540							8	31	91	100			S
July 20	6:00 p.m.	395	81	210							58	82	97	100			S
July 25	3:55 p.m.	608	--	448							8	34	90	100			S
Aug. 14	6:25 a.m.	718	80	512							11	40	92	100			S
Sept. 12	3:40 p.m.	618	--	531							5	23	83	98	99	100	S

a Samples collected by U. S. Bureau of Reclamation personnel.

NIOBRARA RIVER NEAR NORDEN

Aug. 25, 1952.....	11:40 a. m.	728	--	1,100							16	38	92	100			S
Sept. 14.....	12:40 p. m.	745	68	1,080							27	61	97	100			S
Sept. 15.....	1:10 p. m.	731	66	940							18	53	95	100			S
Sept. 22.....	12:05 p. m.	897	69	1,120							12	44	90	100			S
Sept. 25.....	12:25 p. m.	732	67	870							24	63	95	100			S

NIOBRARA RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE NIOBRARA RIVER BASIN IN NEBRASKA--Continued

Particle-size analyses of bed material, water year October 1951 to September 1952
(*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	Water discharge (cfs)	Water temperature (°F)	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
SNAKE RIVER NEAR BURGE																	
Oct. 24, 1951	2	236								0	1	20	94	100	--		S
Apr. 11, 1952	2	244								1	4	53	98	100	--		S
May 9	3	328								0	2	48	89	99	100		S
May 23	2	371								0	2	51	99	100	--		S
June 6	2	236								0	2	53	99	100	--		S
June 20	3	209								0	1	26	91	100	--		S
July 3	1	221								0	2	66	100	--	--		S
July 21	1	209								0	1	37	94	99	100		S
Aug. 1	2	206								--	0	28	94	100	--		S
Aug. 15	1	225								0	1	39	93	100	--		S
Aug. 28	3	206								--	0	23	73	92	99	99	S
Sept. 13	2	225								--	0	17	82	99	100		S
NIOBRARA RIVER NEAR SPARKS																	
Oct. 9, 1951	3									1	2	43	91	98	99	100	S
Dec. 12	3									1	3	57	95	99	100	--	S
June 21, 1952	3									0	2	32	92	99	100	--	S
July 20	3									0	2	25	85	97	99	100	S
July 25	3									0	1	38	83	95	96	98	S
Aug. 14	3									0	3	29	87	98	99	100	S
Sept. 12	3									0	1	26	73	89	94	98	S

JAMES RIVER AT COLUMBIA, S. DAK.

LOCATION.--At gaging station at highway bridge, half a mile west of Columbia, Brown County, and 2 miles upstream from Elm River.
DRAINAGE AREA.--7,050 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.
REMARKS.--No flow from October to March and from July to September. Frequent backwater and occasional reverse flow are caused by Elm River. Records of discharge for water year October 1951 to September 1952 given in WSP 1239.

Chemical analyses, in parts per million, April to July 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Apr. 30, 1952.....	1,540			26	9.7	27		125	43	11			0.05				105	2	36	1.1	323	7.3	
June 12.....	28			71	31	89		375	103	29			19				306	18	33	1.7	815	7.5	
July 10.....	.8			50	11	50		149	136	11			--				171	49	39	1.7	533	8.2	

JAMES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE JAMES RIVER BASIN

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
JAMES RIVER AT JAMESTOWN, N. DAK.																							
Mar. 24, 1952	2.0							374						--				364	57			1,420	7.8
Aug. 23	2.2							406						0.64				382	49			1,430	7.8
Sept. 3	24							410						.33				304	0			975	8.0
Sept. 18	10							296						.26				242	0			789	7.7
JAMES RIVER AT HURON, S. DAK.																							
Apr. 13, 1952	5,250	7.7	0.04	21	7.2	23		66		63	7.0	0.1	2.4		194	0.26		82	28	38	1.1	280	7.0
Apr. 30	4,660			29	9.1	30		116		60	12							110	15	37	1.2	387	7.2

PART 6-B. MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

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 1951 to September 1952.
Sediment records: May 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 81°F June 13; minimum, freezing point Jan. 26 and probably on many days during winter months.
Sediment concentrations: Maximum daily, 9,620 ppm July 7; minimum daily, not determined.
Sediment loads: Maximum daily, 111,000 tons July 7; minimum daily, 25 tons Sept. 30.
EXTREMES, 1950-52.--Water temperatures (May 1951 to September 1952): Maximum, 81°F June 13, 1952; minimum, freezing point Jan. 26, 1952, and probably on many days during winter months.
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 Nov. 4-7, 19-30, Dec. 18 to Mar. 6, Mar. 23-27. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement between 6:00 a. m. and 7:00 a. m. except November to March generally between 9:00 a. m. and 2:00 p. m.)

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,300	220	772	980	125	331	722	110	214
2	1,220	190	626	920	81	201	820	160	354
3	1,220	320	1,050	860	--	e 190	860	220	511
4	1,500	910	3,680	640	--	e 150	840	222	503
5	1,340	420	1,520	470	88	112	860	188	436
6	1,380	300	1,120	560	104	157	860	209	485
7	1,340	220	796	660	107	191	840	210	476
8	1,340	169	611	800	111	240	820	--	e 440
9	1,260	182	619	860	137	318	800	--	e 360
10	1,180	156	497	860	159	369	740	145	290
11	1,140	156	480	820	133	294	705	--	e 260
12	1,100	158	469	840	141	320	654	--	e 220
13	1,060	158	452	860	148	344	413	--	e 130
14	1,060	152	435	840	122	277	227	--	e 60
15	1,000	147	397	800	107	231	398	--	e 220
16	980	138	365	760	--	e 200	459	--	e 380
17	940	132	335	705	--	e 180	523	--	e 420
18	920	137	340	622	--	e 150	560		
19	900	120	292	540	88	128	570		
20	900	104	253	560	110	166	570		
21	920	110	273	600	116	188	560		
22	1,000	165	446	620	97	a 162	550		
23	1,060	146	418	480	82	106	530		
24	1,100	135	401	420	--	e 90	510		
25	1,140	135	416	360	--	e 80	500	--	e 200
26	1,180	155	494	430	--	e 100	480		
27	1,180	140	446	520	86	121	470		
28	1,140	120	369	570	85	131	460		
29	1,100	103	306	620	93	156	460		
30	1,060	113	323	670	115	208	450		
31	1,020	132	364	--	--	--	440		
Total	34,980	--	19,365	20,247	--	5,891	18,651	--	8,559

Day	January			February			March		
1	430	--	e 140	580	--	e 170	1,430	460	1,780
2	420	--	e 140	660	--	e 220	1,230	310	1,030
3	410	--	e 130	740	--	e 280	1,100	--	e 750
4	400	--	e 130	830	--	e 360	980	--	e 550
5	385	124	129	780	--	e 200	900	--	e 340
6	380	--	e 130	660	--	e 100	960	--	e 200
7	380	--	e 110	560	34	51	1,420	107	410
8	380	--	e 90	640	--	e 100	1,260	--	e 400
9	375	--	e 70	730	--	e 280	1,060	178	509
10	370	--	e 50	940	--	e 460	820	395	874
11	370	--	e 40	1,760	--	e 1,500	900	460	1,120
12	370	40	40	2,500	--	e 2,800	2,300	--	e 31,000
13	370	--	e 40	3,000	--	e 3,700	4,060	2,860	s 34,200
14	370	--	e 40	3,700	--	e 5,200	1,850	920	4,600
15	370	--	e 50	3,300	--	e 4,300	2,100	1,440	8,160
16	370	57	57	3,000	460	3,730	2,200	1,240	7,360
17	375	85	86	2,600	410	2,880	2,550	1,750	12,000
18	375	--	e 70	2,400	--	e 2,600	3,150	3,250	27,600
19	540	43	63	2,150	--	e 2,300	4,580	3,170	39,200
20	1,800	--	e 1,500	2,000	--	e 2,200	5,000	1,390	18,800
21	1,040	--	e 550	1,800	--	e 2,100	4,240	1,490	17,000
22	800	--	e 300	1,500	--	e 2,000	3,540	--	e 9,600
23	690	--	e 200	1,370	--	e 1,900	3,000	--	e 5,300
24	580	--	e 130	1,200	--	e 1,800	2,700	540	3,940
25	530	--	e 80	1,100	--	e 1,700	2,400	600	3,890
26	500	44	59	1,000	--	e 1,600	2,100	670	3,800
27	470			1,100	1,110	3,300	1,900	630	3,230
28	460			1,200	1,030	3,340	2,300	800	4,970
29	440	--	e 50	1,280	--	e 2,100	3,760	3,410	s 44,200
30	430			--	--	--	5,800	2,470	38,700
31	490			--	--	--	6,480	1,290	22,600
Total	15,670	--	4,674	45,080	--	53,271	78,070	--	348,113

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952--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	7,390	720	14,400	1,460	233	918	688	146	271
2	6,480	540	9,450	1,380	250	932	638	189	326
3	7,830	590	12,500	1,340	204	738	605	173	282
4	10,100	420	11,400	1,300	186	653	556	153	230
5	8,760	300	7,100	1,220	177	583	572	360	556
6	7,250	260	5,090	1,180	166	529	556	181	272
7	6,480	267	4,670	1,140	263	810	539	169	246
8	5,800	317	4,960	1,140	332	1,020	749	--	e 4,800
9	5,200	438	6,150	1,100	228	677	638	1,380	s 2,460
10	4,580	534	6,600	1,140	212	652	572	352	544
11	4,120	553	6,150	1,140	198	609	539	274	399
12	3,820	562	5,800	1,100	183	544	507	269	368
13	3,760	502	5,100	1,100	178	529	507	179	245
14	3,540	471	4,500	1,060	177	506	608	1,240	s 2,510
15	3,260	438	3,860	1,020	212	584	588	1,070	1,700
16	3,050	430	3,540	1,020	220	606	588	430	683
17	2,900	430	3,370	980	150	397	622	520	873
18	2,800	412	3,110	940	172	436	820	830	1,840
19	2,650	416	2,980	900	159	386	1,020	1,100	3,030
20	2,500	386	2,600	860	174	404	1,390	3,150	s 12,500
21	2,400	384	2,490	840	232	526	1,180	1,200	3,820
22	2,350	401	2,540	840	215	488	1,020	730	2,010
23	2,300	386	2,400	960	465	1,200	940	570	1,450
24	2,200	341	2,020	960	353	915	860	570	1,320
25	2,100	308	1,750	920	250	621	860	680	1,580
26	2,050	292	1,620	880	195	463	820	590	1,310
27	1,950	290	1,530	880	238	565	920	880	2,180
28	1,800	269	1,310	860	205	476	900	620	1,510
29	1,660	240	1,080	800	185	400	980	670	1,770
30	1,580	234	998	760	183	376	980	750	1,980
31	--	--	--	705	161	306	--	--	--
Total	122,660	--	141,068	31,925	--	18,849	22,762	--	53,065
	July			August			September		
1	1,060	800	2,290	383	240	248	556	431	647
2	1,340	1,810	6,550	428	--	e 800	491	319	423
3	1,140	1,590	4,890	475	640	s 889	380	193	198
4	980	980	2,590	345	217	202	315	117	100
5	860	670	1,560	320	190	164	271	184	135
6	928	--	e 8,200	312	150	126	241	174	113
7	4,840	9,620	s 111,000	310	167	140	225	148	90
8	4,280	2,630	30,400	305	176	145	209	146	92
9	2,750	1,810	13,400	295	191	152	194	133	70
10	2,450	1,160	7,670	292	179	141	180	110	53
11	2,050	900	4,980	266	154	111	174	117	55
12	1,800	780	3,790	262	146	103	168	129	58
13	1,500	750	3,040	266	141	101	162	142	62
14	1,340	900	3,260	275	139	103	178	139	67
15	1,180	670	2,130	273	112	82	168	116	53
16	1,060	510	1,460	418	193	s 237	162	117	51
17	1,000	461	1,240	350	180	170	159	130	56
18	940	435	1,100	318	151	130	154	128	53
19	900	402	977	278	108	81	149	106	43
20	820	408	903	273	104	77	146	103	41
21	780	388	817	247	95	63	141	107	41
22	705	370	704	225	123	75	145	96	38
23	671	400	725	213	134	77	142	90	34
24	622	357	600	204	143	79	138	92	34
25	588	340	540	192	140	73	138	92	34
26	539	323	470	188	132	67	136	78	29
27	507	292	400	183	140	69	131	78	28
28	491	278	368	365	357	s 388	129	81	28
29	459	256	320	507	631	864	125	76	26
30	428	257	297	491	507	672	124	74	25
31	413	202	225	507	494	676	--	--	--
Total	39,421	--	216,896	9,766	--	7,305	6,031	--	2,767

Total discharge for year (cfs-days) 445,263
Total load for year (tons) 879,823

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 1951 to August 1952
(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	Water 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, 1951	6:30 p.m.	1,220	66	170	673	--	21	--	69	--	97	98	100		--	--	SPWCM
Apr. 2, 1952	5:35 p.m.	6,240	43	558	1,270	39	40	42	49	54	58	63	75		95	100	SPWCM
Apr. 3	7:30 p.m.	9,000	42	634	1,750	44	46	49	58	67	79	83	93		100	--	SPWCM
Apr. 4	7:15 a.m.	10,400	39	443	1,250	50	53	55	68	73	81	85	95		99	100	SPWCM
May 8	5:40 p.m.	1,140	54	300	--	--	--	--	--	--	59	62	80		100	--	S
June 5	12:45 p.m.	556	74	226	801	37	46	44	60	88	97	99	100		--	--	SPWCM
July 1	6:50 p.m.	1,180	85	819	1,300	38	47	59	69	86	97	100	--		--	--	SPWCM
July 7	5:30 p.m.	5,400	68	4,370	7,350	39	50	64	73	84	89	92	94		99	100	SPWCM
Aug. 6	5:10 p.m.	315	72	134	--	--	--	--	--	--	96	97	100		--	--	S

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA

LOCATION.--At gaging station at highway bridge, 1.3 miles south of Kennebec, Monona 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 1951 to September 1952.
Sediment records: May 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 83°F June 24.
Sediment concentrations: Maximum daily, 21,300 ppm June 27; minimum daily, not determined.
Sediment loads: Maximum daily, 277,000 tons July 7; minimum daily, not determined.
EXTREMES, 1950-52.--Water temperatures (May 1951 to September 1952): Maximum, 83°F June 24, 1952.
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. 3-5, 20-27, Dec. 12 to Mar. 6, Mar. 24-27. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 6:00 a.m. and 8:00 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	a 40	a 34	--	--	a 35	40	63	a 69	75	72	a 70
2	60	a 40	a 40	a 33	--	--	40	a 70	--	79	75	64
3	a 66	--	--	--	--	--	43	a 73	66	a 82	a 70	67
4	62	a 35	--	--	--	--	40	a 75	69	73	70	--
5	60	--	a 41	--	--	--	39	a 70	73	75	69	69
6	56	a 34	a 39	--	--	--	40	a 70	73	75	66	69
7	55	--	a 39	--	--	--	42	a 63	--	--	69	--
8	49	a 40	a 38	--	--	--	49	a 58	77	65	69	71
9	52	a 40	a 35	--	--	--	a 39	a 58	72	67	70	72
10	53	a 42	--	--	--	a 36	a 45	a 55	72	69	71	71
11	56	a 45	--	--	--	a 37	a 42	a 52	74	71	71	72
12	55	a 45	--	a 34	--	a 34	41	a 60	78	76	71	71
13	57	a 45	--	--	--	35	40	--	79	74	72	71
14	58	--	--	--	--	a 35	39	a 70	--	70	77	70
15	55	--	--	--	34	a 35	45	--	75	69	77	--
16	55	--	--	--	a 33	a 38	44	57	77	70	70	--
17	53	--	--	--	a 35	40	48	--	72	75	72	66
18	51	--	--	--	a 35	a 39	50	a 63	74	75	72	66
19	47	a 35	--	--	a 33	35	52	a 63	71	--	75	64
20	45	a 38	--	--	--	36	57	--	71	--	75	61
21	42	a 35	--	--	a 35	a 35	57	60	71	79	76	--
22	a 44	--	--	--	a 34	--	51	60	a 76	79	69	59
23	a 46	--	--	--	a 38	--	55	60	a 80	75	72	55
24	46	--	--	--	--	--	54	61	a 83	77	77	--
25	a 47	--	--	--	a 39	--	57	a 61	a 75	77	--	57
26	a 43	--	a 34	--	a 40	a 37	57	--	75	77	69	61
27	43	a 34	--	--	a 37	a 40	60	65	69	77	--	--
28	a 44	a 35	--	--	a 36	a 42	61	65	76	78	75	64
29	43	a 37	--	--	--	40	62	--	79	70	74	--
30	45	a 39	--	--	--	45	63	a 65	a 82	72	72	60
31	a 44	--	--	--	--	43	--	a 68	--	72	72	--
Average	51	--	--	--	--	--	47	61	74	74	72	--

a Observation made between 1 p. m. and 7 p. m.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,240	370	1,240	1,050	240	680	810	430	940
2	1,170	500	1,580	990	168	449	840	432	980
3	1,200	1,910	6,190	840	142	a 322	930	431	a 1,080
4	1,800	8,590	41,700	700	149	282	930	420	1,050
5	1,600	1,990	8,600	610	158	a 260	930	409	1,030
6	1,480	950	3,800	536	170	246	960	570	1,480
7	1,480	730	2,920	676	180	a 328	960	430	1,110
8	1,480	520	2,080	780	191	402	930	302	758
9	1,450	470	1,840	870	235	552	930	374	939
10	1,380	430	1,600	960	290	752	870		
11	1,310	410	1,450	930	304	763	840	--	e 600
12	1,240	380	1,270	900	268	651	740		
13	1,170	360	1,140	900	244	593	640		
14	1,140	372	1,140	900	196	476	380		
15	1,110	311	932	900	--	e 440	430		
16	1,050	330	936	870	--	e 400	490		
17	1,020	290	799	840	--	e 360	560	--	e 200
18	990	286	764	750	--	e 380	580		
19	960	288	746	662	536	958	590		
20	990	254	679	600	845	1,370	600		
21	990	270	722	620	526	880	590	--	
22	1,020	250	688	640	--	e 600	590	--	
23	1,080	262	764	570	--	e 500	570	--	
24	1,140	520	1,600	510	--	e 380	550	--	
25	1,170	327	1,030	460	--	e 320	530	--	
26	1,200	318	1,030	400	252	272	515	68	e 110
27	1,280	330	1,140	520	263	369	500	--	
28	1,240	260	870	620	257	430	490	--	
29	1,170	231	730	705	347	660	480	--	
30	1,140	220	677	750	441	893	475	--	
31	1,110	259	776	--	--	--	470	--	
Total	37,800	--	91,433	22,059	--	15,968	20,700	--	14,377

	January			February			March		
1	460	--		730	--	e 2,000	1,530	780	3,220
2	450	89		840	--	e 4,500	1,400	--	e 2,500
3	440	--		960	--	e 7,000	1,200	--	e 1,800
4	435	--		1,060	--	e 9,000	1,080	--	e 1,400
5	430	--		1,000	--	e 8,000	940	--	e 1,100
6	425	--		820	3,050	6,750	1,080	--	e 1,700
7	420	--		710	--	e 5,000	1,560	--	e 4,200
8	415	--		640	--	e 3,500	1,240	--	e 2,000
9	405	--		780	--	e 5,000	1,040	--	e 1,300
10	400	--	e 85	950	--	e 9,000	1,000	370	999
11	400	--		1,400	--	e 17,000	1,040	540	1,520
12	400	66		2,450	--	e 32,000	1,410	--	e20,000
13	400	--		3,300	2,750	24,500	5,220	11,700	s154,000
14	400	--		4,000	2,640	28,500	3,370	3,500	31,800
15	400	--		3,600	2,160	21,000	2,180	1,690	9,950
16	410	--		3,100	2,210	18,500	2,460	1,800	12,000
17	410	--		2,750	1,400	10,400	2,610	1,960	13,800
18	410	--		2,500	1,580	10,700	3,180	4,840	s43,700
19	800	--	e 2,100	2,350	1,510	9,580	4,830	7,910	103,000
20	2,000	--	e 16,000	2,100	--	e 6,500	4,990	3,980	53,600
21	1,300	--	e 7,000	1,700	870	3,990	4,670	2,540	32,000
22	960	--	e 3,000	1,540	580	2,410	3,660	--	e23,000
23	760	--	e 1,500	1,390	470	1,760	3,060	--	e12,000
24	680			1,280	450	a 1,560	2,500	--	e14,000
25	620			1,200	420	1,360	2,000	--	e 7,600
26	580	--	e 400	1,100	460	1,370	2,100	1,170	6,630
27	540			1,280	1,020	3,520	2,150	1,570	9,110
28	520			1,450	1,690	6,620	2,360	1,290	8,220
29	500			1,600	--	e 6,000	3,120	3,660	sa37,700
30	480			--	--	--	6,490	9,300	163,000
31	630	--	e 1,000	--	--	--	6,850	2,790	51,600
Total	17,880	--	34,930	48,580	--	267,020	82,320	--	828,449

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1951 to September 1952--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	7,150	2,820	54,400	1,740	580	2,720	842	560	1,270
2	7,350	1,980	39,300	1,630	510	2,240	790	560	a1,190
3	6,580	1,600	28,400	1,560	480	2,020	738	550	1,100
4	7,850	1,930	40,900	1,490	480	1,930	702	520	986
5	8,950	1,620	39,100	1,420	470	1,800	668	410	739
6	9,060	1,200	29,400	1,350	430	1,570	668	430	776
7	7,960	1,140	24,500	1,320	--	e7,500	650	410	720
8	6,670	1,180	21,200	1,320	1,870	6,660	620	400	670
9	5,870	1,370	21,700	1,280	1,170	4,040	965	2,360	6,150
10	5,150	1,110	15,400	1,280	570	1,970	738	1,850	3,690
11	4,590	1,100	13,600	1,240	500	1,670	620	650	1,090
12	4,350	1,230	14,400	1,240	540	1,810	560	490	741
13	4,280	1,080	12,500	1,240	460	1,540	530	450	644
14	4,140	950	10,600	1,210	410	1,340	515	--	e600
15	3,930	770	8,170	1,210	420	a1,370	790	12,300	s29,900
16	3,720	780	7,830	1,180	590	1,880	515	3,380	4,700
17	3,480	760	7,140	1,140	--	e1,700	530	1,660	2,380
18	3,300	760	6,770	1,070	370	1,070	605	1,820	2,970
19	3,120	780	6,570	1,000	310	837	930	2,890	7,260
20	2,880	730	5,680	1,000	--	e1,000	1,240	3,640	12,200
21	2,710	750	5,490	1,070	550	1,590	1,800	17,800	s99,200
22	2,660	910	6,540	1,040	16,500	s56,600	1,240	4,110	13,800
23	2,610	770	5,430	1,240	18,300	61,300	1,100	2,340	6,950
24	2,510	660	4,470	1,140	3,150	9,700	1,040	1,950	5,480
25	2,360	580	3,700	1,070	2,100	6,070	965	5,080	13,200
26	2,310	620	3,870	1,040	1,400	3,930	1,000	2,290	6,180
27	2,220	590	3,540	1,070	1,820	5,260	2,000	21,300	s140,000
28	2,100	520	2,950	1,070	1,190	3,440	1,320	6,510	23,200
29	1,940	540	2,830	1,040	960	2,700	1,140	4,590	14,100
30	1,840	510	2,530	965	840	2,190	1,180	3,350	10,700
31	--	--	--	895	680	1,640	--	--	--
Total	133,640	--	448,910	37,560	--	201,087	27,001	--	412,586

	July			August			September		
1	1,320	7,100	25,300	428	740	855	605	930	1,520
2	1,380	7,190	s30,300	402	520	564	650	770	1,350
3	1,600	11,700	s51,600	590	860	1,370	560	550	832
4	1,320	4,300	15,300	545	600	883	442	450	537
5	1,100	2,300	6,830	415	390	437	374	410	414
6	965	1,700	4,430	415	399	447	324	410	359
7	3,920	17,300	s277,000	402	348	378	280	383	a290
8	6,220	8,500	143,000	402	381	414	260	352	247
9	4,750	4,480	57,400	388	382	400	260	484	340
10	3,060	3,310	27,300	374	394	398	201	558	303
11	2,560	2,340	16,200	361	411	401	208	412	231
12	2,180	1,820	10,700	336	358	325	216	388	226
13	1,980	1,730	9,250	324	348	304	208	375	211
14	1,880	13,000	s74,900	336	331	300	208	645	362
15	1,630	2,410	10,600	336	318	288	216	467	272
16	1,420	1,380	5,290	388	2,090	s2,320	208	355	199
17	1,280	1,070	3,700	485	830	1,090	201	290	157
18	1,180	940	2,990	402	500	543	176	240	114
19	1,100	890	2,640	374	1,260	1,270	160	217	94
20	1,000	820	2,210	388	740	775	182	285	140
21	930	770	1,930	324	510	446	176	--	e150
22	860	710	1,650	301	450	366	176	405	192
23	790	700	1,490	280	420	a318	176	220	104
24	720	700	1,360	260	390	274	170	192	88
25	668	630	1,140	260	450	316	170	209	96
26	620	600	1,000	242	430	281	170	227	104
27	575	620	962	251	440	a298	165	210	a94
28	530	680	973	324	2,660	s2,490	165	207	92
29	500	610	824	456	1,770	2,180	160	209	a90
30	470	580	736	590	1,210	1,930	155	211	88
31	442	640	764	560	1,270	1,920	--	--	--
Total	48,950	--	789,769	11,939	--	24,581	7,622	--	9,296

Total discharge for year (cfs-days)..... 496,051
Total load for year (tons)..... 3,138,406

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Particle-size analyses of suspended sediment, February to August 1952
(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	Water 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
Feb. 6, 1952	5:05 p.m.	820	--	3,050	5,130	4	11	22	34	61	96	99	100		--		SPN
Feb. 6	5:05 p.m.	820	--	3,050	5,050	22	24	31	41	74	97	99	100		--		SPWCM
Apr. 2	11:20 a.m.	7,550	42	2,200	4,490	18	22	25	30	43	62	75	93		100		SPWCM
Apr. 4	11:45 a.m.	7,960	38	1,980	5,250	20	24	30	37	54	76	86	98		100		SPWCM
June 3	11:35 a.m.	738	68	522	1,850	--	18	28	38	58	89	94	99		100		SPWCM
June 27	3:25 p.m.	1,880	76	19,800	17,200	21	31	43	60	85	100	--	--		--		SPWCM
July 1	12:15 p.m.	1,460	81	5,860	23,300	13	17	22	30	55	94	99	--		--		SPWCM
July 7	3:45 p.m.	7,150	--	34,000	40,000	21	30	40	56	85	98	99	100		--		SPWCM
Aug. 5	7:20 p.m.	415	72	408	1,440	30	32	42	50	72	91	94	96		100		SPWCM

PLATTE RIVER BASIN

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.

LOCATION (revised).--At cableway at gaging station, 100 feet west of State Highway 220, 0.3 mile downstream from Cottonwood Creek, 2½ miles downstream from Poison Spring Creek, 4 miles southwest of Goose Egg Ranch, 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 1952.
Sediment records: June 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Minimum, freezing point Nov. 15, Dec. 19, Jan. 9, 25, Feb. 25, and probably on many other days during November to March.
Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.
Sediment loads: Maximum daily, 40,000 tons (estimated) June 3; minimum daily, less than 0.50 ton on many days during October and January.
EXTREMES, 1950-52.--Water temperatures: Minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 12,900 ppm July 23, 1950; minimum daily, not determined.
Sediment loads: Maximum daily, 174,000 tons July 23, 1950; minimum daily, less than 0.50 ton on many days during October 1951 and January 1952.
REMARKS.--Flow affected by ice Dec. 5 to Mar. 25. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 12:00 m. and 9:00 p.m./

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

a Observation made between 7 a.m. and 9 a.m.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	74			28			144		e 5
2	70		(t)	29			78		e 2
3	76			37			42		
4	96		e 2	39			28		
5	89		e 2	40			26		
6	128		e 3	36			25		e 1
7	76		e 2	35			26		
8	57			36			28		
9	50			36			30		
10	48			35			31		
11	48			35		e 1	31		
12	46			35			31		
13	45			37			30		
14	43			28			30		
15	43			37			30		
16	46			42			30		
17	50			39			30		
18	50			55			30		
19	48		e 2	40			30		
20	46			46			30		e 4
21	50			46			30		
22	52			46			30		
23	46			128			30		
24	45			251			30		
25	46			191			30		
26	46			254		e 5	30		
27	45			176			32		
28	45			165			34		
29	42			154			35		
30	45			154			35		
31	43			--		--	30		
Total-	1,734		58	2,310		62	1,106		102

Day	January			February			March		
1	25		e 2	30			31		
2	25		e 1	30			31		
3	26			30			31		
4	27			30			31		
5	29			32			30		
6	30			40			30		
7	30			37			30		
8	30			36			30		
9	30			35			30		
10	30			34			30		
11	30			33			30		
12	30			33			30		
13	30		(t)	33			30		
14	30			31			30		e 2
15	30			30		e 2	30		
16	30			30			30		
17	30			30			30		
18	30			30			30		
19	30			30			30		
20	30			31			28		
21	28			33			26		
22	25			35			25		
23	25			35			26		
24	30		e 1	35			28		
25	33			35			30		
26	35			34			33		
27	30			33			37		
28	30		e 2	32			72		e 10
29	30			31			154		e 150
30	30			--		--	149		e 130
31	30			--		--	89		e 100
Total-	908		28	948		58	1,271		444

e Estimated.
t Less than 0.50 ton.

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	57	--	e 90	1,990	92	494	4,430	430	5,140
2	45	660	80	2,000	98	529	4,750	620	sa 8,700
3	45	--	e 70	2,290	300	sa 2,300	5,740	--	e 40,000
4	37	--	e 60	3,140	400	3,390	6,240	--	e 15,000
5	33	--	e 50	3,130	230	1,940	7,920	--	e 9,000
6	37	--	e 50	3,040	135	1,110	7,960	--	e 8,000
7	50	--	e 60	2,880	90	700	8,020	--	e 7,000
8	94	--	e 70	2,890	85	663	8,060	--	e 6,000
9	106	--	e 100	2,930	230	1,820	8,040	--	e 6,200
10	50	349	47	2,900	150	1,170	7,980	186	4,010
11	37	--	e 35	2,890			8,190	140	3,100
12	32	--	e 25	2,880			8,620	--	e 5,000
13	29	--	e 20	2,880			8,640	207	4,830
14	27	--	e 15	2,880			8,270	--	e 4,500
15	20	--	e 10	2,850	51	366	7,420	--	e 3,000
16	18	--	e 9	2,620			6,990	--	e 2,500
17	217	1,270	s 5,740	2,430			6,000	104	1,680
18	1,890	1,990	10,200	2,410			6,000	--	e 1,600
19	1,960	570	3,020	2,390			5,540	57	853
20	2,000	400	2,160	2,330			4,020	--	e 700
21	2,030	280	1,530	2,180	40	235	3,980	--	e 700
22	2,000	215	1,160	2,460	860	6,020	3,660	--	e 500
23	1,960	180	952	3,030	1,310	10,700	2,970	--	e 700
24	1,950			3,460	665	6,210	3,000	--	e 500
25	1,960			3,370	275	2,500	2,980	--	e 350
26	1,960			3,380	700	6,590	3,000	--	e 250
27	1,970	127	677	3,240	365	3,190	2,970		
28	1,980			3,130	135	1,140	2,960	24	192
29	2,000			3,040	280	sa 2,600	2,960		
30	2,000			4,390	630	7,470	2,960		
31	--	--	--	4,430	280	3,350	--	--	--
Total	26,594	--	30,292	89,860	--	67,781	170,270	--	140,581

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	2,960			5,730	62	959	4,300		
2	2,970			5,780	240	3,750	4,290		
3	2,970			5,710	92	1,420	4,290		
4	2,970	18	144	5,730	155	2,400	4,300		
5	2,970			5,700	60	923	4,310	20	222
6	2,990			5,680	42	644	4,310		
7	2,990			5,680	50	767	4,020		
8	2,980	18	145	4,630	31	387	3,750		
9	3,380	110	sa 1,200	3,480			3,750		
10	4,360	51	600	3,420			3,750		
11	4,350	41	482	3,280	12	109	3,760		
12	4,390	118	1,400	3,280			3,760		
13	4,360	131	1,540	3,260			3,750		
14	4,340	46	539	3,430			3,740		
15	4,580	190	sa 2,700	5,240			3,740	15	152
16	5,890	159	2,530	5,260	33	470	3,740		
17	5,840	69	1,090	5,240			3,730		
18	5,870	62	982	5,210			3,740		
19	5,860	72	1,140	5,380			3,740		
20	5,860	72	1,140	5,700			3,750		
21	5,870	59	935	5,700			3,360		
22	5,920	62	991	5,700			2,740		
23	5,920	59	943	5,710			2,720		
24	5,810	45	706	5,710			2,670		
25	5,570	39	586	5,730	31	473	2,900	12	96
26	5,580	33	497	5,700			3,640		
27	5,660			5,650			3,320		
28	5,680			5,630			2,810		
29	5,700	--	e 500	5,730			2,770		
30	5,700			5,730			2,740		
31	5,700			5,120			--	--	--
Total	145,990	--	23,654	158,930	--	19,930	108,190	--	4,700

Total discharge for year (cfs-days) 708,111
Total load for year (tons) 287,690

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.--Continued

Particle-size analyses of suspended sediment, May 1951 to August 1952
(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	Water 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 10, 1951	3:55 p.m.	2,200	49	409	1,180	32	40	51	64	78	89	93	96		97		BWCM
Apr. 10, 1952	1:30 p.m.	46	--	398	501	77	85	92	94	94	96	98	100		--		BWCM
Apr. 17	11:20 p.m.	1,840	--	13,200	12,900	1	2	4	85	96	99	--	--		--		SPNM
Apr. 17	11:20 p.m.	1,840	--	13,200	8,530	42	55	70	87	97	99	--	--		--		SPWCM
Apr. 18	9:40 a.m.	1,900	--	1,340	3,450	--	46	--	80	--	98	--	--		--		SPWCM
Apr. 30	12:00 m.	2,000	45	98	460	--	52	--	74	--	94	--	--		--		SPWCM
June 10	2:40 p.m.	7,920	--	186	1,110	26	30	33	38	46	58	67	82		94		BWCM
July 16	2:50 p.m.	5,820	64	70	576	--	--	31	39	48	60	71	86		96		BWCM
Aug. 27	3:50 p.m.	5,700	67	37	402	--	--	--	--	61	71	76	88		94		BWCM

NORTH PLATTE RIVER BELOW CASPER, WYO.

LOCATION (revised).--At cableway at gaging station, 0.3 mile upstream from Claude Creek, half a mile north of U. S. Highways 20, 26, and 87, and 5½ miles east of City Hall in Casper, Natrona County.
DRAINAGE AREA.--12,600 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to August 1952.
Water temperatures: June 1949 to September 1952 (discontinued).
Sediment records: April 1947 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 71°F June 30, July 1, 3, 31, Aug. 12; minimum, freezing point Dec. 19, Jan. 9, 25, Feb. 25, and probably on many days during December to February.
Sediment concentrations: Maximum daily, 3,820 ppm June 4; minimum daily, not determined.
Sediment loads: Maximum daily, 58,500 tons June 4; minimum daily, not determined.
EXTREMES, 1947-52.--Water temperatures (1949-52): Maximum, 76°F July 3, 1951; minimum, freezing point on many days during winter months each year.
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 Dec. 6-9, 11, 14-29, Dec. 31 to Jan. 15, Jan. 17, 18, 21-25, Feb. 12, 13, 18, 20-25, Mar. 2-4. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, October 1951 to August 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Noncarbonate					
Oct. 2, 1951	128	6.2	0.02	96	32	97		189	363	31	0.4	4.2		776	1.06	370	215	36	2.2	1,060	7.5	0.035
Nov. 15	68			127	42	142		192	550	49				1,080	1.47	490	333	39	2.8	1,460	7.2	.188
Dec. 19	a48			149	40	142		262	528	56				1,100	1.50	535	320	37	2.7	1,500	7.6	.364
Jan. 25, 1952	a64			119	45	165		176	580	67			0.30	--	--	483	339	43	3.3	1,540	7.1	1.19
Feb. 11	50			134	41	152		226	543	59				--	--	504	319	40	2.9	1,490	7.2	.282
Mar. 14	50			117	40	150		175	533	60				--	--	458	314	42	3.0	1,460	7.4	.352
Apr. 17	57			102	38	141		124	515	55				--	--	409	307	43	3.0	1,340	7.6	.097
May 29	3,060			51	19	37		148	146	10				--	--	207	86	28	1.1	553	7.9	.023
June 27	2,980			52	16	38		144	139	11				--	--	196	78	29	1.2	540	7.7	.015
July 16	5,610			52	15	38		148	131	11				338	.46	191	70	30	1.2	519	7.6	.018
Aug. 27	5,570			49	14	36		142	124	10				--	--	182	66	30	1.1	497	8.0	.066

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 4:00 a.m. and 7:00 p.m./

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

a Observation made between 12 m. and 3 p. m.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	137			80			137		
2	131			64			131	8	3
3	131			73			90		
4	137			85			50		
5	131	4	1	80	8	2	50		
6	134			80			48		
7	143			78			45		
8	115			73			43		e 1
9	105			73			45		
10	98			70			50		
11	95			70			56		
12	90			68			68		
13	88			68			61		e 2
14	85			59			54		
15	82	7	2	75	9	2	48		
16	82			73			52		
17	85			54			56		
18	85			48			54		
19	85			61			48		
20	80			80			45		
21	82			70			49		
22	85			66			54		e 1
23	85			52	8	2	52		
24	80			95			58		
25	80			125			48		
26	80	9	2	100			52		
27	80			163	27	10	54		
28	80			149			60		
29	80			140			62		
30	80			137			64		
31	80			--	--	--	54		
Total	3,011	--	52	2,509	--	108	1,838		40

Day	January			February			March		
1	46			61			47		e 2
2	52			64			47		
3	50			61			48		
4	52			54			48		
5	56			64			54		
6	60			57			57		
7	60			52			57		
8	60			61			59		
9	58			54			61		
10	40			61			61		
11	52			57			66		
12	62			54		e 1	66		
13	62			54			64		
14	58			54			64		
15	58			54			59		e 1
16	57		e 1	54			66		
17	58			59			73		
18	58			60			75		
19	61			57			68		
20	54			52			64		
21	43			48			48		
22	46			47			50		
23	45			48			50		
24	54			52			57		
25	64			50			61		
26	59			45		e 2	61		
27	57			54			59		
28	57			61			61		
29	59			54			78		e 2
30	57			--		--	140		e 5
31	59			--		--	152		e 10
Total	1,714		31	1,603		36	2,021		46

e Estimated.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	115	--	e 5	1,960	--	--	4,520	470	5,740
2	102	--	e 2	1,960	111	590	4,540	290	3,560
3	85			1,980	--	--	5,510	860	12,800
4	78			2,860	835	6,450	5,680	3,820	58,500
5	73	--	e 1	3,090	380	3,170	7,110	1,040	20,000
6	66			3,040	250	2,050	7,350	520	10,300
7	66			2,880	180	1,400	7,370	390	7,760
8	78			2,850	--	--	7,390	310	6,180
9	102	--	e 2	2,900	165	1,280	7,420	310	6,210
10	120	6	2	2,860			7,420	260	5,210
11	92	--	e 2	2,830			7,420	240	4,810
12	80			2,830			7,850	330	7,000
13	73			2,830			7,900	330	7,040
14	70	--	e 1	2,820	101	753	7,920	320	6,840
15	70			2,850			7,130	190	3,660
16	66			2,700			6,980	170	3,200
17	59	5	1	2,430			6,160	125	2,080
18	900	2,440	s 10,500	2,390			5,970	110	1,770
19	1,800	1,010	4,910	2,360	46	294	5,930	110	1,760
20	1,850	550	2,750	2,350	--	--	4,400	100	1,190
21	1,880	425	2,160	2,180	50	294	4,160	75	842
22	1,900	300	1,540	2,400	330	a 2,100	4,040	75	818
23	1,880			3,040	1,200	9,800	3,090	60	501
24	1,860			3,590	3,000	a 29,000	3,060	105	868
25	1,880			3,500	701	6,630	3,010		
26	1,890	176	903	3,460	480	a 4,500	2,980		
27	1,900			3,410	730	b 6,700	2,960	43	344
28	1,920			3,300	230	b 2,100	2,940		
29	1,930			3,070	120	995	2,930		
30	1,960			3,970	670	7,180	2,910		
31	--	--	--	4,440	400	4,800	--	--	--
Total	24,945	--	29,109	89,130	--	98,932	164,050	--	180,703

Day	July			August			September		
1	2,930			5,610	40	606	4,440		
2	2,930			5,860	650	a 9,900	4,400		
3	2,940			5,610	230	3,480	4,380		
4	2,940			5,660	260	3,970	4,360		
5	2,940	29	230	5,610	90	1,400	4,380	25	286
6	2,930			5,590	70	1,060	4,400		
7	2,940			5,590	50	754	4,360		
8	2,930			5,360	65	941	3,820		
9	2,910			3,590			3,860		
10	4,160			3,520			3,870		
11	4,260			3,320	19	172	3,890		
12	4,280	112	1,280	3,260			3,950		
13	4,280			3,250			3,910		
14	4,260			3,210			3,910		
15	4,220			4,700	100	a 1,400	3,910	27	285
16	5,320	340	4,880	5,180	40	559	3,910		
17	5,590	225	3,400	5,240	44	622	3,910		
18	5,630	180	2,730	5,260	50	710	3,910		
19	5,680			5,260	80	a 1,100	3,910		
20	5,700			5,680	109	1,670	3,910		
21	5,720			5,680			3,890		
22	5,720			5,660			2,880		
23	5,760			5,660			2,780		
24	5,780			5,660			2,740		
25	5,470	63	958	5,660			2,680	22	184
26	5,470			5,660	37	564	3,660		
27	5,550			5,590			3,720		
28	5,610			5,570			2,930		
29	5,610			5,660			2,820		
30	5,610			5,660			2,770		
31	5,610			5,570			--	--	--
Total	141,680	--	33,214	158,190	--	35,408	112,260	--	7,550

Total discharge for year (cfs-days) 702,951
Total load for year (tons) 385,229

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

NORTH PLATTE RIVER BELOW CASPER, WYO.--Continued

Particle-size analyses of suspended sediment, July 1951 to July 1952
(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	Water 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 22, 1951	8:00 p.m.	5,180	63	2,190	1,530	38	52	65	77	87	94	96	98		99		BWCM
Apr. 18, 1952	4:30 p.m.	1,640	60	7,670	11,600	--	64	--	94	--	99	--	--		--		SPWCM
Apr. 30	2:25 p.m.	1,960	54	134	320	--	71	72	77	89	91	94	96		97		BWCM
May 23	8:15 a.m.	3,140	--	1,130	1,570	56	68	80	88	96	98	--	--		--		BWCM
May 24	11:45 a.m.	3,530	58	3,410	4,440	46	57	72	83	92	96	98	99		100		BWCM
June 4	9:20 a.m.	5,720	55	8,800	12,200	--	56	--	82	--	98	--	--		--		SPWCM
June 10	4:50 p.m.	7,390	62	231	730	20	28	32	36	45	58	69	88		96		BWCM
July 16	11:45 a.m.	5,610	64	195	1,050	17	22	26	33	44	59	78	93		99		BWCM

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 near Douglas.
DRAINAGE AREA.--14,300 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: August 1950 to September 1952.
Water temperatures: June 1949 to September 1952 (discontinued).
Sediment records: April 1947 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 75°F Aug. 15; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 1,790 ppm June 5; minimum daily, not determined.
Sediment loads: Maximum daily, 28,200 tons June 5; minimum daily, not determined.
EXTREMES, 1947-52.--Water temperatures (1949-52): 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, not determined.
Sediment loads: Maximum daily, 349,000 tons July 12, 1949; minimum daily, less than 1 ton Jan. 11-12, 1949.
REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local rain. Records of discharge for gaging station near Douglas for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Phenolic material as C_6H_5OH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 2, 1951	a 150	13	0.02	117	40	144		290	463	34	0.4	2.9	992	1.35		458	220	41	2.9	1,360	7.4	0.000
Dec. 5	346			105	35	109		254	375	30			820	1.12		405	197	37	2.3	1,170	8.0	.000
Jan. 4, 1952 ...	a 86			141	45	140		332	493	39			1,120	1.52		536	264	36	2.6	1,410	7.4	.001
Feb. 5	a 165			96	34	154		220	465	35			--	--		380	200	47	3.4	1,140	8.0	.000
Mar. 5	a 130			120	42	119		294	420	38			--	--		472	231	35	2.4	1,350	7.9	.001
Apr. 3	485			96	36	130		220	430	31			--	--		388	208	42	2.9	1,240	7.8	.003
May 7	3,480			51	15	34		148	121	10			--	--		188	67	28	1.1	518	7.6	.001
June 4	5,680			57	17	42		170	145	9.0			--	--		212	73	30	1.3	557	7.5	.001
July 2	3,020			51	18	41		150	145	12			--	--		202	79	31	1.3	548	8.2	.000
Aug. 6	5,250			48	16	37		144	129	11			--	--		187	69	30	1.2	517	7.9	.001
Sept. 3	4,080			51	14	41		150	132	10			--	--		186	63	32	1.3	527	8.0	.001

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 1951 to September 1952
/Once-daily temperature measurement between 5 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	--	a41		--	--	45	--	61	72	72	a56
2	59	a33	--		--	--	a38	64	58	a66	72	63
3	--	a32	34		--	--	a43	66	63	72	72	69
4	a52	a32	32		--	--	53	64	a62	72	71	a61
5	a46	a33	a35		--	--	58	63	65	70	71	70
6	54	--	--		--	--	57	63	64	63	a73	a68
7	55	32	--		--	--	63	58	66	67	--	71
8	58	41	--		--	--	41	a54	64	70	--	68
9	59	--	--		--	--	51	50	64	72	a67	69
10	59	43	32		32	--	50	54	66	71	--	68
11	58	42	--		32	--	51	56	63	66	67	69
12	58	40	--		32	--	50	61	68	64	--	63
13	a58	37	--		--	--	54	52	66	61	--	a61
14	45	--	--		--	--	57	62	65	64	--	--
15	a47	32	--		--	32	49	a55	65	69	75	63
16	--	a32	--		--	--	55	49	62	70	70	68
17	--	32	--		--	--	61	49	64	70	a66	68
18	--	--	--		--	--	--	53	64	69	a68	68
19	--	32	--		--	--	a57	--	65	68	69	a60
20	--	32	--		--	32	56	59	63	69	a68	69
21	--	32	--		--	--	46	54	66	69	a67	69
22	44	32	--		--	32	49	48	65	67	70	69
23	--	33	--		--	32	55	52	66	a67	a68	69
24	51	32	--		--	--	59	52	63	69	a70	69
25	45	33	--		--	--	60	58	64	69	--	70
26	--	32	--		--	32	61	53	62	a71	68	70
27	47	32	--		--	32	66	54	65	74	--	68
28	50	32	--		--	32	a62	63	67	72	--	69
29	a39	--	--		--	32	59	59	69	72	--	70
30	--	--	--		--	38	53	59	70	72	--	70
31	--	--	--		--	41	--	63	--	73	--	--
Average	--	--	b32		b32	b32	54	57	64	69	--	67

a Observation made before 12 m.
b Includes estimated temperature, 32°F, on missing days.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

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	321	6	5	166			249		
2	291	6	5	150			237		
3	297	20	a 16	165			228	18	
4	442	650	b 800	175			216		
5	386	900	b 950	185			158	20	
6	314	1,000	848	186			120	--	
7	276	155	116	180			115	--	
8	267	85	61	192			110	--	
9	276	68	51	180			120	--	
10	240	50	32	183			125	82	
11	219	38	22	180			120	--	
12	216	26	15	177			110	--	
13	225			172			94	--	
14	204	27		158			92	--	
15	192			163			98	--	
16	201	--		155	51	25	105	--	e 10
17	207	26	e 22	150			110	--	
18	198	--		150			105	--	
19	192	--		165			98	--	
20	192	--		180			94	--	
21	189	--		165			110	--	
22	195	86	45	150			115	--	
23	198	88	b 48	140			110	--	
24	198	95	51	150			100	--	
25	195	103	54	160			94	--	
26	198	104	b 55	204			96	--	
27	198	90	48	246			100	--	
28	189	72	37	246			105	--	
29	189	96	49	279			110	--	
30	186	--	e 40	258			110	--	
31	186	--	e 40	--	--	--	94	--	
Total-	7,277	--	3,586	5,410	--	750	3,848	--	310

	January			February			March		
1	80	--		150	--		125	--	
2	84	--		155	--		125	--	
3	82	--		160	--		120	--	
4	86	15		170	--		125	--	
5	92	--		165	6		130	20	
6	96	--		165	--		135	--	
7	94	--		170	--		150	--	
8	90	--		170	--		145	--	
9	86	--		175	--		150	--	
10	84	--		175	35		160	--	e 10
11	90	--		170	35		160	--	
12	98	7		155	42		145	--	
13	105	--		145	--		145	--	
14	110	--		140	--		145	--	
15	110	--		130	--	e 10	155	12	
16	115	--	e 4	135	--		165	--	
17	115	--		145	--		160	--	
18	105	--		140	--		155	--	
19	100	--		130	--		150	42	17
20	100	--		130	--		150	12	5
21	74	--		130	--		135	30	a 10
22	78	--		125	--		135	40	14
23	76	--		125	--		140	40	15
24	84	--		125	--		145	30	a 12
25	110	--		115	--		145	30	a 12
26	135	--		105	--		150	26	11
27	130	--		120	--		195	60	32
28	145	--		130	--		240	135	88
29	150	--		135	--		320	460	b 400
30	160	--		--	--	--	470	760	b 950
31	160	--		--	--	--	360	500	486
Total-	3,224	--	124	4,185	--	290	5,330	--	2,232

e Estimated.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER ABOVE BEDTICK CREEK NEAR DOUGLAS, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	324	195	171	2,630	220	1,560	4,710	620	7,880
2	314	80	68	2,500	193	1,300	4,620	450	5,610
3	282	83	63	2,450	160	1,060	4,730	530	6,770
4	249	55	37	2,460	155	1,030	5,660	1,700	26,000
5	222	25	15	3,320	668	5,990	5,830	1,790	28,200
6	204	26	14	3,400	560	5,140	7,470	840	16,900
7	195	31	16	3,310	372	3,320	7,530	600	12,200
8	195	29	15	3,220	280	2,430	7,560	490	10,000
9	243	42	28	3,340	308	2,780	7,530	420	8,540
10	294	43	34	3,430	252	2,330	7,500	370	7,490
11	346	73	68	3,320	208	1,860	7,410	362	7,240
12	374	60	61	3,270	195	1,720	7,710	350	7,290
13	342	34	31	3,190	135	1,160	8,430	352	8,010
14	314	22	19	3,110	135	1,130	8,560	368	8,500
15	318	21	18	3,090	127	1,060	8,190	350	7,740
16	414	50	56	3,140	204	1,730	7,120	315	6,060
17	442	50	60	3,040	204	1,670	6,820	300	5,520
18	455	57	70	2,850	180	1,390	5,850	240	3,790
19	953	878	s 3,800	2,750	148	1,100	5,790	200	3,130
20	2,480	1,370	9,170	2,670	133	959	5,450	222	3,270
21	2,570	760	5,270	2,650	95	680	4,180	230	2,600
22	2,560	570	3,940	2,710	195	1,430	4,040	254	2,770
23	2,350	420	2,660	3,270	1,640	14,500	3,860	215	2,240
24	2,260	375	2,290	4,230	1,450	16,600	3,240	134	1,170
25	2,300	260	1,610	4,460	1,570	18,900	3,260	550	b 4,800
26	2,400	255	1,650	4,230	950	10,800	3,190	183	1,580
27	2,540	268	1,840	4,550	600	7,370	3,220	820	b 7,100
28	2,620	305	2,160	4,300	870	10,100	3,060	280	2,310
29	2,660	300	2,150	4,000	420	4,540	3,000	170	1,380
30	2,660	250	1,800	3,690	250	2,490	2,960	150	b 1,200
31	--	--	--	4,570	600	7,400	--	--	--
Total	33,880	--	39,184	103,150	--	135,529	168,480	--	217,290

Day	July			August			September		
1	2,930	125	989	5,290	112	1,600	4,940	116	1,550
2	2,910	100	786	5,320	114	1,640	4,200	137	1,550
3	2,910	140	1,100	5,380	670	9,730	4,120	90	1,000
4	2,920	115	907	5,340	200	2,880	4,060	80	b 900
5	2,880	115	894	5,380	208	3,020	4,000	103	1,110
6	2,880	113	879	5,320	182	2,610	4,000	104	1,120
7	2,890	130	1,010	5,320	150	a 2,200	4,010	97	1,050
8	2,870	110	852	5,340	170	a 2,400	3,860	80	834
9	2,850	75	577	4,730	150	1,920	3,540	104	994
10	2,960	92	735	3,600	121	1,180	3,490	115	1,080
11	3,890	307	3,220	3,490	95	895	3,480	82	770
12	4,060	320	3,510	3,320	--	e 900	3,490	57	537
13	4,120	770	8,560	3,240	--	e 750	3,460	76	710
14	4,020	490	5,320	3,190	--	e 600	3,440	75	b 700
15	3,980	215	2,310	3,180	65	558	3,450	71	661
16	4,040	160	1,740	4,510	120	1,460	3,450	47	438
17	5,200	300	4,210	4,730	158	2,020	3,440	62	576
18	5,250	248	3,520	4,710	188	2,390	3,460	48	448
19	5,390	195	2,840	4,730	186	2,380	3,490	50	471
20	5,430	209	3,060	4,870	400	sa 5,600	3,490	45	424
21	5,450	227	3,340	5,410	1,100	sa 17,000	3,500	62	586
22	5,450	286	4,210	5,230	222	3,130	3,400	57	523
23	5,470	168	2,480	5,230	175	2,470	2,790	44	331
24	5,480	170	b 2,500	5,250	157	2,220	2,670	48	346
25	5,410	193	2,820	5,250	160	b 2,300	2,620	35	248
26	5,120	165	2,280	5,230	164	2,320	2,590	27	b 190
27	5,120	190	2,630	5,230			3,260	72	634
28	5,160	168	2,340	5,210	--	e 2,100	3,240	97	848
29	5,210	200	2,810	5,200			2,750	48	356
30	5,210	216	3,040	5,250			2,660	48	345
31	5,230	160	2,260	5,250	139	1,970	--	--	--
Total	132,690	--	77,729	148,730	--	84,543	104,350	--	21,330

Total discharge for year (cfs-days) 720,554
Total load for year (tons) 582,897

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-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 June 1952
(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	Water 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. 19, 1952...	8:30 a.m.	698		258	2,200	40	55	66	78	91	97	97	100				BWCM
Apr. 19	12:00 p.m.	2,400		2,040	5,560	--	46	--	72	--	93	--	--				SPWCM
May 7	11:40 a.m.	3,300	59	328	2,620	26	39	47	57	67	77	84	95		98	100	BWCM
June 4	1:15 p.m.	5,620		3,830	4,910	--	61	--	79	--	94	--	--				SPWCM

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.

