Quality of Surface Waters of the United States 1953

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:

C. G. Paulsen ..... Chief Hydraulic Engineer
S. K. Love ..... Chief, Quality of Water Branch

P. C. Benedict, regional engineer .... Lincoln, Nebr.

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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, 1952 , to September 30, 1953 . 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.

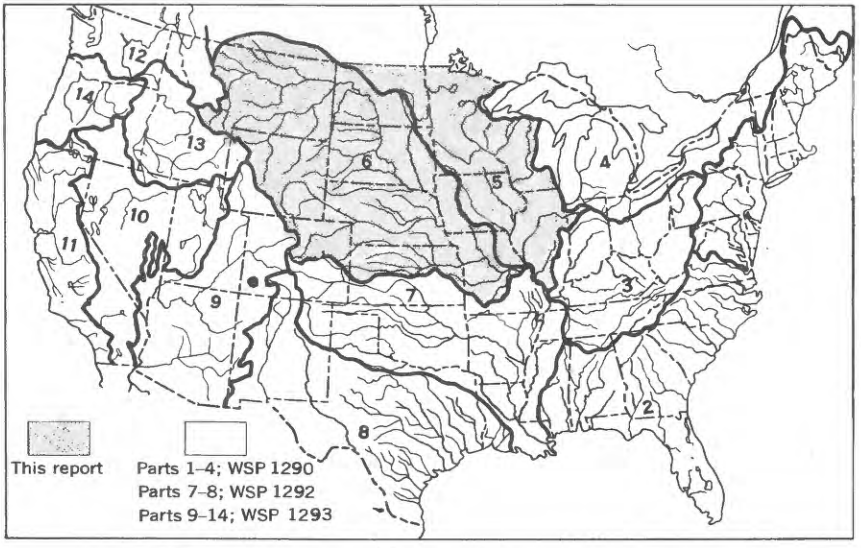

Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1953. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

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, 1953, 73 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 59 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 64 stations during the year ended September 30, 1953. 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 50 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 and is not considered in this report. All other undissolved material in transport is termed suspended sediment and generally constitutes the major part of the total sediment load. At the present time no reliable method has been developed for determining bed load on a routine basis.

COLLECTION AND EXAMINATION OF SAMPLES

CHEMICAL QUALITY

Samples for chemical 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

1,000,000 times the ratio of the weight of sediment to the weight of water-sediment mixture. Daily sediment loads are expressed in tons per day, and except for subdivided days are usually obtained by multiplying daily mean sediment concentration in parts per million by the daily mean discharge, and the appropriate conversion factor, normally 0.0027.

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

COMPOSITION OF SURFACE WATERS

All natural waters contain dissolved mineral matter. Water in contact with soils or rock, even for only a few hours, will dissolve some rock materials. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rocks or soils through which the water has passed and the length of time it has been in contact with the rocks or soils. Some streams are fed by both surface runoff and underground water from springs or seeps. Such streams reflect the chemical character of their concentrated underground sources during dry periods and are more dilute during periods of heavy rainfall. Underground water is usually more highly concentrated than surface runoff as it remains in contact with the rocks and soils for much longer periods. The concentration of dissolved solids in a river water is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or--in irrigated regions--by return drain waters.

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

MINERAL CONSTITUENTS IN SOLUTION

Silica (SiO_2)

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

Aluminum (Al)

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

Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. Waters impounded in large reservoirs may contain manganese that has been dissolved from the mud on the bottom of the reservoir by action of carbon dioxide produced by anaerobic fermentation of organic matter. Manganese is not regularly determined in areas where it is not present in the waters in appreciable amounts. It is especially objectionable in water used in laundry work and in textile processing. Concentrations as low as 0.2 part per million may cause a dark-brown or black stain on fabrics and porcelain fixtures. Appreciable quantities of manganese are often found in waters containing objectionable quantities of iron.

Iron (Fe)

Iron is dissolved from many rocks and soils. On exposure to the air, normal basic waters that contain more than 1 part per

million of iron soon become turbid with the insoluble reddish ferric oxide produced by oxidation. Surface waters, therefore, seldom contain as much as 1 part per million of dissolved iron, although some acid waters carry large quantities of iron in solution. Iron causes reddish-brown stains on white porcelain or enameled ware and fixtures and on fabrics washed in the water.

Calcium (Ca)

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

Magnesium (Mg)

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

Sodium and potassium (Na and K)

Sodium and potassium are dissolved from practically all rocks. Sodium is the predominant cation in some of the more highly mineralized waters found in the western United States. Natural waters that contain only 3 or 4 parts per million of the two together are likely to carry almost as much potassium as sodium. As the total quantity of these constituents increases, the proportion of sodium becomes much greater. Moderate quantities of sodium and potassium have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 or 100 parts per million of the two may require careful operation of steam boilers to prevent foaming. More highly mineralized waters that contain a large proportion of sodium salts may be unsatisfactory for irrigation.

Carbonate and bicarbonate (CO_3 and HCO_3)

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

Sulfate (SO_4)

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

Chloride (Cl)

Chloride is dissolved from rock materials in all parts of the country. Surface waters in the humid regions are usually low in chloride, whereas streams in arid or semiarid regions may contain several hundred parts per million of chloride leached from soils and rocks, especially where the streams receive return drainage from irrigated lands or are affected by ground-water-inflow carrying appreciable quantities of chloride. Large quantities of chloride may affect the industrial use of water by 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, 1951, and 1952, 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, 1198, and 1251.

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 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 City, Iowa.

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

In addition to these cooperative programs, many of the stations were operated from funds appropriated directly to the Geological

Survey for quality-of-water investigations.

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

DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, Carl G. Paulsen, Chief Hydraulic Engineer, and S. K. Love, Chief of the Quality of Water Branch.

The chemical quality and sediment investigations in the Missouri River basin in Colorado, Iowa, Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming were begun in 1945. The studies were made as a part of the program of the Interior Department for development of the Missouri River basin through funds provided directly to the Geological Survey for this purpose. The studies were made under the direction of P. C. Benedict, regional engineer, Lincoln, Nebr. A few chemical analyses of streams in the Hudson Bay basin in North Dakota were made in connection with this program. Any additional 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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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 1953.
Water temperatures: January 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 670 ppm May 31 to June 30; minimum, 270 ppm Oct. 1-31.
Hardness: Maximum, 336 ppm Feb. 23 to Mar. 22; minimum, 150 ppm Apr. 3-30.
Specific conductance: Maximum daily, 1,130 micromhos June 12; minimum daily, 373 micromhos Oct. 15.
Water temperatures: Maximum, 79°F July 14; minimum, 33°F Jan. 8, 9, Feb. 17, Apr. 17.
EXTREMES, 1951-53.--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 1952 to September 1953 given in WSP 1278.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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				Hardness as $CaCO_3$		Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
														Residue at 180°C	Sum								
Oct. 1-31, 1952	1.2			54	16	18		233	44	4.0		1.1	0.06	270		0.37	0.87	200	9	16	0.6	440	8.2
Nov. 1-30	8.0			52	19	39		280	60	6.5		1.2	.09	336		.46	7.26	209	0	28	1.2	528	8.2
Dec. 1-31	2.6			60	23	71		380	78	12		1.6	.17	469		.64	3.29	245	0	38	2.0	715	8.2
Jan. 1-4, 1953	3.0			62	22	51		349	62	9.5		2.0	.11	419		.57	3.39	246	0	30	1.4	658	--
Jan. 5-9	2.4			60	25	65		--	75	--		--	.14	--		--	--	254	--	36	1.8	--	--
Jan. 10-Feb. 22	2.4			65	29	58		399	76	12		2.5	.13	473		.64	3.07	280	0	30	1.5	742	8.1
Feb. 23-Mar. 22	3.4			85	30	59		456	75	13		2.9	.14	530		.72	4.87	336	0	27	1.4	840	8.1
Mar. 23-27	7.8			81	29	50		418	74	13		2.4	.14	486		.66	10.2	321	0	25	1.2	787	7.8
Mar. 28-Apr. 2	71.7			60	30	80		395	112	16		2.3	.19	530		.72	103	273	0	37	2.1	838	7.9
Apr. 3-30	36.4			34	16	49		200	84	10		2.5	.12	330		.45	32.4	150	0	40	1.7	515	7.5
May 1-4	45.0			46	22	64		262	105	17		1.3	.16	430		.58	52.2	205	0	40	1.9	669	7.3
May 5-30	62.2			54	29	129		387	181	23		1.8	.31	652		.89	109	253	0	52	3.5	976	7.6
May 31-June 30	61.5			60	30	123		426	165	17		2.2	.31	670		.91	111	274	0	49	3.2	973	7.8
July 1-11	135			31	31	104		365	125	11		2.0	.22	536		.73	195	204	0	52	3.2	787	8.2
July 12-25	32.0			41	26	120		407	113	10		2.1	.16	566		.77	48.9	208	0	56	3.5	831	8.1
July 26-Aug. 13	6.9			54	14	78		344	78	8.0		2.3	.23	438		.60	8.16	192	0	45	2.4	672	7.9
Aug. 14-31	1.2			50	19	61		322	68	6.5		2.1	.21	396		.54	1.28	202	0	38	1.9	618	8.0
Sept. 1-30	2.1			57	17	41		299	55	5.5		1.1	.12	360		.49	2.04	211	0	29	1.2	555	7.8
Weighted average a	21.7			49	27	100		362	133	15		2.1	0.23	552		0.75	32.3	234	0	48	2.8	823	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1952 to September 1953.

RED RIVER OF THE NORTH BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/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	56	43	38	a38	--	--	37	43	68	a70	72	73
2	45	37	39	38	36	35	35	49	66	71	--	72
3	56	--	39	37	37	36	35	--	69	71	67	61
4	34	40	40	--	40	36	35	50	65	--	68	58
5	--	39	40	35	38	36	--	64	--	--	67	59
6	40	37	40	34	38	35	35	61	63	69	63	--
7	45	37	--	36	38	--	35	58	--	67	65	--
8	48	37	40	33	--	--	34	63	60	66	71	63
9	--	--	38	33	38	37	35	63	60	69	--	66
10	59	39	39	36	36	37	34	--	65	76	69	73
11	49	--	38	--	37	--	34	51	--	74	68	63
12	34	41	36	37	37	35	--	42	73	--	69	60
13	45	39	38	34	38	36	36	43	--	75	74	--
14	45	40	--	--	35	38	36	43	--	79	68	65
15	35	40	40	--	--	--	35	48	74	74	69	64
16	42	--	37	37	35	38	35	54	76	78	73	63
17	--	39	37	38	33	40	33	--	74	74	--	58
18	47	38	--	--	36	37	36	--	77	76	76	52
19	--	35	38	36	36	40	--	55	70	--	73	56
20	42	35	38	37	35	43	--	53	a64	72	73	--
21	43	39	--	38	35	37	42	51	--	73	73	51
22	44	34	39	--	--	--	--	--	a63	70	72	63
23	46	39	36	38	--	35	42	58	65	74	--	52
24	46	38	38	38	37	35	42	--	62	72	71	53
25	49	--	--	--	38	40	40	66	63	74	73	51
26	--	35	--	38	39	38	--	60	67	--	71	51
27	39	--	38	37	38	40	42	61	66	--	69	--
28	38	38	--	34	36	36	41	60	--	72	68	53
29	39	37	37	36	--	--	52	60	a74	72	69	52
30	40	--	37	35	--	38	--	--	70	76	--	57
31	41	--	38	36	--	35	--	--	--	--	78	--
Average	44	--	--	--	37	--	--	--	--	--	70	60

a Observation made between 2 p. m. and 4 p. m.

SOURIS RIVER NEAR VERENDRYE, N. DAK.

LOCATION.--At gaging station, 2.7 miles north of Verendrye, McHenry County, and 7½ miles southwest of (19 miles upstream from) mouth of Wintering River.
DRAINAGE AREA.--12,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1951, August 1952 to September 1953.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1278.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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. 10, 1952	21			--	--	160		442	33	150	68							322	0	52	3.9	1,160	8.7
Nov. 6	33			--	--	133		426	0	140	58							287	0	50	3.4	1,040	7.7
Dec. 3	28			--	--	148		496	0	170	54							338	0	49	3.5	1,170	7.8
Feb. 4, 1953	14			77	36	105		448	0	144	35							339	0	40	2.5	1,050	7.5
Mar. 7	24			--	--	110	--	427	0	149	44							--	--	42	2.6	1,080	7.2
Mar. 31	225			30	12	52		167	0	84	9.0							123	0	48	2.1	470	7.1
May 6	202			--	--	132	--	308	0	235	16							--	--	55	3.7	964	8.1
June 2	676			44	21	81		233	0	158	11							195	4	47	2.5	725	7.4
July 2	1,590			38	21	47		228	0	82	8.0							181	0	36	1.5	538	7.7
July 23	1,430			45	25	63		271	0	114	10							217	0	39	1.9	663	7.9
Sept. 2	137			60	28	108		374	0	158	20							265	0	47	2.9	886	7.7

PAINT CREEK BASIN

PAINT CREEK AT WATERVILLE, IOWA

LOCATION.--At gaging station, on downstream side of bridge on State Highway 373 and 0.5 mile northwest of Waterville, Allamakee County.
DRAINAGE AREA.--42.7 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1952 to September 1953.
Sediment records: November 1952 to September 1953.
EXTREMES, November 1952 to September 1953.--Water temperatures: Maximum, 72°F May 10; minimum, freezing point on several days during November to March.
Sediment concentrations: Maximum daily, 6,700 ppm July 26; minimum daily, not determined.
Sediment loads: Maximum daily, 23,000 tons July 26; minimum daily, less than 1.0 ton on many days.
REMARKS.--Flow affected by ice Nov. 25-28, Jan. 16-25, Feb. 21. Records of discharge for November 1952 to September 1953 given in WSP 1278.

Temperature (°F) of water, November 1952 to September 1953

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

PAINT CREEK BASIN--Continued

PAINT CREEK AT WATERVILLE, IOWA--Continued

Suspended sediment, November 1952 to September 1953

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				--	--	--	9.8	--	
2				--	--	--	9.8	--	
3				--	--	--	9.8	--	
4				--	--	--	11	35	
5				--	--	--	10	--	
6				--	--	--	10	--	e 0.9
7				--	--	--	9.8	31	
8				--	--	--	10	--	
9				--	--	--	10	--	
10				--	--	--	10	--	
11				--	--	--	10	--	
12				--	--	--	9.8	--	
13				--	--	--	9.8	--	
14				9.8			9.8	26	
15				9.8			9.2	--	
					56	1.6			
16				10			9.2	--	e .7
17				13			9.2	--	
18				13			9.2	25	
19				9.8	38	1.1	9.8	--	
20				9.8			10	--	
21				9.8			9.8	--	
22				9.8	--		9.8	--	
23				9.8	--		9.8	--	
24				9.8	--		9.2	35	
25				9.2	--		9.2	--	
26				8.0	89	e 1	9.8	--	e .9
27				9.3	--		9.2	--	
28				9.7	--		9.2	--	
29				9.8	--		9.2	--	
30				9.8	34		9.2	--	
31				--	--		9.2	--	
Total				170.2	--	19.8	299.8	--	25.9

Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	9.2	--		7.4	--		11	--	
2	9.2	38		7.4	--		9.8	23	
3	9.2	--		7.4	11		9.8	--	
4	9.2	--		7.4	--		9.2	18	
5	8.6	--		8.0	--		9.2	--	e 0.6
						e 0.3			
6	8.6	30		8.6	11		8.6	32	
7	8.6	--		8.0	--		8.0	--	
8	8.6	--		8.0	--		8.0	--	
9	8.9	33		7.4	--		14	55	s 2.3
10	9.2	--	e 0.8	8.0	17		141	1,010	s 947
11	8.6	--		9.2	--		164	874	s 642
12	8.6	--		8.6	--		179	906	s 625
13	8.6	24		8.6	31		86	710	s 210
14	8.6	--		8.0	--		83	660	sa 200
15	11	--		8.0	--		77	500	a 105
						e .6			
16	9.0	34		7.4	--		35	170	16
17	8.8	--		7.4	24		56	490	sa 100
18	8.6	--		7.4	--		40	260	28
19	8.4	--		8.0	--		29	180	a 14
20	8.2	6		44	186	s 39	23		
21	8.0	--		15			23	--	e 10
22	7.8	--		13			23		
23	7.6	11		13			39	360	sb 40
24	7.5	--		13			26	70	a 4.9
25	7.5	--	e .3	11	26	.9	22	--	
26	7.4	--		11			19	--	
27	7.4	28		14			18	--	e 2
28	7.4	--		15			17	--	
29	7.4	--		--	--	--	16	--	
30	7.4	11		--	--	--	16	36	
31	7.4	--		--	--	--	18	37	
Total	260.5	--	18.3	299.2	--	54.6	1,237.6	--	2,983.0

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

PAINT CREEK BASIN--Continued

PAINT CREEK AT WATERVILLE, IOWA--Continued

Suspended sediment, November 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	18	60	2.9	24			18		
2	18	--	e 3	23	50	3.1	18		
3	24	90	5.8	23			18		
4	21	--	e 5	23			17		
5	19			22			17		
6	18	--	e 2	21	39	2.2	18	147	7.0
7	18			21			18		
8	18			21			18		
9	20	48	2.6	19			18		
10	37	297	30	21	42	s 2.6	18		
11	27	132	9.6	20	146	7.9	18		
12	24	90	5.8	18	86	4.2	17		
13	22	88	5.2	17	65	3.0	56	3,770	s 908
14	21	73	4.1	18			23	920	57
15	30	150	12	17			20	320	a 17
16	28	180	14	16			18	282	14
17	25	116	7.8	16	49	2.3	16	242	10
18	24	117	7.6	17			15	173	
19	23	72	4.5	17			15	--	
20	21			17			15	--	
21	20	62	3.3	20			14	172	e 6
22	19			25	84	5.7	13	--	
23	18			19	99	5.1	12	153	
24	20			51	3,280	s 878	12	--	
25	26	70	4.9	31	2,010	s 207	13	390	14
26	21	64	3.6	24	286	19	17	220	10
27	20			23			13	185	6.5
28	20	42	2.3	20	183	9.9	30	--	e 25
29	20			20			19	94	4.8
30	21			19			15	104	4.2
31	--	--	--	18			--	--	--
Total	661	--	162.1	660	--	1,223.8	549	--	1,276.5

Day	July			August			September		
1	14			25	84	5.7	15		
2	13	123	4.3	141	1,900	sb 1,100	15		
3	12			117	1,130	s 410	14		
4	12			80	356	77	15		
5	15	--	e 10	55	186	28	15	22	0.9
6	17	--	e 12	49	138	18	15		
7	13			42	200	23	15		
8	12			37	119	12	15		
9	12			36	87	6.5	15		
10	11	27	.9	32			15		
11	11			30	66	5.3	14		
12	12			30			14		
13	14			27			14	29	1.1
14	13	46	1.6	26			14		
15	11	137	4.1	25	52	3.5			
16	11	100	3.0	25			14		
17	40	--	e 60	23			13		
18	15	--	e 12	23			13	--	
19	12			21			13	--	
20	12	84	2.9	21			13	--	
21	15			20	29	1.6	13	--	
22	13			19			13	--	
23	10			19			13	--	
24	10	73	2.0	18			13	41	e 1
25	10			18			13	--	
26	858	6,700	sb 23,000	17			14	--	
27	57	800	123	17			13	--	
28	36	170	17	16			13	40	
29	30	102	8.3	16	43	1.9	13	--	
30	26	72	5.1	16			13	--	
31	27	89	6.5	16			--	--	--
Total	1,374	--	23,303.7	1,057	--	1,739.6	416	--	30.1

Total discharge for period Nov. 14, 1952 to Sept. 30, 1953 (cfs-days) 6,984.3
Total load for period Nov. 14, 1952 to Sept. 30, 1953 (tons) 30,837.4

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

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 1953.
Water temperatures: January 1944 to September 1953.
Sediment records: October 1943 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 338 ppm Dec. 28 to Jan. 14; minimum, 110 ppm Feb. 20-27.
Hardness: Maximum, 277 ppm Oct. 1-31; minimum, 70 ppm Feb. 20-27.
Specific conductance: Maximum daily, 611 micromhos Jan. 11; minimum daily, 153 micromhos Feb. 21.
Water temperatures: Maximum, 87°F Aug. 31; minimum, 33°F on several days during January and February.
Sediment concentrations: Maximum daily, 7,800 ppm June 13; minimum daily, not determined.
Sediment loads: Maximum daily, 83,000 tons June 28; minimum daily, not determined.
EXTREMES, 1943-53.--Dissolved solids (1944-53): Maximum, 436 ppm Jan. 26 to Feb. 17, 1948; minimum, 96 ppm Jan. 5-10, 1946.
Hardness (1944-53): Maximum, 345 ppm Dec. 21-31, 1944; minimum, 54 ppm Jan. 5-10, 1946.
Specific conductance (1945-53): Maximum daily, 739 micromhos Feb. 3, 1948; minimum daily, 108 micromhos Jan. 9, 1946.
Water temperatures (1944-53): Maximum, 89°F July 4, 1949; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 7,800 ppm June 13, 1953; 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. Flow affected by ice Nov. 22 to Dec. 4, Dec. 9-14, 26-28, Jan. 15-17, 25-28, Feb. 1-3, 13-19, Mar. 1, 4-7. Records of discharge for water year October 1952 to September 1953 given in WSP 1278.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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
Oct. 1-31, 1952	165							276	64	12				336		0.46	150	277	51			554	7.7
Nov. 1-16.....	171							274	64	13				336		.46	155	274	49			558	8.0
Nov. 17-20.....	1,011							131	37	7.0				184		.25	502	130	23			301	7.3
Nov. 21-23.....	307							175	50	14				258		.35	214	186	42			418	7.5
Nov. 24-30.....	289							209	58	12				286		.39	223	220	49			472	7.6
Dec. 1-19.....	236							259	55	13				332		.45	212	262	50			538	7.9
Dec. 20-27.....	495							176	5.	8.0				246		.33	329	180	36			388	7.4
Dec. 28-Jan. 14, 1953.....	219							273	58	14				338		.46	200	270	46			561	8.0
Jan. 15-30.....	521							147	33	8.0				204		.28	287	150	29			334	7.4
Jan. 31-Feb. 5.	328							247	54	13				318		.43	282	248	45			523	7.3
Feb. 6-19.....	1,619							106	27	6.0				162		.22	708	107	20			249	7.1
Feb. 20-27.....	5,973							75	11	3.0				110		.15	1,770	70	8			164	7.0
Feb. 28-Mar. 3	2,993							122	23	3.5				178		.24	1,440	125	25			284	7.1
Mar. 4-10.....	1,459							187	41	7.0				264		.36	1,040	193	40			403	7.6
Mar. 11-31....	2,584							173	43	6.0				266		.36	1,860	189	47			397	7.7

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				Hardness as $CaCO_3$		Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
														Residue at 180°C	Sum								
Apr. 1-4, 1953	3,373							177	51	6.5				278		0.38	2,530	195	50			414	7.6
Apr. 5-30	1,958							233	56	7.5				318		.43	1,680	250	59			498	7.9
May 1-23	2,311							228	57	7.0				318		.43	1,980	248	61			493	7.3
May 24-27	4,555							108	32	3.0				164		.22	2,020	119	30			259	6.8
May 28-June 6	1,842							220	51	6.5				308		.42	1,530	235	55			465	7.4
June 7-17	2,794							142	32	5.0				186		.25	1,400	141	25			306	7.3
June 18-27	1,324							251	54	8.0				324		.44	1,160	258	52			516	7.7
June 28-July 1	4,370							133	26	5.5				172		.23	2,030	128	19			278	7.2
July 2-6	2,430							175	39	5.5				227		.31	1,490	184	40			381	7.4
July 7-15	1,444							222	49	6.0				279		.38	1,090	226	44			454	7.8
July 16-22	892							242	52	7.5				300		.41	723	241	43			485	7.8
July 23-Aug. 7	631							215	51	8.0				269		.37	458	216	40			449	7.6
Aug. 8-18	836							232	44	7.5				286		.39	646	234	44			468	7.9
Aug. 19-23	415							198	55	8.5				252		.34	282	206	44			426	7.6
Aug. 24-31	286							222	57	9.5				281		.38	217	227	45			471	7.6
Sept. 1-30	168							--	--	--				--		--	--	--	--			533	--
Weighted average a	1,261							178	37	6.4				246		0.33	838	186	40			387	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1952 to September 1953.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 7 a. m. and 10 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	67	49	36	a 37	33	36	44	54	72	78	83	80
2	62	50	37	37	36	36	46	54	71	78	82	a 78
3	59	46	37	36	36	38	47	--	70	77	82	a 81
4	59	49	38	37	36	35	47	55	74	78	84	a 80
5	60	48	38	33	38	38	47	56	74	78	78	72
6	54	47	43	35	38	35	49	56	69	76	76	--
7	53	45	44	33	37	34	51	58	--	77	75	66
8	50	46	39	37	a 37	--	52	62	68	74	73	67
9	51	44	39	36	36	37	52	60	73	76	--	68
10	54	43	38	38	a 36	38	49	68	68	73	73	a 74
11	52	42	37	36	a 35	43	48	63	71	74	74	69
12	55	44	36	36	33	44	48	63	74	78	74	67
13	52	43	36	36	36	47	47	57	74	75	74	67
14	52	46	36	38	37	43	50	59	74	74	74	64
15	49	42	37	--	34	--	50	63	74	75	75	65
16	50	48	38	a 34	34	41	47	62	76	78	73	62
17	42	52	38	a 34	a 35	42	46	63	74	78	74	67
18	47	54	35	a 33	36	45	44	61	76	78	a 79	69
19	a 58	52	38	38	37	45	48	62	80	82	a 81	65
20	47	49	38	36	38	47	45	65	81	81	a 77	67
21	48	46	38	37	33	48	49	64	81	78	--	61
22	48	45	39	37	37	52	54	63	78	78	--	59
23	47	43	38	38	--	50	54	62	75	78	--	60
24	49	44	38	37	37	44	57	--	75	78	a 79	66
25	50	42	--	37	36	46	55	63	--	78	a 80	64
26	55	--	36	36	36	50	51	65	73	80	--	61
27	50	35	36	38	38	46	49	66	74	80	76	62
28	46	36	--	38	38	48	51	65	75	80	77	62
29	48	37	37	35	--	--	52	66	72	81	77	63
30	48	39	38	36	--	48	54	70	76	81	83	63
31	49	--	38	36	--	43	--	73	--	82	a 87	--
Average	52	45	38	36	36	43	49	62	74	78	78	67

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

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953

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	130			124			225		
2	102			160			200		
3	288			223			250		
4	100			161			260		
5	100	100	42	168			260	31	21
6	214			199			272		
7	110			128			260		
8	237			107			250		
9	102			262	56	26	265		
10	174			147			250		
11	158			183			270		
12	146			179			250		
13	215			214			110		
14	159			160			120		
15	111			160			303	35	21
16	244	80	36	157			246		
17	89			1,630	350	sa 1,800	219		
18	244			1,207	482	1,570	192		
19	85			642	240	416	274		
20	294			566	190	290	807	70	153
21	92			361	123	120	813	100	220
22	179			310			564	59	90
23	209			250			454	39	48
24	113			290			489		
25	147			350			310		
26	246	67	31	440	78	60	245	17	14
27	163			270			280		
28	158			220			255		
29	170			190			228		
30	169			260			302		
31	167			--	--	--	252		
Total	5,115	--	1,126	9,718	--	5,152	9,475	--	1,022

Day	January			February			March		
1	266			250			3,100	500	4,190
2	232			210	34	23	2,510	256	1,730
3	222			310			2,110	170	968
4	228			238			1,450		
5	216			630	100	sa 260	1,400		
6	98			2,350	553	3,510	1,500	37	142
7	200	27	14	2,110	410	2,340	1,380		
8	194			2,030	419	2,300	1,310		
9	231			1,950	365	1,920	1,470		
10	116			1,870	311	1,570	1,700	200	sa 1,100
11	188			1,750	221	1,040	2,910	1,150	9,040
12	254			1,870	258	1,300	2,430	850	5,580
13	125			2,000	232	1,250	2,510	795	5,390
14	333	48	43	2,100	342	1,940	2,830	1,200	sa 10,000
15	800	180	b 390	1,500	230	931	3,260	1,290	11,400
16	740	158	316	960	210	544	3,260	1,430	12,600
17	320			700	110	208	3,080	1,280	10,600
18	806			620	72	121	2,750	600	4,460
19	869	76	138	860	110	sa 310	2,590	420	2,940
20	698			7,910	2,990	s 70,400	2,430	350	2,300
21	592			6,970	1,300	s 25,900	2,270	245	1,500
22	590	58	82	5,200	920	12,900	2,110	250	1,420
23	494			5,400	890	13,000	2,270	310	1,900
24	422			5,400	965	14,100	2,750	910	6,760
25	380			5,600	700	10,600	3,080	1,570	13,100
26	320			5,700	555	8,540	2,590	945	6,610
27	350	22	20	5,600	530	8,010	2,270	410	2,510
28	310			4,250	505	5,790	2,030	215	1,180
29	327			--	--	--	1,830	185	914
30	316			--	--	--	2,030	360	sa 2,200
31	329			--	--	--	2,990	770	6,220
Total	11,566	--	1,951	76,338	--	188,876	72,200	--	127,464

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

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	3,620	1,000	9,770	2,830	478	3,650	1,710	230	1,060
2	3,530	910	8,670	2,910	530	4,160	1,590	200	859
3	3,350	720	6,510	3,170	1,090	9,330	1,470	190	754
4	2,990	555	4,480	3,170	1,040	8,900	1,390	150	563
5	2,670	390	2,810	3,170	740	6,330	1,390	150	563
6	2,510	306	2,070	2,990	570	4,600	1,910	310	1,600
7	2,350	252	1,600	2,910	450	3,540	2,190	1,600	9,460
8	2,190	229	1,350	2,750	360	2,670	2,350	1,920	12,200
9	2,110	205	1,170	2,590	340	2,380	2,830	3,800	29,000
10	2,070	182	1,020	2,430	361	2,370	3,080	5,220	43,400
11	1,990			2,270	309	1,890	2,750	3,700	27,500
12	1,950			2,190	270	1,600	2,670	2,840	20,500
13	1,910			2,030	247	1,350	3,440	7,800	72,400
14	1,870	136	695	1,830	337	1,670	3,800	5,500	56,400
15	1,870			1,710	190	877	3,080	3,180	26,400
16	1,870			1,630	188	827	2,510	1,670	11,300
17	1,790			1,630	167	735	2,030	1,080	5,920
18	1,710	•		1,500	178	721	1,790	510	2,460
19	1,670			1,470	146	579	1,630	360	1,580
20	1,630			1,430	126	486	1,470	270	1,070
21	1,670	99	439	1,470	120	476	1,310	250	884
22	1,670			2,240	790	sa 5,900	1,200	250	810
23	1,590			2,830	1,830	14,000	1,160	220	689
24	1,550			4,400	5,370	s 72,900	1,090	210	618
25	1,710	282	1,300	5,400	5,500	80,200	1,020	190	523
26	1,790	129	623	4,900	4,380	57,900	1,020	180	496
27	2,030	265	1,450	3,520	2,060	19,600	1,550	430	sa 2,200
28	2,110	525	2,990	2,670	885	6,380	4,160	7,100	sa 83,000
29	2,110	378	2,150	2,270	520	3,190	4,800	6,000	77,800
30	2,510	436	2,950	2,110	320	1,820	4,900	2,500	33,100
31	--	--	--	1,910	250	1,290	--	--	--
Total	64,390	--	58,851	80,330	--	322,321	67,290	--	525,109

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	3,620	1,440	14,100	692			244		
2	2,670	1,300	9,370	662			228		
3	2,510	1,300	8,810	439			130		
4	2,270	2,120	13,000	656	117	187	154		
5	2,270	1,500	9,190	424			198		
6	2,430	1,900	sa 13,000	462			178		
7	1,830	600	2,960	805			268		
8	1,870	810	4,090	1,020			180	106	55
9	1,630	730	3,210	1,020			216		
10	1,550	470	1,970	950	170	452	159		
11	1,390	521	1,960	950			192		
12	1,270	475	1,630	980			242		
13	1,200	263	852	890			112		
14	1,200	230	745	830			194		
15	1,060			752	144	312	191		
16	980			710			102		
17	860			650			268		
18	890	179	441	443			100		
19	860			406			214		
20	920			443			100		
21	980			484			265		
22	752			388	100	104	98		
23	656			355			128	102	40
24	662			416			99		
25	662			227			144		
26	746	119	213	319			118		
27	722			322	133	116	98		
28	686			312	185	156	235		
29	662			250			94		
30	628			264	88	54	90		
31	534			174			--	--	--
Total	40,970	--	90,332	17,695	--	6,359	5,039	--	1,425

Total discharge for year (cfs-days)..... 460,126
Total load for year (tons)..... 1,329,988

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 station on upstream side of bridge on State Highway 1, at east side of Iowa City, Johnson County, and 2.8 miles upstream from mouth.
DRAINAGE AREA.--3.01 square miles.
RECORDS AVAILABLE.--Sediment records: April 1952 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 4,970 ppm May 24; minimum daily, no flow on many days during August and September.
Sediment loads: Maximum daily, 1,980 tons May 24; minimum daily, 0 ton on many days during August and September.
EXTREMES, April 1952 to September 1953.--Sediment concentrations: Maximum daily, 4,970 ppm May 24, 1953; minimum daily, no flow on many days during August and September 1953.
Sediment loads: Maximum daily, 1,980 tons May 24, 1953; minimum daily, 0 ton on many days during August and September 1953.
REMARKS.--Flow affected by ice Dec. 14-17, 25-28, Jan. 4-6, 15-17, 26-29, Feb. 4, 5, 13-18, 22-24. Records of discharge for water year October 1952 to September 1953 given in WSP 1278.

Suspended sediment, water year October 1952 to September 1953

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	0.01			0.05	--		0.31	--	
2	.01			.04	--		.36	--	
3	.01			.04	--		.36	--	
4	.01			.02	--		.41	--	
5	.01			.03	--		.45	52	
6	.01			.04	106		.41	--	e0.1
7	.01			.02	--		.41	--	
8	.02			.02	--	(t)	.60	--	
9	.02			.02	--		.60	--	
10	.02			.02	--		.48	--	
11	.02			.04	--		.38	--	
12	.02			.05	--		.34	--	
13	.04			.06	--		.27	--	
14	.03			.05	85		.22	--	
15	.02		(t)	.06	--		.20	--	(t)
16	.06			6.3	693	s158	.23	--	
17	.05			48	3,750	s1,080	.26	76	
18	.04			2.0	130	.7	.29	--	
19	.03			.60	40	.1	2.6	190	sa9.3
20	.03			.41	70	.1	13	350	sb19
21	.02			.32	--	.1	1.9	--	e1.6
22	.04			.27	--	(t)	1.7	297	1.4
23	.04			.27	53	(t)	1.8	--	e1.2
24	.03			.36	80	a.1	1.3	--	e.5
25	.03			3.7	519	s12	.70		
26	.03			1.3	200	a.7	.56		
27	.03			.50			.46	--	e.1
28	.05			.34	--	e.1	.40		
29	.06			.38			.48		
30	.08			.31			.45		
31	.07			--	--	--	.45		
Total	0.95		0.2	65.62	--	1,252.4	32.38	--	35.1

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.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	0.45	--		0.14	43		0.66		
2.....	.48	17		.14	--	(t)	.72		
3.....	.38	--		.18	--		.72		
4.....	.30	--		1.0	110	sa0.6	.72		
5.....	.20	--		40	1,100	s366	.72	--	e0.2
6.....	.16	--	(t)	18	730	sb89	.57		
7.....	.24	--		4.5	150	1.8	.48		
8.....	.29	--		2.2	--	.6	.60		
9.....	.29	--		.98	--		.98	180	a.5
10.....	.31	--		1.2	51		15	3,000	sb410
11.....	.24	71		2.0	--		2.8	170	1.3
12.....	.26	84	0.1	1.6	--		2.4	160	1.0
13.....	1.4	130	sa.8	.80	--	e.2	1.8	101	.5
14.....	5.9	300	6.4	.60	--		20	3,920	s649
15.....	3.0	290	sb3.2	.50	--		5.5	210	3.1
16.....	.50	100	a.1	.40	--		3.0	143	1.2
17.....	.41	--	e.1	.47	158		2.4	117	.8
18.....	.38	38		.54	--		2.8	74	.6
19.....	.36	--		59	2,010	s1,560	1.9	94	.5
20.....	.32	--		92	2,900	sb1,500	1.8	196	1.0
21.....	.32	--		1.8	--	e1.5	1.8	134	.7
22.....	.36	--		1.2	131	.4	2.1	134	.8
23.....	.43	36		1.0			3.0	99	.8
24.....	.36	--	(t)	.90			1.8		
25.....	.27	--		.98	--	e.2	1.6		
26.....	.23	--		1.0			1.4	56	.2
27.....	.20	--		.93			1.3		
28.....	.19	--		.72			1.1		
29.....	.18	--					1.0		
30.....	.21	--		--	--	--	13	1,520	s72
31.....	.23	--		--	--	--	12	930	30
Total.	18.85	--	11.4	234.78	--	3,523.2	105.67	--	1,176.6

Day	April			May			June		
1.....	7.4	160	3.2	11	630	sb25	0.52		
2.....	4.7	--	e1.2	6.1	162	2.7	.52		
3.....	3.8	85	.9	4.2	99	1.1	.50		
4.....	2.8			3.6			.52	44	0.1
5.....	2.4			3.2			.60		
6.....	2.2			2.8	89	.7	.47		
7.....	2.0			2.3			.43		
8.....	2.0			1.9			4.5	1,200	sb40
9.....	2.2	49	.3	1.6			.76		
10.....	1.8			1.5			.55		
11.....	1.6			1.3	48	.2	.57		
12.....	1.5			1.1			.50	177	.2
13.....	1.2			1.0			.55		
14.....	1.2			1.1			.48		
15.....	1.8			.98			.34		
16.....	1.3			.92	76	.2	.36		
17.....	1.1			.86			.31		
18.....	.98			.80			.26	--	e.1
19.....	.98	28	.1	.76			.23		
20.....	.88			.69			.18	43	
21.....	.84			1.9	195	s1.6	.18	--	
22.....	.84			4.1	1,160	s25	.15	--	
23.....	.72	88	.2	1.3	78	.3	.12	--	(t)
24.....	1.9	96	s.6	24	4,970	s1,980	.12	149	
25.....	1.6	70	.3	2.5	117	.8	.18	156	
26.....	1.6			1.8	--	e.4	.14	--	
27.....	1.3	56	.2	1.2	--		7.3	2,120	s362
28.....	1.2			1.2	60		2.1	1,500	sb26
29.....	1.2			.93	--	e.2	.36	192	.2
30.....	16	3,800	sb270	.80	--		.24	118	.1
31.....	--	--	--	.63	--		--	--	--
Total.	71.04	--	281.5	88.07	--	2,043.8	24.04	--	431.2

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.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

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	0.19			0.09	--				
2	.18	83	(t)	.13	--				
3	.14			.05	84				
4	.18			.04	--				
5	5.2	2,480	s 162	.03	--				
6	2.4	1,200	sb 27	.04	--				
7	.32			.04	81				
8	.23			.02	--				
9	.18			.02	--				
10	.16	100	.1	.01	48	(t)			
11	.15			.05	60				
12	.13			.13	72				
13	.13			.04	--				
14	.44	260	b .3	.02	49				
15	.15	190	a .1	.01	--				
16	.12	173	.1	.01	--				
17	.11	--		.01	53				
18	.11	108	(t)	.02	--				
19	.09	62		.01	--				
20	.11	--		.01	45				
21	.72	260	sa 1.2	0	--	0			
22	.14			0	--	0			
23	.09			.01	--	(t)			
24	.06			0	--	0			
25	.05			0	--	0			
26	.04	--	(t)	0	--	0			
27	.05			0	--	0			
28	.05			0	--	0			
29	.04			0	--	0			
30	.03			0	--	0			
31	.05			0	--	0			
Total	12.04	--	191.8	0.79	--	0.1	0	--	0

Total discharge for year (cfs-days) 654.23
Total load for year (tons) 8,947.3

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

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 1953.
Water temperatures: January 1944 to September 1953.
Sediment records: October 1943 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 366 ppm Jan. 1-15; minimum, 144 ppm Feb. 20-28
Hardness: Maximum, 261 ppm Jan. 1-15; minimum, 99 ppm Feb. 20-28
Specific conductance: Maximum daily, 645 micromhos Jan. 13, 14; minimum daily, 191 micromhos Feb. 25.
Water temperatures: Maximum, 83°F July 31; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 1,030 ppm July 6; minimum daily, not determined.
Sediment loads: Maximum daily, 14,500 tons July 6; minimum daily, not determined.
EXTREMES, 1943-53.--Dissolved solids (1944-53): 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 (1945-53): Maximum daily, 689 micromhos Jan. 24, 1950, Feb. 6, 1951; minimum daily, 138 micromhos Jan. 9, 1946, Mar. 31, 1951.
Water temperatures (1944-53): Maximum daily, 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 Lincoln, Nebr. Flow affected by ice Nov. 25, 26, Jan. 10-12, 15-17, 26-29, Feb. 14-20, Feb. 23 to Mar. 1, Mar. 5-8. Records of discharge for water year October 1952 to September 1953 given in WSP 1278.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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	Color
Oct. 1-31, 1952	769							195	39	28				251		0.34	521	182	22			450	7.4	
Nov. 1-28.....	804							226	31	25				276		.38	599	204	19			491	7.6	
Nov. 29-Dec. 31	687							258	43	33				338		.46	627	247	35			572	7.4	
Jan. 1-15, 1953	651							272	48	37				366		.50	643	261	38			624	7.9	
Jan. 16-19.....	988							170	28	23				238		.32	635	167	28			407	7.3	
Jan. 20-Feb. 5.	733							255	54	34				349		.47	691	247	38			588	7.7	
Feb. 6-19.....	1,290							170	38	23				247		.34	860	172	33			421	7.2	
Feb. 20-28.....	5,781							122	27	7.0				144		.20	2,250	99	0			247	7.3	
Mar. 1-31	4,173							171	44	13				257		.35	2,900	182	42			401	7.6	
Apr. 1-30	3,627							209	53	13				284		.39	2,780	224	53			464	7.2	
May 1-31	4,025							205	48	13				266		.36	2,890	208	40			435	7.1	
June 1-17	3,176							204	43	14				266		.36	2,280	202	35			433	7.5	
June 18-20.....	5,733							163	28	9.0				200		.27	3,100	155	21			330	7.5	
June 21-July 5 .	3,112							197	38	13				252		.34	2,120	195	33			415	7.6	
July 6-10	4,538							152	30	8.0				190		.26	2,330	147	22			320	7.5	
July 11-Aug. 4 .	2,638							200	39	15				260		.35	1,850	199	35			428	7.6	

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				Hardness as $CaCO_3$		Per cent 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					
														Residue at 180°C	Sum									
Aug. 5-6, 1953	6,215							184	32	12				234		0.32	3,930	175	24			377	7.4	
Aug. 7-10	12,420							162	27	6.5				208		.28	6,980	159	26			331	7.5	
Aug. 11-12 ...	8,350							224	36	9.0				280		.38	6,310	218	34			439	7.6	
Aug. 13-Sept. 13	2,041							209	38	17				260		.35	1,430	204	33			444	7.5	
Sept. 14-30....	848							175	29	26				236		.32	540	169	25			416	7.4	
Weighted average a	2,447							192	37	15				255		0.35	1,680	192	34			419	--	

a Represents 100 percent of runoff for water year October 1952 to September 1953.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once daily temperature measurement between 4 p.m. and 7 p.m./

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

a Observation made between 11 a.m. and 3 p.m.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	778			790			520		
2.....	766			766			540	53	79
3.....	915			754			600		
4.....	980			766			706		
5.....	838			790			730		
6.....	742			670			802		
7.....	718			778			814		
8.....	706	39	80	754	42	85	826		
9.....	600			766			876	19	40
10.....	670			754			876		
11.....	718			730			850		
12.....	622			730			838		
13.....	814			682			730		
14.....	754			802			510		
15.....	802			694			470		
16.....	730			838	52	118	470		
17.....	790			1,140	96	295	540	45	71
18.....	754			1,040	59	166	660		
19.....	778			1,050	30	85	780		
20.....	766			876			850	15	34
21.....	778			915			814	17	37
22.....	802			850			790	39	83
23.....	754	38	80	826	19	44	814	184	405
24.....	814			802			850	110	253
25.....	790			820			802		
26.....	790			860			778		
27.....	790			706	42	80	580	31	53
28.....	730			570	34	52	530		
29.....	778			490	72	95	560		
30.....	730			450	57	69	560		
31.....	850			--	--	--	658		
Total.	23,847	--	2,480	23,459	--	2,543	21,724	--	2,215

Day	January			February			March		
1.....	706			670			3,200		
2.....	730			670	18	31	2,780		
3.....	730			580			2,460	76	522
4.....	730			622			2,290		
5.....	670	51	88	790	48	102	2,000		
6.....	560			1,500	91	369	1,800		
7.....	470			1,560	88	371	1,700	20	99
8.....	490			1,520	76	312	1,800		
9.....	530			1,210	37	121	2,020		
10.....	580	89	142	1,060	32	92	2,810	48	sa 460
11.....	660			1,700	60	275	3,710	221	2,210
12.....	650			1,920	74	384	3,920	158	1,670
13.....	646			1,670	48	216	4,520	180	2,200
14.....	670	43	98	1,420			5,220	170	2,400
15.....	950			1,200			7,020	388	7,350
16.....	1,300			1,000	22	59	7,390	298	5,950
17.....	1,010			800			6,840	226	4,170
18.....	790			700			6,300	138	2,350
19.....	850			800			5,400		
20.....	863	36	85	4,500	859	s 12,300	4,860	101	1,360
21.....	876			6,070	530	s 9,600	4,860		
22.....	863			7,980	245	5,270	4,860		
23.....	838			7,600	200	4,100	5,580	142	2,140
24.....	850			6,800	170	3,120	6,120	174	2,880
25.....	876			5,800	118	1,850	5,760	178	2,770
26.....	780			5,000			5,040	110	1,500
27.....	700	19	37	4,500	88	1,050	4,340		
28.....	670			3,800			3,920		
29.....	640			--	--	--	3,480	63	650
30.....	610			--	--	--	3,480		
31.....	570			--	--	--	3,880		
Total.	22,858	--	2,511	73,422	--	42,110	129,360	--	49,746

s Computed by subdividing day.

a Computed from partly-estimated concentration graph.

IOWA RIVER BASIN--Continued

CEDAR RIVER AT CEDAR RAPIDS, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953 --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	4,020			4,860	85	1,120	3,250		
2	4,130			5,040	90	1,220	2,840		
3	3,920			5,580	120	1,810	2,560		
4	3,710			6,300	157	2,670	2,460	89	649
5	3,510			6,660	145	2,610	2,640		
6	3,540			6,660	133	2,390	2,460		
7	3,510	68	675	6,120			2,220	170	1,020
8	3,250			5,220	110	1,520	3,380	370	sa3,700
9	3,250			4,860			3,220	468	4,070
10	3,280			4,300			2,950	192	1,530
11	3,480			3,960			3,220	190	1,650
12	3,920			3,640			3,280	210	1,860
13	4,160			3,250	96	889	4,080	437	4,790
14	3,820			3,190			4,520	667	8,140
15	3,480	108	1,010	3,100			4,060	440	4,820
16	3,480			2,890			3,160	360	3,070
17	3,480	59	609	2,780			3,710	90	902
18	3,990			2,640	82	582	6,300	329	5,600
19	4,340			2,510			6,660	360	s6,840
20	3,940	73	sa 820	2,320			4,240	122	1,400
21	3,520	86	sa 890	3,220	260	sa 2,500	3,190		
22	3,220			4,060	560	6,140	2,750		
23	3,100			3,640	607	5,970	2,340		
24	2,890			3,380	375	3,420	2,040	95	628
25	2,920			3,710	420	4,210	2,110		
		64	597						
26	3,070			3,380	220	2,010	2,270		
27	3,310			3,130	161	1,360	2,540	150	a1,030
28	3,780			3,130	140	1,180	3,340	267	2,410
29	4,270			3,250	111	974	3,920	420	4,450
30	4,520			4,200	100	1,130	4,690	539	6,830
31	--	--	--	3,780	72	735	--	--	--
Total	108,810	--	19,979	124,760	--	54,884	100,380	--	71,774

Day	July			August			September		
1	4,270	367	4,230	3,250			1,350		
2	3,920	200	2,120	3,220	102	870	1,240		
3	3,540	162	1,550	2,890			1,140		
4	2,980	115	925	3,280			1,210		
5	2,780	126	946	5,040	200	s 2,880	1,200		
6	5,220	1,030	14,500	7,390	473	9,440	1,210		
7	4,520	860	10,500	9,480	495	12,700	1,150	61	187
8	4,520	800	9,760	11,800	408	13,000	1,110		
9	4,860	692	9,080	14,000	377	14,300	1,040		
10	3,570	350	3,370	14,400	290	11,300	967		
11	2,670	140	1,010	9,860	170	4,530	1,040		
12	2,290			6,840	129	2,380	1,080		
13	2,070			5,580	110	1,660	1,040		
14	1,940	99	551	4,860	100	1,310	954		
15	1,800			4,240			902		
16	2,200			3,710			902		
17	2,460			3,440			778		
18	2,750			3,130	91	793	967		
19	2,670	143	992	2,810			863		
20	2,670			2,720			863		
21	2,290			2,540			902		
22	1,940			2,340			802	51	117
23	1,840	89	452	2,200			850		
24	1,860			2,090			790		
25	2,840			1,860			889		
26	3,740			1,700	64	303	790		
27	3,740	110	928	1,610			838		
28	3,250			1,540			802		
29	2,750			1,400			766		
30	2,590			1,400			754		
31	2,950			1,380			--	--	--
Total	93,490	--	73,558	142,000	--	85,561	29,189	--	4,420

Total discharge for year (cfs-days) 893,299
Total load for year (tons) 411,781

s Computed by subdividing day.
a Computed from partly-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 1952 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 490 ppm June 10; minimum daily, no flow on many days during October, August, and September.
Sediment loads: Maximum daily, 120 tons June 10; minimum daily, 0 ton on many days during October, August and September.
EXTREMES, July 1952 to September 1953.--Sediment concentrations: Maximum daily, 490 ppm June 10, 1953; minimum daily, no flow on many days during October 1952, August and September 1953.
Sediment loads: Maximum daily, 120 tons June 10, 1953; minimum daily, 0 ton on many days during October 1952, August and September 1953.
REMARKS.--Flow affected by ice Nov. 25-28, Dec. 14, 25-30, Jan. 3-7, 11, 12, 15-18, 26 28, Feb. 1-3, 10, 11, 13-15, Feb. 19 to Mar. 8. Records of water discharge for water year October 1952 to September 1953 given in WSP 1278.

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0	0.14	143		0.11	--	
2.....	0	--	0	.14	--	e 0.1	.14	--	
3.....	0	--	0	.14	--		.14	--	
4.....	0	--	0	.14	--		.14	--	
5.....	.01	--	(t)	.14	--		.14	--	
6.....	.14	--	(t)	.14	109		.14	--	
7.....	.16	--	(t)	.14	--		.14	--	
8.....	.19	--		.14	108	(t)	.14	--	
9.....	.20	123		.11	--		.16	--	
10.....	.19	--		.11	--		.16	--	
11.....	.16	141		.11	--		.19	--	
12.....	.14	--		.11	--		.19	19	
13.....	.14	--		.11	--		.19	--	
14.....	.14	--		.11	--		.20	--	
15.....	.14	192		.11	213		.22	--	
16.....	.14	--		.11	--		.22	27	(t)
17.....	.14	--	e.1	.44	112		.22	--	
18.....	.14	153		.33	--		.22	--	
19.....	.14	--		.19	--		.26	--	
20.....	.14	--		.14	136	e.1	.26	54	
21.....	.14	--		.14	--		.29	--	
22.....	.14	--		.16	--		.29	--	
23.....	.14	--		.14	--		.29	--	
24.....	.16	176		.16	--		.29	--	
25.....	.14	184		.26	--		.29	--	
26.....	.14	--		.50	--		.27	41	
27.....	.14	--		.30	--		.24	--	
28.....	.14	121		.14			.22	--	
29.....	.14	--	(t)	.08	--	(t)	.24	--	
30.....	.14	--		.05			.27	--	
31.....	.14	--		--	--	--	.33	--	
Total	3.87	--	2.0	5.03	--	2.2	6.60	--	0.7

e Estimated.
t Less than 0.050 ton.

DES MOINES RIVER BASIN--Continued

EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	0.33	--		0.19	--		5.2		
2	.29	--		.23	--		4.0		
3	.23	30		.19	--		3.5		
4	.20	--		.16	--		3.1	--	e0.6
5	.20	--		.22	--	(t)	2.8		
6	.21	34		.22	--		2.6		
7	.23	--		.33	43		2.3	90	.6
8	.26	--	(t)	.38	--		2.3	76	a.5
9	.26	--		.50	--		4.7	72	.9
10	.22	53		10	97	sa4.2	8.0	40	.9
11	.21	--		15	76	sa3.3	8.0	24	.5
12	.20	--		2.6	40	a.3	7.1	70	1.3
13	.19	--		13	100	sa5.6	6.0	100	1.6
14	.19	--		25	145	9.8	13	191	s8.4
15	.23	--		20	190	sb11	18	229	11
16	.27	--		14	47	a1.8	14	86	3.3
17	.26	112	e0.1	4.2	30	a.3	10	78	2.1
18	.24	--		1.7	30	a.1	8.0		
19	.22	--		3.4	31	a.3	6.8		
20	.19	--		50	83	sb13	6.5		
21	.16	--		35	120	a11	6.2	76	1.3
22	.16	--		24	82	5.3	5.2		
23	.16	--		29	78	sb7.6	5.2		
24	.14	86		35	130	a12	5.0		
25	.16	--	(t)	29	65	a5.1	4.4		
26	.16	--		24	--	e4.0	4.2	66	.7
27	.14	--		16	58	a2.5	4.0		
28	.16	--		12	47	1.5	3.8		
29	.16	--		--	--	--	3.6		
30	.16	--		--	--	--	7.1	90	1.7
31	.16	81		--	--	--	13	112	s5.0
Total	6.35	--	1.2	365.32	--	99.1	197.6	--	53.4

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	25	139	9.4	23	52	3.2	7.4		
2	20	141	7.6	22	46	2.7	7.4	76	1.5
3	33	187	17	22			7.1		
4	25	91	6.1	22			9.3	150	sb4.9
5	21	80	4.5	20	--	e2.5	13	156	5.5
6	18	70	3.4	19			8.0	113	2.4
7	16			17			11	110	sb7.1
8	15			15			47	370	sb52
9	14			15	60	2.4	23	179	11
10	16			14	--	e2.1	90	490	sb120
11	16			11	--	e1.8	43	259	s36
12	15	52	1.9	8.7			26	220	15
13	12			8.0			22	210	12
14	11			8.3			19	--	e10
15	11			7.7			16	153	6.6
16	11			7.4	69	1.4	14	171	6.5
17	11			7.4			11		
18	9.2			7.1			9.2		
19	8.7			7.1			8.0		
20	8.0	39	.9	7.4	50	1.0	7.4	150	3.0
21	8.7			11	70	a2.1	6.5		
22	7.7			23	349	s24	6.0		
23	6.8			18	55	2.7	5.7		
24	12	68	sb2.6	29	370	sa36	5.4		
25	21	89	5.0	23	114	7.1	13	186	s6.9
26	19			19			12	168	5.4
27	18			17			16	219	9.5
28	17	44	2.0	15	70	2.6	12	204	6.6
29	16			12			8.7	195	4.6
30	16			10			7.7	180	3.7
31	--	--	--	8.0			--	--	--
Total	458.1	--	91.9	454.1	--	126.9	491.8	--	354.2

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.

DES MOINES RIVER BASIN--Continued

EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	7.1	230	4.4	0.63	--	e 0.1			
2	6.0	320	5.2	.56	--	e .1			
3	5.0	428	5.8	1.2	201	.7			
4	4.7	150	1.9	.79	--				
5	4.2	148	1.7	.63	--				
6	3.8	334	3.4	.79	--	e .2			
7	3.4	181	1.7	.63	144				
8	2.8	100	.8	.56	--				
9	2.6			.50	79				
10	2.4			.44	--				
11	2.3			.44	--				
12	2.6			.38	--				
13	2.3			.33	--				
14	2.2	61	.4	.29	104				
15	2.0			.29	--				
16	1.8			.29	--	e .1			
17	1.7			.33	--				
18	1.7			.33	--				
19	1.6	--		.33	--				
20	1.6	--		.29	--				
21	1.4	--	e .3	.38	58				
22	1.2	83		.26	--				
23	1.1	--		.14	--				
24	.97	--		.08	--				
25	.88	--		.05	--	(t)			
26	.88	--	e .2	.02	54				
27	.88	93		0	--	0			
28	.79	--		0	--	0			
29	1.2	119	.4	0	--	0			
30	.97	--	e .2	0	--	0			
31	.71	--	e .1	0	--	0			
Total	72.78	--	32.1	10.96	--	3.3	0		0

Total discharge for year (cfs-days) 2,072.51
Total load for year (tons) 767.0

e Estimated.
t Less than 0.050 ton.

PART 6A. MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

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.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.
Water temperatures: May 1949 to June 1953 (discontinued).
Sediment records: March 1949 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Sediment concentrations: Maximum daily, 354 ppm June 4; minimum daily, not determined.
Sediment loads: Maximum daily, 13,800 tons June 6; minimum daily, 50 tons (estimated) Mar. 22.
EXTREMES, 1949-53.--Water temperatures (1949-52): 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, 50 tons (estimated) Mar. 22, 1953.
REMARKS.--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 the water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, October 1952 to June 1953
/Once-daily measurement between 12 m. and 8 p. m./

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

a Reading obtained between 6 a. m. and 8 a. m.

MISSOURI RIVER MAIN STEM--Continued

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

Suspended sediment, October 1952 to June 1953

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	3,500			4,050			3,400	18	
2	3,470			4,070			3,800	--	
3	3,440			3,960			4,000	--	e160
4	3,380			3,910			4,100	--	
5	3,370	14	133	3,910	18	200	4,300	--	
6	3,710			4,070			4,420	--	
7	3,600			4,250			4,440	--	
8	3,600			4,340			4,520	35	e400
9	3,600			4,380			4,420	--	
10	3,540			4,320			4,500	--	
11	3,520			4,310			4,520	--	
12	3,540			4,400			4,590	--	
13	3,570			4,460			4,530	--	
14	3,670			4,520			4,480	--	
15	3,690	17	165	4,550	17	207	4,380	27	e300
16	3,740			4,690			4,360	--	
17	3,620			4,730			4,340	--	
18	3,500			4,520			4,310	--	
19	3,500			4,420			4,290	--	
20	3,620			4,380			4,310	--	
21	3,820			4,420	--		4,320	--	e700
22	3,870			4,320	14		4,310	61	
23	3,910			4,210	--	e160	4,230	--	
24	3,890			4,210	--		3,850	--	e500
25	3,830			4,100	--		3,600	--	e300
26	3,830	18	209	3,900			3,160	--	e100
27	3,850			3,600			2,910	--	e70
28	3,920			3,300	--	e75	3,160	--	e100
29	4,000			3,180			3,690	16	159
30	4,030			3,200			4,230	--	e350
31	4,030			--	--	--	4,570	--	e700
Total	114,160	--	5,279	124,680	--	5,245	128,040	--	10,979

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	4,380	--		3,640			3,330	--	e100
2	4,090	--		3,620			3,070	--	e80
3	4,180	--	e750	3,670			3,160		
4	4,360	--		3,660			3,550		
5	4,310	65		3,690			3,920		
6	3,920			3,690			3,660	18	175
7	3,690			3,690			3,590		
8	4,050	--	e400	3,730			3,600		
9	4,310			3,670			3,660		
10	4,790			3,540			3,670		
11	4,790	--	e800	3,400			3,800	29	298
12	4,890			3,670			3,820	28	289
13	4,750			3,660	43	a410	3,820	25	258
14	4,270	--		3,570			3,760	--	e500
15	3,910	57		3,590			3,670	77	763
16	4,010	--		3,520			3,520	--	e450
17	4,030	--		3,550			3,540	27	258
18	4,010	--	e550	3,550			3,450	12	112
19	4,010	--		3,520			3,450	13	121
20	4,010	--		3,380			2,990	15	121
21	4,030	46		3,350			2,800	--	e70
22	3,920			3,380			2,780	--	e50
23	3,830			3,490			2,720	7	51
24	3,890			3,420			3,160	--	e100
25	3,850	--	e400	3,370			3,520		
26	3,760			3,520	22	209	3,380		
27	3,730			3,590	20	194	3,400	24	230
28	3,500	18		3,590	19	184	3,500		
29	3,620	--	e200	--	--	--	3,590		
30	3,660	--		--	--	--	3,760		
31	3,690	--		--	--	--	3,710		
Total	126,240	--	16,150	99,720	--	10,837	107,350	--	6,631

e Estimated.
a Computed from partly estimated concentration graph.

MISSOURI RIVER MAIN STEM--Continued

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

Suspended sediment, October 1952 to June 1953--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.....	3,570	22	212	5,620	--	e800	7,230	99	1,930
2.....	3,440	30	279	5,220	--	e600	7,900	82	1,750
3.....	3,150	13	111	4,830	--	e400	9,310	134	3,370
4.....	3,130	--	e100	4,290	--	e300	12,200	354	11,700
5.....	3,100	15	126	5,030	--	e200	14,600	314	12,400
6.....	3,210	--	e150	3,910	16	169	16,700	306	13,800
7.....	3,520	19	181	4,010	22	238	16,200	211	9,230
8.....	3,540	14	134	4,420	23	274	14,800	153	6,110
9.....	3,500	--		4,750	32	410	14,400	130	5,050
10.....	3,370	--		4,610	30	373	14,900	126	5,070
11.....	3,350	--		4,520	24	293	15,500	135	5,650
12.....	3,280	--		4,270			16,700	169	7,620
13.....	3,320	--		4,000			18,200	198	9,730
14.....	3,260	--		3,780			20,000	226	12,200
15.....	3,210	--		3,570			21,400	218	12,600
			e140						
16.....	3,210	17		3,370	16	156	21,900	180	10,600
17.....	3,250	--		3,230			21,300	151	8,680
18.....	3,200	--		3,230			20,800	137	7,690
19.....	3,150	--		3,270			20,900	112	6,320
20.....	3,150	--		3,800			21,500	104	6,040
21.....	3,180	--		4,520	30	366	20,600	88	4,890
22.....	2,960	17		4,720	31	395	18,500	72	3,600
23.....	3,500	--	e250	4,790	32	414	15,900	67	2,880
24.....	4,310	29	337	4,730	30	383	13,800	82	3,060
25.....	5,070	--	e700	4,950	42	561	12,800	65	2,250
26.....	5,310	--	e800	5,450	52	765	11,800	70	2,230
27.....	5,440	--	e900	5,420	43	629	10,500	66	1,870
28.....	5,570	--	e1,000	5,540	42	628	9,350	63	1,590
29.....	6,040	--	e1,500	6,080	52	854	8,960	57	1,380
30.....	6,040	--	e1,000	6,830	93	1,720	8,660	49	1,150
31.....	--	--	--	6,960	124	2,330	--	--	--
Total	113,330	--	9,740	142,700	--	14,506	457,310	--	182,440

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs days) 1,413,530
Total load for period Oct. 1, 1952 to June 30, 1953 (tons) 261,807

e Estimated.
a Computed from partly estimated concentration graph.

MARIAS RIVER BASIN

MISCELLANEOUS ANALYSES OF STREAMS IN THE MARIAS RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
MARIAS RIVER NEAR SHELBY																						
Oct. 12, 1952 ...	236			57	24	--	203	141	--								241	75	--	--	575	7.5
Nov. 21	a155			--	--	--	223	164	--								282	99	--	--	639	8.2
Dec. 9	a170			31	33	44	122	198	4.0								215	115	31	1.3	597	8.0
Apr. 3, 1953.....	566			50	21	55	189	164	4.5								213	58	36	1.6	649	7.7
Apr. 28	2,960			38	13	19	145	67	1.0								148	29	22	.7	367	7.6
May 27	8,610			46	15	24	168	85	1.0								175	37	23	.8	435	7.4

a Mean daily discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN THE MILK RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
MILK RIVER BELOW FRESNO DAM																						
Mar. 17, 1953	a79,220			47	22	47		275	75	3.0							206	0	33	1.4	565	8.0
Apr. 16	a88,550			30	14	25		179	39	.5							134	0	29	.9	359	7.9
June 23	a135,200			32	11	56		192	88	.5							127	0	49	2.2	487	8.0
MILK RIVER AT NASHUA																						
Apr. 21, 1953	57			82	39	178		288	455	30							364	128	52	4.1	1,390	7.6
May 2	860			104	46	221		373	540	44							448	142	52	4.5	1,670	7.7
May 26	4,880	29		52	17	145		75	428	3.0	0.5	1.0	0.15	754	1.03		198	136	61	4.5	1,040	6.2

a Reservoir storage, in acre-feet.

YELLOWSTONE RIVER BASIN

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 1953.
Water temperatures: December 1950 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 384 ppm Dec. 27-29; minimum, 100 ppm June 15-21.
Hardness: Maximum, 225 ppm Dec. 1-2; minimum, 55 ppm June 15-21.
Specific conductance: Maximum daily, 613 micromhos Dec. 28; minimum daily, 132 micromhos June 19.
Water temperatures: Maximum, 75°F July 30, Aug. 19, 28; minimum, freezing point on several days during November to March.
EXTREMES, 1950-53.--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, 132 micromhos June 19, 1953.
Water temperatures: Maximum, 76°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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952..	3,065			44	17	36		174	102	8.0		2.0	0.21	314	0.43	2,600	179	36	30	1.2	498	7.9	--
Nov. 1-30	2,938			47	16	34		180	102	8.0		2.0	.21	325	.44	2,580	185	37	28	1.1	499	7.9	--
Nov. 6 a	2,970			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	--	--	0.033
Dec. 1-2	2,400			57	20	39		209	123	11		2.5	.25	382	.52	2,480	225	54	27	1.1	596	7.9	--
Dec. 2 a	2,500			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	--	--	.003
Dec. 3-26.....	2,708			48	16	33		177	103	2.5		2.2	.23	320	.44	2,340	187	42	27	1.0	505	7.9	--
Dec. 27-29	2,163			55	21	40		203	130	11		2.2	.27	384	.52	2,240	223	57	27	1.2	596	7.9	--
Dec.30-Jan.6,1953.	2,901			45	15	31		166	100	9.0		2.0	.24	304	.41	2,380	175	39	27	1.0	493	8.0	--
Jan. 6 a.....	2,330			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	--	--	.037
Jan. 7-8	2,015			52	18	36		186	119	10		2.7	.24	350	.48	1,900	204	51	27	1.1	553	7.9	--
Jan. 9-14	3,180			42	16	29		156	92	8.0		2.3	.23	286	.39	2,460	169	41	27	1.0	457	7.7	--
Jan. 15-31	2,698			45	15	31		160	98	8.5		2.0	.23	298	.41	2,170	174	43	27	1.0	479	7.8	--
Feb. 1-28	2,512			44	16	35		160	101	9.5		1.7	.23	304	.41	2,060	176	45	30	1.1	485	8.0	--
Feb. 6 a	2,680			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	--	--	.001
Mar. 1-31.....	2,419			44	15	33		158	99	9.5		1.7	.23	302	.41	1,970	171	41	29	1.1	490	7.7	--
Mar. 3 a	2,000			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	--	--	.021
Mar. 31 a	2,400			45	13	31		157	90	9.0		--	--	--	--	--	168	39	28	1.0	468	7.5	.001
Apr. 1-22	2,346			42	15	32		157	95	9.5		1.3	.24	294	.40	1,860	167	38	29	1.1	471	7.8	--
Apr. 23-28	3,800			39	12	25		151	69	7.0		3.0	.17	250	.34	2,570	147	23	26	.9	405	7.6	--
Apr. 29-30	4,860			38	9.7	21		140	57	6.0		3.1	.15	226	.31	2,970	135	20	25	.8	362	7.5	--

a Not included in weighted average.

May 1-20, 1953 ..	4,449			33	9.6	21		125	57	6.0		1.3	.13	220	0.30	2,640	122	19	27	.8	336	7.5	--
May 4 a	3,460			36	11		22	135	61	6.5		--	--	--	--	--	135	24	26	.8	363	7.6	0.002
May 21-28	5,703			28	7.3	17		105	44	4.5		1.1	.15	186	.25	2,860	100	14	27	.7	277	7.5	--
May 29	10,700			40	8.0	20		138	58	3.0		3.0	.12	242	.33	6,990	133	20	24	.8	354	7.5	--
May 30-31	14,700			27	5.7	11		100	29	2.0		1.7	.07	158	.21	6,270	91	9	21	.5	233	7 8	--
June 1-12	17,670			24	55.6	11		92	25	3.0		1.3	.06	144	.20	6,870	83	8	22	.5	217	7.3	--
June 2 a	14,100			24	5.8		9.4	90	26	3.0		--	--	--	--	--	84	10	20	.4	216	7.7	.001
June 13-14	38,950			23	3.8	7.2		84	15	1.0		1.7	.07	124	.17	13,040	73	4	18	.4	179	7.5	--
June 15-21	38,210			17	3.0	6.7		63	13	1.5		.8	.03	100	.14	10,320	55	3	21	.4	143	6.9	--
June 22-30	21,080			17	4.5	9.7		69	18	3.0		.8	.03	112	.15	6,370	61	4	26	.5	169	6.7	--
July 1-17	18,050			17	4.7	10		70	22	3.8		1.0	.03	104	.14	5,070	62	5	25	.5	170	7.0	--
July 6 a	20,400			26	8.8		20	89	59	7.0		--	--	--	--	--	101	28	30	.9	295	6 8	.044
July 18-31	8,987			23	7.9	17		97	40	4.8		.9	.06	156	.21	3,790	90	10	29	.8	253	7.0	--
Aug. 1-8	7,360			29	9.6	23		120	55	5.5		.8	.11	204	.28	4,050	112	14	30	.9	317	7.7	--
Aug. 9-19	5,390			31	11	24		131	60	5.5		.9	.13	220	.30	3,200	122	15	29	.9	347	7.9	--
Aug. 20-31	3,763			35	13	29		145	76	7.0		1.3	.18	250	.34	2,540	141	22	30	1.1	402	7.7	--
Sept. 1-30	3,190			41	15	37		163	98	7.5		1.0	.26	294	.40	2,530	166	32	33	1.4	473	7.7	--
Weighted average[b]	6,012			29	8.8	19		111	50	5.0		1.3	0.11	190	0.26	3,080	109	18	27	0 8	298	--	--

a Not included in weighted average.
b Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 4 p. m. and 5 p. m./

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

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, April to July 1953 (discontinued).
EXTREMES, April to July 1953.--Sediment concentrations; Maximum daily, 5,100 ppm June 13; minimum daily, not determined.
Sediment loads: Maximum daily, 45,600 tons June 13; minimum daily, not determined.
EXTREMES, 1951, 1952, 1953.--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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, June to September 1953

Date of collection	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				
June 14, 1953	3,070	20				3.5		96		2.0	0.2	0.1						74	0	9	0.2	164	7.4
Sept. 9.....	a100	28				9.9		128		15	2.0							102	0	17	.4	231	8.0

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, April to July 1953

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.....	80			132	160	57	800	440	950
2.....	74			108			870	820	1,930
3.....	62			92	30	8	666	260	468
4.....	77			92			529	260	371
5.....	65			128	70	24	512	340	470
6.....	77			288	160	s 133	420	150	170
7.....	83			435	220	258	442	105	125
8.....	65	41	8	333	205	184	512	135	187
9.....	62			270	71	52	628	249	s 683
10.....	58			192	58	30	1,680	1,110	s 6,320
11.....	68			153	25	10	2,290	3,500	21,600
12.....	68			136	14	5	2,600	3,150	22,100
13.....	86			122	15	5	3,310	5,100	45,600
14.....	86			118	109	35	3,440	3,690	34,300
15.....	92			132	70	25	2,490	3,590	24,100
16.....	102			139	29	11	2,260	2,680	16,400
17.....	112	103	29	205	29	16	2,500	4,000	s 30,100
18.....	102			311	142	119	2,680	4,290	s 34,400
19.....	99	330	sa 95	368	137	136	2,540	4,050	s 30,300
20.....	132	720	sa 330	295	54	43	1,780	2,040	s 10,700
21.....	188	970	sa 550	295	40	32	1,300	1,070	s 4,050
22.....	260	813	s 613	245	440	s 327	1,420	1,230	s 4,970
23.....	316	720	614	205	200	sa 120	1,490	1,540	s 6,580
24.....	285	580	446	174	120	56	1,340	990	s 3,820
25.....	285	540	a 420	150	55	22	898	380	921
26.....	328	330	292	172	91	s 50	732	145	287
27.....	355	370	355	322	470	sa 550	636	105	180
28.....	344	200	186	839	1,350	3,060	690	205	382
29.....	235	110	70	903	750	1,830	792	320	684
30.....	153	85	35	538	330	479	1,040	754	s 2,240
31.....	--	--	--	590	313	s 567	--	--	--
Total.	4,399	--	4,213	8,482	--	8,260	43,287	--	305,388

	July			August			September		
1.....	1,120	826	s 2,670						
2.....	1,070	530	s 1,640						
3.....	1,050	504	s 1,510						
4.....	1,040	420	s 1,250						
5.....	985	420	s 1,200						
6.....	967	430	s 1,190						
7.....	934	490	sa 1,300						
8.....	885	310	sa 800						
9.....	805	230	sa 540						
10.....	814	170	sa 410						
11.....	642	--	e 200						
12.....	690	--	e 230						
13.....	690	--	e 160						
14.....	662	--	e 80						
15.....	648								
16.....	629	27	42						
17.....	570								
18.....	544								
19.....	489								
20.....	441								
21.....	423								
22.....	378								
23.....	356								
24.....	356								
25.....	350	13	12						
26.....	335								
27.....	356								
28.....	320								
29.....	300								
30.....	285								
31.....	275								
Total.	19,409	--	13,534						

Total discharge for period Apr. 1 to July 31, 1953 (cfs-days) 75,577
Total load for period Apr. 1 to July 31, 1953 (tons) 331,395

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

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

Particle-size analyses of suspended sediment, 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 disperzed)

Date of collection	Time	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 12, 1953....	8:15 a.m.	2,320		1,220	5,480		9		26		61	80	95	99	100	--	SPN
June 12	8:15 a.m.	2,320		1,220	5,080		16		32		61	80	95	99	100	--	SPWCM
June 14	9:35 a.m.	3,130		2,590	11,800		15		32		63	83	97	99	100	--	SPWCM
June 17	3:50 p.m.	1,700		1,120	3,150		6		16		42	57	78	87	93	99	SPN
June 17.....	3:50 p.m.	1,700		1,120	3,250		8		19		42	57	78	87	93	99	SPWCM

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, April to September 1953.
Sediment records: October 1948 to September 1953.
EXTREMES,1952-53.--Water temperatures (April to September): Maximum, 68 °F Aug. 1.
Sediment concentrations: Maximum daily, 2,240 ppm June 14; minimum daily, not determined.
Sediment loads: Maximum daily, 36,800 tons June 14; minimum daily, 1 ton on many days.
EXTREMES,1948-53.--Water temperatures: Maximum (1947-48,1953), 73 °F Aug. 31, 1948; minimum (1947-49), freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 3,100 ppm Aug. 4, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 36,800 tons June 14, 1953; minimum daily, 1 ton on many days during 1953.
REMARKS.--Flow affected by ice Nov. 29 to Feb. 2, Feb. 21-26. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, May to June 1953

Date of collection	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					
May 28,1953,3:20 p.m.	1,650			51	7.3	19	3.4							266	0.36		157		20	0.7	--	6.9	
May 29, 3:24 p.m.	1,650			58	8.9	19	2.9							286	.39		181		18	.6	415	7.2	
June 12	2,960			24	4.9	11	2.0							156	.21		80		23	.5	202	8.2	
June 18	5,320			36	5.6	8.3	1.9							160	.22		113		13	.3	254	7.5	

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Temperature (°F) of water, April to September 1953
(Once-daily measurement between 6 a.m. and 9 a.m.)

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

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	423	20	23	390			400	--	e 50
2	445	20	24	385			395	--	e 50
3	830	168	376	380			390		
4	755	153	312	365			385		
5	755	--	e 230	365			380	--	e 60
6	830			390			380		
7	800			401			400		
8	810			396			410		
9	800			390			430		
10	810	72	154	360	24	25	440		
11	764			385			450		
12	719			390			450		
13	670			396			440		
14	694			396			440	67	76
15	654			396			430		
16	623			406			400		
17	609			401			390		
18	609	19	31	418			390		
19	588			401			380		
20	588			380			370	--	
21	581			412			365	--	
22	574			406	67	70	360	50	
23	442			350			370	--	e 50
24	185			345			370	--	
25	246	26	17	360	--	e 60	370	--	
26	254			345			380	--	
27	270			315			410		
28	345			315			430		
29	390	28	29	350	--	e 50	450	--	e 60
30	390			380	--	e 50	470		
31	385			--	--	--	470		
Total	17,838	--	2,568	11,369	--	1,110	12,595	--	1,946

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	470	--		400	--		423		
2	460	--		400	--		380		
3	450	--		428	--		355		
4	470	--		428	--		365		
5	490	--		412	--		370	25	25
6	490	--		385	160		396		
7	500	--		360	--		385		
8	510	--		380	--	e 120	350		
9	520	--		370	--		345		
10	520	--		340	--		335	8	7
11	520	--		325	--		320		
12	500	--		355	--		308		
13	450	--		350	90		209		
14	420	--		350	--		197		
15	420	--	e 70	345	123		180	5	3
16	440	--		330	--		178		
17	430	--		320	48	e 40	135		
18	420	--		380	--		117		
19	440	73		340	19	17	111		
20	430	--		315	17	14	109		
21	425	--		315			113		
22	425	--		310			99		
23	410	29		340			105		
24	410	--		370			121	3	1
25	420	--		390	148	156	111		
26	410	--		410			111		
27	380	--		445			109		
28	360	--		450			107		
29	370	--		--	--	--	109		
30	390	84		--	--	--	116		
31	400	--		--	--	--	220	100	sa 80
Total	13,750	--	2,170	10,343	--	3,199	6,889	--	352

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

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	127			325	71	62	1,140	730	sa 2,600
2.....	140			258			1,510	1,380	5,630
3.....	165			243	17	11	1,870	1,610	8,130
4.....	160			222			1,440	690	2,680
5.....	152	9	4	256	58	40	1,130	450	1,370
6.....	168			270	43	31	1,250	815	2,750
7.....	200			375	75	76	880	499	1,190
8.....	203			609	135	222	900	278	676
9.....	191			548	83	123	880	237	563
10.....	345			518	46	64	1,180	694	s 3,200
11.....	355			380	55	56	2,400	2,150	s 15,800
12.....	350			290	41	32	3,470	2,160	20,200
13.....	345	24	23	226	20	12	4,540	2,090	25,600
14.....	350			185	15	7	6,090	2,240	36,800
15.....	396			155	11	5	6,570	1,860	33,000
16.....	375			133	8	3	5,140	1,870	26,000
17.....	428			135	6	2	4,580	1,660	20,500
18.....	428			160	11	5	4,940	1,760	23,500
19.....	406			230	27	17	5,300	1,790	25,600
20.....	385	31	34	330	48	43	5,020	1,460	19,800
21.....	412			350	36	34	3,410	943	8,680
22.....	500	120	162	456	59	73	2,290	798	4,930
23.....	536	340	492	300	140	113	2,050	943	5,220
24.....	494	225	300	266	130	93	1,890	810	4,130
25.....	428	140	162	222	165	99	1,430	381	1,470
26.....	385	88	91	122	--	e 15	920	223	554
27.....	462	83	104	50	14	2	638	142	245
28.....	567	138	211	203	260	sa 380	412	80	89
29.....	662	156	279	1,370	1,890	s 7,830	345	90	sa 95
30.....	385	65	68	1,400	1,110	s 4,440	483	160	sa 260
31.....	--	--	--	930	420	1,050	--	--	--
Total.	10,500	--	2,236	11,517	--	14,962	74,098	--	301,262

Day	July			August			September		
1.....	656	282	s 589	162	20	9	39		
2.....	763	238	s 519	209	30	17	50	11	2
3.....	700	175	s 351	519	920	sa 1,600	88		
4.....	688	180	sa 360	670	595	1,080	165		
5.....	664	230	a 410	548	152	225	172		
6.....	664	101	s 193	462	68	85	150	13	5
7.....	620	97	s 174	418	39	44	127		
8.....	565	122	s 199	375			107		
9.....	510	78	s 113	350	27	26	99		
10.....	483	81	s 119	335			300	73	59
11.....	434	51	s 64	278			330	43	38
12.....	362	27	s 28	282			165		
13.....	334	36	s 35	236			158		
14.....	340	41	s 40	206			152		
15.....	310	39	33	200	21	13	158	12	6
16.....	361	61	59	215			185		
17.....	345	42	39	222			209		
18.....	243	28	18	215			246	18	12
19.....	200	72	s 46	222			262	73	52
20.....	290	20	16	226			222	67	40
21.....	310	45	38	155			212	20	11
22.....	266	47	34	123			218	18	11
23.....	197	21	11	111	11	4	182		
24.....	229	24	15	105			152		
25.....	215	29	17	77			168		
26.....	191			70			178	12	6
27.....	194			59			191		
28.....	194			46	10	1	194		
29.....	185	30	15	37			172		
30.....	173			34			178		
31.....	172			38			--	--	--
Total.	11,863	--	3,610	7,205	--	3,291	5,229	--	343

Total discharge for year (cfs-days)..... 193,196
Total load for year (tons)..... 337,049

e Estimated.
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, April 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	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. 24, 1953	9:25 a.m.	478	--	211	2,620		57		70		77	83	90	95	98	100	SPWCM
May 25	4:10 p.m.	209	62	90	2,970		79		96		98	--	--	--	--	--	SPWCM
May 29	2:55 p.m.	1,620	57	2,320	3,320		15		48		79	86	95	97	99	100	SPN
May 29	2:55 p.m.	1,620	57	2,320	3,430		32		53		79	86	95	97	99	100	SPWCM
June 9	3:55 p.m.	764	--	124	1,360		42		58		75	80	88	94	98	100	SPWCM
June 12	9:25 a.m.	2,940	55	1,550	3,550		13		32		64	75	89	94	97	100	SPN
June 12	9:25 a.m.	2,940	55	1,550	3,310		18		64		64	75	89	94	97	100	SPWCM
June 16	2:10 p.m.	4,900	--	1,650	2,740		9		22		50	63	83	92	98	100	SPN
June 16	2:10 p.m.	4,900	--	1,650	2,710		12		26		50	63	83	92	98	100	SPWCM
June 18	4:10 p.m.	5,300	--	1,480	3,380		10		23		57	70	82	87	95	100	SPN
June 18	4:10 p.m.	5,300	--	1,480	2,760		13		28		57	70	82	87	95	100	SPWCM
June 30	9:25 a.m.	412	--	66	680		32		57		76	--	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

BEAVER CREEK NEAR ARAPAHOE, WYO.