LOCATION (revised).--Four hundred feet upstream from gaging station, 1½ miles southeast of Cassa, Platte County, 5½ miles downstream from Horseshoe Creek, and about 8 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 1952.
Sediment records: March 1947 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 75°F July 10, 11, 27; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 6,700 ppm June 27; minimum daily, not determined.
Sediment loads: Maximum daily, 83,000 tons June 27; minimum daily, not determined.
EXTREMES, 1947-52.--Water temperatures (1949-52): Maximum, 78°F July 11, 1950; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 10,500 ppm July 13, 1949; minimum daily, not determined.
Sediment loads: Maximum daily, 121,000 tons July 13, 1949; minimum daily, not determined.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 6:00 a. m. and 11:00 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	--	--	--	35	--	41		--	71	70	58
2	61	33	40	32	--	32	39		--	68	72	55
3	a57	a42	33	--	35	--	47		--	67	70	57
4	56	35	38	32	--	--	a55		--	70	68	62
5	a49	a36	35	--	a35	--	a58		--	70	68	64
6	46	a38	--	32		36	a61		--	68	68	65
7	53	32	--	--	a34	--	a56		68	62	70	65
8	a59	41	34	a33	--	35	a40		--	64	68	66
9	a62	35	--	--	39	--	39		64	65	68	66
10	53	39	a32	33	--	35	41		66	75	67	62
11	57	40	--	--	a39	--	40		65	75	67	61
12	--	--	33	34	--	34	42		65	68	65	65
13	a56	35	--	--	34	--	43		67	68	68	62
14	a60	--	a32	34	--	35	42		67	62	70	56
15	55	--	--	--	33	--	44		68	62	65	56
16	a44	--	--	34	--	34	45		64	67	68	57
17	44	--	32	--	a34	--	46		--	71	68	57
18	a49	--	a32	33	--	33	55		65	69	69	69
19	a52	--	--	--	34	a38	49	a61	61	68	66	62
20	46	--	32	34	--	34	56		61	68	68	62
21	a41	--	--	--	35	32	49		64	65	68	66
22	43	33	33	32	32	32	--		65	68	65	60
23	a52	33	33	--	34	34	--		62	66	68	60
24	a54	--	--	32	--	35	--		65	70	68	62
25	--	--	a32	--	33	a41	--		62	73	70	63
26	a40	--	--	33	--	37	--		63	72	67	63
27	44	--	a32	--	34	41	--		61	75	69	64
28	a50	--	--	a34	--	40	--		62	71	66	62
29	51	a40	34	--	34	36	--		66	74	66	62
30	--	36	--	32	--	38	--		69	67	66	60
31	40	--	a32	--	--	38	--		--	71	63	--
Average	51	--	b33	b32	--	--	--	--	64	69	68	62

a Observation made between 1 p. m. and 6 p. m.
b Includes estimated 32°F on missing days, Dec. 14 to Jan. 31.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	470	12	15	216			300		
2	405	5	5	170			290		
3	385	5	5	208			285		
4	405	7	8	236			270	19	14
5	512	600	a 850	290			256		
6	464	403	505	285			236		
7	400	186	201	256			162		
8	355	226	217	244			138		
9	340	135	124	240			145		
10	340	82	75	236			138		
11	320	27	23	232			134		
12	300			224			212		
13	280			220			244		
14	280			220			180		
15	265	29	21	216	23	14	140		
16	260			180			150		
17	270			117			155		
18	265			140			150		
19	260			180			130	26	11
20	256			232			120		
21	256			300			130		
22	256			295			135		
23	252			248			145		
24	248			216			140		
25	248	27	18	196			135		
26	256			184			140		
27	252			228			145		
28	248			275			150		
29	244			310			155		
30	236			300			160		
31	240			--			130		
Total-	9,568	--	2,412	6,894		420	5,400	--	359

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	120			175			170		
2	125			185			165		
3	120			200			160		
4	120			200			155		
5	130			205			160		
6	140			215			165		
7	140			220			170		
8	130			235			180	9	4
9	125			250			190		
10	125			260			205		
11	125			270			210		
12	130			270			200		
13	140			260			200		
14	150			230			200		
15	145			210	7	4	215		
16	150	11	4	210			225		
17	160			210			230		
18	155			205			230		
19	135			190			215		
20	135			180			200		
21	120			185			200		
22	105			170			190	32	19
23	105			180			200		
24	115			170			210		
25	130			160			215		
26	140			150			235		
27	150			155			270		
28	165			165			300	220	sa 210
29	175			170			458	750	sa 1,000
30	180			--			597	1,230	1,980
31	175			--			597	920	1,480
Total-	4,260		124	5,885	--	116	7,317	--	4,958

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	494	550	734	3,420	342	3,160	5,380	710	10,300
2	434	210	246	3,240	278	2,430	5,310	630	9,030
3	410	80	89	3,100	264	2,210	5,550	900	sa16,000
4	380	42	43	2,990	218	1,760	7,320	2,040	40,300
5	350	24	23	3,240	237	2,070	6,700	1,600	28,900
6	330	24	21	3,770	660	6,720	7,370	1,890	37,600
7	330	20	18	3,690	575	5,730	8,160	900	19,800
8	440	220	a260	3,550	450	4,310	8,020	696	15,100
9	566	148	226	3,510	250	2,370	7,940	580	12,400
10	530	98	140	3,620	298	2,910	7,860	565	12,000
11	548	52	77	3,570	290	2,800	7,710	472	9,820
12	578	50	78	3,460	240	2,240	7,600	432	8,860
13	639	57	98	3,330	220	1,980	7,860	400	8,490
14	611	50	82	3,240	210	1,840	8,080	435	9,490
15	597	45	72	3,170	162	1,390	8,110	370	8,110
16	702	60	114	3,260	162	1,430	7,300	400	7,860
17	770	86	179	3,510	218	2,070	6,920	330	6,160
18	770	59	123	3,410	248	2,280	6,170	270	4,500
19	900	85	a200	3,260	200	1,760	5,810	243	3,810
20	1,880	1,020	s6,740	3,150	140	1,190	5,810	230	3,610
21	2,990	1,770	14,300	3,140	70	593	4,800	197	2,550
22	3,080	820	6,820	3,170	200	1,710	4,120	170	1,890
23	2,880	520	4,040	4,020	2,330	s26,700	4,000	86	929
24	2,690	412	2,990	5,260	2,220	31,500	3,600	95	923
25	2,690	353	2,560	5,690	1,390	21,400	3,260	260	2,290
26	2,870	380	2,940	5,430	1,420	20,800	3,500	1,500	sb19,000
27	3,030	293	2,400	5,550	1,300	19,500	4,580	6,700	a83,000
28	3,240	380	3,320	5,910	1,080	17,200	3,370	2,080	18,900
29	3,300	420	3,740	5,170	960	13,400	3,150	520	4,420
30	3,420	402	3,710	4,680	630	7,960	3,100	235	1,970
31	--	--	--	4,700	520	6,600	--	--	--
Total	42,449	--	56,383	120,210	--	220,013	178,460	--	408,032

	July			August			September		
1	3,080	175	1,440	5,330	70	1,010	5,500	190	2,820
2	2,990	140	1,130	5,400	150	2,190	4,660	118	1,480
3	2,960	90	719	5,380	100	1,450	4,360		
4	2,970	66	529	5,430	490	7,180	4,320		
5	2,970	78	625	5,430	265	3,890	4,300		
6	2,970	75	601	5,380	230	3,340	4,300		
7	3,010	150	1,220	5,380	160	2,320	4,320		
8	2,990	106	856	5,330	95	1,370	4,300		
9	2,970	45	361	5,330	132	1,900	3,960		
10	2,960	55	439	4,060	110	a1,280	3,800		
11	3,050	142	s1,420	3,590	35	339	3,780	52	559
12	4,180	570	6,430	3,500	127	1,200	3,770		
13	4,480	1,610	19,500	3,350	55	497	3,780		
14	4,300	1,000	11,600	3,280	57	505	3,770		
15	4,260	420	4,830	3,240	23	201	3,750		
16	4,200	332	3,760	3,680	120	sb1,400	3,750		
17	4,700	340	4,310	4,720	162	2,060	3,730		
18	5,280	470	6,700	4,740	85	1,090	3,710		
19	5,360	560	8,100	4,760	95	1,220	3,690	148	1,470
20	5,430	432	6,330	4,800	172	2,230	3,730	156	1,570
21	5,450	390	5,740	5,640	1,060	16,100	3,710	160	a1,600
22	5,430	247	3,620	5,330	880	12,700	3,710	150	a1,500
23	5,430	262	3,840	5,330	333	4,790	3,370	150	a1,400
24	5,500	230	3,420	5,310	226	3,240	2,940	152	1,210
25	5,520	204	3,040	5,310	282	4,040	2,870	147	1,140
26	5,280	128	1,820	5,310	150	2,150	2,810	150	1,140
27	5,170	143	2,000	5,360	125	1,810	2,990	70	565
28	5,190	130	1,820	5,430	180	2,640	3,570	86	829
29	5,220	82	1,160	5,330	187	2,690	3,280	70	a600
30	5,260	120	1,700	5,380	207	3,010	2,920	71	560
31	5,310	79	1,130	5,400	168	2,450	--	--	--
Total	133,850	--	110,190	151,240	--	92,292	113,450	--	26,828

Total discharge for year (cfs-days) 778,983
Total load for year (tons) 922,127

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(*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	Water 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. 20, 1952 ...	6:30 p.m.	2,830		1,880	4,320		32	--	62	--	95	--	--		--		SPWCM
May 6.....	7:15 p.m.	3,750		720	1,780	32	38	47	59	70	82	90	95		98	100	BWCM
June 4	6:20 a.m.	7,300		1,940	2,240		42	--	58	--	79	--	--		--		SPWCM
Aug. 21.....	12:35 p.m.	6,340	71	1,710	2,670		44	56	71	86	90	95	99		100		BWCM

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 1952.
Water temperatures: October 1951, April to September 1952.
Sediment records: April 1947 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Minimum, 306 ppm May 2-10.
Hardness: Minimum, 160 ppm May 2-10.
Specific conductance: Minimum daily, 433 micromhos May 8.
Sediment concentrations: Maximum daily, 170 ppm Apr. 7; minimum daily, no flow on many days during November and December.
Sediment loads: Maximum daily, 1,500 tons Aug. 22; minimum daily, 0 ton on many days during November and December.
EXTREMES, 1947-52.--Sediment concentrations: Maximum daily, 1,370 ppm July 16, 1947; minimum daily, no flow on many days during November and December 1951.
Sediment loads: Maximum daily, 16,600 tons July 16, 1947; minimum daily,0 ton on many days during November and December 1951.
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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-12, 1951	461			65	24	75		182	0	222	19		2.0	0.08	534	0.73	665	260	111	39	2.0	780	7.8
Oct. 13-23	322			82	31	98		218	0	318	24		1.8	.12	698	.95	607	332	153	39	2.3	982	7.6
Oct. 24-31	297			95	32	106		236	10	342	25		1.1	.18	780	1.06	625	370	160	38	2.4	1,070	8.3
Jan. 3, 1952	10			128	37	118		304	0	405	33		3.5	.10	932	1.27	25	472	223	35	2.4	1,230	7.7
Feb. 5	20			113	36	108		277	0	395	29		2.2	.10	838	1.14	45	432	205	35	2.3	1,170	7.6
Mar. 4	164			119	42	121		288	0	415	34		4.6	.12	942	1.28	417	468	232	36	2.4	1,280	7.5
Mar. 20	166			109	45	118		280	0	418	33		4.0	.12	926	1.26	415	456	226	36	2.4	1,260	7.5
Apr. 1-6	546			93	47	111		254	0	398	28		4.1	.11	858	1.17	1,260	426	218	36	2.3	1,190	7.6
Apr. 7-16	988			92	31	100		216	0	341	29		2.5	.08	726	.99	1,940	358	181	38	2.3	1,050	7.8
Apr. 17-24	1,176			80	24	87		184	0	289	23		1.2	.05	626	.85	1,990	300	149	39	2.2	891	7.8
Apr. 25-27	1,529			63	20	62		158	0	217	17		1.3	.06	490	.67	2,020	240	110	35	1.7	712	7.7
Apr. 28-May 1	3,410			52	16	42		140	0	146	22		1.2	.05	368	.50	3,390	194	79	31	1.3	550	7.5
May 2-10	3,556			44	12	30		131	0	111	8.0		1.0	.04	306	.42	2,940	160	53	28	1.0	444	7.4
May 11-24	3,361			49	14	34		144	0	122	9.0		.8	.04	326	.44	2,960	181	63	29	1.1	499	7.5
May 25-July 1	5,696			50	16	35		148	0	132	10		1.0	.04	340	.46	5,230	190	69	28	1.1	514	7.9
July 2-4	3,639			52	16	39		154	0	138	9.6		1.0	.06	352	.48	3,460	196	70	30	1.2	539	7.6
July 5-10	4,607			55	17	41		158	0	139	11		.6	.06	362	.49	4,500	208	78	30	1.2	562	7.7

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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)	Chlorids (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 (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 11-Aug. 2, 1952	4,965			51	17	38		152	0	134	11		1.2	0.06	352	0.48	4,720	198	73	29	1.2	529	7.4
Aug. 3-31	4,771			49	16	37		150	0	127	10		.7	.07	334	.45	4,300	189	66	30	1.2	515	7.6
Sept. 1-23	3,946			49	17	37		151	0	126	10		.6	.03	330	.45	3,520	191	67	30	1.2	514	7.8
Sept. 24-30	3,108			51	17	39		156	0	131	11		.4	.05	348	.47	2,920	196	68	30	1.2	532	7.9
Weighted average [a]	3,448			51	17	39		[b]152	--	138	11		0.9	0.05	356	0.48	3,310	197	72	30	1.2	538	--
Weighted average [c]	2,085			52	17	40		[b]154	--	142	11		1.0	0.05	363	0.49	2,040	200	74	30	1.2	548	--

a Represents 98 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement between 6:00 a. m. and 10:00 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58						--	54	--	--	72	67
2	--						--	57	--	69	73	66
3	--			33			42	57	62	68	--	--
4	--						--	--	63	--	--	63
5	52				37		--	--	64	70	71	64
6	48						--	60	65	70	71	66
7	--						a43	--	67	--	72	--
8	--						42	60	--	70	71	--
9	--						42	--	--	70	70	68
10	--						40	57	67	--	--	68
11	55						42	--	67	--	--	68
12	55						45	58	68	72	68	67
13	56						45	58	68	70	--	66
14	53						43	58	68	68	70	--
15	52						44	58	--	65	71	--
16	--						45	56	--	68	71	63
17	--						45	55	67	70	--	61
18	--						46	--	67	72	--	61
19	43						47	--	65	71	71	61
20	47					35	50	57	--	--	71	61
21	--						50	57	65	--	70	--
22	40						48	57	65	--	68	--
23	42						48	55	--	70	68	--
24	--						50	55	--	70	--	60
25	--						--	--	--	71	--	60
26	--						52	--	67	72	71	60
27	--						54	56	68	--	71	60
28	--						53	57	68	--	--	--
29	44						55	58	--	--	68	61
30	--						55	58	--	71	68	60
31	--						--	58	--	71	--	--
Average	--						--	--	--	--	--	--

a Observation made at 11 p.m.

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	753	52	106	270	104	76	0		0
2	472	70	89	245			0		0
3	466	75	a 95	187			0		0
4	472	72	92	290			0		0
5	499	78	105	265			0		0
6	570	46	a 70	350			0		0
7	472	70	b 90	315			0		0
8	417	65	73	270			0		0
9	310	57	s 53	295			111		e 30
10	325	65	b 55	290		e 60	0		0
11	466	68	86	285			0		0
12	315	64	s 63	280			0		0
13	361	60	58	285			65		e 15
14	270	42	31	305			0		0
15	325	67	s 68	270			0		0
16	345	90	s 94	320			10		e 3
17	361	80	78	367			81		e 26
18	330	120	b 110	60			25		e 10
19	330	152	135	0		0	56		e 15
20	310	145	121	0		0	71		e 20
21	305	130	a 110	0		0	35		e 5
22	305	102	84	0		0	10		
23	295	70	56	0		0	10		
24	295	--		0		0	10		
25	295	--		0		0	10		
26	295	--		0		0	10		
27	305	--	e 75	0		0	10		e 1
28	305	--		0		0	10		
29	300	121		0		0	10		
30	285	--		0		0	10		
31	295	--		--		--	10		
Total	11,449	--	2,522	4,949		1,096	554		134

Day	January			February			March		
1	10			20			107	--	
2	10			20			110	--	
3	10	12		20			151	--	
4	10			20			164	4	
5	10			20	30		164	--	
6	10			20			164	--	
7	10			20			126	--	
8	10			20			20	--	
9	10			20			20	--	
10	67			20			129	--	
11	10			20			123	--	
12	10			105			107	--	
13	10			104			170	--	
14	10			104			106	--	
15	10			104		e 2	106	--	
16	10		(t)	105			107	--	e 5
17	10			106			106	--	
18	10			101			141	--	
19	10			148			197	--	
20	10			64			166	2	
21	10			20			196	--	
22	18			63			111	--	
23	10			39			119	--	
24	10			20			333	--	
25	10			44			179	--	
26	10			106			209	--	
27	10			107			133	--	
28	10			107			176	--	
29	10			107			20	--	
30	10			--		--	20	--	
31	10			--		--	319	--	
Total	375		12	1,774		58	4,299	--	155

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.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, water year October 1951 to September 1952--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	576			3,660			5,640	28	a 420
2	636			3,620			5,610	28	424
3	594			3,590			5,660	25	382
4	600	--	e 80	3,570	21	204	6,700	27	488
5	528			3,570			7,380	28	558
6	340			3,570			7,430	30	602
7	672	170	sb 400	3,590			7,770	35	734
8	802	85	b 180	3,620			7,770	40	a 850
9	902	57	139	3,500			7,800	39	821
10	942	57	145	3,370	15	140	7,740	34	710
11	999	30	81	3,380			7,770	28	587
12	999			3,380			7,710	26	541
13	999	42	125	3,420			7,740	25	522
14	1,200			3,590			7,100	22	422
15	1,210			3,980			6,960	28	b 550
16	1,160			3,520			7,040	45	855
17	1,170			3,100			6,510	22	387
18	1,170			2,960	10	87	5,640	20	303
19	1,170			3,010			5,610		
20	1,170			3,060			5,350	17	246
21	1,170	19	63	3,040			5,110	15	207
22	1,190			3,040			3,780	15	153
23	1,190			3,040			3,940		
24	1,180			4,520	8	98	4,140		
25	1,360			5,180	9	a 130	4,030	10	106
26	1,480			5,520	12	179	3,860		
27	1,750			5,540	33	494	3,620		
28	3,080	21	166	5,610	36	545	3,160	8	68
29	3,370			5,640	33	503	3,180	8	b 70
30	3,540			5,640	31	472	3,200	8	b 70
31	--	--	--	5,640	29	442	--	--	--
Total	37,149	--	3,282	121,470	--	6,001	174,950	--	11,803

Day	July			August			September		
1	3,320	12	108	4,880	24	316	4,410	25	298
2	3,550	9	86	4,880	17	224	4,350	23	270
3	3,640	10	98	4,880	15	b 200	4,230	15	b 170
4	3,720	10	a 100	4,880	15	b 200	4,120	10	111
5	4,160	8	90	4,880	15	198	4,010	8	87
6	4,340	8	94	4,860	21	276	3,960	10	107
7	4,520	8	98	4,840	17	222	3,960	10	a 110
8	4,600	9	112	4,820	16	208	3,960	9	96
9	4,960	11	147	4,820	18	234	4,010	8	87
10	5,070			4,820	18	b 240	4,030	8	87
11	5,130	28	385	4,820	16	b 200	4,010	10	108
12	5,090			4,780	13	168	4,000	12	130
13	5,090			4,760	15	a 190	3,940	16	170
14	5,070	56	766	4,720	18	229	3,890	17	a 180
15	5,020	58	786	4,680	23	291	3,840	17	176
16	4,960	58	777	4,780	40	516	3,740	18	182
17	5,000	67	904	4,800	60	b 800	3,660	20	198
18	5,090	102	1,400	4,800	80	1,040	3,690	21	209
19	5,000	73	985	4,800	77	998	3,740	17	172
20	4,960	60	a 800	4,820	82	1,070	3,780	19	194
21	4,980	50	672	4,880	93	1,220	3,760	20	b 200
22	4,980	44	a 600	4,840	115	1,500	3,810	20	b 200
23	4,920	39	518	4,820	76	989	3,840	22	b 220
24	4,920	35	465	4,800	50	b 650	3,830	22	228
25	4,920	28	372	4,800	43	557	3,860	25	260
26	4,900	27	357	4,740	37	474	3,670	31	307
27	4,900	28	a 360	4,720	31	395	3,350	35	316
28	4,900	27	357	4,680	30	379	2,840	42	322
29	4,880	25	329	4,560	30	369	2,280	42	258
30	4,860	25	328	4,480	27	326	1,930	27	141
31	4,860	25	328	4,470	26	a 320	--	--	--
Total	146,310	--	13,577	148,110	--	14,999	112,500	--	5,594

Total discharge for year (cfs-days) 763,889
Total load for year (tons) 59,233

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.

LOCATION.--At bridge at gaging station at east edge of Idaho Springs, Clear Creek County, and three-quarters of a mile downstream from Soda Creek.
DRAINAGE AREA.--264 square miles.
RECORDS AVAILABLE.--Water temperatures: April to September 1952.
Sediment records: April to September 1952.
EXTREMES, April to September 1952.--Water temperatures: Maximum, 62°F Sept. 4.
Sediment concentrations: Maximum daily, 3,900 ppm June 10; minimum daily, 10 ppm Apr. 16, Sept. 30.
Sediment loads: Maximum daily, 22,000 tons June 10; minimum daily, 1 ton Apr. 16.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, April to September 1952
(Once-daily temperature measurement between 7:00 a. m. and 2:00 p. m.)

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

a Observation made between 3 p. m. and 8 p. m.

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Suspended sediment, April to September 1952

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	--	--	--	172	36	a17	752	162	329
2	--	--	--	192	--	e40	817	205	452
3	--	--	--	250	--	e110	956	330	852
4	--	--	--	367	260	sa280	1,030	314	873
5	--	--	--	485	190	249	1,150	340	1,060
6	--	--	--	539	119	173	1,300	562	s2,070
7	--	--	--	527	85	121	1,430	770	2,970
8	--	--	--	545	68	100	1,520	850	3,490
9	--	--	--	527	49	70	1,620	740	3,240
10	--	--	--	473	39	50	1,970	3,900	sa22,000
11	--	--	--	438	26	31	1,860	1,400	a7,000
12	--	--	--	438	32	38	1,810	1,110	5,420
13	--	--	--	479	46	a60	1,750	725	3,420
14	--	--	--	551	82	122	1,730	600	2,800
15	54	12	2	611	90	148	1,760	835	3,970
16	55	10	1	593	79	126	1,680	507	s2,380
17	61	24	4	509	39	54	1,450	244	955
18	69	34	a6	461	27	34	1,350	169	616
19	83	42	a9	438	30	35	1,340	168	608
20	100	42	a11	422	27	31	1,350	170	620
21	119	48	15	411	28	31	1,280	141	487
22	103	23	6	384	28	29	1,200	109	353
23	100	--	e7	411	52	58	1,130	77	235
24	105	24	7	411	53	59	1,070	76	220
25	119	35	11	438	85	100	1,080	94	274
26	138	42	a16	485	108	141	1,100	94	279
27	186	68	34	497	94	126	1,120	102	308
28	214	60	35	527	85	121	1,020	86	237
29	203	48	26	599	112	181	1,020	74	204
30	178	22	10	680	152	279	997	76	204
31	--	--	--	746	137	276	--	--	--
Total	1,887	--	200	14,606	--	3,290	39,642	--	67,926

	July			August			September		
1	1,000	81	219	346	247	231	222	95	57
2	1,000	80	216	340	250	229	208	81	45
3	976	82	216	326	218	192	195	70	37
4	927	83	208	318	220	189	192	74	38
5	864	82	191	308	209	174	182	72	35
6	941	91	231	298	180	145	180	54	26
7	850	77	177	301	192	156	182	47	23
8	784	78	165	290	167	131	180	44	21
9	725	87	170	268	143	103	170	37	17
10	700	84	159	284	--	e220	162	30	13
11	645	99	172	336	420	sa420	155	34	14
12	620	108	181	274	157	116	150	32	13
13	580	107	168	259	125	87	160	32	14
14	555	110	165	259	115	80	150	21	8
15	535	102	147	274	220	sa170	135	21	8
16	500	106	143	253	84	57	148	26	10
17	480	97	126	245	88	58	158	38	16
18	490	106	140	242	92	60	137	18	7
19	490	112	148	232	84	53	128	19	7
20	440	113	134	250	150	a100	128	14	5
21	412	120	133	287	--	e190	128	15	5
22	390	123	130	280	165	125	126	15	5
23	378	147	150	245	140	a95	122	14	5
24	386	320	334	232	126	79	114	14	4
25	458	650	a800	218	87	51	112	13	4
26	466	700	a900	210	85	48	108	12	4
27	471	600	a750	218	91	54	108	12	4
28	462	473	590	235	160	sa110	108	15	4
29	444	429	514	268	220	a160	108	15	4
30	394	500	532	245	110	73	100	10	3
31	370	299	299	220	80	48	--	--	--
Total	18,733	--	8,608	8,361	--	4,004	4,456	--	456

Total discharge for period Apr. 15 to Sept. 30, 1952 (cfs-days) 87,685
Total load for period Apr. 15 to Sept. 30, 1952 (tons) 84,484

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Particle-size analyses of suspended sediment, May to July 1952
(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	Water 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 5, 1952	7:55 p. m.	533	--	226							52	64	80		90	98	S
June 6	9:40 p. m.	1,600	54	1,190							23	32	49		71	100	S
June 8	12:10 a. m.	1,500	46	1,130							19	32	54		81	96	S
June 10	8:45 a. m.	1,880	47	3,120							21	29	46		72	90	S
June 10	1:45 p. m.	1,700	--	4,030							22	30	46		73	93	S
June 11	6:55 a. m.	1,920	44	1,600							33	40	56		76	91	S
June 15	9:45 p. m.	2,000	49	1,380							28	38	52		72	90	S
July 26	10:40 a. m.	458	58	589							70	92	100		--	--	S

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.

LOCATION.--At gaging station, 2.3 miles upstream from mouth and 4½ miles southeast of Blackhawk, Gilpin County.
DRAINAGE AREA.--55.8 square miles.
RECORDS AVAILABLE.--Water temperatures: April to September 1952.
Sediment records: April to September 1952.
EXTREMES, April to September 1952.--Water temperatures: Maximum, 72°F Aug. 15.
Sediment concentrations: Maximum daily, 28,000 ppm June 11; minimum daily, 12 ppm Aug. 18, 19.
Sediment loads: Maximum daily, 10,000 tons June 7; minimum daily, 0.1 ton on several days.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, April to September 1952
(Once-daily temperature measurement between 8:00 a. m. and 12:00 m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	44	48	57	a67	52
2							--	47	48	57	a61	49
3							--	46	41	55	a62	63
4							--	48	49	60	a59	54
5							--	54	52	59	a59	70
6							--	46	52	57	67	a59
7							--	48	52	48	59	61
8							--	44	53	54	55	65
9							--	49	54	58	56	63
10							--	42	52	53	61	59
11							--	43	51	61	61	53
12							--	47	53	59	61	60
13							--	45	59	62	a61	59
14							--	46	57	57	57	59
15							45	45	57	58	a72	a56
16							--	38	50	59	a68	54
17							a54	39	52	57	61	57
18							a49	43	49	a58	a61	52
19							a48	41	52	a69	a60	62
20							a46	44	58	68	69	50
21							35	44	57	59	56	51
22							37	41	53	64	a68	a52
23							a44	38	53	62	63	a52
24							a48	47	54	61	66	54
25							a49	48	54	63	59	46
26							49	45	51	64	67	60
27							46	47	61	62	64	52
28							43	49	57	56	54	55
29							39	45	58	60	67	48
30							39	51	57	59	67	50
31							--	46	--	58	58	--
Average							--	45	53	59	62	56

a Observation made between 1 p. m. and 8 p. m.

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Suspended sediment, April to September 1952

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	--	--	--	39	410	43	166	370	166
2	--	--	--	48	1,000	a130	161	220	96
3	--	--	--	53	1,300	a190	174	2,200	sa1,300
4	--	--	--	82	1,500	a340	142	1,650	633
5	--	--	--	111	1,250	375	137	1,510	558
6	--	--	--	124	930	311	161	5,000	2,170
7	--	--	--	111	700	210	166	23,000	a10,000
8	--	--	--	101	420	114	153	18,100	7,480
9	--	--	--	104	260	73	137	26,600	9,840
10	--	--	--	96	170	44	140	21,700	8,200
11	--	--	--	84	119	27	116	28,000	a8,800
12	--	--	--	78	122	26	114	6,500	2,000
13	--	--	--	82	126	28	96	2,800	726
14	13	200	7.0	89	134	32	80	1,720	372
15	15	170	6.9	92	140	a34	75	1,370	277
16	16	220	9.5	96	125	32	64	950	164
17	18	390	19	84	69	16	57	720	111
18	23	520	32	84	64	14	54	770	112
19	25	750	a50	80	54	12	51	1,020	140
20	26	670	47	77	45	9.4	50	660	89
21	27	350	26	73	47	9.3	48	450	58
22	28	210	16	71	42	a8.0	45	370	45
23	24	350	23	82	180	40	43	380	44
24	30	730	59	87	230	54	40	270	29
25	29	1,200	a95	92	230	57	39	500	53
26	32	1,700	147	109	460	135	37	350	35
27	35	1,450	137	122	670	221	36	240	23
28	37	1,050	105	132	650	232	33	220	20
29	45	880	107	142	690	264	31	220	18
30	43	740	86	155	640	268	31	210	18
31	--	--	--	163	660	290	--	--	--
Total	466	--	972.4	2,943	--	3,638.7	2,677	--	53,577

Day	July			August			September		
1	29	280	22	5.2	63	0.9	3.7	23	0.2
2	27	230	17	4.6	80	a1.0	3.4	20	.2
3	26	160	11	4.6	38	.5	2.8	17	.1
4	24	210	14	4.9	20	.3	2.8	28	.2
5	24	190	12	4.6	19	.2	2.5	26	.2
6	24	280	18	4.6	17	.2	2.5	30	.2
7	24	370	24	4.3	30	a.3	3.1	38	.3
8	22	380	22	5.5	80	1.2	2.8	65	.5
9	18	220	11	4.3	23	.3	2.5	45	.3
10	18	140	6.8	4.3	32	a.4	2.5	30	.2
11	16	140	6.0	6.1	68	a1.1	2.4	25	.2
12	14	140	5.3	4.6	69	.8	2.4	23	.1
13	14	200	7.6	4.3	22	.2	2.4	23	.1
14	14	200	7.6	4.0	20	.2	2.4	21	.1
15	12	100	3.2	3.1	21	.2	2.2	31	.2
16	10	160	4.3	3.1	21	.2	2.2	23	.1
17	9.7	380	10	2.8	17	.1	2.4	25	.2
18	9.7	110	a2.8	2.8	12	.1	2.2	24	.1
19	10	440	a12	2.8	12	.1	2.2	24	.1
20	7.3	340	a6.5	6.4	740	s31	2.2	24	.1
21	6.7	80	1.4	7.9	160	s4.1	2.4	25	.2
22	6.1	100	1.6	5.5	40	.6	2.4	39	.2
23	6.1	120	2.0	4.3	470	5.4	2.0	44	.2
24	6.1	100	1.6	4.0	70	.8	1.9	27	.1
25	9.7	440	s18	3.1	24	.2	1.9	28	.1
26	8.5	80	1.8	3.1	25	.2	1.9	21	.1
27	6.1	32	.5	3.1	40	.3	2.0	21	.1
28	7.3	24	.5	4.0	35	a.4	2.0	22	.1
29	7.9	20	.4	6.1	88	1.4	2.0	28	.2
30	6.1	17	.3	4.3	49	.6	2.0	25	.1
31	5.2	18	.2	3.1	24	.2	--	--	--
Total	428.5	--	251.4	135.4	--	53.5	72.1	--	5.1

Total discharge for period Apr. 14 to Sept. 30, 1952 (cfs-days) 6,722.0
Total load for period Apr. 14 to Sept. 30, 1952 (tons) 58,498.1

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 14, 1952	2:00 p. m.	11	--	205	--	--	--	--	--	--	48	56	77	96	--	--	S
Apr. 15	11:50 a. m.	14	45	134	--	--	--	--	--	--	48	51	63	82	--	--	S
Apr. 16	4:30 p. m.	18	--	257	--	--	--	--	--	--	41	44	53	66	75	86	S
Apr. 17	6:00 p. m.	20	--	712	--	--	--	--	--	--	32	36	45	62	78	91	S
May 5	3:00 p. m.	119	57	954	--	--	--	--	--	--	16	27	48	75	92	99	S
May 5	9:05 p. m.	129	44	1,600	--	--	--	--	--	--	27	38	59	81	91	93	S
May 6	10:00 a. m.	124	46	62	--	--	--	--	--	--	16	25	47	75	93	--	S
June 3	11:55 p. m.	161	44	3,130	--	--	--	--	--	--	18	32	53	76	90	98	S
June 6	7:30 p. m.	176	54	8,690	--	--	--	--	--	--	17	32	56	80	93	99	S
June 7	9:10 a. m.	198	52	16,900	--	--	--	--	--	--	14	29	57	86	96	99	S
June 7	5:50 p. m.	206	58	42,300	14,800	--	7	--	11	--	25	38	60	82	93	98	SPWCM
June 7	11:55 p. m.	166	46	22,400	4,880	--	4	--	7	--	16	26	50	75	88	94	SPWCM
June 8	5:15 p. m.	161	59	20,700	--	--	--	--	--	--	11	24	48	74	88	96	S
June 8	11:45 p. m.	114	48	27,100	5,410	--	4	--	7	--	14	23	42	68	86	95	SPWCM
June 9	8:45 a. m.	94	54	30,000	4,670	--	3	--	5	--	11	17	34	61	81	93	SPWCM
June 9	11:40 p. m.	132	48	24,600	--	--	--	--	--	--	9	15	29	50	72	86	S
June 10	5:50 p. m.	181	58	20,000	--	--	--	--	--	--	6	13	27	54	77	91	S
June 11	9:00 a. m.	129	51	26,000	--	--	--	--	--	--	2	5	14	40	73	90	S
June 11	4:55 p. m.	99	58	41,400	--	--	--	--	--	--	2	4	12	34	63	86	S
June 12	9:15 a. m.	104	53	5,300	--	--	--	--	--	--	5	10	23	50	78	93	S
June 13	8:00 p. m.	94	54	2,510	--	--	--	--	--	--	6	12	27	56	78	92	S
June 14	7:50 p. m.	84	56	1,700	--	--	--	--	--	--	8	15	30	56	78	92	S
June 20	11:05 a. m.	49	60	422	--	--	--	--	--	--	17	25	39	63	87	97	S
June 20	11:20 a. m.	48	60	404	--	--	--	--	--	--	16	26	38	64	83	93	S
June 21	10:30 a. m.	50	57	240	--	--	--	--	--	--	18	28	44	68	90	96	S
July 14	2:50 p. m.	14	62	106	--	--	--	--	--	--	30	39	45	61	78	92	S
Aug. 20	6:30 p. m.	19	60	3,940	2,930	35	43	62	78	94	97	100	--	--	--	--	BWCM
Aug. 20	7:50 p. m.	13	58	3,140	1,950	45	55	73	88	98	99	100	--	--	--	--	BWCM
Aug. 23	8:00 p. m.	4.6	61	1,620	1,160	53	65	78	88	96	98	100	--	--	--	--	BWCM
Aug. 23	10:00 p. m.	4.3	58	2,100	2,750	--	66	--	90	--	94	95	96	97	98	--	SPWCM

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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 1952.
Water temperatures: December 1950 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,390 ppm Sept. 5-30; minimum, 256 ppm June 8-12.
Hardness: Maximum, 704 ppm Sept. 5-30; minimum, 141 ppm June 8-12.
Specific conductance: Maximum daily, 1,840 micromhos Nov. 3, 20; minimum daily, 388 micromhos June 11.
Water temperatures: Maximum, 68°F June 15, 30, Aug. 23; minimum, freezing point on many days during November to March.
EXTREMES, 1950-52.--Dissolved solids: Maximum, 1,390 ppm Sept. 5-30, 1952; minimum, 256 ppm June 8-12, 1952.
Hardness: Maximum, 704 ppm Sept. 5-30, 1952; minimum, 141 ppm June 8-12, 1952.
Specific conductance: Maximum daily, 1,840 micromhos Nov. 3, 20, 1951; minimum daily, 388 micromhos June 11, 1952.
Water temperatures: Maximum, 72°F Aug. 1, 2, 6, 1951; minimum, 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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-25, 1951 ..	613					144		--	630	--				--	--	--	620	--	34	2.5	--	--	
Oct. 26-Nov. 26 ..	639					144		399	585	39				1,320	1.80	2,280	676	349	32	2.4	1,720	7.6	
Nov. 27-Dec. 15 .	638					134		--	555	--				--	--	--	635	--	31	2.3	--	--	
Dec. 16-Jan.10,1952	586					136		--	548	--				--	--	--	676	--	30	2.3	--	--	
Jan. 11-31	632					127		296	535	38				1,160	1.58	1,980	594	351	32	2.3	1,520	7.9	
Feb. 1-29.....	551					141		316	600	41				1,290	1.75	1,920	650	391	33	2.4	1,650	7.8	
Mar. 1-24	496					132		298	500	38				1,240	1.69	1,660	625	381	35	2.3	1,580	7.9	
Mar. 25-Apr. 22..	642					134		281	553	43				1,200	1.63	2,080	598	368	33	2.4	1,560	7.8	
Apr. 23-27.....	1,380					73		191	295	25				666	.91	2,480	344	187	32	1.7	957	7.6	
Apr. 28-30	1,910					46		142	187	17				454	.62	2,340	242	126	29	1.3	666	7.6	
May 1-3	2,640					42		138	156	18				396	.54	2,820	212	99	30	1.3	598	7.5	
May 4-7	2,160					42		121	172	15				396	.54	2,310	210	111	30	1.3	598	7.5	
May 8-13	1,220					44		121	197	12				426	.58	1,400	225	126	30	1.3	629	7.6	
May 14-17.....	844					60		145	255	20				562	.76	1,280	295	176	31	1.5	819	7.9	
May 18	2,680					48		126	183	18				430	.58	3,110	214	111	33	1.4	637	7.8	
May 19-24.....	1,520					72		168	320	21				710	.97	2,910	344	206	31	1.7	954	7.6	
May 25	4,870					53		150	217	15				480	.65	6,310	250	127	31	1.5	727	7.2	
May 26	4,540					43		132	170	13				396	.54	4,850	208	100	31	1.3	607	7.3	
May 27-29	4,190					40		125	154	13				374	.51	4,230	192	89	31	1.3	564	7.6	
May 30-June 7 ...	3,130					35		107	141	12				330	.45	2,790	172	84	30	1.2	503	7.4	

June 8-12, 1952 .	4,350					26		91	110	8.0				256	0.35	3,010	141	66	28	1.0	411	7.5
June 13-17	1,890					40		120	188	11				412	.56	2,100	219	121	28	1.2	612	7.4
June 18-30	432					94		222	453	24				950	1.29	1,110	472	290	30	1.9	1,230	7.9
July 1-25	280					122		272	585	32				1,190	1.62	900	585	372	30	2.2	1,520	8.0
July 26-Aug. 20..	197					142		303	655	37				1,350	1.84	718	671	423	31	2.4	1,680	8.0
Aug. 21-Sept. 4 .	321					128		290	600	33				1,250	1.70	1,080	632	394	31	2.2	1,590	8.0
Sept. 5-30.....	154					143		323	683	37				1,390	1.89	578	704	439	30	2.3	1,740	8.1
Weighted average[a]	772					91		227	385	27				849	1.15	1,770	433	262	31	1.9	1,130	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1951 to September 1952.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/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	56	37	40	--	35	37	44	53	61	62	65	59
2	56	32	39	38	--	35	46	56	62	64	64	57
3	54	36	38	--	34	33	48	59	63	62	64	59
4	53	40	38	32	--	34	44	60	61	64	62	60
5	53	42	37	--	36	35	47	61	62	66	63	61
6	48	40	36	31	--	36	49	61	66	67	64	62
7	48	39	33	--	35	39	52	59	67	57	66	63
8	52	--	32	32	--	42	52	58	66	60	63	61
9	52	43	32	--	37	42	43	58	65	64	64	59
10	52	42	32	32	--	43	43	52	67	64	62	59
11	52	43	36	--	37	42	46	53	66	62	61	60
12	54	44	36	32	--	40	45	54	65	63	63	59
13	50	42	36	--	39	37	46	58	65	64	62	59
14	49	39	--	34	--	36	47	58	66	61	63	58
15	49	40	31	--	35	36	50	59	68	60	60	57
16	49	37	--	32	--	40	49	54	61	63	61	59
17	46	33	32	--	37	43	52	49	62	64	62	56
18	46	34	--	33	--	40	53	49	63	63	62	57
19	46	37	32	--	32	43	54	53	63	65	62	57
20	47	38	--	32	--	40	55	55	63	64	63	58
21	47	39	31	--	33	32	50	56	62	64	63	57
22	45	40	--	31	--	32	45	55	65	64	63	55
23	44	40	33	--	34	32	45	56	65	63	68	55
24	46	39	--	32	--	35	51	53	65	64	64	54
25	46	39	31	--	33	37	54	59	63	65	65	55
26	47	--	--	36	--	40	55	61	61	63	64	56
27	48	40	32	--	39	41	57	58	64	63	65	55
28	45	38	--	34	--	43	57	60	62	62	63	57
29	45	38	36	--	37	46	53	61	66	62	63	57
30	45	39	--	35	--	46	52	61	68	62	62	56
31	41	--	35	--	--	47	--	61	--	64	61	--
Average	49	39	--	--	--	39	49	57	64	63	63	58

PLATTE RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.

LOCATION.--At gaging station at bridge on U. S. Highways 6 and 34, 2 miles northeast of Wiggins, Morgan County, and 5.7 miles downstream from Antelope Creek.
DRAINAGE AREA.--1,420 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: April 1950 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 66,500 ppm Aug. 23; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 550,000 tons Aug. 22; minimum daily, 0 ton on many days.
EXTREMES, 1950-52.--Sediment concentrations: Maximum daily 127,000 ppm July 30, 1950; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 2,500,000 tons Aug. 3, 1951; minimum daily, 0 ton on many days each year.
REMARKS.--No flow during period October to June; record is deleted. Maximum observed sediment concentration during year, 118,000 ppm Aug. 22. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, July to September 1952

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				0	--	0			
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				0	--	0			
19				0	--	0			
20				0	--	0			
21				0	--	0			
22				1,720	59,000	sa 550,000			
23				126	66,500	23,500			
24				45	--	e 10,000			
25				1.6	--	e 200			
26				0	--	0			
27				0	--	0			
28				0	--	0			
29				0	--	0			
30				0	--	0			
31				0	--	0			
Total-	0		0	1,892.6	--	583,700	0		0

Total discharge for year (cfs-days) 1,892.6
Total load for year (tons) 583,700

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Particle-size analyses of suspended sediment, August 1952
(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	Water 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. 22, 1952 ..	12:10 p. m.	7,520	--	118,000	6,600	--	46	--	59	--	76	84	93		99	100	SPWCM
Aug. 22	12:10 p. m.	7,520	--	118,000	7,860	--	--	6	62	68	78	86	95		100		SPNM
Aug. 22	7:15 p. m.	970	71	76,000	5,970	50	60	69	75	83	90	94	98		100		SPWCM
Aug. 22	7:15 p. m.	970	71	76,000	6,030	1	2	7	78	84	89	93	98		100		SPNM

SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on State Highway 51, 0.5 mile southeast 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 1952.
Water temperatures: October 1945 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,520 ppm Dec. 1-17; minimum, 870 ppm May 28 to June 7.
Hardness: Maximum, 722 ppm Dec. 1-17; minimum, 400 ppm May 16-17.
Specific conductance: Maximum daily, 2,110 micromhos Dec. 9; minimum daily, 1,120 micromhos May 31, June 1, 4.
Water temperatures: Maximum, 89°F July 18, Aug. 2, 6, 13; minimum, freezing point on several days during December and January.
EXTREMES, 1945-52.--Dissolved solids: Maximum, 1,610 ppm Feb. 1, 1951; minimum, 478 ppm Aug. 5-7, 1950.
Hardness: Maximum, 770 ppm Jan. 1-10, 1947; minimum, 173 ppm Mar. 1-12, 1947.
Specific conductance: Maximum daily, 2,140 micromhos Dec. 30, 1946; minimum daily, 635 micromhos Aug. 5, 1950.
Water temperatures: Maximum (1946-49, 1950-52), 90°F July 26, 1951; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million	Sum	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	352	--	--	--	--	175	--	--	--	--	--	--	--	--	--	--	--	648	--	37	3.0	--	--
Nov. 1, channel 1 a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,930	--
Nov. 1, channel 2 a	305	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,920	--
Nov. 1, channel 4 a	71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,910	--
Nov. 1-30	378	--	--	--	--	173	--	--	--	--	--	--	--	--	--	--	--	710	--	35	2.8	--	--
Dec. 1, channel 1 a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,920	--
Dec. 1, channel 2 a	293	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,920	--
Dec. 1, channel 4 a	62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,910	--
Dec. 1-17	311	34	0.06	201	54	178	24	349	718	65	0.5	5.7	0.25	b1,520	1,450	2.07	1,280	722	436	34	2.9	1,950	7.5
Dec. 18-Jan. 17,1952	424	--	--	--	--	172	--	--	--	--	--	--	--	--	--	--	--	632	--	37	3.0	--	--
Jan. 18-Feb. 28	528	--	--	--	--	161	--	--	--	--	--	--	--	1,430	--	1.94	2,040	688	--	34	2.7	1,830	--
Feb. 29-Mar. 31	775	--	--	--	--	161	--	--	--	--	--	--	--	1,400	--	1.90	2,930	679	--	34	2.7	1,790	--
Apr. 1-30	655	--	--	--	--	161	--	--	--	--	--	--	--	1,390	--	1.89	2,460	660	--	35	2.7	1,770	--
Apr. 18, channel 1 a	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,780	--
Apr. 18, channel 2 a	576	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,780	--
Apr. 18, channel 4 a	153	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,770	--
May 1-15	572	--	--	--	--	135	--	--	--	--	--	--	--	1,180	--	1.60	1,820	562	--	34	2.5	1,550	--
May 16-17	721	--	--	--	--	132	--	--	--	--	--	--	--	955	--	1.30	1,860	400	--	42	2.9	1,320	--
May 18-20	1,127	--	--	--	--	160	--	--	--	--	--	--	--	1,270	--	1.73	3,860	560	--	38	2.9	1,670	--
May 21-23	1,380	23	.14	138	44	146	12	238	560	53	.7	4.5	.19	c1,160	1,100	1.58	4,320	524	329	37	2.8	1,550	7.8
May 24-27	957	--	--	--	--	167	--	--	--	--	--	--	--	1,360	--	1.85	3,510	618	--	37	2.9	1,760	--
May 28-June 7	2,767	--	--	--	--	102	--	--	--	--	--	--	--	870	--	1.18	6,500	420	--	35	2.2	1,190	--

a Not included in weighted average.
b Color, 6 units.
c Color, 15 units.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million	Sum	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 8-15, 1952	574	--	--	--	--	121	--	--	--	--	--	--	--	1,050	--	1.43	1,630	494	--	35	2.4	1,390	--
June 16-July 12	88.7	--	--	--	--	139	--	--	--	--	--	--	--	1,210	--	1.65	290	558	--	35	2.6	1,590	--
July 13-26.....	56.1	--	--	--	--	139	--	--	--	--	--	--	--	1,200	--	1.63	182	551	--	35	2.6	1,590	--
July 27-Aug. 26	37.3	--	--	--	--	140	--	--	--	--	--	--	--	1,210	--	1.65	122	545	--	36	2.6	1,570	--
Aug. 27-31.....	81.4	31	0.01	184	45	160	16	274	670	60	0.8	7.7	0.22	b1,360	1,310	1.85	299	643	418	34	2.7	1,740	7.9
Sept. 1-30	60.2	--	--	--	--	151	--	--	--	--	--	--	--	1,260	--	1.71	205	584	--	36	2.7	1,650	--
Weighted average[d]	465	--	--	--	--	150	--	--	--	--	--	--	--	e1,290	--	e1.75	e1,620	604	--	35	2.7	e1,670	--

b Color, 6 units.
d Represents 100 percent runoff for water year October 1951 to September 1952.
e Includes estimates where data are missing.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
[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	a63	36	43	33	--	a36	a49	66	a65	82	87	a59
2	a64	a33	a39	--	39	34	51	72	74	80	89	76
3	59	a40	a38	a33	--	a35	a47	a66	73	84	--	81
4	a56	41	39	--	42	34	a47	a64	69	77	88	80
5	50	a41	39	a32	--	a36	58	72	71	82	85	80
6	a49	--	a37	--	37	44	a53	--	79	79	89	77
7	a52	--	a33	a33	--	40	64	68	a74	70	77	81
8	a54	a42	33	--	a36	a42	51	--	77	--	84	85
9	62	47	a32	a33	--	a43	a43	57	81	86	85	78
10	a56	48	a35	--	44	48	49	a56	82	81	a72	76
11	61	49	a38	a33	--	a39	44	66	81	80	75	77
12	61	--	a34	--	44	--	a46	68	85	84	78	72
13	53	46	a36	37	--	a35	53	--	84	69	89	71
14	a52	a39	a33	--	36	39	a50	70	86	74	84	70
15	a55	40	--	a35	--	a38	a49	73	85	79	85	77
16	48	a34	33	--	38	41	a50	51	79	87	86	71
17	51	--	--	a34	--	a41	61	a49	83	79	79	a65
18	a42	a35	a32	--	a36	a43	64	a54	77	89	85	73
19	a46	a38	--	a37	--	a47	66	a59	81	86	85	a68
20	a49	--	a32	--	a34	46	67	--	78	--	78	a68
21	a47	43	--	35	--	a33	50	61	80	85	83	a63
22	a46	a38	a32	--	39	a33	49	63	a76	84	70	a64
23	52	a40	--	a32	--	a33	59	a59	82	85	79	69
24	a47	a35	a33	--	33	a40	63	58	80	86	80	73
25	a51	42	--	a33	--	a40	68	a64	84	78	84	a63
26	a46	a37	a33	--	a34	a41	69	71	78	88	a76	73
27	a43	42	--	33	--	a43	72	70	83	85	83	75
28	a46	a37	a33	--	42	a42	68	a65	85	66	76	a67
29	a50	a39	--	a37	--	a51	61	a65	83	85	81	74
30	46	43	37	--	--	55	61	71	82	78	80	73
31	40	--	--	a35	--	a51	--	69	--	--	a71	--
Average	51	40	--	--	--	41	56	64	79	81	81	73

a Observation made between 10 a. m. and 1 p. m.