LOCATION.--At gaging station, half a mile upstream from mouth and 2½ miles southeast of Arapahoe, Fremont County.
DRAINAGE AREA.--410 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: October 1952 to September 1953 (discontinued).
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 21,000 ppm May 29; minimum daily, no flow June 30 to September 30.
Sediment loads: Maximum daily, 17,000 tons May 28; minimum daily, 0 tons June 30 to September 30.
EXTREMES, 1950-53.--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 tons on many days each year.
REMARKS.--No flow during period July to September; record is deleted. Flow affected by ice Nov. 12 to Mar. 16, Mar. 18. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	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	0.8	--	e 1	12	--	e 40	0.7	--	
2	1.6	--	e 2	12	--	e 40	.8	--	
3	2.7	--		14	--	e 60	2.0	--	
4	2.7	--		15	--	e 80	3.0	--	
5	3.3	--	e 4	12	2,000	sa 70	3.5	54	(t)
6	3.1	410		11	--	e 50	3.1	--	
7	3.1	--		10	--	e 30	2.8	--	
8	2.9	477		8.4	--	e 20	2.6	--	
9	4.4			13	--	e 40	2.4	--	
10	4.7			12	--	e 50	2.1	--	
11	3.8	--	e 10	17	--	e 70	3.6	--	e 1
12	4.1			15	--	e 50	7.4	239	5
13	4.7			12	--	e 30	10	--	e 10
14	6.0			10	767	21	8.4		
15	5.7	1,960		9.0	--		7.8	--	e 5
16	5.7	--		8.0	--		7.0		
17	5.0	--		7.0	--		5.5	--	
18	5.7	--		7.6	--	e 9	5.0	--	
19	6.0	--		6.6	--		4.8	94	
20	6.6	--		5.6	307		4.6	76	
21	7.5	--	e 30	5.0	--		4.5	--	e 1
22	7.5	--		4.0	--		4.2	--	
23	7.9	1,300		3.0	--		3.8	--	
24	7.9	--		4.2	--		3.0	--	
25	9.2	--		4.4	--	e 2	1.5		
26	9.2	--		4.2	212		1.0	--	(t)
27	9.7	--		3.0	--		1.5		
28	10			1.0	--	e 1	2.5		
29	13	--		.8	--	(t)	3.5	--	
30	12		e 40	.7	--	(t)	4.7	138	e 2
31	12			--	--	--	6.0	--	
Total	188.5	--	657	247.5	--	728	123.3	--	51

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

YELLOWSTONE RIVER BASIN--Continued

BEAVER CREEK NEAR ARAPAHOE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	6.3	--		7.6	--		6.8		
2	6.5	--		8.4	--		5.8	--	e3
3	6.6	--		9.0	--		5.0		
4	6.4	--		10	--		7.0		
5	6.2	--		11	--		11	165	5
6	5.8	--		11	186		12	--	e6
7	5.4	--		11	--		13	--	e15
8	5.4	268	e4	9.5	--		14	--	e25
9	5.2	--		8.8	--		15	1,100	a45
10	5.2	--		8.4	--		18	1,800	b90
11	5.2	--		8.0	--		26	2,000	a140
12	5.4	--		7.8	--		28	--	e170
13	6.2	--		7.8	200		29	--	e200
14	5.4	--		8.0	--		30	--	e240
15	4.6	--		8.4	--		30	--	e300
						e4			
16	3.6	--		9.0	--		31	6,900	a580
17	3.2	--		9.4	--		40	9,600	b1,000
18	3.4	--	e1	9.8	--		33	12,000	a1,100
19	4.5	122		9.6	--		26	4,900	b340
20	5.4	--		7.5	150		14	4,200	a160
21	6.0	--		6.7	--		9.7	--	e100
22	7.6	--		6.6	--		6.3	--	e60
23	7.2	102	e2	6.7	--		20	3,300	sa220
24	7.2	--		6.8	--		13	3,900	a140
25	7.2	--		7.0	--		16	4,900	212
			e6						
26	7.2	296		7.0	--		15	5,400	219
27	7.1	--		7.0	202		18	--	e220
28	7.2	--		7.0	--		21	--	e230
29	7.2	--		--	--	--	24	--	e240
30	7.2	517	e10	--	--	--	30	3,460	280
31	7.2	--		--	--	--	42	--	e350
Total	184.2	--	127	234.8	--	112	609.6	--	6,701

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	33			83	9,600	sa2,700	109	8,600	2,530
2	26			72	18,400	sa3,920	105	6,900	1,960
3	26			42	9,500	1,080	87	4,000	940
4	26			46	5,100	634	80	5,100	1,100
5	27			40	6,300	680	92	7,100	sa2,200
		2,600	c180						
6	22			33	3,000	267	72	6,500	1,260
7	27			30	2,400	194	80	3,900	b840
8	21			30	2,200	178	77	3,500	728
9	18			37	2,600	b260	69	2,200	410
10	20			42	3,200	363	61	2,700	445
11	16			44	4,700	558	48	3,700	480
12	14			48	4,000	518	37	1,600	160
13	15			42	2,800	318	30	--	e120
14	15			44	2,300	273	21	--	e95
15	14			37	2,100	210	18	--	e70
16	14			33	--	e180	16	1,270	55
17	14	2,300	c85	33	--	e200	14	--	e25
18	12			35	2,700	255	9.2	--	e10
19	13			37	2,700	270	7.5	272	6
20	12			44	3,400	b400	6.0	--	e4
21	12			42	3,100	352	4.1	--	e3
22	12			40	3,000	324	3.5		
23	14			44	--	e350	2.2	290	2
24	22			58	--	e600	2.2		
25	33			40	4,000	432	1.2		
26	32	3,900	c400	42	3,100	352	.1		
27	48			51	3,400	468	.1		
28	53			103	19,000	sa17,000	.1	36	(t)
29	84	18,600	s4,630	102	21,000	sa7,100	.1		
30	77	11,500	2,390	69	14,000	2,610	0	--	0
31	--	--	--	90	13,000	b3,200	--	--	--
Total	772	--	11,925	1,533	--	46,246	1,052.3	--	13,449

Total discharge for year (cfs-days) 4,945.2
Total load for year (tons) 79,996

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 partly estimated concentration.

BEAVER CREEK NEAR ARAPAHOE, WYO.--Continued

Particle-size analyses of suspended sediment, November 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	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. 5, 1952	3:30 p.m.	16	--	2,500	2,970		41		60		74	81	95	99	100	--	SPWCM
Mar. 16, 1953	4:40 p.m.	48	--	11,900	3,210		1		28		40	42	48	53	65	92	SPN
Mar. 16	4:40 p.m.	48	--	11,900	3,230		19		31		40	--	--	--	--	--	SPWCM
Mar. 24	3:00 p.m.	14	53	4,830	4,920		2		54		70	--	--	--	--	--	SPN
Mar. 24	3:00 p.m.	14	53	4,830	5,090		32		56		70	--	--	--	--	--	SPWCM
Apr. 22	3:15 p.m.	12	--	2,700	5,480		60		81		91	--	--	--	--	--	SPWCM
Apr. 29	5:05 p.m.	80	--	30,800	4,030		68		86		92	--	--	--	--	--	SPWCM
Apr. 30	9:40 a.m.	75	--	11,500	4,020		64		83		91	--	--	--	--	--	SPWCM
May 13	3:30 p.m.	42	--	2,800	2,220		7		54		84	--	--	--	--	--	SPN
May 13	3:30 p.m.	42	--	2,800	2,120		45		62		84	--	--	--	--	--	SPWCM
May 29	7:35 a.m.	90	--	20,200	3,360		46		82		91	--	--	--	--	--	SPWCM
June 6	1:50 p.m.	75	--	5,180	5,930		48		68		87	92	96	98	99	--	SPWCM
June 16	11:35 a.m.	17	82	1,270	1,710		36		48		62	67	84	94	98	100	SPWCM

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 1½ 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, May to September 1953 (discontinued).
Sediment records: March 1949 to September 1953.
EXTREMES, 1952-53.--Water temperatures (May to September): Maximum, 71°F Aug. 1.
Sediment concentrations: Maximum daily, 3,480 ppm May 29; minimum daily, not determined.
Sediment loads: Maximum daily, 11,700 tons May 29; minimum daily, not determined.
EXTREMES, 1949-53.--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 Nov. 12-22, Nov. 24 to Mar. 16. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, June to September 1953

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			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				
June 16, 1953	4,590	6.6				9.0		67	41	1.5	0.0						86	25	20	0.4	212	7.0
Sept. 8	115	11				119		228	473	19							448	261	37	2.4	1,260	7.6

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Temperature (°F) of water, May to September 1953
/Once-daily measurement between 6 a. m. and 11 a. m./

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

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	125			220			210		
2	122			216			215	101	59
3	125			208			220		
4	122	25	8	204			220		
5	122			228			225		
					34	20			
6	125			244			225	41	24
7	153			228			210		
8	193			228			200		
9	193			208			190		
10	208			193			190		
		28	15					34	18
11	216			208	60	34	195		
12	216			220	110	65	200		
13	212			250	65	44	210		
14	224			250			220		
15	252			240			215		
16	260			240			215		
17	248	34	23	230			210		
18	244			240	38	24	210	45	25
19	240			230			205		
20	244			230			205		
21	228			230			205		
22	236			210			205		
23	240			168	74	34	200		
24	240			180			190		
25	240			190			175		
26	232	36	22	180			175		
27	228			175	--	e30	170	--	e20
28	224			180			165		
29	228			190			170		
30	224			200			175		
31	224			--	--	--	185		
Total	6,388	--	548	6,418	--	803	6,205	--	811

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	195	--		240	--		240	--	
2	200	--		240	--		230	--	
3	200	--		235	--		225	--	
4	205	--		230	--		210	--	
5	210	--		230	40		210	9	e10
6	205	--		230	42		220	--	
7	195	52		230	--		240	--	
8	200	--		230	--		255	--	e40
9	205	--		230	--		260	--	e90
10	210	--		220	--		270	190	a140
11	210	--		205	--		275	268	199
12	215	--		205	--		275	280	a210
13	220	--		210	36		275	302	224
14	225	--		215	--		280	245	185
15	220	--		225	--	e25	280	240	181
16	200	--	e25	235	--		285	182	140
17	180	--		240	34		289	204	159
18	170	--		240	--		260	120	84
19	190	52		235	--		244	155	102
20	210	--		215	--		260	260	183
21	215	--		205	--		256	150	104
22	220	--		205	--		224	50	30
23	230	36		210	--		216	42	24
24	225	--		215	--		244	130	86
25	220	--		225	--		264	168	120
26	220	--		235	--		289	188	147
27	225	--		250	--		272	213	156
28	235	--		250	--		264	254	181
29	235	--		--	--	--	260	277	194
30	235	40		--	--	--	289	278	217
31	240	--		--	--	--	298	298	240
Total	6,565	--	775	6,335	--	700	7,959	--	3,506

e Estimated.

a Computed from partly estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	268	290	210	465	620	778	1,040	740	2,080
2	248	214	143	460	2,250	2,790	1,210	650	2,120
3	236	148	94	435	920	1,080	1,390	715	2,680
4	224	158	96	405	500	547	1,360	585	2,150
5	228	128	79	330	410	365	1,320	495	1,760
6	220	135	80	316	245	209	1,440	700	2,720
7	272	152	112	338	200	183	1,210	495	1,620
8	298	130	105	390	180	190	1,200	354	1,150
9	260	90	63	460	225	279	1,080	293	855
10	264	173	123	568	349	535	1,150	630	s2,190
11	252	78	53	526	360	511	1,890	910	s4,960
12	252	82	56	475	350	449	2,820	1,100	8,380
13	244	76	50	435	225	264	3,470	1,030	9,650
14	260	86	60	405	205	224	4,440	876	10,500
15	256	65	45	385	150	156	5,180	524	7,330
16	240	80	52	385	130	135	4,440	359	4,300
17	252	86	59	410	135	149	3,550	345	3,310
18	268	88	64	475	145	186	3,440	330	3,070
19	264	82	58	510	150	207	3,310	341	3,050
20	264	110	78	568	215	330	3,070	223	1,850
21	260	190	133	610	280	461	2,390	202	1,300
22	260	140	98	556	195	293	1,790	196	947
23	298	123	99	515	190	264	1,580	180	768
24	343	172	159	526	260	369	1,550	153	640
25	370	230	230	544	310	455	1,400	114	431
26	366	284	281	500	320	b430	1,090	101	297
27	390	315	332	475	290	372	918	82	203
28	435	312	366	634	630	sa1,300	802	60	130
29	544	760	1,120	1,250	3,480	11,700	760	53	109
30	520	1,150	1,610	1,070	1,610	4,650	724	41	80
31	--	--	--	982	880	2,330	--	--	--
Total	8,856	--	6,108	16,403	--	32,191	61,014	--	80,630

Day	July			August			September		
1	706			180	41	20	110		
2	774			186	33	17	103	37	11
3	795			362	140	sa150	114		
4	748			480	138	179	130		
5	736	32	63	450	131	159	140		
6	700			405	113	124	142		
7	640			356	90	87	140		
8	592			316	76	65	135	35	12
9	568			280	50	38	132		
10	538			252			124		
		27	40		37	23			
11	556			231			122		
12	520			210			114		
13	505			170			106		
14	485			150			101		
15	455			142			96		
16	445	32	38	148			92		
17	465			160			96		
18	410			160			99		
19	380			165	36	15	99		
20	366	80	79	158			101		
21	334	85	77	152			105	24	7
22	294			145			106		
23	262			140			106		
24	252			138			105		
25	234			132			108		
26	231	37	23	120			118		
27	228			112			118		
28	224			114			118		
29	210			114	444	14	108		
30	204			114			105		
31	192			112			--	---	--
Total	14,049	---	1,295	6,354	---	1,187	3,393	---	267

Total discharge for year (cfs days) 149,939
Total load for year (tons) 128,821

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

YELLOWSTONE RIVER BASIN--Continued

POPO AGIE RIVER NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953 ..	8:30 a. m.	a275	--	367	549	74	78	80	86	88	92	94	98	--	99	100	BWCM
Apr. 30.....	2:20 p. m.	510	--	1,050	5,760	--	2	--	93	--	99	--	--	--	--	--	SPN
Apr. 30.....	2:20 p. m.	510	--	1,050	5,460	--	71	--	05	--	99	--	--	--	--	--	SPWCM
May 29	10:40 a. m.	1,300	57	4,300	8,350	--	4	--	70	--	96	--	--	--	--	--	SPN
May 29	10:40 a. m.	1,300	57	4,300	2,840	--	53	--	80	--	96	--	--	--	--	--	SPWCM
June 10.....	10:00 a. m.	982	--	241	2,290	--	45	--	66	--	90	--	--	--	--	--	SPWCM
June 12.....	6:00 p. m.	3,200	--	1,380	5,470	--	23	--	38	--	70	85	96	98	99	100	SPWCM
June 14.....	4:20 p. m.	4,660	--	830	2,930	--	30	--	45	--	69	82	95	97	99	100	SPWCM
June 17.....	4:20 p. m.	3,620	--	350	2,950	--	22	--	37	--	65	76	92	98	100	--	SPWCM
June 23.....	4:00 p. m.	1,640	--	151	1,800	23	30	38	45	59	75	83	99	--	100	--	BWCM

a Mean daily discharge.

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, approximately.
RECORDS AVAILABLE.--Sediment records: April 1951 to September 1953 (discontinued).
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 2,300 tons (estimated) May 28; minimum daily, 0 tons on many days each year.
EXTREMES,1951-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 2,300 tons (estimated) May 28, 1953; minimum daily, 0 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 83,400 ppm Apr. 30. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Monthly and annual summary of water and suapended-sediment discharge, water year October 1952 to September 1953

Month	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	1.9	3.8	430	14	430	0	80,800	83,400
May	19.2	38	a 3,715	120	e 2,300	0	69,100	70,200
June	2.1	4.2	a 430	14	a 430	0	73,100	43,600
July	0	0	0	0	0	0	--	--
August	0	0	0	0	0	0	--	--
September	0	0	0	0	0	0	--	--
Water year 1952-53	23.2	46.0	a 4,575	13	a 2,300	0	70,400	83,400

e Estimated.
a Mostly estimated.

Particle-size analyses of suspended sediment; April to June 1953
(Methods of analysis: B, bottom-withdrawal tube; P, pipette; D, decantation; S, sieve; N, in native waters; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Time	Discharge (cfs)	Suspended sediment					Methods of analysis
			Concentration (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters			
					0.004	0.016	0.062	
Apr. 30, 1953	11:15 a.m.	3.2	83,400	4,170	93	100	--	PWCM
May 3	10:50 a.m.	.6	46,700	4,980	98	100	--	PWCM
May 29	5:25 a.m.	.5	26,600	4,890	2	98	100	SPN
May 29	5:25 a.m.	.5	26,600	4,810	89	98	100	SPWCM
June 6	12:20 p.m.	.8	41,200	4,150	91	99	100	SPWCM

YELLOWSTONE RIVER BASIN--Continued

MUSKRAT CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1¾ 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 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 2,800 tons (estimated) May 29; minimum daily, 0 tons on many days.
EXTREMES, 1952-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 44,600 ppm May 29.
Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Monthly and annual summary of water and suspended sediment discharge, water year October 1952 to September 1953

Month	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	2.4	4.8	e370	12	e360	0	55,100	
May	24.0	48	a5,800	187	a2,800	0	86,300	44,600
June	0	0	0	0	0	0	--	
July	0	0	0	0	0	0	--	
August	0	0	0	0	0	0	--	
September	0	0	0	0	0	0	--	
Water year 1952-53	26.4	52.8	a6,170	17	a2,800	0	83,500	44,600

e Estimated.
a Mostly estimated.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.

LOCATION.--At gaging station, 1,400 feet (revised) 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.
Water temperatures: October 1950 to September 1951.
Sediment records: October 1949 to September 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 25,000 ppm June 6; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 3,200 tons July 28; minimum daily, 0 tons on many days.
EXTREMES,1949-53.--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 tons on many days each year.
REMARKS.--Flow affected by ice Nov. 9 to Mar. 30. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

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	0.2		(t)			
2	0		0	0		0			
3	0		0	0		0			
4	0		0	0		0			
5	0		0	.1					
6	0		0	.1		(t)			
7	0		0	.2					
8	0		0	0		0			
9	0		0	0		0			
10	0		0	0		*0			
11	0		0	.1		(t)			
12	0		0	.2		e1			
13	0		0	.5	1,150	e2			
14	0		0	.7					
15	0		0	1.0		e3			
16	0		0	.8					
17	0		0	.5					
18	0		0	.3		e1			
19	0		0	.1					
20	0		0	0		0			
21	0		0	0		0			
22	0		0	0		0			
23	0		0	0		0			
24	.2		(t)	0		0			
25	.2		(t)	0		0			
26	0		0	0		0			
27	0		0	0		0			
28	0		0	0		0			
29	.1		(t)	0		0			
30	.3	257	(t)	0		0			
31	.5		(t)	--		--			
Total	1.3		1	4.8		16	0		0

e Estimated.
t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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	2.0	--	e 8	0.4	--	e 1
2	0	--	0	5.0	--	e 40	.5	--	e 1
3	0	--	0	8.0	--	e 100	1.0	--	e 5
4	0	--	0	8.0	6,700	145	1.8	3,450	17
5	0	--	0	5.0	--	e 45	2.0	--	e 19
6	0	--	0	4.0	--	e 30	1.5	4,950	20
7	0	--	0	3.0	--	e 15	1.0	7,300	20
8	0	--	0	1.0	408	1	1.0	--	e 20
9	.2	--	(t)	.5	308	(t)	2.0	7,150	41
10	1.0	925	2	.2			2.0	6,230	34
11	.5			.1	--	(t)	2.0	4,190	23
12	.4	--	(t)	.1			1.5	4,820	20
13	.3			.1			1.5	5,470	22
14	.1			.1	103	(t)	1.0	5,270	14
15	0	--	0	.1			1.5	5,140	21
16	0	--	0	.1	--	(t)	1.5	3,920	16
17	0	--	0	.1			1.0	--	e 8
18	.1	--	(t)	.2			.5	1,690	2
19	.5	--	(t)	.2	162	(t)	.5	--	e 2
20	1.0	--	e 1	.1	--	(t)	.5	--	e 2
21	3.0	--	e 3	0	--	0	1.0	1,690	5
22	3.0	--	e 3	0	--	0	2.0	2,600	a 15
23	5.0	388	5	0	--	0	3.0	4,370	35
24	3.0	490	b 4	.1			3.0	2,950	24
25	2.0	--	e 3	.1			2.0	2,790	15
26	2.0	619	3	.2	--	(t)	2.0	--	e 8
27	1.0	--	e 1	.2			1.5	--	e 6
28	.6	--	(t)	.3			1.5	1,380	6
29	.5	--	(t)	--	--	--	1.0	--	e 4
30	.2	--	(t)	--	--	--	1.5	1,890	8
31	.5	1,240	2	--	--	--	2.0	2,500	14
Total	24.9	--	30	38.8	--	387	45.2	--	448

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	1.8			3.2	12,200	s 116	0.6	4,200	7
2	1.7			3.8	13,000	sa 150	.6	--	e 5
3	1.4	--	e 10	1.8	9,000	44	.1	3,000	1
4	1.7			2.0	7,700	42	.2	3,600	2
5	2.0	3,100	a 15	1.9	7,800	a 40	28	24,000	sb 3,000
6	4.9	13,700	181	1.6			11	25,000	sb 1,200
7	4.2	13,400	s 174	1.2			1.5	--	e 30
8	2.3	11,100	69	.9	--	e 25	.6	--	e 10
9	1.9	9,300	sa 60	1.7			.4	--	e 5
10	2.3	9,990	s 75	1.4			0	--	0
11	2.3	10,600	66	1.5	5,300	21	0	--	0
12	2.0	6,800	37	1.3	5,900	sa 30	0	--	0
13	1.7	6,400	s 35	1.7	5,650	26	.2	1,000	sa 35
14	1.5	5,900	a 25	1.6			0	--	0
15	1.0	5,500	a 15	1.5	--	e 20	0	--	0
16	1.3	5,410	19	1.4			0	--	0
17	1.5	6,650	s 30	1.4			0	--	0
18	1.5	7,400	a 30	1.8	4,000	19	0	--	0
19	1.1	7,200	21	1.2	--	e 10	0	--	0
20	.9	3,960	s 12	.4	--	e 2	0	--	0
21	.3	1,100	a 1	2.0	5,300	sa 50	0	--	0
22	0	--	0	1.0	5,660	s 19	0	--	0
23	0	--	0	.6	6,300	a 10	0	--	0
24	0	--	0	.8	8,400	a 20	0	--	0
25	0	--	0	.1	6,000	2	0	--	0
26	.1	--	(t)	.3	--	e 2	0	--	0
27	.2	--	e 1	.4	--	e 2	0	--	0
28	1.4	4,400	sa 45	1.5	6,000	sa 55	0	--	0
29	4.7	16,000	sb 230	1.9	11,400	s 82	0	--	0
30	2.0	10,300	s 63	.5	6,100	a 8	0	--	0
31	--	--	--	.4	--	e 5	--	--	--
Total	47.7	--	1,244	42.8	--	960	43.2	--	4,295

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

Suspended sediment, water year October 1952 to September 1953--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	2.5	6,400	sb85			
3	0	--	0	.6	4,600	sa10			
4	0	--	0	0	--	0			
5	0	--	0	0	--	0			
6	0	--	0	0	--	0			
7	0	--	0	0	--	0			
8	0	--	0	0	--	0			
9	0	--	0	0	--	0			
10	0	--	0	0	--	0			
11	0	--	0	0	--	0			
12	0	--	0	0	--	0			
13	0	--	0	0	--	0			
14	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	0	--	0			
28	9.9	5,600	sa3,200	0	--	0			
29	14	23,000	sa2,700	0	--	0			
30	0	--	0	0	--	0			
31	0	--	0	0	--	0			
Total	23.9	--	5,900	3.1	--	95	0		0

Total discharge for year (cfs-days) 275.7
Total load for year (tons) 13,376

s Computed by subdividing day.
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, November 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	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. 13, 1952	1:45 p.m.	2.9		2,360	2,930		57		86		98	--	--	--	--	--	SPWCM
Jan. 31, 1953	5:45 p.m.	a .5		4,730	3,400		33		61		93	--	--	--	--	--	SPWCM
Feb. 4	1:05 p.m.	10		11,600	3,180		1		36		70	85	96	98	99	100	SPN
Feb. 4	1:05 p.m.	10		11,600	2,700		24		44		70	85	96	98	99	100	SPWCM
Mar. 16	11:55 a.m.	e 10		23,400	3,160		0		38		75	91	99	100	--	--	SPN
Mar. 16	11:55 a.m.	e 10		23,400	3,730		25		42		75	91	99	100	--	--	SPWCM
Mar. 23	3:30 p.m.	4.3		10,900	6,360		48		74		90	--	--	--	--	--	SPWCM
Mar. 30	10:45 a.m.	1.2		5,160	5,830		0		63		87	--	--	--	--	--	SPN
Mar. 30	10:45 a.m.	1.2		5,160	6,400		49		73		87	--	--	--	--	--	SPWCM
Apr. 6	10:35 a.m.	5.0		13,400	3,290		36		54		74	87	95	97	98	100	SPWCM
May 11	11:40 a.m.	1.9		6,440	2,860		35		51		67	78	89	94	98	100	SPWCM
May 18	9:20 a.m.	3.5		5,830	3,660		41		62		81	--	--	--	--	--	SPWCM
May 29	8:30 a.m.	4.7		15,400	4,230		2		37		70	84	96	98	99	100	SPN
May 29	8:30 a.m.	4.7		15,400	4,340		29		46		70	84	96	98	99	100	SPWCM
June 1	12:10 p.m.	.9		5,650	5,820		66		86		90	--	--	--	--	--	SPWCM

a Mean daily discharge.
e Estimated.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.

LOCATION.--At gaging station, 3 miles downstream from Ocean drain, 12½ miles north of Riverton, Fremont County, and 13 miles upstream from mouth.
DRAINAGE AREA.--342 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1950 to November 1951.
Water temperatures: October 1950 to September 1951, October 1952 to September 1953.
Sediment records: October 1949 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Minimum, freezing point on many days during October to April.
Sediment concentrations: Maximum daily, 58,000 ppm Apr. 26; minimum daily, not determined.
Sediment loads: Maximum daily, 21,100 tons Apr. 26; minimum daily, not determined.
EXTREMES, 1949-53.--Water temperatures (1950-51, 1952-53): Minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 89,500 ppm Sept. 20, 1950; minimum daily, not determined.
Sediment loads: Maximum daily, 199,000 tons Sept. 20, 1950; minimum daily, 3 tons Jan. 5, 16, 17, 1950.
REMARKS.--Investigations indicate that practically all the total sediment load is transported in suspension at this contracted section of the creek. Flow affected by ice Dec. 2 to Jan. 14, Jan. 22-28, Feb. 18-28. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 5 a. m. and 10 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	38	a31	31	31	31	a44	38	52	58	64	57
2	47	41	31	31	31	31	a46	40	53	55	59	54
3	49	32	a31	31	31	31	31	41	49	54	58	53
4	45	31	31	a31	31	a31	--	--	48	54	60	52
5	44	34	a31	a31	31	31	31	a68	48	56	60	51
6	41	33	31	31	31	31	a47	a58	44	56	59	53
7	43	33	31	31	31	31	39	a59	54	57	60	54
8	43	33	a31	31	31	31	a44	44	50	58	61	58
9	43	31	31	31	31	a34	31	43	53	59	61	56
10	45	31	a31	31	31	a34	a38	43	54	63	--	55
11	44	31	a31	a31	31	a37	a47	a47	57	60	--	55
12	45	31	a31	a31	31	a40	a39	33	59	62	--	54
13	43	33	a31	31	31	a36	a43	37	58	--	--	57
14	40	31	a32	31	31	a39	a44	39	57	62	--	55
15	38	34	a31	--	31	31	a49	44	58	64	--	53
16	41	31	a31	a31	31	a45	40	47	56	59	--	57
17	40	33	a31	31	31	a34	34	52	58	--	--	55
18	44	--	a31	31	31	a42	a41	50	54	--	60	51
19	47	31	a31	31	31	a37	a57	51	59	--	61	51
20	40	--	31	31	31	a32	a52	48	51	--	61	51
21	40	31	a31	31	31	a35	a56	44	51	--	62	57
22	37	31	31	31	31	31	43	37	53	--	60	52
23	38	31	31	31	31	a41	42	45	55	--	59	52
24	41	31	31	31	--	a52	38	48	54	--	59	50
25	40	31	31	31	31	a43	a63	43	48	--	58	48
26	--	31	a31	31	31	a43	42	48	51	--	59	48
27	37	31	31	31	31	a56	45	49	50	--	57	49
28	31	31	a31	31	31	a46	47	54	53	--	58	48
29	31	31	31	31	--	a40	45	53	56	--	58	49
30	34	--	a31	31	--	a50	46	48	53	--	58	47
31	37	--	31	31	--	--	--	51	--	65	57	--
Average	41	32	31	31	31	38	44	47	53	--	--	53

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	141	14,300	5,440	51	7,200	991	20		
2	158	14,600	6,230	51	6,000	826	20		
3	145	12,500	4,890	39	4,450	s 510	22		
4	106	13,400	3,840	11	3,200	sa 130	21		
5	91	10,200	2,510	51	7,200	991	22		
								141	10
6	75	9,400	1,900	52	7,500	1,050	23		
7	72	8,600	1,670	53	5,800	830	25		
8	72	9,500	1,850	51	6,500	895	35		
9	69	9,400	1,750	50	4,400	594	40		
10	66	7,700	1,370	49	4,000	529	35		
11	66	8,000	1,430	48	4,400	570	32	400	35
12	64	8,000	1,380	49	9,600	1,270	31	550	46
13	62	7,900	1,320	50	6,400	864	32	1,280	111
14	62	9,000	1,510	48	5,700	739	32	1,470	127
15	61	8,600	1,420	48	5,600	726	32	1,700	147
16	60	7,600	1,230	46	4,700	584	33	1,840	164
17	57	8,500	1,310	45	5,800	705	33	2,000	178
18	57	7,200	1,110	43	5,200	604	33	1,730	154
19	57	7,800	1,200	44	3,900	463	33	1,250	111
20	55	7,200	1,070	45	4,600	559	32	1,690	146
21	52	6,700	941	41	2,600	288	31	2,150	180
22	37	3,000	300	40	3,800	410	31	2,440	204
23	51	7,600	1,050	36	3,600	350	30	2,120	172
24	54	7,000	1,020	37	2,900	290	29	1,920	150
25	54	6,600	962	35	3,000	283	24	1,400	91
26	52	6,000	842	33	3,600	321	20	1,090	59
27	34	7,490	s 922	34	3,800	349	22	2,050	122
28	11	3,000	89	33	2,500	223	23	1,650	102
29	10	3,400	92	27	1,300	95	23	2,660	165
30	10	3,900	105	20	--	e 10	24	1,280	83
31	9.4	7,430	189	--	--	--	24	950	62
Total	1,970.4	--	50,942	1,260	--	17,049	867	--	2,709
	January			February			March		
1	23	900	56	40	5,300	572	20	3,200	173
2	22	1,130	67	42	4,700	533	24	3,780	245
3	22	1,380	82	43	6,200	s 760	25	3,100	sa 250
4	21	1,550	88	39	6,300	663	22	4,840	s 434
5	22	1,550	92	28	4,300	325	28	5,800	sa 540
6	22	1,500	89	27	4,400	s 347	29	7,570	s 732
7	22	1,400	83	29	5,000	392	34	11,000	s 1,380
8	23	1,730	107	24	3,100	201	35	10,000	sa 1,300
9	25	1,650	111	21	3,200	sa 210	34	11,000	sa 1,300
10	30	1,930	156	21	3,200	s 226	31	12,000	sa 1,300
11	33	2,400	214	21	3,100	s 207	34	11,000	sa 1,100
12	34	2,670	245	21	4,700	266	36	9,700	a 940
13	33	3,190	284	23	3,100	sa 230	23	10,600	s 781
14	30	2,350	190	21	4,090	s 280	22	11,100	s 798
15	18	1,530	s 86	21	3,000	sa 200	22	10,000	sa 640
16	24	1,730	112	21	3,500	sa 220	21	9,600	sa 630
17	33	1,350	120	21	3,000	sa 200	18	11,000	a 530
18	36	1,190	116	20	3,300	178	19	10,200	s 554
19	36	1,700	165	17	3,300	151	20	9,000	a 490
20	32	2,000	173	15	3,200	130	19	10,000	513
21	31	3,050	255	15	2,900	117	14	9,800	sa 410
22	32	2,450	212	15	2,400	97	14	7,650	s 393
23	34	2,670	245	16	2,700	117	14	9,900	sa 450
24	36	2,780	270	16	1,800	78	14	9,600	sa 440
25	37	3,300	330	17	1,300	60	16	11,000	a 480
26	38	2,890	297	18	1,700	83	14	9,500	359
27	30	1,850	150	20	4,400	238	14	8,600	325
28	27	1,700	124	21	4,400	249	14	7,700	291
29	33	5,000	446	--	--	--	14	7,550	285
30	29	5,600	438	--	--	--	14	6,500	246
31	29	4,700	368	--	--	--	14	6,700	253
Total	897	--	5,771	653	--	7,330	672	--	18,562

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	6,600	214	80	22,300	4,820	91	13,000	3,190
2.....	12	7,400	240	73	22,200	4,380	76	12,000	2,460
3.....	13	4,900	172	68	19,200	3,530	66	11,000	1,960
4.....	14	5,700	215	65	18,000	3,160	80	10,800	2,330
5.....	14	5,750	217	68	19,900	3,650	143	18,800	s7,780
6.....	24	10,800	700	66	17,800	3,170	158	20,900	8,920
7.....	27	11,700	s929	69	18,700	3,480	129	16,700	5,820
8.....	21	11,000	624	75	17,100	3,460	110	15,900	4,720
9.....	20	7,400	400	82	18,000	3,990	98	14,500	3,840
10.....	19	7,550	367	78	17,100	3,600	90	13,000	3,160
11.....	18	5,600	272	73	16,000	3,150	85	14,900	3,420
12.....	18	5,600	272	72	17,000	3,300	87	11,300	2,650
13.....	16	4,800	207	74	16,200	3,240	92	13,800	3,430
14.....	16	4,550	197	72	14,000	2,720	110	13,400	3,980
15.....	14	4,800	181	74	14,300	2,860	123	14,200	4,720
16.....	13	4,400	154	70	13,800	2,610	118	14,200	4,520
17.....	12	4,150	134	66	12,800	2,280	121	14,700	4,800
18.....	13	4,550	160	66	12,000	2,140	136	13,700	5,030
19.....	12	4,800	156	70	12,200	2,310	141	13,800	5,250
20.....	12	4,900	159	65	11,200	1,970	163	16,500	7,260
21.....	12	4,200	136	67	11,300	2,040	171	16,200	7,480
22.....	11	3,500	104	67	12,300	2,230	185	14,500	7,240
23.....	11	3,900	116	60	10,200	1,650	170	16,400	7,530
24.....	9.7	4,000	105	65	10,500	1,840	154	17,400	7,230
25.....	13	14,600	s746	57	8,800	1,350	153	16,500	6,820
26.....	130	58,000	21,100	65	9,400	1,650	159	14,800	6,350
27.....	126	50,100	17,700	80	13,400	2,890	187	18,600	9,390
28.....	76	34,000	7,240	84	13,100	2,970	187	18,300	9,240
29.....	96	36,600	9,840	85	12,500	2,870	181	15,800	7,720
30.....	75	26,200	5,310	80	13,900	3,000	163	16,200	7,130
31.....	--	--	--	91	13,400	3,290	--	--	--
Total.	878.7	--	68,367	2,227	--	89,600	2,927	--	165,370
	July			August			September		
1.....	151	14,900	6,070	196	12,400	6,560	122	5,300	1,750
2.....	156	15,700	6,610	244	11,200	7,380	124	5,000	1,670
3.....	166	14,500	6,500	252	12,400	8,440	138	5,300	1,970
4.....	175	15,300	7,230	216	10,800	6,300	126	4,800	1,630
5.....	197	14,500	7,710	181	9,800	4,790	122	4,200	1,380
6.....	200	16,400	8,860	168	10,900	4,940	121	4,000	1,310
7.....	206	16,000	8,900	152	8,800	3,610	122	4,500	1,480
8.....	200	16,400	8,860	154	8,050	3,350	124	4,600	1,540
9.....	180	15,500	7,530	164	8,800	3,900	117	4,500	1,420
10.....	178	14,400	6,920	157	8,200	3,480	112	4,200	1,270
11.....	184	12,500	6,210	156	7,400	3,120	104	3,400	955
12.....	189	11,600	5,920	153	7,200	2,970	111	3,300	989
13.....	187	12,600	6,360	159	6,550	2,810	117	4,700	1,480
14.....	174	13,700	6,810	154	7,300	3,040	134	4,700	1,700
15.....	174	13,300	6,250	154	6,900	2,870	104	4,100	1,150
16.....	188	14,200	6,700	145	6,300	2,470	100	3,400	918
17.....	189	13,100	6,680	146	6,500	2,560	94	2,900	736
18.....	194	13,300	6,970	151	6,700	2,730	89	3,000	721
19.....	205	13,600	7,530	139	6,400	2,400	92	3,300	820
20.....	197	12,300	6,540	136	6,600	2,420	97	3,500	917
21.....	188	13,800	7,000	132	5,650	2,010	99	3,500	936
22.....	158	12,700	5,420	135	5,700	2,080	98	3,500	926
23.....	170	11,100	5,090	135	5,700	2,080	100	4,000	1,080
24.....	170	12,000	5,510	133	6,500	2,330	94	3,600	914
25.....	174	11,600	5,450	126	6,150	2,090	86	3,300	766
26.....	166	11,200	5,020	122	6,200	2,040	82	2,800	620
27.....	181	12,200	5,960	130	6,150	2,160	82	3,200	708
28.....	183	9,500	4,690	135	6,000	2,190	80	3,400	734
29.....	214	19,000	sa13,000	129	6,100	2,120	80	4,000	864
30.....	184	13,000	6,460	122	6,250	2,060	86	4,200	975
31.....	205	12,500	6,920	130	6,200	2,180	--	--	--
Total.	5,693	--	211,680	4,806	--	103,480	3,157	--	34,329

Total discharge for year (cfs-days) 27,008.1
Total load for year (tons) 775,189

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, October 1952 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	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, 1952	6:35 a.m.	110	45	14,800	6,190		14		21		34	55	84	98	100	--	SPWCM
Oct. 7	2:30 p.m.	72	--	7,690	4,200		1		24		44	65	87	94	97	99	SPN
Oct. 7	2:30 p.m.	72	--	7,690	4,130		17		26		44	65	87	94	97	99	SPWCM
Nov. 28	2:05 p.m.	36	32	3,080	1,320		8		12		19	28	59	78	90	98	SPWCM
Feb. 4, 1953	3:05 p.m.	50	--	11,000	7,880		1		26		49	59	84	93	97	99	SPN
Feb. 4	3:05 p.m.	50	--	11,000	7,970		20		33		49	59	84	93	97	99	SPWCM
Mar. 20	11:45 a.m.	18	--	7,240	3,610		1		20		38	54	74	83	90	97	SPN
Mar. 20	11:45 a.m.	18	--	7,240	3,980		15		23		38	54	74	83	90	97	SPWCM
Apr. 3	1:45 p.m.	15	--	4,520	4,200		26		40		59	74	89	96	99	100	SPWCM
Apr. 27	1:30 p.m.	112	--	47,800	4,210		40		56		83	94	98	99	100	--	SPWCM
Apr. 29	11:30 a.m.	106	--	31,800	4,440		29		43		72	88	96	98	99	100	SPWCM
May 15	10:20 a.m.	72	--	12,700	2,710		2		29		55	76	91	95	98	100	SPN
May 15	10:20 a.m.	72	--	12,700	2,780		25		35		55	76	91	95	98	100	SPWCM
June 26	5:45 p.m.	150	--	15,400	3,540		28		41		59	75	91	96	99	100	SPWCM
July 8	12:20 p.m.	217	--	16,800	3,110		18		38		61	76	90	95	98	100	SPWCM
July 16	12:35 p.m.	210	--	12,500	2,360		26		30		51	70	89	95	98	100	SPWCM
July 16	12:40 p.m.	210	--	12,500	2,530		24		30		48	66	87	94	97	99	SPWCM
July 24	11:35 a.m.	189	--	12,900	4,800		1		29		48	67	88	94	97	99	SPN
July 24	11:35 a.m.	189	--	12,900	4,580		21		29		48	67	88	94	97	99	SPWCM
Aug. 28	10:05 a.m.	145	--	6,730	2,200		18		24		40	57	79	88	95	99	SPWCM

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 1953.
Sediment records: August 1948 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 70°F Sept. 4; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 42,000 ppm Apr. 26; minimum daily, not determined.
Sediment loads: Maximum daily, 23,200 tons Apr. 26; minimum daily, 10 tons Dec. 29.
EXTREMES, 1948-53.--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.--Sampling section modified by an artificial contraction built 200 feet upstream during August 1952. Erosion-control structures placed upstream at several sections during the period Mar. 31 to Oct. 9, 1953. Flow affected by ice Nov. 21 to Dec. 29, Feb. 20-24, Mar. 2-5.
Records of water discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, April to September 1953

Date of collection	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. 28, 1953	122	--		172	30	254	5.2	--	--	--	--				1,570	2.14		554	--	50	4.7	1,990	8.3
May 14	139	--		112	26	195	3.8	--	--	--	--				1,130	1.54		386	--	52	4.3	1,520	8.0
May 27	190	--		104	24	178	4.1	--	--	--	--				1,020	1.39		358	--	52	4.1	1,420	7.4
June 5	325	--		94	20	184	4.1	--	--	--	--				1,010	1.37		317	--	55	4.5	1,390	7.4
June 16	202	13		--	--	161		186	0	465	21	0.5			--	--		318	165	52	3.9	1,270	7.3
June 24	329	--		88	17	144	3.6	--	--	--	--				826	1.12		288	--	52	3.7	1,150	7.9
July 8	381	--		107	16	140	3.8	--	--	--	--				864	1.18		334	--	47	3.3	1,190	7.4
Sept. 8	268	9.6		--	--	202		164	4	568	25				--	--		328	187	57	4.8	1,440	8.4

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 6 a. m. and 9 a. m. 7

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	234	13,000	8,210	58	6,100	s1,010	27	432	31
2.....	254	13,700	9,400	53	5,800	830	28	--	e35
3.....	215	13,500	7,840	48	5,200	674	30	--	e50
4.....	120	9,900	3,210	34	2,600	239	29	1,440	113
5.....	103	9,600	2,670	58	6,100	955	30	--	e150
6.....	94	9,300	2,360	58	6,800	1,060	31	--	e200
7.....	98	8,600	2,280	58	6,400	1,000	35	--	e200
8.....	98	8,300	2,200	59	8,400	1,340	54	2,600	379
9.....	101	6,800	1,850	56	6,320	s1,050	56	3,700	559
10.....	94	7,300	1,850	53	5,390	s888	50	4,800	648
11.....	91	7,600	1,870	53	7,600	1,090	46	4,500	559
12.....	88	7,600	1,810	53	7,000	1,000	44	10,400	1,240
13.....	91	6,700	1,650	53	7,100	1,020	44	4,000	475
14.....	88	7,800	1,850	55	7,100	1,050	45	3,300	401
15.....	86	6,600	1,530	53	8,400	1,200	46	2,200	273
16.....	84	6,600	1,500	53	7,800	1,120	46	2,200	273
17.....	88	7,100	1,690	56	6,500	983	44	3,380	402
18.....	111	7,400	2,220	53	5,600	801	47	2,990	379
19.....	122	6,700	2,210	55	4,450	s706	46	2,920	363
20.....	122	7,100	2,340	56	6,380	s1,140	45	5,220	634
21.....	120	6,300	2,040	54	7,400	1,080	45	3,930	477
22.....	79	3,300	704	53	9,800	1,400	43	3,390	394
23.....	106	5,520	s1,680	50	10,100	1,360	42	2,980	338
24.....	96	6,200	1,610	47	8,000	1,020	41	2,800	310
25.....	73	5,600	1,100	49	8,300	1,100	35	2,500	236
26.....	59	6,100	972	48	6,800	881	30	890	72
27.....	51	4,800	661	47	--	e750	32	590	51
28.....	33	2,300	205	45	5,480	666	35	150	14
29.....	35	2,020	191	35	--	e150	37	100	10
30.....	38	2,300	236	27	--	e30	39	120	13
31.....	38	1,750	180	--	--	--	37	280	28
Total	3,110	--	70,119	1,530	--	27,593	1,239	--	9,307
	January			February			March		
1.....	37	210	21	71	2,200	422	37	950	95
2.....	35	200	19	94	3,570	s1,010	35	--	e80
3.....	34	390	36	106	3,680	s1,130	45	3,700	450
4.....	35	330	31	103	5,300	1,470	40	1,500	162
5.....	38	320	33	88	900	214	50	2,600	351
6.....	40	290	31	77	580	121	58	3,880	s671
7.....	44	290	34	65	1,780	s366	72	4,810	s1,100
8.....	47	550	70	61	1,010	166	82	5,820	1,290
9.....	50	1,300	176	47	730	93	76	5,200	s1,140
10.....	55	1,410	209	43	740	s92	72	5,020	s1,040
11.....	55	990	147	39	780	s96	69	7,600	1,420
12.....	55	1,000	149	43	2,060	s264	54	6,610	s1,090
13.....	53	1,210	173	39	1,640	173	44	5,880	699
14.....	53	830	119	35	1,800	170	39	7,250	s814
15.....	39	920	97	35	1,300	123	31	5,200	435
16.....	40	800	86	35	1,500	142	28	8,200	620
17.....	45	730	89	39	2,130	s297	22	8,800	523
18.....	51	360	50	35	590	56	23	8,640	s655
19.....	53	600	86	31	300	25	28	8,200	620
20.....	47	920	117	30	--	e20	26	6,700	470
21.....	50	1,000	135	30	800	65	26	7,400	519
22.....	50	550	74	30	730	59	28	6,460	488
23.....	48	470	61	30	750	61	29	6,100	478
24.....	53	910	130	31	880	74	30	6,010	487
25.....	53	1,070	153	32	1,600	138	31	6,200	519
26.....	56	1,130	171	33	1,600	142	34	5,600	514
27.....	45	680	83	34	2,190	s229	37	5,400	539
28.....	45	1,290	157	38	1,980	s266	31	5,600	469
29.....	58	1,350	211	--	--	--	29	5,000	392
30.....	71	1,050	201	--	--	--	30	5,000	405
31.....	69	970	181	--	--	--	30	5,200	421
Total	1,504	--	3,330	1,374	--	7,484	1,266	--	18,956

e Estimated.
s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	4,000	324	181	16,300	7,970	164	9,750	4,320
2	32	4,400	380	176	13,500	6,420	153	8,700	3,590
3	28	4,000	302	155	10,800	4,520	150	7,700	3,120
4	31	3,600	301	150	10,200	4,130	150	8,400	3,400
5	31	3,500	293	150	9,600	3,890	260	15,100	s 11,200
6	35	7,400	699	139	9,200	3,450	314	16,500	14,000
7	29	6,900	540	136	10,700	3,930	278	13,200	9,910
8	25	5,100	344	147	11,800	4,680	264	12,400	8,840
9	29	3,950	309	176	11,700	5,560	218	10,400	6,120
10	31	5,260	440	158	11,500	4,910	196	9,200	4,870
11	30	5,060	410	155	10,600	4,440	144	8,400	3,270
12	29	5,290	414	144	9,900	3,850	128	9,000	3,110
13	29	4,600	360	141	9,900	3,770	150	9,600	3,890
14	29	5,060	396	139	9,000	3,380	164	9,800	4,340
15	28	5,180	392	139	9,000	3,380	181	10,500	5,130
16	27	4,140	302	136	8,500	3,120	187	10,300	5,200
17	28	4,950	374	136	9,200	3,380	202	10,500	5,730
18	28	3,710	280	141	6,800	2,590	215	13,000	7,550
19	25	3,300	223	153	7,700	3,180	218	12,400	7,300
20	23	3,200	199	147	8,000	3,180	258	12,700	8,850
21	21	3,400	193	147	7,300	2,900	289	13,000	10,100
22	18	2,800	136	136	7,200	2,640	311	13,800	11,600
23	17	3,000	138	141	6,990	2,660	303	19,200	15,700
24	17	4,500	207	161	8,990	3,910	296	13,800	11,000
25	19	3,300	169	139	5,800	2,180	300	13,700	11,100
26	197	42,000	23,200	158	6,400	2,730	318	14,800	12,700
27	176	37,500	18,500	170	8,200	3,760	347	13,700	12,800
28	129	26,100	s 10,300	155	9,100	3,810	340	15,500	14,200
29	161	26,300	11,400	150	9,600	3,890	332	14,300	12,800
30	158	17,400	7,420	150	8,200	3,320	293	13,500	10,700
31	--	--	--	164	9,900	4,380	--	--	--
Total	1,490	--	78,945	4,670	--	119,910	7,123	--	246,440

Day	July			August			September		
1	272	12,500	9,180	373	12,700	12,800	251	6,790	4,600
2	289	12,300	9,600	418	12,800	14,400	244	9,200	6,060
3	289	13,900	10,800	444	13,800	16,500	275	8,800	6,530
4	289	12,900	10,100	408	13,600	15,000	278	9,000	6,760
5	321	13,500	11,700	389	12,200	12,800	268	7,300	5,280
6	321	13,800	12,000	355	12,500	12,000	261	7,000	4,930
7	340	15,000	13,800	336	11,400	10,300	264	7,900	5,630
8	340	16,300	15,000	314	12,500	10,600	268	8,400	6,080
9	336	15,000	13,600	314	11,500	9,750	264	7,800	5,560
10	340	14,400	13,200	308	12,000	9,980	264	7,600	5,420
11	355	14,200	13,600	286	12,000	9,270	247	7,400	4,940
12	355	13,800	13,200	272	9,600	7,050	244	6,400	4,220
13	344	13,600	12,600	282	9,600	7,310	251	7,900	5,350
14	347	13,800	12,900	282	10,500	8,000	275	7,500	5,570
15	336	13,100	11,900	278	9,800	7,360	244	6,000	3,950
16	351	15,000	14,200	286	9,800	7,570	238	5,600	3,600
17	370	15,400	15,400	261	8,700	6,130	238	6,500	4,180
18	362	14,500	14,200	268	8,900	6,440	224	6,400	3,870
19	370	14,500	14,500	261	9,300	6,550	212	7,100	4,060
20	355	13,900	13,300	268	9,700	7,020	209	6,600	3,720
21	318	12,600	10,800	268	9,700	7,020	221	6,800	4,060
22	293	11,199	8,780	272	9,700	7,120	218	6,700	3,940
23	289	11,300	8,820	278	8,100	6,080	224	6,000	3,630
24	282	11,300	8,600	261	7,570	5,330	218	6,100	3,590
25	289	10,000	7,800	244	7,650	5,040	212	5,500	3,150
26	303	12,200	9,980	231	6,790	4,240	206	6,800	3,780
27	311	12,000	10,100	238	7,050	4,530	206	5,300	2,950
28	332	11,600	10,400	238	7,400	4,760	206	6,000	3,340
29	352	15,300	14,500	241	8,510	5,540	184	6,000	2,980
30	347	12,600	11,800	228	6,710	4,130	202	4,900	2,670
31	366	12,200	12,100	244	7,290	4,800	--	--	--
Total	10,164	--	368,460	9,146	--	255,420	7,116	--	134,400

Total discharge for year (cfs-days) 49,732

Total load for year (tons) 1,340,364

s Computed by subdividing day.

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment; water year, October 1952 to September 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	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. 15, 1952	10:15 a.m.	84	--	6,590	--		15		21		37	66	96	--	100	--	SPWCM
Oct. 15	2:45 p.m.	84	--	5,930	2,200		19		30		50	78	97	100	--	--	SPWCM
Dec. 8	4:00 p.m.	58	32	1,960	2,040		14		20		27	43	78	92	97	98	SPWCM
Jan. 13, 1953	11:45 a.m.	50	35	2,460	599		17		24		38	55	82	93	98	100	SPWCM
Feb. 26	12:55 p.m.	30	35	4,250	--		11		15		31	55	91	97	99	100	SPWCM
Feb. 26	2:55 p.m.	29	38	4,580	1,000		16		23		34	54	89	97	99	100	SPWCM
Mar. 24	12:00 m.	37	40	9,550	3,860		19		29		58	84	99	100	--	--	SPWCM
Apr. 15	11:25 a.m.	31	52	5,290	2,460		23		34		61	86	99	100	--	--	SPWCM
Apr. 28	10:05 a.m.	120	54	22,300	8,240		11		59		75	84	94	96	97	99	SPN
Apr. 28	10:05 a.m.	120	54	22,300	8,030		39		54		75	84	94	96	97	99	SPWCM
May 7	2:15 p.m.	139	--	10,600	4,270		2		37		67	83	97	99	100	--	SPN
May 7	2:15 p.m.	139	--	10,600	3,570		32		47		68	83	97	99	100	--	SPWCM
May 14	9:40 a.m.	139	--	9,550	4,310		2		27		51	70	92	97	98	99	SPN
May 14	9:40 a.m.	139	--	9,550	7,190		19		28		51	70	92	97	98	99	SPWCM
May 22	9:30 a.m.	141	--	7,760	2,670		13		30		46	66	89	96	98	100	SPWCM
May 27	10:00 a.m.	190	--	8,200	2,850		2		32		59	78	95	99	100	--	SPN
May 27	10:00 a.m.	190	--	8,200	2,910		25		37		61	78	95	99	100	--	SPWCM
June 5	12:55 p.m.	325	--	18,200	10,400		0		27		60	81	93	97	99	100	SPN
June 5	12:55 p.m.	325	--	18,200	10,600		19		31		64	81	93	97	99	100	SPWCM
June 16	9:50 a.m.	209	63	10,500	3,420		2		31		57	74	91	96	99	100	SPN

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment; water year, October 1952 to September 1953--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	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 16 1953	9:50 a.m.	209	63	10,500	3,300		23		34		58	74	91	96	99	100	SPWCM
June 24	2:10 p.m.	332	66	14,600	3,660		0		30		53	72	87	94	98	100	SPN
June 24	2:10 p.m.	332	66	14,600	4,410		22		32		59	75	88	94	98	100	SPWCM
June 24	5:30 p.m.	300	65	13,600	--		25		37		59	77	91	--	99	100	SPWCM
June 25	12:20 p.m.	321	--	13,400	--		23		33		57	78	93	--	99	100	SPWCM
July 8	10:50 a.m.	381	66	17,200	3,700		1		29		52	--	--	--	--	--	SPN
July 8	10:50 a.m.	381	66	17,200	3,880		22		35		57	73	89	96	98	100	SPWCM
July 22	2:55 p.m.	293	--	10,600	--		25		38		65	82	94	--	99	100	SPWCM
July 22	3:25 p.m.	289	80	11,500	3,030		24		36		58	76	92	97	99	100	SPWCM
Aug. 12	11:25 a.m.	286	71	9,640	2,890		15		30		43	65	86	94	97	99	SPWCM
Aug. 14	10:30 a.m.	300	--	10,800	3,010		12		19		32	50	78	91	97	100	SPWCM
Aug. 27	10:55 a.m.	254	64	7,260	2,450		15		21		35	53	83	94	99	100	SPWCM
Sept. 14	9:45 a.m.	286	--	7,660	2,050		16		23		35	51	76	88	96	100	SPWCM

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of bed material, October 1952 to April 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	Number of sampling points	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	8.000	16.000	
Oct. 15, 1952	5	84						0	3	24	63	80	89	94	97		S
Dec. 8	5	58						0	1	17	63	82	91	96	99		S
Mar. 24, 1953	5	28						1	8	43	80	88	92	95	99		S
Apr. 15	5	31						1	5	37	72	86	93	97	99		S
Apr. 28	4	117						1	6	36	77	90	96	98	99		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 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 34,100 ppm May 29; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 2,960 tons May 29; minimum daily, 0 tons on many days.
EXTREMES,1949-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 72,900 ppm May 29. Flow affected by ice Mar. 12-17, 19,20,24,25. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	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	0.1	20		0.2					
2	.1	--		.2					
3	.1	--		.2					
4	.1	--		.2			0.1	31	(t)
5	.1	--		.2					
6	.1	--		.2					
7	.1	--		.2					
8	.2	--	(t)	.2			0		0
9	.1	--		.2			0		0
10	.1	21		.3			0		0
11	.1	--		.3			0		0
12	.1	--		.3		(t)	0		0
13	.1	--		.2			0		0
14	.2	--		.2			0		0
15	.2	--		.2					
16	.2			.2					
17	.2			.2					
18	.2			.2			.1		(t)
19	.2			.2					
20	.2			.2	60				
21	.2			.2					
22	.2			.2			0		0
23	.2			.1			0		0
24	.2		(t)	.1			0		0
25	.2			.1			0		0
26	.2			.1		(t)	0		0
27	.2			.1			0		0
28	.2			0		0	0		0
29	.2			0		0	0		0
30	.2			0		0	0		0
31	.2			--		--	0		0
Total	5.0	--	0.2	5.2		0.7	1.4		0.1

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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				0		0	0.3	--	
2				0		0	.3	--	
3				0		0	.3	--	
4				0		0	.3	53	(t)
5				0		0	.3	--	
6				0		0	.3	17	
7				0		0	.3	--	
8				0		0	.4		
9				0		0	.4	--	e0.2
10				0		0	.5		
11				0		0	1.0	--	
12				0		0	1.0	254	
13				0		0	.9	--	
14							.8	--	
15				.1		(t)	.6	--	e.7
16							.5	--	
17							.4	--	
18							.3	475	
19					126		.4	--	
20							.5	1,600	
21							.3	--	e.5
22				.2		e.1	.3	--	
23							.4	--	
24							.4	--	
25							.5	--	
26							.5	--	e.8
27							.5	593	
28				.3		e.1	.4	--	
29				--		--	.3	--	
30				--		--	.6	--	e2.0
31				--		--	.3	--	e.2
Total	0		0	2.8		1.2	14.3	--	15.6

	April			May			June		
1	0.3	--		1.8	2,700	sa30	0.7	518	1.0
2	.3	--		2.8	4,900	sa45	.4		
3	.3	188	e0.2	.5	--	2.0	.3	--	e.3
4	.3	--		.3	--		.3		
5	.3	--		.3	198		2.5	10,000	sa280
6	3.3	5,240	s67	.2	--	e.1	5.9	11,000	sa460
7	1.5	3,240	13	.2	--		.7	--	e3.0
8	.4	--	e1.0	.2	36		.4	742	.8
9	.8	1,400	sa10	1.7	--	e30	.3	277	.2
10	.4	650	.7	.9	--	e10	.3		
11	.3	--		.5	--	e5.0	.4		
12	.3	--		.3	--		.4		
13	.2	205	e.1	.3	--		.3	--	e.2
14	.3	--		.2	--		.3		
15	.3	--		.2	169		.3		
16	.2	--		.2	--		.3		
17	.3	43		.3	--		.2	--	
18	.4	--		.2	--	e.1	.2	--	
19	.3	--		.2	--		.2	111	
20	.3	--		.2	--		.2	--	e.1
21	.2	--	(t)	.2	--		.2	--	
22	.2	--		.2	100		.2	--	
23	.2	--		.2	--		.2	--	
24	.2	30		.8	--	e10	.1		
25	.2	--		.2	353	.2	.1		
26	.2	--		.2	122	.1	.1	--	(t)
27	.2	--		.1	--	.1	.1		
28	.3	--	e.5	8.7	6,300	sa160	.1		
29	2.9	5,560	s55	31	34,100	s2,960	.1		
30	.7	1,900	sa4.3	2.1	16,600	s129	.1		
31	--	--	--	1.3	--	e20	--	--	--
Total	16.1	--	153.4	56.5	--	3,403.1	15.9	--	748.2

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POISON CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

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	0.1			0		0	0		0
2	.1			0		0	0		0
3	.1		(t)	0		0	0		0
4	.1			0		0	0		0
5	.1			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	0		0	0		0
10	.1		(t)	0		0	0		0
11	0		0	.2		e .2	0		0
12	0		0	0		0	0		0
13	0		0	0		0	0		0
14	0		0	0		0	0		0
15	0		0	0		0	0		0
16	0		0	0		0	0		0
17	0		0	0		0	0		0
18	0		0	0		0	0		0
19	0		0	0		0	0		0
20	0		0	0		0	0		0
21	0		0	0		0	0		0
22	0		0	0		0	.1		
23	0		0	0		0	.1		
24	0		0	0		0	.1	109	(t)
25	0		0	0		0	.1		
26	0		0	0		0	.1		
27	0		0	0		0	0		0
28	0		0	0		0	0		0
29	0		0	0		0	0		0
30	0		0	0		0	0		0
31	0		0	0		0	--		--
Total	0.6		0.1	0.2		0.2	0.5		0.2

Total discharge for year (cfs-days) 118.5
Total load for year (tons) 4,323.0

e Estimated.
t Less than 0.050 ton.

POISON CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000
Mar. 30, 1953	9:15 a.m.	a0.5		1,600	1,210	71	79	85	94	96	97	98	99		100		BWCM
Apr. 6	2:30 p.m.	6.5		8,770	5,990		3		98		100						SPN
Apr. 6	2:30 p.m.	6.5		8,770	5,860		75		--		100						SPWCM
Apr. 29	9:40 a.m.	6.0		8,880	6,680		76		100		--						PWCM
May 29	7:15 a.m.	147		39,900	7,460		14		89		96						SPN
May 29	7:15 a.m.	147		39,900	6,460		60		90		96						SPWCM
June 6	1:40 a.m.	19		29,500	5,090		60		92		99						SPWCM

a Mean daily discharge.

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 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 81,600 ppm Aug. 16; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 32,100 tons May 29; minimum daily, 0 tons on many days.
EXTREMES,1947-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration, 155,000 ppm Aug. 3. No flow during October to December; record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, April 1951, April to June 1953

Date of collection	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
Apr. 2, 1951 ..	18	15	0.04	116	47	149		232	570	14	0.4	3.7	0.00	1,120	1,030	1.52		483	293	40		1,440	8.0
Apr. 29, 1953 .	60			90	31	112	6.3							820		1.12		350		40	2.6	1,130	7.7
May 15.....	7.0			130	49	142	8.2							1,140		1.55		526		37	2.7	1,510	7.8
May 22	6.8			113	54	132	7.1							1,080		1.47		504		36	2.6	1,420	7.7
May 25	30			82	29	102	6.3							742		1.01		324		40	2.5	1,020	8.4
May 29,5:06 a.m.	544			98	27	140	6.7							864		1.18		355		46	3.2	1,210	7.8
May 29,9:35 a.m.	150			100	26	127	7.3							860		1.17		356		43	2.9	1,190	7.8
June 6	273			82	18	90	6.3							632		.86		278		41	2.3	913	7.2

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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
2							0	--	0
3							0	--	0
4							0	--	0
5							0	--	0
6							0	--	0
7							0	--	
8							0	--	0
9							0	--	0
10							2.7	1,990	s 63
11							9.8	5,480	s 176
12							3.5	1,690	s 24
13							6.5	4,190	s 88
14							5.9	1,940	s 53
15							5.0	2,500	s 60
16							6.3	6,160	s 267
17							3.5	8,530	s 163
18							1.6	728	s 9
19							6.5	7,180	s 196
20							6.1	9,950	s 247
21							6.2	3,200	s 92
22							1.0	1,400	s 6
23							3.4	1,190	s 19
24							3.0	4,600	s 44
25							2.2	3,640	s 26
26							1.8	1,790	s 16
27							6.6	5,680	s 101
28							9.3	6,900	173
29							9.3	8,850	222
30							8.7	6,750	159
31							5.0	5,200	70
Total	0		0	0		0	113.9	--	2,274

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	6.0	5,350	87	44	11,300	1,340	26	5,100	358
2	5.0	3,930	53	26	6,500	456	18	3,950	192
3	5.2	4,300	s 64	14	4,550	172	16	3,000	130
4	2.9	2,850	33	16	3,600	156	16	3,400	147
5	.8	8,200	18	16	2,500	108	75	14,300	s 4,810
6	12	8,550	277	8.1	1,650	36	81	17,200	3,760
7	5.5	4,300	64	3.2	1,000	9	35	7,100	671
8	2.9	2,800	22	1.1	1,160	s 7	24	4,500	292
9	3.6	1,410	s 16	2.4	4,200	27	11	3,350	99
10	2.8	2,450	19	5.5	3,850	57	3.8	1,450	15
11	2.0	2,650	14	22	2,700	160	.1	650	(t)
12	4.1	2,850	s 35	8.4	1,750	40	.2	260	(t)
13	3.2	3,120	27	9.3	2,350	59	.5	450	1
14	1.7	1,600	7	12	1,650	53	0	--	0
15	1.4	1,950	7	6.5	2,050	36	2.9	2,820	s 46
16	2.6	1,450	10	7.8	2,700	57	0	--	0
17	.7	1,100	2	12	3,250	105	0	--	0
18	2.4	1,050	7	7.8	3,000	63	0	--	0
19	2.6	1,250	9	8.4	2,700	61	0	--	0
20	4.0	1,500	16	5.8	1,550	24	0	--	0
21	2.0	950	5	4.6	1,000	12	0	--	0
22	1.4	2,060	8	7.0	1,800	34	0	--	0
23	3.0	4,000	32	8.1	4,950	108	0	--	0
24	12	6,450	209	41	8,700	963	0	--	0
25	17	7,000	321	29	10,900	853	0	--	0
26	19	5,250	269	46	9,330	1,160	0	--	0
27	13	3,750	132	32	5,950	514	0	--	0
28	9.0	6,910	s 197	58	22,600	s 5,720	0	--	0
29	38	14,900	s 1,690	208	41,900	s 32,100	0	--	0
30	24	11,900	771	52	16,600	2,330	0	--	0
31	--	--	--	30	7,300	591	--	--	--
Total	209.8	--	4,421	752.0	--	47,411	209.5	--	10,522

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 1952 to September 1953--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				0	--	0			
2.....				0	--	0			
3.....				18	79,300	s 6,980			
4.....				1.7	47,300	s 466			
5.....				0	--	0			
6.....				0	--	0			
7.....				0	--	0			
8.....				0	--	0			
9.....				0	--	0			
10.....				0	--	0			
11.....				3.9	64,400	s 1,390			
12.....				.4	14,000	sa 32			
13.....				0	--	0			
14.....				0	--	0			
15.....				0	--	0			
16.....				49	81,600	11,200			
17.....				1.2	16,000	sa105			
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.	0		0	74.2	--	20,173	0		0

Total discharge for year (cfs-days)..... 1,459.4
Total load for year (tons)..... 84,801

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

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953	6:00 a.m.	13		8,240	6,720		72		97		98						SPWCM
Mar. 13	10:00 a.m.	2.8		5,040	2,840		66		83		91						SPWCM
Mar. 17	2:30 a.m.	9.0		22,200	8,670		38		63		92						SPWCM
Apr. 6	3:20 p.m.	12		12,000	3,860		1		61		85						SPN
Apr. 6	3:20 p.m.	12		12,000	3,960		44		68		85						SPWCM
Apr. 24	2:45 p.m.	13		10,600	5,290		1		71		91						SPN
Apr. 24	2:45 p.m.	13		10,600	5,630		53		77		91						SPWCM
Apr. 29	2:10 p.m.	58		22,600	7,240		1		57		79						SPN
Apr. 29	2:10 p.m.	58		22,600	7,310		40		61		79						SPWCM
May 15	1:10 p.m.	7.0		4,120	4,410		2		59		89						SPN
May 15	1:10 p.m.	7.0		4,120	4,630		44		56		89						SPWCM
May 22	11:30 a.m.	6.8		3,100	2,780		4		65		88						SPN
May 22	11:30 a.m.	6.8		3,100	3,660		51		71		88						SPWCM
May 25	2:20 p.m.	31		13,000	6,680		1		65		87						SPN
May 25	2:20 p.m.	31		13,000	6,800		48		67		87						SPWCM
May 26	9:10 a.m.	54		13,700	3,560		40		59		83						SPWCM
May 29	5:00 a.m.	544		83,900	2,820		3		68		75						SPN
May 29	5:00 a.m.	544		83,900	3,900		34		55		75						SPWCM
May 29	9:35 a.m.	144		46,400	3,860		2		65		84						SPN
May 29	9:35 a.m.	144		46,400	3,960		47		67		84						SPWCM
June 6	1:00 a.m.	278		27,700	2,780		4		45		70						SPN
June 6	1:00 a.m.	278		27,700	2,770		35		47		70						SPWCM
Aug. 3	9:50 a.m.	40		136,000	5,770		66		93		95	96	99	100			SPWCM
Aug. 11	3:30 p.m.	4.0		107,000	3,640		80		99		--						SPWCM

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Particle-size analyses of bed material, 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	Number of sampling points	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	
Aug. 11, 1953	6	4.1							4	13	50	80	90	95	98	100	S
Aug. 16	5	53							1	4	26	61	78	88	94	98	S

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.
DRAINAGE AREA.--257 square miles.
RECORDS AVAILABLE.--Water temperatures: March to July 1949.
Sediment records: March 1949 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 39,800 ppm July 30; minimum daily, no flow Jan. 1-8, June 30 to July 9.
Sediment loads: Maximum daily, 17,000 tons July 19, 20; minimum daily, 0 tons Jan. 1-8, June 30 to July 9.
EXTREMES, 1949-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on several days during 1950-51, 1953.
Sediment loads: Maximum daily, 140,000 tons (estimated) July 4, 1950; minimum daily, 0 tons on several days during 1950-51, 1953.
REMARKS.--Maximum observed sediment concentration during water year, 83,500 ppm July 30. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff. Flow affected by ice Nov. 3 to Mar. 14. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4.6			3.8	475	5	1.7		
2.....	4.6			6.2	915	15	2.0		
3.....	5.0			3.5	1,390	13	2.5		
4.....	5.6			6.0	1,440	23	2.5		
5.....	5.6			8.0	2,400	a50	2.5	--	e1
6.....	5.6	413	6	6.0	3,100	a50	2.5		
7.....	6.2			5.0	1,600	a20	2.5		
8.....	5.6			3.0	990	a8	2.5		
9.....	5.6			2.5	820	a6	2.5	--	
10.....	4.6			2.0	790	a4	2.7	--	
11.....	4.6			3.5	420	a4	2.8	354	e2
12.....	5.0			4.2	--	e4	3.0	117	
13.....	6.2			5.0	300	a4	3.5	--	
14.....	7.4			5.2	--	e3	4.0	--	
15.....	8.6			5.2	140	a2	4.5		
16.....	6.8			5.3			5.0		
17.....	6.8	492	9	5.2			5.0		
18.....	6.8			5.0			5.0	--	e3
19.....	6.2			4.2			5.0		
20.....	6.2			3.5	--	e2	5.0		
21.....	5.0			2.9			5.0		
22.....	4.6			2.5			5.0		
23.....	5.0	735	10	2.0			5.0	--	
24.....	5.0			1.9			5.0	--	
25.....	4.2			1.8			4.7	--	e8
26.....	4.6			1.7	--		4.2	684	
27.....	5.0	447	5	1.6	--		1.8	--	e3
28.....	4.6			1.5	267	e1	1.0	--	e2
29.....	5.0			1.5	--		.5	--	e1
30.....	3.8			1.5	--		.3	--	(t)
31.....	3.8			--	--	--	.1	--	(t)
Total.	168.2	--	218	111.2	--	236	99.3	--	82

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

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	12	--		2.5	--	e 3
2	0	--	0	13	430		2.0	--	e 3
3	0	--	0	14	--	b 25	3.3	--	e 10
4	0	--	0	14	860		6.2	2,800	a 45
5	0	--	0	14	--		8.0	3,200	a 70
6	0	--	0	13	392		10	3,400	a 90
7	0	--	0	11	--	b 12	12	4,200	a 140
8	0	--	0	9.0	--		15	5,300	a 210
9	.1			6.2	392		18	5,800	a 280
10	.1			4.8	--		20	7,400	a 400
11	.2			4.6	--		20	16,000	a 860
12	.2			4.5	--	b 6	20	17,000	a 920
13	.2	--	(t)	4.5	499		20	14,000	a 760
14	.2			4.5	--		20	18,000	a 970
15	.1			4.5	--		17	19,000	sa 1,100
16	.1			4.5	248		12	27,400	s 949
17	.1			4.3	--		6.2	23,400	s 447
18	.5	--		3.8	--	b 3	4.2	15,000	170
19	.5	--		3.5	330		4.2	8,500	96
20	.5	183		2.5	252		3.0	9,800	79
21	.5	--	(t)	2.0	--		4.2	8,300	94
22	.5	178		2.5	--		4.2	8,500	96
23	.7	--		2.5	252		4.2	8,200	93
24	1.1	--		2.5	--	b 3	6.2	8,150	136
25	2.0	--		2.5	--		5.6	10,500	159
26	4.0	360	e 4	2.5	--		5.0	10,000	a 140
27	5.0	--		3.0	590		5.6	11,000	166
28	6.6	--		4.0	--		8.0	10,700	231
29	8.0			--	--	--	11	10,400	309
30	9.4	--	e 10	--	--	--	8.6	9,200	214
31	10			--	--	--	6.8	9,400	173
Total	50.6	--	52	173.7	--	242	293.0	--	9,413

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	6.2	11,000	184	9.8	5,150	136	3.8	1,450	15
2	6.8	7,450	137	9.8	2,550	67	5.0	1,400	19
3	7.1	10,500	201	7.4	2,000	40	5.6	1,100	17
4	8.0	9,200	199	6.2	1,650	28	6.2	1,350	23
5	6.8	9,750	179	5.0	1,630	22	20	4,100	sa 390
6	9.2	9,800	243	4.6	1,630	20	35	17,200	s 1,820
7	9.2	9,500	236	5.0	1,600	22	4.2	5,000	57
8	6.8	5,550	102	4.6	1,970	24	2.6	3,490	24
9	6.2	7,510	126	4.2	1,730	20	2.2	2,100	12
10	6.8	6,510	120	3.8	1,460	15	2.2	2,150	13
11	6.2	7,100	119	3.0	1,710	14	1.8	2,100	10
12	5.6	5,700	86	3.0	1,750	14	3.4	2,450	22
13	5.6	6,510	98	3.4	1,840	17	3.0	2,800	23
14	5.0	5,100	69	4.2	1,780	20	1.4	1,950	7
15	3.4	2,750	25	5.0	1,320	18	1.4	1,550	6
16	2.6	3,650	26	5.6	1,230	19	1.4	1,300	5
17	3.0	3,050	25	8.0	1,020	22	.9	1,150	3
18	3.0	4,700	38	7.4	1,740	35	.6	600	1
19	3.4	5,350	49	5.0	1,220	16	.6	550	1
20	4.2	3,850	44	6.2	1,730	29	5.8	12,000	sa 260
21	3.8	3,750	38	9.8	3,550	94	1.0	8,890	s 28
22	2.6	3,200	22	9.2	3,000	75	.5	5,000	7
23	1.8	3,350	16	6.2	1,750	29	.3	1,100	1
24	2.6	3,650	26	6.8	2,000	37	.1	385	(t)
25	3.0	3,300	27	8.0	1,850	40	.3	1,760	s 2
26	3.4	2,750	25	6.8	1,750	32	.4	790	1
27	3.8	3,850	40	6.2	1,750	29	.4	1,190	1
28	4.2	3,200	36	7.4	2,500	50	.3	1,690	1
29	8.6	5,850	136	8.0	2,000	43	.1	350	(t)
30	9.8	4,500	119	5.0	--	e 20	0	--	0
31	--	--	--	3.4	--	e 15	--	--	--
Total	158.7	--	2,791	188.0	--	1,062	110.5	--	2,769

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

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	0.9	1,500	4	0.4	70	(t)
2.....	0	--	0	14	29,000	sa 1,100	1.1	600	2
3.....	0	--	0	14	22,000	sa 990	3.0	820	7
4.....	0	--	0	12	6,300	s 410	2.6	350	2
5.....	0	--	0	3.4	1,250	11	1.8	221	1
6.....	0	--	0	2.2	720	4	1.8		
7.....	0	--	0	1.4			1.0		
8.....	0	--	0	1.4			.7	128	(t)
9.....	0	--	0	1.0			.8		
10.....	.2	2,410	1	1.0	280	1	.7		
11.....	.3	1,610	1	1.4			.5		
12.....	.7	1,200	2	1.0			.3		
13.....	.6	320	1	.8			.4		
14.....	.8	310	1	.7			.4	49	(t)
15.....	.8	310	1	.8	174	(t)	.6		
16.....	1.8	1,000	5	1.4			.6		
17.....	1.8	610	3	24	8,800	sa 2,400	1.0	590	2
18.....	38	32,000	sa 7,400	7.0	4,650	88	1.8	572	3
19.....	46	18,000	sa 17,000	5.0	1,100	15	1.0	210	1
20.....	71	39,000	sa 17,000	4.0	290	3	.9		
21.....	8.0	2,300	50	3.8	--	e 2	1.8		
22.....	4.2	465	5	1.4			2.6		
23.....	1.4	350	1	.8	240	1	2.2		
24.....	.8			.6			1.4		
25.....	.8			.4			2.2	137	1
26.....	.8	62	(t)	.2			2.2		
27.....	.8			.4			2.2		
28.....	3.3	7,600	sa 540	.5	35	(t)	1.4		
29.....	56	28,000	sa 11,000	.5			1.4		
30.....	22	39,800	s 4,060	.4			1.8		
31.....	2.6	9,500	67	.5		-	--	--	--
Total.	262.7	--	57,138	106.9	--	5,040	40.6	--	31
Total discharge for year (cfs days)									1,763.4
Total load for year (tons)									79,074

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

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Particle-size analyses of suspended sediment, February to July 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	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. 4, 1953	11:50 a.m.	13		1,410	2,020	39	49	55	61	65	76	95	99	--	100		BWCM
Mar. 9	5:00 p.m.	a17		8,570	6,230	--	48	--	75	--	94	--	--	--	--		SPWCM
Mar. 16	3:05 p.m.	24		37,500	2,910	--	2	--	39	--	86	--	--	--	--		SPN
Mar. 16	3:05 p.m.	24		37,500	2,670	--	27	--	49	--	86	--	--	--	--		SPWCM
Mar. 30	1:15 p.m.	8.6		9,080	11,200	--	33	--	50	--	84	97	100	--	--		SPWCM
Apr. 6	12:15 p.m.	9.2		10,200	9,630	--	0	--	32	--	67	89	99	100	--		SPN
Apr. 6	12:15 p.m.	9.2		10,200	9,760	--	25	--	39	--	67	--	--	--	--		SPWCM
May 18	10:35 a.m.	8.6		2,990	7,300	--	24	--	35	--	70	92	99	100	--		SPWCM
July 16	8:00 a.m.	2.2		1,840	1,230	46	59	72	89	94	96	97	99	--	100		BWCM
July 19	7:00 a.m.	3.8		13,000	4,470	--	69	--	90	--	95	--	--	--	--		SPWCM
July 20	7:00 a.m.	59		47,400	3,980	--	57	--	89	--	100	--	--	--	--		SPWCM
July 20	5:15 p.m.	14		13,800	4,630	--	0	--	83	--	97	--	--	--	--		SPN
July 20	5:15 p.m.	14		13,800	4,640	--	68	--	93	--	97	--	--	--	--		SPWCM
July 29	6:00 a.m.	52		38,000	6,660	--	53	--	77	--	95	--	--	--	--		SPWCM
July 30	8:00 a.m.	100		78,600	4,040	--	47	--	73	--	94	--	--	--	--		SPWCM

a Mean daily discharge.