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 1951 to September 1952.
Water temperatures: March 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 802 ppm Mar. 27 to Apr. 14; minimum, 454 ppm Sept. 3-30.
Hardness: Maximum, 373 ppm June 2-8; minimum, 190 ppm Aug. 30 to Sept. 2.
Specific conductance: Maximum daily, 1,210 micromhos Mar. 26, Apr. 6, 14, 15; minimum daily, 677 micromhos Sept. 21.
Water temperatures: Maximum, 85°F June 13, 15; minimum freezing point on several days during November and December.
EXTREMES, March 1951 to September 1952.--Dissolved solids: Maximum, 802 ppm Mar. 27 to Apr. 14, 1952; minimum, 368 ppm May 15, 1951.
Hardness: Maximum, 373 ppm June 2-8, 1952; minimum, 171 ppm May 15, 1951.
Specific conductance: Maximum daily, 1,210 micromhos Mar. 26, Apr. 6, 14, 15, 1952; minimum daily, 499 micromhos May 15, 1951.
Water temperatures: Maximum, 85°F June 13,15, 1952; minimum, freezing point on several days during winter months.
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 Ocrober 1951 to September 1952 given in reports of State Engineer.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	1,955			59	18	81		211	0	196	22		1.6	0.13	542	0.74	2,860	223	50	43	2.3	782	7.9
Nov. 1-30	1,874			70	20	84		227	0	220	24		2.0	.15	582	.79	2,940	258	72	41	2.3	856	7.9
Dec. 1-14	1,776			77	22	89		238	0	248	27		2.1	.14	636	.86	3,050	284	89	39	2.3	922	8.0
Dec. 15-31	1,102			82	23	93		259	0	257	28		2.4	.15	660	.90	1,960	298	86	39	2.3	968	8.0
Jan. 1-31, 1952	1,711			75	22	89		240	0	242	27		2.0	.17	630	.86	2,910	278	81	40	2.3	916	8.1
Feb. 1-29	1,907			80	22	87		246	0	240	27		2.0	.16	634	.86	3,260	290	88	38	2.2	928	7.8
Mar. 1-26	1,871			93	27	96		255	0	299	30		2.3	.16	740	1.01	3,740	344	135	37	2.2	1,040	8.0
Mar. 27-Apr. 14	1,952			98	31	100		248	0	335	34		3.2	.17	802	1.09	4,230	370	167	36	2.3	1,090	8.0
Apr. 15-20	2,037			86	28	94		232	0	297	30		2.8	.16	716	.97	3,940	329	139	38	2.3	1,010	8.1
Apr. 21-May 25	2,003			68	20	78		224	0	204	24		2.4	.13	556	.76	3,010	251	67	39	2.1	814	8.0
May 26-June 1	2,046			100	28	102		230	0	355	34		3.0	.15	798	1.09	4,410	364	175	36	2.3	1,100	8.0
June 2-8	2,040			102	29	99		218	0	363	32		3.1	.16	788	1.07	4,340	373	194	36	2.2	1,090	7.9
June 9-30	2,043			74	25	87		226	0	261	28		2.3	.17	635	.86	3,500	288	103	38	2.2	927	7.7
July 1-30	2,050			68	24	85		220	0	240	26		2.1	.17	603	.82	3,340	267	87	39	2.3	883	7.7
July 31-Aug. 29	2,015			51	18	75		219	0	165	21		2.1	.12	484	.66	2,630	200	20	43	2.3	720	7.8
Aug. 30-Sept 2	1,980			51	15	72		221	6	153	19		2.1	.14	462	.63	2,470	190	0	41	2.3	696	8.3
Sept. 3-30	1,825			51	16	70		222	0	153	19		1.3	.14	454	.62	2,240	194	12	41	2.2	693	7.9
Weighted average [a]	1,889			72	22	85		b230	--	234	26		2.1	0.15	608	0.83	3,100	270	81	39	2.3	880	--

a Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement at approximately 4:30 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 59	--	41	a 33	40	34	a 43	a 57	72	81	a 72	68
2	68	a 34	a 37	33	a 35	--	49	--	a 67	a 73	77	a 63
3	a 57	39	39	a 33	36	34	a 43	a 61	72	79	a 73	73
4	62	a 34	a 35	33	a 34	a 33	48	73	a 68	a 74	77	a 66
5	a 55	39	38	a 33	38	35	a 42	a 62	76	80	a 71	--
6	58	a 37	a 35	33	38	a 35	53	68	a 71	a 73	80	a 67
7	a 51	43	34	--	a 35	38	a 48	a 60	80	72	a 74	73
8	60	a 37	a 33	33	39	a 36	50	67	a 73	a 65	77	a 65
9	a 53	44	33	a 33	a 35	40	a 39	a 59	76	78	a 70	72
10	63	a 39	a 33	33	43	a 34	--	59	a 72	a 76	79	a 64
11	a 55	45	33	a 33	a 36	39	a 39	a 53	80	79	a 69	68
12	62	a 40	a 33	34	42	a 34	42	66	a 75	a 71	75	a 64
13	a 58	44	34	a 33	a 39	38	a 41	a 57	85	77	a 70	70
14	60	a 38	a 33	34	40	a 37	50	71	a 78	a 67	79	a 62
15	a 53	40	33	--	a 36	40	a 46	a 63	85	71	a 72	60
16	52	a 36	a 32	35	39	a 37	48	59	a 69	a 68	80	a 65
17	a 48	35	32	a 33	a 34	42	a 44	a 52	77	79	a 73	70
18	54	a 32	a 32	36	36	a 38	55	56	a 71	a 73	79	a 63
19	a 50	38	--	a 35	a 34	42	a 50	a 54	76	82	a 74	65
20	52	a 33	--	35	33	a 38	60	64	a 71	a 74	80	a 60
21	a 43	38	--	a 33	a 33	--	a 54	a 62	76	80	a 72	62
22	41	a 34	a 32	33	34	a 34	50	65	a 72	a 73	75	a 55
23	a 44	34	--	a 33	a 33	33	a 45	a 60	81	79	a 69	66
24	51	a 35	--	34	33	a 33	60	68	a 74	a 70	72	a 61
25	a 46	39	32	a 33	a 33	37	a 53	a 62	79	77	a 71	67
26	45	a 34	a 32	35	35	a 35	66	74	a 72	a 70	80	a 60
27	a 43	40	32	a 34	a 34	43	a 57	a 63	75	79	a 73	68
28	50	a 35	a 33	36	35	a 39	66	70	a 70	a 73	76	a 60
29	a 45	40	33	a 34	a 34	49	a 56	a 60	80	--	a 72	68
30	46	a 36	a 33	39	--	a 44	60	71	a 72	a 70	78	a 62
31	a 41	--	33	a 34	--	48	--	a 62	--	77	a 71	--
Average	52	38	34	34	36	38	50	63	75	75	75	65

a Observation made at approximately 8:30 a. m.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging stations at highway bridges, half a mile and 2½ miles respectively, 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 1952.
Water temperatures: March 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 656 ppm June 2-8; minimum, 426 ppm Oct. 1-31.
Hardness: Maximum, 309 ppm June 2-8; minimum, 189 ppm Sept. 3-30.
Specific conductance: Maximum daily, 1,060 micromhos Apr. 15, 16 (Chan. 1); minimum daily, 520 micromhos Oct. 6 (Chan. 1).
Water temperatures: Maximum, 83°F Aug. 2 (Chan. 4); minimum, freezing point on many days during November to March.
EXTREMES, February 1951 to September 1952.--Dissolved solids: Maximum, 656 ppm June 2-8, 1952; minimum, 312 ppm June 8, 1951.
Hardness: Maximum, 309 ppm June 2-8, 1952; minimum, 151 ppm June 8, 1951.
Specific conductance: Maximum daily, 1,060 micromhos Apr. 15, 16, 1952 (Chan. 1); minimum daily, 411 micromhos June 23, 1951 (Chan. 1).
Water temperatures (March 1951 to September 1952): Maximum, 90°F July 19, 20, 1951 (Chan. 1); minimum, freezing point on many days during winter months.
REMARKS.--Daily samples for chemical analysis from each of two major channels composited by discharge. Composite periods normally identical to those of Supply Canal (Tri-County Diversion) near Maxwell, Nebr. 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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951 ...	268			56	14	53		209	0	124	16		1.8	0.10	426	0.58	308	197	26	35	1.6	619	7.9
Nov. 1-30	312			61	14	54		211	0	135	16		2.1	.11	460	.63	388	209	36	35	1.6	645	8.0
Dec. 1-14.....	317			62	14	51		211	0	132	16		2.4	.10	462	.63	395	211	38	33	1.5	638	8.0
Dec. 15-31	714			62	17	73		200	0	195	23		2.6	.12	534	.73	1,030	226	62	39	2.1	774	8.2
Jan. 1-31, 1952 ...	569			61	16	57		221	0	142	18		1.8	.09	468	.64	719	216	35	35	1.7	677	7.8
Feb. 1-29.....	1,899			59	16	65		231	0	146	18		1.5	.14	478	.65	2,450	211	22	38	2.0	699	7.8
Mar. 1-26	2,309			65	14	70		236	0	157	19		1.3	.22	492	.67	3,070	221	27	39	2.0	737	8.2
Mar. 27-Apr. 14 ..	1,359			64	18	70		228	0	171	21		1.8	.15	506	.69	1,860	232	45	38	2.0	739	8.2
Apr. 15-20	1,011			83	24	81		228	0	257	27		2.7	.14	646	.88	1,760	304	117	36	2.0	907	7.9
Apr. 21-May 25 ...	482			57	16	62		220	0	133	18		2.0	.12	452	.61	588	207	25	39	1.9	664	7.8
May 26-June 1	771			67	18	69		223	0	185	21		2.1	.10	526	.72	1,090	241	58	37	1.9	772	7.8
June 2-8.....	1,726			84	24	82		225	0	265	27		3.0	.13	656	.89	3,060	309	124	36	2.0	923	7.8
June 9-30.....	1,170			55	17	72		241	0	148	20		1.0	.13	476	.65	1,500	205	7	41	2.2	707	7.8
July 1-30.....	1,159			53	16	71		226	5	141	19		1.1	.11	470	.64	1,470	198	4	42	2.2	687	8.3
July 31-Aug. 29 ...	600			50	16	68		225	0	129	18		1.5	.15	448	.61	726	190	5	43	2.1	668	8.0
Sept. 3-30	182			51	15	63		216	0	135	17		.5	.13	430	.58	211	189	12	40	2.0	648	7.6
Weighted average [a]	868			61	16	68		[b] 228	--	156	19		1.6	0.14	488	0.66	1,140	218	31	39	2.0	715	--

a Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

CHANNEL 1

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 8 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	31	36	--	33	34	46	57	64	73	72	--
2	62	32	40	--	34	a32	42	57	67	72	a82	--
3	58	25	38	--	35	a31	42	62	66	69	74	59
4	55	--	a35	--	33	--	44	63	68	71	70	65
5	51	--	33	--	35	a34	45	62	70	70	70	66
6	48	--	36	--	33	34	42	57	74	73	72	--
7	51	--	--	--	33	34	48	60	72	65	72	67
8	48	--	a32	--	32	--	51	60	72	65	70	63
9	52	41	32	33	33	37	35	57	67	67	68	63
10	60	39	a33	--	35	36	39	50	74	72	71	62
11	55	43	33	33	35	37	38	50	75	71	66	65
12	a64	32	34	33	34	36	38	53	77	75	65	65
13	56	42	35	39	41	a35	--	56	77	72	70	62
14	51	37	a32	--	38	33	41	60	80	65	74	56
15	52	35	--	--	35	36	46	61	78	67	72	62
16	46	34	a35	34	35	37	46	55	64	70	71	62
17	42	32	--	33	34	42	45	51	66	70	75	60
18	45	33	--	33	34	37	50	54	69	75	69	60
19	43	32	--	34	32	39	53	54	65	75	72	62
20	42	33	--	a33	32	a33	55	55	68	75	72	58
21	44	33	--	a33	32	--	53	60	72	72	69	55
22	39	34	35	a38	32	a34	45	58	72	72	64	51
23	40	--	31	a37	--	32	45	60	74	69	67	56
24	43	32	--	--	a33	34	51	60	74	73	67	55
25	46	a35	--	--	32	34	54	69	70	72	70	55
26	42	33	--	a35	32	33	55	64	70	72	71	54
27	40	35	--	a35	34	39	59	65	68	77	73	54
28	43	32	--	34	35	42	58	60	68	70	68	59
29	42	37	--	33	a37	46	58	60	74	68	--	56
30	41	37	--	32	--	51	55	65	73	70	--	58
31	37	--	--	34	--	51	--	62	--	69	--	--
Average	48	35	--	--	34	37	48	59	71	71	71	60

a Observation made between 1 p. m. and 5 p. m.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

CHANNEL 4

Temperature (°F) of water, water year October 1951 to September 1952
/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	59	35	40	--	35	35	43	57	62	72	72	--
2	62	34	42	--	38	a 35	41	55	66	72	a 83	--
3	55	37	40	--	40	a 32	44	60	65	68	74	60
4	55	--	a 38	--	37	39	47	62	66	71	68	65
5	52	--	35	--	39	a 37	46	62	66	--	69	67
6	49	--	39	--	36	37	43	58	70	73	71	a 78
7	48	--	--	--	36	37	45	59	70	65	70	67
8	46	--	--	a 40	36	39	52	60	70	62	68	65
9	50	44	33	33	35	40	37	57	65	--	68	65
10	58	41	a 33	36	37	39	42	52	74	70	70	63
11	53	45	35	35	36	40	a 40	52	75	70	67	65
12	a 63	41	37	35	40	36	40	52	75	72	65	65
13	54	44	40	35	43	a 35	42	55	75	72	70	64
14	52	40	a 34	41	40	35	44	60	78	65	74	60
15	54	37	a 29	36	37	40	46	61	77	65	72	67
16	50	36	a 35	37	36	39	47	54	65	69	71	63
17	45	32	--	37	35	44	46	51	66	70	75	61
18	46	34	--	36	33	39	50	54	--	74	70	61
19	46	34	--	40	32	40	52	54	66	75	72	61
20	45	36	--	a 37	33	a 50	55	55	68	75	74	59
21	46	37	--	a 37	33	38	53	60	72	70	70	56
22	42	36	--	a 40	32	a 35	46	57	72	72	67	52
23	42	35	32	a 38	--	33	44	58	70	67	67	56
24	46	34	--	a 33	35	37	50	60	72	73	68	56
25	48	a 42	--	33	34	37	52	63	68	72	70	56
26	45	35	--	a 35	35	35	55	63	68	72	70	55
27	43	38	--	a 35	37	41	58	65	66	76	74	55
28	43	35	--	36	37	42	57	59	67	70	70	59
29	45	40	32	33	a 39	45	59	59	70	63	70	57
30	44	40	--	34	--	49	55	65	72	69	--	58
31	41	--	--	36	--	49	--	60	--	69	--	--
Average	49	38	--	--	36	39	46	58	70	70	71	61

a Observation made between 1 p. m. and 4 p. m.

PLATTE RIVER NEAR OVERTON, NEBR.

LOCATION.--At gaging station at highway bridge, 4 miles south of Overton, Dawson County, and 4 miles downstream from Plum Creek.
DRAINAGE AREA.--58,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Dec. 5, 1951	2,010	23	0.04	71	20	74		238	184	22	0.4	2.8	0.12	538	0.73		260	65	38	2.0	800	7.7	
Dec. 29	617	31	.04	73	19	71		243	175	22	.5	3.4	.12	526	.72		262	63	37	1.9	783	7.7	
Feb. 1, 1952	2,890	28	.04	61	16	60		214	141	17	.5	2.1	.10	450	.61		218	43	38	1.8	665	7.8	
Mar. 6	4,340	23	.04	77	22	90		245	228	26	.5	2.6	.12	608	.83		282	81	41	2.3	895	7.9	
Mar. 27	5,640	25	.04	71	18	76		236	183	21	.5	1.5	.10	528	.72		250	56	40	2.1	783	8.1	
Apr. 29	2,260	26	.04	74	23	86		226	234	26	.5	1.6	.16	608	.83		280	95	40	2.2	878	8.2	
May 28	2,540	18	.04	59	21	76		202	188	24	.4	1.2	.14	532	.72		232	66	42	2.2	780	7.9	
June 26	1,480	19	.04	78	28	100		217	293	30	.4	1.7	.15	708	.96		310	132	41	2.5	984	7.8	
July 16	1,370	28	.04	68	21	89		236	206	25	.5	2.4	.13	556	.76		254	60	43	2.4	823	8.0	
Aug. 28	457	20	.04	57	19	90		207	203	24	.5	1.4	.10	526	.72		221	51	47	2.6	784	8.0	
Sept. 24	548	22	.04	62	21	88		223	201	25	.5	3.2	.11	539	.73		240	57	44	2.5	812	7.9	

PLATTE RIVER BASIN--Continued

PLATTE RIVER NEAR OVERTON, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 4, 1951	1,650	66	294
Oct. 11	2,200	64	380
Oct. 12	1,680	70	318
Oct. 24	2,230	53	319
Nov. 8	2,480	76	509
Nov. 9	2,370	65	416
Nov. 21	2,140	52	300
Nov. 21	2,380	45	289
Dec. 5	1,650	66	294
Dec. 5	2,230	61	367
Dec. 28	a 1,040	172	483
Dec. 29	a 1,130	137	418
Jan. 11, 1952	2,100	116	658
Jan. 11	a 2,210	72	430
Jan. 31	3,350	188	1,700
Feb. 1	a 3,380	206	1,880
Feb. 14	3,550	120	1,150
Feb. 14	4,050	107	1,170
Feb. 21	4,340	115	1,350
Mar. 5	4,700	165	2,090
Mar. 6	4,270	145	1,670
Mar. 19	3,770	173	1,760
Mar. 20	4,510	137	1,670
Mar. 20	4,610	107	1,330
Mar. 27	5,670	156	2,390
Mar. 28	5,030	186	2,530
Apr. 2	4,170	101	1,140
Apr. 16	1,460	57	225
Apr. 16	2,720	10	73
Apr. 29	2,430	232	1,520
May 2	2,370	58	371
May 14	1,980	49	262
May 15	1,370	28	104
May 15	1,440	38	148
May 15	1,680	41	186
May 28	2,230	164	988
May 28	2,540	155	1,060
June 12	2,760	136	1,010
June 13	1,650	96	428
June 26	1,480	145	579
July 16	1,220	393	1,290
July 17	468	40	50
July 31	173	25	12
Aug. 13	1,030	171	476
Aug. 14	674	87	158
Aug. 28	489	63	83
Sept. 24	584	47	74
Sept. 25	714	44	85

a Mean daily discharge.

PLATTE RIVER NEAR OVERTON, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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, 1951	11:10 a.m.	1,650	63	66			--		--		46	52	70		96	100	S
Oct. 11	3:45 p.m.	2,200	69	64			--		--		50	57	77		98	100	S
Oct. 12	10:20 a.m.	1,680	59	70			--		--		40	45	65		95	100	S
Oct. 24	5:15 p.m.	2,230	55	53			--		--		47	54	78		98	100	S
Nov. 8	5:10 p.m.	2,480	43	76			--		--		25	32	62		95	100	S
Nov. 9	2:00 p.m.	2,370	47	65			--		--		26	33	69		96	100	S
Nov. 21	10:40 a.m.	2,140	38	52			--		--		31	38	75		98	100	S
Nov. 21	3:20 p.m.	2,380	42	45			--		--		36	44	78		98	100	S
Dec. 5	9:35 a.m.	1,650	35	66			--		--		16	21	64		97	100	S
Dec. 5	2:25 p.m.	2,230	39	61			--		--		22	28	64		98	100	S
Dec. 28	2:00 p.m.	a1,040	--	172			--		--		10	11	16		55	90	S
Dec. 29	11:15 a.m.	a1,130	--	137			--		--		21	22	28		54	91	S
Jan. 11, 1952	11:00 a.m.	2,100	--	116			--		--		24	26	39		78	95	S
Jan. 11	4:15 p.m.	a2,210	--	72			--		--		38	41	64		96	100	S
Jan. 31	3:15 p.m.	3,350	--	188			--		--		28	37	69		98	100	S
Feb. 1	9:05 a.m.	a3,380	32	206			--		--		22	28	61		97	100	S
Feb. 14	11:00 a.m.	3,550	--	120			--		--		31	38	68		98	100	S
Feb. 14	4:45 p.m.	4,050	37	107			--		--		34	42	70		98	100	S
Feb. 21	3:50 p.m.	4,340	--	115			--		--		26	35	72		98	100	S
Mar. 5	5:30 p.m.	4,700	33	165			--		--		17	22	56		90	96	S
Mar. 6	10:50 a.m.	4,270	33	145			--		--		14	15	26		90	99	S
Mar. 19	7:15 p.m.	3,770	--	173			--		--		22	28	50		88	96	S
Mar. 20	11:00 a.m.	4,510	44	137			--		--		18	26	56		91	100	S
Mar. 20	2:10 p.m.	4,610	44	107			--		--		24	32	58		90	99	S
Mar. 27	1:10 p.m.	5,670	45	156			--		--		24	31	63		94	99	S
Mar. 28	9:20 a.m.	5,030	41	186			--		--		14	19	52		90	98	S
Apr. 2	1:40 p.m.	4,170	53	101			--		--		25	31	63		93	100	S
Apr. 16	9:20 a.m.	1,460	47	57			--		--		29	32	54		92	100	S
Apr. 16	3:10 p.m.	2,720	50	10			--		--		34	38	59		92	98	S

a Mean daily discharge.

PLATTE RIVER NEAR OVERTON, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952--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	Water 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. 29, 1952 ..	1:45 p.m.	2,430	63	232			--		--		21	22	29		68	92	S
May 2	5:10 p.m.	2,370	66	58			--		--		70	74	87		99	100	S
May 14.....	5:00 p.m.	1,980	71	49			--		--		69	72	83		98	100	S
May 15.....	8:15 a.m.	1,370	60	28			--		--		46	50	68		95	100	S
May 15.....	11:45 a.m.	1,440	72	38			--		--		56	58	75		98	100	S
May 15.....	4:10 p.m.	1,680	67	41			--		--		5	15	51		90	100	SPWCM
May 28.....	9:30 a.m.	2,230	63	164			33		44		66	69	78		96	100	SPWCM
May 28.....	1:35 p.m.	2,540	72	155			35		42		80	84	89		97	100	SPWCM
June 12	4:00 p.m.	2,760	84	136			32		48		73	75	86		98	100	SPWCM
June 13	9:25 a.m.	1,650	--	96			56		69		81	83	90		99	100	SPWCM
June 26	3:30 p.m.	1,480	70	145			--		--		56	60	73		96	99	S
July 16	3:35 p.m.	1,220	--	393			12		16		23	25	31		63	91	SBWCM
July 17	9:30 a.m.	468	--	40			--		--		69	80	84		100	--	S
July 31	9:40 a.m.	173	70	25			--		--		65	--	--		--	--	S
Aug. 13	3:10 p.m.	1,030	85	171			--		--		71	72	80		94	100	S
Aug. 14	11:25 a.m.	674	79	87			--		--		86	89	93		100	--	S
Aug. 28	6:35 p.m.	489	75	63			--		--		68	71	84		97	100	S
Sept. 24.....	4:00 p.m.	584	--	47			--		--		54	56	70		100	--	S
Sept. 25.....	6:10 p.m.	714	71	44			--		--		74	77	87		100	--	S

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 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water charge (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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 8, 1951	1,470			--	--	--	--	223	0	218	--				--	--		259	76	--	--	859	7.8
Dec. 5	2,070			--	--	--	--	232	0	197	--				--	--		256	66	--	--	810	7.9
Dec. 29	1,540			--	--	81	--	241	0	228	26				--	--		284	86	37	2.1	888	7.8
Feb. 1, 1952	2,990			--	--	62	--	225	0	169	20				--	--		236	51	35	1.8	730	7.8
Mar. 6	4,280	24	0.03	78	22	85	11	227	12	235	26	0.4	2.0	0.14	626	0.85		287	81	38	2.2	905	8.5
Mar. 27	5,780			79	22	90		240	0	240	27				626	.85		289	92	40	2.3	905	7.5
Apr. 29	2,130			--	--	--	--	212	0	313	--				--	--		320	146	--	--	1,020	7.6
May 28	3,010			--	--	--	--	177	0	167	--				--	--		200	55	--	--	676	7.6
June 26	470			--	--	--	--	204	0	250	--				--	--		260	93	--	--	866	7.9
July 17	1,170			--	--	--	--	216	0	273	--				--	--		288	111	--	--	951	7.7
Aug. 28	194			--	--	--	--	206	0	223	--				--	--		246	77	--	--	845	7.9
Sept. 24	194			--	--	--	--	193	0	220	--				--	--		206	48	--	--	766	8.0

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 January 1952 (discontinued).
EXTREMES, October 1951 to January 1952.--Sediment concentrations: Maximum daily, 100 ppm Dec. 9; minimum daily, not determined.
Sediment loads: Maximum daily, 1.7 tons Oct. 6; minimum daily, less than 0.050 ton Oct. 15.
EXTREMES, 1947-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.
Sediment loads: Maximum daily, 356,000 tons June 22, 1947; minimum daily, less than 0.050 ton Oct. 15, 1951.
REMARKS.--Flow affected by ice Nov. 22-23, Dec. 8, 14-26, Dec. 31 to Jan. 5. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, October 1951 to January 1952

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	68	0.3	1.4			2.0		
2	2.0	59	.3	1.2	55	0.2	2.0		
3	2.4	49	.3	1.4			1.7		
4	3.1	31	.3	1.1	58	.2	2.0	60	0.3
5	3.2	24	a.2	1.1	52	.2	2.0		
6	9.8	56	s1.7	1.1	42	a.1	2.0		
7	3.2	35	.3	1.3	61	.2	2.0		
8	1.4	25	.1	1.0	33	.1	1.4	28	.1
9	1.2	21	.1	1.1	30	.1	1.5	100	.4
10	1.2	32	.1	1.0	26	.1	1.7	48	.2
11	1.2	30	.1	1.1			1.7		
12	1.2	32	a.1	1.4			1.7		
13	1.2	44	.1	1.4			1.7		
14	1.2	35	.1	1.4			1.6		
15	.8	22	(t)	1.4	23	.1	1.3	27	.1
16	.8	39	.1	1.4			1.4		
17	.9	44	.1	1.4			1.4		
18	1.0	48	.1	1.5			1.5		
19	.9	42	a.1	1.5			1.6		
20	1.1	23	.1	1.7			1.6		
21	1.0	21	.1	2.0			1.7	70	.3
22	1.2	24	a.1	1.5			1.8		
23	1.4	35	.1	1.6	20	.1	1.9		
24	1.4	32	.1	1.7			2.0	27	.2
25	1.4	30	.1	1.7			2.2		
26	1.4	22	.1	2.0			2.6		
27	1.4	23	.1	2.0			2.9		
28	1.1	35	.1	2.2			3.2		
29	1.0	40	.1	2.0	89	.5	3.6	26	a.2
30	.7	34	a.1	2.0			3.2		
31	1.2	22	.1	--	--	--	3.0		
Total-	52.8	--	5.8	44.6	--	4.8	61.9	--	6.1

s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

WOOD RIVER NEAR RIVERDALE, NEBR.--Continued

Suspended sediment, October 1951 to January 1952--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	2.8								
2	2.9								
3	3.0								
4	3.0								
5	3.0								
6	3.2	67	a0.6						
7	3.6								
8	3.6								
9	3.2								
10	3.2								
11	3.6		--						
12	--		--						
13	--		--						
14	--		--						
15	--		--						
16	--		--						
17	--		--						
18	--		--						
19	--		--						
20	--		--						
21	--		--						
22	--		--						
23	--		--						
24	--		--						
25	--		--						
26	--		--						
27	--		--						
28	--		--						
29	--		--						
30	--		--						
31	--		--						
Total	35.1		6.6						

Total discharge for period Oct. 1, 1951 to Jan. 11, 1952 (cfs-days) 194.4
Total load for period Oct. 1, 1951 to Jan. 11, 1952 (tons)..... 23.3

a Computed from partly estimated concentration graph.

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 1952.
Sediment records: March 1950 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 90°F June 13-14; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 3,800 ppm Feb. 23; minimum daily, 56 ppm Jan. 23.
Sediment loads: Maximum daily, 5,160 tons Mar. 31; minimum daily, 21 tons Jan. 23.
EXTREMES, 1949-52.--Water temperatures: Maximum, 90°F June 13-14, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations (1950-52): Maximum daily, 3,800 ppm Feb. 23, 1952; minimum daily, 56 ppm Jan. 23, 1952.
Sediment loads (1950-52): Maximum daily, 5,160 tons Mar. 31, 1952; minimum daily, 21 tons Jan. 23, 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240. Investigations indicate that practically all the total sediment load is transported in suspension at this section of the river.

Temperature (°F) of water, water year October 1951 to September 1952
/Seven-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	71	58	38	32	46	40	32	32	32	32	38	32	50	42	66	56	70	59	82	71	84	68	66	58
2	68	60	34	32	43	39	32	32	41	32	35	32	56	39	72	55	80	60	83	70	80	68	69	53
3	64	57	37	32	42	36	32	32	42	36	33	32	49	42	73	58	72	64	83	64	79	68	73	56
4	60	55	33	32	40	33	32	32	42	32	33	32	54	40	74	58	81	61	82	66	82	65	75	60
5	55	40	36	32	38	32	32	32	41	37	34	32	58	42	70	58	82	66	83	68	81	67	76	63
6	54	48	43	35	38	32	32	32	42	32	39	32	59	42	69	57	82	66	76	66	85	70	74	63
7	59	45	45	36	32	32	32	32	42	33	41	35	64	46	72	58	84	68	70	59	76	70	73	62
8	61	48	47	36	32	32	32	32	39	32	43	39	57	40	65	57	77	68	79	57	--	--	72	58
9	63	49	48	38	32	32	32	32	43	32	47	38	45	35	57	50	80	61	82	63	--	--	72	60
10	65	52	49	39	32	32	32	32	43	34	50	36	51	34	56	46	82	68	84	66	--	--	69	60
11	--	--	49	42	33	32	32	32	45	33	42	37	45	36	63	44	85	66	81	66	76	63	67	63
12	--	--	48	40	39	32	32	32	44	36	38	32	43	41	68	48	86	70	83	66	73	64	74	59
13	--	52	47	42	36	32	32	32	43	36	34	32	54	40	67	54	90	72	78	65	84	66	68	62
14	60	49	45	37	32	32	32	32	36	33	38	32	60	41	72	56	90	74	75	61	76	72	68	56
15	59	49	40	35	32	32	32	32	40	32	48	33	59	45	64	54	87	73	73	62	82	67	71	55
16	53	44	35	32	32	32	32	32	40	32	44	37	52	47	54	50	77	62	82	65	83	67	73	59
17	52	42	33	32	32	32	32	32	40	32	45	38	60	44	58	50	78	62	80	68	80	68	69	59
18	46	44	34	32	32	32	32	32	34	33	46	36	64	48	64	49	77	65	86	68	80	68	67	58
19	46	41	38	32	32	32	32	32	36	32	53	36	65	52	58	51	76	62	84	70	83	67	67	56
20	51	42	44	32	32	32	32	32	32	32	50	39	65	53	67	50	80	64	84	69	80	69	69	56
21	48	37	43	36	32	32	32	32	33	32	42	32	59	47	64	58	78	66	82	68	78	68	64	54
22	46	36	37	34	32	32	32	32	32	32	33	32	50	46	72	57	81	68	78	67	75	64	66	50
23	52	39	38	32	32	32	32	32	39	32	32	32	62	45	66	58	82	70	78	64	76	64	68	53
24	54	42	34	32	32	32	32	32	36	32	32	32	66	50	72	57	86	71	83	64	72	66	68	53
25	53	44	40	32	32	32	32	32	33	32	37	32	70	52	74	59	83	67	79	67	80	67	68	54
26	47	39	41	32	32	32	32	32	42	32	49	35	70	56	74	57	75	68	80	64	81	68	68	54
27	49	37	43	35	32	32	32	32	47	36	51	35	72	56	71	58	75	66	81	68	84	70	68	55
28	52	40	44	35	32	32	32	32	43	36	57	40	69	57	70	55	81	65	74	66	76	69	68	56
29	54	42	45	38	32	32	32	32	42	32	60	44	67	53	68	54	82	67	80	63	72	68	--	--
30	49	38	45	37	32	32	32	32	--	--	61	47	65	56	72	58	84	68	81	64	80	65	--	--
31	40	37	--	--	32	32	32	32	--	--	55	47	--	--	75	56	--	--	82	64	76	63	--	--
Average	55	45	41	35	34	33	32	32	39	33	43	35	59	46	67	54	81	66	80	65	79	67	70	57

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (TOTAL LOAD SECTION)--Continued

Suspended sediment, water year October 1951 to September 1952

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	367	1,160	1,150	376	1,460	1,480	431	1,500	1,750
2	379	1,060	1,080	364	1,360	1,340	415	1,570	1,760
3	391	1,310	1,380	361	1,760	1,720	394	1,750	1,860
4	394	1,120	1,190	382	2,280	2,350	376	2,140	2,170
5	367	1,020	1,010	382	1,390	1,430	385	1,860	1,930
6	330	1,320	1,180	370	1,870	1,870	415	1,880	2,110
7	352	1,580	1,500	376	1,670	1,680	391	1,540	1,630
8	394	1,240	1,320	379	1,430	1,460	358	1,580	1,530
9	394	1,140	1,210	397	1,480	1,590	358	1,490	1,440
10	391	1,180	1,250	385	1,780	1,850	400	1,710	1,850
11	385	1,290	1,340	394	1,670	1,780	403	2,020	2,200
12	388	1,280	1,340	403	1,550	1,690	397	1,630	1,750
13	397	1,400	1,500	403	1,380	1,500	415	1,540	1,730
14	406	1,680	1,840	388	1,660	1,740	366	611	604
15	388	1,350	1,410	400	1,380	1,490	337	361	328
16	397	1,480	1,590	367	1,730	1,710	378	507	517
17	385	1,580	1,640	355	2,080	1,990	421	336	382
18	382	1,720	1,770	358	2,040	1,970	411	524	581
19	376	1,310	1,330	391	1,860	1,960	367	521	516
20	385	1,620	1,680	388	1,740	1,820	302	500	a410
21	397	1,780	1,910	415	1,410	1,580	290	490	384
22	370	1,810	1,810	385	1,340	1,390	320	487	421
23	385	1,680	1,750	388	1,500	1,570	360	129	125
24	388	1,800	1,890	364	1,750	1,720	456	129	159
25	406	1,870	2,050	367	2,080	2,060	422	223	254
26	415	1,910	2,140	409	1,930	2,130	394	160	170
27	385	1,670	1,740	382	1,680	1,730	383	169	175
28	391	1,770	1,870	391	1,560	1,650	384	217	225
29	421	1,670	1,900	409	1,740	1,920	401	465	503
30	434	1,650	1,930	431	1,660	1,930	445	530	637
31	400	1,740	1,880	--	--	--	438	180	213
Total	12,040	--	48,580	11,560	--	52,100	12,013	--	30,314
	January			February			March		
1	294	105	83	416	1,050	1,180	370	1,670	1,670
2	301	149	121	420	912	1,030	364	2,140	2,100
3	497	242	325	447	1,320	1,590	341	2,180	2,010
4	497	318	427	421	1,500	1,710	341	2,280	2,100
5	504	415	565	424	1,800	2,060	336	2,070	1,880
6	490	440	582	412	2,150	2,390	355	2,740	2,630
7	482	305	397	418	2,020	2,280	350	1,920	1,810
8	493	284	378	400	2,030	2,190	385	1,630	1,690
9	464	245	307	437	2,270	2,680	394	1,450	1,540
10	436	265	312	437	1,970	2,320	400	1,600	1,730
11	468	288	364	437	1,920	2,270	412	1,540	1,710
12	425	251	288	418	2,200	2,480	421	1,870	2,130
13	425	180	206	437	2,630	3,100	403	2,950	3,210
14	468	220	a 280	453	2,460	3,010	394	2,000	2,130
15	461	326	406	424	2,210	2,530	406	1,560	1,710
16	403	215	234	431	1,950	2,270	440	1,950	2,320
17	403	242	263	409	1,930	2,130	456	1,700	2,090
18	367	256	254	409	2,160	2,390	485	1,670	2,190
19	371	372	373	403	2,220	2,420	499	1,340	1,810
20	346	248	232	358	2,450	2,370	506	1,410	1,930
21	297	294	236	379	3,020	3,090	492	1,220	1,620
22	210	130	a 75	385	3,040	3,160	360	1,025	996
23	140	56	21	376	3,800	3,860	450	700	850
24	212	214	122	358	2,680	2,590	540	820	1,190
25	270	183	133	361	1,750	1,710	600	1,650	2,670
26	295	223	178	364	2,260	2,220	492	1,780	2,360
27	305	324	267	367	1,970	1,950	463	1,940	2,430
28	342	501	463	379	1,470	1,500	479	2,520	3,260
29	349	291	274	350	1,500	1,420	509	1,830	2,510
30	371	254	254	--	--	--	519	2,120	2,970
31	396	388	415	--	--	--	579	3,300	5,160
Total	11,782	--	8,835	11,730	--	65,900	13,541	--	66,406

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 1951 to September 1952--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	536	2,330	3,370	400	1,360	1,470	355	1,130	1,080
2	469	2,420	3,060	388	1,370	1,430	367	1,430	1,420
3	469	2,220	2,810	382	1,250	1,290	370	1,510	1,510
4	460	2,520	3,130	388	1,630	1,710	373	1,140	1,150
5	447	1,360	1,640	382	1,760	1,820	352	1,180	1,120
6	460	1,400	1,740	379	1,450	1,480	344	1,650	1,530
7	455	1,280	1,570	412	1,420	1,580	344	1,310	1,220
8	489	1,220	1,610	391	1,540	1,630	347	845	792
9	447	1,460	1,760	406	1,380	1,510	344	1,160	1,080
10	409	1,180	1,300	379	2,080	2,130	336	965	875
11	379	1,100	1,130	370	3,420	3,420	341	1,120	1,030
12	412	1,240	1,380	394	2,330	2,480	341	800	737
13	428	2,300	2,660	391	2,280	2,410	338	910	830
14	424	1,070	1,220	385	2,040	2,120	347	930	871
15	421	1,000	1,140	391	2,530	2,670	347	930	871
16	479	1,130	1,460	489	2,580	3,410	341	880	810
17	444	1,000	1,200	450	2,020	2,450	330	820	731
18	415	990	1,110	453	2,190	2,680	325	1,000	877
19	440	1,180	1,400	472	2,230	2,840	338	1,000	913
20	437	1,190	1,400	447	2,720	3,280	379	1,900	1,940
21	453	2,610	3,190	444	2,530	3,030	367	1,320	1,310
22	424	2,220	2,540	460	1,690	2,100	352	1,260	1,200
23	403	1,770	1,930	447	1,680	2,030	376	1,280	1,300
24	428	2,030	2,350	440	1,930	2,290	358	1,430	1,380
25	406	2,890	3,170	463	2,030	2,540	370	1,160	1,160
26	403	1,800	1,960	479	2,120	2,740	391	1,420	1,500
27	394	1,520	1,620	364	1,800	1,770	391	1,340	1,410
28	388	1,550	1,620	364	1,750	1,720	367	1,560	1,550
29	382	1,380	1,420	350	1,350	1,280	364	995	978
30	397	1,980	2,120	350	1,070	1,010	367	2,350	2,330
31	--	--	--	361	1,300	1,270	--	--	--
Total	12,988	--	58,010	12,671	--	65,590	10,662	--	35,505
	July			August			September		
1	367	2,040	2,020	333	570	512	361	1,260	1,230
2	370	1,240	1,240	341	610	561	367	1,530	1,520
3	355	930	891	379	670	686	355	1,470	1,410
4	350	800	756	364	750	737	358	950	918
5	350	730	690	364	745	732	352	940	893
6	355	795	762	352	715	680	355	950	911
7	361	1,390	1,360	352	720	684	352	990	941
8	347	1,380	1,290	364	635	624	336	945	857
9	355	830	796	352	780	741	336	975	885
10	358	1,580	1,530	361	755	736	347	920	862
11	355	840	805	397	900	965	355	795	762
12	382	990	1,020	385	1,010	1,050	347	820	768
13	447	1,320	1,590	367	760	753	358	880	851
14	403	940	1,020	370	660	659	364	1,000	983
15	350	1,060	1,000	367	890	882	341	1,050	967
16	340	890	841	364	870	855	338	940	858
17	344	650	604	367	835	827	347	870	815
18	344	650	604	364	1,010	993	352	920	874
19	350	740	699	358	950	918	350	920	869
20	330	740	659	382	1,120	1,160	338	790	721
21	333	760	683	373	1,190	1,200	333	870	782
22	330	750	a670	355	1,040	997	325	1,180	1,040
23	320	700	a600	352	1,210	1,150	330	1,100	980
24	322	660	a570	361	1,040	1,010	327	1,390	1,230
25	317	650	556	367	1,050	1,040	333	1,170	1,050
26	330	720	642	373	965	972	330	900	802
27	327	675	596	379	950	972	333	905	814
28	333	647	581	364	760	747	322	840	730
29	344	715	664	355	860	824	327	1,000	883
30	325	700	614	361	905	882	336	790	717
31	330	647	576	364	1,030	1,010	--	--	--
Total	10,834	--	26,929	11,287	--	26,559	10,305	--	27,923

Total discharge for year (cfs-days) 141,413
Total load for year (tons) 512,651

a Computed from estimated concentration graph.

MIDDLE LOUP RIVER AT DUNNING, NEBR. (TOTAL LOAD SECTION)--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 31, 1951	3:00 p.m.	424	40	1,640							4	18	56	81	91	97	S
Dec. 5	2:00 p.m.	364	36	2,020							4	19	62	87	95	99	S
Jan. 7, 1952	5:45 p.m.	a482	32	287							12	28	74	99	100	--	S
Jan. 28	5:35 p.m.	a342	32	704							21	35	69	97	--	--	S
Feb. 11	4:00 p.m.	444	--	1,900							8	28	62	88	95	99	S
Mar. 10	6:10 p.m.	440	48	1,440							9	26	59	85	92	97	S
Mar. 26	5:40 p.m.	434	48	2,000							13	42	71	93	97	100	S
May 6	7:00 p.m.	364	67	971							9	28	65	90	97	--	S
May 22	10:20 a.m.	450	64	1,450							10	28	64	90	96	98	S
June 4	9:10 a.m.	388	66	1,010							12	27	60	88	96	99	S
June 18	3:05 p.m.	320	77	672							13	32	68	90	96	100	S
July 6	6:10 p.m.	341	73	816							12	23	58	89	97	--	S
July 18	8:25 p.m.	341	80	852							10	24	58	84	93	98	S
July 30	5:10 p.m.	314	81	762							10	24	54	83	94	99	S
Aug. 13	4:25 p.m.	367	84	686							12	28	60	87	96	--	S
Aug. 26	7:05 p.m.	344	--	1,260							6	13	34	63	84	99	S
Sept. 11	2:30 p.m.	336	67	1,040							5	15	40	76	88	97	S
Sept. 24	2:10 p.m.	373	68	1,020							6	20	51	84	93	98	S

a Mean daily discharge.

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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 10,000 ppm Mar. 10, May 27; minimum daily, 13 ppm Dec. 30, 31.
Sediment loads: Maximum daily, 30,000 tons May 27; minimum daily, 6 tons Dec. 30, 31.
EXTREMES, 1946-52.--Sediment concentrations: Maximum daily, 19,100 ppm June 19, 1946; minimum daily, 13 ppm Dec. 30, 31, 1951.
Sediment loads: Maximum daily, 672,000 tons June 22, 1947; minimum daily, 6 tons Dec. 30, 31, 1951.
REMARKS.--Flow affected by ice Nov. 4-6, 16-19, 22-26, Dec. 8 to Mar. 10, Mar. 23-25. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	190	580	300	230	570	a 350	245	1,700	a 1,100
2	190	260	130	216	830	480	245	1,900	1,300
3	192	320	170	206	1,000	a 560	250	1,700	a 1,100
4	202	510	a 280	200	1,200	650	250	1,200	810
5	211	490	280	190	1,900	a 970	250	800	a 540
6	223	300	180	210	2,500	1,400	245	920	610
7	233	550	350	230	1,000	620	245	940	a 620
8	223	400	240	206	710	390	230	900	560
9	218	390	230	218	590	a 350	210	1,300	a 740
10	214	600	350	221	660	390	200	1,500	810
11	214	680	390	226	840	a 510	180	950	a 460
12	211	620	350	226	1,100	670	165	290	130
13	214	410	240	226	1,300	a 790	150	--	
14	214	340	200	228	1,400	860	130	120	
15	214	500	290	216	1,000	a 580	120	--	
16	214	380	220	210	650	370	110	--	e 47
17	206	350	a 190	210	730	a 410	130	140	
18	199	380	200	200	1,100	590	160	--	
19	197	390	a 210	200	1,400	a 760	164	230	100
20	197	390	210	214	1,600	920	163	220	a 97
21	211	--	e 500	206	1,400	a 780	177	130	
22	216	--	e 600	200	1,500	810	193	--	
23	216	680	400	190	1,900	a 970	191	110	
24	206	390	220	190	2,200	1,100	167	--	
25	202	330	a 180	200	2,700	a 1,500	163	110	e 55
26	206	380	210	220	2,900	1,700	172	--	
27	221	400	a 240	240	2,000	a 1,300	180	110	
28	216	380	220	245	950	630	184	--	
29	216	340	a 200	226	1,100	a 670	182	24	12
30	216	320	a 190	230	1,500	930	175	13	a 6
31	228	340	210	--	--	--	171	13	6
Total	6,530	--	8,180	6,430	--	23,010	5,797	--	9,723

e Estimated.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	173	16	7	271	170	a 120	232	1,400	a 880
2	171	78	a 36	295	230	180	213	320	180
3	176	210	100	320	830	a 720	164	170	a 75
4	173	160	a 75	303	1,740	1,400	194	200	100
5	181	76		328	1,300	a 1,200	280	810	a 610
6	182	--		337	400	360	357	1,500	1,400
7	193	110		328	290	a 260	386	1,700	a 1,800
8	193	--		354	340	320	493	1,900	2,500
9	193	70	e 41	373	2,300	a 2,300	525	3,100	a 4,400
10	193	--		383	7,200	7,400	630	10,000	s 20,000
11	193	78		400	5,200	a 5,600	680	5,300	9,700
12	193	--		398	3,100	3,300	624	4,300	7,200
13	195	68		398	2,900	a 3,100	672	3,700	a 6,700
14	194	120	63	396	3,900	4,200	604	2,500	4,100
15	208	81		398	5,900	a 6,300	470	1,700	a 2,200
16	230	--		361	5,500	5,400	428	1,500	1,700
17	230	80		361	3,500	a 3,400	475	1,600	a 2,100
18	230	--	e 59	345	1,700	1,600	563	3,000	a 4,600
19	215	120		316	1,200	a 1,000	563	3,000	4,600
20	194	--		274	1,200	890	470	2,000	2,500
21	179	130		236	1,600	a 1,000	423	1,300	1,500
22	148	210	a 84	231	2,500	1,600	326	660	580
23	137	270	100	231	3,000	a 1,900	320	620	540
24	185	200	a 100	214	3,300	a 1,900	350	2,500	2,400
25	195	150		223	3,000	1,800	400	4,500	4,900
26	187	--		246	1,500	1,000	574	3,400	5,300
27	213	160		248	470	310	446	2,500	3,000
28	238	--	e 100	246	750	a 500	380	1,400	1,400
29	258	180		247	1,700	1,100	348	1,200	1,100
30	260	--		--	--	--	372	2,000	2,000
31	260	170		--	--	--	376	2,000	2,000
Total	6,170	--	2,047	9,061	--	60,160	13,338	--	102,065

Day	April			May			June		
1	344	2,300	2,100	245	1,400	930	238	1,800	1,200
2	323	1,900	1,700	245	1,400	930	221	860	510
3	296	1,300	1,000	233	1,200	750	218	720	420
4	286	1,100	850	223	1,200	720	223	930	560
5	290	1,100	860	218	1,200	710	206	840	470
6	286	930	720	221	1,300	780	204	780	430
7	260	820	580	235	1,500	950	199	650	a 350
8	260	900	630	226	1,000	610	190	510	260
9	290	870	680	218	770	450	187	530	270
10	274	930	690	218	770	450	174	670	310
11	277	1,100	a 820	226	740	450	170	640	290
12	290	1,400	1,100	230	680	420	166	680	300
13	290	1,400	1,100	230	410	250	156	420	180
14	290	1,800	1,400	235	550	350	148	290	120
15	290	1,400	1,100	238	660	420	140	330	120
16	290	1,000	780	250	770	520	127	250	86
17	277	1,000	750	252	480	330	121	340	110
18	316	850	730	247	1,100	730	119	320	100
19	356	930	890	238	1,000	640	121	280	91
20	456	2,800	3,400	245	920	610	121	290	95
21	392	2,000	2,100	250	1,100	740	132	300	110
22	384	1,100	1,100	269	1,400	1,000	134	330	120
23	341	1,600	1,500	252	1,200	820	138	350	130
24	312	1,600	1,300	255	680	470	135	240	87
25	306	1,200	990	269	1,100	800	130	220	77
26	312	1,300	1,100	269	2,000	a 1,500	134	270	98
27	312	1,600	1,300	858	10,000	s 30,000	190	1,400	720
28	299	1,100	890	330	1,500	1,300	170	1,900	870
29	269	1,800	1,300	266	690	500	160	810	350
30	252	2,200	1,500	258	770	540	146	300	120
31	--	--	--	245	2,400	1,600	--	--	--
Total	9,220	--	34,960	8,194	--	51,270	4,918	--	8,954

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	138	340	130	83	140	31	114	470	140
2	132	310	110	85	160	37	114	340	100
3	129	280	98	86	340	79	113	81	25
4	126	240	82	86	210	49	111	160	48
5	122	260	86	86	200	46	108	190	55
6	122	200	66	91	280	69	108	100	29
7	146	360	140	98	240	64	105	86	24
8	142	430	160	102	250	69	100	120	32
9	140	430	160	104	200	56	95	83	21
10	134	450	160	104	170	48	94	94	24
11	132	290	100	108	320	93	92	120	30
12	122	160	53	110	250	74	92	150	37
13	137	170	63	113	220	67	95	210	54
14	520	4,900	s 9,400	119	370	120	98	260	69
15	252	3,400	2,300	135	480	170	100	160	43
16	206	1,500	830	126	350	120	104	160	45
17	190	780	400	121	440	140	104	520	150
18	156	520	220	111	260	78	104	480	130
19	146	480	190	110	130	39	104	170	48
20	130	390	140	110	89	26	104	100	28
21	121	400	130	104	140	39	108	110	32
22	104	360	100	103	70	19	111	170	51
23	94	290	74	105	77	22	114	190	58
24	90	260	63	107	120	35	111	250	a 75
25	82	270	60	108	160	47	111	280	84
26	80	260	56	104	150	42	114	120	37
27	79	240	51	103	86	24	111	120	36
28	78	190	40	105	160	45	107	120	34
29	79	160	34	111	140	42	110	110	33
30	85	160	37	111	490	150	110	200	59
31	86	260	60	107	310	90	--	--	--
Total	4,300	--	15,593	3,256	--	2,030	3,166	--	1,631
1									
2									
3									

Total discharge for year (cfs-days) 80,380
Total load for year (tons) 319,623

s Computed by subdividing day.
a Computed from estimated concentration graph.