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 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 78,000 ppm July 20; minimum daily, no flow Dec. 22 to Jan. 8.
Sediment loads: Maximum daily, 51,000 tons July 20; minimum daily, 0 tons Dec. 22 to Jan. 8.
EXTREMES, 1949-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 200,000 tons (estimated) July 5, 1950; minimum daily, 0 tons on many days.
REMARKS.--Maximum observed sediment concentration during water year, 176,000 ppm July 20. Flow affected by ice Nov. 9 to Dec. 2, Dec. 5, 7-13 to Mar. 12.
Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, March to September 1953

Date of collection	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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Mar. 16, 1953 ...	38	--		165	74	115	5.0	--	--	--				1,340	1.82		714	--	26	1.9	1,650	7.6
May 8.....	11	--		160	81	140	6.7	--	--	--				1,460	1.99		732	--	29	2.3	1,770	7.9
May 18.....	16	--		133	68	113	5.8	--	--	--				1,170	1.59		612	--	28	2.0	1,500	8.0
June 2	43	--		89	38	77	5.1	--	--	--				758	1.03		380	--	30	1.7	1,020	7.7
June 6	81	--		142	60	125	6.3	--	--	--				1,220	1.66		603	--	31	2.2	1,540	7.2
June 16	15	14		--	--	103		162	500	20	0.7			--	--		460	327	33	2.1	1,230	7.3
July 22	33	--		104	33	82	5.1	--	--	--				786	1.07		397	--	31	1.8	1,070	7.6
Sept. 8.....	33	14		--	--	136		168	490	26				--	--		388	250	43	3.0	1,200	7.9

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	13			5.7	--	e 18	1.4		
2	24	2,440	132	5.7	--	e 18	1.3	--	e 1
3	23			2.8	600	a 5	1.2		
4	19			4.8	1,380	18	.4	79	
5	8.9			7.0	1,400	s 35	.4	--	
6	5.7			12	--	e 45	.4	--	
7	7.1			8.9	--	e 30	.3	--	
8	8.3	1,300	26	7.1	--	e 20	.3	--	
9	8.3			2.4	--	e 5	.3	--	
10	7.1			1.3	--		.2	--	(t)
11	6.7			1.4	--		.2	250	
12	5.7			1.5	--		.2	--	
13	5.7			1.5	274		.2	--	
14	4.8			1.6	--		.2	--	
15	8.3	1,310	24	1.7	--		.2	--	
16	8.3			1.7	--		.2	--	
17	8.3			1.7	--		.2	--	
18	7.1			1.7	--		.2	28	
19	8.3			1.6	--		.2	--	(t)
20	8.3	--	e 25	1.5	206	e 1			
21	8.3			1.4	--		.1	--	
22	5.7	--		1.3	--		0	--	0
23	4.8	1,360		1.2	--		0	--	0
24	5.7	--		1.4	--		0	--	0
25	5.7	--		1.5	--		0	--	0
26	5.7	--	e 18	1.5	--		0	--	0
27	5.7	--		1.5	--		0	--	0
28	5.7	--		1.5	230		0	--	0
29	6.7	--		1.5	--		0	--	0
30	6.7	980		1.5	--		0	--	0
31	3.8	--	e 10	--	--	--	0	--	0
Total	260.4	--	1,126	87.9	--	215	8.3	--	4

Day	January			February			March		
1	0	--	0	11	--	e 10	1.0	--	e 1
2	0	--	0	13	--		1.0	--	e 1
3	0	--	0	14	--		2.4	--	e 3
4	0	--	0	14	572	e 20	5.0	455	6
5	0	--	0	14	--		6.6	--	e 10
6	0	--	0	13	--		8.6	706	16
7	0	--	0	10	--	e 10	12	--	e 35
8	0	--	0	8.0	--	e 10	16	--	e 50
9	.1			5.0	--	e 8	20	1,300	70
10	.2			4.0	--		26	--	150
11	.2			4.0	--		30	--	e 300
12	.2			4.0	584	e 6	30	--	e 400
13	.2			4.0	--		33	5,400	sb 580
14	.2	--	(t)	4.0	--		23	4,500	sa 360
15	.1			4.0	--		21	4,600	sa 350
16	.2			3.6			21	6,000	s 384
17	.2			3.1	--	e 2	12	6,800	sb 280
18	.2			2.6			5.2	7,400	sb 260
19	.2	--		2.0	220		17	9,200	sa 480
20	.2	1,140		1.0	--		16	11,000	sb 540
21	.2	--	e 1	1.1	--		10	9,300	sa 310
22	.2	--		1.2	--		9.6	10,000	
23	.3	--		1.5	--	e 1	15	6,700	b 270
24	1.0	--		1.9	248		14	9,600	363
25	2.0	--	e 3	2.0	--		15	8,200	332
26	4.0	296		2.1	318		11	10,100	300
27	4.8	--		1.8	230		9.6	11,700	303
28	5.7	--		1.3	--		9.6	11,000	a 290
29	7.2	306	e 6	--	--	--	14	10,000	a 380
30	8.5	--		--	--	--	14	11,000	416
31	10	--		--	--	--	11	11,000	327
Total	46.1	--	45	151.2	--	190	439.6	--	7,967

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 1952 to September 1953--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	10,000	324	23	17,000	sb1,300	31	12,000	a1,000
2	14	5,600	a210	14			37	13,000	1,300
3	14	3,600	136	12			27	8,650	631
4	14	5,400	a200	11			17	5,300	243
5	14	8,200	a310	7.6	6,650	180	19	8,150	s480
6	16	10,700	462	4.8			47	16,800	s2,580
7	16	12,300	531	8.3			56	22,000	3,330
8	14	11,200	423	12			42	13,500	1,530
9	13	8,200	sb360	26	17,000	a1,200	36	10,200	991
10	12	10,100	327	14			20	5,600	302
11	12	10,000	a320	15			13		
12	12	10,000	a320	13			14		
13	12	8,400	272	13	6,200	234	15		
14	11	8,000	a240	12			11	3,880	136
15	9.6	7,800	202	13			12		
16	8.3			15			13		
17	8.3			19			8.9		
18	8.3	7,610	171	18			8.9		
19	8.3			17			10	2,560	67
20	8.3			19	6,900	373	11		
21	6.7			22			27		
22	5.7			24			39		
23	4.8			15			40	7,970	689
24	3.8			14			28		
25	3.8	5,150	64	11	4,970	174	27		
26	3.8			9.6			26		
27	3.8			14			29		
28	5.7			21	7,600	431	33	4,780	348
29	14	8,650	257	31	11,000	921	28		
30	13			25	10,000	a680	21		
31	--	--	--	19	8,900	a460	--	--	--
Total	302.2	--	6,711	492.3	--	10,998	746.8	--	18,656

Day	July			August			September		
1	16			40	14,000	a1,500	41		
2	14	2,790	121	55	22,000	sa3,700	48		
3	16			69	23,100	4,300	52	7,280	943
4	18			64	19,800	3,420	53		
5	14			48	10,000	1,300	47		
6	12	6,020	228	47	10,100	1,280	36		
7	14			43	10,000	1,160	28	4,860	420
8	14			31	8,500	a710	31		
9	23			14	5,300	a200	45	8,250	1,000
10	30			14	5,800	219	46	8,900	1,110
11	28	6,300	442	26	8,000	562	27		
12	26			19	4,500	231	17		
13	25			21	7,850	445	16		
14	26			43	12,000	1,390	14		
15	39			61	20,000	sa3,800	17	5,640	274
16	31	7,650	702	84	21,000	a4,800	22		
17	31			81	12,900	2,820	18		
18	42	21,000	sa4,500	101	33,000	sb9,800	14		
19	49	34,000	sa5,000	72	13,300	2,590	8.9		
20	136	78,000	sb51,000	43	7,100	824	8.9		
21	49	21,500	s3,090	28			14		
22	33	8,350	744	26			15		
23	22			21	5,380	334	11		
24	19			18			9.6		
25	23	5,110	304	20			12	2,780	83
26	17			26	7,250	509	11		
27	22			34	8,900	817	11		
28	30			38	9,200	944	9.6		
29	88	41,100	s15,300	45	8,800	a1,100	12		
30	44	29,000	sb4,200	36	8,100	a790	13		
31	48	33,000	4,440	34	7,250	666	--	--	--
Total	999	--	96,252	1,302	--	51,547	708.0	--	11,273

Total discharge for year (cfs-days) 5,543.8
Total load for year (tons) 204,984

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

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Oct. 7, 1952	10:30 a.m.	3.8	--	710	1,590		27	34	37	41	47	59	95	--	--	--	BWCM
Mar. 16, 1953	4:25 p.m.	38	35	14,200	3,060		1		33		57	80	97	99	100	--	SPN
Mar. 16	4:25 p.m.	38	35	14,200	3,250		25		34		57	80	97	99	100	--	SPWCM
Mar. 20	10:45 a.m.	16	--	15,800	1,470		4		29		39	62	94	98	99	100	SPN
Mar. 20	10:45 a.m.	16	--	15,800	1,360		23		28		39	62	94	98	99	100	SPWCM
Mar. 30	3:35 p.m.	14	--	12,500	3,560		39		54		71	82	93	97	99	100	SPWCM
Apr. 6	3:45 p.m.	18	--	13,300	2,810		2		32		59	--	--	--	--	--	SPN
Apr. 6	3:45 p.m.	18	--	13,300	2,980		27		40		59	--	--	--	--	--	SPWCM
Apr. 16	10:00 a.m.	12	--	9,420	4,910		33		52		69	85	97	99	100	--	SPWCM
Apr. 22	9:00 a.m.	4.8	--	4,760	5,110		49		58		73	82	93	96	98	100	SPWCM
Apr. 29	2:55 p.m.	14	--	9,680	4,500		28		41		62	81	96	99	100	--	SPWCM
May 8	3:00 p.m.	11	--	6,040	4,950		2		47		73	88	98	99	100	--	SPN
May 8	3:00 p.m.	11	--	6,040	3,150		37		55		73	88	98	99	100	--	SPWCM
May 18	12:20 p.m.	16	--	5,490	5,030		1		31		57	79	96	99	100	--	SPN
May 18	12:20 p.m.	16	--	5,490	5,020		24		35		57	79	96	99	100	--	SPWCM
June 2	3:25 p.m.	43	60	14,500	3,900		2		41		63	79	95	99	100	--	SPN
June 2	3:25 p.m.	43	60	14,500	3,940		30		43		63	79	95	99	100	--	SPWCM
June 6	4:15 p.m.	81	--	26,700	4,060		2		45		74	89	98	--	99	100	SPN
June 6	4:15 p.m.	81	--	26,700	4,060		34		49		74	89	98	--	99	100	SPWCM
June 16	12:10 p.m.	14	--	2,630	2,960		39		49		54	62	89	98	100	--	SPWCM
June 22	11:55 a.m.	40	--	9,290	4,190		31		42		67	85	96	98	99	--	SPWCM
July 9	9:15 a.m.	20	--	5,360	2,580		19		24		38	58	87	96	99	100	SPWCM
July 16	9:25 a.m.	32	--	7,470	3,180		14		19		37	56	80	87	90	93	SPWCM
July 20	11:10 a.m.	232	--	176,000	3,700		34		54		78	--	--	--	--	--	SPWCM
July 22	11:45 a.m.	33	--	9,030	4,000		2		43		59	72	90	97	99	*100	SPN
July 22	11:45 a.m.	33	--	9,030	4,200		30		43		59	72	90	97	99	100	SPWCM
July 29	10:55 a.m.	182	71	35,800	3,750		3		32		76	89	98	99	100	--	SPN
July 29	10:55 a.m.	182	71	35,800	3,770		25		39		76	89	98	99	100	--	SPWCM
Aug. 3	11:10 a.m.	69	--	22,400	2,740		32		44		64	77	92	97	99	100	SPWCM
Aug. 12	4:20 p.m.	20	81	3,580	4,340		23		33		62	84	99	100	--	--	SPWCM
Aug. 17	10:15 a.m.	81	--	12,800	4,910		17		24		48	66	88	96	99	100	SPWCM
Aug. 24	10:00 a.m.	19	--	4,900	1,950		13		19		31	46	77	92	98	100	SPWCM
Sept. 15	9:00 a.m.	17	54	7,050	6,120		8		9		16	35	81	95	99	100	SPWCM

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.
DRAINAGE AREA.--170 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: March to September 1949, October 1950 to September 1953 (discontinued).
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 41,300 ppm July 30; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 11,000 tons Aug. 2; minimum daily, 0 tons on many days.
EXTREMES,1949,1950-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 73,600 ppm July 30. No flow January to March; record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

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.....	5.7	1,680	26						
2.....	3.5	1,240	12						
3.....	6.3	1,310	22						
4.....	5.7	1,000	a15						
5.....	1.8	500	a2						
6.....	.4	50	(t)						
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.	23.4	--	77	0		0	0		0

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

YELLOWSTONE RIVER BASIN--Continued

DRY COTTONWOOD CREEK NEAR BONNEVILLE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0	--	0	0	--	0
2				0	--	0	0	--	0
3				0	--	0	0	--	0
4				0	--	0	0	--	0
5				0	--	0	23	28,000	sb3,500
6				0	--	0	4.2	18,000	s 259
7				0	--	0	.4	3,200	a
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	.6	1,450	s 4
23				0	--	0	.3	1,000	sa 2
24				0	--	0	.2	500	sa 1
25				0	--	0	0	--	0
26				0	--	0	0	--	0
27				0	--	0	0	--	0
28				0	--	0	.6	3,100	sa 7
29				6.3	8,700	sa210	.9	3,300	sa15
30				1.6	3,600	a16	.8	3,400	sb 8
31				0	--	0	--	--	--
Total	0		0	7.9	--	226	31.0	--	3,799

Day	July			August			September		
1	1.2	--	e 10	0.8	4,500	a 10	3.0	--	e 5
2	.2	560	sa 1	66	29,000	sa11,000	4.0	1,180	13
3	0	--	0	47	23,000	sb6,000	3.5	4,000	38
4	0	--	0	15	24,000	sb1,700	3.0	--	e 15
5	0	--	0	2.0	6,000	a 30	1.6	--	e 5
6	.2	2,100	sa 4	2.0	--	e 20	2.0	--	e 5
7	0	--	0	3.0	2,500	20	2.0	--	e 4
8	0	--	0	4.0	--	e 25	3.5	850	8
9	0	--	0	6.3	--	e 80	4.5	960	12
10	0	--	0	9.6	6,500	sb 220	4.5	620	a 8
11	0	--	0	8.2	5,500	122	.8	220	(t)
12	0	--	0	9.6	2,350	61	.4	180	(t)
13	.3	3,000	sa 5	8.9	1,630	39	0	--	0
14	3.3	3,860	s 39	5.1	980	13	0	--	0
15	2.5	2,900	20	5.7	1,200	sa 25	0	--	0
16	1.2	2,500	a 8	7.5	2,400	a 50	.4	--	(t)
17	.8	1,500	sa 7	7.5	1,800	36	2.0	--	e 2
18	1.9	1,400	sa 9	6.3	1,310	22	2.0	--	e 1
19	.2	--	(t)	6.9	1,010	19	.4	--	(t)
20	.1	--	(t)	3.0	890	7	0	--	0
21	1.9	3,100	sa 20	1.6	570	3	0	--	0
22	3.0	3,600	sa 30	2.5	--	e 5	0	--	0
23	3.0	2,250	18	2.0	--	e 5	0	--	0
24	4.0	2,500	27	.8	850	2	0	--	0
25	0	--	0	.8	--	e 3	0	--	0
26	0	--	0	4.0	1,220	13	0	--	0
27	0	--	0	4.5	960	12	0	--	0
28	0	--	0	5.1	795	11	0	--	0
29	8.1	29,800	s 1,200	3.5	--	e 7	0	--	0
30	59	41,300	s10,100	4.5	--	e 9	0	--	0
31	2.0	6,880	s 44	3.5	630	6	--	--	--
Total	92.9	--	11,542	257.2	--	19,575	37.6	--	117

Total discharge for year (cfs-days) 450.0
Total load for year (tons) 35,336

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

Particle-size analyses of suspended sediment, June to September 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 disperzed)

Date of collection	Time	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 5, 1953	3:45 p.m.	40		44,400	4,120		57		84		93						SPWCM
June 6	12:25 a.m.	17		26,900	5,380		76		94		96						SPWCM
July 24	10:50 a.m.	6.3		2,820	2,680		6		75		93						SPN
July 24	10:50 a.m.	6.3		2,820	3,020		64		86		93						SPWCM
July 29	2:00 p.m.	4.5		48,300	4,350		84		100		--						SPWCM
July 30	12:01 a.m.	332		56,600	3,810		42		61		76	90	98	100			SPWCM
Aug. 3	12:35 p.m.	18		10,900	4,310		4		93		94						SPN
Aug. 3	12:35 p.m.	18		10,900	4,040		81		91		94						SPWCM
Aug. 17	9:45 a.m.	8.9		1,930	2,570		46		70		90						SPWCM
Sept. 3	10:25 a.m.	5.7		6,240	4,530		85		96		97						SPWCM

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.

LOCATION.--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 springs inflow.
DRAINAGE AREA.--8,080 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1953.
Water temperatures: April 1947 to September 1953.
Sediment records: March 1946 to September 1952.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 756 ppm Mar. 30; minimum, 410 ppm Oct. 1-31.
Hardness: Maximum, 311 ppm Mar. 30; minimum, 202 ppm Oct. 1-31.
Specific conductance: Maximum daily, 1,070 micromhos Mar. 30; minimum, 589 micromhos Oct. 3.
Water temperatures: Maximum, 80°F June 29; minimum, 33°F Dec. 4, 26, 27.
EXTREMES, 1947-53.--Dissolved solids (1947-49, 1951-53): Maximum, 756 ppm Mar. 30, 1953; minimum, 176 ppm July 7-15, 1947.
Hardness (1947-49, 1951-53): Maximum, 346 ppm Apr. 1-20, 1947; minimum, 104 ppm June 22-24, 1951.
Specific conductance (1947-49, 1951-53): Maximum daily, 1,270 micromhos Apr. 26, 1947; minimum daily, 245 micromhos June 10, 1948.
Water temperatures: Maximum, 80°F June 29, 1953; minimum, freezing point on many days during winter months 1947-51.
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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952	1,153	--	--	--	--	53	--	--	--	--	--	--	--	410	0.56	1,280	202	--	36	1.6	623	8.0	--
Oct. 31a	990	--	--	58	17	65	--	152	206	13	--	--	--	--	--	--	216	91	40	1.9	677	7.9	0.041
Nov. 1-24	976	11	0.01	57	18	60	3.6	164	194	12	0.8	0.6	0.07	454	.62	1,200	214	80	37	1.8	671	7.7	--
Nov. 25-Dec. 1	1,023	--	--	--	--	60	--	--	--	--	--	--	--	446	.61	1,230	212	--	38	1.8	658	--	--
Dec. 1a	1,060	--	--	59	16	64		159	196	13	--	--	--	--	--	--	213	83	40	1.9	668	7.7	.028
Dec. 2-25	998	--	--	--	--	60	--	--	--	--	--	--	--	460	.63	1,240	221	--	37	1.8	671	--	--
Dec. 26-29	1,043	--	--	--	--	64	--	--	--	--	--	--	--	480	.65	1,350	220	--	39	1.9	689	--	--
Dec. 30-Jan. 2, 1953	1,075	--	--	--	--	64	--	--	--	--	--	--	--	478	.65	1,390	230	--	38	1.8	709	--	--
Jan. 3-16	1,116	--	--	--	--	65	--	--	--	--	--	--	--	468	.64	1,410	226	--	39	1.9	699	--	--
Jan. 6a	1,130	--	--	59	18	69		167	208	14	--	--	--	462	.63	1,410	222	85	40	2.0	710	8.0	.002
Jan. 17-31	1,015	--	--	--	--	64	--	--	--	--	--	--	--	474	.64	1,300	231	--	38	1.8	713	--	--
Feb. 1-28	1,405	11	.01	62	18	64	3.5	173	209	13	.3	.6	08	477	.65	1,810	230	88	37	1.8	725	7.5	--
Feb. 6a	1,630	--	--	59	18	69		167	210	11	--	--	--	--	--	--	220	83	41	2.0	688	7.8	.001
Mar. 1-29	1,420	--	--	--	--	66	--	--	--	--	--	--	--	492	.67	1,890	235	--	38	1.9	738	--	--
Mar. 3a	1,470	--	--	61	19	66		171	208	11	--	--	--	--	--	--	229	89	38	1.9	724	7.7	.019

Mar. 30, 1953	1,420	--	--	--	--	115	--	--	--	--	--	--	--	--	756	1.03	2,900	311	--	45	2.8	1,070	--	--
Mar. 31-Apr. 30	1,435	--	--	--	--	74	--	--	--	--	--	--	--	--	558	.76	2,160	256	--	39	2.0	815	--	--
Mar. 31a	1,440	--	--	68	20	75		183	235	14	--	--	--	--	--	--	251	101	39	2.1	792	7.2	.000
May 1-31	1,385	--	--	--	--	72	--	--	--	--	--	--	--	538	.73	2,010	258	--	38	1.9	809	--	--
May 4a	1,420	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.000
June 1-15	1,371	--	--	--	--	77	--	--	--	--	--	--	--	556	.76	2,060	270	--	38	2.0	825	--	--
June 5a	1,310	--	--	68	23	78		188	250	15	--	--	--	--	--	--	265	111	39	2.1	821	7.9	.001
June 16-July 1	1,146	--	--	--	--	71	--	--	--	--	--	--	--	516	.70	1,600	257	--	38	1.9	777	--	--
July 2	1,060	--	--	--	--	65	--	--	--	--	--	--	--	490	.67	1,400	241	--	37	1.8	729	--	--
July 3-14	1,039	--	--	--	--	62	--	--	--	--	--	--	--	474	.64	1,330	233	--	37	1.8	713	--	--
July 15-31	1,175	--	--	--	--	60	--	--	--	--	--	--	--	468	.64	1,480	235	--	36	1.7	694	--	--
Aug. 1-31	1,130	8.9	.00	60	17	60	3.0	162	193	12	.3	.7	.09	440	.60	1,340	218	85	37	1.8	670	7.3	--
Sept. 1-30	1,174	--	--	--	--	63	--	--	--	--	--	--	--	478	.65	1,520	219	--	38	1.8	688	--	--
Weighted average[b]	1,210	--	--	--	--	65	--	--	--	--	--	--	--	487	0.66	1,590	233	--	38	1.8	725	--	--

a Not included in weighted average.
b Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 7 a.m. and 11 a.m., except December to June at 1 p.m.)

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

a Reading obtained at 2 p.m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT THERMOPOLIS, WYO.--Continued

Periodic determinations of suspended-sediment discharge, November 1952 to August 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Nov. 3, 1952	901	14	34
Dec. 2	1,130	37	113
Jan. 6, 1953	1,090	44	130
Jan. 19	825	22	49
Feb. 6	1,980	282	1,510
Mar. 3	1,700	199	913
Mar. 31	917	8	20
May 8	1,840	162	804
June 5	1,030	22	61
July 1	888	14	34
Aug. 3	1,190	129	414
Aug. 4	1,150	490	1,520
Aug. 11	1,120	678	2,050
Aug. 31	1,170	27	85

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.

LOCATION.--At gaging station, a quarter of a mile northeast of Pulliam, Washakie 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 June 1953. (discontinued).
EXTREMES, October 1952 to June 1953.--Sediment concentrations: Maximum daily, 2,220 ppm Mar. 13; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 108 tons Mar. 13; minimum daily, 0 tons on many days.
EXTREMES, 1951-53.--Sediment consentrations 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 tons on many days each year.
REMARKS.--Flow affected by ice Nov. 19-25, Dec. 7-25, Jan. 6 to Mar. 16, Mar. 21,22.
Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, October 1952 to June 1953

Day	October			November			December		
		Suspended sediment			Suspended sediment			Suspended sediment	
	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	0	--	0	1.5		e1	0		0
2	0	--	0	.7			0		0
3	0	--	0	.3			0		0
4	0	--	0	.4			0		0
5	0	--	0	.4		(t)	0		0
6	0	--	0	.8			0		0
7	0	--	0	.8			.1		
8	0	--	0	.4			.2		
9	0	--	0	.2			.1		
10	0	--	0	.2			.1		
11	0	--	0	.1		(t)	.1		
12	0	--	0	.1			.1		
13	0	--	0	.1			.2		(t)
14	0	--	0	.5		(t)	.2		
15	0	--	0	.8		e1	.1		
16	0	--	0	1.6		e1	.1		
17	.6	--	(t)	2.4		e2	.1		
18	1.1	--	e1	1.7		e2	.1		
19	1.0	--	e1	1.0		e1	0		0
20	.8	--	e1	.5			0		0
21	.8	--	e1	.4		(t)	.1		(t)
22	.5			.2			.1		(t)
23	.3			.1			0		0
24	.2			0		0	0		0
25	.3	--	(t)	0		0	0		0
26	.3			0		0	0		0
27	.2			0		0	0		0
28	.4			0		0	0		0
29	.7	--	(t)	0		0	0		0
30	1.1	397	1	0		0	0		0
31	1.7	544	2	--		--	0		0
Total	19.0	--	10	15.2		13	1.7		1

e Estimated.
t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO--Continued

Suspended sediment, October 1952 to June 1953--Continued

Day	Janaury			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	3			4		
2.....	0		0	4			2	--	e 3
3.....	0		0	4	--	e 4	1		
4.....	0		0	4			3	680	6
5.....	0		0	3	500	4	8	630	14
6.....	0		0	3	225	2	10	--	e 20
7.....	0		0	3	150	1	10	--	e 20
8.....	0		0	3	330	3	15	--	e 30
9.....	.1			3	--	e 2	15	1,000	40
10.....	.1			2	400	2	15	1,620	66
11.....	.2		(t)	2	230	1	20	990	53
12.....	.2			2	220	1	20	1,000	54
13.....	.2			3	230	2	18	2,220	108
14.....	.2			4	320	3	15	1,330	54
15.....	0		0	4	--	e 3	11	910	27
16.....	0		0	4	265	3	12	1,370	44
17.....	0		0	5	280	4	12	1,160	38
18.....	0		0	5	215	3	10	1,290	s 29
19.....	0		0	3	230	2	6.2	1,170	s 19
20.....	0		0	2	200	1	3.8	990	a 10
21.....	0		0	1			3	--	e 6
22.....	.1			1	--	e 1	3	--	e 6
23.....	.1			2			2.4	620	4
24.....	.1			3	370	3	2.6	530	4
25.....	.2		(t)	3	370	3	2.2	740	4
26.....	.3			3	360	3	2.2	370	2
27.....	.3			4	--	e 4	1.8		
28.....	.4			5	--	e 5	1.7		
29.....	.5			--	--	--	1.2	218	1
30.....	1		e 1	--	--	--	1.4		
31.....	2		e 2	--	--	--	.8		
Total.	6.0		5	88	--	74	233.3	--	672

Day	April			May			June		
1.....	0.8			0.4			0.8	--	e 1
2.....	.7			.4			2.2	940	6
3.....	.7	90	(t)	.2			1.8	--	e 2
4.....	.4			.2			1.5	--	e 2
5.....	9	--	(t)	.2			1.6	540	2
6.....	1.9	400	2	.2			1.3	--	e 1
7.....	2.0	520	3	.2			.7	--	(t)
8.....	1.0	180	(t)	.2			.8	154	(t)
9.....	7	103	(t)	.6	45		.6		
10.....	.8	--	(t)	.6			.3		
11.....	.6	97	(t)	.4			.5		
12.....	.6	90	(t)	.4			.8		
13.....	.6	--		.5			.9		
14.....	.6	--		.4			.5		
15.....	.5	--		.3			.6	--	(t)
16.....	.5	--		.3		(t)	.4		
17.....	6	92		.2			.4		
18.....	.5	--		.2			.2		
19.....	.4	--		.2			.1		
20.....	.4	--	(t)	.2			.1		
21.....	.4	--		.4			0	--	0
22.....	.4	--		.6			0	--	0
23.....	.3	--		.3			0	--	0
24.....	.3	--		.5			0	--	0
25.....	.3	--		.2			0	--	0
26.....	.6	--		.1			0	--	0
27.....	.4	--		.1			0	--	0
28.....	4	250	sa 1	.3			0	--	0
29.....	1.8	910	4	.6			0	--	0
30.....	.8	120	(t)	.6			0	--	0
31.....	--	--	--	.7			--	--	--
Total.	20.9	--	14	10.7		3	16.1	--	17

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs-days)..... 401.9
Total load for period Oct. 1, 1952 to June 30, 1953 (tons)..... 809

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

YELLOWSTONE RIVER BASIN--Continued

GOOSEBERRY CREEK AT PULLIAM, WYO.--Continued

Particle-size analyses of suspended sediment, February to April 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000
Feb. 16, 1953....	3:50 p.m.	4.5	32	496	660		--		--		65	78	97	100			SPWCM
Mar. 9.....	4:05 p.m.	a15		2,210	3,940		18		30		64	84	99	100			SPWCM
Apr. 6.....	5:00 p.m.	2.2		531	760		55		66		94	--	--	--			SPWCM

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.

LOCATION.--At gaging station, 1¾ miles upstream from mouth and 2¾ miles west of Worland, Washakie County.
DRAINAGE AREA.--500 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: March 1951 to September 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 75,700 ppm May 29; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 47,000 tons July 29; minimum daily, 0 tons on many days.
EXTREMES,1951-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 160,000 ppm May 29. No flow during October to December; record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Suspended sediment, water year October 1952 to September 1953

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							20	18,500	sa 1,700
10							34	25,600	2,350
11							34	24,900	s 2,440
12							18	15,800	768
13							11	11,400	339
14							8.0	9,800	212
15							3.4	7,200	b 65
16							.4	6,100	b 7
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	0		0	0		0	128.8	--	7,881

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

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	--	0	8.0	41,000	918	12	40,000	b1,300
2	0	--	0	.6	24,000	sb60	10	34,000	b950
3	0	--	0	0	--	0	7.0	31,000	b590
4	0	--	0	0	--	0	4.5	28,000	b340
5	0	--	0	0	--	0	2.8	26,000	b200
6	0	--	0	0	--	0	39	52,200	s7,770
7	68	44,000	11,100	0	--	0	22	36,000	2,220
8	124	58,800	s24,100	0	--	0	100	57,300	s23,400
9	21	30,000	1,700	8.0	7,600	sb1,400	19	35,000	1,860
10	8.5	25,000	574	92	63,000	s19,000	13	27,500	965
11	4.0	23,000	b250	23	30,000	1,860	7.0	23,000	b430
12	1.4	21,000	b80	15	24,000	972	1.4	21,000	b80
13	.5	--	e10	15	21,000	850	0	--	0
14	0	--	0	22	25,100	s1,680	0	--	0
15	0	--	0	8.0	23,000	497	0	--	0
16	0	--	0	1.9	23,000	b120	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	50	32,300	s14,400	63	75,700	s25,000	0	--	0
30	47	60,500	s8,650	30	57,200	s5,270	0	--	0
31	--	--	--	18	42,000	b2,100	--	--	--
Total	324.4	--	60,864	304.5	--	59,727	237.7	--	40,105

Day	July			August			September		
1	0	--	0	2.5	14,000	94			
2	0	--	0	1.9	240	sb2			
3	0	--	0	21	41,700	s2,980			
4	0	--	0	7.5	34,000	s845			
5	0	--	0	2.2	20,000	119			
6	0	--	0	.1	6,000	b2			
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	0	--	0			
28	0	--	0	0	--	0			
29	134	10,000	sb47,000	0	--	0			
30	123	63,300	s30,000	0	--	0			
31	9.0	36,000	907	0	--	0			
Total	266.0	--	77,907	35.2	--	4,042	0		0

Total discharge for year (cfs-days) 1,296.6
Total load for year (tons) 250,526

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

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Particle-size analyses of suspended sediment, March to July 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	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. 12, 1953	1:56 p.m.	16		15,000	5,500		4		99		100						SPN
Mar. 12	1:56 p.m.	16		15,000	5,580		96		100		--						PWCM
Apr. 7	9:30 a.m.	79		59,400	4,640		3		90		97						SPN
Apr. 7	9:30 a.m.	79		59,400	4,420		69		89		97						SPWCM
Apr. 8	8:45 a.m.	167		67,800	5,800		54		74		92						SPWCM
Apr. 8	11:00 a.m.	125		59,600	6,110		59		80		95	98	100				SPWCM
Apr. 29	4:25 p.m.	57		56,000	5,670		92		100		--						PWCM
May 10	12:45 p.m.	87		54,000	4,780		31		82		96						SPN
May 10	12:45 p.m.	87		54,000	4,980		61		83		96						SPWCM
May 29	11:10 a.m.	143		160,000	4,380		40		62		87						SPWCM
June 8	9:10 a.m.	177		80,300	5,290		52		76		95						SPWCM
July 30	3:40 a.m.	205		81,400	5,620		60		83		97						SPWCM
July 30	10:50 a.m.	111		71,500	3,840		60		83		95						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 July 1953 (discontinued).
Water temperatures: August 1949 to October 1953 (discontinued).
Sediment records: April 1949 to November 1953 (discontinued).
EXTREMES, October 1952 to November 1953.--Water temperatures (October to October): Maximum, 86°F July 14; minimum, freezing point Dec. 1, Jan. 6.
Sediment concentrations: Maximum daily, 26,200 ppm July 30; minimum daily, not determined.
Sediment loads: Maximum daily, 111,000 tons July 30; minimum daily, not determined.
EXTREMES, 1949-53.--Water temperatures: Maximum, 86°F July 14, 1953; 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 Nov. 24 to Dec. 1, Dec. 27 to Jan. 4, Jan. 6, 14-18, Feb. 19-22. Records of discharge for period October 1952 to December 1953 given in WSP 1279.

Chemical analyses, in parts per million, November 1952 to October 1953

Date of collection	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. 3, 1952	1,120			77	22	95		199	283	22				--	--		281	118	42	2.5	899	7.3	0.040
Dec. 1	a1,000			72	23	87		193	265	20				--	--		273	115	41	2.3	870	7.3	.000
Jan. 6, 1953	a1,150			71	24	89		193	270	21				588	0.80		275	117	41	2.3	877	7.8	.000
Feb. 2	1,670			74	27	102		197	314	19				--	--		294	132	43	2.6	958	7.8	.000
Mar. 4	1,780			75	23	94		194	287	19				--	--		280	121	42	2.5	923	7.5	.040
Mar. 10	2,010			77	24	98	4.6	--	--	--				654	.89		290	--	42	2.5	969	7.0	--
Apr. 7	1,920			76	22	99		193	299	19				--	--		280	122	44	2.6	949	7.5	.019
Apr. 30	1,520			51	13	126	7.4	--	--	--				616	.84		182	--	59	4.1	899	7.7	--
May 5	886			77	24	96		202	294	20				--	--		290	124	42	2.5	953	7.5	.037
May 11	1,530			77	25	106	4.3	--	--	--				668	.91		296	--	43	2.7	984	7.8	--
May 27	846			83	24	105	4.6	--	--	--				690	.94		306	--	42	2.6	1,010	8.0	--
June 2	554			81	28	105		212	325	23				--	--		316	142	42	2.6	1,030	7.9	.001
June 8	1,280			77	17	134	7.0	--	--	--				722	.98		260	--	52	3.6	1,060	7.1	--
July 9	249			84	32	137		224	393	32				--	--		340	156	47	3.2	1,200	7.9	.001
Oct. 22	1,510			78	19	102	6.0	--	--	--				652	.89		272	--	44	2.7	948	7.5	--

a Mean daily discharge.

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

Temperature (°F) of water, October 1952 to October 1953
[Twice-daily measurements between 7 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	
	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	55	64	47	--	--	32		33	--	--	--	--	a44	45	47	52	64	69	70	77	73	77	67	75
2	55	65	45	48	--	a34		a35	--	43	--	a35	a42	45	46	--	63	69	68	82	70	--	61	58
3	56	62	41	48	--	a37		--	a40	43	--	37	a42	48	--	51	60	66	70	71	70	75	55	60
4	52	57	40	--	--	a34		a35	a40	42	--	42	a48	--	47	58	55	63	--	--	70	76	56	67
5	50	50	--	a47	--	a35		34	a40	40	a40	--	--	--	50	57	57	56	67	77	68	77	62	--
6	46	55	a45	--	--	--		32	a36	38	--	43	--	a46	56	65	a62	65	70	83	68	78	62	--
7	47	60	--	a49	--	--		a35	a35	--	a45	--	a43	42	60	64	60	65	69	77	73	81	64	72
8	49	62	a36	--	--	37		a36	--	--	--	49	35	40	55	--	59	65	70	77	74	73	--	75
9	51	67	--	a45	--	a37		a40	--	33	a45	50	33	39	--	49	63	73	71	83	72	--	63	72
10	52	59	--	a43	--	a36		a42	--	36	41	49	36	41	--	--	67	76	73	77	70	69	64	72
11	54	61	--	a44	a34	--		a44	--	a36	49	42	36	--	45	45	68	76	70	80	63	76	63	75
12	55	60	--	a44	--	a39		43	a36	40	41	47	a43	--	38	45	70	73	75	--	66	80	64	--
13	51	54	--	45	--	--		41	a35	40	41	42	42	49	44	48	70	77	76	84	70	81	--	--
14	48	53	--	45	--	--		--	a37	--	38	--	44	43	46	55	a72	--	74	86	70	74	63	70
15	47	53	a42	--	--	39		a33	--	--	a40	--	42	50	52	63	65	75	75	77	68	74	63	72
16	50	55	a42	--	--	a35		a33	a34	38	40	50	44	51	57	63	68	80	66	70	--	--	65	70
17	50	--	--	42	--	a38		--	a36	40	39	43	a44	45	56	65	70	76	70	81	71	78	62	65
18	50	--	--	42	a35	--		33	--	--	38	44	41	50	60	68	70	76	75	78	69	80	60	--
19	50	56	--	a43	--	a34		37	--	--	42	48	45	58	58	63	67	70	--	--	69	80	61	--
20	49	58	--	a41	--	--		38	--	a35	--	46	--	--	57	62	63	71	72	75	70	80	58	--
21	50	55	--	--	--	a38		--	--	a36	42	42	51	60	53	54	a70	74	67	78	71	75	58	66
22	51	57	--	35	--	35		a38	a36	--	--	42	55	64	52	63	63	79	68	83	68	72	60	68
23	51	57	--	--	--	36		38	--	38	a41	--	60	57	54	59	70	74	70	80	--	--	62	68
24	--	56	a33	--	a35	--	a38	--	--	a42	43	52	50	52	55	--	61	67	70	81	67	76	60	64
25	--	55	--	a33	--	--		--	--	41	a48	54	a49	--	52	62	63	71	70	80	67	75	58	65
26	51	--	--	--	--	34		a42	a39	44	57	52	--	60	56	66	63	70	--	--	63	73	58	--
27	46	58	--	--	--	33		--	a44	43	47	55	57	61	61	70	63	72	75	79	67	78	--	--
28	47	58	--	--	--	33		37	--	--	a48	--	55	58	62	64	--	--	71	83	66	78	60	--
29	46	54	--	a34	--	33		a40	--	--	a52	--	--	51	61	59	68	83	74	82	69	72	57	65
30	48	54	--	a35	--	34		a43	--	--	a48	53	48	52	57	65	70	83	67	79	--	--	58	65
31	46	52	--	--	--	34		a45	--	--	a48	53	--	--	60	70	--	--	74	80	67	80	--	--
Average	50	57	--	--	--	--	--	--	--	--	--	--	45	50	53	59	65	72	71	79	69	76	61	--

Temperature (F°) of water, October 1953

Day	a.m.	p.m.	Day	a.m.	p.m.	Day	a.m.	p.m.	Day	a.m.	p.m.	Day	a.m.	p.m.	Day	a.m.	p.m.
1	61	66	6	53	61	11	--	--	16	56	--	21	47	--	26	--	50
2	58	--	7	55	62	12	55	60	17	a58	--	22	a45	45	27	--	52
3	a57	--	8	--	63	13	57	60	18	--	--	23	a47	50	28	--	55
4	--	--	9	59	--	14	57	62	19	53	--	24	--	--	29	--	55
5	a55	--	10	--	--	15	55	--	20	a53	--	25	--	--	30	--	--
															31	--	--

a Reading obtained between 10 a.m. and 3 p.m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, October 1952 to November 1953

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	822	760	1,690	1,070	1,450	4,190	1,000	1,290	3,480
2	814	860	1,890	1,020	1,480	4,080	1,050	2,150	6,100
3	878	880	2,090	1,030	1,030	2,860	1,100	1,580	4,690
4	886	980	2,340	959	1,780	4,610	1,160	1,930	6,040
5	894	950	2,290	934	1,470	3,710	1,190	2,320	7,450
6	886	1,130	2,700	918	924	2,290	1,300	--	e7,000
7	886	940	2,250	894	1,120	2,700	1,400	--	e6,000
8	902	910	2,220	910	766	1,880	1,500	1,180	4,780
9	995	1,210	3,250	894	951	2,300	1,300	1,260	4,420
10	1,080	1,850	5,390	902	1,160	2,830	1,400	1,990	7,520
11	1,130	1,700	5,190	902	1,240	3,020	1,200	2,190	7,100
12	1,140	1,420	4,370	894	1,430	3,450	1,300	1,570	5,510
13	1,130	1,340	4,090	902	1,120	2,730	1,400	--	e5,000
14	1,130	1,300	3,970	926	1,110	2,780	1,500	--	e5,000
15	1,230	1,630	5,410	878	1,100	2,610	1,400	1,100	4,160
16	1,400	1,830	6,920	870	1,080	2,540	1,300	1,500	5,260
17	1,420	1,650	6,330	902	1,210	2,950	1,350	1,950	7,110
18	1,420	1,340	5,140	902	1,000	2,440	1,400	1,690	6,390
19	1,410	1,220	4,640	910	1,020	2,510	1,400	1,430	5,410
20	1,420	1,250	4,790	894	1,250	3,020	1,350	--	e5,300
21	1,410	1,100	4,190	900	--	e3,500	1,300	1,500	5,260
22	1,410	1,040	3,960	886	1,690	4,040	1,200	1,050	3,400
23	1,380	900	3,350	890	--	e3,000	1,100	950	2,820
24	1,360	800	2,940	850	650	1,490	1,000	1,030	2,780
25	1,380	840	3,130	800	790	1,710	1,000	--	e2,800
26	1,380	1,060	3,950	750	--	e1,000	995	1,040	2,790
27	1,360	830	3,050	750	--	e1,000	1,000	800	2,160
28	1,370	850	3,140	800	--	e1,500	1,000	1,240	3,350
29	1,310	825	2,920	880	1,170	2,780	1,000	1,360	3,670
30	1,070	1,000	2,890	950	1,550	3,980	1,000	1,430	3,860
31	1,080	1,190	3,470	--	--	--	1,000	1,890	5,100
Total	36,383	--	113,950	26,967	--	83,500	37,595	--	151,710

Day	January			February			March		
1	1,000	2,100	5,670	1,200	--	e4,500	1,500	--	e4,500
2	1,000	1,780	4,810	1,230	1,320	s5,030	1,530	1,300	5,370
3	1,000	--	e5,000	1,310	1,900	s8,190	1,560	1,170	4,930
4	1,000	1,990	5,370	1,370	2,240	s9,750	1,660	1,340	6,010
5	1,100	1,790	5,320	1,740	3,460	16,300	1,710	1,610	7,430
6	1,150	1,730	5,370	1,740	4,020	18,900	1,620	780	3,410
7	1,210	2,020	6,600	1,710	3,400	15,700	1,610	1,240	5,390
8	1,310	2,360	8,350	1,700	--	e10,000	1,630	2,600	11,400
9	1,500	1,490	6,030	1,550	1,700	7,110	1,730	3,140	14,700
10	1,700	1,220	5,600	1,750	2,200	10,400	1,880	3,500	17,800
11	1,700	1,380	6,330	1,780	1,930	9,280	1,790	3,370	s17,300
12	1,500	1,350	5,470	1,730	1,160	5,420	1,800	1,630	7,920
13	1,200	1,500	4,860	1,840	1,200	5,960	1,770	1,050	5,020
14	800	--	e3,000	1,780	957	4,600	1,750	1,000	4,720
15	900	1,240	3,010	1,700	--	e4,000	1,720	840	3,900
16	1,050	1,300	3,690	1,630	766	3,370	1,670	660	2,980
17	1,200	--	e3,000	1,830	1,060	5,240	1,710	820	3,790
18	1,100	890	2,640	1,700	--	e4,000	1,660	690	3,090
19	846	902	2,060	1,500	--	e4,000	1,680	630	2,860
20	1,020	1,700	s5,730	1,300	1,550	5,440	1,690	520	2,370
21	1,100	--	e6,000	1,300	2,250	7,900	1,690	720	3,290
22	1,330	2,200	7,900	1,300	1,360	4,770	1,670	540	2,430
23	1,330	2,270	8,150	1,330	828	s4,000	1,680	590	2,680
24	1,200	2,000	6,480	1,330	780	2,800	1,670	500	2,250
25	1,200	--	e6,000	1,620	975	4,260	1,660	600	2,690
26	1,210	1,480	4,840	1,730	1,350	6,310	1,690	600	2,740
27	1,200	--	e4,500	1,570	1,020	4,320	1,560	780	3,290
28	1,310	1,900	6,720	1,600	--	e4,500	1,510	680	2,770
29	1,190	1,600	5,140	--	--	--	1,570	520	2,200
30	1,260	1,570	5,340	--	--	--	1,610	600	2,610
31	1,200	1,290	4,180	--	--	--	1,440	510	1,980
Total	36,816	--	163,160	43,870	--	196,050	51,420	--	163,820

e Estimated.
s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, October 1952 to November 1953--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.....	1,480	470	1,880	1,440	2,540	9,880	854	550	1,270
2.....	1,470	580	2,300	1,260	1,130	3,840	638	230	396
3.....	1,460	450	1,770	1,180	490	1,560	748	348	s 796
4.....	1,470	520	2,060	950	510	1,310	776	320	670
5.....	1,500	--	e 2,100	950	400	s 1,180	830	336	s 896
6.....	1,610	680	2,960	950	480	1,230	870	1,140	s 6,240
7.....	1,660	3,520	s 18,000	894	360	869	977	1,500	3,960
8.....	1,600	7,220	s 36,000	854	490	1,130	1,250	16,000	s 61,900
9.....	1,450	1,990	7,790	959	620	1,610	734	3,230	6,400
10.....	1,450	1,300	5,090	1,070	3,600	s 13,700	1,110	1,370	4,110
11.....	1,420	980	3,760	1,150	2,750	8,540	1,070	750	2,170
12.....	1,490	570	2,290	1,200	1,330	4,310	918	500	1,240
13.....	1,610	570	2,480	830	1,580	3,540	685	350	647
14.....	1,570	610	2,590	1,470	1,430	5,680	671	290	525
15.....	1,560	510	2,150	694	950	1,780	830	570	1,280
16.....	1,570	410	1,740	652	510	898	769	620	1,290
17.....	1,540	420	1,750	556	380	570	650	570	1,000
18.....	1,520	420	1,720	926	958	s 3,060	596	280	451
19.....	1,510	400	1,630	596	230	370	566	200	306
20.....	1,520	--	e 1,600	782	330	697	590	150	239
21.....	1,340	420	1,520	582	270	424	566	150	229
22.....	1,240	700	2,340	790	470	1,000	548	135	200
23.....	1,140	594	s 2,170	934	500	1,260	542	145	212
24.....	1,380	490	1,830	1,160	710	2,220	734	301	s 749
25.....	1,480	660	2,640	1,090	4,400	12,900	713	272	s 568
26.....	1,370	480	1,780	995	1,250	3,360	584	180	284
27.....	1,360	510	1,870	934	528	1,330	566	165	252
28.....	1,150	390	1,210	790	330	704	450	--	e 150
29.....	1,480	1,800	s 8,960	1,380	6,770	s 29,100	372	78	78
30.....	1,560	8,810	37,100	1,060	10,800	s 29,400	336	72	65
31.....	--	--	--	950	1,600	4,100	--	--	--
Total.	43,960	--	163,080	30,028	--	151,552	21,543	--	98,573

	July			August			September		
1.....	308			515	1,100	1,530	495	87	116
2.....	291	102	82	530	800	859	505	115	157
3.....	288			734	3,300	s 7,130	584	380	509
4.....	285	--	e 75	578	2,350	3,670	566	180	275
5.....	291	91	71	536	1,200	1,740	590	200	319
6.....	320	117	101	525	284	403	638	330	568
7.....	285			520	226	317	734	429	s 921
8.....	267	80	60	520	203	285	644	320	556
9.....	279			520	164	230	692	312	583
10.....	273			505	158	215	706	340	648
11.....	285	100	77	500	149	201	734	335	664
12.....	273			475	130	167	766	482	997
13.....	276	59	43	465	98	123	783	--	e 1,000
14.....	264			450	76	92	776	311	652
15.....	279			445	96	115	783	585	1,240
16.....	410	156	173	470	--	e 150	755	330	672
17.....	440	260	309	470	92	117	720	1,000	a 1,900
18.....	435	168	197	440	65	77	713	360	693
19.....	435	--	e 150	435	66	78	713	232	447
20.....	445	132	159	420	52	59	713	230	443
21.....	410	118	131	430	77	89	741	232	464
22.....	420	112	127	430	96	111	790	263	561
23.....	420			440	--	e 90	790	318	678
24.....	430			450	80	97	822	285	633
25.....	430	71	75	435	78	92	830	294	659
26.....	380			445	75	90	846	394	900
27.....	348			450	66	80	902	--	e 1,000
28.....	344			475	76	97	902	398	969
29.....	549	8,260	s 18,600	480	65	84	942	461	1,170
30.....	1,460	26,200	s 111,000	500	--	e 100	1,010	752	s 2,200
31.....	638	4,100	7,060	500	88	119	--	--	--
Total.	12,258	--	139,338	15,088	--	18,807	22,185	--	22,684

Total discharge for water year 1952-53 (cfs days) 378,113
Total load for water year 1952-53 (tons) 1,466,024

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

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Suspended sediment, October 1952 to November 1953--Continued

Day	October			November					
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	870	1,140	2,680	1,260					
2.....	926			1,240					
3.....	934			1,260					
4.....	1,020			1,420					
5.....	986			1,430					
		472	1,240		808	2,920			
6.....	977			1,420					
7.....	977			1,410					
8.....	986			1,400					
9.....	986			1,260					
10.....	968			1,280					
11.....	1,050			--		--			
12.....	1,300			--		--			
13.....	1,320			--		--			
14.....	1,300			--		--			
15.....	1,290			--		--			
		1,210	4,150						
16.....	1,300			--		--			
17.....	1,300			--		--			
18.....	1,280			--		--			
19.....	1,280			--		--			
20.....	1,280			--		--			
21.....	1,660	9,480	s48,200	--		--			
22.....	1,400	9,080	34,300	--		--			
23.....	1,280	2,220	7,670	--		--			
24.....	1,280	--	e4,000	--		--			
25.....	1,270	--	e3,500	--		--			
26.....	1,260	930	3,160	--		--			
27.....	1,260	773	2,630	--		--			
28.....	1,380	948	3,530	--		--			
29.....	1,590	1,040	4,460	--		--			
30.....	1,570	--	e4,000	--		--			
31.....	1,520	--	e3,500	--		--			
Total	37,800	--	174,290	13,400		29,200			

Total discharge for period Oct. 1 to Nov. 10, 1953 (cfs days) 51,200

Total load for period Oct. 1 to Nov. 10, 1953 (tons) 203,490

e Estimated.

s Computed by subdividing day.

BIGHORN RIVER NEAR MANDERSON, WYO.--Continued

Particle - size analyses of suspended sediment, November 1952 to October 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; V, visual accumulation tube)

Date of collection	Time	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. 3, 1952	5:10 p.m.	1,120	--	1,290	--		--		--		9	44	94	99	100	--	S
Dec. 1	1:00 p.m.	a1,000	33	1,020	--		--		--		7	30	89	97	99	100	S
Jan. 6, 1953	5:35 p.m.	1,690	32	2,340	--		--		--		8	19	82	97	99	100	S
Jan. 20	3:15 p.m.	995	35	736	--		--		--		12	36	90	98	100	--	S
Feb. 17	12:35 p.m.	2,150	40	1,200	682		4		5		21	43	89	98	100	--	SPWCM
Mar. 4	6:00 p.m.	2,060	39	1,530	1,420		4		5		20	40	87	98	100	--	SPWCM
Mar. 6	2:20 p.m.	1,870	--	1,010	434		--		--		19	40	88	98	100	--	S
Mar. 10	2:50 p.m.	2,020	49	3,320	2,430		2		68		76	--	--	--	--	--	SPN
Mar. 10	2:50 p.m.	2,020	49	3,320	3,220		55		68		76	--	--	--	--	--	SPWCM
Apr. 7	2:30 p.m.	2,050	--	8,220	5,410		62		82		90	--	--	--	--	--	SPWCM
Apr. 8	4:20 p.m.	1,880	37	9,550	6,520		2		83		93	--	--	--	--	--	SPN
Apr. 8	4:20 p.m.	1,880	37	9,550	6,210		52		77		93	--	--	--	--	--	SPWCM
Apr. 29	7:05 p.m.	2,040	51	6,080	4,170		55		80		90	--	--	--	--	--	SPWCM
Apr. 30	9:45 a.m.	1,520	49	24,100	2,110		7		91		97	--	--	--	--	--	SPN
Apr. 30	9:45 p.m.	1,520	49	24,100	2,410		67		86		97	--	--	--	--	--	SPWCM
May 11	4:05 p.m.	1,530	45	1,560	1,600		3		42		69	78	93	99	100	--	SPN
May 11	4:05 p.m.	1,530	45	1,560	1,440		41		49		69	--	--	--	--	--	SPWCM
May 27	9:00 a.m.	701	60	376	719		21		41		66	--	--	--	--	--	SPN
May 27	9:00 a.m.	701	60	376	760		46		47		66	--	--	--	--	--	SPWCM
June 8	4:45 p.m.	1,270	63	27,300	4,370		2		84		98	--	--	--	--	--	SPN
June 8	4:45 p.m.	1,270	63	27,300	4,280		59		84		98	--	--	--	--	--	SPWCM
July 29	7:35 p.m.	894	78	39,000	7,910		2		94		99	--	--	--	--	--	SPN
July 29	7:35 p.m.	894	78	39,000	8,330		68		95		99	--	--	--	--	--	SPWCM
Aug. 3	2:05 p.m.	854	75	6,370	4,700		2		88		97	--	--	--	--	--	SPN
Aug. 3	2:05 p.m.	854	75	6,370	4,430		68		88		97	--	--	--	--	--	SPWCM
Oct. 22	11:25 a.m.	1,520	46	7,250	5,650		1		79		91	96	99	100	--	--	VPN
Oct. 22	11:25 a.m.	1,520	46	7,250	5,620		65		89		91	96	99	100	--	--	VPWCM

a Means daily discharge.

YELLOWSTONE RIVER BASIN--Continued

PAINTROCK CREEK NEAR HYATTVILLE, WYO.

LOCATION.--At gaging station, 0.5 mile upstream from Luman Creek and 6 miles northeast of Hyattville, Big Horn County. Prior to June 15, 1953, at site 400 feet upstream.
DRAINAGE AREA.--164 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to July 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1053 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to July 1953

Date of collection	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. 3, 1952	27			24	9.7	1.6		123		2.0	0.5							100	0	3	0.1	195	8.0
Nov. 7	20			26	11	1.4		136		3.0	.5							112	0	3	.1	218	8.1
Dec. 2	19			--	--	--		149		4.0	--							124	2	--	--	239	7.7
Jan. 8, 1953	16			--	--	--		152		1.0	--							125	0	--	--	244	8.2
Feb. 3	17			--	--	--		148		3.0	--							123	2	--	--	237	8.1
Mar. 3	18			--	--	--		153		2.0	--							129	4	--	--	244	7.9
Apr. 9	16			--	--	--		134		6.0	--							117	7	--	--	226	7.5
May 5	34			--	--	--		99		1.0	--							84	3	--	.0	170	7.8
June 4	510	5.8	0.08	8.0	2.2	.2		32		1.0	.6	0.4	0.6	0.02	46	0.06		29	3	2	--	63.6	7.3
July 7	345			--	--	--		31		1.0	--							25	0	--		56.3	7.5

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 July 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to July 1953

Date of collection	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				
Oct. 3, 1952	11							160	0	--								144	13			266	7.8
Nov. 7	13							160	4	--								138	0			260	8.3
Dec. 2	11							172	0	5.0								141	0			267	8.2
Jan. 8, 1953	10							188	3	2.0								143	0			269	8.4
Feb. 3	10							174	0	4.0								143	0			270	8.2
Mar. 3	10							177	0	1.0								147	2			273	8.1
Apr. 9	10							175	0	.2								146	2			276	8.2
May 5	11							168	0	1.0								99	0			267	7.8
June 4	152	6.8	0.03	14	4.1	0.5		60	0	1.0	1.0	0.4	0.4	0.03	68	0.09		52	3	2	0.0	105	7.5
July 7	68							90	0	1.0								74	0			155	7.6

YELLOWSTONE RIVER BASIN--Continued

PAINTROCK CREEK NEAR MOUTH BELOW HYATTVILLE, WYO.

LOCATION.--At bridge on road between Manderson (revised) 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 1953 (discontinued).
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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)	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				
Oct. 3, 1952		--	--	224	71	174		304	0	930	7.5	--	--	--	--	--		850	601	31	2.6	1,910	7.5
Nov. 7		--	--	168	46	95		240	0	585	5.0	--	--	--	--	--		607	410	25	1.7	1,310	8.0
Dec. 2		--	--	139	39	56		241	0	410	3.5	--	--	--	--	--		507	309	19	1.1	1,060	7.8
Jan. 8, 1953		--	--	--	--	--		211	6	363	--	--	--	--	--	--		458	275	--	--	1,000	8.4
Feb. 3		--	--	--	--	--		226	0	380	--	--	--	--	--	--		462	277	--	--	1,020	8.2
Mar. 3		--	--	--	--	--		235	0	410	--	--	--	--	--	--		489	296	--	--	1,050	8.0
Apr. 8		--	--	--	--	--		209	0	448	--	--	--	--	--	--		463	292	--	--	1,150	7.5
May 5		--	--	--	--	--		208	0	380	--	--	--	--	--	--		439	268	--	--	1,020	7.9
June 4		7.3	0.02	43	17	54		108	0	194	1.5	0.6	0.8	0.10	389	0.53		178	69	40	1.7	579	7.8
July 7		7.0	.00	41	12	20		96	0	108	1.0	.1	1.0	.05	251	.34		151	72	22	.7	384	7.9
Aug. 4		--	--	94	27	60		187	0	308	1.5	--	--	--	--	--		346	193	27	1.4	773	7.5
Sept. 3		--	--	205	59	110		281	0	725	6.0	--	--	--	--	--		754	524	24	1.7	1,640	7.6

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 July 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to July 1953

Date of collection	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. 6, 1952	116	--	--	50	23	49		186	0	163	2.5	--	--	--	--	--		220	67	32	1.4	601	8.1
Nov. 13	84	9.3	0.01	56	25	53		173	3	198	2.5	0.2	0.8	0.08	443	0.60		242	95	32	1.5	649	8.3
Dec. 16	a75	--	--	52	26	55		171	0	203	3.0	--	--	--	--	--		237	97	33	1.5	660	8.1
Jan. 5, 1953	a65	--	--	--	--	--		178	0	200	--	--	--	--	--	--		247	101	--	--	663	8.0
Feb. 3	a55	--	--	67	23	60		157	6	241	3.5	--	--	.07	--	--		263	124	33	1.6	729	8.5
Mar. 6	a70	--	--	--	--	--		167	0	236	--	--	--	--	--	--		257	120	--	--	720	8.0
Apr. 1	67	13	.00	56	27	62		160	0	241	3.0	.2	.7	--	490	.67		252	121	35	1.7	725	8.0
May 12	131	--	--	--	--	--		134	0	149	--	--	--	--	--	--		177	67	--	--	522	7.6
June 4	535	--	--	--	--	--		88	0	47	--	--	--	--	--	--		76	4	--	--	237	7.5
July 6	786	--	--	--	--	--		89	0	48	--	--	--	--	--	--		88	15	--	--	247	7.6

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

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 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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
Oct. 4, 1952....	11			107	42	250		384	605	26								438	123	55	5.2	1,720	8.0
Nov. 4.....	78			93	36	198		351	488	12								382	94	53	4.4	1,230	7.9
Dec. 1.....	a80			115	47	158		411	455	10								482	145	42	3.1	1,390	8.0
Jan. 7, 1953 ...	a95			--	--	--		323	330	--								374	109	--	--	1,090	8.2
Feb. 2.....	a145			--	--	--		258	288	--								309	97	--	--	945	7.8
Mar. 5.....	a95			--	--	--		314	368	--								388	131	--	--	1,140	8.2
Apr. 7.....	136			--	--	--		270	360	--								290	69	--	--	1,130	8.0
May 4.....	15			91	34	190		302	410	14								367	119	47	3.4	1,260	8.0
June 3.....	17			85	31	183		285	460	18								340	106	54	4.3	1,350	8.2
July 6.....	13			--	--	--		304	475	--								359	110	--	--	1,400	8.1
Aug. 4.....	83			61	20	104		240	243	8.5								236	39	49	2.9	871	7.6
Sept. 2.....	16	16	0.00	92	35	209		335	500	22	0.8	1.4	0.14	1,070	1,040	146		375	100	55	4.7	1,500	7.6

a Mean daily discharge.

DRY CREEK AT GREYBULL, WYO.

LOCATION.--At gaging station, half a mile north of Greybull, Big Horn County, and half a mile upstream from mouth. Prior to Nov. 12, 1952, at site 1 mile upstream.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1951.
Water temperatures: October 1951 to June 1953 (discontinued).
Sediment records: April 1951 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Water temperatures: Minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 12,600 ppm May 31; minimum daily, not determined.
Sediment loads: Maximum daily, 2,440 tons June 15; minimum daily, less than 0.50 ton on many days.
EXTREMES, 1951-53.--Water temperatures: Maximum (1951-52), 79°F July 24, 1952; minimum, freezing point on many days during winter months each year.
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 many days.
REMARKS.--Flow affected by ice Nov. 10 to Mar. 10. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, October 1952 to June 1953
/Twice-daily 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.						
1	52	58	40	46			--	--			--	--	34	--	45	52	55	65						
2	48	59	35	--		32		--			--	--	31	50	42	49	59	63						
3	49	58	33	34				--			--	--	32	54	44	42	54	58						
4	46	48	32	--				--			--	--	38	57	44	64	51	62						
5	47	47	--	--				--			--	--	--	53	48	65	54	53						
6	45	46	--	--				--			--	--	43	44	52	66	51	64						
7	41	45	--	--				32			--	--	40	42	59	60	58	62						
8	43	43	--	--				--			--	--	36	42	51	--	55	64						
9	43	48	--	--				--			--	--	32	42	49	47	59	74						
10	50	53	--	--				--			--	--	32	--	43	45	64	75						
11	48	50	--	--				--			35	37	32	--	--	--	69	74						
12	48	50	--	--				--			--	38	35	45	35	--	--	--						
13	45	46	--	--				--			31	--	34	52	40	--	64	74						
14	44	47	--	--				--			--	--	39	41	50	55	64	--						
15	44	48	--	42				--			--	--	34	51	48	63	60	--						
16	--	47	--	--				--			31	--	37	--	52	61	64	72						
17	42	48	--	--				--			31	41	37	46	53	65	65	71						
18	46	50	--	--				--			--	45	34	50	53	65	64	74						
19	46	50	--	--				--			31	48	34	51	55	58	60	62						
20	46	48	--	--				--		32	37	42	39	63	53	55	56	66						
21	42	46	--	--				32			31	42	40	59	48	48	58	70						
22	42	46	--	--				--			32	40	48	--	46	55	60	68						
23	41	49	--	--				--			32	42	51	55	58	--	62	69						
24	42	48	--	--				--			31	--	--	--	58	59	55	63						
25	45	48	--	--				--			38	53	41	60	48	59	55	65						
26	44	47	--	--				--			37	55	46	63	55	65	56	61						
27	--	46	--	--				--			38	57	52	62	58	--	56	72						
28	37	42	--	--				--			40	--	51	58	57	62	60	75						
29	38	48	--	--				--			43	49	46	52	58	58	61	--						
30	42	42	--	--				--			38	48	48	52	52	60	62	--						
31	38	44	--	--				--			38	53	--	--	51	66	--	--						
Average	44	48	--	--	a32	a32	a32	a32	a32	a32	--	--	39	52	50	58	59	67						

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

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Suspended sediment, October 1952 to June 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	12			16			7		
2	11			17	20	1	8	50	
3	11			17			9		
4	15			17			8		
5	14	18	1	17			8		
6	13			17			9		
7	16			18	--	e 1	10		
8	17			18			10		
9	14			18			10		
10	14			17			10		
11	14			17	--		10		
12	21			17	--		10		
13	19			17	--		10		
14	15			17	--		10		
15	15	18	1	17	62		10		e 1
16	14			18	--	e 3	10		
17	14			19	--		10		
18	14			19	--		10		
19	15			19	--		10		
20	15			19	--		10		
21	14			19	--		10		
22	14			17			9		
23	14			13			8		
24	15			11			7		
25	15			10			6		
26	15	19	1	9	--	e 1	6		
27	15			8			7		
28	15			7			8		
29	15			7			9		
30	16			7			10		
31	16			--	--	--	10		
Total	457	--	31	459	--	52	279		31

Day	January			February			March		
1	10	--		11	--		10		
2	10	--		11	52		9	--	e 1
3	10	--		11	--	e 2	8		
4	10	--		11	--		10	120	3
5	9	--		10	--		15	--	e 10
6	8	--		10	--		15	--	e 10
7	10	42	e 1	9	--		25	--	e 25
8	10	--		9	--		35	--	e 70
9	12	--		9	--		50	--	e 300
10	12	--		8	--		60	3,080	499
11	12	--		8	--		67	5,430	s 1,040
12	12	--		9	--		32	2,800	242
13	12	--		10	--		26	1,620	114
14	9	--		10	--		17	1,030	47
15	6	--		10	--		14	498	19
16	7	--		10	--		13	250	9
17	8	--		10	--		12	192	6
18	9	--		8	--	e 1	10	195	5
19	10	--		7	--		10	185	5
20	10	--		6	80		10	172	5
21	10	19		6	--		9.2	167	4
22	10	--	(t)	7	--		8.8	124	3
23	10	--		7	--		8.4	96	2
24	10	--		7	--		8.4	68	2
25	10	--		8	--		9.2		
26	10	--		9	--		9.2		
27	9	--		10	--		9.2	40	1
28	9	--		11	--		9.2		
29	10	--		--	--	--	8.8		
30	11	--		--	--	--	9.2		
31	11	--		--	--	--	8.8		
Total	306	--	22	252	--	33	546.4	--	2,430

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

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Suspended sediment, October 1952 to June 1953--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.....	8.4			35	555	52	8.8	3,000	71
2.....	7.7			24	295	19	9.6	1,000	26
3.....	8.4			14	110	4	15	580	23
4.....	8.0	26	1	10	62	2	7.4	190	4
5.....	8.0			6.8	54	1	28	2,880	s544
6.....	9.2			2.1	16	(t)	70	6,600	1,250
7.....	11	70	2	.7	14	(t)	55	6,000	891
8.....	11	38	1	7.9	444	s17	51	3,800	523
9.....	11	111	3	19	899	s64	32	1,270	110
10.....	12	108	3	28	1,640	s135	16	441	19
11.....	10	72	2	4.2	350	4	23	400	25
12.....	10	47	1	4.2	165	2	30	499	40
13.....	9.2			6.2	183	3	44	858	102
14.....	9.6			3.6	80	1	47	848	108
15.....	8.8			6.7	201	s6	78	7,780	s2,440
16.....	9.2			16	492	21	43	1,220	142
17.....	9.2			8.1	298	7	36	627	s65
18.....	9.2	41	1	8.0	161	3	31	502	42
19.....	9.6			24	398	32	40	592	64
20.....	9.6			19	340	17	62	1,440	s264
21.....	8.8			16	205	9	56	1,060	s170
22.....	8.4			23	260	16	61	818	135
23.....	10			16	155	7	52	583	82
24.....	9.2			16	135	6	61	793	131
25.....	13	89	3	19	125	6	64	879	152
26.....	19	341	17	8.8	80	2	32	340	29
27.....	21	313	18	8.0	72	2	16	147	6
28.....	22	310	18	7.4	30	1	8.0	60	1
29.....	38	988	101	35	5,670	s738	5.6	58	1
30.....	37	630	63	40	4,370	472	8.0	41	1
31.....	--	--	--	17	12,600	s651	--	--	--
Total.	375.5	--	250	454.0	--	2,300	1,090.4	--	7,461

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs-days) 4,219.3
Total load for period Oct. 1, 1952 to June 30, 1953 (tons) 12,610

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

YELLOWSTONE RIVER BASIN--Continued

DRY CREEK AT GREYBULL, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953	4:35 p.m.	a60		4,300	4,600		3		81		89						SPN
Mar. 10	4:35 p.m.	a60		4,300	6,350		64		77		89						SPWCM
Apr. 29	1:10 p.m.	44		1,280	2,830		62		91		96						SPWCM
May 11	10:00 a.m.	4.4	46	308	464	87	89	89	--		97	97	99	100			BWCM
May 29	12:55 p.m.	52		15,200	5,470		4		99		99						SPN
May 29	12:55 p.m.	52		15,200	6,420		70		96		99						SPWCM
June 6	12:10 p.m.	78		4,410	5,500		1		86		95						SPN
June 6	12:10 p.m.	78		4,410	5,450		70		87		95						SPWCM
June 8	2:35 p.m.	59		3,410	6,450		81		95		98						SPWCM
June 15	5:15 p.m.	70		8,210	4,400		63		86		97						SPWCM

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 1953.
Water temperatures: July to September 1949, October 1950 to September 1953.
Sediment records: March 1946 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 85°F July 14, 30; minimum, freezing point on several days during November to March.
Sediment concentrations: Maximum daily, 12,100 ppm July 31; minimum daily, not determined.
Sediment loads: Maximum daily, 131,000 tons June 14; minimum daily, 200 tons Dec. 27.
EXTREMES, 1946-53.--Water temperatures (1950-53): Maximum, 85°F July 14, 30, 1953; 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. 25 to Dec. 5, Dec. 27 to Jan. 10, Jan. 14-17, Feb. 22, 23. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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. 3, 1952	1,250			--	--	103	--							759	1.03		--		--	--	1,160	--	
Nov. 5	1,480			--	--	100	--							762	1.04		--		--	--	1,060	--	
Dec. 5	a1,500			--	--	86	--							699	.95		--		--	--	994	--	
Jan. 6, 1953.....	a1,450			--	--	84	--							673	.92		--		--	--	956	--	
Feb. 3	1,650			--	--	89	--							662	.90		--		--	--	945	--	
Mar. 5	2,350			--	--	86	--							645	.88		--		--	--	924	--	
Mar. 11	3,030			79	25	97	3.9							662	.90		298		41	2.4	969	7.5	
Mar. 31	2,350			--	--	86	--							645	.88		--		--	--	940	--	
May 4	1,810			--	--	101	--							721	.98		--		--	--	1,030	--	
May 11	2,120			81	25	90	4.7							668	.91		304		39	2.2	965	7.9	
June 3	3,470			58	15	42		144	162	7.5				--	--		205	87	31	1.3	577	7.6	
June 13	8,200			59	12	35	2.8							364	.50		197		27	1.1	526	7.5	
June 15	9,260			75	13	35	3.4							400	.54		240		24	1.0	603	7.0	
July 8	1,070			--	--	74	--							597	.81		--		--	--	872	--	
Aug. 4.....	1,710			--	--	129	--							868	1.18		--		--	--	1,220	--	
Sept. 10	1,020			--	--	123	--							840	1.14		--		--	--	1,180	--	

a Main daily discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Twice-daily measurements between 7 a.m. and 11 a.m., and 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	62	--	45	--	--	--	--	--	--	--	--	--	--	--	50	52	42	65	71	73	70	--	68	75
2	--	64	--	--	34	--	--	34	--	--	--	32	38	--	41	46	60	65	66	76	--	--	67	64
3	55	--	42	--	--	--	--	--	--	--	32	34	38	--	46	50	59	58	68	79	--	--	55	63
4	52	--	--	--	--	--	--	--	--	--	35	35	45	52	47	55	55	59	--	--	--	76	67	60
5	--	--	--	41	--	33	--	--	32	--	34	--	45	50	42	60	--	55	68	73	--	73	62	69
6	42	--	--	--	--	--	32	--	32	--	34	39	45	47	53	65	53	61	66	78	--	76	--	67
7	44	--	39	--	--	--	--	--	--	33	38	44	45	46	56	63	58	61	69	76	67	80	75	72
8	47	--	--	41	--	33	--	33	33	--	41	45	42	40	56	61	58	70	69	75	71	71	66	74
9	50	--	--	--	--	--	--	--	--	33	41	47	32	38	51	50	60	73	71	79	70	78	66	76
10	53	--	--	--	--	--	--	--	--	33	40	47	34	--	40	40	65	72	--	77	--	67	65	71
11	--	51	--	--	34	--	36	--	32	--	44	46	34	40	42	42	65	69	70	80	63	72	64	73
12	--	58	--	--	--	--	--	38	33	34	--	--	36	42	39	42	63	64	77	83	65	71	64	--
13	49	--	--	--	--	--	--	--	33	34	42	40	39	44	42	45	60	62	75	83	71	77	66	72
14	41	--	--	44	--	33	--	--	33	35	39	42	41	45	42	49	62	63	75	85	73	--	66	--
15	46	--	--	--	--	--	--	35	--	34	38	44	38	41	47	55	59	63	77	81	--	71	66	71
16	--	--	40	--	--	--	--	--	--	--	40	46	41	42	52	60	--	65	68	76	--	--	62	70
17	--	--	--	--	--	33	33	--	34	--	42	42	40	44	55	60	64	68	69	80	72	--	65	66
18	--	--	--	--	--	33	33	--	--	--	38	--	37	43	55	67	64	67	74	83	--	--	60	67
19	50	--	--	--	--	--	--	--	--	33	41	48	38	47	60	63	62	64	75	79	--	--	53	--
20	53	--	--	--	--	34	--	--	34	34	43	46	43	50	57	61	60	65	74	80	77	--	60	--
21	49	--	34	--	--	--	--	--	--	--	41	43	47	51	52	57	61	66	--	78	--	76	--	66
22	42	--	32	--	--	--	--	33	--	--	39	41	51	61	52	58	62	69	68	81	71	70	58	68
23	50	--	--	--	--	--	--	--	--	--	38	44	53	56	53	58	67	72	70	81	68	78	60	67
24	47	--	--	--	--	--	33	--	33	34	38	48	50	52	57	58	61	65	71	80	67	75	59	64
25	48	--	34	--	--	33	32	--	33	36	45	50	47	56	--	61	61	64	70	83	66	67	55	64
26	--	--	--	--	--	--	35	--	34	--	45	50	50	60	57	63	60	64	--	78	71	75	55	--
27	--	--	--	--	--	--	--	33	40	40	46	44	56	61	--	--	60	70	72	81	--	75	57	65
28	--	--	--	--	--	--	33	--	39	--	45	52	54	57	62	65	65	73	72	79	68	--	56	61
29	47	--	--	--	--	--	--	--	--	--	48	49	51	55	60	62	65	65	74	83	--	74	--	--
30	47	--	--	--	--	35	--	--	--	--	45	50	50	52	56	63	69	--	74	85	69	78	--	70
31	43	--	--	--	--	--	--	32	--	--	46	51	--	--	58	65	--	--	75	75	67	79	--	--
Average	--	--	--	--	--	--	--	--	--	--	41	44	43	49	51	57	61	65	71	79	--	--	62	68

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	1,210	387	1,260	1,560	580	2,440	1,250	--	e300
2	1,220	282	929	1,550	660	2,760	1,300	74	260
3	1,240	191	639	1,490	820	3,300	1,350	--	e500
4	1,240	339	1,130	1,450	--	e2,200	1,400	--	e1,000
5	1,280	--	e1,500	1,390	425	1,600	1,500	375	1,520
6	1,240	435	1,460	1,400	525	1,980	1,530	--	e1,700
7	1,270	531	1,820	1,390	530	1,990	1,700	--	e2,000
8	1,290	365	1,270	1,440	580	2,260	1,800	470	2,280
9	1,350	304	1,110	1,430			1,870	500	2,520
10	1,440	326	1,270	1,360			1,650	--	e1,300
11	1,500	505	2,050	1,390	--	e2,500	1,720	280	1,300
12	1,540	587	2,440	1,490			1,550	430	1,800
13	1,530	452	1,870	1,560			1,660	570	2,590
14	1,490	496	2,000	1,560	710	2,990	1,760	520	2,470
15	1,510	548	2,230	1,550	--	e2,700	1,810	550	2,690
16	1,630	470	2,070	1,500	600	2,430	1,750	--	e2,400
17	1,650	502	2,240	1,530	--	e2,500	1,660	470	2,110
18	1,660	--	e2,400	1,510	640	2,610	1,750	280	1,320
19	1,750	561	2,650	1,540	--	e2,500	1,770	310	1,480
20	1,780	578	2,780	1,530	630	2,600	1,750	460	1,890
21	1,810	657	3,210	1,480	500	2,000	1,690	440	2,010
22	1,800	619	3,010	1,510	230	938	1,680	550	2,490
23	1,750	555	2,620	1,560	--	e800	1,450	--	e1,000
24	1,750	764	3,610	1,330	--	e500	1,450	149	583
25	1,750	865	4,090	1,200	96	311	1,320	118	421
26	1,740	922	4,330	1,150	--	e300	1,330	--	e300
27	1,720	990	4,600	1,100	421	1,250	1,350	--	e200
28	1,710	820	3,790	1,100	--	e700	1,400	58	219
29	1,760	680	3,230	1,150	--	3500	1,400	--	e300
30	1,740	610	2,870	1,200	--	e400	1,400	98	370
31	1,500	630	2,550	--	--	--	1,400	134	507
Total	47,850	--	73,028	42,400	--	57,059	48,420	--	41,880