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Particle size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 10, 1951....	12:20 p. m.	216	58	606	1,900	16	17	20	25	35	61	79	99		100		SPWCM
Oct. 23	12:00 m.	211	--	692	986	20	21	23	30	40	54	72	97		100		SPWCM
Nov. 7.....	11:45 a. m.	233	37	1,060	1,160	11	12	13	19	32	48	70	99		100		SPWCM
Apr. 10, 1952 ...	1:35 p. m.	272	46	866	--	--	--	--	--	--	61	85	100		--		S
May 5	2:15 p. m.	223	74	1,200	2,180	6	7	8	11	19	40	56	86		99	100	SPWCM
May 19.....	1:50 p. m.	238	65	899	--	--	--	--	--	--	57	80	99		100		S
May 27	1:00 p. m.	1,320	--	15,400	23,400	30	40	46	55	67	88	94	99		100		SPWCM
June 2	11:15 a. m.	216	74	720	2,030	15	16	22	29	40	73	94	100		--		SPWCM
June 3	1:40 p. m.	218	76	700	1,560	20	22	26	33	47	76	92	99		100		SPWCM
July 9	10:10 a. m.	142	74	325	--	--	--	--	--	--	67	79	99		100		S
July 28.....	3:00 p. m.	78	75	165	--	--	--	--	--	--	78	100	--		--		S
July 28	11:30 a. m.	80	74	182	--	--	--	--	--	--	73	83	98		100		S
Aug. 14.....	2:30 p. m.	118	86	347	--	--	--	--	--	--	68	80	99		100		S
Aug. 25	10:35 a. m.	110	74	185	--	--	--	--	--	--	76	87	99		100		S
Sept. 22	3:25 p. m.	113	69	188	--	--	--	--	--	--	64	81	100		--		S
Sept. 25	1:15 p. m.	111	71	226	--	--	--	--	--	--	60	80	99		100		S

Particle-size analyses of bed material, June to September 1952
(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	Water discharge (cfs)	Water temperature (°F)	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000
June 2, 1952	3	216								2	15	64	95	99	100	--	S
July 9	3	142								--	8	78	97	99	99	100	S
July 28	3	78								0	11	76	96	99	100	--	S
Aug. 25.....	3	110								1	8	69	96	99	100	--	S
Sept. 22	3	113								1	8	66	95	99	100	--	S

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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.
Sediment loads: Maximum daily, 25,900 tons Mar. 16; minimum daily, not determined.
EXTREMES, 1946-52.--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. 2-9, 16-30, Dec. 7 to Feb. 13, Feb. 19-25, Mar. 1-14, 21-26. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, water year October 1951 to September 1952

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	956	505	1,300	1,220	--		982	--	
2	969	515	1,350	1,270	--		1,020	1,020	
3	1,010	655	1,790	1,160	--		1,320	1,180	
4	1,220	915	3,010	876	--	e 5,600	1,260	--	e 3,500
5	1,300	1,260	4,420	896	2,230		1,030	--	
6	1,350	1,520	5,540	944	--		1,020	--	
7	1,200	1,340	4,340	1,190	3,280	e 9,600	900	760	a 1,800
8	969	1,060	2,770	1,130	--		870		
9	1,020	1,100	3,030	978	1,950	5,150	820	--	e 680
10	1,050	1,040	2,950	894	--		780		
11	1,070	1,220	3,520	1,050	--		740	1,790	
12	1,230	1,370	4,550	1,100	1,750	e 4,700	650	2,390	e 2,300
13	1,070	1,440	4,160	1,260	--		510	--	
14	1,170	1,600	5,050	1,350	1,370		360	--	
15	1,320	1,460	5,200	1,160	--		300		
16	1,090	1,390	4,090	933			250		
17	1,220	1,900	6,260	880	--	e 2,900	189	--	e 110
18	1,190	1,900	6,100	935			155		
19	1,060	1,390	3,980	1,010			225		
20	1,060	1,200	a 3,400	1,450	2,460		272	610	a 450
21	1,050	1,100	a 3,100	1,430	3,260		375	852	863
22	1,160	1,090	3,410	1,330	2,340		588	1,300	a 1,400
23	1,410	1,120	4,260	1,430	--		736	--	
24	1,450	1,260	4,930	1,420	--		701	--	
25	1,430	1,720	6,640	1,340	--	e 8,600	866	--	
26	1,490	1,660	6,680	1,210	2,130		820	--	
27	1,510	1,630	6,640	1,510	2,170		760	--	e 2,400
28	1,400	1,750	6,620	1,670	--		712	2,570	
29	1,030	1,300	a 3,600	1,710	1,790		881	--	
30	1,050	793	2,250	1,580	--		945	--	
31	1,100	1,300	3,860	--	--	--	949	--	
Total	36,604	--	128,800	36,316	--	192,350	21,986	--	58,903

e Estimated.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,030	--		1,570	--		892	--	e 4,700
2	902	--		1,640	--		784		
3	953	--	e 3,200	1,580	--	e 1,800	565	1,200	a 1,800
4	1,080	1,350		1,610	395		1,090		
5	838	370	837	1,580	240		1,510	--	
6	812	55	a 120	1,560	--	e 1,000	1,680		e 3,400
7	960	175		1,590	375	1,610	2,040		
8	1,090	--		1,640	--		2,460	3,140	
9	1,080	--		1,630	--		2,040	--	
10	1,040	220		1,650	705	e 3,000	1,850	4,180	e 18,000
11	1,080	--		1,670	--		1,700	--	
12	1,120	--		1,430	1,990	7,680	1,600	4,130	17,800
13	1,120	--	e 550	1,850	3,000	a 15,000	1,700	4,130	19,000
14	1,170	--		2,440	2,950		1,800	3,970	19,300
15	1,230	--		2,050	--		1,900	4,000	a 20,000
16	1,260	--		2,070	3,340	e 16,000	2,250	4,270	25,900
17	1,250	165		1,860	--		2,570	3,670	25,500
18	1,330	--		1,580	2,450		2,610	3,420	24,100
19	1,580	--		1,180	--		2,130	2,970	17,100
20	1,600	240		984	--		2,230	2,330	14,000
21	1,500	--		1,010	1,810	e 4,200	1,400	2,000	a 7,600
22	1,500	--	e 1,000	722	1,500		884	1,300	a 3,100
23	1,420	--		732	--		398	910	978
24	1,260	255		1,140	--		666	1,940	3,490
25	840	--		1,320	2,300	8,520	900	2,890	s 11,200
26	635	165		1,480	3,600		1,300	4,160	14,600
27	596	--	e 360	1,300	--	e 12,000	1,820	3,070	15,100
28	724	150		1,350	--		1,840	2,670	13,300
29	975	--		1,350	2,890		1,400	2,560	9,680
30	1,230	305	1,010	--	--	--	1,530	2,190	9,050
31	1,440	380	a 1,500	--	--	--	1,460	1,660	6,540
Total	34,645	--	30,217	43,568	--	207,210	48,999	--	388,738

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1,510	2,110	8,600	1,220	1,240	4,080	1,020	614	1,690
2	1,480	1,920	7,670	1,340	1,480	5,350	906	490	1,200
3	1,320	1,710	6,090	1,340	1,720	6,220	858	420	973
4	1,280	1,590	5,500	1,200	1,380	4,470	777	543	1,140
5	1,130	1,560	4,760	1,060	1,590	4,550	777	362	759
6	1,030	1,330	3,700	1,050	1,470	4,170	918	603	1,490
7	1,030	998	2,780	1,120	1,150	3,480	766	582	1,200
8	1,010	1,280	3,490	1,170	1,050	3,320	722	533	1,040
9	1,070	1,500	4,330	1,190	1,040	3,340	744	695	1,400
10	1,190	1,800	5,780	1,170	1,520	4,800	755	570	1,160
11	1,320	1,530	5,450	1,070	1,550	4,480	670	427	772
12	1,280	2,100	7,260	995	1,000	2,690	620	480	a 800
13	1,450	1,790	7,010	918	970	2,400	610	533	878
14	1,340	1,810	6,550	969	625	1,640	546	363	535
15	1,320	1,430	5,100	1,030	730	2,030	519	400	561
16	1,320	1,620	5,770	1,380	1,460	5,440	494	318	424
17	1,650	1,260	5,610	1,580	1,700	7,250	510	400	551
18	1,730	1,300	6,070	1,400	1,590	6,010	519	380	532
19	1,510	1,180	4,810	1,100	1,130	3,360	462	300	374
20	1,610	1,290	5,610	1,260	955	3,250	402	495	537
21	1,460	1,826	7,170	1,630	1,120	4,930	502	498	675
22	1,680	1,380	6,260	1,820	1,280	6,290	573	430	a 660
23	1,530	1,800	7,440	1,770	2,100	10,000	600	440	713
24	1,260	1,500	a 5,100	1,400	1,350	5,100	573	539	834
25	1,030	1,240	3,450	1,240	845	2,830	573	590	913
26	1,030	815	2,270	1,320	950	3,380	630	540	919
27	956	1,020	2,630	2,250	3,100	s 22,600	846	728	1,660
28	1,070	1,620	4,680	2,190	2,790	16,500	822	577	1,280
29	1,050	1,100	3,120	1,410	1,310	4,990	846	564	1,290
30	1,120	1,200	3,630	1,240	1,290	4,320	777	598	1,250
31	--	--	--	1,190	682	2,190	--	--	--
Total	38,766	--	157,690	41,022	--	165,460	20,337	--	28,210

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	733	560	1,110	446	358	431	640	336	581
2	640	416	719	478	297	383	670	402	727
3	650	428	751	486	361	474	660	530	a940
4	582	280	440	537	342	496	690	522	972
5	546	350	516	510	358	493	610	368	606
6	486	360	472	537	367	532	600	270	437
7	591	423	675	502	386	523	582	318	500
8	810	628	1,370	591	323	515	555	358	536
9	700	570	1,080	620	227	380	555	193	289
10	690	617	1,150	591	236	377	564	240	365
11	600	484	784	690	302	563	555	218	327
12	555	377	565	630	277	471	546	340	501
13	600	500	810	670	328	593	546	296	436
14	1,290	2,300	bs 9,500	766	460	951	630	227	386
15	1,130	3,240	s 10,700	766	396	819	660	258	460
16	956	1,180	3,050	744	340	a680	744	344	691
17	788	956	2,030	690	417	777	711	468	898
18	711	790	a1,500	640	334	577	640	468	809
19	660	502	895	564	274	417	630	400	a680
20	650	492	863	537	238	345	670	332	601
21	630	561	954	528	403	575	711	254	488
22	640	448	774	528	417	594	722	366	713
23	610	333	548	510	280	386	766	410	848
24	519	330	462	537	390	565	766	384	794
25	438	270	319	564	252	384	755	487	993
26	430	319	370	564	236	359	755	358	730
27	409	370	409	537	273	396	733	500	990
28	430	363	421	600	379	614	722	420	819
29	494	318	424	630	428	728	766	398	823
30	494	222	296	630	360	a610	733	532	1,050
31	478	217	280	610	353	581	--	--	--
Total	19,940	--	44,237	18,233	--	16,589	19,887	--	19,990

Total discharge for year (cfs-days) 380,303
Total load for year (tons) 1,438,394

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 22, 1951	5:20 p.m.	1,140	47	1,100	--	--	--	--	--	--	28	57	97		100	--	S
Oct. 30	12:20 p.m.	1,030	47	758	--	--	--	--	--	--	37	65	98		100	--	S
Nov. 20	11:30 a.m.	1,240	--	2,520	3,580	--	3	--	5	--	22	53	98		100	--	SPWCM
Nov. 27	12:40 p.m.	1,690	--	2,180	2,890	--	4	--	6	--	20	41	90		100	--	SPWCM
Dec. 3	1:00 p.m.	1,300	--	1,220	1,410	--	4	--	6	--	18	46	96		100	--	SPWCM
Dec. 11	11:45 a.m.	a740	--	1,930	2,650	--	6	--	9	--	22	41	89		100	--	SPWCM
Mar. 17, 1952	11:30 a.m.	2,610	39	3,660	8,090	9	11	13	17	28	40	56	87		100	--	SPWCM
Mar. 28	4:00 p.m.	1,750	--	2,200	--	--	--	--	--	--	33	53	84		99	100	S
Apr. 2	2:15 p.m.	1,450	--	1,850	--	--	--	--	--	--	39	64	92		100	--	S
Apr. 7	3:35 p.m.	1,060	61	892	--	--	--	--	--	--	49	73	97		100	--	S
Apr. 29	1:30 p.m.	1,100	70	1,130	--	--	--	--	--	--	26	47	85		98	100	S
May 6	3:30 p.m.	982	--	1,350	--	--	--	--	--	--	22	38	76		98	100	S
May 15	10:20 a.m.	1,170	--	632	--	--	--	--	--	--	29	54	91		100	--	S
May 28	12:30 p.m.	2,330	60	3,110	5,070	24	30	34	38	46	62	78	95		100	--	SPWCM
June 3	1:00 p.m.	858	--	368	--	--	--	--	--	--	51	69	95		100	--	S
July 2	11:30 a.m.	650	80	354	--	--	--	--	--	--	36	49	87		100	--	S
July 9	10:45 a.m.	711	76	540	--	--	--	--	--	--	50	64	93		100	--	S
July 16	2:40 p.m.	906	84	988	--	--	--	--	--	--	66	78	92		100	--	S
Aug. 6	12:30 p.m.	564	--	342	--	--	--	--	--	--	39	63	96		100	--	S
Aug. 13	11:30 a.m.	670	76	344	--	--	--	--	--	--	36	61	94		100	--	S
Aug. 20	3:30 p.m.	546	80	216	--	--	--	--	--	--	43	63	96		100	--	S
Aug. 27	1:15 p.m.	537	86	259	--	--	--	--	--	--	42	59	93		100	--	S
Sept. 5	1:15 p.m.	650	78	356	--	--	--	--	--	--	36	49	81		100	--	S

a Mean daily discharge.

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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 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 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 3,600 ppm Mar. 17; minimum daily, not determined.
Sediment loads: Maximum daily, 17,100 tons Mar. 17; minimum daily, not determined.
EXTREMES, 1946-52.--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 Dec. 11 to Mar. 11, Mar. 22-24. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, water year October 1951 to September 1952

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	955	335	864	1,090	--		1,130	788	
2	942	259	659	980	--		1,130	--	
3	955	400	1,030	992	940		1,200	--	
4	1,100	782	2,320	918	--	e 1,700	1,200	815	
5	1,140	745	2,290	769	540		1,200	--	
6	1,130	586	1,790	918	655		1,260	783	e 2,400
7	1,100	437	1,300	905	770		1,370	--	
8	1,020	378	1,040	882	--		1,320	--	
9	992	395	1,060	1,020	--		1,060	--	
10	1,000	423	1,140	1,020	540		1,000	563	
11	1,000	480	1,300	1,070	--	e 1,900	990	602	1,610
12	1,000	465	1,260	1,090	637		994	923	2,480
13	955	460	1,190	1,140	--		755	--	e 1,300
14	992	468	1,250	1,180	817		394	--	
15	1,070	560	1,620	1,200	660		131	--	
16	1,020	528	1,450	1,140	--		140	--	
17	1,090	522	1,540	980	--	e 1,600	187	68	e 55
18	1,090	575	a 1,690	870	--		364	--	
19	1,090	630	1,850	894	645		562	--	
20	1,090	662	a 1,950	942	900		810	--	
21	1,100	658	1,950	824	--		920	--	
22	1,110	623	1,870	848	--		868	122	
23	1,070	560	1,620	882	840		810	223	e 320
24	1,090	492	a 1,450	942	--	e 2,200	881	--	
25	1,100	462	1,370	992	765		911	--	
26	1,100	524	1,560	1,200	--		904	88	
27	1,130	560	a 1,710	1,230	780		919	--	
28	1,110	514	1,540	1,180	--		880	262	
29	1,100	532	a 1,580	1,220	680	e 2,200	890	252	e 490
30	1,100	630	1,870	1,130	--		911	--	
31	1,060	550	1,570	--	--	--	918	150	
Total	32,801	--	46,683	30,448	--	57,600	27,009	--	35,655

e Estimated.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	907	--		1,170	--		1,080	1,520	
2	872	290		1,230	--		1,080	--	
3	843	--	e 620	1,320	--		755	--	
4	846	264		1,370	--	e 1,100	437	--	
5	872	--		1,440	--		536	--	e 2,100
6	899	375		1,510	325		536	--	
7	906	--	e 980	1,490	340		778	600	
8	920	404		1,550	--		1,220	--	
9	941	--		1,550	422		1,590	978	4,200
10	964	462		1,560	--		1,650	1,080	4,810
11	950	300		1,570	628	e 2,200	1,990	1,230	6,610
12	950	--		1,500	--		2,540	1,100	a 7,540
13	987	--		1,610	710		3,450	1,520	14,200
14	1,020	--		1,780	490		2,570	1,650	a 11,400
15	1,050	60	e 410	1,880	--		1,830	1,540	7,610
16	1,140	--		1,560	418		1,720	3,200	sa 17,000
17	1,290	238		1,540	--	e 2,400	1,760	3,600	17,100
18	1,300			1,610	600		1,740	2,400	11,300
19	1,310			1,640	776		1,510	1,750	--
20	1,360	--	e 820	1,220	--		1,600		
21	1,380			712	500		1,690	--	e 7,200
22	1,200			915	--		1,600		
23	922	--		854	548	e 1,900	650	825	a 1,450
24	613	50		1,170	--		1,200	1,420	4,600
25	576	238		1,180	763		1,140	2,760	8,500
26	656	--		1,170	850		1,400	3,230	12,200
27	798	100	e 340	1,120	--	e 2,700	1,030	2,210	6,150
28	964	--		1,090	783		955	1,580	4,070
29	1,020	140		1,090	--		1,020	1,260	3,470
30	1,080	--		--	--	--	1,280	853	2,950
31	1,090	200		--	--	--	1,480	1,110	4,440
Total-	30,626	--	18,390	39,401	--	58,400	43,817	--	195,200

Day	April			May			June		
1	1,480	1,010	4,040	1,000	385	770	894	254	613
2	1,380	1,030	3,840	1,040	342	960	882	245	583
3	1,370	828	3,060	1,040	333	935	870	218	512
4	1,350	785	2,860	1,000	394	1,060	802	206	446
5	1,240	638	2,140	955	266	686	802	278	602
6	1,170	592	1,870	894	258	623	738	227	452
7	1,160	568	1,780	1,000	317	856	685	157	290
8	1,140	661	2,030	1,040	298	837	675	190	346
9	1,170	698	a 2,200	1,090	452	1,330	675	171	312
10	1,000	700	1,890	1,170	486	1,540	656	160	283
11	924	650	1,650	1,140	466	1,430	636	181	311
12	1,060	693	1,980	1,100	430	1,280	627	168	284
13	1,100	710	2,110	1,030	359	998	588	200	a 318
14	1,110	560	1,680	1,020	316	870	544	230	338
15	1,090	458	1,350	980	320	847	484	160	209
16	1,100	470	1,400	1,030	272	756	420	134	152
17	1,180	475	1,510	1,280	659	s 2,450	406	136	149
18	1,420	904	3,470	1,650	1,620	7,220	406	155	170
19	1,370	640	2,370	1,500	992	4,020	386	240	250
20	1,350	516	1,880	1,550	678	2,840	372	183	184
21	1,450	568	2,220	1,650	816	3,640	553	190	284
22	1,600	848	3,660	1,780	970	4,660	685	198	366
23	1,690	1,350	6,160	1,810	846	4,130	685	190	351
24	1,380	763	2,840	1,620	552	2,410	685	270	499
25	1,340	420	1,520	1,450	446	1,750	675	223	406
26	1,340	470	1,700	1,340	382	1,380	790	360	s 838
27	1,170	410	1,300	1,530	964	3,980	882	1,380	3,290
28	1,040	323	907	1,480	501	2,000	942	872	2,220
29	968	222	580	1,180	347	1,110	955	413	1,060
30	992	200	536	1,060	308	881	905	263	643
31	--	--	--	992	265	710	--	--	--
Total-	37,152	--	66,533	38,401	--	58,959	20,305	--	16,761

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	758	177	362	270	110	80	627	390	660
2	656	172	305	270	132	96	627	280	474
3	617	207	345	297	121	97	607	200	a 328
4	570	336	517	420	294	333	598	184	297
5	509	338	466	468	370	468	579	188	294
6	476	218	280	400	168	181	579	195	305
7	656	222	393	492	175	232	526	238	338
8	553	212	316	588	206	327	526	288	409
9	500	180	243	685	203	375	535	210	303
10	436	122	144	675	159	290	535	155	224
11	372	183	184	675	124	a 226	544	128	188
12	400	171	185	656	140	a 248	535	222	321
13	393	135	143	675	240	437	553	214	320
14	484	143	187	738	382	761	579	148	231
15	570	308	474	790	522	1,110	579	160	250
16	598	330	a 533	738	302	602	656	176	312
17	535	195	282	656	238	422	646	222	387
18	468	129	163	666	177	318	646	202	352
19	420	110	125	627	153	259	617	177	295
20	372	97	97	636	202	347	588	196	311
21	346	105	98	617	213	355	607	234	384
22	334	110	a 99	607	237	388	636	204	350
23	334	84	76	636	290	498	617	180	300
24	315	100	85	588	208	330	598	240	388
25	309	77	64	627	311	526	607	230	377
26	297	60	48	570	224	345	598	182	294
27	280	72	a 54	553	212	317	607	185	303
28	264	72	51	570	223	343	607	200	328
29	280	74	56	598	203	328	607	180	295
30	286	81	62	617	162	270	607	175	287
31	286	113	87	617	241	a 401	--	--	--
Total	13,674	--	6,524	18,022	--	11,310	17,773	--	9,905

Total discharge for year (cfs-days) 349,429
Total load for year (tons) 581,920

a Computed from estimated concentration graph.

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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. 2, 1951	1:30 p.m.	918	71	242	--		--		--		53	70	93	100	--		S
Oct. 9	2:10 p.m.	1,020	--	408	--		--		--		35	51	83	99	100		S
Oct. 16	4:00 p.m.	980	52	498	--		--		--		29	46	79	100	--		S
Oct. 22	4:20 p.m.	1,110	47	620	--		--		--		30	47	84	100	--		S
Oct. 30	3:50 p.m.	1,130	46	655	--		--		--		47	69	94	100	--		S
Nov. 14	2:00 p.m.	1,200	44	830	--		--		--		13	28	68	90	100		S
Nov. 27	12:45 p.m.	1,170	34	732	1,500		9		13		36	55	85	100	--		SPWCM
Dec. 4	10:40 a.m.	1,220	--	795	1,030		7		9		24	42	87	100	--		SPWCM
Dec. 11	12:40 p.m.	904	33	582	--		--		--		14	35	88	99	100		S
Dec. 22	3:15 p.m.	853	32	113	--		--		--		45	60	87	98	100		S
Jan. 4, 1952	3:50 p.m.	859	32	256	--		--		--		16	29	80	99	100		S
Feb. 25	11:45 a.m.	1,320	--	763	--		--		--		10	21	65	97	99	100	S
Feb. 26	11:15 a.m.	1,400	--	702	--		--		--		21	40	85	100	--		S
Mar. 10	1:00 p.m.	1,560	--	1,070	--		--		--		20	35	77	99	100		S
Mar. 25	1:30 p.m.	1,340	--	2,860	--		--		--		41	63	87	100	--		S
Apr. 7	12:10 p.m.	1,170	52	522	--		--		--		35	56	89	100	--		S
Apr. 15	4:15 p.m.	1,140	54	439	--		--		--		36	57	88	100	--		S
Apr. 23	4:00 p.m.	2,000	56	1,680	--		--		--		54	70	92	100	--		S
May 6	12:00 m.	894	--	276	--		--		--		44	63	91	100	--		S
May 20	12:30 p.m.	1,530	54	634	--		--		--		41	61	86	99	100		S
May 28	4:00 p.m.	1,500	73	412	--		--		--		55	75	94	100	--		S
June 4	2:45 p.m.	790	78	190	--		--		--		48	65	90	100	--		S
Aug. 13	2:45 p.m.	675	--	216	--		--		--		76	88	97	100	--		S
Aug. 20	12:15 p.m.	627	80	174	--		--		--		66	78	93	100	--		S
Aug. 26	12:00 m.	579	--	207	--		--		--		68	82	97	100	--		S
Sept. 4	2:30 p.m.	598	79	172	--		--		--		48	67	95	100	--		S
Sept. 10	12:00 m.	544	74	138	--		--		--		56	70	93	100	--		S
Sept. 17	3:15 p.m.	646	72	240	--		--		--		45	60	90	100	--		S

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.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1952.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 16, 1951	7,540	--	--	--	--	--		226	0	50	--	--	--		--	--		190	5	--	--	471	8.2
Nov. 30	6,570	--	--	--	--	--		212	6	54	--	--	--		--	--		193	9	--	--	473	8.3
Jan. 24, 1952	6,340	28	0.05	46	9.5	21	112	170	0	49	7.5	0.3	7.6		275	0.37		154	15	21	0.7	409	7.8
Feb. 18	19,600	23	.10	55	5.1	24		189	0	40	6.0	.2	5.7		261	.35		158	3	25	.8	401	8.1
Mar. 21	16,370	21	.10	49	9.1	27		199	0	41	5.0	.2	7.2		271	.37		160	0	27	.9	415	7.9
Mar. 31	25,030	17	.07	49	10	23		190	0	46	4.5	.4	5.4		264	.36		165	9	23	.8	415	7.5
Apr. 16	a10,600	--	--	68	16	27	8.2	262	0	71	7.5	--	--		--	--		235	20	19	.8	565	7.8
May 12	6,940	--	--	--	--	--		240	0	68	--	--	--		--	--		214	17	--	--	523	7.7
June 19	3,380	--	--	--	--	--		232	0	102	--	--	--		--	--		215	25	--	--	595	7.9
Aug. 6	2,800	--	--	--	--	--		248	0	34	--	--	--		--	--		204	1	--	--	469	7.8
Sept. 2	3,840	--	--	--	--	--		185	0	29	--	--	--		--	--		150	0	--	--	370	8.0

a Mean daily discharge.

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, March to September 1952.
EXTREMES, March to September 1952.--Sediment concentrations: Maximum daily, 41,100 ppm Mar. 31; minimum daily, 33 ppm Sept. 30.
Sediment loads: Maximum daily, 662,000 tons June 27; minimum daily, 6 tons Sept. 1, 30.
EXTREMES, 1951, 1952.--Sediment concentrations: Maximum daily, 41,100 ppm Mar. 31, 1952; minimum daily, 10 ppm Sept. 22, 1951.
Sediment loads: Maximum daily, 857,000 tons June 2, 1951; minimum daily, 3 tons Sept. 22, 23, 1951.
REMARKS.--Maximum observed sediment concentration March to September 1952, 91,100 ppm Mar. 31, Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Periodic determinations of suspended-sediment discharge, October 1951 to March 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 4, 1951	679	8,540	15,700
Oct. 4	679	7,480	13,700
Dec. 9	72	35	6.8
Dec. 12	86	14	3.3
Jan. 14, 1952	200	660	356
Feb. 5	132	49	17
Feb. 18	92	64	16
Mar. 6	86	19	4.4

Suspended sediment, March to September 1952.

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							312	610	514
17							526	2,020	s 3,080
18							900	7,080	s 23,000
19							1,710	15,400	71,100
20							504	5,100	sa 7,400
21							308	2,800	a 2,300
22							252	2,300	a 1,600
23							80	900	a 190
24							127	900	a 300
25							159	400	172
26							259	650	454
27							566	2,100	sb 3,600
28							1,240	6,570	22,000
29							1,210	8,300	27,100
30							1,340	13,400	48,500
31							1,370	41,100	s 199,000
Total							10,863	--	410,310

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Suspended sediment, March to September 1952--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	460	7,200	s 9,660	344	572	531	147	56	22
2	356	1,540	1,480	308	555	462	142	50	19
3	230	720	447	252	432	294	140	35	13
4	220	520	309	220	375	223	129	36	12
5	230	880	546	234	324	205	127	40	14
6	224	530	320	227	255	156	127	38	13
7	159	230	99	210	240	136	109	50	15
8	213	700	sb 460	213	240	b 140	100	63	17
9	1,320	24,500	s 108,000	200	208	112	96	58	15
10	1,220	10,400	s 38,100	177	162	77	96	120	31
11	1,090	5,750	16,900	147	125	ɔ0	100	107	29
12	1,360	5,800	b 21,000	177	115	55	100	47	13
13	1,360	5,850	s 23,000	171	130	60	98	41	11
14	697	2,310	4,350	165	130	b 60	96	42	11
15	447	1,170	1,410	177	138	66	92	42	10
16	368	670	666	949	10,500	s 35,200	88	61	14
17	426	2,270	s 2,930	562	5,920	s 9,780	73	352	69
18	638	4,050	6,980	259	560	392	94	547	139
19	517	1,000	1,400	230	400	248	127	272	93
20	364	700	688	224	500	302	147	750	sa 460
21	981	9,500	sb 33,000	278	860	646	252	4,000	sa 3,200
22	2,020	19,000	sa 20,000	784	7,700	sb 25,000	266	2,980	2,140
23	1,260	16,000	sa 58,000	1,180	6,590	s 23,900	142	2,100	805
24	674	6,680	s 13,000	413	1,030	1,150	886	7,100	sa 20,000
25	512	2,300	3,180	220	920	546	241	4,220	2,740
26	434	824	966	244	760	501	903	6,000	sa 21,000
27	393	710	753	234	1,500	948	12,000	20,500	s 662,000
28	336	685	621	234	1,200	758	4,510	7,490	s 111,000
29	312	555	468	180	670	326	720	1,300	a 2,500
30	308	495	412	162	188	82	800	4,800	sa 12,000
31	--	--	--	153	135	56	--	--	--
Total	19,129	--	469,145	9,528	--	102,462	22,948	--	838,405

Day	July			August			September		
1	360	2,100	a 2,000	102	112	31	252	1,170	796
2	281	1,700	a 1,300	102	96	26	106	460	132
3	234	1,400	a 900	129	52	18	98	200	53
4	171	1,150	531	115	80	25	94	88	22
5	168	1,020	463	115	37	11	82	58	13
6	102	700	a 190	92	38	9	77	59	12
7	150	110	45	92	108	27	69	49	9
8	140	100	b 38	137	2,200	b 800	73	45	9
9	134	62	22	117	2,100	b 650	64	40	7
10	124	59	20	137	180	66	58	62	10
11	115	102	32	127	100	34	59	93	15
12	189	700	sa 1,600	96	100	a 26	58	67	10
13	1,860	11,100	s 61,600	53	100	a 14	56	63	10
14	5,220	13,500	s 184,000	458	18,000	sb 27,000	68	70	13
15	4,250	6,750	s 70,300	206	8,400	4,670	66	67	12
16	662	3,600	s 7,110	117	4,700	1,480	71	66	13
17	270	730	532	88	590	140	58	67	10
18	210	240	136	102	478	132	54	61	9
19	187	134	68	98	450	119	54	45	6
20	241	622	405	124	796	267	58	44	7
21	193	462	241	82	678	150	62	43	7
22	165	134	60	456	3,660	s 4,750	61	73	12
23	129	293	102	134	900	326	58	73	11
24	177	388	185	80	300	65	54	56	8
25	122	220	b 70	216	2,300	sa 6,100	53	70	10
26	98	150	40	815	9,500	sa 27,000	62	133	22
27	96	178	46	165	1,500	668	54	53	8
28	80	128	28	162	1,220	534	60	50	a 8
29	77	80	17	548	7,300	a 11,000	68	77	14
30	77	47	10	308	1,220	1,010	64	33	6
31	98	72	19	348	1,400	1,320	--	--	--
Total	16,380	--	332,110	5,921	--	88,468	2,171	--	1,274

Total discharge for period Mar. 16 to Sept. 30, 1952 (cfs-days) 86,940

Total load for period Mar. 16 to Sept. 30, 1952 (tons) 2,242,174

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

SALT CREEK AT LINCOLN, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to July 1952
(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	Water 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, 1951	8:35 a.m.	679	65	8,540	13,900	42	52	63	75	90	98	98	99		100		SPWCM
June 27, 1952	1:15 p.m.	14,600		19,600	38,000	30	42	54	66	84	97	99	100		--		SPWCM
July 14	9:50 p.m.	7,750		8,180	11,200	40	48	56	64	80	89	92	96		100		SPWCM

Particle-size analyses of bed material, December 1951 to April 1952
(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 disperzed)

Date of collection	Number of sampling points	Water discharge (cfs)	Water temperature (°F)	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
Dec. 9, 1951	3	72								--	1	15	84	98	100	--	S
Dec. 12	2	86								1	2	8	41	76	90	97	S
Jan. 14, 1952	3	200								--	1	23	80	95	98	99	S
Feb. 5	2	132								--	--	4	37	82	94	98	S
Feb. 18	3	92								--	--	11	74	95	99	100	S
Mar. 6	3	86								--	--	5	48	84	94	98	S
Mar. 17	3	544								--	1	10	48	87	99	100	S
Apr. 2	3	278								1	2	23	83	96	98	100	S

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
BIG THOMPSON RIVER AT MOUTH NEAR LASALLE, COLO.																							
Nov. 24, 1951	70	--	--	--	--	--		434	0	1,140	--	--	--	--	--	--		1,110	744	--	--	2,470	7.1
Jan. 8, 1952	56	--	--	--	--	--		408	0	1,180	--	--	--	--	--	--		1,140	805	--	--	2,530	7.2
Feb. 25	52	--	--	--	--	--		432	0	1,350	--	--	--	--	--	--		1,250	896	--	--	2,870	7.3
Mar. 24	57	--	--	142	85	122		235	0	718	16	--	9.2	0.25	--	--		704	511	27	2.0	1,630	7.6
May 5	508	14	0.04	54	27	39		110	0	221	5.0	0.4	3.6	.14	442	0.60		246	156	26	1.1	630	7.5
June 2	665	12	.08	36	16	27		83	0	132	3.0	.4	2.5	.12	280	.38		154	86	28	.9	422	7.7
June 26	83	--	--	--	--	--		238	20	995	--	--	--	.12	--	--		867	638	--	--	2,010	8.6
July 28	143	--	--	--	--	--		301	0	1,080	--	--	--	.42	--	--		983	736	--	--	2,270	7.8
Sept. 2	185	--	--	--	--	--		250	0	705	--	--	--	.22	--	--		691	486	--	--	1,610	7.9
CACHE LA POUDRE RIVER NEAR GREELEY, COLO.																							
Nov. 24, 1951	120			209	98	160		782	0	558	15		1.2					924	283	28	2.3	2,050	7.5
Jan. 8, 1952	103					--		296	6	765	--							803	550	--	--	1,780	8.2
Feb. 25	92					143		348	0	830	15							865	580	27	2.1	1,950	7.6
Mar. 24	95					--		310	0	685	--							733	479	--	--	1,690	7.3
May 5	58					--		310	0	875	--							881	627	--	--	1,980	7.6
June 2	34					--		293	0	685	--							720	480	--	--	1,670	7.9
June 26	30					--		370	0	725	--							798	495	--	--	1,830	7.9
July 28	19					--		366	0	795	--							845	545	--	--	1,920	7.8
Sept. 2	22					--		332	0	725	--							784	512	--	--	1,790	8.0
JOHNSON RESERVOIR NEAR LEXINGTON, NEBR.																							
Dec. 4, 1951	a 43,940							225	0	221								257	72			857	7.7
Feb. 29, 1952	a 37,240					87		240	0	239								284	87	40	2.2	913	8.0
June 2	a 42,680							209	0	280								294	123			957	7.9
Sept. 3	a 41,230							208	0	184								210	39			763	8.1

a Reservoir contents, in acre-feet.

Nov. 13, 1951	1,720						234	0	190	23			--				252	60	40	2.2	795	7.9
Feb. 11, 1952	4,790	25		65	18	73	221	0	175	21			--	500	0.68		234	53	40	2.1	745	7.7
June 20	b 600						226	0	235	--			0.16				260	75	--	--	888	8.1
Aug. 27	b 250						182	6	251	--			.14				240	81	--	--	885	8.4

b 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 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
SOUTH PLATTE RIVER AT SUBLETTE, COLO. (NORTH CHANNEL)			
Mar. 24, 1952	278	126	94
Mar. 27	232	312	195
Apr. 13	268	402	291
Apr. 18	96	15	3.9
May 5	968	659	1,720
May 6	954	687	1,770
May 7	940	1,140	2,890
June 2	2,900	830	6,500
June 6	1,880	627	3,180
June 16	1,020	747	2,060
June 22	392	150	159
July 8	378	904	923
July 9	645	399	695
July 9	623	391	658
July 9	610	438	721
July 10	550	234	347
July 11	368	364	362
July 15	310	797	667
July 23	208	62	35
Aug. 16	252	57	39
Aug. 18	225	53	32
Aug. 23	263	59	42
Aug. 28	368	127	126
SOUTH PLATTE RIVER AT SUBLETTE, COLO. (SOUTH CHANNEL)			
Mar. 24, 1952	68	58	11
Apr. 13	81	183	40
Apr. 18	7.6	10	.2
May 5	346	565	528
May 6	339	404	370
May 7	324	440	385
June 2	510	334	460
June 6	281	397	301
June 16	176	764	363
June 22	7.4	38	.8
July 8	5.9	102	1.6
July 9	26	213	15
July 9	30	220	18
July 9	26	313	22
July 10	17	98	4.5
July 15	1.1	35	.1
July 23	.9	32	.1
Aug. 16	1.7	24	.1
Aug. 18	1.9	35	.2
DISMAL RIVER AT DUNNING, NEBR.			
Oct. 2, 1951	283	574	439
Oct. 16	312	920	775
Nov. 14	312	726	612
Nov. 28	312	1,120	943
Dec. 3	300	1,090	883
Dec. 12	315	2,170	1,850
Dec. 18	305	1,900	1,560
Jan. 9, 1952	344	466	433
Jan. 23	164	68	30
Feb. 5	345	1,080	1,010
Feb. 21	306	1,420	1,170
Mar. 6	321	1,280	1,110
Mar. 18	412	1,110	1,230
Apr. 2	318	1,140	979
Apr. 16	348	680	639

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
DISMAL RIVER AT DUNNING, NEBR.--Continued			
May 1, 1952	321	995	862
May 7	348	582	547
May 12	283	551	421
May 26	928	3,800	9,520
May 27	400	670	724
June 4	306	548	453
June 12	315	564	480
June 25	300	480	389
July 5	277	426	319
July 9	292	524	413
July 22	306	651	538
July 29	306	428	354
Aug. 6	306	424	350
Aug. 19	300	399	323
Aug. 27	312	438	369
Sept. 2	289	524	409
Sept. 17	306	601	497
MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.			
Nov. 9, 1951	820	828	1,830
Nov. 15	a782	1,060	2,240
Nov. 27	794	994	2,130
Dec. 12	814	1,310	2,880
Dec. 28	a798	267	575
Jan 8, 1952	892	354	853
Feb. 6	866	1,290	3,020
Feb. 22	782	2,020	4,270
Mar. 5	763	1,360	2,800
Mar. 18	896	1,680	4,060
Apr. 2	864	920	2,150
Apr. 15	754	1,080	2,200
Apr. 30	788	736	1,570
May 13	856	550	1,270
May 27	765	650	1,340
June 13	723	686	1,340
June 26	744	588	1,180
July 10	693	511	956
July 17	684	354	654
July 22	670	434	785
Aug. 5	733	538	1,060
Aug. 12	827	514	1,150
Aug. 20	697	428	805
Sept. 3	744	869	1,750
Sept. 10	693	961	1,800
Sept. 16	749	286	578
MIDDLE LOUP RIVER NEAR MILBURN, NEBR.			
Oct. 9, 1951	836	838	1,890
Oct. 17	758	552	1,130
Nov. 1	843	985	2,240
MIDDLE LOUP RIVER AT ARCADIA, NEBR.			
Oct. 16, 1951	975	838	2,210
Oct. 24	865	785	1,830
Nov. 8	865	514	1,200
Nov. 19	749	1,720	3,480
Dec. 5	838	1,360	3,080
Dec. 17	173	1,430	668
Jan. 3, 1952	631	351	598
Jan. 16	1,210	424	1,380
Jan. 30	1,140	678	2,090
Feb. 14	1,220	1,570	5,170

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 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
MIDDLE LOUP RIVER AT ARCADIA, NEBR.--Continued			
Feb. 27, 1952	1,370	233	860
Mar. 7	1,090	1,210	3,550
Mar. 12	1,190	3,040	9,770
Mar. 26	1,420	2,550	9,800
Apr. 9	1,210	1,400	4,600
Apr. 23	975	848	2,230
May 8	938	699	1,770
May 14	804	632	1,370
May 20	1,200	1,180	3,830
May 27	2,550	3,310	22,600
June 10	521	300	422
June 17	501	303	410
June 24	554	429	642
July 8	508	260	357
July 17	534	361	520
July 22	458	392	485
Aug. 12	567	370	566
Aug. 20	501	307	415
Sept. 3	602	402	653
Sept. 15	691	399	744
Sept. 30	602	345	561
MIDDLE LOUP RIVER AT LOUP CITY, NEBR.			
Oct. 8, 1951	788	706	1,500
Oct. 25	816	777	1,710
Nov. 19	771	1,800	3,750
Dec. 6	984	1,740	4,620
Dec. 27	751	389	789
Jan. 16, 1952	1,280	265	916
Mar. 12	1,310	1,920	6,790
Mar. 31	1,120	1,590	4,810
Apr. 23	1,180	854	2,720
May 5	900	605	1,470
May 21	914	930	2,300
May 27	2,350	3,110	19,700
June 3	606	484	792
June 20	411	196	218
July 2	433	238	278
July 16	630	232	395
July 29	422	161	183
Aug. 25	534	188	271
Sept. 11	522	187	264
Oct. 8	802	620	1,340
NORTH LOUP RIVER AT BURWELL, NEBR.			
Oct. 1, 1951	551	276	411
Oct. 15	557	388	584
Oct. 24	675	682	1,240
Nov. 7	662	906	1,620
Nov. 19	582	1,100	1,730
Dec. 4	609	1,060	1,740
Jan. 3, 1952	547	296	437
Jan. 15	616	337	560
Jan. 29	615	170	282
Feb. 12	857	1,170	2,710
Feb. 25	584	1,180	1,860
Mar. 12	804	1,070	2,320
Apr. 8	680	1,020	1,870
May 6	561	285	432
June 2	535	231	334
July 21	230	110	68
Aug. 4	254	162	111
Aug. 11	407	173	190
Aug. 18	309	140	117

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
NORTH LOUP RIVER AT BURWELL, NEBR.--Continued			
Sept. 1, 1952	278	181	136
Sept. 9	276	108	80
Sept. 15	365	230	227
Sept. 29	281	156	118
CALAMUS RIVER NEAR BURWELL, NEBR.			
Oct. 8, 1951	343	164	152
Oct. 23	369	275	274
Nov. 7	354	486	465
Nov. 20	336	313	284
Dec. 4	354	318	304
Dec. 17	a 326	142	125
Jan. 3, 1952	a 330	128	114
Jan. 11	a 354	78	75
Jan. 15	a 477	223	287
Feb. 12	442	2,280	2,720
Feb. 25	376	578	587
Mar. 5	a 386	500	521
Mar. 13	424	619	709
Mar. 24	a 382	1,140	1,180
Apr. 7	369	220	219
Apr. 22	396	2,810	3,000
May 6	332	171	153
May 12	332	141	126
May 20	486	481	631
May 26	454	308	378
June 16	292	186	147
July 16	308	148	123
July 21	289	96	75
Aug. 4	308	188	156
Aug. 11	305	148	122
Aug. 18	276	110	82
Sept. 9	267	138	99
Sept. 15	282	148	113
Sept. 29	276	146	109
NORTH LOUP RIVER AT ORD, NEBR.			
Oct. 8, 1951	1,010	445	1,210
Oct. 22	1,140	404	1,240
Nov. 19	910	646	1,590
Dec. 3	1,120	2,830	8,560
Dec. 19	755	1,480	3,020
Jan. 2, 1952	808	173	377
NORTH LOUP RIVER NEAR COTESFIELD, NEBR.			
Oct. 8, 1951	1,030	506	1,410
Oct. 29	1,050	495	1,400
Nov. 26	a 1,060	607	1,740
LOUP RIVER AT FULLERTON, NEBR.			
Oct. 3, 1951	2,010	653	3,540
Oct. 16	2,390	926	5,980
Oct. 29	2,480	1,390	9,310
Oct. 31	2,410	1,450	9,440
Nov. 15	2,530	1,660	11,300
Nov. 28	2,480	1,120	7,500
Dec. 7	2,220	1,480	8,870
Dec. 10	1,760	252	1,200
Dec. 28	1,400	163	616
Jan. 9, 1952	2,300	118	733

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinationa of suspended-sediment discharge, water year October 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
LOUP RIVER AT FULLERTON, NEBR.--Continued			
Jan. 31, 1952	2,070	279	1,560
Feb. 4	2,860	515	3,980
Feb. 15	4,390	3,490	41,400
Mar. 4	870	482	1,130
Mar. 13	5,350	3,720	53,700
Mar. 19	3,980	1,850	19,900
Mar. 28	4,020	2,040	22,100
Apr. 1	3,580	1,300	12,600
Apr. 15	2,660	1,290	9,260
Apr. 28	1,670	874	3,940
Apr. 29	2,270	1,140	6,990
May 11	2,470	888	5,920
May 13	2,160	682	3,980
May 19	2,970	892	7,150
May 26	2,480	806	5,400
June 12	1,330	312	1,120
June 16	941	254	645
June 25	1,140	271	834
July 9	1,420	296	1,130
July 9	1,260	360	1,220
July 16	1,480	1,300	5,190
July 23	767	146	302
Aug. 3	800	128	276
Aug. 5	1,120	373	1,130
Aug. 11	1,140	260	800
Aug. 20	1,280	217	750
Aug. 31	1,220	190	630
Sept. 3	1,390	262	983
Sept. 8	1,200	216	700
Sept. 16	1,250	178	601
Sept. 25	1,410	188	716
Sept. 28	1,400	202	764
Sept. 30	1,450	175	685
LOUP RIVER POWER CANAL NEAR GENOA, NEBR.			
Oct. 16, 1951	2,620	365	2,580
Oct. 26	2,680	341	2,470
Nov. 14	2,450	391	2,590
Dec. 7	2,400	339	2,200
Feb. 1, 1952	1,930	235	1,220
Feb. 15	1,540	233	969
Mar. 13	1,670	3,440	15,500
Mar. 27	1,430	2,000	7,720
Apr. 15	1,800	570	2,770
June 16	1,130	141	430
June 24	1,210	89	291
July 16	1,940	1,040	5,450
July 23	928	69	173
Aug. 11	1,310	146	516
Aug. 19	1,450	446	1,750
Sept. 8	1,200	68	220
Sept. 16	1,200	50	162
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.			
Mar. 26, 1952	2,830	3,430	26,200
Apr. 1	8,960	6,260	151,400
Apr. 1	8,850	6,010	143,600
Apr. 2	7,900	5,700	121,600
Apr. 2	7,860	5,010	106,300
Apr. 2	7,540	5,300	107,900
Apr. 3	6,520	4,140	72,900
Apr. 4	5,610	3,780	57,300
Apr. 9	4,020	4,460	48,400

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.--Continued			
Apr. 18, 1952	2,860	1,520	11,700
Apr. 23	4,100	2,570	28,400
May 1	2,150	1,000	5,800
May 7	1,700	513	2,350
May 15	1,500	600	2,430
May 21	1,540	698	2,900
May 28	5,740	813	12,600
June 4	2,080	1,210	6,800
June 12	1,260	398	1,350
June 18	978	349	920
June 26	879	604	1,430
June 30	1,820	3,410	16,800
July 10	1,890	3,400	17,400
July 18	1,190	1,440	4,630
July 24	749	319	650
July 31	673	213	390
Aug. 7	967	978	2,550
Aug. 12	799	311	670
Aug. 21	2,840	3,790	29,100
Aug. 27	1,000	578	1,560
Sept. 2	1,150	830	2,580
Sept. 9	650	218	383
Sept. 15	622	191	321
Sept. 22	685	399	738
Sept. 30	517	154	215

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952
(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	Water 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	
SOUTH PLATTE RIVER AT SUBLETTE, COLO. (NORTH CHANNEL)																	
Mar. 24, 1952	7:45 p.m.	278	45	126							30	35	49	78	89	96	S
Mar. 27	6:10 p.m.	232	53	312							12	14	22	72	93	--	S
Apr. 13	6:30 p.m.	268	56	402							66	70	80	97	100	--	S
May 5	9:25 a.m.	968	--	659							65	72	84	97	100	--	S
May 6	3:45 p.m.	954	--	687							65	62	81	90	96	97	S
May 7	9:20 a.m.	940	60	1,140							31	35	45	76	92	98	S
June 2	5:30 p.m.	2,900	--	830							35	40	53	77	91	98	S
June 6	7:15 a.m.	1,880	--	627							58	65	79	96	100	--	S
June 16	11:45 p.m.	1,020	65	747							37	44	59	80	98	--	S
June 22	4:15 p.m.	392	80	150							63	73	91	99	100	--	S
July 8	11:45 a.m.	378	69	904							40	43	52	73	94	100	S
July 9	8:45 a.m.	645	66	399							73	79	90	98	100	--	S
July 9	10:05 p.m.	610	69	438							44	49	59	70	84	95	S
July 10	7:50 a.m.	550	65	234							68	74	90	99	100	--	S
July 11	7:45 a.m.	368	64	364							18	20	26	71	97	--	S
July 15	2:00 p.m.	310	76	797							6	7	13	53	87	97	S
SOUTH PLATTE RIVER AT SUBLETTE, COLO. (SOUTH CHANNEL)																	
Mar. 24, 1952	8:20 p.m.	68	45	58							56	61	64	66	84	100	S
Apr. 13	6:45 p.m.	81	56	183							66	76	85	96	99	--	S
May 5	10:00 a.m.	346	--	565							74	80	88	96	99	--	S
May 6	4:10 p.m.	339	--	404							80	87	94	99	100	--	S
May 7	9:50 a.m.	324	--	440							76	83	90	97	100	--	S
June 2	5:15 p.m.	510	--	334							86	92	97	99	100	--	S
June 6	7:00 a.m.	281	--	397							88	94	97	98	99	--	S
June 16	11:30 p.m.	176	65	764							37	45	59	89	99	100	S

DISMAL RIVER AT DUNNING, NEBR.

Oct. 2, 1951	5:50 p.m.	283	--	574							20	59	95	100	--		S
Apr. 2, 1952 ...	6:00 p.m.	318	57	1,140							22	53	93	100	--		S
May 1	9:45 a.m.	321	--	995							16	46	93	100	--		S
May 7	12:20 p.m.	348	68	582							24	52	91	100	--		S
May 12	6:00 p.m.	283	--	551							22	58	97	100	--		S
May 26.....	8:15 p.m.	928	51	3,800	3,820	7	7	8	10	16	35	56	91	99	100		SPWCM
May 27.....	11:50 a.m.	400	64	670							27	61	93	100	--		S
June 4	12:10 p.m.	306	75	548							22	53	95	100	--		S
June 12	9:50 a.m.	315	73	564							23	53	92	100	--		S
June 25	7:45 p.m.	300	80	480							22	49	92	100	--		S
July 5	5:30 p.m.	277	82	426							27	53	90	100	--		S
July 9	12:50 p.m.	292	76	524							23	49	86	99	100		S
July 29	6:35 p.m.	306	76	428							20	48	88	99	100		S
Aug. 6	3:15 p.m.	306	86	424							24	54	93	100	--		S
Aug. 27.....	2:50 p.m.	312	83	438							22	50	93	100	--		S
Sept. 17.....	1:30 p.m.	306	67	601							15	48	93	100	--		S

MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.

Apr. 2, 1952	2:40 p.m.	864	54	920							29	67	98	--	--		S
Apr. 30	11:45 a.m.	788	61	736							15	47	92	98	99		S
May 13	11:40 a.m.	856	--	550							22	56	96	--	--		S
May 27	4:30 p.m.	756	70	650							23	57	95	--	--		S
June 26	3:30 p.m.	744	73	588							32	54	95	--	--		S
July 10	11:40 a.m.	693	76	511							20	41	85	100	--		S
July 17	5:25 p.m.	684	80	354							24	48	90	--	--		S
Aug. 5	2:55 p.m.	733	80	538							22	47	89	100	--		S
Aug. 12	5:35 p.m.	827	74	514							23	52	92	100	--		S
Sept. 10	10:40 a.m.	693	--	961							8	20	65	96	99		S

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952--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	Water 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
MIDDLE LOUP RIVER NEAR MILBURN, NEBR.																
Oct. 9, 1951	1:00 p.m.	836	58	838							14	49	93	100			S
Nov. 1	2:15 p.m.	843	36	985							13	45	94	100			S
MIDDLE LOUP RIVER AT ARCADIA, NEBR.																
Oct. 16, 1951 ...	3:00 p.m.	975	50	838							16	57	98	100			S
Apr. 9, 1952	1:15 p.m.	1,210	--	1,400							20	54	96	100			S
May 8	1:40 p.m.	938	64	699							23	58	97	100			S
May 14	3:15 p.m.	804	75	632							26	62	95	100			S
May 20	11:00 a.m.	1,200	60	1,180							16	47	92	100			S
May 27	1:20 p.m.	2,550	--	3,310							28	58	90	99			S
June 10	3:30 p.m.	521	84	300							24	49	93	100			S
June 17	11:15 a.m.	501	74	303							29	52	88	100			S
July 17	11:45 a.m.	534	79	361							23	52	91	100			S
Aug. 12	11:25 a.m.	567	74	370							27	56	92	100			S
Sept. 30	3:15 p.m.	602	74	345							27	61	94	100			S
MIDDLE LOUP RIVER AT LOUP CITY, NEBR.																
Oct. 8, 1951.....	4:15 p.m.	788	--	706							15	52	94	100			S
Oct. 25	2:00 p.m.	816	59	777							16	58	98	100			S
Mar. 31, 1952 ..	4:00 p.m.	1,120	--	1,590							20	50	93	100			S
May 5	6:15 p.m.	900	73	605							26	58	85	100			S
May 21	2:45 p.m.	914	64	930							23	55	94	99	100		S
May 27	6:20 a.m.	2,350	71	3,110							33	65	94	100			S
June 3	11:05 a.m.	606	72	484							21	52	90	100			S
July 2	4:45 p.m.	433	86	238							36	57	92	100			S
July 29	1:00 p.m.	422	60	161							36	61	94	100			S
Aug. 25.....	4:40 p.m.	534	80	188							41	63	94	100			S

Sept. 11, 1952 ...	1:00 p.m.	522	70	187							34	61	91	100			S
Oct 8	3:00 p.m.	802	61	620							20	49	89	100			S
NORTH LOUP RIVER AT BURWELL, NEBR.																	
Oct. 1, 1951	1:50 p.m.	551	69	276							18	52	90	100			S
Oct. 15	4:30 p.m.	557	62	388							12	44	90	100			S
Nov. 7	12:00 m.	662	--	906							11	46	92	100			S
Apr. 8, 1952	10:00 a.m.	680	--	1,020							9	36	89	100			S
May 6	9:45 a.m.	561	61	285							16	50	92	100			S
June 2	3:40 p.m.	535	81	231							21	44	81	100			S
Aug. 4	2:40 p.m.	254	70	162							38	54	90	100			S
Aug. 11	6:10 p.m.	407	79	173							40	62	92	100			S
Aug. 18	3:30 p.m.	309	--	140							39	60	91	100			S
Sept. 9	10:45 a.m.	276	--	108							31	61	94	100			S
Sept. 29	1:30 p.m.	281	69	156							22	53	92	100			S
CALAMUS RIVER NEAR BURWELL, NEBR.																	
Oct. 8, 1951	5:00 p.m.	343	60	164							22	43	88	100	--		S
Oct. 23	5:35 p.m.	369	51	275							12	32	77	99	100		S
Apr. 7, 1952	5:15 p.m.	369	64	220							30	58	93	100	--		S
May 6	12:30 p.m.	332	66	171							35	59	95	100	--		S
May 12	4:45 p.m.	332	70	141							37	66	94	100	--		S
May 20	2:30 p.m.	486	--	481							15	40	69	94	100		S
May 26	4:40 p.m.	454	76	308							28	52	88	100	--		S
June 16	7:15 a.m.	292	75	186	574	10	12	14	14	21	44	67	93	100	--		SPWCM
July 16	6:25 p.m.	308	81	148							36	61	84	100	--		S
Aug. 4	5:10 p.m.	308	--	188							39	67	96	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 1951 to September 1952--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	Water 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
CALAMUS RIVER NEAR BURWELL, NEBR.--Continued																
Aug. 11, 1952	6:20 p.m.	305	76	148							34	58	93	100	--		S
Aug. 18	5:20 p.m.	276	--	110							40	67	95	100	--		S
Sept. 9	8:00 a.m.	267	60	138							25	56	94	100	--		S
Sept. 29	3:50 p.m.	276	--	146							20	50	92	100	--		S
NORTH LOUP RIVER AT ORD, NEBR.																
Oct. 8, 1951	2:00 p.m.	1,010	58	445							19	46	93	100			S
Oct. 22	3:30 p.m.	1,140	47	404							22	53	93	100			S
LOUP RIVER AT FULLERTON, NEBR.																
Oct. 3, 1951	4:10 p.m.	2,010	--	653	--	--	--	--	--	--	43	56	87	100	--		S
Oct. 16	4:50 p.m.	2,390	--	926	1,590	6	7	8	10	16	28	46	86	100	--		SPWCM
Oct. 31	4:30 p.m.	2,410	--	1,450	1,570	7	7	7	9	14	26	44	85	100	--		SPWCM
Nov. 15	12:30 p.m.	2,530	--	1,660	1,320	--	--	--	8	8	18	35	84	99	100		SPWCM
Nov. 28	4:40 p.m.	2,480	--	1,120	2,790	9	10	12	17	25	50	67	98	100	--		SPWCM
Dec. 7	3:20 p.m.	2,220	35	1,480	2,280	5	6	7	9	14	30	52	93	100	--		SPWCM
Dec. 10	5:00 p.m.	1,760	--	252	1,390	13	14	16	19	30	55	71	87	94	100		SPWCM
Dec. 28	12:40 p.m.	1,400	--	163	--	--	--	--	--	--	38	58	93	100	--		S
Jan. 9, 1952	12:00 m.	2,300	32	118	--	--	--	--	--	--	53	65	93	100	--		S
Jan. 31	7:40 p.m.	2,070	32	279	--	--	--	--	--	--	46	60	90	100	--		S
Feb. 4	5:30 p.m.	2,860	32	515	--	--	--	--	--	--	26	34	67	96	100		S
Feb. 15	3:10 p.m.	4,390	--	3,490	--	--	--	--	--	--	20	37	84	99	100		S
Mar. 13	5:45 p.m.	5,350	34	3,720	8,440	10	14	15	20	32	47	62	92	100	--		SPWCM
Mar. 28	12:45 p.m.	4,020	44	2,040	4,340	10	12	14	19	31	46	63	94	100	--		SPWCM
Apr. 1	4:35 p.m.	3,580	--	1,300	2,380	14	15	16	22	35	62	81	97	100	--		SPWCM
Apr. 15	4:05 p.m.	2,660	60	1,290	2,190	7	8	9	11	18	34	54	90	100	--		SPWCM
Apr. 28	6:00 p.m.	1,670	--	874	1,380	8	9	8	11	17	39	64	95	100	--		SPWCM

Apr. 29, 1952	2:27 p.m.	2,270	--	1,140	958	4	5	6	9	18	27	47	92	100	--		SPWCM
May 11	8:05 p.m.	2,470	57	888	1,370	6	6	6	9	15	33	54	91	100	--		SPWCM
May 13	3:30 p.m.	2,160	75	682	1,530	6	7	10	13	15	37	57	92	100	--		SPWCM
May 19	7:30 p.m.	2,970	67	892	1,930	6	11	11	12	24	49	69	93	100	--		SPWCM
May 26	7:30 p.m.	2,480	--	806	1,640	15	15	17	19	31	53	75	98	100	--		SPWCM
June 12	10:30 a.m.	1,330	--	312	--	--	--	--	--	--	49	63	93	100	--		S
June 16	1:30 p.m.	941	76	254	--	--	--	--	--	--	50	62	88	100	--		S
July 9	3:45 p.m.	1,260	--	360	--	--	--	--	--	--	68	76	100	--	--		S
July 16	1:15 p.m.	1,480	--	1,300	--	--	--	--	--	--	90	95	98	100	--		S
Aug. 3	4:40 p.m.	800	84	128	--	--	--	--	--	--	70	82	100	--	--		S
Aug. 11	12:15 p.m.	1,140	75	260	--	--	--	--	--	--	61	73	96	100	--		S
Aug. 20	11:45 a.m.	1,280	60	217	--	--	--	--	--	--	55	68	90	100	--		S
Aug. 31	2:10 p.m.	1,220	80	190	--	--	--	--	--	--	63	76	95	100	--		S
Sept. 8	4:40 p.m.	1,200	--	216	--	--	--	--	--	--	50	67	95	100	--		S
Sept. 25	2:50 p.m.	1,410	72	188	--	--	--	--	--	--	59	71	94	100	--		S
Sept. 28	10:00 a.m.	1,400	63	202	--	--	--	--	--	--	55	69	87	97	100		S
Sept. 30	10:30 a.m.	1,450	66	175	--	--	--	--	--	--	54	71	92	100	--		S
LOUP RIVER POWER CANAL NEAR GENOA, NEBR.																	
Oct. 16, 1951	11:30 a.m.	2,620		365	2,730	--	21	--	30	--	94	99	100				SPWCM
Oct. 26	9:55 p.m.	2,680		341	1,800	24	25	28	35	52	93	99	100				SPWCM
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.																	
Mar. 26, 1952....	11:30 a.m.	2,830	--	3,430	4,180	18	18	24	28	49	64	77	96	100			SPWCM
Apr. 1	5:30 p.m.	8,850	46	6,010	8,770	22	25	29	35	48	72	85	98	100			SPWCM
Apr. 2	12:45 p.m.	7,860	46	5,010	7,500	19	24	27	32	45	71	85	98	100			SPWCM
Apr. 3	12:50 p.m.	6,520	46	4,140	6,080	17	20	24	29	42	66	82	98	100			SPWCM
Apr. 18	11:20 a.m.	2,860	--	1,520	1,790	18	18	21	24	36	58	80	99	100			SPWCM

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952--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	Water 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	
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.--Continued																	
May 1, 1952	12:45 p.m.	2,150	--	1,000	1,850	19	19	22	27	42	62	78	97	100			SPWCM
May 15	1:15 p.m.	1,500	66	600	1,150	23	23	26	31	46	63	77	98	100			SPWCM
May 21	11:45 a.m.	1,540	64	698	1,240	18	25	27	33	42	66	80	98	100			SPWCM
June 30	5:10 p.m.	1,820	79	3,410	14,900	50	63	71	77	85	94	98	100	--			SPWCM

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of bed material water year October 1951 to September 1952
(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	Water discharge (cfs)	Water temperature (°F)	Bed material												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.062	0.125	0.250	0.500	1.000	2.000	4.000				
DISMAL RIVER AT DUNNING, NEBR.																
Oct. 30, 1951....	3	300				0	2	25	61	78	87	92				S
Dec. 3	3	300				0	1	20	61	81	90	97				S
May 7, 1952.....	3	348				0	1	17	54	70	81	90				S
June 4	3	306				0	2	33	68	79	88	95				S
July 5	3	277				0	2	42	80	87	92	97				S
July 29.....	3	306				0	2	31	73	83	88	94				S
Aug. 27	3	312				0	2	23	60	77	88	95				S
Sept. 23	3	315				0	2	27	64	79	88	97				S
MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.																
July 17, 1952....	3	684				0	2	36	79	90	95	98				S
Aug. 12	3	827				0	1	33	80	91	95	98				S
Sept. 10	3	693				0	1	15	58	78	87	95				S
MIDDLE LOUP RIVER NEAR MILBURN, NEBR.																
Aug. 17, 1951 ...	3	761				0	3	35	65	79	89	96				S
Nov. 1.....	3	843				0	1	31	80	93	96	98				S
MIDDLE LOUP RIVER AT ARCADIA, NEBR.																
May 20, 1952....	3	1,200				0	14	62	91	99	100	--				S
June 17	3	501					1	31	87	97	99	100				S
July 17	3	534					2	37	88	99	99	100				S
Aug. 12	3	567					4	42	92	100	--	--				S
Sept. 9	3	495					2	42	91	99	99	--				S

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN--Continued

Periodic determinations of bed material, water year October 1951 to September 1952--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	Number of sampling points	Water discharge (cfs)	Water temperature (°F)	Bed material												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.062	0.125	0.250	0.500	1.000	2.000	4.000				
MIDDLE LOUP RIVER AT LOUP CITY, NEBR.																
July 24, 1951	3	695				3	7	49	95	100	--	--				S
Dec. 6	3	984				0	1	28	90	100	--	--				S
May 5, 1952	3	900				0	2	28	87	96	98	99				S
June 3	3	606				0	3	32	92	100	--	--				S
July 2	3	433				0	2	35	86	99	100	--				S
July 29	3	183				0	5	52	91	99	99	100				
Aug. 25	3	271				2	11	39	85	98	100	--				S
Sept. 23	3	630				0	2	32	84	97	99	100				S
NORTH LOUP RIVER AT BURWELL, NEBR.																
June 16, 1952	3	267				0	3	19	66	83	91	96				S
July 16	3	319				0	1	19	62	76	92	97				S
Aug. 11	3	407				0	1	28	69	82	92	98				S
Sept. 9	3	276				0	2	28	65	80	88	94				S
CALAMUS RIVER NEAR BURWELL, NEBR.																
Jan 11, 1952	3	a 354				1	2	23	70	85	92	99				S
May 20	3	486				0	1	19	73	90	95	98				S
June 16	3	292				1	5	37	73	86	91	97				S
July 16	3	308				0	2	30	73	87	92	97				S
Aug. 11	3	305				0	2	38	83	93	96	98				S
Sept. 9	3	267				0	2	24	71	85	92	97				S
LOUP RIVER AT FULLERTON, NEBR.																
Oct. 29, 1951	3	2,480				1	3	49	93	98	99	100				S
Dec. 7	3	2,220				0	2	39	92	97	97	99				S
Jan 31, 1952	3	2,070				6	17	55	95	100	--	--				S

a Mean daily discharge.

Feb. 15, 1952 ...	3	4,390				1	2	38	92	100	--	--				S
Feb. 26	1	2,660				0	2	39	94	99	99	100				S
Mar. 13.....	3	5,350				0	2	49	97	99	99	99				S
Mar. 28.....	3	4,020				1	4	44	92	98	99	100				S
Apr. 15	3	2,660				1	4	44	94	99	100	--				S
Apr. 29	5	2,270				9	21	65	95	99	99	100				S
May 19	3	2,970				0	2	31	89	98	99	100				S
June 8	3	1,430				0	2	34	91	98	99	99				S
June 16	3	941				0	1	28	88	97	98	99				S
July 9	3	1,420				3	9	56	93	99	99	100				S
July 16	3	1,480				1	3	53	94	98	99	99				S
Aug. 3	3	800				0	3	29	82	94	96	99				S
Aug. 11.....	3	1,140				0	2	49	90	97	99	100				S
Aug. 31.....	3	1,220				0	2	31	83	95	98	100				S
Sept. 8	5	1,200				0	4	33	85	96	98	99				S
Sept. 22	3	1,310				0	2	46	88	97	99	99				S
Sept. 25	5	1,410				0	2	32	82	95	97	99				S
Sept. 28	5	1,400				0	1	25	83	94	97	99				S

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION.--At gaging station at Waubonsie highway bridge at Nebraska City, Otoe County.
DRAINAGE AREA.--414,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1952.
Water temperatures: May 1951 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 600 ppm Jan. 1-10; minimum, 336 ppm Apr. 17-18.
Hardness: Maximum, 344 ppm Jan. 1-10; minimum, 168 ppm Apr. 17-18.
Specific conductance: Maximum daily, 931 micromhos Dec. 27; minimum daily, 408 micromhos June 28.
Water temperatures: Maximum, 85°F July 25; minimum, freezing point Dec. 27, Jan. 5, 16, 30, Mar. 24.
EXTREMES, January 1951 to September 1952.--Dissolved solids: Maximum, 600 ppm Jan. 1-10, 1952; minimum, 280 ppm Mar. 27-29, 1951
Hardness: Maximum, 344 ppm Jan. 1-10, 1952; minimum, 168 ppm Apr. 17-18, 1952.
Specific conductance: Maximum daily, 931 micromhos Dec. 27, 1951; minimum daily, 361 micromhos Mar. 29, 1951.
Water temperatures (May 1951 to September 1952): Maximum, 85°F July 25, 1952; minimum, freezing point Dec. 27, 1951, Jan. 5, 16, 30, Mar. 24, 1952.
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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951....	53,860	--		65	19	52	--	206	0	157	15	--	4.6	0.18	474	0.64	68,930	241	72	32	1.5	689	8.0
Nov. 1-30.....	47,550	--		69	17	52	--	213	0	155	15	--	4.0	.18	454	.62	58,290	242	67	31	1.5	678	7.9
Dec. 1-15.....	33,530	--		70	23	53	--	237	0	164	17	--	4.8	.08	498	.68	45,080	270	76	29	1.4	728	7.7
Dec. 27-28.....	11,600	--		76	26	55	--	266	0	162	23	--	6.7	.17	530	.72	16,600	296	78	28	1.4	786	8.0
Jan. 1-10, 1952 ...	14,450	--		92	28	59	--	304	0	183	29	--	6.8	.08	600	.82	23,410	344	95	26	1.4	884	7.8
Jan. 16-Feb. 10 ...	27,730	--		71	22	56	--	237	0	161	21	--	5.8	.17	500	.68	37,440	266	72	31	1.5	744	7.7
Feb. 11-Mar. 9....	46,190	--		66	20	44	--	213	0	143	15	--	8.2	.17	440	.60	54,870	247	72	27	1.2	661	7.8
Mar. 10-30.....	51,880	--		64	17	40	--	195	0	133	16	--	8.4	.05	408	.55	57,150	229	69	27	1.1	617	7.9
Mar. 31-Apr. 5....	127,800	--		62	17	39	--	183	0	142	11	--	7.6	.05	398	.54	137,300	225	75	27	1.1	603	7.8
Apr. 6-9.....	154,300	--		64	17	51	--	158	0	189	10	--	5.3	.05	436	.59	181,600	228	98	32	1.5	660	7.7
Apr. 10-16.....	225,400	--		52	13	45	--	150	0	149	8.5	--	3.5	.07	364	.50	221,500	185	62	33	1.4	562	8.0
Apr. 17-18.....	335,000	14		46	13	40	4.5	156	0	114	7.7	0.2	2.9	.07	336	.46	303,900	168	40	33	1.3	509	7.7
Apr. 19.....	390,000	19		46	13	40	4.3	159	0	114	6.8	.2	3.5	.06	348	.47	366,400	169	39	33	1.3	510	7.9
Apr. 20-23.....	270,800	17		46	14	42	4.7	162	0	120	7.7	.2	3.6	.06	350	.48	255,900	174	41	34	1.4	524	7.9
Apr. 24-May 2	133,000	--		54	15	46	--	180	0	139	9.0	--	4.6	.11	377	.51	135,400	198	50	32	1.4	583	8.0
May 3-6.....	83,400	--		54	15	47	--	176	4	135	11	--	3.8	.09	379	.52	85,340	197	46	33	1.5	585	8.3
May 7-22.....	73,140	--		57	17	50	--	193	0	143	13	--	4.0	.11	426	.58	84,130	211	53	33	1.5	622	7.7
May 23-June 2	71,990	--		57	15	45	--	196	0	121	12	--	5.1	.12	412	.56	80,080	203	42	32	1.4	586	7.6
June 3-7.....	64,940	--		57	16	57	--	193	0	156	14	--	3.7	.12	468	.64	82,060	208	50	36	1.7	655	7.8
June 8-13	64,880	--		53	16	51	--	175	0	144	14	--	2.9	.17	428	.58	74,980	196	52	35	1.6	600	7.9
June 14-19	59,730	--		60	17	61	--	175	0	185	15	--	4.3	.19	518	.70	83,540	219	75	37	1.8	695	7.9
June 20-July 6	71,830	--		56	13	36	--	189	0	105	16	--	4.2	.11	343	.47	66,520	193	38	27	1.1	534	7.5

July 7-8, 1952	75,600	--		71	15	61	--	196	0	196	11	--	7.8	0.14	502	0.68	102,500	240	79	34	1.7	726	7.7
July 9-21.....	52,140	--		56	12	43	--	178	0	116	12	--	5.6	.14	361	.49	50,820	188	42	32	1.4	561	7.8
July 22-Aug. 27....	34,530	--		55	16	54	--	179	0	151	18	--	3.0	.14	416	.57	38,780	202	55	35	1.7	633	7.8
Aug. 28-Sept. 3....	40,130	17		56	15	48	--	178	0	143	16	0.4	2.9	.14	390	.53	42,260	202	56	33	1.5	604	7.7
Sept. 4-30.....	33,330	17		60	18	56	--	190	0	168	17	.5	2.0	.11	440	.60	39,600	225	69	34	1.6	671	7.8
Weighted average [a]	60,660	--		59	16	47	--	b189	--	144	13	--	4.7	0.12	415	0.56	67,970	213	58	31	1.4	621	--
Weighted average [c]	58,180	--		59	16	47	--	b189	--	144	13	--	4.7	0.12	415	0.56	65,190	213	58	31	1.4	621	--

a Represents 99 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1951 to September 1952.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 1 p. m. and 2 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	45	38	--	36	36	42	65	68	83	80	72
2	65	40	40	--	36	35	41	65	68	80	76	70
3	68	40	44	--	35	34	42	68	68	80	75	70
4	--	40	40	--	36	34	40	60	68	80	76	70
5	63	38	42	a32	35	33	42	70	72	81	74	74
6	59	41	44	--	36	37	40	68	75	82	76	72
7	57	34	42	--	37	35	42	65	67	76	75	74
8	57	36	36	--	35	35	43	64	76	72	74	73
9	63	35	36	--	35	35	42	62	76	76	75	74
10	58	37	36	--	35	34	42	59	77	75	75	--
11	58	40	35	--	37	38	42	58	80	80	73	74
12	64	44	36	--	37	38	43	58	82	80	71	76
13	61	44	34	--	37	38	40	59	84	76	76	75
14	62	43	34	--	35	37	42	60	83	74	80	72
15	63	42	33	--	35	37	--	62	82	72	76	74
16	59	--	--	32	36	39	45	--	--	78	80	71
17	56	36	--	34	37	42	46	58	77	78	76	78
18	54	35	--	35	37	40	44	60	77	--	78	74
19	--	36	--	35	37	40	50	60	73	82	82	68
20	52	36	--	35	37	42	52	64	76	80	76	66
21	50	38	--	35	34	38	56	62	82	84	74	64
22	50	36	--	--	34	--	56	62	72	84	74	65
23	49	34	--	34	35	34	55	62	76	82	73	67
24	54	35	--	34	35	32	55	--	78	79	74	64
25	50	33	--	35	35	37	57	66	78	85	71	66
26	52	35	--	34	36	40	60	68	80	82	73	66
27	50	36	a32	34	37	40	62	66	80	82	76	68
28	54	34	34	34	37	40	60	62	70	80	79	68
29	56	36	--	34	37	44	64	68	80	78	76	70
30	50	37	--	32	--	45	66	67	82	79	76	68
31	48	--	--	36	--	44	--	66	--	78	76	--
Average	57	38	--	--	36	38	49	63	76	79	76	70

a Observation made at approximately 3 p. m.

NISHNABOTNA RIVER BASIN

DAVIDS CREEK NEAR HAMLIN, IOWA

LOCATION.--At gaging station on downstream side of bridge on State Highway 64, 5.2 miles east of Hamlin, Audubon County, and 8 miles upstream from mouth and East Nishnabotna River.
DRAINAGE AREA.--26.1 square miles.
RECORDS AVAILABLE.--Sediment records: July to September 1952.
EXTREMES, July to September 1952.--Sediment concentrations: Maximum daily, 4,860 ppm July 7; minimum daily, 122 ppm July 29, Aug. 27.
Sediment loads: Maximum daily, 4,540 tons July 7; minimum daily, 2.7 tons July 29.
REMARKS.--Records of discharge for period June to September 1952 given in WSP 1240.

Suspended sediment, July to September 1952

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	23	410	25	9.1	172	4.2	27	266	s 20
2	30	784	sa 237	8.2	152	3.4	23	194	12
3	103	2,770	sa1,360	17	332	sb 23	20	194	10
4	22	440	26	12	179	s 6.3	19	200	10
5	19	300	15	10	176	4.8	17	192	8.8
6	24	429	s 71	9.5	154	4.0	15	180	7.3
7	328	4,860	s 4,540	8.7	144	3.4	15	210	8.5
8	50	720	97	39	3,170	sa 497	14	238	9.0
9	32	426	37	14	320	s 13	12	242	7.8
10	28	302	23	10	154	4.2	12	246	8.0
11	23	308	19	9.1	148	3.6	11	234	6.9
12	20	322	17	8.2	168	3.7	11	222	6.6
13	20	272	15	7.8	136	2.9	10	220	b 5.9
14	22	268	16	20	1,000	s 67	16	444	sa 21
15	20	188	10	239	2,540	sa2,830	12	246	8.0
16	18	178	8.7	27	320	s 24	11	258	7.7
17	17	196	9.0	19	220	11	11	230	6.8
18	17	202	9.3	16	206	8.9	10	212	5.7
19	17	192	8.8	14	196	7.4	9.5	220	5.6
20	15	220	8.9	16	210	9.1	10	202	5.5
21	14	246	9.3	17	190	8.7	10	194	5.2
22	12	266	8.6	12	168	5.4	10	212	5.7
23	12	266	8.6	11	170	5.0	9.5	202	5.2
24	11	208	6.2	10	152	4.1	8.7	178	4.2
25	10	220	5.9	10	180	4.9	8.7	160	3.8
26	9.1	250	6.1	9.5	180	4.6	8.2	156	b 3.5
27	8.7	164	3.9	8.7	122	2.9	7.8	188	4.0
28	8.2	196	4.3	35	1,150	sa 516	7.4	174	3.5
29	8.2	122	2.7	329	2,580	sa2,770	7.0	180	3.4
30	7.8	144	3.0	45	454	55	7.0	182	3.4
31	8.2	184	4.1	31	406	34	--	--	--
Total	957.2	--	6,615.4	1,031.8	--	6,941.5	269.8	--	223.0

Total discharge for period July 1 to Sept. 30, 1952 (cfs-days) 2,358.8
Total load for period July 1 to Sept. 30, 1952 (tons) 13,779.9

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN

SOUTH FORK REPUBLICAN RIVER NEAR HALE, COLO.

LOCATION.--At gaging station, half a mile downstream from Bonny Dam and 1 mile west of Hale, Yuma County.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952.
REMARKS.--Flow regulated by Bonny Reservoir. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Dec. 17, 1951....	6.0	45	0.04	60	16	36		310	25	7.0	1.1	2.3	0.09	350	0.48		216	0	27	1.1	542	7.5	
Apr. 7, 1952.....	127	15	.03	44	10	26		210	24	5.5	.9	1.8	.09	246	.33		153	0	27	.9	390	7.7	
June 30	a5.0	44	.04	53	15	38		286	26	9.0	1.1	.8	.10	330	.45		194	0	30	1.2	502	7.8	
Sept.19	5.2	42	.01	57	17	39		304	29	9.0	1.0	1.0	.15	344	.47		210	0	29	1.2	532	7.9	

a Mean daily discharge.

ENDERS RESERVOIR, NEBR.

LOCATION.--Near outlet tube of Enders Dam on Frenchman Creek and 2½ miles southeast of Enders, Chase County.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952.
REMARKS.--Records of reservoir contents for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Reservoir contents (acre-feet)	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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Dec. 17, 1951	41,240	25	0.04	39	13	21		211		17	3.0	0.8	1.0	0.08	230	0.31		152	0	23	0.7	375	7.7
Mar. 25, 1952	39,400	30	.04	38	13	17		203		10	3.0	.6	1.9	.08	234	.32		147	0	20	.6	358	7.9
June 28	33,780	26	.04	39	12	22		205		18	4.0	.9	2.4	.05	225	.31		148	0	25	.8	367	7.6
July 24	32,170	--	--	--	--	17	--	--		--	--	--	--	--	--	--		144	--	20	.6	361	--
Sept. 22	28,380	18	.04	37	14	23		212		20	3.0	.8	2.2	.08	225	.31		152	0	25	.8	377	8.1

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 1952.
Water temperatures: January 1950 to September 1952.
Sediment records: January 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 88°F June 14; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 23,000 ppm May 27; minimum daily, 80 ppm Jan. 9.
Sediment loads: Maximum daily 34,000 tons May 27; minimum daily, 7 tons Jan. 9.
EXTREMES, 1950-52.--Water temperatures: Maximum, 88°F June 14, 1952; mnnimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 41,300 ppm July 18, 1951; minimum daily, 80 ppm Jan. 9, 1952.
Sediment loads: Maximum daily, 60,600 tons May 21, 1951; minimum daily, 4 tons Jan. 5, 1950.
REMARKS.--Flow affected by ice Nov. 17-21, Dec. 8-12, Dec. 14 to Feb. 5, Feb. 21-25, Feb. 29 to Mar. 7, Mar. 14, 22-25. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 8, 1951	61			--	--	19	--	341	0	--	--				--	--		255	0	14	0.5	579	7.7
Dec. 7	49			--	--	19	--	327	0	--	--				--	--		250	0	14	.5	560	8.0
Dec. 29	42			--	--	19	--	327	0	--	--				--	--		250	0	14	.5	563	7.9
Feb. 1, 1952	40			67	12	16	12	283	0	20	6.5				317	0.43		218	0	13	.5	498	7.9
Mar. 6	36			--	--	18	--	304	0	--	--				336	.46		232	0	14	.5	527	--
Mar. 31	75			--	--	20	--	302	0	--	--				343	.47		230	0	16	.6	537	7.8
May 1	361	23	0.07	49	6.0	7.6		186	0	5.0	.5	0.2	6.1	0.03	201	.27		147	0	10	.3	311	7.5
June 6	30			--	--	20	--	272	16	--	--				--	--		227	0	16	.6	542	8.6
June 25	20			--	--	19	--	297	0	--	--				--	--		224	0	16	.6	517	7.6
July 14	200			65	9.5	11		264	0	5.0	2.5				--	--		201	0	11	.3	400	7.3
July 31	16			60	16	25		263	9	30	6.0				--	--		216	0	20	.7	510	8.4
Sept. 2	24			--	--	20	--	229	0	--	--				--	--		178	0	20	.7	417	7.5

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
(Once-daily temperature measurement between 12 m. and 7 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	38	40	32	35	35	50	61	69	a74	83	64
2	65	--	--	32	37	33	47	a58	74	a69	82	66
3	62	39	--	32	--	32	48	71	74	a66	82	69
4	60	--	35	32	34	32	51	74	78	a69	78	69
5	53	38	37	32	36	32	49	72	--	77	77	75
6	50	41	38	32	36	32	58	65	77	81	81	78
7	50	39	36	32	37	37	58	a63	82	a66	78	74
8	56	41	--	34	38	42	54	62	78	71	77	72
9	55	43	33	34	38	40	41	60	76	76	77	72
10	58	46	35	34	41	41	47	58	83	78	78	67
11	60	39	36	34	39	37	42	60	80	a70	70	72
12	59	43	33	35	43	--	42	61	84	a70	77	75
13	56	43	--	33	42	34	52	60	87	77	85	72
14	56	41	--	34	38	36	51	61	88	65	86	69
15	57	39	--	35	39	39	54	68	85	--	82	68
16	51	34	--	34	39	44	50	a54	76	a68	82	72
17	49	33	--	34	39	42	56	56	76	a71	79	69
18	51	35	--	35	37	40	60	60	77	85	80	66
19	47	34	--	35	35	47	61	55	73	--	85	65
20	49	36	--	33	33	45	60	62	85	83	80	63
21	47	38	--	35	33	--	37	61	77	--	77	62
22	--	--	--	32	a34	--	48	61	87	80	68	62
23	47	38	--	32	37	33	56	65	85	80	74	63
24	50	33	--	32	--	34	59	65	80	81	73	65
25	50	37	--	36	32	35	61	73	78	81	81	64
26	45	37	--	34	38	37	68	71	a69	85	84	64
27	46	38	--	35	41	42	67	64	a68	84	85	67
28	48	43	35	36	43	49	65	65	--	72	74	68
29	49	40	35	34	34	52	59	69	a72	74	72	67
30	44	41	35	34	--	55	61	a64	a72	78	75	67
31	40	--	--	36	--	52	--	71	--	82	74	--
Average	52	39	b34	34	37	40	54	64	78	75	78	68

a Observation made between 7 a.m. and 11 a.m.
b Includes estimated temperature, 32° F, on missing days, Dec. 13-27.

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	35	1,070	101	43	1,220	142	49	1,650	218
2	35	1,170	110	41	1,300	a 140	49	1,700	a 220
3	35	1,000	94	41	1,330	147	49	1,660	220
4	35	1,050	99	40	1,200	a 130	49	1,410	186
5	36	1,120	109	40	1,010	109	49	1,290	171
6	38	1,060	109	40	1,030	111	49	1,510	200
7	40	1,110	120	40			49	1,310	173
8	40	1,290	139	41	1,150	126	42	1,000	b 110
9	42	1,350	153	41			44	350	42
10	43	1,370	159	42	1,320	150	35	130	12
11	44	1,480	176	43			37	320	32
12	44	1,380	164	43	1,330	154	42	1,050	119
13	42	1,400	159	43			50	--	e 110
14	43	1,270	147	43	1,300	151	35	--	e 48
15	43	1,210	140	43	1,190	138	38	--	e 38
16	43	1,180	137	43	1,090	126	41	--	e 36
17	43	1,050	122	37	1,310	131	39	320	34
18	43	1,090	126	43	720	84	38		
19	43	1,040	121	42	600	68	39		
20	43	1,030	120	44	1,390	165	40	--	e 34
21	42	1,120	127	42	2,630	298	40		
22	42	1,020	116	44	2,000	a 240	39		
23	41	1,050	116	44	1,430	170	41		
24	41	1,070	118	45	1,500	182	42		
25	41	1,100	122	51	1,990	274	44	--	e 44
26	42	1,170	133	51	1,990	274	46		
27	43	1,320	153	50	1,490	201	45		
28	44	1,280	152	49	1,680	222	43	380	44
29	44	1,280	152	49	1,810	239	42	390	44
30	44	1,420	169	49	1,690	224	38	440	45
31	43	1,200	139	--	--	--	38	550	b 55
Total	1,277	--	4,102	1,307	--	4,956	1,321	--	2,547

Day	January			February			March		
1	29	890	70	45	1,400	170	51	3,670	505
2	29	870	68	47	2,190	278	49	3,560	471
3	28	270	20	51	3,430	472	42	2,670	303
4	30	198	16	61	2,600	428	50	630	85
5	35	237	22	60	5,100	826	46	480	60
6	36	285	28	54	5,310	774	51	2,160	297
7	43	220	26	52	5,000	702	42	6,200	a 700
8	46	173	21	52	4,600	646	55	4,600	683
9	31	80	7	52	3,750	526	54	3,470	506
10	43	162	19	52	3,960	556	53	3,270	468
11	48	125	16	52	3,600	505	72	6,400	sa 1,400
12	39	280	29	51	3,570	492	77	--	e 1,300
13	36	242	24	50	4,050	547	62	4,440	743
14	42	373	42	52	3,920	550	57	5,500	a 850
15	39	239	25	52	3,650	512	58	4,190	656
16	44	212	25	52	3,520	494	56	3,800	574
17	50	248	33	53	3,430	491	106	12,700	s 4,130
18	50	325	44	54	3,440	502	122	18,000	s 6,080
19	50	510	69	54	3,640	531	78	8,000	1,680
20	47	548	70	53	3,900	558	73	6,540	1,290
21	55	432	64	49	2,730	361	74	5,800	b 1,200
22	36	280	27	48	4,810	623	56	3,600	b 550
23	43	200	23	49	3,390	448	50	1,000	135
24	54	207	30	48	2,700	350	70	3,900	a 750
25	52	183	26	48	2,670	346	68	8,300	1,520
26	53	455	65	45	3,400	413	64	7,600	1,310
27	41	453	50	56	5,400	a 800	58	5,700	892
28	36	498	48	50	3,470	468	58	5,940	930
29	38	385	39	50	3,720	502	64	7,100	1,230
30	41	532	59	--	--	--	82	10,900	2,410
31	41	990	110	--	--	--	75	9,380	1,900
Total	1,285	--	1,215	1,492	--	14,871	1,961	--	35,608

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	69	7,210	1,340	96	8,550	s 4,750	36	1,500	146
2	61	5,100	840	68	4,880	896	30	1,100	89
3	57	4,490	691	52	3,500	491	31	1,190	100
4	54	4,120	601	49	2,510	332	31	1,140	95
5	52	3,650	512	50	2,440	329	30	1,060	86
6	49	3,380	447	49	2,470	327	30	1,170	95
7	48	3,330	432	50	3,150	425	29	1,160	91
8	45	3,080	374	50	2,720	367	28	1,260	95
9	45	2,420	294	48	2,350	304	27	1,070	78
10	43	2,150	250	48	2,260	293	27	1,020	74
11	42	2,000	227	47	2,090	265	26	1,050	74
12	42	2,100	238	46	2,010	250	26	1,030	72
13	41	2,400	266	49	6,100	sa 1,000	25	940	63
14	41	2,310	256	45	4,980	605	24	950	62
15	41	2,090	231	46	3,200	397	24	970	63
16	44	2,710	322	49	3,400	450	23	880	55
17	46	3,240	402	54	4,800	a 700	22	800	48
18	47	2,940	373	46	3,030	376	21	870	49
19	47	3,400	431	46	2,760	343	21	770	44
20	72	6,400	sb 1,300	46	3,040	378	21	670	38
21	68	6,300	a 1,200	44	3,450	410	22	1,320	78
22	66	4,400	784	52	4,850	681	22	1,120	66
23	62	3,950	661	49	4,370	578	21	1,150	65
24	58	4,030	631	47	3,900	495	21	2,100	119
25	58	3,890	609	47	4,250	539	21	1,250	71
26	58	3,730	584	50	4,260	s 883	21	3,640	206
27	56	3,470	525	356	23,000	sb34,000	24	2,220	144
28	54	2,780	405	60	4,840	784	20	1,450	78
29	52	2,400	337	49	2,800	370	20	1,140	62
30	50	2,560	346	46	2,710	336	19	1,010	52
31	--	--	--	43	2,270	264	--	--	--
Total	1,568	--	15,909	1,877	--	52,418	743	--	2,458

	July			August			September		
1	18	1,130	55	17	550	25	27	2,860	208
2	19	1,310	67	17	490	22	25	1,830	124
3	18	1,230	60	18	740	36	24	1,380	89
4	18	1,700	a 85	18	690	34	22	1,200	71
5	124	18,000	sa 8,400	19	780	40	21	1,100	62
6	23	3,000	186	19	870	45	21	1,000	57
7	31	8,200	sa 800	20	890	48	20	880	48
8	21	1,230	70	21	1,000	57	20	790	43
9	20	940	51	21	1,060	60	19	700	36
10	20	880	48	25	3,400	a 220	19	600	31
11	19	780	40	23	3,390	210	18	556	27
12	20	1,600	sb 95	23	1,050	65	18	533	26
13	24	3,200	b 200	24	1,670	108	18	560	27
14	94	18,000	sa 5,200	22	1,290	77	18	560	27
15	34	7,000	a 650	22	1,170	69	18	529	26
16	27	3,200	233	22	1,060	63	18	575	28
17	24	2,300	149	24	3,800	sa 260	18	570	28
18	24	2,110	137	21	1,300	74	19	569	29
19	25	2,330	157	20	780	42	19	511	26
20	26	2,720	191	19	710	36	19	532	27
21	24	2,900	a 190	19	620	32	19	566	29
22	26	2,580	181	18	580	28	19	582	30
23	21	1,400	79	19	700	36	20	650	35
24	20	980	53	19	830	42	19	668	34
25	19	880	45	18	830	40	19	668	34
26	18	860	42	18	880	43	19	715	37
27	18	700	34	18	1,020	50	19	710	36
28	18	670	32	18	920	45	19	656	34
29	17	650	30	73	5,940	s 2,030	19	689	35
30	17	480	22	54	6,100	889	19	615	32
31	17	560	26	33	5,300	472	--	--	--
Total	844	--	17,608	722	--	5,298	592	--	1,376

Total discharge for year (cfs-days) 14,989
Total load for year (tons) 158,366

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 17, 1952	12:35 p.m.	134	42	18,300	11,300	--	20	--	30	--	90	100	--				SPWCM
Mar. 18	12:45 p.m.	138	40	21,300	7,860	--	19	--	33	--	90	99	100				SPWCM
Mar. 26	9:45 a.m.	70	--	7,870	9,050	--	14	--	27	--	86	99	100				SPWCM
Mar. 30	2:00 p.m.	83	55	11,900	8,390	--	14	--	23	--	90	100	--				SPWCM
May 1	6:50 p.m.	317	--	70,500	13,200	--	18	--	30	--	92	100	--				SPWCM
May 1	7:10 p.m.	403	57	55,400	9,360	--	23	--	34	--	94	100	--				SPWCM
May 1	8:00 p.m.	435	--	28,600	9,260	--	26	--	39	--	93	100	--				SPWCM
May 1	8:15 p.m.	403	--	22,400	8,580	--	30	--	45	--	96	100	--				SPWCM
May 1	8:50 p.m.	317	--	17,600	6,880	--	33	--	50	--	97	100	--				SPWCM
May 13	12:40 p.m.	99	60	14,500	8,940	17	23	30	44	65	96	100	--				SPWCM
May 27	8:00 a.m.	314	58	23,300	6,610	--	33	--	50	--	96	100	--				SPWCM
May 27	1:00 p.m.	207	64	21,100	6,800	--	32	--	50	--	96	100	--				SPWCM
July 5	7:00 a.m.	414	68	25,800	4,986	--	29	--	45	--	95	100	--				SPWCM
July 5	11:15 a.m.	147	71	22,100	6,770	--	35	--	54	--	96	100	--				SPWCM
July 14	8:00 a.m.	200	63	30,600	5,860	--	38	--	58	--	97	100	--				SPWCM
July 14	10:00 a.m.	162	--	23,800	11,900	24	34	44	56	74	97	100	--				SPWCM
July 14	10:00 a.m.	162	--	23,800	11,800	2	4	29	55	76	97	100	--				SPNM
Aug. 29	6:15 p.m.	186	72	12,200	7,440	--	25	--	44	--	94	100	--				SPWCM

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 1951 to September 1952.
Sediment records: April 1951 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 84°F July 27; minimum, freezing point Dec. 15, Jan. 23.
Sediment concentrations: Maximum daily, 3,840 ppm July 14; minimum daily, not determined.
Sediment loads: Maximum daily, 1,530 tons Aug. 1; minimum daily, not determined.
EXTREMES, April 1951 to September 1952.--Water temperatures: Maximum, 84°F July 27, 1952; minimum, freezing point Dec. 15, 1951, Jan. 23, 1952.
Sediment concentrations: Maximum daily, 20,000 ppm July 12, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 22,700 tons May 20, 1951; minimum daily, not determined.
REMARKS.--Flow affected by ice Nov. 17-19, Dec. 9-11, Dec. 14 to Jan. 16, Jan. 21-27, Feb. 20, 21, 25, 26, Mar. 4-6, 22, 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 8 a. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	38	43	--	41	34	51	58	62	79	68	63
2	59	39	42	33	40	--	52	55	64	78	74	72
3	59	40	43	--	--	34	43	--	73	68	69	68
4	58	38	36	33	40	33	54	61	68	73	73	70
5	52	35	--	--	--	35	49	72	68	73	70	70
6	52	42	36	33	41	38	55	62	75	72	74	70
7	50	40	--	--	--	40	52	66	80	66	74	70
8	50	39	33	35	43	42	52	63	73	62	74	63
9	59	45	--	34	--	--	47	58	--	78	75	68
10	58	42	33	--	45	42	43	56	78	78	74	67
11	59	42	--	35	--	34	44	57	--	78	70	67
12	60	46	39	35	43	36	43	66	76	--	--	65
13	56	42	--	--	--	35	49	--	--	76	78	67
14	53	38	--	36	40	35	45	59	82	61	77	68
15	57	38	32	--	40	45	52	--	83	69	78	68
16	50	35	--	36	39	42	47	55	75	--	--	70
17	50	36	34	36	40	40	50	51	68	76	73	67
18	48	36	--	36	37	39	49	60	68	78	68	61
19	75	35	34	36	35	45	53	--	75	78	--	66
20	46	39	--	--	33	40	62	62	68	78	78	67
21	46	40	34	37	33	--	42	63	76	77	72	64
22	46	35	--	--	40	--	47	62	71	76	69	52
23	48	36	34	32	35	34	51	58	78	--	71	65
24	51	40	--	33	--	34	56	68	78	78	72	64
25	50	40	34	34	38	39	51	66	69	76	76	64
26	44	38	--	35	39	44	55	66	72	73	75	62
27	43	41	33	38	38	50	63	68	69	84	78	63
28	47	38	--	39	45	42	65	58	78	68	70	62
29	47	38	34	42	42	46	--	58	78	75	68	65
30	44	43	--	--	--	47	56	--	68	74	79	66
31	44	--	34	41	--	44	--	62	--	--	74	--
Average	52	39	--	--	--	39	51	61	73	74	73	66

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	21	290	16	24			28		
2	21	240	14	23			28		
3	21	260	15	23	170	11	28		
4	22	300	18	24			26		
5	26	510	36	24			25	190	14
6	31	760	64	25			27		
7	28	430	32	26			30		
8	25	340	23	26			28		
9	24	300	20	26			27		
10	23	270	17	26	200	14	27	590	43
11	22	310	19	26			28	320	a 24
12	22	250	15	26			25		
13	23	360	a 22	28			27	300	21
14	28	650	50	27			24		
15	29	520	41	25			26		
16	26	260	18	24	380	25	20	260	a 14
17	24	200	13	23			19	180	9
18	24	190	12	23	490	30	18	110	a 5
19	24	170	11	25	840	57	18		
20	24	190	12	23	280	17	13		
21	24	220	14	24	160	10	10		
22	27	380	28	25	230	16	12		
23	27	290	21	24	650	42	17	120	5
24	26	180	b 13	24	980	63	16		
25	25	160	11	25	260	18	15		
26	24	230	15	27	200	15	16		
27	29	370	29	28	220	17	15		
28	28	270	20	28	280	21	16		
29	27	260	b 19	28	230	17	22	210	12
30	26	240	b 17	28	200	15	20	190	b 10
31	25	210	14	--	--	--	16	170	7
Total	776	--	669	758	--	594	667	--	384

Day	January			February			March		
1	11			30	270	22	29	240	19
2	15			30	310	25	27	240	b 17
3	19			31	280	b 24	28	600	45
4	16	130	6	31	240	20	28	700	53
5	16			30			28	850	64
6	18			29			30	560	45
7	22	100	b 6	29			26	250	18
8	28	120	9	29			27	250	18
9	30	150	12	28	220	18	34	1,000	sa 130
10	23	180	a 11	29			60	2,100	b 340
11	30	210	17	29			41	750	83
12	29	210	16	29			33	440	39
13	29	280	a 22	31			39	1,000	sa 120
14	32	360	31	33			31	320	27
15	43	440	a 50	31	220	18	31	290	24
16	46	690	86	29	170	13	37	750	s 84
17	27	630	46	28	170	13	58	2,760	s 445
18	27	250	18	28	230	17	51	1,480	204
19	27	250	18	28	580	44	39	760	80
20	28	220	b 17	27	675	49	36	550	53
21	25	210	14	28	600	45	33	550	a 50
22	22	300	a 18	26	180	13	35	800	a 75
23	30	300	24	25	160	11	42	1,840	206
24	21	150	8	25	160	a 11	37	1,730	173
25	24	95	6	20	500	b 28	38	750	77
26	29	220	17	22	620	37	35	540	51
27	30	550	44	31	510	43	34	490	45
28	28	290	22	32	450	39	36	550	53
29	29	240	19	29	310	24	37	560	56
30	28	260	b 20	--	--	--	34	520	48
31	28	250	19	--	--	--	32	500	43
Total	810	--	606	827	--	676	1,106	--	2,785

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	420	32	36	1,470	s 160	19	410	21
2.....	26	370	26	36	1,000	97	19	420	22
3.....	26	300	21	30	600	a 50	18	380	18
4.....	26	270	19	27	550	40	17	360	16
5.....	25	260	18	25	570	38	17	350	16
6.....	25	290	20	24	520	34	17	360	16
7.....	26	330	23	25	560	38	16	350	15
8.....	26	370	26	25	520	35	17	430	20
9.....	26	250	18	25	550	37	17	700	a 32
10.....	25	210	14	29	760	60	17	650	30
11.....	25	220	15	27	470	34	15	550	a 22
12.....	26	300	21	24	510	33	14	370	14
13.....	27	310	22	23	500	a 30	14	350	13
14.....	26	250	18	22	360	21	13	370	13
15.....	25	350	24	21	360	b 20	13	570	20
16.....	36	870	84	26	850	60	13	420	15
17.....	38	650	67	35	1,110	105	13	260	9
18.....	32	540	47	30	810	66	12	230	8
19.....	28	360	27	27	600	a 44	12	260	8
20.....	27	360	26	25	480	32	12	300	10
21.....	38	920	94	24	570	37	13	330	12
22.....	44	1,090	129	29	1,020	80	13	350	12
23.....	34	850	78	28	730	55	13	330	12
24.....	29	430	34	25	620	42	12	340	11
25.....	27	350	26	23	470	29	13	300	10
26.....	25	330	22	21	400	23	13	330	12
27.....	24	330	21	21	500	28	13	350	12
28.....	24	310	20	20	380	20	13	390	14
29.....	23	320	b 20	19	320	16	13	360	13
30.....	25	380	26	18	340	b 17	12	330	11
31.....	--	--	--	19	380	19	--	--	--
Total.	842	--	1,038	789	--	1,400	433	--	457

	July			August			September		
1.....	12	320	10	172	3,460	s 1,530	21	284	16
2.....	12	250	8	159	1,170	s 537	21	138	8
3.....	11	250	7	28	600	45	19	169	9
4.....	11	310	9	21	460	26	18	181	9
5.....	11	230	7	24	650	sa 46	16	211	9
6.....	11	250	7	24	350	b 22	16	203	9
7.....	12	270	9	21	240	14	15	218	9
8.....	12	250	8	19	240	12	15	200	8
9.....	12	260	8	18	220	11	14	157	6
10.....	12	270	9	17	190	9	14	140	5
11.....	12	260	8	18	180	9	14	163	6
12.....	12	280	b 9	18	190	b 9	14	174	7
13.....	20	2,500	sb 420	17	200	9	14	166	6
14.....	38	3,840	s 452	16	200	9	15	157	6
15.....	23	980	61	16	200	9	15	145	6
16.....	19	650	33	15	160	a 6	15	158	6
17.....	17	500	23	15	220	b 9	15	152	6
18.....	15	410	18	15	174	7	15	163	7
19.....	14	430	16	15	160	b 6	15	122	5
20.....	14	440	17	15	157	6	16	120	5
21.....	16	710	31	15	183	7	17	128	6
22.....	15	460	20	14	175	7	18	144	7
23.....	14	300	b 11	15	190	8	18	141	7
24.....	13	310	11	16	170	7	17	143	7
25.....	12	310	10	16	180	8	17	143	7
26.....	12	270	9	16	210	9	17	140	6
27.....	11	270	8	15	174	7	17	152	7
28.....	11	260	8	19	360	b 18	16	121	5
29.....	11	280	8	22	565	34	16	105	4
30.....	11	270	8	23	410	25	16	121	5
31.....	11	240	7	22	294	17	--	--	--
Total.	437	--	1,270	856	--	2,478	486	--	209

Total discharge for year (cfs-days) 8,787
Total load for year (tons) 12,566

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 10, 1952....	3:00 p.m.	54	--	1,540	2,640	--	34	--	44	--	91	99					SPWCM
Mar. 17.....	5:40 p.m.	63	42	5,060	6,760	14	22	26	39	62	94	99	100				SPWCM
July 13	11:00 p.m.	111	60	21,300	6,420	19	25	35	48	73	96	--					SPWCM
July 13	11:00 p.m.	111	60	21,300	6,340	4	9	26	42	70	96	--					SPN
July 13	11:05 p.m.	113	60	21,000	6,590	--	28	--	51	--	96	--					SPWCM
Aug. 1	3:20 p.m.	326	82	7,660	6,340	--	41	--	65	--	94	--					SPWCM
Aug. 1	10:00 p.m.	334	--	1,740	2,920	--	42	--	46	--	86	--					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 1951 to September 1952.
Sediment records: April 1951 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 87°F June 12, July 11.
Sediment concentrations: Maximum daily, 10,600 ppm Mar. 17; minimum daily, not determined.
Sediment loads: Maximum daily, 5,800 tons July 31; minimum daily, less than 0.050 ton on many days.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, 22,700 ppm June 8, 1951; minimum daily, 0 ppm on several days during September 1951.
Sediment loads: Maximum daily, 58,000 tons Sept. 2, 1951; minimum daily, 0 tons on several days during September 1951.
REMARKS.--Flow affected by ice Dec. 8 to Feb. 1, Feb. 24, 25, Mar. 4. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 7 a. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	--	--	41	--	37	58	58	73	65	62
2	57	34	45	37	--	35	37	60	75	68	85	68
3	64	--	--	--	44	--	45	64	74	--	70	68
4	53	38	39	33	--	34	46	57	73	62	65	66
5	--	--	--	--	42	--	42	68	75	77	75	75
6	50	43	38	37	--	40	50	69	75	--	74	70
7	--	35	--	--	46	--	55	73	75	67	75	70
8	55	--	35	37	--	38	50	56	70	74	75	72
9	60	--	--	--	42	--	38	54	75	75	78	70
10	50	--	37	39	--	39	41	60	84	--	78	70
11	--	48	--	--	47	39	46	50	80	87	70	--
12	49	--	40	39	--	34	42	62	87	75	76	74
13	--	46	--	--	41	35	47	68	83	75	82	70
14	50	41	34	40	--	--	58	68	84	59	82	68
15	--	--	--	--	40	34	55	68	--	70	80	69
16	50	36	33	37	45	--	48	52	74	80	80	68
17	51	--	--	--	--	40	56	58	78	75	78	57
18	51	37	33	43	39	38	68	53	81	81	77	65
19	--	--	34	--	--	50	58	65	75	82	82	66
20	47	42	36	36	38	40	55	73	81	80	77	59
21	--	--	--	--	--	--	48	64	78	80	74	56
22	40	39	35	--	42	--	47	70	68	75	68	61
23	51	--	--	--	--	37	59	59	77	75	79	65
24	45	38	34	35	35	36	64	65	78	78	77	62
25	--	--	--	--	--	37	61	55	76	72	80	65
26	44	38	34	40	37	--	58	76	72	70	77	64
27	--	41	33	--	44	47	57	67	73	70	78	58
28	39	45	34	43	--	--	50	67	74	69	72	66
29	--	--	--	--	37	50	51	70	63	67	73	68
30	41	37	35	42	--	--	54	60	67	62	72	67
31	41	--	--	--	--	54	--	72	--	62	68	--
Average	--	--	--	--	--	--	51	63	75	73	76	66

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.4			0.7			0.8		
2	.3			.7			.7		
3	.4			.9			.8		
4	.6			1.0	6	(t)	.8		
5	.9	4	(t)	1.0			.8		
6	.7			1.1			.9		
7	.7			1.0			.7		
8	.7			1.0			.6		
9	.7			1.0	21	.1	.5		
10	.7			1.0			.5		
11	.8			1.1			.5		
12	.8			1.2			.5		
13	.9			1.3			.4		
14	1.0			1.0			.6		
15	1.0			.9			.7		
16	.9			.8			.9	10	(t)
17	.9	3	(t)	.7			1.1		
18	.8			.8			.7		
19	1.0			.8			.6		
20	1.0			.8			.6		
21	1.1			.9	7	(t)	.4		
22	1.1			.7			.5		
23	1.0			.8			.5		
24	1.0			.7			.5		
25	.8			.8			.5		
26	.9	110	.3	.7			.5		
27	1.4	360	a1.4	.8			.8		
28	1.2	36	.1	.7			.7		
29	1.2	19	.1	.8			.9		
30	1.1	5	(t)	.7			.9		
31	.7	2	(t)	--	--	--	.9		
Total	26.7	--	2.0	26.4	--	0.7	20.8	--	0.6

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.8			0.8			0.7		
2	.7			1.5			.6		
3	.7			1.3			.7		
4	.8			1.3			.4		
5	.7			1.3			.4	40	(t)
6	.7			1.3			.3		
7	.8			1.1			.2		
8	.8			1.1	17	0.1	.2		
9	.9			1.1			18	5,400	sa1,000
10	.9			1.1			37	8,780	s1,400
11	.9			1.0			3.1	1,760	s32
12	.8			1.0			.7	500	.9
13	.9	13	(t)	1.2			.7	250	.5
14	.8			1.1			.4	110	b.1
15	.8			1.0			.4	110	.1
16	.8			1.0			12	4,000	sb460
17	.8			1.0			47	10,600	s2,190
18	.8			.9			9.3	2,800	sb140
19	.8			.9			1.7	238	1.1
20	.6			.9			1.3	100	.4
21	.7			.9	16	(t)	1.3	100	a.4
22	.4			.8			1.5	200	a.8
23	.4			.9			4.0	169	1.8
24	.8			.6			2.2	137	.8
25	.5			.8			1.4	108	.4
26	.6			2.7	442	s6.9	1.6	216	.9
27	.6			18	2,300	sa150	1.4	192	.7
28	.7			3.5	440	a15	.8	100	a.2
29	.7	42	.1	1.6	69	.3	.7	41	.1
30	.8			--	--	--	.7	60	a.1
31	.8			--	--	--	.7	77	.2
Total	22.9	--	1.2	51.7	--	174.1	151.4	--	5,231.9

s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.7	49	0.1	1.0	455	1.2	0.6		
2	.8	26	.1	.8	97	.2	.6		
3	.9	34	.1	.8	43	.1	.6		
4	.9	46	.1	.9	34	.1	.7		
5	.9	180	.4	.8	20	(t)	.6		
6	.9	81	.2	.9			.5	65	0.1
7	.9	106	.3	.9			.5		
8	.9	38	.1	1.1			.5		
9	.9	15	(t)	1.2			.5		
10	.9	28	.1	1.0			.5		
11	.9	44	.1	1.0	32	.1	.6		
12	.9	15	(t)	.8			.4		
13	.9	6	(t)	.8			.4		
14	.9	19	(t)	.8			.4		
15	.8	38	.1	.8			.4		
16	1.0	140	b.4	1.3	130	.5	.4		
17	1.0	30	.1	1.0	90	a.2	.3		
18	1.0	19	.1	.9	195	.5	.3		
19	1.0	11	(t)	.7	69	.1	.3		
20	1.0	13	(t)	.7	30	.1	.5		
21	.9	125	.3	1.0	260	s1.3	.3	22	(t)
22	.8	49	.1	.8	32	.1	.3		
23	.7	10	(t)	1.0	90	a.2	.3		
24	.7	7	(t)	.7	62	.1	.3		
25	.5	12	(t)	.6			.3		
26	.5	12	(t)	.6			.4		
27	.5	7	(t)	.6			.5		
28	.6	13	(t)	.5	60	.1	.3		
29	.8	14	(t)	.6			.3		
30	1.3	480	sa19	.6			.3		
31	--	--	--	.6			--	--	--
Total	25.4	--	22.1	25.8	--	6.4	12.9	--	1.5

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.2			6.3	3,600	sb160	0.4	85	0.1
2	.2			.3	550	.4	.4	50	.1
3	.2			.2	170	.1	.2		
4	.3			.1	160	(t)	.2		
5	.3			2.6	3,640	s39	.2		
6	.2			.2	580	.3	.2		
7	.2	18	(t)	.1	170	(t)	.2		
8	.1			.1	100	(t)	.2		
9	.2			.1	60	(t)	.2	40	(t)
10	.1			.2	40	(t)	.2		
11	.1			.4	40	(t)	.2		
12	.2			.4	50	.1	.2		
13	3.1	790	s49	.4	130	.1	.3		
14	59	6,830	s2,830	.4	30	(t)	.3		
15	.6	575	s1.5	.3	30	(t)	.3		
16	.4	100	.1	.3	80	.1	.4		
17	.6	92	.1	1.5	1,100	sb7.0	.3		
18	.6	41	.1	.7	105	.2	.3		
19	.7			.6	40	.1	.3		
20	.6			.3			.4		
21	.3			.2			.4		
22	.2			.2			.4		
23	.2			.2			.4	42	(t)
24	.2			.2	24	(t)	.4		
25	.2	22	(t)	.3			.4		
26	.2			.3			.4		
27	.2			.1			.6		
28	.2			.4	26	(t)	.4		
29	.2			.4	135	.1	.3		
30	.2			.7	178	s.5	.2		
31	60	6,400		.1	140	(t)	--	--	--
Total	130.0	--	8,681.2	18.6	--	208.4	9.3	--	0.9

Total discharge for year (cfs-days) 521.9
Total load for year (tons) 14,331.0

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

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 10, 1952	3:20 p.m.	41	--	11,900	5,800	4	7	12	20	41	86	98	99				SPWCM
Mar. 10	3:20 p.m.	41	--	11,900	6,380	3	8	17	24	44	89	99	100				SPN
Mar. 10	6:30 p.m.	98	36	22,400	7,710	--	20	--	37	--	93	100	--				SPWCM
Mar. 10	9:20 p.m.	76	--	18,400	6,720	--	23	--	42	--	93	100	--				SPWCM
Mar. 17	4:30 p.m.	101	--	24,400	9,010	--	17	--	30	--	90	100	--				SPWCM
Mar. 17	5:20 p.m.	112	35	36,000	12,600	--	17	--	29	--	87	100	--				SPWCM
Mar. 17	6:30 p.m.	102	40	30,000	9,670	--	18	--	34	--	91	100	--				SPWCM
July 13	10:30 p.m.	21	--	5,040	6,360	--	47	--	68	--	93	--	--				SPWCM
July 13	11:25 p.m.	24	--	3,890	5,690	--	64	--	86	--	97	--	--				SPWCM
July 14	1:30 a.m.	398	--	23,300	6,320	--	32	--	53	--	95	--	--				SPWCM
July 14	2:35 a.m.	276	--	17,300	7,120	--	36	--	57	--	96	--	--				SPWCM
July 14	8:50 a.m.	18	59	5,740	3,890	56	68	76	84	92	98	100	--				BWCM
Aug. 5	9:15 a.m.	7.0	--	9,080	3,230	--	77	--	91	--	99	--	--				SPWCM
Aug. 5	11:30 a.m.	8.0	75	4,680	6,630	--	64	--	90	--	99	--	--				SPWCM

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.