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	1,450	--	550	1,630	840	3,700	2,210	765	4,569
2	1,450	136	532	1,720	--	e3,400	2,090	690	3,890
3	1,450	88	345	1,850	630	3,150	1,980	460	2,460
4	1,450	319	1,250	1,820	--	e4,000	1,990	772	s4,570
5	1,450	176	689	1,860	1,460	7,330	2,040	1,120	6,170
6	1,450	67	262	2,290	2,330	s15,600	2,020	925	5,040
7	1,450	--	e900	2,400	1,400	9,070	2,090	1,500	8,460
8	1,500	530	2,150	2,380	720	4,630	2,350	1,730	11,000
9	1,600	530	2,290	2,570	1,140	7,910	2,520	2,270	15,400
10	1,850	590	2,950	2,190	600	3,550	2,720	3,930	28,900
11	2,030	590	3,230	2,360	280	1,780	2,820	4,080	31,100
12	2,040	620	3,410	2,220	530	3,190	2,720	3,570	26,200
13	1,940	130	681	2,300	750	4,660	2,460	3,136	20,800
14	1,600	70	302	2,450	970	6,420	2,210	2,030	12,100
15	1,200	70	227	2,350	870	5,520	2,070	1,460	8,160
16	1,400	--	e700	2,250	720	4,370	2,040	1,430	7,880
17	1,600	430	1,860	2,120	760	4,350	2,070	1,300	7,270
18	1,800	470	2,280	2,230	1,090	6,560	2,020	990	5,400
19	1,500	--	e2,000	2,220	930	5,570	1,950	963	5,070
20	1,480	500	2,000	1,860	760	3,520	2,050	832	4,610
21	1,660	620	2,780	1,770	770	3,680	2,020	1,110	6,050
22	1,740	630	2,960	1,700	--	e3,500	1,950	1,100	5,790
23	1,830	825	4,080	1,700	725	3,330	1,910	810	4,180
24	1,680	900	4,080	1,690	460	2,100	1,870	849	4,280
25	1,690	790	3,600	1,910	600	3,090	1,910	927	4,780
26	1,690	830	3,790	2,040	5,950	32,800	1,960	1,010	5,340
27	1,780	815	3,920	2,160	1,080	6,360	1,880	1,160	5,890
28	1,520	440	1,810	2,120	1,110	s6,740	1,910	1,190	6,140
29	1,520	770	3,160	--	--	--	1,860	1,290	6,830
30	1,620	--	e3,300	--	--	--	1,950	1,390	7,320
31	1,680	770	3,490	--	--	--	1,990	1,070	5,750
Total	50,100	--	65,578	58,180	--	169,870	65,710	--	281,360

e Estimated.
s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	1,910	1,480	7,630	1,870	8,200	41,400	2,960	5,440	43,500
2.....	1,860	1,460	7,330	1,710	5,700	26,300	3,170	3,800	32,500
3.....	1,760	1,580	7,510	1,620	2,530	11,100	3,240	3,300	28,900
4.....	1,820	1,040	5,110	1,560	1,450	6,110	3,240	2,600	22,700
5.....	1,870	1,200	6,060	1,480	940	3,760	3,030	2,180	17,800
6.....	1,870	585	2,950	1,430	890	3,440	3,010	3,010	24,500
7.....	2,080	992	s 5,860	1,330	1,000	3,590	2,800	2,330	17,600
8.....	2,260	2,410	14,700	1,250	1,020	3,440	2,980	3,680	29,600
9.....	2,090	6,560	37,000	1,310	1,000	3,540	3,330	9,300	83,600
10.....	1,850	4,510	22,500	1,740	2,640	s 14,000	3,030	5,050	41,300
11.....	1,870	2,360	11,900	1,880	4,330	22,000	4,380	5,750	68,000
12.....	1,950	1,460	7,690	1,600	3,590	15,500	6,520	6,200	109,000
13.....	1,960	1,220	6,460	1,690	2,400	11,000	8,230	5,410	120,000
14.....	1,950	1,040	5,480	1,580	950	4,050	9,380	5,190	131,000
15.....	1,960	755	4,000	1,830	1,420	7,020	9,800	4,770	126,000
16.....	1,940	805	4,220	1,260	1,240	4,220	9,110	3,960	97,400
17.....	1,940	946	4,960	1,170	910	2,870	6,600	4,000	71,300
18.....	2,020	1,020	5,560	1,170	750	2,370	6,350	3,200	54,900
19.....	1,940	1,000	5,240	1,500	1,300	5,270	6,270	2,790	47,200
20.....	1,900	963	4,940	1,420	990	3,800	5,640	2,330	35,500
21.....	1,910	1,080	5,570	1,460	1,200	4,730	4,560	1,760	21,700
22.....	1,800	837	4,070	1,330	970	3,480	3,240	1,380	12,100
23.....	1,700	909	4,170	1,490	1,010	4,060	2,820	1,150	8,760
24.....	1,600	966	4,170	1,590	1,050	4,510	2,640	800	5,700
25.....	1,860	1,010	5,070	1,690	1,590	7,260	2,660	975	7,000
26.....	1,810	1,110	5,420	1,880	4,100	20,800	2,230	975	5,870
27.....	1,720	1,040	4,830	1,620	4,650	20,300	1,880	747	3,790
28.....	1,660	1,150	5,150	1,600	2,000	8,640	1,700	727	3,340
29.....	1,590	1,000	4,290	1,980	2,430	s 14,600	1,540	756	3,140
30.....	2,050	2,050	11,300	3,330	7,400	66,500	1,480	547	2,190
31.....	--	--	--	3,100	10,400	87,000	--	--	--
Total.	56,500	--	231,140	51,470	--	436,660	127,820	--	1,275,890

	July			August			September		
1.....	1,490	525	2,110	948	11,300	28,900	771	320	666
2.....	1,590	748	3,210	757	2,750	5,620	743	260	522
3.....	1,540	432	1,800	860	1,520	3,530	771	370	770
4.....	1,400	--	e 1,600	1,560	1,920	8,090	964	250	651
5.....	1,250	443	1,500	1,270	2,300	7,890	940	435	1,100
6.....	1,240	459	1,540	1,120	2,380	7,200	964	200	521
7.....	1,200	547	1,770	1,010	820	2,240	998	490	1,320
8.....	1,120	475	1,440	932	620	1,560	1,050	680	1,930
9.....	1,010	344	938	916	490	1,210	1,030	675	1,880
10.....	924	322	803	916	480	1,190	1,010	570	1,550
11.....	892	329	792	948	520	1,330	998	640	1,720
12.....	836	292	659	916	550	1,360	1,020	555	1,530
13.....	860	306	711	844	710	1,620	998	354	954
14.....	916	223	552	764	400	825	1,030	341	948
15.....	1,010	217	592	736	280	556	980	342	905
16.....	1,060	266	761	757	--	e 700	964	324	843
17.....	924	309	771	844	430	980	998	270	728
18.....	729	365	718	806	--	e 800	998	420	1,130
19.....	757	261	533	722	--	e 500	1,020	310	854
20.....	799	245	529	674	180	328	1,020	416	1,150
21.....	799	254	548	650	175	307	1,010	304	829
22.....	844	191	435	626	205	346	1,050	314	890
23.....	806	166	361	662	275	492	1,140	372	1,150
24.....	771	140	291	662	170	304	1,140	470	1,450
25.....	729	154	303	662	325	581	1,150	422	1,310
26.....	750	212	429	638	165	284	1,160	491	1,540
27.....	729	160	315	620	125	209	1,180	485	1,550
28.....	687	135	250	644	300	522	1,260	540	1,840
29.....	674	156	284	656	340	602	1,260	--	e 2,200
30.....	729	234	461	687	240	445	1,260	770	2,620
31.....	1,650	12,100	s 48,700	736	250	497	--	--	--
Total.	30,715	--	75,706	25,543	--	81,018	30,877	--	37,051

Total discharge for year (cfs-days) 635,585
Total load for year (tons) 2,826,190

e Estimated.
s Computed by subdividing day.

BIGHORN RIVER AT KANE, WYO.--Continued

Particle-size analyses of suspended sediment, October 1952 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	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. 14, 1952....	12:25 p. m.	1,480	48	430	1,380		14	15	20	24	29	40	--	--	--		BWCM
Nov. 5	4:10 p. m.	1,490	41	336	--		--		--		15	31	86	94	98	100	S
Dec. 5	2:20 p. m.	1,430	35	812	--		--		--		15	32	82	98	100		S
Mar. 5, 1953....	11:40 a. m.	2,330	36	1,200	2,410		7		11		35	64	92	99	100		SPWCM
Mar. 11	1:25 p. m.	3,050	46	4,240	3,170		2		66		79	92	98	100	--		SPN
Mar. 11.....	1:25 p. m.	3,050	46	4,240	4,310		49		63		79	92	98	100	--		SPWCM
Mar. 31	1:35 p. m.	2,350	--	1,220	1,720		16		23		53	81	98	100	--		SPWCM
Apr. 8	11:20 a. m.	2,630	40	2,270	2,230		4		44		62	--	--	--	--		SPN
Apr. 8.....	11:20 a. m.	2,630	40	2,270	1,770		29		40		62	--	--	--	--		SPWCM
Apr. 15	11:10 a. m.	2,280	42	1,320	1,290		13		18		32	56	87	97	100		SPWCM
May 11	1:35 p. m.	2,120	--	3,610	3,150		0		66		79	--	--	--	--		SPN
May 11	1:35 p. m.	2,120	--	3,610	4,120		51		67		79	--	--	--	--		SPWCM
May 30	1:10 p. m.	3,870	--	6,680	6,240		2		45		82	93	98	99	100		SPN
May 30	1:10 p. m.	3,870	--	6,680	2,080		28		49		82	93	98	99	100		SPWCM
June 3	3:35 p. m.	3,480	--	2,810	2,660		6		24		62	81	95	99	100		SPN
June 3	3:35 p. m.	3,480	--	2,810	2,430		22		33		62	81	95	99	100		SPWCM
June 13	4:40 p. m.	8,150	65	4,180	3,340		10		40		77	91	98	99	100		SPN
June 13	4:40 p. m.	8,150	65	4,180	3,500		27		42		77	91	98	99	100		SPWCM
June 15	2:00 p. m.	9,260	64	4,470	3,620		8		43		79	89	97	99	100		SPN
June 15	2:00 p. m.	9,260	64	4,470	4,730		31		48		79	89	97	99	100		SPWCM
July 31	10:20 a. m.	1,850	78	8,900	5,740		0		90		93	--	--	--	--		SPN
July 31	10:20 a. m.	1,850	78	8,900	5,520		69		87		93	--	--	--	--		SPWCM
Aug. 4	12:30 p. m.	1,700	74	2,460	3,260		4		69		84	--	--	--	--		SPN
Aug. 4	12:30 p. m.	1,700	74	2,460	3,210		48		70		84	--	--	--	--		SPWCM
Aug. 20	10:45 a. m.	674	77	205	--		--		--		42	--	--	--	--		S

YELLOWSTONE RIVER BASIN--Continued

SHOSHONE RIVER BELOW CODY, WYO.

LOCATION.--At bridge on State Highway 14, 1½ miles downstream from Sage Creek, 1½ miles upstream from Corbett Dam, and 6 miles northeast of Coy, Park County.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to July 1953 (discontinued).
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, November 1952 to July 1953

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. 14, 1952				256	131	389		278	1,650	55							1,180	952	42	4.9	3,210	7.7	0.035
Dec. 5				85	20	51		240	190	8.0							295	98	27	1.3	743	7.7	.005
Jan. 6, 1953				142	42	108		283	470	29				992	1.35		528	296	31	2.0	1,350	8.1	.031
Feb. 3				76	19	45		229	160	7.0							266	78	27	1.2	677	7.9	.000
Mar. 3				131	37	84		338	348	15							478	201	28	1.7	1,170	7.5	.035
Mar. 31				126	30	63		343	265	12							436	155	24	1.3	1,030	7.7	.001
May 4				98	39	117		213	440	18							403	228	39	2.5	1,210	7.6	.001
June 2				59	14	37		161	122	6.0							204	56	28	1.1	545	7.6	.000
July 9				36	8.0	21		106	73	3.5							123	36	27	.8	330	6.9	.000

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.

LOCATION.--At gaging station, 200 feet downstream from bridge on U. S. Highway 310, 1½ miles upstream from mouth, and 3 miles west of Lovell, Big Horn County. Prior to Mar. 25, 1953, at site 400 feet upstream.
RECORDS AVAILABLE.--Water temperatures: December 1952 to June 1953 (discontinued).
Sediment records: April 1951 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Water temperatures (December to June): Minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 9,830 ppm Apr. 20; minimum daily, not determined.
Sediment loads: Maximum daily, 6,840 tons May 29; minimum daily, not determined.
EXTREMES, 1951-53.--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. 23 to Jan. 30, Feb. 10-26, Mar. 2-5. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, December 1952 to July 1953

Date of collection	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					
Dec. 16, 1952	a 21			279	209	843		378	2,890	49			0.57				1,550	1,240	54	9.3	5,240	7.6	
Jan. 7, 1953	a 20			333	227	875		476	3,080	50			.58				1,760	1,370	52	9.1	5,550	8.0	
Apr. 1	19			281	209	904		358	3,030	57			.55				1,560	1,270	56	10	5,550	7.5	
July 8	157			117	61	224		222	750	17			.24				542	360	47	4.2	1,830	7.7	

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Temperature (°F) of water, December 1952 to June 1953
(Once-daily measurement between 6 p. m. and 8 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	--		--	a37	52	62			
2			--	--		--	47	53	60			
3			--	--	a37	a32	50	50	57			
4			a32	--		--	55	60	39			
5			--	--		--	53	a47	--			
6			--	--		--	46	a53	42			
7			--	a32		--	a41	55	42			
8			--	--		--	42	50	50			
9			--	--		--	40	--	--			
10			--	--		--	43	47	64			
11			--	--		46	46	a43	a65			
12			--	--		46	45	a37	66			
13			--	--		38	46	a39	--			
14			--	--		a40	a36	55	a60			
15			--	--		43	48	56	--			
16			--	--		47	48	58	--			
17			--	--		39	43	a53	60			
18			--	--		40	44	54	65			
19			--	--		34	40	60	a56			
20			--	a32		43	53	53	a60			
21			--	--		a42	a45	--	60			
22			--	--		41	60	53	60			
23			--	--		46	a60	54	60			
24			--	--		52	50	48	59			
25			--	--		51	54	a43	61			
26			--	--		53	56	--	--			
27			--	--		55	a50	--	60			
28			--	--		--	50	--	64			
29			--	--		a45	a51	--	a65			
30			--	--		40	53	--	a66			
31			--	--		51	--	--	--			
Average			b32	b32	--	--	48	--	58			

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

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Suspended sediment, October 1952 to June 1953

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	171	--	e320	97			21	--	
2	182	659	324	94			22	--	
3	179	765	370	91	268	67	24	--	
4	177	504	241	91			25	170	
5	188	540	274	87			25	--	
6	196	648	343	86			25	171	
7	204	684	377	86			25	--	
8	200	648	350	84			25	--	
9	210	747	424	79	--	e60	25	--	
10	214	1,010	584	78			25	--	
11	210	872	494	82			25	--	
12	202	638	348	87	282	66	25	--	
13	194	516	270	72	--	e45	25	--	
14	190	493	253	52	--	e25	25	--	
15	218	730	430	54	--	e25	25	--	
16	236	1,040	663	56	--	e30	21	--	e10
17	236	981	625	54	--	e25	21	--	
18	234	1,040	657	49	--	e20	21	--	
19	243	1,120	735	54	148	22	21	--	
20	234	882	557	51			21	--	
21	228	783	482	51	--	e15	21	--	
22	206	692	385	42			21	--	
23	131	484	171	35			21	--	
24	108	--	e100	30			21	--	
25	104			25	--	e10	19	--	
26	102			25			17	--	
27	97			20	--	e8	17	--	
28	106	265	72	15	--	e6	17	--	
29	99			15	133	5	18	--	
30	95			20	--	e7	20	--	
31	95			--	--	--	20	--	
Total	5,489	--	10,281	1,762	--	1,069	684	--	310

Day	January			February			March		
1	20			28	--	e20	17	285	13
2	20			24	--	e15	17	--	e15
3	20	--	e10	23	218	14	18	320	16
4	22			23			20	350	19
5	22			21	--	e15	20	330	18
6	15	--	e8	22			26	370	26
7	20	210	11	23	300	19	24	530	34
8	25			20	260	14	22	495	29
9	25			17	200	9	27	710	52
10	25	--	e15	15	238	10	30	860	70
11	25			15	270	11	34	820	75
12	25			20	315	17	30	725	59
13	25			20	450	24	30	860	70
14	20	--	e10	20	405	22	22	630	37
15	15	--	e8	20	220	12	23	680	42
16	15			23	275	17	24	690	45
17	18	--	e10	23	395	25	24	595	39
18	22			23	300	19	20	375	20
19	22			18	200	10	22	575	34
20	22	210	12	15	225	9	25	485	33
21	22			15	250	10	20	325	18
22	22			20	235	13	20	370	20
23	22			20	--	e15	19	375	19
24	25			25	250	17	20	350	19
25	25	--	e15	25	250	17	22	215	13
26	25			30	270	22	22	180	11
27	22			34	475	44	21	140	8
28	20			25	550	37	23	170	a11
29	20			--	--	--	22	145	9
30	24			--	--	--	22	140	8
31	29	--	e20	--	--	--	20	120	6
Total	679	--	399	607	--	487	706	--	888

e Estimated.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

SAGE CREEK NEAR LOVELL, WYO.--Continued

Suspended sediment, October 1952 to June 1953--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	19			95	2,690	690	220	4,550	2,700
2	18			76	1,290	265	271	6,100	4,460
3	18			77	1,490	310	249	4,690	3,150
4	19			82	1,440	319	236	3,560	2,270
5	19	59	3	84	1,480	336	247	3,840	2,560
6	19			79	1,450	309	266	4,290	3,080
7	20			79	1,580	337	271	5,130	3,750
8	22			90	2,110	513	234	3,560	2,250
9	33	1,040	s117	123	2,200	a750	218	--	e1,500
10	38	1,940	s216	139	2,810	1,050	202	1,900	1,040
11	21	261	15	155	2,820	1,180	188	2,280	1,160
12	30	818	s94	157	2,760	1,170	155	1,980	829
13	37	2,160	s228	190	3,670	1,880	146	--	e700
14	21	504	29	180	3,470	1,690	146	1,560	615
15	20	559	s32	171	3,040	1,400	182	4,210	s2,280
16	33	1,780	159	169	3,360	1,530	158	1,650	704
17	38	1,480	152	162	2,350	1,030	150	1,940	786
18	53	4,020	s670	158	2,080	887	133	2,000	718
19	66	6,130	s1,670	158	1,910	815	130	1,900	667
20	125	9,830	3,320	150	1,580	640	133	2,120	761
21	128	8,640	2,990	151	1,500	a600	143	1,660	641
22	118	7,120	2,270	144	1,160	451	153	1,760	727
23	104	4,290	1,200	141	1,530	582	141	1,440	548
24	110	4,510	1,340	166	2,330	1,040	131	1,180	417
25	104	2,850	800	166	2,440	1,090	148	1,200	a480
26	102	2,730	752	151	2,310	942	151	1,450	591
27	111	2,620	785	141	2,070	788	160	1,380	596
28	106	2,210	633	157	2,180	924	179	1,450	701
29	111	2,680	803	266	8,110	s6,840	173	1,470	687
30	108	2,510	732	238	9,660	6,210	173	1,360	635
31	--	--	--	206	4,290	2,390	--	--	--
Total	1,771	--	19,031	4,501	--	38,958	5,487	--	42,003

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs-days) 21,686
Total load for period Oct. 1, 1952 to June 30, 1953 (tons) 113,426

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

SAGE CREEK NEAR LOVELL, WYO.--Continued

Particle-size analyses of suspended sediment, March to July 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	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, 1953...	10:50 a.m.	32	39	1,160	3,410		72		95		100	--	--				SPWCM
Apr. 9.....	7:00 p.m.	39	40	1,600	1,300	64	75		97	98	99	100	--	--			BWCM
Apr. 29.....	2:45 p.m.	116	--	3,030	5,220		32		45		70	90	99	100			SPWCM
May 11	11:30 a.m.	167	--	4,200	3,480		3		29		68	87	98	100			SPN
May 11.....	11:30 a.m.	167	--	f 4,200	3,810		26		38		68	87	98	100			SPWCM
May 30	10:40 a.m.	258	--	8,900	6,740		0		43		80	93	99	100			SPN
May 30	10:40 a.m.	258	--	8,900	6,960		43		60		80	93	99	100			SPWCM
June 2	2:40 p.m.	284	--	6,910	4,310		36		51		81	93	99	100			SPWCM
June 3	11:40 a.m.	266	--	4,590	4,200		1		32		72	90	99	100			SPN
June 3	11:40 a.m.	266	--	4,590	2,980		31		45		72	90	99	100			SPWCM
June 15	3:30 p.m.	226	--	5,950	3,280		41		56		82	--	--	--			SPWCM
July 1.....	11:50 a.m.	171	72	1,510	3,080		30		44		68	87	99	100			SPWCM

YELLOWSTONE RIVER BASIN--Continued

SHOSHONE RIVER AT KANE, WYO.

LOCATION.--At bridge on county road, three-quarters of a mile upstream from mouth and 1 mile north of Kane, Big Horn County.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to June 1953 (discontinued).
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses, in parts per million, October 1952 to June 1953

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. 3, 1952				85	31	139		214	433	12							340	165	47	3.3	1,170	8.1	0.002
Dec. 5				71	47	119		219	410	15							369	189	41	2.7	1,170	7.6	.031
Jan. 6, 1953				91	59	139		302	478	18				994	1.35		468	220	39	2.8	1,370	8.1	.027
Feb. 3				108	37	139		266	463	16							420	202	42	3.0	1,290	7.7	.000
Mar. 3				159	56	210		354	728	25							627	337	42	3.7	1,900	7.8	.000
Mar. 31				128	50	186		293	635	22							527	287	43	3.5	1,660	7.7	.016
May 4				114	44	181		260	595	18							465	252	46	3.6	1,540	7.7	.001
June 2				88	31	140		219	438	13							349	169	47	3.3	1,210	7.7	.001

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 1953.
Water temperatures: April 1949 to September 1951, August 1952 to September 1953.
Sediment records: July 1947 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 908 ppm Sept. 1-30; minimum, 390 ppm June 13-20.
Hardness: Maximum, 405 ppm Jan. 3-9; minimum, 209 ppm June 13-20.
Specific conductance: Maximum daily, 1,300 micromhos Sept. 21, 22; minimum daily, 515 micromhos June 15.
Water temperatures: Maximum, 89°F Aug. 7; minimum, freezing point Dec. 2, Jan. 6, Mar. 3 and probably on several other days during December to March.
Sediment concentrations: Maximum daily, 6,550 ppm June 2; minimum daily, not determined.
Sediment loads: Maximum daily, 164,000 tons June 16; minimum daily, not determined.
EXTREMES, 1947-53.--Dissolved solids (1951-53): Maximum, 908 ppm Sept. 1-30, 1953; minimum, 304 ppm June 23, 1951.
Hardness (1951-53): Maximum, 432 ppm Feb. 1-10, 1951; minimum, 151 ppm June 23, 1951.
Specific conductance (1951-53): Maximum daily, 1,300 micromhos Sept. 21, 22, 1953; minimum daily, 384 micromhos June 20, 1951.
Water temperatures: (1949-51, 1952-53): Maximum, 89°F Aug. 7, 1953; minimum, freezing point on many days during winter months.
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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952	2,885			90	32	113		218		393	15		1.8	0.15	778	1.06	6,060	355	176	40	2.6	1,100	7.9
Nov. 1-30	2,860			99	34	114		240		413	17		1.9	.16	846	1.15	6,530	386	189	38	2.5	1,170	7.8
Jan. 3-9, 1953	2,686			104	35	108		262		388	18		2.7	.18	830	1.13	6,020	405	190	36	2.3	1,150	7.9
Jan. 10-12	3,333			91	29	88		224		333	15		2.5	.13	710	.97	6,390	348	164	35	2.0	1,000	7.9
Jan. 13-19	3,036			92	34	99		239		355	16		3.4	.16	770	1.05	6,310	368	172	36	2.2	1,090	7.7
Jan. 20 - Feb. 4	2,734			91	32	96		232		343	15		3.4	.14	744	1.01	5,490	358	168	37	2.2	1,050	7.9
Feb. 5-28	2,886			93	32	102		234		365	17		3.1	.14	768	1.04	5,980	362	170	37	2.3	1,080	7.9
Mar. 1-31	2,873			90	32	106		220		375	17		2.4	.14	800	1.09	6,210	357	177	39	2.4	1,090	7.9
Apr. 1-30	2,598			93	32	108		228		380	18		3.2	.16	802	1.09	5,630	363	176	38	2.5	1,130	7.9
May 1-31	2,616			87	33	112		216		385	16		2.4	.16	786	1.07	5,550	351	174	40	2.6	1,110	7.7

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				
June 1-12, 1953	5,533			75	24	83		189		278	10		3.0	0.06	604	.82	9,020	287	132	39	2.1	868	7.1
June 13-20	9,673			58	16	42		149		159	5.5		3.4	.03	390	.53	10,190	209	87	30	1.3	574	7.3
June 21 - July 9	3,458			62	22	66		157		225	8.5		1.7	.06	504	.69	4,710	244	115	37	1.8	744	7.4
July 10-31	1,379			80	35	122		173		440	15		1.3	.14	814	1.11	3,030	344	202	43	2.9	1,140	7.2
Aug. 1-31	1,879			96	30	136		204		460	17		2.3	.20	874	1.19	4,430	364	197	44	3.1	1,230	7.5
Sept. 1-30	2,013			97	34	138		212		470	18		1.2	.22	908	1.23	4,940	380	206	44	3.1	1,260	7.6
Weighted average a	2,846			86	30	102		209		357	15		2.4	0.14	739	1.01	5,080	338	167	39	2.4	1,040	--
Weighted average b	2,803			89	30	102		213		359	15		2.5	0.14	746	1.01	5,050	343	168	39	2.4	1,050	--

a Represents 92 percent of runoff for water year October 1952 to September 1953.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Temperature (°F) of water, August 1952 to September 1953--Continued
[Twice-daily measurements between 7 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	57		46				--	--	--	a35	--	--	45	--	--	51	62	68	71	76	--	a79	69	78
2	55		40			a32	--	--	--	a35	--	--	43	--	49	50	61	68	69	--	--	--	--	60
3	56		40				--	--	a35	--	a32	--	43	--	46	52	60	58	70	80	69	72	60	61
4	50		40				--	--	--	a36	34	--	44	--	50	60	55	63	70	77	65	72	59	65
5	46		46				--	--	35	--	35	--	42	--	53	63	63	62	70	77	69	72	59	65
6	--		39				--	a32	a35	--	--	--	45	--	57	69	56	64	70	78	69	74	62	70
7	--		38	a44			--	--	35	--	37	--	44	--	62	--	59	61	72	--	68	89	65	73
8	--		37				--	--	35	--	a40	--	40	40	60	64	59	68	69	a73	70	75	66	70
9	--		37				a--	--	--	--	34	--	40	41	63	61	62	70	72	--	72	77	67	74
10	--		35				--	--	--	37	34	--	40	41	48	49	65	72	76	--	69	68	66	74
11	--		39				--	--	--	33	42	36	37	--	41	43	66	74	76	--	65	74	66	69
12	--		36				--	--	--	--	40	--	39	--	40	45	70	75	76	--	66	76	66	74
13	--		36				--	--	34	--	--	40	39	--	44	46	71	78	76	--	69	76	68	72
14	--		36				--	--	--	a35	37	39	41	41	45	52	69	70	77	--	69	72	65	79
15	43		35				--	--	--	34	36	44	40	45	44	55	67	69	80	84	70	80	69	70
16	46		38				--	--	34	--	39	49	40	42	--	65	--	70	72	80	72	78	64	69
17	44		39				--	--	--	a34	36	40	41	44	54	60	68	72	72	86	72	80	61	64
18	45		a37				--	--	a34	--	37	43	41	45	55	65	70	73	76	86	71	79	60	--
19	46		36				--	--	--	--	38	47	43	48	59	60	65	62	77	80	74	80	60	62
20	--		a38				--	a34	--	--	40	44	43	53	56	56	60	65	76	82	72	81	56	59
21	--		a36				--	a33	--	--	--	--	56	56	53	48	62	70	76	79	75	80	--	59
22	46		35				--	a33	--	36	38	41	65	59	51	60	65	77	70	79	73	80	56	65
23	--		--				34	--	--	33	--	44	55	55	55	61	68	--	73	79	74	80	60	60
24	47		a40				--	--	38	--	37	--	53	55	56	--	65	66	74	79	75	79	57	62
25	48		--				--	--	36	--	40	45	53	--	54	62	62	69	71	78	69	--	54	61
26	--		--				--	--	--	a36	44	--	50	--	58	--	66	71	67	79	69	76	54	65
27	42		--				--	--	--	a37	45	--	56	--	65	68	65	72	70	79	68	75	50	63
28	42		--				--	a34	a34	--	48	--	55	--	64	62	66	75	75	80	72	72	55	64
29	42		--				--	a34	--	--	46	--	54	--	56	62	67	76	--	--	69	78	55	60
30	50		--				--	a34	--	--	44	--	51	--	57	63	71	--	--	--	70	--	55	a58
31	--		--				--	--	--	--	45	a49	--	--	57	68	--	--	78	80	71	--	--	--
Average	--	--	--	--	--	--	--	--	--	--	39	--	46	--	54	58	64	69	73	--	70	77	60	66

a Reading obtained between 10 a.m. and 4 p.m.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Temperature (°F) of water, August 1952 to September 1953
(Twice-daily measurements between 7 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.
1																					--		60	
2																					--		58	
3																					--		62	
4																					--		68	
5																					--		65	
6																					70		64	
7																					71		66	
8																					68		64	
9																					69		65	
10																					69		66	
11																					--		67	
12																					65		66	
13																					67		61	
14																					66		66	
15																					68		56	
16																					67		59	
17																					70		59	
18																					70		60	
19																					70		60	
20																					69		58	
21																					70		55	
22																					70		56	
23																					72		66	
24																					72		58	
25																					71		57	
26																					--	75	58	
27																					66		60	
28																					68		59	
29																					69		56	
30																					65		57	
31																					66		--	
Average																					--	--	61	--

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	2,400	260	1,680	2,780	198	1,490	2,210		e 400
2.....	2,430	283	1,860	2,700	247	1,800	2,800	62	469
3.....	2,460	276	1,830	2,680	208	1,500	3,150		e 1,000
4.....	2,500	266	1,800	2,600	244	1,710	3,150		
5.....	2,520	247	1,680	2,700	208	1,520	2,800		
6.....	2,620	273	1,930	2,830	153	1,170	2,350		
7.....	2,680	390	2,820	2,860	202	1,560	2,400		
8.....	2,730	387	2,850	2,920	257	2,030	2,500		
9.....	2,760	325	2,420	3,020	260	2,120	2,600		
10.....	2,800	309	2,340	3,040	280	2,300	2,400		
11.....	2,810	224	1,700	3,040	380	3,120	2,400		
12.....	2,860	257	1,980	3,000	234	1,900	2,500		
13.....	2,930	276	2,180	2,990	370	2,990	2,500		e 1,500
14.....	3,020	312	2,540	2,990	315	2,540	2,500		
15.....	3,060	354	2,920	3,000	250	2,020	2,600		
16.....	3,110	413	3,470	3,110	208	1,750	2,500		
17.....	3,150	416	3,540	3,020	169	1,380	2,500		
18.....	3,130	292	2,470	2,970	169	1,360	2,600		
19.....	3,060	370	3,060	2,950	234	1,860	2,500		
20.....	3,080	341	2,840	3,130	228	1,930	2,400		
21.....	3,080	416	3,460	3,080	211	1,750	2,500		
22.....	3,060	325	2,690	3,040	156	1,280	2,500		
23.....	3,110	358	3,010	3,020	72	590	2,300		
24.....	3,060	276	2,280	3,020	65	530	2,100		e 1,000
25.....	2,990	260	2,100	2,860	214	1,650	1,900		e 600
26.....	2,990	169	1,360	2,810	240	1,820	1,800		
27.....	3,020	221	1,800	2,700	--	e 1,000	1,700		
28.....	3,020	214	1,740	2,520	--	e 500	1,800		e 300
29.....	3,060	270	2,230	2,120	--	e 400	1,800		
30.....	2,970	254	2,040	2,300	--	e 400	1,900		
31.....	2,950	188	1,500	--	--	--	2,100		e 500
Total.	89,420	--	72,120	85,800	--	47,970	73,760		35,469

Day	January			February			March		
1.....	2,200	--	e 600	2,700	530	3,860	2,610	870	6,130
2.....	2,400	--	e 750	2,700	1,090	7,950	2,580	740	5,150
3.....	2,600	--	e 900	2,750	1,360	10,100	2,590	780	5,450
4.....	2,700	--	e 1,000	2,800	1,790	13,500	2,350	830	5,270
5.....	2,650	--	e 800	2,990	1,430	11,500	2,740	975	7,210
6.....	2,600	86	604	2,990	870	7,020	2,940	810	6,430
7.....	2,500	--	e 700	3,340	1,130	10,200	2,970	760	6,090
8.....	2,750	225	1,670	3,440	1,340	12,400	2,990	560	4,520
9.....	3,000	370	3,000	3,480	1,500	14,100	2,970	750	6,010
10.....	3,250	210	1,840	3,090	1,260	10,500	3,310	1,030	9,210
11.....	3,350	200	1,810	2,760	940	7,000	3,610	1,910	18,600
12.....	3,400	200	1,840	2,610	975	6,870	3,630	3,200	31,400
13.....	3,350	125	1,130	2,810	950	7,210	3,730	3,420	34,400
14.....	3,200	105	907	3,250	1,140	10,000	3,480	3,120	29,300
15.....	3,100	125	1,050	3,360	1,200	10,900	3,160	2,740	23,400
16.....	3,100	110	921	2,830	930	7,110	3,080	1,710	14,200
17.....	2,900	160	1,250	3,080	1,160	9,650	2,950	1,160	9,240
18.....	2,800	440	3,330	2,950	775	6,170	2,880	998	7,760
19.....	2,800	365	2,760	3,100	640	5,360	2,830	836	6,390
20.....	2,800	165	1,250	2,650	565	4,040	2,830	652	4,980
21.....	2,700	140	1,020	2,420	765	5,000	2,680	698	5,050
22.....	2,600	180	1,260	2,470	845	5,640	2,860	585	4,520
23.....	2,750	235	1,740	2,390	740	4,780	2,770	572	4,280
24.....	2,750	240	1,780	2,580	775	5,400	2,490	450	3,030
25.....	2,750	250	1,860	2,580	790	5,500	2,630	357	2,530
26.....	2,700	250	1,820	2,590	810	5,660	2,510	298	2,020
27.....	2,650	150	1,070	2,590	710	4,960	2,540	374	2,560
28.....	2,800	220	1,660	2,920	840	6,620	2,680	412	2,980
29.....	2,850	375	2,890	--	--	--	2,490	416	2,800
30.....	2,750	380	2,820	--	--	--	2,590	408	2,850
31.....	2,700	260	1,900	--	--	--	2,580	404	2,810
Total.	87,450	--	47,932	80,220	--	219,000	89,050	--	276,570

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	2,580	442	3,080	2,680	684	4,950	5,330	4,670	67,200
2.....	2,540	463	3,180	2,770	860	6,430	5,050	6,550	89,300
3.....	2,630	382	2,710	2,540	2,080	14,300	5,410	3,450	50,400
4.....	2,590	370	2,590	2,300	4,900	30,400	5,580	2,170	32,700
5.....	2,470	395	2,630	2,180	4,000	23,500	5,640	2,000	30,500
6.....	2,510	404	2,740	2,090	1,480	8,350	5,190	1,750	24,500
7.....	2,580	459	3,200	1,980	820	4,380	5,470	1,580	23,300
8.....	2,810	442	3,350	1,910	650	3,350	5,160	1,480	20,600
9.....	3,140	700	5,930	1,910	580	2,990	5,360	1,500	21,700
10.....	3,270	1,730	15,300	2,090	610	3,440	5,970	2,300	37,100
11.....	2,860	3,440	26,600	2,470	800	5,340	5,240	3,400	48,100
12.....	2,830	4,400	33,600	3,160	1,300	11,100	6,990	5,460	103,000
13.....	2,670	2,700	19,500	2,990	1,780	14,400	8,560	5,150	119,000
14.....	2,650	1,460	10,400	3,040	3,270	26,800	9,670	4,810	126,000
15.....	2,520	1,010	6,870	2,970	2,500	20,000	10,600	4,600	132,000
16.....	2,700	878	6,400	2,940	1,560	12,400	12,000	5,060	164,000
17.....	2,630	1,060	7,530	2,700	1,090	7,950	11,600	4,070	127,000
18.....	2,540	824	5,650	2,490	1,030	6,920	8,780	3,300	78,200
19.....	2,580	639	4,450	2,340	720	4,550	8,150	2,420	53,300
20.....	2,590	630	4,410	2,300	620	3,850	8,020	2,020	43,700
21.....	2,590	702	4,910	2,460	680	4,520	7,510	1,850	37,500
22.....	2,560	616	4,260	2,350	570	3,620	6,620	1,780	31,800
23.....	2,400	742	4,810	2,340	560	3,540	5,130	1,320	18,300
24.....	2,320	891	5,580	2,300	500	3,100	4,440	1,240	14,900
25.....	2,420	1,220	7,970	2,590	520	3,640	4,110	930	10,300
26.....	2,560	1,200	8,290	2,510	600	4,070	4,080	850	9,360
27.....	2,400	792	5,130	2,630	700	4,970	3,890	910	9,560
28.....	2,230	540	3,250	2,440	580	3,820	3,580	808	7,810
29.....	2,390	738	4,760	2,700	2,710	s 20,800	3,280	801	7,090
30.....	2,370	522	3,340	3,590	2,690	26,100	2,900	738	5,780
31.....	--	--	--	5,330	5,860	s 95,500	--	--	--
Total.	77,930	--	222,420	81,090	--	389,080	189,310	--	1,644,000

Day	July			August			September		
1.....	2,760	1,320	9,840	1,860	761	s 4,350	1,640	180	797
2.....	2,400	558	3,620	2,030	620	3,400	1,790	232	1,120
3.....	2,290	450	2,780	1,970	3,300	17,600	1,920	348	1,800
4.....	2,520	468	3,180	2,210	6,140	36,600	2,070	292	1,630
5.....	2,470	405	2,700	2,650	2,010	14,400	2,230	392	2,360
6.....	2,370	360	2,300	2,530	1,310	8,950	2,240	328	1,980
7.....	2,070	270	1,510	2,320	1,150	7,200	2,230	288	1,730
8.....	1,760	243	1,150	2,230	1,360	8,190	2,210	304	1,810
9.....	1,530	198	818	2,190	1,080	6,390	2,200	276	1,640
10.....	1,340	184	666	2,150	684	3,970	2,160	640	3,730
11.....	1,270	144	494	2,150	608	3,530	2,070	208	1,160
12.....	1,180	135	430	2,190	450	2,660	2,000	208	1,120
13.....	1,190	122	392	2,150	405	2,350	2,030	200	1,100
14.....	1,170	158	499	2,040	340	1,870	1,900	176	903
15.....	1,130	165	503	1,920	285	1,480	1,840	140	696
16.....	1,130	150	458	1,820	212	1,040	1,790	136	657
17.....	1,160	160	501	1,760	208	988	1,800	132	642
18.....	1,380	260	969	1,760	188	893	1,830	172	850
19.....	1,840	472	2,340	1,750	232	1,100	1,860	160	812
20.....	1,920	357	1,850	1,640	148	655	1,900	308	1,580
21.....	1,760	399	1,900	1,560	100	421	2,000	328	1,770
22.....	1,600	352	1,520	1,480	96	384	2,020	220	1,200
23.....	1,450	209	818	1,460	92	363	2,070	264	1,480
24.....	1,310	165	584	1,510	136	554	2,100	216	1,220
25.....	1,300	204	716	1,540	160	665	2,020	192	1,050
26.....	1,280	209	722	1,560	200	842	1,990	164	881
27.....	1,340	242	876	1,530	140	578	2,070	200	1,120
28.....	1,380	264	984	1,500	132	535	2,070	168	939
29.....	1,330	275	988	1,570	184	780	2,150	180	1,040
30.....	1,420	319	1,220	1,590	240	1,030	2,170	216	1,270
31.....	1,460	308	1,210	1,630	196	863	--	--	--
Total.	50,510	--	48,538	58,250	--	134,631	60,390	--	40,087

Total discharge for year (cfs days) 1,023,180
Total load for year (tons) 3,077,817

s Computed by subdividing day.