LOCATION.--At bridge on State Highway 23N, 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, approximately.
RECORDS AVAILABLE.--Water temperatures: April 1951 to August 1952 (discontinued).
Sediment records: April 1951 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 82°F July 11; minimum, freezing point Dec. 19, Jan. 23.
Sediment concentrations: Maximum daily, 6,620 ppm July 14; minimum daily, not determined.
Sediment loads: Maximum daily, 2,030 tons July 14; minimum daily, less than 0.50 ton many days during October and November.
EXTREMES, April 1951 to September 1952.--Water temperatures: Maximum, 82°F July 11, 1952; minimum, Dec. 19, 1951, Jan. 23, 1952.
Sediment concentrations: Maximum daily, 37,600 ppm June 8, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 131,000 tons May 31, 1951; minimum daily, less than 0.50 ton on many days during September to November 1951.
REMARKS.--Flow affected by ice Dec. 10, 20-22, Jan. 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, October 1951 to August 1952
(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	68	--	40	33	41	33	53	--	60	69	60	
2	62	--	--	--	--	--	52	--	64	77	--	
3	73	--	44	a 33	--	--	49	59	63	--	--	
4	61	33	a 41	--	40	33	--	62	--	64	--	
5	--	a 41	42	33	--	--	46	70	60	--	76	
6	50	44	--	--	41	40	49	64	66	77	--	
7	--	--	--	a 36	--	--	--	68	69	60	--	
8	59	a 45	33	a 34	41	40	53	64	61	a 69	76	
9	58	--	--	37	--	--	39	56	70	68	--	
10	a 62	40	--	--	40	40	a 53	--	70	69	--	
11	--	--	--	40	--	35	42	47	69	a 82	--	
12	61	46	44	--	44	36	41	63	72	a 78	--	
13	--	a 46	--	--	--	34	42	66	--	68	--	
14	a 63	--	--	--	40	39	55	71	79	--	a 80	
15	--	40	--	39	a 40	a 35	52	71	75	61	--	
16	--	--	--	--	36	38	49	--	65	--	--	
17	46	a 33	--	41	--	--	59	--	62	--	--	
18	--	--	a 34	--	38	43	63	--	--	68	--	
19	--	40	32	38	--	47	52	--	59	70	--	
20	--	--	--	--	34	47	55	--	--	--	78	
21	--	44	33	39	39	--	52	a 62	--	--	--	
22	a 46	--	34	--	34	--	48	53	--	69	--	
23	45	37	--	31	--	a 33	60	56	--	a 73	--	
24	--	--	33	--	33	37	62	63	--	a 76	--	
25	50	37	--	35	--	--	--	63	63	a 76	--	
26	a 53	a 43	--	--	36	47	57	61	65	a 80	--	
27	--	42	a 34	--	42	48	--	60	67	a 80	--	
28	--	--	33	--	43	54	a 65	63	--	--	a 67	
29	--	44	--	37	--	49	--	--	--	63	--	
30	a 46	--	35	--	--	52	--	62	70	68	--	
31	37	--	--	41	--	56	--	62	--	--	--	
Average	--	--	--	--	--	--	52	--	--	--	--	

a Observation made between 1 p.m. and 8 p.m.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	27	0.6	8.8			9.0		
2	7.9	22	.5	8.8			9.0		
3	7.9	19	.4	9.2	21	0.5	8.9		
4	8.0	22	.5	9.3			8.9		
5	8.5	27	.6	9.2			9.0	39	0.9
6	8.5	26	.6	9.3			9.3		
7	8.5	20	a.5	9.3			9.0		
8	8.5	14	.3	9.3			8.7		
9	8.2	14	.3	9.3			8.6	--	
10	8.2			9.3	19	.5	9.0	47	
11	8.2			9.5			9.2	--	e1.1
12	8.2			9.5			9.2	41	
13	8.3	19	.4	9.7			9.2	--	
14	8.4			9.5			8.8	--	
15	8.0			9.5			8.8	--	
16	7.8			9.2			8.9	--	
17	8.0	11	.2	8.9	21	.5	8.8	--	e2.0
18	8.2	--		8.9			8.7	99	
19	8.4	--		9.0			8.9	75	
20	8.5	--		9.0			8.7		
21	8.7	--	e.4	9.0			8.7		
22	8.9	15		8.9			9.0		
23	8.8	19		8.9			9.5	34	8
24	8.8	--		8.8	14	.3	9.5		
25	8.9			9.2			9.5		
26	9.0	25	.6	9.2			9.5		
27	9.5			9.3			9.5		
28	8.9			9.2	29	.7	9.5		
29	9.0	17	.4	9.0			9.5	47	1.2
30	8.8			9.0			9.5		
31	8.8			--	--	--	9.2		
Total	262.5	--	13.5	275.0	--	14.6	281.5	--	35.9

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	9.3			9.3			8.6		
2	9.4			9.4			8.7		
3	9.3			9.3			8.3		
4	9.6			9.2	41	1.0	8.6		
5	9.5			9.3			8.6	80	1.8
6	9.5	32	0.8	9.3			8.5		
7	9.6			9.4			8.4		
8	9.6			9.0			8.5		
9	9.5			9.0			23	2,200	sb500
10	9.4			9.2			32	6,200	sa900
11	9.4	28		9.3			12	1,680	s66
12	9.4	--		9.3			11	580	17
13	9.4	--		9.3			10	490	13
14	9.5	--		9.3	60	1.5	10	180	4.9
15	9.5	28	e.7	9.0			10	420	sb14
16	9.4	--		9.2			13	1,830	s72
17	9.4	26		9.2			18	5,600	sa400
18	9.3	--		9.2			12	1,700	sa55
19	9.5	31		9.2			10	400	11
20	9.5	--		8.7			10	230	6.2
21	9.5			8.8			10	460	b12
22	9.2			8.8			12	850	b28
23	9.4			8.8			11	890	26
24	9.6			8.8	55	1.3	11	410	12
25	9.7			8.4			10	250	6.8
26	9.7	36	.9	8.8			9.9	220	5.9
27	9.5			9.0	106	2.6	9.9	220	5.9
28	9.3			9.9	400	a11	9.9	270	7.2
29	9.3			8.9	299	b7.0	9.5	220	5.6
30	9.3			--	--	--	9.3	180	4.5
31	9.3			--	--	--	9.0	170	4.1
Total	292.8	--	24.9	264.3	--	55.4	350.7	--	2,191.5

e Estimated.
s Computed by subdividing day.
a Computed from partly estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	8.9	120	2.9	9.5	360	sb12	8.0	190	4.1
2	8.7	100	2.3	11	1,900	sb65	7.9	180	3.8
3	8.8	96	2.3	9.9	370	9.9	8.0	170	3.7
4	8.9	60	a1.4	9.7	280	7.3	7.9	180	3.8
5	9.0	68	1.6	9.6	280	7.2	7.8	170	3.6
6	8.9	84	2.0	9.7	260	6.8	7.8	170	3.6
7	9.0	77	1.9	9.9	480	13	7.7	220	4.6
8	8.9	70	1.7	9.8	300	7.9	7.8	240	5.0
9	9.3	58	1.4	9.8	220	5.8	7.8	300	6.3
10	9.4	50	1.3	9.6	200	5.2	7.6	350	7.2
11	9.5	70	1.8	9.4	200	5.1	7.3	260	5.1
12	9.5	54	1.4	9.2	190	4.7	7.2	310	6.0
13	9.3	43	1.1	9.2	170	4.2	7.1	440	a8.5
14	8.9	36	.9	9.2	220	5.5	6.9	470	8.8
15	8.9	74	1.8	9.2	320	7.9	6.9	330	6.1
16	9.3	150	3.8	9.5	410	10	6.8	220	4.0
17	8.8	61	1.4	9.3	310	7.8	6.8	210	3.8
18	8.7	52	1.2	8.9	230	5.5	6.8	210	3.8
19	8.6	66	1.5	8.7	230	5.4	6.8	150	2.8
20	8.6	66	1.5	8.6	230	5.3	6.9	280	5.2
21	9.3	320	8.0	8.6	350	8.1	6.8	360	6.6
22	9.2	185	4.6	8.7	400	9.4	6.9	270	5.0
23	8.9	82	2.0	8.5	270	6.2	6.9	260	4.8
24	8.8	69	1.6	8.4	180	4.1	7.0	270	5.1
25	8.7	75	a1.8	8.4	150	3.4	7.1	210	4.0
26	8.7	80	1.9	8.4	170	3.8	7.2	280	5.4
27	8.7	90	a2.1	8.5	180	4.1	7.8	690	14
28	8.7	103	2.4	8.4	110	2.5	7.1	240	4.6
29	8.7	140	a3.2	8.4	130	2.9	6.9	240	4.5
30	9.0	165	4.0	8.4	170	3.8	7.0	250	4.7
31	--	--	--	8.4	140	3.2	--	--	--
Total	268.6	--	66.8	282.8	--	253.0	218.5	--	158.5

Day	July			August			September		
1	6.6	270	4.8	6.0	120	1.9	6.3	120	2.0
2	6.5	210	3.7	6.0	100	1.6	6.3	100	1.7
3	6.4	170	2.9	6.2	90	1.5	6.0	100	1.6
4	6.5	200	a3.5	6.2	90	1.5	5.9	80	1.3
5	7.0	350	b6.5	7.0	190	3.6	5.7	80	1.2
6	6.5	280	4.9	6.8	110	2.0	5.7	120	1.8
7	6.6	250	4.4	6.6	130	2.3	5.7	90	1.4
8	6.1	200	3.3	6.7	150	2.7	5.7	70	a1.1
9	6.2	130	2.2	6.6	150	a2.6	5.4	70	1.0
10	6.0	130	2.1	6.6	170	3.0	5.4	70	1.0
11	5.8	190	3.0	7.4	260	5.2	5.4	80	1.2
12	5.9	280	4.5	7.2	180	3.5	5.5	80	1.2
13	9.1	1,000	s75	6.8	160	2.9	5.4	80	1.2
14	64	6,620	s2,030	6.8	140	2.6	5.4	80	1.2
15	7.0	850	16	6.4	140	2.4	6.5	70	1.0
16	6.6	340	a6.0	6.2	150	2.5	5.5	70	1.0
17	6.5	180	a3.2	6.7	180	b3.2	5.4	80	1.2
18	6.3	150	2.6	6.4	150	a2.6	5.6	160	a2.4
19	6.3	230	3.9	6.4	140	2.4	5.2	290	4.1
20	6.6	260	4.6	6.1	170	2.8	5.1	280	a3.8
21	6.3	130	2.2	6.0	120	1.9	5.3	200	2.9
22	6.2	140	2.3	6.0	90	1.5	5.9	210	3.3
23	6.1	150	a2.4	6.3	100	1.7	5.5	150	2.2
24	6.1	150	2.5	6.6	100	1.8	5.4	120	1.7
25	6.0	110	1.8	6.6	140	2.5	5.4	90	1.3
26	6.0	110	1.8	6.4	120	2.1	5.4	70	1.0
27	5.9	118	1.9	6.3	120	2.0	5.4	70	1.0
28	5.7	120	1.8	6.5	110	1.9	5.4	80	1.2
29	6.1	120	2.0	7.0	180	a3.4	5.4	80	1.2
30	6.1	120	2.0	7.0	190	3.6	5.6	70	1.1
31	5.8	100	1.6	6.2	120	2.0	--	--	--
Total	254.8	--	2,209.4	202.0	--	77.2	166.8	--	49.3

Total discharge for year (cfs-days) 3,120.3
Total load for year (tons) 5,150.0

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, March to July 1952
(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	Water 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. 10, 1952...	1:10 p.m.	14	36	4,040	5,580	39	51	66	75	85	97	100					SPWCM
Mar. 17	6:50 a.m.	30		7,350	5,110	29	39	48	63	74	95	100					SPWCM
July 14	11:45 a.m.	19		6,380	4,600	--	48	--	70	--	97	100					SPWCM
July 14	3:40 p.m.	10		3,790	2,700	--	63	--	87	--	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 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 26,000 ppm Mar. 16; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 3,100 tons Aug. 11; minimum daily, 0 ton on many days.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 95,000 tons (estimated) June 8, 1951; minimum daily, 0 ton on many days each year.
REMARKS.--Maximum observed concentration during water year 73,300 ppm July 13. No flow during period October to December; record is omitted. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, January to September 1952

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
2							0	--	0
3							0	--	0
4							0	--	0
5							0	--	0
6							0	--	0
7							0	--	0
8							0	--	0
9							13	14,000	sa1,700
10							9.4	20,400	s602
11							1.1	3,380	s26
12							0	--	0
13							0	--	0
14							0	--	0
15							.8	13,000	sa100
16							6.7	26,000	sb650
17							4.6	5,820	s136
18							.8	850	sa3
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	0		0	0		0	36.4	--	3,217

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

DRY CREEK NEAR CURTIS, NEBR.--Continued

Suspended sediment, January to September 1952

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									
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

Day	July			August			September		
1	0	--	0	0	--	0			
2	0	--	0	0	--	0			
3	0	--	0	0	--	0			
4	.1	4,200	sa 11	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	23	13,000	sa 3,100			
12	0	--	0	0	--	0			
13	6.4	4,200	s 969	0	--	0			
14	5.6	6,700	sa 650	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	0	--	0			
23	0	--	0	0	--	0			
24	0	--	0	0	--	0			
25	0	--	0	0	--	0			
26	0	--	0	0	--	0			
27	0	--	0	0	--	0			
28	0	--	0	0	--	0			
29	0	--	0	0	--	0			
30	0	--	0	.3	1,400	sa 5			
31	0	--	0	0	--	0			
Total-	12.1	--	1,630	23.3	--	3,105	0		0

Total discharge for year (cfs-days) 71.8
Total load for year (tons) 7,952

s Computed by subdividing day.
a Computed from estimated concentration graph.

DRY CREEK NEAR CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 10, 1952 ...	1:30 p.m.	12		17,600	5,660	--	22	--	44	--	97	100					SPWCM
Mar. 10	2:30 p.m.	14		21,000	6,720	19	24	32	47	73	98	100					SPWCM
Mar. 10	2:30 p.m.	14		21,000	6,810	2	4	19	40	70	98	100					SPNM
Mar. 10	10:05 p.m.	8.8		21,600	6,850	--	34	--	66	--	99	100					SPWCM
Mar. 11	3:30 p.m.	.5		2,120	1,140	88	97	100	--	--	--	--					BWCM
Mar. 16	7:20 p.m.	9.7		13,200	5,820	--	27	--	51	--	97	100					SPWCM
Mar. 16	10:10 p.m.	14		57,400	10,000	--	24	--	42	--	98	100					SPWCM
Mar. 17	2:45 p.m.	1.8	36	2,220	1,570	86	90	95	96	98	100	--					BWCM
July 13	10:40 p.m.	164		73,300	6,550	--	14	--	31	--	92	100					SPWCM
July 14	6:00 a.m.	.6		6,690	5,100	--	84	--	97	--	100	--					SPWCM
Aug. 11	5:00 a.m.	37		19,300	10,700	24	33	45	60	78	98	100					SPWCM
Aug. 11	5:00 a.m.	37		19,300	11,000	3	5	32	54	75	97	100					SPNM
Aug. 11	6:05 a.m.	16		13,000	9,750	--	47	--	74	--	98	100					SPWCM

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.

LOCATION (revised).--At gaging station, a third of a mile downstream from top of Harry Strunk Lake flood-control pool, Frontier County, 2½ miles upstream from top of irrigation pool, 3¾ miles southeast of Stockville, and 13½ miles upstream from Medicine Creek Dam.
RECORDS AVAILABLE.--Sediment records: April 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 14,700 ppm Mar. 17; minimum daily, 100 ppm Sept. 10.
Sediment loads: Maximum daily, 13,400 tons July 14; minimum daily, 9 tons Sept. 10.
EXTREMES, April 1951 to September 1952.--Sediment concentrations: Maximum daily, not determined; minimum daily, 100 ppm Sept. 10, 1952.
Sediment loads: Maximum daily, 490,000 tons (estimated) June 22, 1951; minimum daily, 9 tons Sept. 10, 1952.
REMARKS.--Flow affected by ice Nov. 18, Dec. 9-11, Dec. 14 to Feb.1,Feb.25,Mar.4-7,22-25. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, water year October 1951 to September 1952

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.....	53	360	52	63			64	500	86
2.....	52			63	210	35	66	430	77
3.....	52			61			66	780	140
4.....	51			61			64	1,570	270
5.....	58	490	72	62	340	57	64		
6.....	63			62	450	75	66		
7.....	63	520	88	63			64	550	94
8.....	61	490	81	63	430	72	64		
9.....	60	460	74	62			60		
10.....	59	470	75	62			50	610	
11.....	58			62	420	70	65	1,020	
12.....	56			62	420	70	64	--	
13.....	59	470	75	67	460	83	62	630	e110
14.....	60			67	480	87	54	--	
15.....	63			66	360	64	51	--	
16.....	66	490	87	62	660	110	58	--	
17.....	62			62	780	130	75	610	
18.....	61			65	900	160	80	--	e120
19.....	60	--	e110	67	690	120	70	--	
20.....	61			67	400	72	51	--	
21.....	62	700	120	62	310	52	52	--	
22.....	64	380	66	62			47	--	
23.....	64			62	300	50	49	--	
24.....	64			62			52	--	
25.....	64	300	52	63			54	--	e60
26.....	64			61	220	36	56	--	
27.....	67	300	54	62	330	55	57	--	
28.....	68	270	50	64	330	57	58	--	
29.....	67	280	51	66	530	94	60	--	
30.....	67	350	63	64	580	100	60	--	
31.....	63	--	e40	--	--	--	50	320	
Total	1,892	--	2,284	1,897	--	2,120	1,853	--	2,893

e Estimated.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	30	270		100	1,100	a 300	72	--	e 260
2	35	--		75	2,000	a 400	70	--	e 200
3	34	--		64	1,790	310	67	700	a 130
4	42	--		64	1,770	310	60	500	81
5	38	--	e 20	63	--		99	990	260
6	42	--		64	1,240		122	3,000	b 1,000
7	49	230		63	--		80	2,800	b 600
8	51	--		63	--		64	1,630	280
9	54	--		63	--		64	2,200	b 380
10	50	110		62	1,480	e 240	152	12,000	sb 5,300
11	61	--		63	1,270		178	12,000	s 6,260
12	60	--		63	1,330		91	2,800	690
13	65	270		66	--		71	2,400	460
14	74	--		71	1,500		75	2,050	420
15	70	--	e 50	70	--		67	1,750	320
16	71	--		67	940	170	64	3,800	sa 1,300
17	71	300		66	1,000	b 180	206	14,700	8,180
18	66	--		66	1,030	180	169	8,900	sa 4,500
19	68	--		66	1,060	190	94	2,800	710
20	62	330		62	1,200	a 200	79	1,680	360
21	57	--		63	1,280	220	80	1,300	a 280
22	21	--		68	1,100	a 200	70	1,100	a 200
23	33	--		61	800	130	65	1,120	200
24	61	740	e 75	66	750	a 130	100	2,240	600
25	57	--		55	1,600	b 240	150	5,600	2,300
26	59	--		67	2,620	470	83	3,780	850
27	61	290	48	58	2,300	a 360	77	2,800	580
28	70	370	70	87	--	e 400	77	2,800	580
29	75	400	81	91	--	e 360	75	3,360	680
30	86	500	b 120	--	--	--	75	3,000	a 600
31	90	720	180	--	--	--	71	2,250	430
Total	1,763	--	1,649	1,957	--	7,390	2,887	--	38,991

Day	April			May			June		
1	65	2,100	sa 420	72	2,600	b 500	53	980	140
2	68	2,600	b 480	77	3,180	660	54	1,180	170
3	66	1,340	240	72	2,800	b 550	53	900	130
4	63	1,160	200	66	2,510	450	50	1,170	160
5	63	1,160	200	61	2,030	350	50	1,300	b 180
6	62	1,130	190	60	2,250	380	48	1,200	160
7	62	1,380	230	62	2,230	380	46	720	89
8	63	1,450	250	61	2,290	390	46	1,110	140
9	60	1,540	250	61	2,200	370	46	1,050	130
10	59	1,370	220	61	1,830	300	45	620	75
11	60	1,300	210	62	1,600	270	44	890	110
12	60	1,150	190	59	1,790	280	43	840	98
13	60	1,200	190	56	1,620	240	41	510	56
14	60	1,200	b 190	56	1,830	280	39	860	91
15	60	1,240	200	56	1,770	270	39	1,000	110
16	67	1,640	300	64	1,560	270	38	930	95
17	73	2,250	440	70	1,900	360	38	590	60
18	73	2,760	540	73	2,050	400	38	750	77
19	70	1,670	320	70	1,750	330	38	1,390	140
20	67	1,880	340	63	1,780	300	38	1,600	a 160
21	73	1,840	360	63	2,200	b 380	39	1,300	a 140
22	84	2,600	590	66	2,580	460	39	1,100	a 120
23	82	2,940	650	66	2,230	400	38	820	84
24	73	2,580	510	63	1,470	250	38	730	75
25	71	1,940	370	60	1,690	270	38	640	66
26	68	1,350	250	56	1,530	230	38	780	80
27	67	1,370	250	62	2,700	b 460	44	1,200	140
28	61	1,420	230	58	1,270	200	43	1,150	130
29	61	1,380	230	54	1,260	180	39	730	77
30	61	1,580	260	56	1,240	190	38	720	74
31	--	--	--	55	1,100	b 160	--	--	--
Total	1,983	--	9,300	1,941	--	10,510	1,281	--	3,357

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	36	1,130	110	67	3,520	s 1,000	50	490	66
2	35	1,350	130	161	6,200	2,690	44	460	55
3	34	980	90	169	4,450	s 2,370	43	380	44
4	34	640	60	58	1,200	190	41	320	35
5	39	760	80	52	920	130	38	200	20
6	25	830	sa 60	53	930	130	38	150	15
7	60	3,000	sb 600	49	700	93	37	170	17
8	41	1,500	170	45	480	58	35	180	17
9	39	1,370	140	42	410	46	35	140	13
10	38	920	94	41	390	43	34	100	9
11	35	800	76	79	6,400	sb 1,400	34	180	16
12	38	600	62	46	1,510	190	34	180	16
13	67	3,100	sa 2,500	40	770	83	34	170	16
14	316	14,000	s 13,400	41	660	73	35	180	17
15	96	4,520	s 1,340	40	560	60	35	180	17
16	56	1,350	200	38	380	39	35	140	13
17	49	720	95	38	290	30	36	110	11
18	44	410	49	41	320	35	36	100	10
19	40	370	40	39	340	36	35	190	18
20	40	430	46	38	280	29	36	250	24
21	41	450	50	38	230	24	37	220	22
22	44	470	56	38	330	34	38	220	23
23	41	430	48	40	280	30	39	250	26
24	38	340	35	41	220	24	38	320	33
25	36	290	28	42	260	29	38	290	30
26	35	270	26	41	250	28	37	170	17
27	35	290	27	40	250	27	37	160	16
28	34	320	29	41	300	33	37	130	13
29	35	300	28	46	460	57	35	130	12
30	35	320	30	58	750	a 120	35	170	16
31	34	220	20	51	480	66	--	--	--
Total	1,570	--	19,719	1,653	--	9,197	1,116	--	657

Total discharge for year (cfs-days) 21,793
Total load for year (tons) 108,067

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1952
(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	Water 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. 11, 1952	9:45 a.m.	234	34	17,500	7,530	16	19	24	30	47	86	99	--		--		SPWCM
Mar. 11	9:45 a.m.	234	34	17,500	7,680	2	4	18	28	44	85	99	--		--		SPN
Mar. 11	11:00 a.m.	231	--	15,300	5,030	--	24	--	37	--	89	--	--		--		SPWCM
Mar. 17	11:20 a.m.	234	--	17,100	5,770	--	18	--	30	--	86	--	--		--		SPWCM
Mar. 17	4:00 p.m.	208	--	15,400	4,280	--	22	--	37	--	86	98	--		--		SPWCM
Mar. 18	3:50 p.m.	162	38	13,100	9,150	21	28	35	45	62	89	100	--		--		SPWCM
Mar. 18	3:50 p.m.	162	38	13,100	9,260	2	4	20	43	58	86	99	--		--		SPN
July 14	2:00 a.m.	404	--	22,300	13,900	19	24	30	39	56	93	100	--		--		SPWCM
July 14	2:00 a.m.	404	--	22,300	13,800	2	5	24	34	54	92	100	--		--		SPN
July 14	4:50 a.m.	390	--	15,900	8,340	28	40	53	66	82	97	100	--		--		SPWCM
July 14	4:50 a.m.	390	--	15,900	8,300	4	12	42	62	80	97	100	--		--		SPN
July 14	1:35 p.m.	271	--	14,200	6,550	27	33	42	50	64	88	97	98		--		SPWCM
July 14	1:35 p.m.	271	--	14,200	6,570	3	9	36	47	62	88	96	98		--		SPN
July 14	5:00 p.m.	309	68	12,200	4,710	--	33	--	51	--	83	96	98		99		SPWCM
July 14	6:00 p.m.	328	68	11,400	11,100	24	34	43	50	63	91	98	99		100		SPWCM
July 14	6:00 p.m.	328	68	11,400	10,500	3	6	36	50	65	88	98	99		--		SPN
July 15	9:50 a.m.	97	--	4,320	8,340	--	50	--	69	--	93	--	--		--		SPWCM
Aug. 2	4:15 p.m.	210	--	4,920	6,220	--	37	--	54	--	84	97	--		--		SPWCM
Aug. 11	10:15 a.m.	80	--	5,820	8,940	--	35	--	65	--	95	--	--		--		SPWCM

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.

LOCATION.--At gaging station at top of Harry Strunk Lake flood-control pool, Frontier County, 2 1/4 miles southwest of Orafino, 9 1/2 miles upstream from Medicine Creek Dam, and 14 miles northwest of Cambridge.
DRAINAGE AREA.--53 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: October 1951 to September 1952.
EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 7,300 ppm Aug. 11; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,020 tons Aug. 11; minimum daily, 0 tons on many days.
REMARKS.--Flow affected by ice Mar. 9-12, 15-17, 26-29. Record for October to December omitted; no flow during this period. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, January to September 1952

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
2.....							0	--	0
3.....							0	--	0
4.....							0	--	0
5.....							0	--	0
6.....							0	--	0
7.....							0	--	0
8.....							0	--	0
9.....							.1	400	a.1
10.....							2.0	1,500	sb40
11.....							5.3	2,800	sb70
12.....							1.0	1,100	sa3.6
13.....							.5	1,100	sa1.7
14.....							.2	360	a.2
15.....							.2	--	a.2
16.....							1.5	2,000	sa12
17.....							9.0	4,600	sb160
18.....							.5	1,980	s2.8
19.....							.1	800	a.2
20.....							0	--	0
21.....							0	--	0
22.....							0	--	0
23.....							.1		
24.....							.1		
25.....							.2	--	e.1
26.....							.1		
27.....							.1		
28.....							.1		
29.....							.2	700	a.4
30.....							.4	700	a7.0
31.....									
Total.	0		0	0		0	21.8	--	298.9

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, January to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0.2	1,700	s3.3	0		0			
2	.2	500	a.3	0		0			
3	.1	200	a.1	0		0			
4	.1	200	a.1	0		0			
5	0	--	0	0		0			
6	0	--	0	0		0			
7	0	--	0	0		0			
8	0	--	0	0		0			
9	0	--	0	0		0			
10	0	--	0	0		0			
11	0	--	0	0		0			
12	0	--	0	0		0			
13	0	--	0	0		0			
14	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	0		0			
23	0	--	0	0		0			
24	0	--	0	0		0			
25	0	--	0	0		0			
26	0	--	0	0		0			
27	0	--	0	.1	750	a.2			
28	0	--	0	0		0			
29	0	--	0	0		0			
30	--	--	--	0		0			
31	--	--	--	0		0			
Total	0.6	--	3.8	0.1		0.2	0	--	0

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	--	0	0	--	0	0.1	500	a0.1
2	0	--	0	0	--	0	0		0
3	0	--	0	0	--	0	0		0
4	0	--	0	0	--	0	0		0
5	0	--	0	.1	329	s.3	0		0
6	0	--	0	.1	800	sa.3	0		0
7	.5	2,000	sb3.6	.1	600	sa.1	0		0
8	0	--	0	0	--	0	0		0
9	0	--	0	0	--	0	0		0
10	0	--	0	0	--	0	0		0
11	0	--	0	31	7,300	s1,020	0		0
12	0	--	0	3.0	3,700	s39	0		0
13	2.8	1,100	sa75	.1	900	sa.4	0		0
14	15	6,780	s398	0	--	0	0		0
15	.8	2,270	s6.6	0	--	0	0		0
16	.1	750	a.2	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	0	--	0	.1	1,100	sa.2	0		0
Total	19.2	--	483.4	34.5	--	1,060.3	0.1		0.1

Total discharge for year (cfs-days) 76.3
Total load for year (tons) 1,846.7

s Computed by subdividing day.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August, 1952
(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	Water 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. 11, 1952	12:20 p.m.	a5.3	34	1,340	1,680	--	86	--	93	--	99	100					SPWCM
Mar. 17	8:55 a.m.	a9.0	--	7,890	6,090	--	59	--	91	--	100						SPWCM
Mar. 18	2:15 p.m.	1.0	40	3,220	2,390	--	91	--	98	--	100						SPWCM
July 7	1:50 p.m.	.3	--	1,520	1,200	93	98	--	98	98	100						BWCM
July 14	3:25 a.m.	47	--	10,000	8,540	--	46	--	79	--	100						SPWCM
July 14	8:10 a.m.	20	60	7,950	7,900	40	58	80	92	96	99						SPWCM
July 14	8:10 a.m.	20	60	7,950	8,000	5	11	71	92	96	99						SPN
July 14	9:50 a.m.	11	60	4,760	9,420	--	70	--	94	--	99						SPWCM
July 15	9:50 a.m.	.7	--	2,180	1,720	90	98	99	--	--	--						BWCM
Aug. 11	11:55 a.m.	64	64	9,980	7,280	34	49	68	81	90	98						SPWCM
Aug. 11	11:55 a.m.	64	64	9,980	7,190	4	10	56	77	89	98						SPN
Aug. 11	2:00 p.m.	111	--	15,200	11,100	27	40	57	75	88	99						SPWCM
Aug. 11	2:00 p.m.	111	--	15,200	11,000	2	6	48	71	90	99						SPN
Aug. 12	9:45 a.m.	2.0	--	4,050	3,170	84	93	97	99	--	--						BWCM

HARRY STRUNK LAKE, NEBR.

LOCATION.--At outlet tube or spillway of Medicine Creek Dam on Medicine Creek, 7 miles northwest of Cambridge, Furnas County.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952.
REMARKS.--Records of reservoir contents for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, December 1951 to September 1952

Date of collection	Reservoir contents (acre-feet)	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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Dec. 7, 1951	38,700	12	0.04	45	7.2	13		192	6.0	2.5	0.4	2.5	0.05	196	0.27		142	0	16	0.5	334	7.8	
Mar. 6, 1952....	37,410	21	.04	48	10	17		218	12	3.5	.4	2.3	.04	226	.31		161	0	19	.6	371	8.0	
June 23..... ..	40,300	16	.02	40	12	17		202	15	3.5	.2	1.0	--	220	.30		150	0	20	.6	351	8.1	
Sept. 2.....	37,580	6.7	.04	42	10	19		202	15	4.0	.5	1.4	.03	202	.27		148	0	22	.7	351	7.8	

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, 2½ miles upstream from mouth, and 7½ miles downstream from Harry Strunk Lake.
DRAINAGE AREA.--1,070 square miles, approximately, of which about 680 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.-- Water temperatures: March 1951 to September 1952.
Sediment records: November 1945 to December 1949, March 1951 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 94°F June 20; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 4,000 ppm July 14; minimum daily, not determined.
Sediment loads: Maximum daily, 2,300 tons July 14; minimum daily, less than 0.50 ton on many days during October, November, and May.
EXTREMES, 1945-49, 1951-52.--Water temperatures(March 1951 to September 1952): Maximum, 94°F June 20, 1952; minimum, freezing point on several days during winter months.
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 during 1949, 1951-52.
REMARKS.--Flow affected by ice Nov. 18, 19, Dec. 9, 10, Dec. 14 to Jan. 11, Jan. 15, 16, 20, 22-26, 29, Feb. 20, 21, 25, 26, Feb. 29 to Mar. 6, Mar. 13, 22, 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily measurement between 3 p.m. and 6 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	42	44	33	47	41	54	--	77	89	92	69
2	--	43	44	34	48	47	55	a74	85	91	82	79
3	--	45	43	34	41	38	46	80	83	91	84	81
4	--	43	42	33	--	36	55	81	87	89	86	86
5	--	45	41	34	40	38	57	75	88	88	83	88
6	--	46	39	33	44	40	59	69	87	a83	87	86
7	--	49	38	33	47	42	61	71	89	79	81	79
8	--	50	35	33	44	44	47	--	87	85	84	77
9	--	52	37	33	49	40	46	59	89	93	82	77
10	--	54	38	33	48	47	48	64	87	91	83	74
11	--	49	40	40	49	41	43	75	90	87	76	75
12	64	50	42	40	45	35	44	74	93	--	82	81
13	58	45	34	38	42	44	54	72	93	86	87	74
14	64	48	--	42	39	38	60	77	93	75	88	74
15	65	44	--	42	43	47	52	74	91	78	85	76
16	53	--	--	39	46	46	49	53	86	87	86	80
17	56	41	--	38	46	52	52	61	a83	83	83	76
18	59	40	34	43	38	48	62	a68	84	87	83	73
19	53	40	32	44	40	53	--	68	83	87	86	73
20	53	42	32	39	40	46	58	77	94	88	85	73
21	--	44	32	39	40	--	54	68	--	87	82	67
22	49	40	35	32	42	--	48	77	a89	85	74	73
23	55	41	32	33	44	35	59	76	93	84	77	74
24	57	35	33	33	34	44	64	80	85	86	76	76
25	62	40	35	34	42	44	a65	83	89	85	85	78
26	46	41	33	41	47	49	68	--	a73	87	86	77
27	52	42	33	44	48	53	65	78	82	90	87	77
28	56	46	35	46	47	52	a65	82	92	77	a75	73
29	57	47	35	42	43	58	51	78	86	85	a78	77
30	49	46	36	45	--	58	64	81	90	87	88	77
31	45	--	32	46	--	a52	--	83	--	86	81	--
Average	--	44	36	38	44	45	55	74	87	86	83	77

a Observation made between 7 p.m. and 8 p.m.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	5.2			76			86		
2	5.0			76			86		
3	4.9			72	220	43	87	213	49
4				65			86		
5				61	118	19	86	153	36
		7	(t)						
6				53	84	12	86	190	a 44
7	5.0			51	70	a 10	85	220	a 50
8				10	31	1	84	240	b 55
9				6.4	17	(t)	83	460	a 100
10				20	120	sb 44	83	550	a 120
11	34	280	sb 65	60	216	35	74	300	a 60
12	92	500	a 120	60	130	21	55	184	27
13	94	402	102	70	222	s 46	55	150	22
14	90	382	93	94	500	sa 140	55		
15	82	254	56	124	754	252	60		
								--	e 30
16	79	260	55	124	550	b 180	65		
17	77	196	41	88	320	b 75	65		
18	71	210	40	9.0			63	207	35
19	53	166	s 29	8.0	30	1	65	200	a 36
20	9.6	29	1	7.2			65	203	36
21	8.0	22	(t)	6.4			70	200	a 38
22	7.6	22	(t)	6.0			70	194	37
23	7.2	20	(t)	5.7	24	(t)	70	162	31
24	19	140	sb 17	6.4			70	118	22
25	54			6.4			70	154	29
		190	28						
26	55			8.0	30	1	70	142	27
27	55			33	463	s 95	70	196	37
28	58	170	27	87			75	128	26
29	70			87	284	67	75	118	24
30	77	263	53	87			75	128	26
31	76			--	--	--	70	100	19
Total	1,218.5	--	891	1,467.5	--	1,309	2,259	--	1,253

Day	January			February			March		
1	70	78	15	70	223	42	70	240	45
2	70	51	10	70	257	48	70	188	36
3	70	52	10	70	347	66	69	209	39
4	72	48	9	70	320	b 60	69	254	47
5	75	60	12	69	264	49	69	206	38
6	75	51	10	70	224	42	69	170	32
7	75	32	b 6	70	250	47	69	218	41
8	75	40	b 8	70	236	45	70	212	40
9	75	40	8	70	212	40	69	204	38
10	75	81	16	70	230	43	69	237	44
11	70	360	a 70	70	202	38	69	201	37
12	68	497	91	65	168	29	70	240	b 46
13	67	350	63	72	211	41	69	303	56
14	68	300	a 55	71	206	39	68	237	44
15	68	298	55	71	196	38	68	196	36
16	68	300	55	71	172	33	68	188	34
17	69	280	52	71	168	32	69	218	41
18	69	269	50	71	175	34	68	201	37
19	69	287	53	70	153	29	68	168	31
20	69	292	54	70	185	35	74	225	45
21	69	280	a 50	70	246	46	92	280	b 70
22	65	233	41	72	231	45	95	500	b 130
23	65	117	20	72	188	36	95	1,200	a 300
24	70	158	30	72	128	25	94	690	175
25	75	220	44	75	280	a 55	93	465	117
26	75	372	75	73	319	63	91	416	102
27	74	408	82	71	223	43	91	410	101
28	72	377	73	71	180	34	93	303	76
29	72	362	70	70	162	31	93	260	b 65
30	71	324	62	--	--	--	93	242	61
31	71	291	56	--	--	--	93	291	73
Total	2,196	--	1,305	2,047	--	1,208	2,407	--	2,077

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.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--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	95	319	82	16	55	a 2	21	148	8
2	95	249	64	11	130	a 4	22	156	9
3	95	201	52	8.8	52	1	22	148	9
4	92	189	47	7.6	62	1	23	130	8
5	92	209	52	6.0	48	1	24	116	8
6	92	188	47	5.1	20	(t)	25	120	8
7	93	148	37	4.8	31	(t)	25	113	8
8	92	158	39	5.1	38	1	26	117	8
9	91	141	35	4.8	28	(t)	25	99	7
10	91	119	29	4.8	24	(t)	22	101	6
11	91	120	29	4.5	29	(t)	22	95	6
12	92	111	28	4.5	21	(t)	22	80	b 5
13	92	105	26	3.9	22	(t)	22	88	5
14	91	106	26	4.5	29	(t)	22	87	5
15	90	90	22	3.9	43	(t)	21	90	5
16	93	96	24	5.1	39	1	22	105	6
17	91	110	27	6.4	26	(t)	18	80	4
18	91	116	28	4.8	22	(t)	17	66	3
19	91	120	b 30	4.5	21	(t)	17	75	3
20	93	129	32	5.4	29	(t)	18	140	s 8
21	92	172	43	5.7	29	(t)	25	312	21
22	92	216	54	7.2	21	(t)	21	140	8
23	89	182	44	8.4	27	1	21	113	6
24	89	184	44	8.8	30	1	21	127	7
25	88	184	44	10	30	1	22	122	7
26	88	186	44	23	480	sb 200	20	138	7
27	87	202	47	54	1,200	sb 460	23	154	10
28	88	238	56	19	262	13	25	149	10
29	88	268	64	17	190	9	24	153	10
30	62	193	s 42	20	180	10	25	202	14
31	--	--	--	20	166	9	--	--	--
Total	2,706	--	1,238	314.6	--	720	663	--	229

	July			August			September		
1	22	189	11	50	280	a 38	26	109	8
2	22	184	11	55	254	38	25	97	6
3	21	173	10	60	286	46	23	75	a 5
4	20	200	sa 13	60	280	a 46	16	60	3
5	51	1,600	sb 300	60	--	e 80	15	65	3
6	27	390	a 28	60	--	e 80	14	51	2
7	33	453	40	60	275	44	15	37	1
8	31	331	28	55	232	34	15	41	2
9	29	303	24	80	460	a 100	15	49	2
10	28	321	24	110	500	a 150	15	48	2
11	27	305	22	130	437	153	14	40	2
12	26	320	b 22	125	317	107	14	39	1
13	62	1,200	sb 900	122	267	88	14	38	1
14	143	4,000	sb2,300	115	261	81	14	32	1
15	67	902	163	112	273	82	14	35	1
16	67	744	134	109	271	80	36	280	a 28
17	66	662	118	107	254	73	38	176	18
18	63	573	97	106	250	72	28	104	8
19	59	565	90	104	284	80	26	76	5
20	57	500	a 75	102	286	79	25	77	5
21	55	425	63	101	269	73	20	54	3
22	53	415	59	100	256	69	15	43	2
23	50	400	54	99	292	78	14	36	1
24	46	311	39	98	258	68	14	32	1
25	43	298	34	99	283	76	14	31	1
26	40	286	31	98	310	82	14	26	1
27	38	274	28	91	276	68	14	27	1
28	37	284	28	75	234	47	14	26	1
29	35	228	22	47	174	22	14	27	1
30	33	200	18	29	123	10	14	27	1
31	45	240	a 30	26	111	8	--	--	--
Total	1,396	--	4,816	2,645		2,152	549	--	117

Total discharge for year (cfs-days) 19,868.6

Total load for year (tons) 17,315

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.

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment, July 1952

(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	Water 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 14	8:55 a.m.	111	64	4,540	515	44	52	59	66	77	91	97	100				BWCM
July 14	10:00 a.m.	100		3,440	514	49	58	65	72	84	97	100	--				BWCM
July 14	10:00 a.m.	100		3,440	513	6	15	54	71	80	93	98	100				BNM

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.

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.
DRAINAGE AREA.--13,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1952.
Water temperatures: December 1950 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 438 ppm July 24 to Aug. 4; minimum, 196 ppm July 14-15.
Hardness: Maximum, 230 ppm Nov. 1-30; minimum, 127 ppm July 14-15.
Specific conductance: Maximum daily, 830 micromhos Aug. 21; minimum daily 285 micromhos July 14.
Water temperatures: Maximum, 97°F Aug. 19; minimum, freezing point on several days during December and January.
EXTREMES, December 1950 to September 1952.--Dissolved solids: Maximum (1951-52), 438 ppm July 24 to Aug. 4, 1952; minimum, 196 ppm July 14-15, 1952.
Hardness: Maximum, 270 ppm Apr. 1-12, 1951; minimum, 127 ppm July 14-15, 1952.
Specific conductance: Maximum daily (1951-52), 830 micromhos Aug. 21, 1952; minimum daily, 285 micromhos July 14, 1952.
Water temperatures: Maximum, 97°F Aug. 19, 1952; minimum, freezing point on several 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. Water discharge computed 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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951....	305	--		60	18	40		280	6	68	11	--	3.2	0.10	426	0.58	351	225	0	26	1.2	605	8.3
Nov. 1-30.....	350	--		61	19	35		280	5	64	10	--	3.6	.11	410	.56	387	230	0	24	1.0	589	8.2
Dec. 1-31.....	198	--		57	21	37		283	5	62	11	--	4.0	.12	426	.58	228	229	0	25	1.1	599	8.2
Jan. 1-31, 1952....	252	--		60	18	32		283	0	54	10	--	3.7	.10	404	.55	275	226	0	23	.9	571	8.0
Feb. 1-29.....	507	--		56	15	29		256	0	50	8.5	--	5.0	.03	341	.46	467	203	0	23	.9	519	7.9
Mar. 1-31.....	590	--		56	17	32		263	0	54	9.0	--	4.4	.07	356	.48	567	210	0	24	1.0	544	7.9
Apr. 1-30.....	605	--		58	17	34		263	5	61	11	--	4.0	.08	374	.51	611	216	0	24	1.0	563	8.3
May 1-26.....	665	--		54	16	32		258	0	52	9.0	--	3.2	.09	358	.49	643	199	0	25	1.0	537	8.0
May 27.....	1,110	--		49	12	17		224	0	26	3.0	--	.4	.04	262	.36	785	172	0	17	.6	413	7.8
May 28-June 24....	187	--		50	16	34		248	0	58	10	--	2.8	.07	360	.49	182	191	0	26	1.1	538	8.1
June 25-July 4	19.8	--		41	18	36		246	0	52	12	--	1.4	.14	352	.48	18.8	175	0	29	1.2	511	8.2
July 5-13	189	--		39	11	21		204	0	23	7.0	--	2.2	.08	258	.35	132	142	0	22	.8	385	7.3
July 14-15	576	--		39	7.2	7.3		171	0	4.0	1.0	--	1.5	.07	196	.27	305	127	0	11	.3	288	7.5
July 16-23	80.5	--		49	13	30		242	0	49	10	--	1.8	.12	346	.47	75.2	178	0	25	1.0	495	7.7
July 24-Aug. 4	2.1	--		58	20	45		306	0	73	13	--	1.6	.15	438	.60	2.48	228	0	28	1.3	637	7.7

Aug. 5-29, 1952	9.3	--		49	18	40	270	0	59	13	--	0.7	0.16	378	0.51	9.49	195	0	29	1.2	565	7.5
Aug. 30-Sept. 4	63.5	35		48	8.3	19	212	0	28	5.5	0.6	3.4	.11	264	.36	45.3	154	0	19	.7	405	7.7
Sept. 5-9	9.0	35		49	13	28	240	0	42	10	.8	2.2	.11	312	.42	7.58	174	0	24	.9	482	7.8
Sept. 10-30	a.0	33		59	17	37	289	0	61	13	.8	2.4	.13	378	.51	.00	216	0	25	1.1	593	7.5
Weighted average[b]	309	--		56	17	33	c 268	--	56	9.6	--	3.8	0.08	371	0.50	310	210	0	24	1.0	550	--

a Nearly zero discharge.
b Represents 100 percent of runoff for water year October 1951 to September 1952.
c Includes carbonate as bicarbonate.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily measurement between 12 m. and 5 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	38	42	32	36	40	51	68	a 67	b 87	96	68
2	b 74	35	b 44	34	37	35	56	70	b 83	b 87	91	71
3	b 66	38	a 43	34	b 36	33	a 46	75	b 79	b 82	b 83	76
4	65	38	38	b 33	37	33	56	79	b 84	b 84	--	80
5	55	a 33	38	a 32	a 34	34	a 44	74	b 87	b 83	b 84	84
6	53	40	38	33	40	34	61	63	b 89	85	91	85
7	58	40	35	34	a 34	38	61	b 77	b 84	71	a 71	a 67
8	59	44	--	a 32	a 34	43	55	b 67	a 73	a 65	87	b 75
9	62	47	34	34	40	39	b 46	61	b 87	93	83	b 76
10	62	50	34	35	47	46	b 51	60	b 85	95	92	b 74
11	65	50	37	35	--	43	--	66	b 91	88	b 76	74
12	b 65	52	36	34	a 39	a 39	42	65	90	85	83	--
13	62	a 43	35	34	43	b 36	42	66	b 92	84	b 95	69
14	63	a 39	33	35	b 40	37	54	72	b 94	68	95	--
15	64	42	33	35	39	40	52	b 74	94	b 76	89	a 58
16	54	37	b 33	34	40	39	50	63	84	b 87	b 90	b 71
17	54	--	33	35	b 42	45	59	55	b 82	b 80	b 91	70
18	56	b 33	32	34	38	45	65	b 62	b 76	b 89	a 70	68
19	51	38	33	37	b 39	49	65	b 64	b 80	91	97	67
20	a 46	37	32	33	b 37	48	64	67	b 95	a 76	89	64
21	a 47	40	33	35	b 38	b 33	60	67	b 82	78	83	64
22	47	a 35	33	33	b 33	b 33	50	b 70	87	90	b 70	71
23	--	39	33	33	b 40	37	62	b 68	b 87	b 83	a 67	73
24	57	37	32	33	a 33	35	62	69	b 80	89	a 68	74
25	60	40	32	37	34	44	65	a 63	b 85	b 80	88	76
26	a 46	b 41	33	b 35	38	b 45	66	83	b 75	b 90	85	76
27	a 43	39	33	37	b 43	b 51	74	71	b 80	89	91	77
28	a 45	42	b 35	--	44	55	71	77	b 91	75	75	--
29	54	45	35	b 35	b 40	b 58	62	b 73	b 80	a 67	78	--
30	47	44	35	36	--	64	b 67	b 76	90	90	b 86	--
31	42	--	32	b 37	--	60	--	a 63	--	87	74	--
Average	56	41	35	34	38	42	57	69	84	83	84	72

a Observation made between 8 a.m. and 11 a.m.
b Observation made between 6 p.m. and 8 p.m.

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 3/4 miles upstream from Sappa Creek, and 23 miles upstream from Harlan County Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1952.
Sediment records: October 1947 to September 1948.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 9, 1951	379			--	--	36		276	57	9.5							221	0	26	1.1	568	7.6	
Dec. 5	421			--	--	33		276	52	8.5							220	0	25	1.0	554	7.7	
Dec. 28	215			--	--	36		324	52	11							257	0	23	1.0	623	7.8	
Feb. 1, 1952	512			--	--	23		237	42	7.5							187	0	21	.7	477	7.7	
Feb. 28	574			--	--	29		264	42	7.5							207	0	23	.9	512	7.9	
Mar. 28	890			55	16	33		251	54	8.5							201	0	27	1.0	527	7.7	
Apr. 29	738			--	--	40		279	62	10							220	0	28	1.2	572	7.9	
May 28	995	34	0.12	55	13	30		251	39	6.5	0.5	1.2		312	0.42		192	0	25	.9	436	7.4	
June 26	16			--	--	42		303	55	10							229	0	28	1.2	587	7.7	
July 31	17			--	--	36		282	36	9.0							216	0	23	.9	526	7.9	
Sept. 2	76			--	--	26		200	29	7.5							149	0	27	.9	377	7.6	

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, February to September 1952 (discontinued).
Sediment records: April 1947 to September 1951, February to September 1952 (discontinued).
EXTREMES, February to September 1952.--Water temperatures: Maximum, 80°F June 22; minimum, freezing point on several days during March.
Sediment concentrations: Maximum daily, 15,600 ppm May 1; minimum daily, 23 ppm Feb. 29.
Sediment loads: Maximum daily, 32,800 tons May 1; minimum daily, less than 0.50 ton July 11, Sept. 11-20.
EXTREMES, 1947-51, 1952.--Water temperatures (1949-51, 1952): Maximum, 89°F Aug. 29, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 15,600 ppm May 1, 1952; 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 Feb. 26, 27, Mar. 1-10, 21-27. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, February to September 1952
(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					--	32	46	48	--	73	71	64
2					--	32	45	54	65	74	--	67
3					--	32	--	59	68	70	a 70	63
4					--	--	46	66	69	70	69	69
5					--	a 32	a 43	64	70	a 70	69	66
6					--	a 34	a 42	63	69	68	71	66
7					--	a 34	a 56	62	70	66	67	65
8					--	35	a 52	a 63	74	62	70	66
9					--	35	a 42	59	68	65	68	66
10					--	--	45	54	71	68	69	64
11					--	36	41	55	74	68	68	66
12					--	38	--	54	75	68	64	64
13					--	a 37	43	57	75	70	75	66
14					--	a 34	a 52	61	75	63	72	57
15					--	36	a 50	62	75	68	--	56
16					--	a 42	a 48	48	68	68	--	60
17					--	--	a 54	50	65	a 71	75	62
18					--	a 46	a 57	a 57	70	72	70	62
19					--	a 48	a 59	48	68	72	72	55
20					--	a 46	a 51	55	70	a 76	72	54
21					--	--	52	58	75	74	--	55
22					--	a 36	a 51	57	a 80	74	68	53
23					--	a 35	a 49	57	72	72	68	54
24					--	--	a 57	59	74	72	a 74	54
25					--	a 37	a 56	59	70	74	70	55
26					--	a 42	54	60	70	72	70	59
27					a 40	a 43	61	61	71	79	72	61
28					36	a 47	a 64	60	--	--	70	61
29					a 35	47	a 60	61	a 76	65	70	63
30					--	48	64	62	71	66	70	64
31					--	a 42	--	62	--	67	65	--
Average					--	38	51	58	71	70	70	61

a Observation made between 2 p. m. and 8 p. m.

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, February to September 1952

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	54	3
2				--	--	--	19	24	1
3				--	--	--	17	50	a 2
4				--	--	--	17	100	a 5
5				--	--	--	17	36	2
6				--	--	--	18	22	1
7				--	--	--	20	29	2
8				--	--	--	22	29	2
9				--	--	--	22	31	2
10				--	--	--	23	30	2
11				--	--	--	23	68	4
12				--	--	--	27	92	7
13				--	--	--	25	51	3
14				--	--	--	27	45	3
15				--	--	--	24	31	2
16				--	--	--	26	49	3
17				--	--	--	26	63	4
18				--	--	--	23	45	3
19				--	--	--	26	36	2
20				--	--	--	26	25	2
21				--	--	--	26	40	b 3
22				--	--	--	22	200	a 12
23				--	--	--	20	159	9
24				--	--	--	20	73	4
25				--	--	--	22	45	3
26				19	150	a 8	22	52	3
27				21	56	3	22	64	4
28				21	33	2	28	84	6
29				22	23	1	26	52	4
30				--	--	--	26	52	4
31				--	--	--	29	74	6
Total				83	--	14	711	--	113

	April			May			June		
1	32	153	13	778	15,600	32,800	22	480	a 28
2	42	236	27	259	7,940	s 6,050	26	465	33
3	43	228	26	82	4,600	sa 1,400	20	386	21
4	38	160	16	104	4,000	sa 1,300	21	381	22
5	35	152	14	42	2,250	255	21	370	21
6	34	154	14	33	1,000	89	19	350	18
7	31	132	11	31	1,000	84	18	338	16
8	31	150	12	29	706	55	19	310	16
9	31	136	11	27	555	40	20	292	16
10	31	98	8	27	407	30	19	290	15
11	29	96	8	28	380	29	17	297	14
12	29	85	7	26	360	25	15	260	10
13	29	70	5	25	340	23	13	235	8
14	30	120	10	25	318	21	13	272	10
15	28	114	9	25	242	16	12	283	9
16	27	110	8	149	7,000	s 3,560	10	242	6
17	29	130	10	188	6,800	sa 3,600	10	224	6
18	29	530	41	212	6,900	sa 4,200	9.8	225	6
19	34	1,300	sb 140	80	3,830	s 867	8.8	200	5
20	114	6,300	a 1,900	49	2,320	307	9.0	232	6
21	60	3,250	s 603	37	1,820	182	9.0	143	3
22	43	1,120	130	47	2,100	sb 320	8.8	138	3
23	41	830	92	125	5,100	sb 2,000	8.5	174	4
24	32	550	48	58	4,520	708	8.5	150	3
25	33	354	32	110	5,800	sb 1,900	8.5	180	4
26	29	318	25	104	4,290	s 1,280	8.8	195	5
27	29	274	21	122	5,100	sb 1,900	28	1,500	sb 480
28	29	248	19	36	2,120	206	145	7,100	sa 3,300
29	31	266	22	29	1,450	114	21	1,700	96
30	165	4,700	s 9,030	24	830	54	13	550	19
31	--	--	--	22	550	33	--	--	--
Total	1,218	--	12,312	2,933	--	63,448	581.7	--	4,203

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, February to September 1952--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.....	12	362	12	9.2	540	13	3.9	120	
2.....	8.5	275	6	7.8	200	b4	4.1	120	
3.....	7.8	198	4	7.2	156	3	3.2	117	
4.....	7.8	177	4	6.5	194	3	3.4	119	
5.....	8.0	170	4	6.2	275	5	2.6	109	
6.....	8.0	189	4	126	6,400	sb3,400	2.6	104	1
7.....	8.0	188	4	100	7,200	s2,170	2.4	97	
8.....	13	220	a8	30	3,300	267	2.2	95	
9.....	10	150	4	13	1,060	37	2.0	100	
10.....	6.0	60	1	8.8	470	11	2.0	120	
11.....	5.8	30	(t)	7.4	420	8	1.3	96	
12.....	6.0	50	1	15	550	22	1.3	--	
13.....	10	120	3	40	3,480	s553	1.1	86	
14.....	241	8,810	s5,920	31	2,400	b200	1.0	67	
15.....	220	5,420	s3,320	20	2,600	140	1.3	74	
16.....	95	4,040	1,040	12	900	b30	1.3	60	
17.....	64	3,700	639	7.6	390	8	1.1	54	
18.....	65	2,400	a420	5.4	242	4	1.0	56	
19.....	81	1,190	260	4.6	176	2	1.0	58	
20.....	38	1,130	116	4.4	163	2	1.4	52	
21.....	23	980	61	15	548	s122	1.3	50	(t)
22.....	16	700	30	102	5,050	s1,600	1.1	51	
23.....	11	544	16	20	2,290	124	1.1	50	
24.....	8.8	291	7	8.8	264	6	1.1	40	
25.....	7.6	265	5	5.4	165	2	1.1	46	
26.....	6.7	303	5	4.2	120	1	1.1	42	
27.....	6.0	312	5	3.9	110	1	1.0	41	
28.....	5.4	300	a4	5.0	532	7	.9	40	
29.....	83	3,880	s1,020	4.1	215	2	1.3	40	
30.....	95	4,580	s1,350	4.6	160	2	.8	40	
31.....	17	1,420	65	3.7	120	1	--	--	--
Total	1,194.4	--	14,338	638.8	--	8,750	51.0	--	14

Total discharge for period Feb. 26 to Sept. 30, 1952 (cfs-days) 7,410.9

Total load for period Feb. 26 to Sept. 30, 1952 (tons)..... 103,192

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly-estimated concentration graph.

b Computed from estimated concentration graph.

SAPPA CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 20, 1952	5:15 p.m.	136	51	7,600	5,000	--	62	--	86	--	99	100					SPWCM
Apr. 30	9:00 p.m.	742	44	38,400	12,800	--	34	--	54	--	99	100					SPWCM
Apr. 30	10:30 p.m.	1,070	--	18,500	6,560	--	32	--	52	--	98	100					SPWCM
May 2	5:20 p.m.	156	--	7,060	6,090	36	52	64	78	91	99	100					SPWCM
May 2	5:20 p.m.	156	--	7,060	6,220	4	8	51	76	88	99	100					SPNM
May 16	8:00 a.m.	258	48	19,000	6,810	36	42	52	65	87	99	100					SPWCM
May 17	8:00 a.m.	146	50	5,880	4,440	--	66	--	85	--	99	100					SPWCM
June 28	7:40 a.m.	205	--	7,280	5,650	--	55	--	84	--	99	100					SPWCM
July 14	4:05 a.m.	173	--	9,080	7,350	--	39	--	62	--	98	100					SPWCM
July 14	8:15 a.m.	221	--	8,550	6,630	--	57	--	84	--	99	100					SPWCM
July 14	11:20 a.m.	313	--	12,000	7,850	--	46	--	76	--	99	100					SPWCM
July 14	2:10 p.m.	305	76	8,150	8,770	35	51	66	82	93	99	100					SPWCM
July 14	2:10 p.m.	305	76	8,150	8,650	5	15	54	77	92	99	100					SPNM
July 14	7:00 p.m.	284	66	7,810	6,690	--	54	--	82	--	99	100					SPWCM
July 29	5:45 a.m.	108	65	4,750	3,360	--	53	--	78	--	99	100					SPWCM
July 30	1:40 a.m.	176	--	8,130	4,240	--	59	--	84	--	100	--					SPWCM
July 30	3:35 p.m.	62	--	3,950	5,200	50	70	85	92	96	100	--					SPWCM
July 30	3:35 p.m.	62	--	3,950	5,230	12	33	76	91	98	100	--					SPNM
Aug. 7	6:30 a.m.	126	67	8,920	5,620	--	63	--	94	--	100	--					SPWCM
Aug. 8	6:00 p.m.	22	--	2,510	1,860	84	92	95	96	98	98	100					BWCM
Aug. 13	8:10 p.m.	67	--	11,700	10,300	--	68	--	97	--	100	--					SPWCM
Aug. 22	12:45 a.m.	175	69	9,060	6,730	--	59	--	89	--	99	100					SPWCM
Aug. 22	2:00 a.m.	180	69	7,480	6,010	--	56	--	87	--	100	--					PWCM

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 1952.
Sediment records: December 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 77°F June 29; minimum, freezing point on several days during November to March.
Sediment concentrations: Maximum daily, 9,300 ppm May 1; minimum daily, not determined.
Sediment loads: Maximum daily, 11,100 tons May 16; minimum daily, less than 0.50 ton Sept. 10-30.
EXTREMES, 1950-52.--Water temperatures: Maximum, 80°F Aug. 5, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily; 12,100 ppm June 8, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 22,600 tons June 8, 1951; minimum daily, less than 0.50 ton on several days each year.
REMARKS.--Flow affected by ice Nov. 17-27, Dec. 8 to Feb. 13, Feb. 20 to Mar. 12, Mar. 22-28. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, December 1951 to July 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Dec. 4, 1951 ...	33			--	--			334	--	--							243	0	--	--	736	8.0	
Feb. 28, 1952 ...	32			--	--			444	--	--							312	0	--	--	823	8.0	
Apr. 29	46			--	--			414	79	22							326	0	--	--	865	8.2	
May 1.....	730	28	0.10	49	7.7		15	205	14	2.5	0.3	0.4	0.04		228		154	0	18	0.5	282	7.0	
July 14	537			41	4.7		6.7	160	4.0	1.0							122	0	11	.3	266	7.8	

KANSAS RIVER BASIN--*Continued*

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

/Once-daily temperature measurement between 6 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	45	a42	--	--	a36	a50	50	a71	73	70	67
2	60	a39	--	--	a36	a33	46	54	66	73	71	57
3	60	a35	a41	--	--	a32	46	61	70	70	77	58
4	59	33	--	--	--	a32	a48	69	70	69	66	60
5	a53	a37	--	a40	--	a32	46	64	70	70	67	64
6	53	a44	37	--	a38	32	54	62	69	71	67	66
7	51	a45	a57	a41	a36	a34	a60	60	74	65	70	64
8	49	a46	--	--	a39	34	57	62	a72	70	69	61
9	51	a43	a36	--	a42	a34	a49	58	70	64	67	62
10	53	a46	--	a45	a42	a38	43	55	72	66	66	64
11	52	43	--	--	a47	a38	47	53	74	69	67	66
12	56	a47	a36	a36	a40	a36	49	52	75	75	64	65
13	55	a45	--	--	a41	a38	--	57	74	70	68	65
14	58	a48	--	a31	38	a37	49	59	74	61	72	60
15	53	a40	--	--	37	a38	a53	63	75	63	70	55
16	a51	a33	--	36	a43	a39	49	50	68	69	a74	60
17	53	32	--	--	a41	--	a57	53	66	73	70	61
18	48	35	--	--	--	--	a61	55	69	76	71	60
19	a59	--	--	a37	--	a50	a64	54	67	74	72	54
20	a51	a34	--	--	--	a39	56	54	71	76	75	57
21	52	40	--	a36	--	a34	68	59	70	73	70	54
22	a51	--	--	--	--	a32	a53	a65	74	70	66	51
23	a50	--	--	a38	a32	a32	53	53	73	70	67	50
24	49	--	--	--	a32	a32	50	65	72	70	69	55
25	49	--	--	--	a32	a32	a63	66	71	72	--	58
26	42	a41	--	a36	a32	33	a65	73	70	74	68	54
27	42	--	--	--	a32	a36	--	63	--	74	71	58
28	48	--	--	--	a38	a45	a69	62	73	72	71	53
29	49	42	--	--	a34	a54	a62	62	77	66	68	55
30	a47	--	--	a34	--	a55	a63	63	72	65	67	56
31	42	--	--	--	--	45	--	a73	--	69	74	--
Average	52	--	--	--	--	37	55	60	71	70	69	59

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

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

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	73	330	65	43			34		
2	72	321	62	42			34		
3	69	300	56	42			33		
4	68	258	47	41			33	94	8
5	65	176	31	41	73	8	32		
6	65	171	30	40			32		
7	64	163	28	40			31		
8	63	148	25	41			30		
9	62	150	25	41			28	102	
10	60	158	26	41			28	--	
11	60	152	25	42			30	--	
12	58	140	22	42			32	92	
13	58	130	20	42	76	9	32	--	
14	56	112	17	43			26	--	
15	54	103	15	42			24	--	
16	54	92	13	41			24	--	
17	52			38	61	6	24	--	
18	52			38	78	8	24	--	
19	51			40	121	13	24	--	
20	51			42	130	15	26	--	e6
21	50	85	11	40	106	11	26	--	
22	49			38	--		26	--	
23	48			36	--		28	--	
24	47			36	--		28	--	
25	47			36	--		26	--	
26	47			34	67	e7	26	--	
27	47			34	--		26	--	
28	46	88	11	35	--		26	--	
29	45			35	88		28	--	
30	45			35	--		28	--	
31	44			--	--	--	28	--	
Total	1,722	--	672	1,181	--	251	877	--	200

Day	January			February			March		
1	26	--		34	173		32	125	11
2	26	--		34	104		30	128	10
3	26	--		34	--	a12	24	132	8
4	26	30		34	--		22	112	7
5	26	104		34	--		22	124	7
6	26	--		32	222	19	22	160	b10
7	26	90		32	208	18	24	150	b10
8	26	--		32	272	24	28	102	8
9	26	--		32	312	27	28	134	10
10	28	71		32	182	16	30	126	10
11	28	--	a6	34	164	15	30	122	10
12	28	93		34	150	14	30	170	b14
13	28	--		34	142	13	30	138	11
14	30	86		36	145	14	34	128	12
15	30	--		34	114	10	37	130	13
16	30	150		34	120	11	37	134	13
17	30	--		34	110	10	36	136	13
18	30	--		34	120	b11	35	148	14
19	30	86		34	130	b12	38	200	20
20	30	--		34	140	13	37	190	b18
21	28	69		32	150	c13	39	180	19
22	26	--		28	170	c13	30	188	15
23	24	120	8	28	188	14	22	190	11
24	22	150	c9	28	160	12	24	194	12
25	24	1,200	c80	28	140	11	24	200	b13
26	26	1,100	b80	28	168	13	26	210	15
27	28	200	b15	30	184	15	32	180	b16
28	31	116	10	32	180	16	38	300	31
29	30	110	c9	32	138	12	41	300	33
30	30	97	8	--	--	--	47	300	38
31	32	100	c9	--	--	--	52	330	46
Total	857	--	360	938	--	406	981	--	478

e Estimated.
a Computed on basis of infrequent samples.
b Computed from partly-estimated concentration graph.
c Computed from estimated concentration graph.

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	52	397	56	348	9,300	s 9,890	46	1,040	129
2	62	447	75	119	6,100	sb 2,400	44	870	103
3	66	453	81	92	2,300	sb 600	48	872	113
4	62	463	78	60	3,130	s 522	43	850	99
5	59	382	61	47	1,660	211	41	884	98
6	56	381	58	54	1,130	165	41	764	84
7	54	392	57	47	750	95	41	723	80
8	52	420	c 60	47	715	91	39	671	71
9	52	320	c 44	43	670	78	37	647	65
10	50	275	37	42	560	64	35	625	59
11	49	260	34	41	447	49	33	572	51
12	49	233	31	40	476	51	31	560	47
13	47	240	b 30	39	499	52	30	558	45
14	47	245	31	68	1,900	sc 420	29	505	40
15	46	242	30	72	1,150	223	28	524	40
16	47	247	31	526	7,150	s 11,100	26	495	35
17	46	260	32	185	5,400	s 2,850	25	455	31
18	45	263	32	82	2,790	618	25	412	28
19	45	269	33	68	1,590	292	24	400	26
20	47	330	42	58	1,050	164	24	390	25
21	62	950	b 160	56	880	133	24	410	26
22	50	1,050	142	66	1,100	b 200	23	275	17
23	51	485	67	49	840	111	22	292	17
24	49	408	54	48	860	111	20	266	14
25	48	402	52	47	740	94	20	250	14
26	47	390	49	108	2,400	700	21	500	sc 32
27	47	345	44	114	3,200	985	25	1,220	82
28	47	331	42	68	2,650	486	21	600	34
29	47	352	45	54	2,180	318	15	477	19
30	94	2,120	s 1,620	51	1,680	231	16	320	14
31	--	--	--	49	1,150	152	--	--	--
Total	1,575	--	3,208	2,788	--	33,456	897	--	1,538

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	17	322	15	7.6	164	3	3.1	107	1
2	16	340	b 15	7.4	195	4	18	512	s 26
3	16	328	14	6.7	150	3	10	316	8
4	16	300	b 13	6.5	148	3	6.8	196	4
5	17	372	17	6.8	182	3	4.8	208	3
6	15	380	15	11	800	sb 40	3.5	234	2
7	15	240	10	12	1,400	45	2.6	140	1
8	15	247	10	6.8	700	13	2.3	162	1
9	14	213	8	6.0	265	4	2.0	133	1
10	13	214	8	5.8	234	4	1.4	104	
11	13	203	7	6.7	238	4	1.2	100	
12	13	200	b 7	5.5	220	3	1.1	69	
13	34	1,410	s 670	13	1,600	sb 70	.9	61	
14	305	8,780	s 8,500	9.2	520	13	.9	68	
15	30	2,940	s 254	6.5	316	6	.9	50	
16	40	1,530	s 172	7.0	212	4	.9	83	
17	51	2,700	c 380	6.0	231	4	1.0	66	
18	32	2,410	s 215	5.5	268	4	.7	59	
19	20	1,420	77	4.8	185	2	.7	55	
20	16	580	25	4.4	181	2	.8	65	(t)
21	13	347	12	3.9	140		.7	62	
22	16	355	15	3.7	128		.7	59	
23	15	324	13	3.5	131		.8	89	
24	13	312	11	3.5	114		1.0	108	
25	12	260	8	3.5	117		.7	88	
26	11	207	6	3.5	117	1	.7	85	
27	9.8	192	5	2.9	132		.6	116	
28	8.6	164	4	4.0	121		.4	89	
29	9.6	225	6	3.5	131		.4	43	
30	9.6	184	5	3.5	115		.3	53	
31	8.6	164	4	3.4	101		--	--	--
Total	834.2	--	10,521	184.1	--	245	69.9	--	51

Total discharge for year (cfs-days) 12,904.2
Total load for year (tons) 51,386

s Computed by subdividing day.
t Less than 0.50 ton.
b Computed from partly-estimated concentration graph.
c Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, April to July 1952
(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	Water 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. 30, 1952	9:20 p.m.	271	54	14,000	9,740	--	34	--	59	--	99	100					SPWCM
May 1	1:25 a.m.	643	--	18,400	6,540	--	45	--	65	--	99	100					SPWCM
May 1	3:50 a.m.	748	--	8,950	5,910	--	50	--	75	--	99	100					SPWCM
May 1	2:50 p.m.	187	--	14,800	9,380	--	42	--	65	--	100	--					PWCM
May 16	6:00 a.m.	676	49	13,300	9,870	--	33	--	56	--	98	100					SPWCM
May 16	9:40 a.m.	786	50	6,940	10,400	38	52	66	78	88	98	100					SPWCM
May 16	9:40 a.m.	786	50	6,940	10,200	3	7	57	76	88	98	100					SPNM
May 16	6:30 p.m.	601	52	5,810	4,220	--	64	--	77	--	99	100					SPWCM
May 17	10:15 a.m.	213	--	5,740	3,830	--	58	--	80	--	100	--					SPWCM
July 14	1:00 a.m.	374	64	12,800	6,630	--	44	--	65	--	99	100					SPWCM
July 14	6:05 a.m.	551	62	14,800	5,240	--	50	--	70	--	98	100					SPWCM
July 14	11:00 a.m.	345	61	5,940	4,300	--	59	--	79	--	99	100					SPWCM
July 14	2:50 p.m.	222	67	5,510	5,380	43	51	60	70	87	99	100					SPWCM
July 14	2:50 p.m.	222	67	5,510	5,330	13	31	53	66	84	99	100					SPNM

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.

LOCATION.--At highway bridge, 500 feet upstream from gaging station, 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 1952.
Sediment records: March 1947 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 89°F June 14; minimum, freezing point Dec. 28 and probably on many other days during winter months.
Sediment concentrations: Maximum daily, 8,500 ppm May 3; minimum daily, not determined.
Sediment loads: Maximum daily, 30,200 tons July 14; minimum daily, less than 0.50 ton Sept. 29, 30.
EXTREMES, 1947-52.--Water temperatures (1949-52): Maximum, 89°F June 14, 1952; 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 0.50 ton on many days during 1948-50, 1952.
REMARKS.--Flow affected by ice Dec. 14 to Feb. 3, Feb. 20 to Mar. 7, Mar. 22, 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
(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	a59	--	--	--	a36	36	52	68	71	88	a75	73
2	a60	38	--	--	--	--	a46	60	a69	80	85	70
3	a60	--	45	37	--	--	--	66	a71	82	82	72
4	a60	38	--	--	38	35	52	70	78	34	--	77
5	--	a36	--	34	--	--	a49	a66	79	--	82	71
6	54	--	--	--	--	34	--	65	79	78	82	a70
7	57	a38	--	--	--	35	--	a60	80	74	80	a69
8	59	--	--	a34	--	37	--	a61	--	77	77	72
9	a55	45	--	--	a38	35	--	a60	77	a65	a71	--
10	--	a40	--	--	--	38	--	a55	82	86	81	a69
11	a56	--	37	a34	--	39	--	a51	82	85	72	--
12	a58	a44	--	--	39	--	--	a55	85	88	76	a70
13	61	--	--	--	--	39	48	a57	87	78	86	--
14	63	--	--	--	--	37	54	a58	89	66	86	a71
15	58	43	--	--	a38	43	52	70	--	70	a77	--
16	--	--	--	37	--	36	48	56	80	a68	a83	a68
17	a51	--	--	--	--	52	57	54	78	a73	80	--
18	54	--	--	38	38	a42	--	a55	78	80	82	a68
19	--	a34	--	--	--	--	a55	a59	--	a76	a80	--
20	a48	--	--	--	36	--	56	65	85	--	--	68
21	--	a38	--	--	--	--	60	--	a73	a75	a75	--
22	a45	--	--	--	--	--	52	a58	81	82	a69	--
23	a45	--	--	--	38	36	58	a58	88	80	74	75
24	a49	--	--	--	--	35	60	a60	85	84	a69	--
25	a51	--	34	38	36	a35	65	a63	84	a80	80	74
26	--	a37	--	--	--	40	67	a65	a73	a76	--	--
27	a45	--	--	--	44	45	71	69	80	--	85	74
28	47	--	a32	40	a38	50	--	69	a74	74	78	--
29	a50	44	--	--	--	55	65	a60	79	76	--	75
30	48	--	37	--	--	55	58	72	84	--	a70	--
31	46	--	--	a34	--	58	--	a60	--	a71	a74	--
Average	54	--	--	--	--	--	--	62	80	78	78	--

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

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	156	361	152	91			80		
2	152	356	146	89			80		
3	149	351	141	91			80		
4	141	289	110	90			79		
5	132	236	84	89	71	17	79		
6	133	219	79	88			78	110	a 22
7	133	185	66	88			75		
8	131	198	70	88			74		
9	130	190	67	88			53		
10	129	180	a 65	88			70		
11	125	173	58	90	92	22	73		
12	125	198	67	91			65	98	
13	122	187	62	94	--		74	--	
14	120	155	50	96	87		50	--	
15	120	157	51	93	73		44	--	
16	119	140	a 44	90	--	e 20	44	--	
17	116	118	37	83	--		44	--	
18	114	107	33	77	--		47	--	
19	114	110	a 34	74	98		50	--	
20	109	79	23	88	--		51	76	
21	104	80	a 22	90			50	--	e 10
22	101	79	22	88			50	--	
23	97	71	19	82			51	--	
24	97	78	20	79			52	--	
25	97	78	20	86	110	a 24	52	36	
26	97	85	a 22	82			53	--	
27	96	90	23	82			53	--	
28	96	70	18	80			55	58	
29	96	67	17	80			56	--	
30	96	73	19	80			56	93	
31	94	71	18	--	--	--	55	--	
Total	3,641	--	1,659	2,595	--	619	1,873	--	442

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	51	--		67	114		40	132	14
2	51	--		69	--		43	120	a 14
3	50	72	e 10	63	--		45	--	e 13
4	52	--		67	170		42	108	12
5	54			65	--	e 26	50	185	25
6	54			66	--		59	198	32
7	54	120	a 17	65	108		67	137	25
8	54			73	--		78	189	40
9	54			62	167		79	168	36
10	53			73	--		77	143	30
11	55	73		70	--		69	184	34
12	57	--		64	130		71	--	e 34
13	58	--		67	--		70	148	28
14	60	--		62	110		74	130	26
15	61	--		62	132	e 20	64	128	22
16	62	80		58	--		76	136	28
17	61	--	e 13	58	--		72	149	29
18	60	104		58	95		76	140	29
19	60	--		58	--		76	141	29
20	55	--		48			77	140	a 30
21	52	--		38			77	--	e 24
22	39	--		42			70	--	e 20
23	40	--		42			65	440	a 75
24	41	91	10	42	140	a 15	79	415	88
25	40	132	14	28			71	178	34
26	44	140	a 17	29			91	210	52
27	51	150	a 20	40			95	308	79
28	65	187	33	41			90	250	61
29	63	160	a 28	42			90	240	a 60
30	67	130	a 24	--	--	--	82	306	68
31	76	112	23	--	--	--	90	378	92
Total	1,694	--	480	1,619	--	590	2,205	--	1,183

e Estimated.

a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	94	379	96	545	5,930	s15,300	100	1,270	343
2	96	326	84	1,420	7,490	s27,900	96	1,130	293
3	111	394	118	556	8,500	s13,200	94	1,100	279
4	123	472	157	248	4,220	2,820	95	970	249
5	122	450	148	216	3,100	a1,800	90	910	221
6	115	375	116	168	2,390	1,080	86	728	169
7	110	385	114	141	2,470	560	85	688	158
8	106	390	a110	130	1,090	382	83	650	a150
9	99	350	a95	124	990	331	77	608	126
10	95	302	77	115	920	286	75	600	121
11	92	280	a70	110	789	234	74	541	108
12	89	255	61	107	751	217	74	516	103
13	87	213	50	107	712	206	68	485	89
14	84	262	59	103	635	176	64	460	79
15	82	227	50	115	810	251	58	460	a70
16	83	245	55	215	3,650	s2,730	53	423	60
17	83	280	63	774	6,650	13,900	51	391	54
18	82	--	e65	342	5,440	5,020	49	379	50
19	83	384	86	321	5,020	4,350	48	360	a46
20	178	3,270	s2,180	214	3,890	2,250	46	370	46
21	182	1,890	s954	157	2,700	1,140	46	415	52
22	183	3,100	a1,500	142	2,050	786	47	330	42
23	124	1,610	539	132	1,540	549	43	327	38
24	113	1,900	580	140	1,800	sa750	41	336	37
25	107	1,820	526	183	2,200	1,090	39	280	29
26	96	820	212	130	1,300	456	38	274	28
27	94	670	170	242	3,350	2,190	42	450	51
28	88	680	162	264	4,190	2,990	50	1,080	146
29	87	630	148	184	4,500	2,240	139	1,740	s786
30	87	590	138	115	2,340	726	113	2,650	808
31	--	--	--	108	1,630	475	--	--	--
Total	3,175	--	8,783	7,868	--	106,385	2,064	--	4,831

Day	July			August			September		
1	57	1,700	262	90	2,720	s692	14	308	12
2	38	1,020	105	45	1,060	129	14	265	10
3	34	646	59	31	608	51	17	345	16
4	30	511	41	27	460	a34	22	330	20
5	28	480	a36	24	375	24	17	260	a12
6	35	506	48	23	321	20	14	248	9
7	34	478	44	24	380	sa36	12	284	9
8	28	350	30	152	5,900	sa2,400	9.7	188	5
9	28	350	26	79	4,360	930	88.2	170	a4
10	32	412	36	45	2,580	313	6.6	212	4
11	32	405	35	31	2,880	241	6.0	170	a3
12	25	335	23	28	1,340	101	5.8	129	2
13	45	1,130	s179	25	780	53	5.4	120	a2
14	1,520	7,580	s30,200	50	1,300	sa200	5.4	119	2
15	1,490	5,760	s22,300	64	2,000	346	5.0	--	
16	373	5,700	5,740	42	1,400	159	4.6	80	
17	222	3,550	2,130	32	1,500	130	4.2	--	
18	182	2,480	1,220	24	1,040	67	3.8	90	
19	140	2,020	763	21	676	38	3.2	--	
20	122	2,000	a650	18	469	23	3.2	84	
21	113	1,970	600	16	391	17	3.4	--	e1
22	79	1,000	213	16	323	14	3.0	--	
23	62	680	114	62	1,400	s377	3.2	85	
24	55	617	92	54	3,000	437	3.2	--	
25	49	500	66	27	1,730	126	3.6	87	
26	43	403	47	18	950	a46	3.2	--	
27	38	360	a36	15	545	22	2.6	94	
28	32	320	28	13	464	16	2.2	--	
29	31	388	32	15	--	e20	2.2	70	(t)
30	57	--	e280	19	418	21	1.6	67	(t)
31	123	3,380	1,120	15	393	16	--	--	--
Total	5,177	--	66,555	1,145	--	7,099	209.3	--	125

Total discharge for year (cfs-days) 33,265.3
Total load for year (tons) 198,751

e Estimated.
s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from partly-estimated concentration graph.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 20, 1952	3:00 p.m.	310	56	7,780	5,810	--	47	--	73	--	99	100	--				SPWCM
Apr. 22	2:00 p.m.	188	52	3,580	2,460	--	67	--	86	--	99	100	--				SPWCM
May 1	12:20 p.m.	318	65	4,120	8,340	--	35	--	55	--	98	--	--				SPWCM
May 1	7:00 p.m.	1,190	66	16,800	6,850	--	36	--	58	--	98	99	100				SPWCM
May 2	6:30 a.m.	1,860	55	6,340	4,520	--	61	--	71	--	94	97	98				SPWCM
May 2	3:50 p.m.	1,210	60	7,940	10,000	30	44	56	67	81	97	99	--				SPWCM
May 2	3:50 p.m.	1,210	60	7,940	10,400	4	7	56	68	84	97	99	--				SPNM
May 17	12:20 a.m.	545	52	7,600	10,700	--	43	--	63	--	95	97	99				SPWCM
May 17	12:50 a.m.	569	52	8,520	5,380	--	45	--	65	--	96	98	100				SPWCM
May 17	11:15 a.m.	988	--	6,400	5,930	30	44	58	71	85	98	--	--				SPWCM
May 17	11:15 a.m.	988	--	6,400	6,290	5	12	59	72	85	97	98	--				SPNM
May 17	7:00 p.m.	645	53	5,720	4,120	--	67	--	81	--	97	--	--				SPWCM
May 28	6:10 p.m.	260	67	4,610	3,480	--	69	--	90	--	99	--	--				SPWCM
July 14	3:00 a.m.	1,900	--	8,510	5,900	--	43	--	62	--	96	--	--				SPWCM
July 14	4:00 p.m.	1,430	66	7,780	11,500	36	47	59	70	86	97	--	--				SPWCM
July 14	4:00 p.m.	1,430	66	7,780	11,600	4	7	46	66	84	97	--	--				SPNM
July 15	3:00 p.m.	1,120	70	6,140	4,230	--	66	--	80	--	98	--	--				SPWCM
July 31	8:45 a.m.	120	71	2,850	5,140	--	64	--	83	--	99	--	--				SPWCM
Aug. 8	5:30 p.m.	136	77	5,380	4,240	--	70	--	90	--	100	--	--				SPWCM
Aug. 24	10:00 a.m.	54	69	3,460	2,320	71	87	95	98	99	100	--	--				BWCM

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 1948 to September 1952 (discontinued).
Sediment records: March 1947 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 87°F June 12, 20; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 9,110 ppm May 1; minimum daily, not determined.
Sediment loads: Maximum daily, 15,500 tons May 1; minimum daily, less than 0.50 ton Sept. 12-30.
EXTREMES, 1947-52.--Water temperatures (1948-52); Maximum, 87°F June 12, 20, 1952; 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 0.50 ton on many days during 1947-50, 1952.
REMARKS.--Flow affected by ice Dec. 8 to Feb. 13, Feb. 19-26, Mar. 1-12, 22-27. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, water year October 1951 to September 1952
(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	--	a36	--	--	a40	32	45	55	64	--	--	64
2	60	--	--	--	a38	--	41	54	66	68	--	54
3	56	a41	a42	--	--	a32	a48	a68	68	--	--	59
4	56	--	--	a32	a43	a32	42	a74	--	70	a75	62
5	55	a40	a39	--	--	--	--	65	--	73	67	a76
6	--	--	--	a33	a41	a33	--	61	69	--	69	--
7	a53	a42	a35	--	--	a38	47	62	--	67	70	a74
8	--	--	--	a35	a43	a39	53	61	a79	--	71	63
9	50	a47	--	--	32	a36	38	a59	65	64	69	--
10	50	--	--	a34	--	34	34	53	72	68	--	64
11	52	a50	--	--	a45	33	--	--	72	68	69	69
12	55	--	--	a34	37	a36	a47	a68	a87	--	63	66
13	--	--	--	--	--	a42	--	57	76	68	71	68
14	a42	--	--	a35	--	a36	41	60	77	62	72	61
15	a61	a39	--	--	34	--	--	63	a85	66	73	57
16	a50	--	--	a36	--	--	--	56	a71	67	72	62
17	a52	--	a33	--	40	--	a58	a57	62	69	a75	63
18	a53	--	--	a34	--	--	a62	--	69	73	69	61
19	a48	--	a32	--	--	a58	54	52	67	75	73	56
20	--	--	--	a34	a37	--	52	52	a87	--	74	58
21	a46	a40	a32	--	32	36	--	60	73	73	70	--
22	--	--	--	--	--	--	49	--	--	--	67	53
23	a53	--	--	a32	--	a33	47	57	74	--	67	54
24	a54	--	--	--	--	33	52	60	a82	70	68	56
25	a59	a40	--	a35	a36	32	52	60	a82	a85	69	54
26	--	--	a32	--	32	a43	a69	a75	70	--	70	55
27	a49	a41	a33	--	--	--	58	a68	a80	--	74	58
28	--	--	a38	--	--	--	a67	58	71	--	74	--
29	a58	a46	a35	--	32	--	a61	60	--	--	70	56
30	a42	--	--	a38	--	--	55	--	72	65	69	59
31	a43	--	a32	--	--	--	--	62	--	68	a72	--
Average	--	--	b33	b33	--	--	--	61	74	--	70	61

a Observation made between 12 m. and 7 p.m.
b Includes estimated temperature, 32°F on missing days.

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1951 to September 1952

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	43	214	25	24			18		
2	42	230	26	24	15	1	18		
3	40	104	11	24			18		
4	40	62	7	23			18	16	1
5	38	56	6	22			18		
6	37			22			18		
7	36			22			17		
8	36	31	3	22			16		
9	35			22			15	--	e 1
10	34			22	50	3	15		
11	34			22			16		
12	33			22			17		
13	32	17	1	22			17		
14	31			22			15	24	1
15	30			21			15		
16	28			22			15		
17	28			20			16	36	2
18	27	16	1	19	60	3	16	34	a 1
19	26			21			14		
20	26			23			12		
21	26			21			10		
22	25			19			10		
23	25	20	1	19			10	32	b 1
24	25			19			10		
25	25			19	38	2	11		
26	24			18			11		
27	24			18			11		
28	24			18			11		
29	24	10	1	17			12		
30	24			17			13	18	1
31	24			--	--	--	13		
Total	946	--	111	626	--	72	446	--	32

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	13			15	58	2	16	62	3
2	13	--	e 1	15	146	6	14	90	a 3
3	13			16	80	a 3	12	90	3
4	13			16	45	2	12	115	4
5	13			16	70	c 3	12	90	a 3
6	13			17	96	4	12	53	2
7	13			17	100	a 5	12	60	2
8	14	35	1	18	110	5	12	58	2
9	14			19	105	5	12	55	a 2
10	14			20	100	a 5	12	73	2
11	14			21	75	4	13	67	2
12	16			19	87	4	14	91	3
13	18			21	90	c 5	15	100	4
14	21			20	280	a 15	15	65	3
15	22			23	74	5	15	37	2
16	22			22	70	a 4	15	36	a 1
17	22	29	2	20	84	4	16	46	2
18	21			21	79	4	15	47	2
19	21			19	95	a 5	15	40	2
20	20			17	90	4	15	35	1
21	19			15	80	3	15	40	2
22	16			15	120	c 5	14	50	a 2
23	14			15	156	6	14	46	2
24	12			15	140	a 6	14	26	1
25	12			15	93	4	14	95	4
26	14	50	b 2	16	64	3	14	105	4
27	14			19	80	a 4	18	90	4
28	14			18	70	3	19	85	a 4
29	14			17	55	2	19	84	4
30	14			--	--	--	20	85	a 5
31	15			--	--	--	21	80	a 4
Total	488	--	51	517	--	130	456	--	84

e Estimated.
a Computed from partly-estimated concentration graph.
b Computed on basis of infrequent samples.
c Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	20	76	4	473	9,110	s 15,500	20	900	a 50
2	20	64	3	243	6,150	s 4,800	17	188	9
3	20	52	3	100	3,400	s 1,040	15	158	6
4	19	52	3	41	1,260	139	14	120	4
5	18	45	2	30	460	37	14	120	a 4
6	18	40	a 2	26	261	18	14	147	6
7	17	48	2	23	204	13	13	155	5
8	17	50	2	21	177	10	14	141	5
9	16	43	2	20	139	8	13	179	6
10	17	27	1	19	132	7	12	174	6
11	16	20	1	19	118	6	12	178	6
12	17	23	1	18	141	7	12	141	5
13	18	21	a 1	17	176	8	12	178	6
14	18	34	2	17	167	8	12	150	5
15	18	24	1	16	159	7	11	132	4
16	19	27	1	15	120	5	10	150	4
17	19	29	1	15	128	5	10	150	4
18	19	24	1	15	140	a 6	10	164	4
19	119	40	2	15	140	a 6	10	143	4
20	66	3,100	sa 800	15	134	5	9.5	127	3
21	20	270	14	14	121	5	9.5	141	4
22	18	150	7	15	89	4	10	160	a 4
23	15	89	4	15	116	5	9.2	162	4
24	14	86	3	15	135	5	8.1	147	3
25	13	82	3	13	129	4	8.1	160	4
26	13	94	3	13	90	3	8.1	139	3
27	12	90	3	33	2,480	s 30	9.2	142	4
28	12	101	3	20	355	19	8.6	161	4
29	11	102	3	18	211	10	8.9	165	4
30	42	2,080	s 1,220	17	215	10	8.4	190	a 4
31	--	--	--	17	167	8	--	--	--
Total	581	--	2,090	1,348	--	22,008	342.6	--	184

Day	July			August			September		
1	7.3	157	3	6.6	134	2	4.7	190	2
2	7.1	143	3	6.1	96	2	4.0	172	2
3	6.6	140	a 2	6.1	80	c 1	3.6	151	2
4	6.6	147	3	5.6	91	1	3.4	144	1
5	6.1	150	2	18	3,330	s 206	3.0	120	1
6	6.3	170	a 3	15	1,300	sc 75	2.6	121	1
7	6.3	82	2	20	2,300	sa 170	2.3	118	1
8	6.8	106	a 2	12	510	16	1.9	118	1
9	6.6	135	2	8.4	280	6	1.6	119	a 1
10	5.8	128	2	6.8	222	4	1.8	113	1
11	5.4	122	2	14	2,230	s 124	1.9	99	1
12	5.4	500	sc 10	7.6	390	8	1.8	98	(t)
13	55	3,760	s 581	11	1,160	s 44	1.8	86	(t)
14	211	5,230	s 3,340	7.3	320	6	1.8	83	(t)
15	199	3,500	1,880	5.4	215	3	1.6	83	(t)
16	225	3,600	2,190	4.9	181	2	1.6	88	(t)
17	109	3,100	912	4.7	160	a 2	1.8	94	(t)
18	48	2,200	285	4.2	127	1	1.1	93	(t)
19	51	2,100	289	4.0	135	1	1.1	91	(t)
20	36	1,840	179	3.8	140	1	1.5	102	(t)
21	25	1,300	88	148	3,120	s 2,050	1.5	81	(t)
22	19	870	45	52	3,510	s 527	1.4	90	(t)
23	15	2,400	c 95	9.2	1,080	s 28	1.2	102	(t)
24	12	1,200	a 40	7.1	720	s 16	1.1	90	(t)
25	11	810	s 38	4.9	301	4	1.2	92	(t)
26	9.0	700	sc 28	4.0	218	2	1.1	69	(t)
27	9.5	600	sc 20	3.8	197	2	1.1	75	(t)
28	8.1	190	4	6.5	500	cs 15	1.1	84	(t)
29	7.8	154	3	9.2	600	sa 17	.7	82	(t)
30	7.8	134	3	5.1	260	4	.8	82	(t)
31	7.3	137	3	3.8	181	2	--	--	--
Total	1,142.8	--	10,059	425.1	--	3,342	56.1	--	20

Total discharge for year (cfs-days) 7,374.6
Total load for year (tons) 38,192

s Computed by subdividing day.
t Less than 0.50 ton.
a Computed from partly-estimated concentration graph.
c Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

PRAIRIE DOG CREEK AT NORTON, KANS.--Continued

Particle-size analyses of suspended sediment, April to August 1952
(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	Water 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. 20, 1952....	9:05 a.m.	80	52	3,060	1,920	--	70	--	94	--	97	97	100		--	--	SPWCM
Apr. 30	9:40 p.m.	91	--	11,000	7,660	--	46	--	74	--	98	98	99		100	--	SPWCM
Apr. 30	11:30 p.m.	436	--	16,600	6,670	--	45	--	69	--	98	99	100		--	--	SPWCM
May 1.....	12:15 a.m.	433	--	14,100	7,570	37	50	60	74	86	93	94	95		96	98	SPWCM
May 1	12:15 a.m.	433	--	14,100	15,100	2	3	12	66	83	92	93	94		95	98	SPNM
May 1.....	2:25 a.m.	146	--	6,960	5,240	--	62	--	86	--	100	--	--		--	--	SPWCM
May 1.....	10:40 a.m.	215	--	8,980	6,450	--	56	--	83	--	99	100	--		--	--	SPWCM
May 1	7:20 p.m.	1,210	56	24,400	7,590	--	36	--	57	--	93	94	96		97	100	SPWCM
May 1	9:00 p.m.	1,570	--	12,500	9,840	--	45	--	70	--	96	97	99		100	--	SPWCM
May 2	2:00 a.m.	534	--	8,680	7,050	--	51	--	73	--	99	99	100		--	--	SPWCM
May 27.....	1:15 p.m.	60	--	3,660	2,540	63	74	80	82	82	82	--	--		--	--	BWCM
May 27.....	3:35 p.m.	45	68	1,960	1,720	65	71	77	82	86	89	92	--		--	--	BWCM
May 27.....	9:30 p.m.	28	65	2,800	2,250	79	81	85	87	91	93	--	--		--	--	BWCM
July 13	8:50 a.m.	121	68	4,460	3,380	--	62	--	88	--	100	--	--		--	--	SPWCM
July 14	4:35 a.m.	347	--	8,570	7,420	--	44	--	77	--	99	100	--		--	--	SPWCM
July 14.....	5:25 a.m.	457	--	8,460	5,640	--	54	--	79	--	99	100	--		--	--	SPWCM
July 14.....	1:25 p.m.	178	65	4,000	3,090	--	74	--	93	--	100	--	--		--	--	SPWCM
July 16.....	7:50 a.m.	231	67	3,890	3,120	--	72	--	92	--	100	--	--		--	--	SPWCM
July 16	3:15 p.m.	237	--	3,540	2,610	70	78	90	92	96	99	100	--		--	--	BWCM
July 17.....	6:55 a.m.	132	69	3,340	1,900	69	83	90	93	97	99	100	--		--	--	BWCM
July 18.....	6:55 a.m.	52	73	2,360	1,380	80	88	94	97	99	100	--	--		--	--	BWCM
July 19.....	8:30 a.m.	57	75	2,030	1,380	85	92	95	97	100	--	--	--		--	--	BWCM
July 25.....	9:55 a.m.	30	--	2,160	1,520	53	70	85	95	99	100	--	--		--	--	BWCM
Aug. 5	2:00 p.m.	48	--	11,000	10,100	--	59	--	83	--	99	100	--		--	--	SPWCM
Aug. 5	5:05 p.m.	26	--	4,940	3,810	--	78	--	91	--	99	100	--		--	--	SPWCM

Aug. 11, 1952...	8:40 a.m.	32	68	7,300	5,630	57	69	79	85	92	99	100	--	--	--	SPWCM
Aug. 11	10:00 a.m.	30	--	9,350	6,740	--	68	--	93	--	99	100	--	--	--	SPWCM
Aug. 21.....	9:50 a.m.	208	--	11,000	5,040	--	36	--	50	--	60	62	75	93	100	SPWCM
Aug. 21.....	11:10 a.m.	428	--	7,490	3,880	--	64	--	82	--	97	--	--	--	--	SPWCM
Aug. 21	11:58 a.m.	498	--	4,980	3,890	--	66	--	84	--	98	--	--	--	--	SPWCM
Aug. 21	1:40 p.m.	446	70	4,740	6,630	53	69	81	90	95	99	100	--	--	--	SPWCM
Aug. 21	1:40 p.m.	446	70	4,740	6,230	20	44	74	88	96	99	100	--	--	--	SPNM
Aug. 21	4:45 p.m.	223	--	4,940	9,220	--	69	--	92	--	100	--	--	--	--	SPWCM

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.

LOCATION.--At gaging station at highway bridge, half a mile northwest of Lovewell, Jewell County.
DRAINAGE AREA.-- 358 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: February 1950 to September 1952.
Sediment records: February 1950 to September 1952.
EXTREMES, 1951-52.--Water temperatures: Maximum, 85°F June 29, July 22, Aug. 10; minimum, freezing point probably on many days during December to February.
Sediment concentrations: Maximum daily, 21,500 ppm May 22; minimum daily, not determined.
Sediment loads: Maximum daily, 50,000 tons June 27; minimum daily, 1 ton on several days during September.
EXTREMES, 1950-52.--Water temperatures: Maximum 85°F June 29, July 22, Aug. 10, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 32,000 ppm Apr. 25, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 284,000 tons July 10, 1950; minimum daily, less than 1 ton on many days during 1950.
REMARKS.--Flow affected by ice Nov. 19-20, Dec. 9-11, Dec. 14 to Feb. 9, Feb. 11, 22-26, Mar. 1-7, 22-24. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to August 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Nov. 30, 1951....	30							424	313	37							626	278			1,350	7.6	
Feb. 29, 1952 ...	22							406	308	37							604	271			1,310	7.7	
May 26	42							376	249	41							534	226			1,180	7.9	
June 27	1,290	20	0.16	62	8.6		17	222	33	5.5	0.5	1.4		268	0.36		190	8	16	.5	383	7.5	
Aug. 4	6.4							181	263	23							334	186			844	7.2	

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement reading between 2 p. m. and 8 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	a 39	39	--	--	37	49	66	a 66	a 82	81	a 69
2	a 53	a 36	--	a 33	a 35	37	a 50	69	75	83	80	78
3	a 64	a 38	--	--	--	a 35	a 49	65	76	80	81	66
4	68	a 34	--	--	--	36	a 46	a 69	77	82	78	a 69
5	a 60	a 35	37	33	--	35	50	a 69	a 72	82	77	77
6	55	a 35	--	--	37	36	51	68	78	83	80	75
7	a 53	a 36	--	--	--	36	51	a 66	a 77	a 72	a 74	73
8	a 53	a 39	34	--	--	36	a 55	a 65	80	75	a 73	74
9	a 53	42	--	a 34	37	37	50	a 62	81	76	78	77
10	a 53	a 39	--	--	--	38	a 40	a 61	78	76	85	77
11	a 53	47	--	--	--	39	a 42	63	a 77	a 73	78	a 72
12	a 57	44	33	34	--	37	44	63	a 79	75	77	76
13	a 58	a 50	--	--	39	36	45	a 62	a 80	--	a 74	74
14	a 56	a 52	--	--	--	38	48	a 62	83	70	84	79
15	a 55	a 39	33	--	35	38	50	61	80	a 68	a 72	71
16	a 54	--	--	a 34	35	39	a 52	60	79	--	a 75	a 70
17	a 51	42	--	--	--	a 39	53	59	78	78	78	a 68
18	a 51	--	--	--	39	a 39	57	60	a 74	a 79	80	69
19	a 49	--	32	34	--	a 38	58	60	--	a 78	a 79	a 62
20	a 51	--	--	--	37	48	59	a 59	80	84	77	a 67
21	a 50	36	--	--	--	a 35	63	59	80	84	76	57
22	a 48	--	32	--	a 36	35	a 56	62	a 78	85	77	64
23	a 49	--	--	34	--	35	55	64	82	80	77	67
24	a 49	38	--	--	36	a 34	59	63	84	a 79	76	66
25	a 49	--	--	--	--	38	62	a 63	79	83	a 75	63
26	a 47	--	33	34	36	40	60	68	84	84	78	a 62
27	a 49	--	--	--	--	a 38	a 59	70	78	84	a 76	a 60
28	a 50	40	--	--	a 37	42	a 60	68	82	79	80	a 61
29	a 47	--	35	--	--	52	65	67	85	75	a 76	a 63
30	a 48	--	--	a 34	--	58	69	67	84	79	a 71	69
31	a 44	--	--	--	--	56	--	a 66	--	82	77	--
Average	53	--	b 33	b 32	--	39	54	64	79	79	77	69

a Observation made between 7 a. m. and 12 m.
b Includes estimated temperature, 32°F, on missing days.

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	36	88	9	25	71	5	30	122	
2	37	119	12	24	70	4	30	--	
3	38	145	15	24	70	4	30	--	
4	248	3,630	s 4,340	25			29	--	
5	198	5,800	a 3,100	25			28	132	
6	154	2,100	873	26	44	3	29	--	
7	117	1,880	594	27			28	--	
8	64	1,300	225	28			25	135	
9	51	528	73	29			23	--	
10	42	323	37	28			24	--	
11	38	277	28	28	60	4	26	--	
12	36	248	24	29	74	6	28	165	
13	33	205	18	30	71	6	27	--	
14	29	231	18	29	79	6	25	--	
15	28	170	13	27	51		22	175	
16	28	162	12	25	--		21	--	e 9
17	26	128	9	24	52		21	--	
18	25	115	8	22	--		21	--	
19	25	60	4	26	--		21	139	
20	26	101	7	29	--		21	--	
21	28	100	8	29	116		21	--	
22	27	81	6	29	--	e 4	21	115	
23	26	66	5	28	--		21	--	
24	26	66	5	27	33		21	--	
25	26	62	4	30	--		21	--	
26	26	59	4	32	--		21	113	
27	27	51	4	31	--		21	--	
28	29	59	5	30	26		22	--	
29	29	45	4	30	--		24	197	
30	28	51	4	29	46		25	--	
31	27	68	5	--	--	--	24	--	
Total	1,578	--	9,473	825	--	120	751	--	279

	January			February			March		
1	22	--		24	--		22	53	3
2	22	135		24	109		22	59	4
3	21	--		24	--		22	65	4
4	21	--		23	--		22	82	5
5	21	107		23	67		22	61	4
6	21	--		23	101		22	56	3
7	21	--		23	--		23	54	3
8	21	198		24	--	e 7	25	60	4
9	21	116		24	93		28	40	3
10	21	--		24	--		33	80	7
11	22	--		24	--		37	95	9
12	22	154		22	--		46	93	12
13	22	--		24	192		45	93	11
14	24	--		24	--		36	58	6
15	24	--		23	82		34	48	4
16	24	120	e 9	22	61		34	53	5
17	24	--		22	--		33	25	2
18	24	--		22	67		62	340	sb 70
19	26	150		23	--		178	8,200	sb 5,600
20	25	--		22	60		122	7,360	s 2,520
21	24	--		19	--		75	560	113
22	24	--		19	55	e 3	46	380	47
23	22	183		19	--		40	370	40
24	21	--		19	59		45	360	44
25	21	--		19	--		56	280	42
26	23	174		20	36		79	390	83
27	23	--		22	--		80	280	60
28	23	--		22	44		88	250	59
29	23	--		23	27		105	550	156
30	23	146		--	--	--	157	1,800	a 750
31	24	--		--	--	--	141	1,310	499
Total	700	--	279	646	--	147	1,780	--	10,172

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	100	830	224	69	210	39	34	141	13
2	65	550	96	77	192	40	32	159	14
3	51	350	48	68	169	31	31	148	12
4	45	190	23	63	130	22	30	189	15
5	41	125	14	60	124	20	28	191	14
6	39	200	21	54	122	18	28	165	12
7	39	150	16	52	135	19	27	130	9
8	42	380	sb 50	52	151	21	26	139	10
9	166	3,500	b 1,600	49	142	19	25	170	11
10	114	1,100	a 340	46	124	15	24	186	12
11	113	600	sa 190	43	88	10	24	168	11
12	209	1,300	a 750	42	78	9	23	215	13
13	166	750	336	41	86	10	21	175	10
14	144	1,100	a 420	42	101	11	18	116	6
15	108	650	b 190	41	105	12	17	202	9
16	88	250	59	40	110	12	16	160	7
17	93	235	59	44	79	9	15	210	8
18	102	200	55	42	86	10	14	229	9
19	93	170	43	40	109	12	15	215	9
20	86	130	30	40	120	a 13	15	241	10
21	110	360	107	593	20,200	s 35,200	15	271	11
22	165	3,200	sb 1,600	837	21,500	48,600	15	292	12
23	348	6,920	s 7,060	169	11,200	s 5,420	14	226	8
24	196	6,020	s 3,360	80	5,300	1,140	12	193	6
25	114	2,200	677	52	1,050	147	11	171	5
26	93	750	188	43	450	52	20	950	sb 220
27	85	430	99	38	393	40	1,170	15,000	sa 50,000
28	80	316	68	35	384	36	95	9,200	s 2,620
29	74	230	46	34	250	23	76	7,800	sa 1,900
30	70	240	45	34	199	18	81	7,500	sa 2,200
31	--	--	--	34	218	20	--	--	--
Total	3,239	--	17,814	2,954	--	91,048	1,972	--	57,196

	July			August			September		
1	21	1,010	s 60	7.2	181	4	8.3	128	3
2	16	430	18	7.0	162	3	8.9	92	2
3	14	330	12	6.5	166	3	7.1	103	2
4	13	248	9	6.4	194	3	6.4	107	2
5	12	128	4	6.2	229	4	5.9	102	2
6	12	113	4	7.0	219	4	5.3	91	1
7	12	135	4	6.8	280	a 5	4.5	158	2
8	16	191	s 9	9.2	340	a 8	4.2	210	2
9	67	2,200	sb 440	7.4	227	4	4.1	142	2
10	33	1,400	a 120	5.4	179	3	4.0	113	1
11	16	1,210	52	5.9	169	3	3.8	148	2
12	13	530	19	5.6	169	2	4.0	127	1
13	19	750	sb 42	5.3	168	2	4.0	134	1
14	68	4,030	s 1,000	6.2	129	2	4.1	120	1
15	72	8,000	a 1,600	5.8	121	2	3.9	130	1
16	153	7,280	3,010	5.1	120	2	3.9	125	1
17	42	4,560	s 534	5.6	122	2	4 3	123	1
18	18	2,080	101	4.9	147	2	4.2	115	1
19	13	650	23	5.1	154	2	4.1	122	1
20	11	350	10	5.7	210	3	3.9	112	1
21	9.6	310	8	5.2	237	3	3.9	101	1
22	8.8	355	8	5.2	178	2	4.0	95	1
23	8.4	300	7	5.3	170	2	4.0	99	1
24	7.8	180	4	5.6	165	2	4.0	98	1
25	7.5	121	2	5.6	230	3	4.0	136	1
26	7.2	78	2	5.6	260	4	4.0	168	2
27	7.2	154	3	5.6	230	3	4.0	170	2
28	6.7	99	2	5.6	158	2	4.0	137	1
29	7.4	117	2	5.6	150	2	4.0	140	2
30	8.6	142	3	7.0	155	3	3.7	147	1
31	7.5	180	4	8.4	110	2	--	--	--
Total	727.7	--	7,116	189.0	--	91	138.5	--	43

Total discharge for year (cfs-days) 15,500.2
Total load for year (tons) 193,778

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Particle-size analyses of suspended sediment, March to July, 1952
(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	Water 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	
Mar. 20, 1952...	9:15 a.m.	127	43	7,870	5,630	--	85	--	98	--	100					SPWCM
Mar. 20.....	6:00 p.m.	100	48	7,840	4,860	--	86	--	100	--	--					PWCM
Apr. 23.....	10:00 a.m.	424	54	12,800	8,600	--	59	--	87	--	100					SPWCM
May 21.....	8:45 a.m.	913	60	22,600	7,090	--	64	--	86	--	100					SPWCM
May 21.....	7:30 p.m.	320	59	17,200	6,130	--	70	--	91	--	100					SPWCM
May 22.....	9:00 a.m.	897	60	22,900	7,700	--	62	--	84	--	100					SPWCM
May 22.....	7:15 p.m.	647	62	16,000	11,000	--	64	--	86	--	100					SPWCM
May 23.....	7:30 p.m.	78	64	10,100	7,040	--	72	--	93	--	100					SPWCM
June 27.....	8:30 a.m.	1,790	72	13,200	8,860	--	62	--	87	--	100					SPWCM
June 27.....	1:55 p.m.	1,220	75	13,600	13,300	40	59	79	92	99	100					SPWCM
June 27.....	1:55 p.m.	1,220	75	13,600	13,800	2	3	17	92	99	100					SPN
July 14.....	3:00 p.m.	124	70	8,270	5,220	--	66	--	92	--	100					SPWCM

SALINE RIVER AT TESCOTT, KANS.

LOCATION.--At gaging station at highwat 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 1952.
Water temperatures: April 1950 to September 1952.
EXTREMES, 1951-52.--Dissolved solids: Maximum, 2,370 ppm Sept. 1-30; minimum, 222 ppm Aug. 9.
Hardness: Maximum, 624 ppm Dec. 1-30; minimum, 123 ppm Aug. 13.
Specific conductance: Maximum daily, 4,440 micromhos Sept. 30; minimum daily, 339 micromhos June 1.
Water temperatures: Maximum, 83°F June 16; minimum, freezing point on several days during December to March.
EXTREMES, 1950-52.--Dissolved solids: Maximum, 2,650 ppm Apr. 4 to May 5, 1950; minimum, 170 ppm June 8-10, 1951.
Hardness: Maximum, 624 ppm Dec. 1-30, 1951; minimum, 120 ppm July 20, 1950.
Specific conductance: Maximum daily, 4,940 micromhos May 6, 1950; minimum daily, 253 micromhos June 8, 1951.
Water temperatures: Maximum, 83°F June 16, 1952; minimum, 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 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1951	404			177	33	340		366	0	353	464		16	0.24	1,640	2.23	1,790	578	278	55	6.1	2,580	8.0
Nov. 1-30	313			184	34	330		379	0	368	456		18	.23	1,650	2.24	1,390	600	289	53	5.9	2,580	7.9
Dec. 1-30	205			176	45	358		389	0	388	483		23	.28	1,750	2.38	969	624	305	55	6.2	2,720	7.8
Dec. 31-Jan. 31, 1952	189			186	34	335		384	0	360	458		20	.23	1,670	2.27	852	605	290	54	5.9	2,630	8.0
Feb. 1-Mar. 3	185			176	35	358		354	0	365	492		16	.22	1,710	2.33	854	582	292	57	6.5	2,710	8.0
Mar. 4-26	227			169	31	309		316	0	355	423		14	.20	1,540	2.09	944	550	291	54	5.7	2,420	7.9
Mar. 27-Apr. 10 ...	277			164	30	238		260	6	358	330		14	.17	1,370	1.86	1,020	532	309	48	4.5	2,050	8.3
Apr. 11-12.....	805			136	26	210		223	0	298	290		11	.15	1,180	1.60	2,560	446	263	50	4.3	1,770	8.0
Apr. 13-14	980			104	12	63		186	0	177	79		8.4	.11	634	.86	1,680	308	155	30	1.6	881	7.7
Apr. 15-29	764			150	22	102		246	0	285	139		9.9	.11	908	1.23	1,870	465	263	32	2.1	1,320	7.9
Apr. 30-May 30	411			163	29	181		254	0	350	260		9.7	.16	1,190	1.62	1,320	524	316	42	3.4	1,790	8.0
May 31	498			121	20	120		202	6	237	161		8.5	.13	838	1.14	1,130	385	211	40	2.7	1,270	8.3
June 1	956			58	4.3	11		158	0	45	10		1.0	.06	248	.34	640	162	32	13	.4	368	8.0
June 2	381			97	12	90		186	0	162	127		1.3	.07	632	.86	650	290	137	39	2.3	1,000	7.5
June 3	304			147	27	228		262	0	318	324		9.9	.17	1,270	1.73	1,040	478	263	49	4.5	1,970	8.0
June 4-14	251			155	31	300		250	0	373	421		8.4	.19	1,490	2.03	1,010	514	309	55	5.8	2,350	7.8
June 15-26	171			152	36	421		258	0	403	578		6.0	.25	1,800	2.45	831	528	316	63	8.0	2,860	7.7
June 27-July 20.....	123			143	45	610		253	0	470	847		2.8	.32	2,310	3.14	767	540	333	70	11	3,740	7.6

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 21-24, 1952 ...	103			107	26	270		224	0	285	358		5.4	0.20	1,220	1.66	339	372	188	59	6.1	1,970	7.6
July 25-Aug. 1.....	124			128	42	552		220	0	430	778		2.1	.30	2,120	2.88	710	491	311	70	11	3,450	7.4
Aug. 2-8	121			102	24	246		252	0	235	329		6.4	.18	1,130	1.54	369	354	147	58	5.7	1,840	7.8
Aug. 9	877			42	5.4	24		162	0	26	20		2.8	.06	222	.30	526	127	0	27	.9	358	7.7
Aug. 10-11.....	564			58	9.6	107		161	0	92	144		2.4	.09	530	.72	807	184	52	54	3.4	896	7.7
Aug. 12.....	2,540			48	6.3	57		149	0	50	79		1.8	.07	348	.47	2,390	146	24	43	2.1	579	7.8
Aug. 13.....	1,450			42	4.4	31		138	0	39	37		.8	.06	252	.34	987	123	10	33	1.2	403	7.7
Aug. 14.....	323			55	5.4	62		151	0	64	85		2.4	.08	384	.52	335	159	35	43	2.1	634	7.7
Aug. 15	184			56	6.2	67		146	0	71	93		5.6	.07	410	.56	204	165	45	44	2.3	671	7.7
Aug. 16-31.....	167			98	21	282		216	0	219	399		5.5	.16	1,180	1.60	532	330	153	63	6.7	1,990	7.7
Sept. 1-30	68.9			126	46	648		275	0	425	898		2.9	.30	2,370	3.22	441	502	276	73	13	3,900	7.7
Weighted average [a]	275			153	30	271		b 294	--	324	373		12	0.19	1,380	1.88	1,020	505	264	53	5.2	2,160	--

a Represents 100 percent of runoff for water year October 1951 to September 1952.
b Includes carbonate as bicarbonate.

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
/Once-daily temperature measurement between 8 a. m. and 12 m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	41	43	a32	31	a42	56	67	66	81	79	a71
2	65	42	44	a32	32	--	54	67	68	81	80	67
3	66	43	45	a33	40	--	56	68	73	79	79	68
4	67	--	44	a34	39	a35	a54	69	74	77	76	70
5	65	39	43	32	40	33	51	70	73	72	a80	71
6	61	39	43	a33	40	34	51	71	75	79	75	76
7	59	40	41	a34	40	a37	53	a73	76	77	77	72
8	59	40	40	34	41	39	52	a72	77	78	77	72
9	59	42	a39	33	41	a41	--	a69	76	71	--	72
10	58	43	a38	32	41	a40	47	63	78	74	75	72
11	59	40	a38	--	42	38	45	61	79	74	75	73
12	60	43	a40	34	a44	42	45	62	80	76	71	71
13	60	49	38	33	a45	40	44	62	81	77	--	71
14	60	48	--	37	a44	40	44	63	81	75	76	70
15	60	46	a32	37	a44	40	47	65	79	73	77	62
16	60	43	a33	35	42	40	49	65	83	73	79	69
17	51	40	32	36	40	38	a50	61	75	76	80	70
18	55	a41	a32	36	42	a39	50	62	76	78	77	69
19	55	a41	32	39	43	a42	55	60	74	80	79	60
20	53	a41	a32	38	a42	41	58	62	77	79	80	64
21	55	40	a32	38	a40	40	59	63	77	80	78	63
22	51	39	32	a34	a40	--	61	66	78	80	73	62
23	51	38	32	a33	39	31	58	65	78	78	74	61
24	51	37	32	a33	--	39	57	69	78	78	74	62
25	52	38	32	34	a41	39	57	68	78	79	74	63
26	53	38	32	35	a41	42	57	68	79	80	76	64
27	47	a42	a33	34	39	41	59	--	79	81	78	65
28	49	41	33	34	39	40	61	68	79	80	78	66
29	51	42	34	a35	a42	43	65	68	81	77	78	62
30	51	a43	--	a32	--	53	65	69	80	77	76	67
31	42	--	33	35	--	55	--	69	--	78	76	--
Average	56	41	36	34	41	40	54	66	77	77	77	68

a Observation made between 1 p. m. and 5 p. m.

KANSAS RIVER BASIN--Continued

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.

LOCATION.--At gaging station on highway bridge, half a mile south of Kirwin, Phillips County, three-quarters of a mile downstream from Bow Creek, and 1½ miles upstream from Deer Creek.
DRAINAGE AREA.--1,290 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: February 1950 to June 1952 (discontinued).
Sediment records: February 1950 to June 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 11,000 ppm May 3; minimum daily, not determined.
Sediment loads: Maximum daily, 32,600 tons May 31; minimum daily, 5 tons Mar. 22, 23.
EXTREMES, 1950-52.--Water temperatures: Maximum, 80°F July 24, 1950, Aug. 29, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 14,800 ppm July 13, 1950; minimum daily, not determined.
Sediment loads: Maximum daily, 320,000 tons Aug. 12, 1950; minimum daily, less than 1 ton on many days during 1950.
REMARKS.--Flow affected by ice Dec. 14 to Jan. 30, Mar. 23. Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Temperature (°F) of water, October 1951 to June 1952
/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	62	a40	--	--	40	32	50	60	65			
2	53	35	46	35	32	38	50	60	65			
3	53	40	--	--	36	32	50	61	70			
4	60	35	--	35	32	32	45	70	72			
5	60	32	32	--	35	--	44	69	55			
6	55	40	--	32	32	32	45	65	69			
7	48	40	35	--	33	35	45	62	70			
8	50	40	--	35	33	38	--	60	72			
9	52	45	35	--	35	40	40	60	66			
10	52	40	--	--	32	40	48	50	72			
11	55	45	--	35	32	35	40	50	74			
12	60	45	38	--	40	45	40	50	75			
13	60	45	--	35	40	35	40	58	74			
14	55	40	a33	--	37	40	40	54	74			
15	52	40	--	32	35	38	47	65	74			
16	50	35	32	--	35	42	50	55	68			
17	45	--	--	35	32	42	52	55	62			
18	50	33	--	--	32	40	55	57	70			
19	45	--	34	--	37	40	54	55	67			
20	47	--	--	31	31	45	60	55	70			
21	52	47	35	--	--	40	60	60	70			
22	45	--	--	--	33	a34	55	60	72			
23	45	35	35	31	33	32	50	59	75			
24	45	--	--	--	32	39	50	62	74			
25	50	40	32	35	31	38	50	60	70			
26	50	--	--	--	31	40	45	64	70			
27	45	--	--	32	32	43	60	62	74			
28	42	40	32	--	32	41	55	58	--			
29	52	--	--	--	31	--	60	58	--			
30	51	35	32	32	--	--	55	62	--			
31	40	--	--	--	--	--	--	58	--			
Average	51	--	b33	b33	34	38	49	59	70			

a Observation made between 2 p. m. and 5 p. m.
b Includes estimated temperature, 32°F on missing days.

KANSAS RIVER BASIN--Continued

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Suspended sediment October 1951 to June 1952

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	107	126	36	89	89	21	86		
2	106	88	25	85	69	16	86		
3	106	82	23	84			84		
4	566	6,740	s13,600	85			85		
5	352	3,990	s4,150	89			82		
					93	22		94	20
6	210	1,200	680	89			86		
7	162	665	291	89			81		
8	138	405	151	86			78		
9	123	286	95	89			65		
10	115	231	72	86			61		
					53	12			
11	108	218	64	86			72		
12	104	191	54	87			85		
13	100	175	47	87			93		
14	99	133	36	86			70		
15	96			84			35		
					49	10		126	19
16	96	125	32	81			40		
17	94			76			40		
18	95			62			40		
19	93			73	--	e12	41		
20	94			91	--	e24	40		
21	95			87			40		
22	95	83	21	89			45		
23	94			87	92	20	45		
24	95			82			45		
25	93			87			45		
26	95			87			45	56	8
27	96	68	18	85			45		
28	96			85	112	26	60		
29	98			84			70		
30	98	89	24	85			70		
31	98	89	24	--	--	--	60		
Total	4,017	--	19,727	2,542		533	1,920	--	478

Day	January			February			March		
1	45	--		93	345	87	66	104	19
2	45	202		86	290	67	66	134	24
3	45	--		77	222	46	53	118	17
4	45	148		71	177	34	31	70	6
5	45	--		67	169	31	53	64	9
			e28						
6	50	394		65	173	30	61	90	15
7	50	--		64	164	28	55	117	17
8	50	124		64	166	29	78	195	41
9	50	--		64	163	28	80	192	41
10	50	--		63	136	23	80	174	38
11	50	132		63	123	21	73	150	30
12	50	--		63	134	23	69	96	18
13	60	136		64	123	21	64	118	20
14	70	--		65	116	20	61	126	21
15	70	63		65	114	20	61	146	24
			e25						
16	70	--		65	95	17	60	92	15
17	70	216		65	95	17	60	92	15
18	70	--		64	124	21	62	102	17
19	70	--		64	110	19	61	62	10
20	70	158		58	131	21	58	51	8
21	60	--		54	185	27	55	45	7
22	50	--		58	150	23	42	43	5
23	35	118		57	128	20	40	48	5
24	40	--		61	110	18	43	70	8
25	60	134		54	91	13	61	160	a26
			e22						
26	60	--		55	114	17	96	296	77
27	60	207		64	136	24	94	118	30
28	60	--		65	109	19	93	--	e30
29	70	--		67	104	19	93	--	e34
30	75	139		--	--	--	93	--	e40
31	84	--	e44	--	--	--	87	189	44
Total	1,779	--	794	1,885	--	783	2,049	--	711

e Estimated.
s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Suspended sediment, October 1951 to June 1952--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	182	41	106	224	64	456	8,120	s 11,000
2.....	77	152	32	136	750	s 938	118	3,250	s 1,070
3.....	73	133	26	759	11,000	s 25,300	130	4,700	1,650
4.....	71	114	22	255	4,160	s 3,040	102	1,250	344
5.....	69	114	21	185	2,250	1,120	98	1,250	331
6.....	69	90	17	148	1,200	480	93	980	246
7.....	69	80	15	134	800	289	80	700	151
8.....	69	69	13	122	520	171	75	543	110
9.....	72	54	10	120	460	149	69	470	88
10.....	72	42	8	111	410	123	63	381	65
11.....	75	95	19	106	360	103	58	295	46
12.....	78	156	33	96	323	84	55	259	38
13.....	84	112	25	94	326	83	52	223	31
14.....	80	79	17	91	518	127	49	239	32
15.....	76	62	13	96	730	189	46	242	30
16.....	76	100	21	94	345	88	43	223	26
17.....	76	79	16	90	210	51	40	192	21
18.....	76	109	22	89	270	65	39	177	19
19.....	76	68	14	84	231	52	38	165	17
20.....	76	70	a 14	84	212	48	40	201	22
21.....	78	95	a 20	84	194	44	39	208	22
22.....	214	3,510	s 2,510	89	240	58	38	194	20
23.....	185	1,420	s 767	93	330	83	38	178	18
24.....	129	355	124	148	3,600	sa 2,000	38	156	16
25.....	111	280	84	172	5,000	sa 2,400	32	114	10
26.....	100	229	62	203	6,520	s 3,810	29	147	12
27.....	94	193	49	115	2,600	807	33	134	12
28.....	89	163	39	112	1,350	408	--	--	--
29.....	85	138	32	93	820	206	--	--	--
30.....	91	178	44	82	610	135	--	--	--
31.....	--	--	--	1,180	9,090	s 32,600	--	--	--
Total.	2,674	--	4,130	5,371	--	75,115	1,991	--	15,447

Total discharge for period Oct. 1, 1951 to June 27, 1952 (cfs-days) 24,228
Total load for period Oct. 1, 1951 to June 27, 1952 (tons)..... 117,718

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

NORTH FORK SOLOMON RIVER AT KIRWIN, KANS.--Continued

Particle-size analyses of suspended sediment, April to June 1952
(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 disperzed)

Date of collection	Time	Water 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	
Apr. 22, 1952 ...	8:25 a.m.	362	55	8,000	4,460	--	60	--	84	--	95	95	100	--		SPWCM
Apr. 23	3:55 p.m.	162	59	864	1,930	60	70	80	86	91	--	--	--	--		BWCM
May 3	12:10 a.m.	1,220	--	13,800	9,000	--	42	--	66	--	98	98	100	--		SPWCM
May 3	1:00 a.m.	1,160	--	16,400	9,950	--	48	--	72	--	96	97	97	100		SPWCM
May 3	1:45 a.m.	1,280	63	17,400	6,110	--	54	--	77	--	96	96	97	99	100	SPWCM
May 3	2:00 a.m.	1,300	--	17,800	5,690	--	52	--	72	--	--	--	94	96		SPWCM
May 3	5:05 a.m.	1,240	61	14,100	8,470	42	54	65	76	89	96	97	98	99		SPWCM
May 3	5:05 a.m.	1,240	61	14,100	9,050	3	4	20	75	88	96	97	98	99		SPNM
May 31	7:20 a.m.	1,380	58	7,180	4,000	--	51	--	62	--	90	91	100	--		SPWCM
May 31	10:50 a.m.	1,480	65	9,940	6,780	--	59	--	78	--	94	94	100	--		SPWCM
May 31	4:55 p.m.	1,220	--	12,600	9,420	--	59	--	80	--	98	99	99	100		SPWCM
May 31	5:25 p.m.	1,140	67	12,200	7,480	--	57	--	80	--	98	99	99	100		SPWCM
June 1.....	7:50 a.m.	555	65	10,400	7,630	--	56	--	83	--	99	--	--	--		SPWCM

KANSAS RIVER BASIN--Continued

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.

LOCATION (revised).--At cableway at gaging station, half a mile south of Alton, Osborne County.
DRAINAGE AREA.--1,720 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: June 1949 to July 1951.
Sediment records: June 1946 to July 1951, April to September 1952 (discontinued).
EXTREMES, April to September 1952.--Sediment concentrations: Maximum daily, 6,830 ppm May 11; minimum daily, 38 ppm Sept. 28.
Sediment loads: Maximum daily, 11,400 tons May 31; minimum daily, 1 ton Sept. 21, 24-30.
EXTREMES, 1946-51, 1952.--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.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Suspended sediment, April to September 1952

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	368	213	553	4,980	s7,740
2	--	--	--	224	219	132	266	1,870	1,340
3	--	--	--	358	2,590	s2,890	197	590	314
4	--	--	--	295	2,930	2,330	166	365	164
5	--	--	--	234	1,020	644	181	1.260	616
6	--	--	--	185	429	214	124	427	143
7	--	--	--	148	344	137	110	194	58
8	--	--	--	140	306	116	102	137	38
9	--	--	--	139	275	103	94	154	39
10	--	--	--	332	3,130	s4,980	89	139	33
11	--	--	--	462	6,830	8,520	81	147	32
12	--	--	--	302	3,880	3,160	74	163	33
13	--	--	--	272	1,790	1,310	66	221	39
14	--	--	--	212	890	509	61	231	38
15	--	--	--	181	552	270	56	223	34
16	--	--	--	161	431	187	50	270	36
17	--	--	--	147	326	129	48	240	31
18	--	--	--	141	277	105	45	217	26
19	--	--	--	145	251	98	43	209	24
20	--	--	--	141	233	89	44	190	23
21	--	--	--	183	1,100	sa1,000	43	157	18
22	--	--	--	400	4,950	s5,860	40	185	20
23	352	1,150	1,090	283	2,670	2,040	32	210	18
24	322	580	504	295	1,740	s1,530	29	165	13
25	234	361	228	335	2,360	2,130	28	133	10
26	228	250	154	240	1,960	1,270	28	175	13
27	202	187	102	197	1,000	532	30	165	13
28	183	158	78	161	560	243	26	132	9
29	165	108	48	138	385	143	24	124	8
30	193	262	137	136	350	129	22	123	7
31	--	--	--	594	5,720	s11,400	--	--	--
Total	1,879	--	2,341	7,395	--	52,413	2,752	--	10,930

s Computed by subdividing day.
a Computed from partly estimated concentration graph.

SOUTH FORK SOLOMON RIVER AT ALTON, KANS.--Continued

Suspended sediment, April to September 1952--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.....	18	135	7	11	119	4	15	216	9
2.....	18	142	7	12	102	3	13	168	6
3.....	18	118	6	12	101	3	14	150	6
4.....	18	100	5	11	96	3	17	150	7
5.....	21	96	5	28	104	8	15	170	a7
6.....	20	90	5	32	155	13	12	175	6
7.....	19	83	4	17	107	5	9.6	145	4
8.....	18	97	5	14	91	3	8.4	126	3
9.....	17	91	4	14	88	3	8.0	114	2
10.....	15	90	4	15	60	2	8.0	105	2
11.....	15	90	4	39	218	s 52	8.0	91	2
12.....	14	92	3	66	694	s 168	7.6	108	2
13.....	14	72	3	20	185	10	7.6	130	3
14.....	32	100	9	14	171	6	8.0	80	2
15.....	38	71	7	12	185	6	8.0	97	2
16.....	29	70	5	11	161	5	7.6	79	2
17.....	23	85	5	11	155	5	7.6	87	2
18.....	18	92	4	10	160	4	8.4	99	2
19.....	15	99	4	10	129	3	8.8	105	2
20.....	15	90	a4	9.6	140	4	9.6	68	2
21.....	14	70	3	12	147	5	10	53	1
22.....	27	500	sa 95	12	133	4	9.6	59	2
23.....	108	3,710	s 2,060	11	110	3	9.6	65	a2
24.....	32	215	19	12	124	4	9.2	60	1
25.....	43	252	29	14	125	5	9.2	49	1
26.....	23	180	11	12	120	4	8.4	55	1
27.....	18	125	6	45	255	31	8.0	52	1
28.....	15	122	5	21	219	12	7.2	38	1
29.....	13	115	4	18	192	9	6.8	47	1
30.....	13	94	3	20	200	11	5.7	69	1
31.....	12	96	3	15	192	8	--	--	--
Total	713	--	2,338	560.6	--	406	284.9	--	85

Total discharge for period Apr. 23 to Sept. 30, 1952 (cfs-days)..... 13,584.5
Total load for period Apr. 23 to Sept. 30, 1952 (tons)..... 68,543

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 1952
(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	Water 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 4, 1952	10:30 a.m.	358		4,110	3,840		72		95		100	--					PWCM
May 10	6:50 p.m.	676		7,840	6,170		56		81		99	100					SPWCM
May 12	9:50 p.m.	302		4,120	3,420		78		94		100	--					PWCM
May 22	8:00 a.m.	474		5,720	4,030		56		82		99	100					SPWCM
May 23	6:45 a.m.	291		3,230	2,800		69		90		100	--					SPWCM
May 31	7:30 a.m.	302		3,790	2,950		54		82		100	--					SPWCM
May 31	3:50 p.m.	995		10,500	7,910		45		68		97	--					SPWCM
May 31	6:10 p.m.	1,100		8,100	7,120		53		74		98	100					SPWCM
July 23	6:30 a.m.	163		6,940	5,330		73		96		100	--					PWCM

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 1½ miles upstream from Leban Creek.
DRAINAGE AREA.--5,430 square miles, approximately
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1952.
Water temperatures: February 1949 to September 1952 (discontinued).
Sediment records: May 1948 to September 1952 (discontinued).
EXTREMES, 1951-52.--Water temperatures: Maximum, 89°F June 15; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 7,900 ppm July 16; minimum daily, not determined.
Sediment loads: Maximum daily, 55,500 tons July 16; minimum daily, not determined.
EXTREMES, 1948-52.--Water temperatures (1949-52): Maximum, 89°F June 15, 1952; 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 Jan. 2-4, 1950.
REMARKS.--Records of discharge for water year October 1951 to September 1952 given in WSP 1240.

Chemical analyses, in parts per million, November 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Nov. 30, 1951	387			150	21	66	9.2	355		215	63		24					462	171	23	1.3	1,140	7.8
Dec. 30	298			177	24	82	9.5	424		240	78		32					541	193	24	1.5	1,320	7.7
Feb. 1, 1952	429			149	22	62	8.7	359		205	57		24					464	170	22	1.3	1,110	8.0
Feb. 28	308			144	22	69	9.1	350		208	67		20					452	165	24	1.4	1,130	7.9
Mar. 31	622			134	21	52	9.2	278		228	51		20					421	193	21	1.1	1,020	7.9
Apr. 28	716			--	--	53		285		225	58		--					434	200	21	1.1	1,040	7.9
June 2	2,050			70	7.7	26		166		96	19		--					206	70	22	.8	521	8.1
June 26	182			--	--	95		250		210	90		--					343	138	38	2.2	1,060	7.5
Aug. 5	97			--	--	83		231		160	78		--					286	97	39	2.1	907	7.4
Sept. 3	136			--	--	69		258		138	68		--					300	88	33	1.7	887	7.7

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Temperature (°F) of water, water year October 1951 to September 1952
[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	64	46	40	--	38	32	42	65	70	85	82	78
2	65	42	--	32	--	36	46	65	72	85	80	78
3	66	40	--	--	a38	32	45	68	74	80	--	78
4	66	36	40	a32	--	32	42	64	74	84	82	78
5	64	32	--	--	38	32	44	65	74	82	80	78
6	56	32	40	--	--	32	45	66	74	85	80	74
7	57	35	--	a32	38	32	53	65	75	80	80	78
8	55	35	40	--	--	--	53	65	75	80	80	78
9	55	38	--	--	--	32	40	65	75	80	80	78
10	56	42	--	32	--	32	40	61	81	81	80	79
11	57	45	32	--	40	36	42	61	78	80	78	78
12	60	45	--	32	--	38	44	60	80	81	80	79
13	60	47	36	--	40	32	43	62	79	a82	80	79
14	60	45	--	40	40	34	44	67	79	82	81	71
15	60	42	32	--	38	32	45	67	89	80	80	72
16	60	40	--	38	40	41	45	60	85	81	80	75
17	55	37	--	--	--	40	45	60	85	80	84	71
18	54	--	32	--	38	32	48	61	80	81	80	72
19	52	34	--	40	40	34	48	62	83	80	82	66
20	50	--	--	--	34	40	55	65	84	82	82	67
21	52	40	--	40	34	32	57	65	79	82	76	65
22	50	--	32	--	32	32	58	65	--	82	80	64
23	52	--	--	--	a36	32	58	62	84	80	80	61
24	50	32	32	32	32	32	59	63	83	80	78	65
25	52	--	--	--	32	32	60	67	83	82	79	65
26	53	--	--	--	32	38	60	70	83	82	80	65
27	49	38	32	32	36	32	65	70	85	84	80	65
28	48	--	--	--	38	40	65	70	85	85	80	65
29	50	32	32	--	--	40	65	72	86	82	78	67
30	52	42	a36	32	--	40	65	72	84	83	78	67
31	47	--	36	--	--	42	--	70	--	80	78	--
Average	56	--	--	--	--	35	51	65	80	82	80	72

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

KANSAS RIVER BASIN--Continued

SOLOMON RIVER AT BELOIT, KANS.--Continued

Suspended sediment, water year October 1951 to September 1952

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	655	290	513	550	90	131	438		
2	648	252	441	529	213	304	438		
3	641	278	481	487	250	329	438		
4	627	266	450	420			432		
5	714	650	sa 1,500	474			432	85	96
6	1,850	4,680	23,400	468			420		
7	1,100	4,050	12,000	462			408		
8	842	2,580	5,860	462			402		
9	722	1,040	2,030	468	192	241	396		
10	662	573	1,020	474			390		
11	627	438	741	474			355		
12	613	373	617	468			350		
13	592	332	531	468			355		
14	578	301	470	468			378		
15	557	330	496	468			345	90	80
16	536	227	328	456	113	140	270		
17	522			450			260		
18	522			450	--		320		
19	522			444	45		310	80	67
20	515	186	260	444	--		300	--	e 50
21	515			444	83		290	--	e 40
22	515			444	--		285		
23	522			450	--		290		
24	522			450	67	e 69	290		
25	515			440	--		285		
26	515	121	168	430	--		285	37	29
27	508			426	29		285		
28	508			440	--		285		
29	529			444	29		290		
30	536	90		444	93		295	155	123
31	543		131	--	--	--	305	180	148
Total	19,773	--	53,839	13,796	--	4,631	10,622	--	2,260

	January			February			March		
1	275	--		420	65		325	114	100
2	315	188		432	--		345	119	111
3	295	--		432	145		345	99	92
4	300	185		426	--		320	102	88
5	295	--		390	180		260	103	72
6	290	--	e 129	372	--		265	104	74
7	310	130		360	150	e 137	290	88	69
8	310	--		360	--		340	90	a 85
9	315	--		350	--		355	108	104
10	305	132		345	--		396	107	114
11	320	127		340	127		444	110	132
12	325	150		340	--		474	112	143
13	330	--		350	149	141	474	120	154
14	345	118		350	115	109	462	100	125
15	360	--		350	120	113	438	98	116
16	396	111		350	105	99	396	110	118
17	414	--	e 123	345	110	102	360	135	131
18	426	--		340	117	107	355	128	123
19	432	104		330	117	104	372	91	91
20	432	--		325	110	97	571	310	478
21	450	84		325	83	73	529	1,260	1,800
22	487	--		320	52	45	438	430	508
23	251	--		310	60	50	384	480	498
24	256	83		305	49	40	300	244	198
25	280	--		310	40	33	290	128	100
26	366	--		310	41	34	335	107	97
27	355	123	e 86	315	51	43	396	121	129
28	350	--		300	70	57	620	244	408
29	350	--		315	100	a 85	714	345	665
30	315	91		--	--	--	690	352	656
31	360	--		--	--	--	641	320	554
Total	10,610	--	3,540	10,117	--	2,975	12,924	--	8,133

e Estimated.
s 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 1951 to September 1952--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	578	307	479	620	266	445	648	802	s1,840
2	508	269	369	634	231	395	2,100	4,840	27,400
3	438	215	254	676	265	484	1,370	5,130	19,000
4	402	210	228	690	221	412	770	3,650	7,590
5	378	188	192	1,290	1,660	5,780	571	2,390	3,680
6	355	145	139	930	3,000	7,530	457	1,460	1,800
7	350	139	131	730	1,740	3,430	448	910	1,100
8	345	123	115	620	1,020	1,710	416	620	696
9	494	800	sa1,400	564	680	1,040	361	549	535
10	1,360	3,450	12,700	536	527	763	320	424	366
11	818	2,080	4,590	508	420	576	310	303	254
12	655	630	1,110	655	420	743	296	245	196
13	966	730	1,900	818	2,090	4,620	280	175	132
14	930	860	2,160	648	2,770	4,850	262	102	72
15	722	462	901	564	1,430	2,180	248	58	39
16	606	290	474	494	780	1,040	231	48	30
17	543	209	306	501	650	879	218	45	26
18	550	340	505	480	425	551	210	49	28
19	606	288	471	468	334	422	196	55	29
20	676	304	555	438	287	339	196	60	32
21	676	320	584	426	405	466	191	70	36
22	966	765	s2,310	571	600	925	190	92	47
23	2,120	3,750	21,500	1,150	2,630	8,170	186	78	39
24	1,700	3,900	17,900	948	3,400	8,700	178	90	43
25	1,350	1,940	7,070	690	1,930	3,600	174	174	82
26	1,060	950	2,720	620	810	1,360	168	160	73
27	890	605	1,450	613	870	1,440	172	164	76
28	770	458	952	613	1,270	2,100	164	154	68
29	683	337	621	578	1,400	2,180	179	164	79
30	634	314	537	468	1,650	2,080	181	154	75
31	--	--	--	438	895	1,060	--	--	--
Total	23,129	--	84,623	19,979	--	70,270	11,691	--	65,463

Day	July			August			September		
1	166	121	54	90	122	30	146	224	88
2	158	122	52	87	129	30	141	172	65
3	158	112	48	84	110	25	136	159	58
4	146	107	42	84	91	21	136	203	75
5	142	107	41	96	98	25	125	205	69
6	142	99	38	95	132	34	117	172	54
7	134	89	32	110	152	45	110	171	51
8	135	105	38	164	153	68	107	132	38
9	163	326	s200	236	440	280	99	117	31
10	347	6,100	a5,700	192	575	298	98	118	31
11	190	852	s506	162	284	124	94	121	31
12	119	282	91	226	789	s599	93	113	28
13	134	285	103	792	5,600	12,000	89	114	27
14	135	163	59	511	5,870	8,100	85	121	28
15	147	159	63	250	1,760	s1,270	86	129	30
16	1,840	7,900	s55,500	187	625	316	84	122	28
17	2,190	5,460	s34,400	153	261	108	86	132	31
18	543	4,860	7,120	139	194	73	84	119	27
19	338	2,860	2,610	129	194	68	81	131	29
20	265	975	698	129	198	69	79	79	17
21	248	473	317	119	180	58	79	96	20
22	224	350	212	110	166	49	78	107	23
23	217	291	170	139	550	sa340	79	108	23
24	195	250	132	740	7,320	s15,300	79	117	25
25	224	331	200	315	4,340	3,690	79	113	24
26	175	225	106	208	1,150	646	77	111	23
27	137	138	51	170	364	167	77	104	22
28	132	112	40	154	204	85	77	94	20
29	117	110	35	141	176	67	76	103	21
30	104	99	28	153	190	78	75	95	19
31	96	91	24	173	216	101	--	--	--
Total	9,461	--	108,710	6,338	--	44,164	2,852	--	1,056

Total discharge for year (cfs-days) 151,292
Total load for year (tons) 449,665

s Computed by subdividing day.
a Computed from partly-estimated concentration graph.

SOLOMON RIVER AT BELOIT, KANS.--Continued

Particle-size analyses of suspended sediment, June to August 1952
(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	Water 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 2, 1952	8:45 a.m.	2,110	72	5,560	3,650	--	59	--	87	--	99						SPWCM
June 2	4:50 p.m.	2,320	--	4,860	6,930	39	59	76	88	96	99						SPWCM
June 2	4:50 p.m.	2,320	--	4,860	7,130	1	3	16	98	--	100						SPNM
June 3	5:45 a.m.	1,640	68	5,520	6,740	--	71	--	94	--	100						SPWCM
July 16	11:40 a.m.	2,000	--	11,600	7,360	--	62	--	87	--	100						SPWCM
July 16	12:35 p.m.	2,210	--	14,800	8,760	--	65	--	90	--	100						SPWCM
July 16	3:20 p.m.	2,680	--	14,800	9,540	47	65	81	92	96	100						SPWCM
July 16	9:00 p.m.	3,290	80	11,200	7,500	--	68	--	90	--	100						SPWCM
Aug. 13	8:30 a.m.	848	80	6,370	4,420	--	72	--	94	--	100						SPWCM
Aug. 14	6:30 a.m.	575	81	6,800	4,110	--	76	--	98	--	100						SPWCM
Aug. 24	9:15 a.m.	970	78	9,760	5,870	--	69	--	96	--	100						SPWCM

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN

Chemical analyses, in parts per million, October 1945 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
ROCK CREEK AT PARKS, NEBR.																							
Dec. 18, 1951	17	51	0.04	49	11	21		224	0	18	3.5	0.6	3.7	0.05	271	0.37		166	0	22	0.7	406	7.3
Mar. 25, 1952	33	46	.05	46	9.7	22		212	0	18	4.0	.8	3.8	.06	272	.37		155	0	23	.8	378	7.8
June 30	12	44	.04	41	9.8	21		200	0	15	2.5	.9	3.2	.08	240	.33		143	0	24	.8	354	7.6
Sept. 19	12	40	.06	38	9.5	23		192	0	18	3.0	.8	2.2	.07	236	.32		134	0	27	.9	339	8.1
SAPPA CREEK NEAR OBERLIN, KANS.																							
Dec. 6, 1951	11	29	0.04	95	25	75		469	0	76	26	1.0	2.8	0.13	568	0.77		341	0	32	1.8	896	8.0
Mar. 7, 1952	11	32	.04	92	25	72		448	0	77	25	1.0	4.4	.13	559	.76		332	0	32	1.7	877	7.9
May 9	14	35	.04	92	26	74		475	0	68	23	1.0	3.5	.16	596	.81		337	0	32	1.8	884	7.8
Aug. 11	.45	33	.04	88	23	81		376	0	79	65	1.0	8.3	.17	584	.79		315	7	36	2.0	919	7.5
THOMPSON CREEK AT RIVERTON, NEBR.																							
Dec. 20, 1951	5.4			--	--	--		236	0	45	--				--	--		216	22	--	--	487	7.4
Mar. 28, 1952	29			59	9.2	18		205	0	43	8.5				288	0.39		185	17	18	0.6	427	7.6
July 1	17	34	0.04	59	7.5	19		190	8	35	8.0	0.1	3.4		269	.37		178	9	19	.6	414	8.4
Sept. 22	17			--	--	--		186	10	41	--				--	--		174	5	--	--	389	8.5
REPUBLICAN RIVER NEAR HARDY, NEBR.																							
Nov. 30, 1951	633			79	18	37		318	0	69	13							271	10	23	1.0	655	7.9
Mar. 10, 1952	1,090			64	14	30		259	0	52	11							217	5	23	.9	542	7.8
June 11	344			53	15	41		230	0	73	13							193	4	32	1.3	544	7.7
June 27	2,650	24	0.14	47	8.9	24		199	0	28	8.0	0.5	1.3		246	0.33		154	0	25	.8	350	7.3
Sept. 2	153			62	10	24		230	0	44	10							196	7	21	.8	471	8.0

CEDAR BLUFF RESERVOIR, NEAR ELLIS, KANS.

July 27, 1951	a244,190	14	0.02	58	8.1	19	122	0	106	5.0	0.4	2.1	0.05	291	0.40	178	78	19	--	433	7.4
Dec. 19	a180,660	13	.04	84	9.4	28	157	0	154	11	.5	2.7	.05	394	.54	248	119	19	0.8	589	7.6
Feb. 27, 1952	a168,430	11	.04	84	12	28	164	0	161	11	.4	2.0	.07	413	.56	260	126	19	.7	619	7.7
May 15	a150,960	9.5	.06	88	15	37	169	7	184	13	.4	1.8	.11	485	.66	281	131	22	1.0	651	8.3
Aug. 15	a133,170	11	.04	92	17	37	168	0	208	16	.5	3.4	.03	488	.66	300	162	21	.9	710	7.6

KANOPOLIS RESERVOIR NEAR KANOPOLIS, KANS.

Dec. 19, 1951	a50,650	13		112	22	122	9.3	224	0	174	203			0.08	803	1.09	368	184	41	2.8	1,310	7.7
Feb. 28, 1952	a50,200	--		--	--	126	9.0	217	0	193	210			.10	--	--	382	204	41	2.8	1,340	7.9
Apr. 7	a48,690	--		107	19	92		176	0	206	132			.10	--	--	345	201	37	2.1	1,070	7.9
May 15	a51,250	2.9		107	18	91	--	166	0	177	--			.03	688	.94	339	203	37	2.1	1,120	7.7
Aug. 15	a50,690	2.6		--	--	--	--	--	--	--	--			.07	796	1.08	351	--	--	--	1,300	--

LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.

Mar. 19, 1952	b1,340			22	3.6	8.1		79	0	14	6.0			0.05			70	5	20	0.4	190	7.3
Sept. 18	132			60	7.9	38		218	0	33	36			.03	319	0.43	182	3	31	1.2	513	7.9

KANSAS RIVER AT BONNER SPRINGS, KANS.

Oct. 18, 1945	2,800	18	0.12	95	24	100	7.0	293	0	114	137	0.2	4.3	0.02	658	0.89	336	96	39	--	1,080	7.4
Apr. 7, 1952	11,400	15	.07	81	16	40	6.2	245	0	93	43	.3	6.6	.08	434	.59	268	67	24	1.1	696	7.8
July 7	6,850	13	.04	43	7.4	43		129	0	43	53	.4	5.3	.05	310	.42	138	32	40	1.6	476	7.5

a Reservoir contents, in acre-feet.
b Meandaily discharge.

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
MEDICINE CREEK BELOW HARRY STRUNK LAKE, NEBR. [a]			
Nov. 15, 1951	115	16	5.0
Dec. 7	b82	10	2.2
Dec. 29	b71	7	1.3
Feb. 2, 1952	66	1	.2
Feb. 6	66	1	.2
Feb. 11	68	3	.6
Mar. 6	67	4	.7
Mar. 26	92	13	3.2
Mar. 31	90	12	2.9
Apr. 7	87	29	6.8
Apr. 25	88	6	1.4
May 1	b10	10	.3
May 12	b3.8	14	.1
July 10	c25	26	1.8
Sept. 2	b23	13	.8
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.			
Oct. 3, 1951	297	908	728
Oct. 24	292	518	408
Oct. 25	350	570	539
Nov. 6	420	689	781
Nov. 8	372	945	949
Nov. 21	307	562	466
Dec. 5	420	601	681
Dec. 7	396	727	777
Jan. 4, 1952	262	126	89
Jan. 17	356	255	245
Jan. 30	447	413	498
Feb. 6	527	2,370	3,370
Feb. 25	548	1,530	2,260
Mar. 6	473	1,130	1,440
Mar. 14	634	1,260	2,160
Mar. 26	927	4,780	12,000
Mar. 28	936	3,450	8,720
Mar. 31	819	2,190	4,840
Apr. 7	602	1,370	2,230
Apr. 14	658	1,610	2,860
Apr. 21	666	1,920	3,450
Apr. 25	722	2,020	3,940
Apr. 28	706	1,720	3,280
May 5	626	1,760	2,970
May 12	594	2,740	4,390
May 16	578	1,430	2,230
May 19	666	2,200	3,960
May 26	594	1,350	2,160
June 3	420	1,230	1,390
June 14	86	122	28
June 19	38	88	9.0
June 27	47	79	10
July 2	34	159	14
July 10	117	294	93
July 18	182	1,330	654
July 29	40	133	14
July 30	41	122	14
Aug. 4	66	143	25
Aug. 11	144	567	220
Aug. 27	100	303	82
Sept. 10	14	144	5.4
Sept. 22	16	140	6.0

a Most samples obtained at reservoir outlet works.
b Mean daily discharge.
c Discharge sampled at spillway.

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1951 to September 1952--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
LITTLE BLUE RIVER AT ANGUS, NEBR.			
Oct. 2, 1951	87	32	7.5
Oct. 18	88	25	5.9
July 14, 1952	5,400	3,570	52,100
July 15	4,760	2,710	34,800
Aug. 25	64.7	108	19
Sept. 3	64.0	82	14
Sept. 8	59.2	105	17
LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.			
Oct. 2, 1951	254	76	52
Oct. 17	232	86	54
Oct. 30	221	106	63
Nov. 14	210	52	29
Nov. 27	215	39	23
Dec. 11	185	43	21
Dec. 28	b176	18	8.6
Jan. 7, 1952	b172	30	14
Feb. 4	212	50	29
Feb. 19	195	76	40
Mar. 19	1,360	4,440	16,300
Apr. 2	586	1,530	2,420
May 14	252	199	135
May 27	312	859	724
June 11	195	155	82
June 23	226	290	177
July 7	301	373	303
July 21	615	984	1,630
Aug. 4	208	208	117
Aug. 19	159	125	54
Sept. 3	185	182	91
Sept. 18	132	92	33

b Mean daily discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN THE BLUE RIVER BASIN IN MISSOURI

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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 (micromhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
BLUE RIVER NEAR KANSAS CITY																							
May 10, 1952.....	99	9.7	0.04	84	8.1	14	257	47	6.5	0.2	5.6	0.04	314	0.43		243	32	11	0.4	496	8.0	
July 10	5.5	11	.02	51	7.3	25	162	54	11	.4	8.6	.10	276	.38		157	24	26	.9	413	7.5	

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MISCELLANEOUS ANALYSES OF STREAMS IN THE LITTLE BLUE RIVER BASIN IN MISSOURI

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
LITTLE BLUE RIVER NEAR LAKE CITY																							
May 10, 1952.....	121	11	0.04	79	7.1	14		228		50	8.0	0.2	5.9	0.05	318	0.43		226	39	12	0.4	470	8.1
July 11.....	16.2	14	.04	71	6.1	12		211		38	8.0	.2	4.9	.06	310	.42		202	29	12	.4	438	7.5

CHARITON RIVER BASIN

HONEY CREEK NEAR RUSSELL, IOWA

LOCATION.--At gaging station on downstream side of county road bridge, 0.7 mile upstream from mouth and 5.5 miles southeast of Russell, Lucas County.
DRAINAGE AREA.--13.8 square miles.
RECORDS AVAILABLE.--Sediment records: June to September 1952.
EXTREMES.--Sediment concentrations: Maximum daily, 9,840 ppm June 20; minimum daily, no flow on many days during July, August, and September.
Sediment loads: Maximum daily, 2,500 tons (estimated) June 21; minimum daily, 0 ton on many days during July, August, and September.
REMARKS.--Records of water discharge for June to September 1952 given in WSP 1240.

Suspended sediment, June to September 1952

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.....							--	--	--
2.....							--	--	--
3.....							--	--	--
4.....							--	--	--
5.....							--	--	--
6.....							0.74	120	0.2
7.....							.70	117	a .2
8.....							2.3	929	s 25
9.....							.74	306	s .6
10.....							.54	259	.4
11.....							.41	220	a .2
12.....							.36	188	.2
13.....							.26	198	.1
14.....							.28	230	a .2
15.....							.36	304	s .3
16.....							.20	195	.1
17.....							.16		
18.....							.13	--	e .1
19.....							.15		
20.....							102	9,840	s 2,070
21.....							372	--	e 2,500
22.....							60	210	34
23.....							20	100	5.4
24.....							10	52	1.4
25.....							6.5	200	3.5
26.....							4.6	80	1.0
27.....							12	2,000	sa 92
28.....							3.6	332	s 3.6
29.....							1.3	210	.7
30.....							.89	128	.3
31.....							--	--	--
Total.							600.22	--	4,739.7

e Estimated.
s Computed by subdividing day.
a Computed from estimated concentration graph.

HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, June to September 1952--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	0.84	99	0.2	0	--	0	0.09	112	s0.1
2	.74	117	.2	0	--	0	.13	130	
3	1.1	88	.3	0	--	0	.10	--	
4	.62	110	.2	0	--	0	.04	--	(t)
5	.36	126	.1	0	--	0	.02	--	
6	.26	90	.1	0	--	0	.01	--	
7	.24	88	.1	0	--	0	0	--	0
8	.41	100	a .1	0	--	0	0	--	0
9	.26	45		.21	270	sa .5	0	--	0
10	.16	--		1.9	390	sa 8.5	0	--	0
11	.10	--	(t)	62	1,400	sb 280	0	--	0
12	.05	--		4.4	186	2.2	0	--	0
13	.07	40		.36	130	.1	0	--	0
14	1.5	375	s3.8	1.9	550	sb 19	7.6	830	sa 38
15	.54	172	.3	14	570	sa 31	.33	160	.1
16	.31	108	a .1	1.2	180	a .6	.12		
17	.22	80	(t)	.33	142	.1	.06	--	(t)
18	.39	60	.1	.24	126	a .1	.03		
19	.26	80	.1	.18	119	a .1	.01		
20	.15	59	(t)	3.9	845	s17	0	--	0
21	.06	35		2.4	173	sa 1.6	0	--	0
22	.02	--		.28	--	e .1	0	--	0
23	0	--	0	.16			0	--	0
24	0	--	0	.12			0	--	0
25	0	--	0	.09			0	--	0
26	0	--	0	.09			0	--	0
27	0	--	0	.06	--	(t)	0	--	0
28	0	--	0	.04			0	--	0
29	0	--	0	.03			0	--	0
30	0	--	0	.02			0	--	0
31	0	--	0	.02			--	--	--
Total	8.66	--	5.8	93.93	--	361.1	8.54	--	38.4

Total discharge for period June 6 to Sept. 30, 1952 (cfs-days)..... 711.35
Total load for period June 6 to Sept. 30, 1952 (tons)..... 5,145.0

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.

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