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Particle-size analyses of suspended sediment, October 1952 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	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. 14, 1952	9:25 a.m.	3,040	--	335	586	--	19	--	24	--	26	42	86	100	--		SPWCM
Nov. 5	11:45 a.m.	2,670	44	207	--	--	--	--	--	--	21	35	96	100	--		S
Feb. 6, 1953	10:50 a.m.	2,990	36	842	1,730	16	23	28	36	42	56	68	97	--	100		BWCM
Mar. 3	11:45 a.m.	2,680	32	756	2,000	23	28	32	39	45	52	59	97	--	100		BWCM
Mar. 13	5:00 p.m.	4,200	40	3,150	1,800	52	62	73	79	83	87	90	98	--	100		BWCM
Mar. 31	2:30 p.m.	2,510	49	380	779	24	34	43	52	57	62	66	95	--	99		BWCM
Apr. 2	9:50 a.m.	2,540	43	436	1,430	23	34	42	51	56	59	65	--	--	--		BWCM
Apr. 11	--	2,990	--	3,950	2,830	--	75	--	90	--	90	--	--	--	--		SPWCM
Apr. 14	2:05 p.m.	2,400	41	1,350	3,380	--	73	--	89	--	90	--	--	--	--		SPWCM
Apr. 15	3:05 p.m.	2,460	44	985	2,560	--	70	--	84	--	88	--	--	--	--		SPWCM
May 4	1:40 p.m.	2,280	56	4,750	3,720	--	85	--	--	--	98	--	--	--	--		SPWCM
May 5	5:55 p.m.	2,100	63	2,740	1,800	--	5	--	88	--	90	91	97	100	--		SPN
May 5	5:55 p.m.	2,100	63	2,740	1,810	--	73	--	87	--	90	91	97	100	--		SPWCM
May 19	8:30 a.m.	2,270	60	614	695	--	68	--	76	--	80	--	--	--	--		SPWCM
May 20	6:50 a.m.	2,280	56	612	1,500	--	8	--	82	--	88	--	--	--	--		SPN
June 2	2:10 p.m.	5,160	--	7,300	4,430	--	3	--	89	--	96	--	--	--	--		SPN
June 2	2:10 p.m.	5,160	--	7,300	5,200	--	59	--	78	--	96	--	--	--	--		SPWCM
June 4	10:25 a.m.	5,500	55	2,080	5,260	--	41	--	50	--	83	--	--	--	--		SPWCM
June 18	9:40 a.m.	8,930	70	3,420	2,160	--	8	--	48	--	81	--	--	--	--		SPN
June 18	9:40 a.m.	8,930	70	3,420	2,260	--	36	--	50	--	81	--	--	--	--		SPWCM
Aug. 3	2:30 p.m.	1,980	--	2,520	3,110	--	2	--	68	--	68	73	81	95	100		SPN
Aug. 3	2:30 p.m.	1,980	--	2,520	3,110	--	56	--	67	--	68	73	81	95	100		SPWCM

TONGUE RIVER NEAR ACME, WYO.

LOCATION.--At gaging station at highway bridge, just upstream from Ash Creek and 3.2 miles northeast of Acme, Sheridan County.
DRAINAGE AREA.--894 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1952 to September 1953.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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. 6, 1952	107	22	0.01	63	46	42		294	0	184	4.5	0.2	0.7	0.11	510	0.69		348	107	21	1.0	768	8.0
Nov. 18	178	--	--	49	41	32		247	0	145	3.5	--	--	--	--	--		290	87	19	.8	634	7.8
Dec. 1	a 165	--	--	69	49	34		334	0	162	4.0	--	--	--	--	--		373	99	17	.8	758	8.0
Jan. 13, 1953	a 172	--	--	61	36	28		262	0	132	4.5	--	--	--	--	--		298	83	17	.7	636	8.1
Feb. 18	a 142	--	--	65	37	31		264	8	142	4.0	--	--	--	--	--		316	86	18	.8	661	8.4
Mar. 2	a 100	--	--	64	38	38		275	0	161	4.5	--	--	--	--	--		316	90	21	.9	685	8.0
Apr. 27	240	--	--	48	29	21		212	0	102	3.0	--	--	--	--	--		238	64	16	.6	529	7.7
May 13	532	9.9	.02	36	18	12		151	0	62	1.0	.6	1.3	.05	224	.30		165	41	14	.4	371	8.1
June 12	3,530	8.9	.06	29	6.9	5.8		106	0	22	.5	.2	3.0	.04	141	.19		101	14	11	.2	225	7.3
July 1	490	--	--	42	18	13		173	0	64	.5	--	--	--	--	--		180	38	14	.4	401	8.0
Aug. 25	73	--	--	58	41	32		266	0	156	3.0	--	--	--	--	--		314	96	18	.8	695	7.7
Sept. 11	90	--	--	59	41	31		273	0	147	3.0	--	--	--	--	--		314	90	17	.7	686	7.7

a Mean daily discharge.

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 1953.
Water temperatures: April 1949 to September 1953.
Sediment records: June 1946 to September 1951.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 968 ppm July 23-30; minimum, 200 ppm June 23-27.
Hardness: Maximum, 556 ppm Nov. 26 to Dec. 5; minimum, 124 ppm May 10-11.
Specific conductance: Maximum daily, 2,280 micromhos July 24; minimum daily, 288 micromhos June 21.
Water temperatures: Maximum, 75°F June 13; minimum, freezing point on many days during November to March.
EXTREMES, 1949-53.--Dissolved solids (1951-53): Maximum, 974 ppm Aug. 30, 1952; minimum, 200 ppm June 23-27, 1953.
Hardness (1951-53): Maximum, 556 ppm Nov. 26 to Dec. 5, 1952; minimum, 96 ppm Mar. 29, 1952.
Specific conductance (1951-53): Maximum daily, 2,280 micromhos July 24, 1953; minimum daily, 288 micromhos, June 21, 1953.
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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952	335			63	48	53		279	0	230	4.0		0.8	0.12	566	0.77	512	353	124	24	1.2	852	7.5
Nov. 1-25	237			75	53	69		311	0	278	5.0		1.0	.14	672	.91	430	405	150	27	1.5	982	8.0
Nov. 26 - Dec. 5	178			98	76	97		430	0	403	7.5		.4	.18	934	1.27	449	556	203	27	1.8	1,310	8.0
Dec. 6-31	207			89	62	70		370	0	325	6.5		.6	--	766	1.04	428	478	175	23	1.4	1,100	8.2
Jan. 1-31, 1953	180			85	57	67		354	0	298	5.5		1.6	.13	718	.98	349	446	156	24	1.4	1,050	8.1
Feb. 1-28	167			75	50	66		318	0	278	5.0		.8	.11	648	.88	292	394	133	26	1.4	965	8.2
Mar. 1-8	150			59	47	66		263	0	256	5.5		.1	.11	586	.80	237	340	124	29	1.6	883	8.2
Mar. 9-10	325			50	34	75		221	8	231	3.0		.8	.12	552	.75	484	266	72	37	2.0	810	8.4
Mar. 11-12	425			46	29	53		213	0	172	3.0		.1	.09	430	.58	493	234	59	32	1.5	671	8.2
Mar. 13-16	395			58	41	59		257	0	221	4.5		.5	.09	534	.73	570	314	103	29	1.4	812	8.2
Mar. 17-28	175			72	53	83		322	0	298	6.0		1.5	.12	698	.95	330	397	133	31	1.8	1,040	8.0
Mar. 29 - Apr. 27	154			67	52	75		301	0	285	5.5		1.5	.12	670	.91	279	382	135	30	1.7	987	8.0
Apr. 28 - May 9	122			63	42	97		290	0	284	5.0		1.8	.14	662	.90	218	329	91	39	2.3	987	8.0
May 10-11	1,122			30	12	114		222	0	190	1.0		2.7	.19	490	.67	1,480	124	0	65	4.5	748	8.0
May 12-24	432			55	36	58		244	0	201	3.5		1.8	.12	496	.67	579	286	86	30	1.5	767	7.7
May 25-26	980			37	14	71		175	8	145	1.0		1.7	.12	402	.55	1,060	150	0	50	2.5	601	8.5
May 27-June 1	654			55	34	46		232	0	171	3.0		2.2	.05	452	.61	798	276	86	27	1.2	707	7.1

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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)	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				
June 2-3, 1953	2,130			59	28	29		221	0	122	2.5		4.7	.04	384	.52	2,210	261	80	19	.8	603	7.2
June 4-14	1,633			40	16	24		156	0	82	.5		2.1	.08	264	.36	1,160	165	37	24	.8	430	7.0
June 15-22	2,514			34	12	18		134	0	56	.5		1.5	.00	212	.29	1,440	133	23	23	.7	339	7.3
June 23-27	1,590			33	13	16		128	0	59	.5		.7	.01	200	.27	859	134	29	21	.6	334	7.5
June 28-July 2	622			42	16	31		170	0	91	2.0		1.8	.05	294	.40	494	172	33	28	1.0	459	7.5
July 3-10	289			43	21	37		184	0	113	2.0		1.2	.07	332	.45	259	192	41	30	1.2	519	7.2
July 11-22	69.9			54	28	62		244	0	175	3.0		.9	.11	462	.63	87	251	51	35	1.7	720	7.6
July 23-30	12.6			80	53	175		430	0	418	11		.7	.19	968	1.32	33	417	64	47	3.7	1,410	7.8
July 31-Aug. 5	35.7			62	32	178		335	0	385	5.5		1.7	.20	876	1.19	84	286	11	56	4.6	1,260	7.6
Aug. 6	156			48	19	67		218	0	154	3.0		3.9	.12	434	.59	183	198	19	42	2.1	639	7.6
Aug. 7-9	26.0			56	27	120		286	0	263	4.0		1.8	.17	648	.88	45	249	14	51	3.3	958	7.7
Aug. 10-20	44.6			61	33	82		284	0	220	3.5		1.0	.13	572	.78	69	287	54	38	2.1	856	7.4
Aug. 21-30	19.4			64	34	149		341	0	325	5.0		2.3	.22	792	1.08	41	300	20	52	3.7	1,150	7.4
Aug. 31-Sept. 30	21.7			67	40	112		329	0	293	5.0		1.3	.24	706	.96	41	332	62	42	2.7	1,050	7.7
Weighted average a	324			54	32	47		b 227	--	170	2.8		1.5	0.08	444	0.60	388	266	80	28	1.3	674	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.
b Includes carbonate as bicarbonate.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 6 a.m. and 9 a.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	53	44	32	32	32	32	41	46	64	72	68	62
2	45	38	32	32	32	32	35	42	66	65	69	60
3	51	35	32	32	32	32	34	43	62	69	63	50
4	45	36	32	32	32	32	38	41	57	66	58	50
5	35	39	32	32	32	32	42	48	55	68	59	49
6	34	34	--	32	32	32	45	54	55	67	63	52
7	37	33	32	32	32	32	42	57	57	67	59	53
8	40	35	32	32	32	32	38	55	58	66	60	58
9	45	32	32	32	32	33	35	53	63	65	62	60
10	44	33	32	32	32	33	34	46	68	69	63	57
11	46	33	32	32	32	32	33	36	68	70	61	53
12	49	32	32	32	32	32	37	33	73	71	58	54
13	47	35	32	32	32	33	38	40	75	69	61	58
14	42	32	32	32	32	32	39	41	74	69	63	52
15	38	33	32	32	32	32	33	46	68	70	60	47
16	43	35	32	32	32	33	34	51	67	69	65	49
17	39	35	32	32	32	34	36	53	69	66	65	58
18	41	34	32	32	32	32	34	50	70	68	66	59
19	42	32	32	32	32	34	37	57	68	68	67	52
20	44	33	32	32	32	34	48	56	63	67	63	54
21	44	32	32	32	32	34	48	50	62	61	65	42
22	44	32	--	32	32	33	51	52	64	59	67	47
23	45	32	32	32	32	32	53	51	68	62	62	56
24	44	37	32	32	32	32	50	56	66	64	64	54
25	45	32	32	32	32	33	45	53	60	65	65	42
26	42	32	32	32	32	40	47	53	63	62	57	46
27	39	32	32	32	32	44	50	57	65	67	61	49
28	35	32	32	32	32	46	46	64	66	67	62	48
29	36	32	32	32	--	50	45	62	69	65	61	47
30	42	32	32	32	--	40	38	56	71	67	63	42
31	41	--	32	32	--	42	--	59	--	66	67	--
Average	42	34	a32	32	32	35	41	50	65	67	63	52

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

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 1953 (discontinued).
Water temperatures: April 1951 to September 1953 (discontinued).
Sediment records: May 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 4,650 ppm Nov. 5; minimum, 1,510 ppm July 19.
Hardness: Maximum, 1,620 ppm May 30; minimum, 718 ppm June 6.
Specific conductance: Maximum daily, 5,260 micromhos Nov. 5; minimum daily, 1,880 micromhos July 19.
Water temperatures: Maximum, 86°F July 6; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 76,200 ppm July 16; minimum daily, not determined.
Sediment loads: Maximum daily, 114,000 tons June 15; minimum daily, less than 0.50 ton on many days.
EXTREMES, 1950-53.--Dissolved solids (May 1952 to September 1953): Maximum, 4,650 ppm Nov. 5, 1952; minimum, 1,510 ppm July 19, 1953.
Hardness (May 1952 to September 1953): Maximum, 1,620 ppm May 30, 1953; minimum, 718 ppm June 6, 1953.
Specific conductance (May 1952 to September 1953): Maximum daily, 5,260 micromhos Nov. 5, 1952; minimum daily, 1,880 micromhos July 19, 1953.
Water temperatures (1951-53): Maximum, 90°F July 31, 1951; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 89,400 ppm Sept. 7, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 1,270,000 tons May 22, 1953; 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. Maximum observed sediment concentration during water year, 145,000 ppm June 15. Flow affected by ice Nov. 4, 8-11, Nov. 20 to Jan. 31, Feb. 6 to Mar. 4. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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 $CaCO_3$: Non-carbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1952	9.04	20	0.01	309	81	526	21	130	1,350	522	2.6	14	0.43	3,110	2,910	4.23	75.9	1,110	1,000	50	6.9	4,040	7.3
Nov. 1-4	10.1	24	.02	303	80	544	21	118	1,250	634	3.2	5.3	.43	3,080	2,920	4.19	84.0	1,080	983	52	7.2	4,190	7.4
Nov. 5	14	16	.01	382	138	820	17	284	2,530	312	1.8	56	.46	4,650	4,410	6.32	176	1,520	1,290	54	9.1	5,260	7.3
Nov. 6-8	15.3	34	.01	294	79	364	13	192	1,230	321	1.8	18	.39	2,570	2,450	3.50	106	1,060	903	42	4.9	3,280	7.6
Nov. 9-11.....	17.0	23	.01	322	58	440	16	169	1,240	451	2.4	13	.38	2,820	2,650	3.84	129	1,040	901	47	5.9	3,690	8.0
Nov. 12-21 ...	20.6	35	.01	268	67	322	12	174	1,400	295	1.6	22	.35	2,280	2,210	3.10	127	946	803	42	4.6	2,960	7.9
Nov. 22-30 ...	11.3	26	.01	336	85	470	18	196	1,360	474	2.4	12	.41	3,010	2,880	4.09	91.8	1,190	1,030	46	5.9	3,890	7.8
Dec. 1-31.....	17.8	22	.01	275	73	317	13	192	1,150	286	1.8	13	.28	2,310	2,250	3.14	111	988	831	41	4.4	2,970	8.0
Jan. 1-8, 1953	17.0	22	.01	277	67	328	13	191	1,040	314	1.6	7.5	.28	2,280	2,160	3.10	105	968	811	42	4.6	2,070	7.4
Jan. 9-14.....	31.2	15	.01	203	54	224	8.5	150	825	168	1.3	17	.19	1,660	1,590	2.26	140	728	605	40	3.6	2,210	7.7
Jan. 15-19....	15.4	19	.01	278	71	360	14	185	1,130	322	1.6	19	.32	2,430	2,310	3.30	101	985	833	44	5.0	3,170	7.8
Jan. 20-31....	25.2	16	.01	231	66	280	9.6	182	1,010	204	1.5	23	.24	1,970	1,930	2.68	134	846	697	41	4.2	2,580	7.8
Feb. 1-6	32.5	16	.01	211	58	242	8.6	170	890	157	1.2	23	.22	1,760	1,690	2.39	154	765	626	40	3.8	2,310	7.8
Feb. 7-25.....	27.4	17	.01	266	70	338	12	186	1,090	288	1.6	22	.29	2,330	2,200	3.17	172	952	799	43	4.8	3,010	7.9
Feb. 26-Mar. 8	30.5	15	.00	207	54	247	9.0	166	870	167	1.2	19	.22	1,750	1,670	2.38	144	740	604	42	3.9	2,310	7.9
Mar. 9-13	264	9.9	.01	227	51	272	7.8	133	1,160	42	1.0	11	.18	1,940	1,850	2.64	1,380	778	669	43	4.2	2,380	7.8
Mar. 14-31 ...	47.6	13	.01	236	59	304	8.6	153	1,180	121	1.0	13	.21	2,110	2,010	2.87	271	832	707	44	4.6	2,630	7.7

Apr. 1-29, 1953	31.9	17	.00	232	58	335	10	165	1,120	163	1.2	15	.25	2,140	2,030	2.91	184	818	683	47	5.1	2,710	7.9
Apr. 30-May 6	33.7	18	.00	224	61	332	9.4	178	1,110	150	1.4	14	.28	2,140	2,010	2.91	195	808	662	47	5.1	2,710	7.7
May 7-29	14.9	21	.00	281	81	508	15	182	1,550	295	1.8	24	.43	2,970	2,870	4.04	119	1,040	891	51	6.9	3,710	7.7
May 30	66	24	--	416	140	769	14	478	2,660	90	--	.0	.29	4,610	4,360	6.27	822	1,620	1,230	51	8.3	5,090	7.2
May 31-June 5	19.1	20	.00	316	81	465	16	178	1,480	307	2.2	11	.34	3,120	2,790	4.24	161	1,120	974	47	6.0	3,860	7.4
June 6	249	17	.05	204	51	296	8.0	294	1,010	50	1.8	.2	.25	1,880	1,780	2.56	1,260	718	477	47	4.8	2,300	7.2
June 7-8	132	16	.04	297	70	421	11	176	1,610	88	1.4	5.6	.32	2,760	2,610	3.75	984	1,030	886	47	5.7	3,260	7.7
June 9-14	17.0	20	.01	317	86	516	18	142	1,590	361	2.2	21	.36	3,140	3,000	4.27	144	1,140	1,020	49	6.6	3,920	7.6
June 15	310	20	--	408	99	490	11	386	2,140	30	--	.4	.38	3,540	3,400	4.81	2,960	1,430	1,110	43	5.6	3,850	7.0
June 16	136	22	--	354	88	409	9.4	312	1,750	58	--	.3	.38	3,040	2,850	4.13	1,120	1,240	984	41	5.0	3,400	7.1
June 17-27	23.2	22	--	322	77	488	14	200	1,610	225	2.0	12	.36	3,020	2,870	4.11	189	1,120	956	48	6.3	3,600	6.8
June 28-July 15	6.62	25	.00	297	72	532	24	117	1,270	540	2.6	6.0	.42	2,990	2,830	4.07	53.4	1,040	944	52	7.2	3,990	6.9
July 16	270	19	--	368	106	457	11	388	1,960	41	--	1.5	.39	3,310	3,150	4.50	2,410	1,350	1,030	42	5.4	3,690	7.2
July 17-18	156	19	--	363	79	438	11	208	1,830	113	--	.7	.36	3,060	2,960	4.16	1,290	1,230	1,060	43	5.4	3,470	7.5
July 19	268	19	--	220	44	164	7.9	282	770	32	--	1.0	.25	1,510	1,400	2.05	1,090	730	499	33	2.6	1,880	7.2
July 20-28	11.5	19	.01	298	68	400	18	126	1,290	327	2.2	3.2	.37	2,600	2,490	3.54	80.7	1,020	917	45	5.4	3,280	7.0
July 29	504	22	--	375	91	374	11	500	1,610	55	--	.6	.43	2,920	2,790	3.97	3,970	1,310	900	38	4.5	3,330	7.1
July 30	82.0	18	--	298	55	165	9.3	192	1,030	64	.9	.1	.27	1,910	1,740	2.60	423	970	813	27	2.3	2,150	7.5
July 31-Aug. 4	40.4	18	--	316	61	334	14	157	1,270	221	1.6	4.5	.38	2,450	2,320	3.33	267	1,040	911	41	4.5	3,030	7.2
Aug. 5-31	6.35	26	--	302	70	501	22	141	1,220	544	2.6	1.9	.54	2,900	2,760	3.94	49.7	1,040	924	50	6.8	3,900	7.1
Sept. 1-30	7.99	22	--	303	72	490	22	99	1,250	538	2.6	5.5	.52	2,910	2,750	3.96	62.8	1,050	969	50	6.6	3,870	7.3
Weighted average a	28.7	18	0.01	274	68	357	12	202	1,280	187	1.5	11	0.30	2,430	--	3.30	188	963	797	44	5.0	3,000	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 2 p. m. and 5 p. m. October to March,
between 8 a. m. and 11 a. m. from April to September/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 50	a 44	32	--	--	32	b 40	50	65	74	68	b 68
2	a 50	--	32	31	34	32	40	42	58	70	66	b 58
3	--	44	--	--	35	33	b 50	45	64	72	60	--
4	--	46	--	--	34	32	b 50	48	--	70	62	--
5	--	46	--	--	35	a 34	b 52	--	b 48	70	60	--
6	--	40	--	--	--	40	40	--	54	b 86	64	b 70
7	65	40	--	--	32	44	36	--	60	72	66	66
8	70	38	--	--	32	45	b 46	--	56	70	66	b 68
9	65	38	--	--	--	42	b 48	b 46	--	--	--	60
10	55	40	--	--	--	a 35	b 45	46	68	70	b 60	60
11	68	40	--	--	--	a 40	b 40	44	--	b 72	b 70	--
12	a 58	42	--	34	--	a 40	b 50	--	80	--	62	--
13	60	40	--	34	--	--	b 50	46	b 82	b 82	64	b 75
14	54	43	--	--	--	44	38	48	b 78	b 82	64	--
15	50	a 36	--	--	--	43	40	48	b 67	78	64	--
16	a 42	a 34	--	--	--	46	b 54	--	64	64	b 76	--
17	58	36	--	--	--	42	43	--	65	58	75	--
18	60	40	--	--	--	a 33	40	65	65	66	60	58
19	a 50	38	32	--	--	46	b 56	--	b 64	56	60	62
20	60	--	--	--	--	46	b 60	52	76	66	--	--
21	62	--	--	--	--	a 40	48	50	--	60	60	b 66
22	a 52	32	--	--	--	43	54	56	64	--	--	b 70
23	a 54	--	--	--	--	44	54	48	66	70	b 66	b 68
24	58	--	--	--	--	55	b 48	56	58	72	58	--
25	a 50	a 32	--	34	--	a 40	48	50	56	70	b 64	50
26	56	a 32	--	38	--	54	52	58	60	66	--	b 64
27	a 36	--	--	--	--	60	56	64	66	72	62	b 66
28	60	--	--	--	32	a 42	55	56	70	66	b 70	--
29	55	32	--	34	--	54	48	58	70	64	b 68	50
30	54	a 32	--	34	--	a 42	48	50	66	66	--	b 64
31	50	--	--	32	--	52	--	64	--	68	--	--
Average	56	--	c 32	c 32	c 32	42	48	--	65	70	65	--

a Reading obtained between 8 a. m. and 11 a. m.
b Reading obtained between 2 p. m. and 5 p. m.
c Includes estimated temperature, 32° F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	6.8	42	1	11	140	4	11	192	6
2	6.4	44	1	10	--	e 4	13	--	e 8
3	6.8			9.4	135	3	15	228	9
4	6.8			10	100	3	13	--	e 8
5	6.8	--	e 1	14	366	s 15	14	--	e 7
6	7.1			16	390	17	17	--	e 10
7	7.4			17	425	20	19	--	
8	8.1			13	570	20	20	--	
9	8.1			15	485	20	18	--	
10	8.1			17	670	31	19	292	e 15
11	8.5			19	890	46	20	--	
12	8.5			21	880	s 61	22	--	e 20
13	8.1	61	1	26	895	63	24		
14	11			20	565	31	26	--	e 25
15	11			22	--	e 20	26		
16	8.5			20	240	13	24	--	e 20
17	8.5			21	290	16	20	--	e 10
18	9.7			20	320	17	15	130	5
19	10			18	160	8	16	370	16
20	11			20	130	7	18	--	e 20
21	11	112	3	18	220	11	18	--	e 15
22	11			15	280	11	17	280	13
23	10			10	290	8	16	--	e 10
24	9.3	24	1	12	130	4	15	--	e 8
25	8.9	15	(t)	14	150	6	13	--	e 5
26	9.7			10			15	--	e 8
27	10			9.0			16	--	e 10
28	10			10	--	e 5	17	264	12
29	11	151	4	11			18	--	e 15
30	11			11			20	--	e 20
31	11			--	--	--	16	--	e 15
Total	280.1	--	56	459.4	--	484	551	--	420

	January			February			March		
1	16			34	630	58	25	--	e 80
2	18	--	e 15	36	690	67	20	--	e 40
3	17			36	670	65	22	867	51
4	16	298	13	36	580	56	23	--	e 90
5	15	--	e 10	28	600	45	23	2,220	138
6	13	--	e 5	25	670	45	23	--	e 200
7	16	--	e 15	22	495	29	21	--	e 400
8	25	--	e 25	20	260	14	60	6,700	sa 1,200
9	35	477	45	18	270	13	224	18,100	s 13,500
10	40	--	e 100	15	210	9	300	24,100	s 21,300
11	40	1,490	161	16	--	e 15	351	28,900	s 29,900
12	37	--	e 90	20	--	e 20	258	19,300	13,400
13	20	--	e 30	25	--	e 30	188	12,900	6,550
14	15	--	e 10	30	--	e 40	120	5,400	1,750
15	10	--	e 5	35	--	e 60	85	4,000	918
16	14	--	e 10	35	--	e 80	64	2,900	501
17	16	--	e 15	40	--	e 100	75	3,430	695
18	18	320	16	30	--	e 80	67	3,400	615
19	19			25	--	e 50	43	2,040	237
20	20	--	e 20	20	--	e 30	42	2,700	306
21	20			25	--	e 40	47	1,920	244
22	20			30	--	e 50	40	1,270	137
23	22	--	e 25	35	--	e 70	33	770	69
24	25	--	e 35	40	--	e 90	31	600	50
25	28	614	46	40	--	e 100	31	590	49
26	28	620	47	43	1,240	144	34	1,990	183
27	25	614	41	40	--	e 140	36	3,940	383
28	24	632	41	35	1,420	134	29	1,110	87
29	27	482	35	--	--	--	27	1,000	73
30	30	292	24	--	--	--	27	1,000	73
31	33	452	40	--	--	--	26	850	60
Total	702	--	1,009	834	--	1,674	2,395	--	93,279

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

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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	25	460	31	27	7,870	574	10	9,290	s 280
2	25	400	27	26	6,910	485	8.9	1,530	37
3	25	810	55	31	5,550	465	8.9	750	18
4	24	770	50	45	6,450	784	8.5	350	8
5	23	530	33	31	4,390	367	62	18,000	sa 9,900
6	54	6,510	s 1,500	36	1,580	154	249	60,500	40,600
7	64	7,400	1,280	17	530	24	197	49,000	s 30,100
8	43	6,290	730	13	390	14	67	18,900	s 4,580
9	42	5,300	601	18	2,360	s 140	22	2,800	166
10	45	4,090	497	19	2,750	141	18	770	37
11	45	3,960	481	17	940	43	16	308	13
12	34	3,300	303	18	2,650	129	15	199	8
13	33	3,100	276	16	3,630	157	15	158	6
14	29	3,400	266	16	4,580	198	16	110	5
15	28	1,780	135	15	3,500	142	310	57,100	s 114,000
16	28	1,780	135	13	1,780	62	136	62,000	s 26,700
17	33	1,210	108	12	670	22	50	19,100	s 3,060
18	33	2,010	179	13	730	26	20	7,710	s 612
19	31	2,190	183	13	2,900	102	24	4,100	266
20	31	1,990	167	12	4,700	152	19	720	37
21	29	1,960	153	11	5,720	170	34	18,200	s 2,280
22	29	1,460	114	12	1,700	55	32	34,500	3,090
23	27	830	60	12	1,600	52	24	27,000	1,750
24	25	550	37	18	4,640	226	21	8,600	488
25	24	380	25	14	3,350	127	15	1,180	48
26	23	270	17	13	1,600	56	8.7	330	8
27	23	280	17	14	1,670	63	7.9	230	5
28	23	250	16	13	2,550	90	7.2	136	3
29	27	620	s 51	23	14,700	s 1,040	6.4	95	2
30	40	4,520	s 700	66	75,000	s 16,400	6.4	72	1
31	--	--	--	16	29,400	1,270	--	--	--
Total	965	--	8,227	620	--	23,730	1,434.9	--	238,108

Day	July			August			September		
1	4.8			30	230	19	4.8		
2	5.6			28	360	27	6.4		
3	5.6			46	11,000	sa 2,200	8.7	197	4
4	5.6	22	(t)	58	54,900	8,920	8.7		
5	5.6			21	28,200	1,600	8.7		
6	5.6			7.9	23,800	508	8.7		
7	5.6			4.1	3,280	36	8.7		
8	5.6			4.1	920	10	7.2		
9	7.9	425	sa 13	4.1	300	3	8.7	21	(t)
10	6.4	685	12	5.6			8.7		
11	6.4	120	2	4.8			4.8		
12	7.9	113	2	4.8			4.8		
13	7.9	50	1	4.8			4.8		
14	8.7	25	1	5.6			4.8		
15	10	3,600	sa 200	6.4			5.6	150	2
16	270	76,200	s 90,600	6.4	139	2	6.4		
17	53	30,800	4,410	6.4			10	1,700	sa 65
18	259	31,100	s 63,300				12	1,560	51
19	268	33,800	s 36,500	5.6			10	390	11
20	41	4,130	s 504	6.4			9.5		
21	21	370	21	5.6			8.7	132	3
22	9.5	120	3	4.8			9.5		
23	7.9	80	2	11	16,500	sa 640	8.7		
24	5.6			7.2	1,140	22	8.7		
25	4.8			4.8			7.9		
26	4.8	18	(t)	5.6			8.7	38	1
27	4.1			5.6	189	3	9.5		
28	4.8			5.6			8.7		
29	504	35,700	s 95,000	5.6			9.5		
30	82	10,000	s 2,900	5.6			7.9		
31	40	960	104	5.6			--	--	--
Total	1,678.7	--	293,579	333.4	--	14,032	239.8	--	171

Total discharge for year (cfs-days) 10,493.3
Total load for year (tons) 674,769

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

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

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

Date of collection	Time	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. 14, 1952	4:20 p.m.	25	42	1,280	984		58		86		97						SPWCM
Feb. 3, 1953	12:20 p.m.	33	39	526	820		44		48		70						SPWCM
Mar. 9	11:45 a.m.	318	36	28,100	4,380		32		48		81						SPWCM
Mar. 10	10:35 a.m.	346	35	26,400	3,440		2		80		92						SPN
Mar. 10	10:35 a.m.	346	35	26,400	3,570		64		86		92						SPWCM
Mar. 18	6:20 p.m.	60	42	3,380	3,420		67		86		96						SPWCM
Mar. 27	3:50 p.m.	33	60	2,750	3,060		3		99		99						SPWCM
Mar. 27	3:50 p.m.	33	60	2,750	3,380		81		99		99						SPWCM
Apr. 1	12:50 p.m.	25	43	415	1,240	65	79	91	95	96	97	98	99		100		BWCM
Apr. 6	5:00 p.m.	98	--	16,000	6,230		55		77		93						SPWCM
Apr. 7	12:50 p.m.	36	--	7,780	4,170		72		93		98						SPWCM
Apr. 7	5:00 p.m.	67	--	7,680	5,670		65		84		95						SPWCM
Apr. 9	5:10 p.m.	47	48	5,070	3,860		67		86		94						SPWCM
Apr. 10	5:30 p.m.	47	45	5,220	3,990		61		77		92						SPWCM
Apr. 14	11:50 a.m.	34	--	2,930	3,150		80		96		98						SPWCM
Apr. 14	5:00 p.m.	28	--	4,000	3,150		84		99		99						SPWCM
Apr. 30	12:15 a.m.	42	--	4,550	2,500		67		87		95						SPWCM
Apr. 30	1:45 a.m.	60	--	8,470	5,990		58		80		94						SPWCM
Apr. 30	12:10 p.m.	34	--	4,380	2,150		73		94		99						SPWCM
May 4	11:10 a.m.	47	--	6,740	6,210		2		74		98						SPN
May 4	11:10 a.m.	47	--	6,740	2,690		76		96		98						SPWCM
May 21	9:50 a.m.	12	50	10,100	3,530		1		89		100						SPN
May 21	9:50 a.m.	12	50	10,100	3,670		90		95		100						SPWCM
July 16	9:55 a.m.	492	64	132,000	7,420		0		68		95						SPN
July 16	9:55 a.m.	492	64	132,000	7,410		43		69		95						SPWCM

YELLOWSTONE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, November 1952 to July 1953--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	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 17, 1953....	11:15 a.m.	53	71	31,700	6,780		2		97		100						SPN
July 17	11:15 a.m.	53	71	31,700	7,050		77		99		100						SPWCM
July 19	12:20 a.m.	990	--	75,100	4,810		2		64		92						SPN
July 19	12:20 a.m.	990	--	75,100	4,970		40		61		92						SPWCM
July 19	3:45 a.m.		53	55,800	4,210		2		75		95						SPN
July 19	3:45 a.m.	603	53	55,800	4,480		48		69		95						SPWCM
July 29	11:50 a.m.	1,550	68	73,500	6,700		2		57		87						SPN
July 29	11:50 a.m.	1,550	68	73,500	6,770		39		58		87						SPWCM

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 1952 to September 1953.
Water temperatures: June 1949 to September 1953.
Sediment records: April 1949 to September 1953(discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 3,220 ppm July 29; minimum, 216 ppm May 24-31.
Hardness: Maximum, 2,080 ppm July 29; minimum, 154 ppm May 24-31.
Specific conductance: Maximum daily, 3,120 micromhos July 29; minimum daily, 289 micromhos May 28.
Water temperatures: Minimum, freezing point on many days during November to February.
Sediment concentrations: Maximum daily, 25,400 ppm July 29; minimum daily, not determined.
Sediment loads: Maximum daily, 8,080 tons July 29; minimum daily, not determined.
EXTREMES, 1949-53.--Dissolved solids (June 1952 to September 1953): Maximum, 3,220 ppm July 29, 1953; minimum, 216 ppm May 24-31, 1953.
Hardness (June 1952 to September 1953): Maximum, 2,080 ppm July 29, 1953; minimum, 154 ppm May 24-31, 1953.
Specific conductance (June 1952 to September 1953): Maximum daily, 3,120 micromhos July 29, 1953; minimum daily, 289 micromhos May 28, 1953.
Water temperatures: Maximum (1949-52), 80°F July 6, 24, Aug. 5-7, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 25,400 ppm July 29, 1953; minimum daily, not determined.
Sediment loads: Maximum daily, 18,700 tons June 9, 1949; minimum daily (1949-52), less than 1 ton Aug. 26-30, 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. 9-11, Nov. 20 to Jan. 10, Jan. 15-19, 23, 27-29, Feb. 5-22, Mar. 2-5. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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
Oct. 1-31, 1952	34.5	11	0.01	143	47	32	3.0	214	418	16	0.4	0.7	0.15	813		1.11	75.7	550	375	11	0.6	1,070	7.3
Nov. 1-18.....	36.7	14	.01	158	49	34	2.8	211	445	18	.3	1.7	.17	885		1.20	87.7	594	421	11	.6	1,150	7.8
Nov. 19-Dec. 19	35.7	13	.01	142	48	29	2.6	242	393	15	.6	1.3	.11	796		1.08	76.7	552	354	10	.5	1,070	7.9
Dec. 20-31.....	35.8	13	.01	150	46	32	2.8	258	395	18	.4	.6	.12	826		1.12	79.8	564	352	11	.6	1,100	7.2
Jan. 1-17, 1953	41.1	15	.01	137	44	29	2.1	234	365	15	.3	2.8	.11	758		1.03	84.1	521	329	11	.6	1,030	7.9
Jan. 18-23.....	45.3	16	--	140	42	30	1.8	227	370	16	.4	3.4	.12	758		1.03	92.7	521	335	11	.6	1,020	7.9
Jan. 24 -Feb. 1	40.4	13	.01	138	43	29	2.0	230	368	16	.3	3.0	.10	750		1.02	81.8	520	331	11	.6	1,020	8.1
Feb. 2-14.....	36.2	14	.01	128	46	29	1.8	221	363	16	.3	3.0	.12	742		1.01	72.5	507	326	11	.6	1,020	8.1
Feb. 15-22	34.3	18	--	136	43	30	2.0	227	373	18	.4	3.0	.17	764		1.04	70.8	516	330	11	.6	1,030	8.1

YELLOWSTONE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--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	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Feb. 23-Mar. 2, 1953	38.5	14	0.00	134	44	30	2.4	218	360	17	0.2	2.7	0.10	752		1.02	78.2	516	337	11	0.6	1,020	8.1
Mar. 3 - Apr. 1	45.7	13	.00	133	41	28	2.2	218	365	15	.2	2.5	.11	751		1.02	92.7	502	323	11	.5	1,020	8.1
Apr. 2-10	48.2	13	.00	124	43	27	2.2	209	333	14	.3	2.2	.10	706		.96	91.9	485	314	11	.5	965	7.5
Apr. 11-23	44.6	18	.00	124	40	27	2.7	205	330	14	.2	2.6	.12	698		.95	84.1	476	308	11	.5	950	7.6
Apr. 24 - May 1	64.3	15	.01	85	27	18	2.2	168	200	9.5	.2	2.1	.18	460		.63	79.9	321	183	11	.4	668	7.7
May 2-6	58.4	16	.00	96	33	30	2.1	172	273	12	.3	1.5	.09	570		.78	89.9	376	235	15	.7	803	7.7
May 7-16	83.3	13	.01	81	23	16	2.0	169	172	8.0	.2	3.0	.05	412		.56	92.7	297	158	10	.4	621	7.2
May 17-23	139	17	.00	54	15	10	1.5	120	108	5.0	.2	2.0	.05	276		.38	104	197	99	10	.3	424	7.3
May 24-31	270	15	.01	47	8.9	7.6	1.2	102	81	3.0	.1	2.6	.05	216		.29	157	154	70	10	.3	337	7.2
June 1-13	159	14	.00	48	14	11	1.1	109	95	4.5	.4	2.1	.05	246		.33	106	178	89	12	.4	385	6.8
June 14-28	64.3	13	.00	66	22	15	1.8	141	151	7.0	.4	1.4	.05	358		.49	62.2	254	138	11	.4	529	7.8
June 29 - July 9	32.6	12	.00	88	31	22	1.6	168	226	10	.4	.8	.08	496		.67	43.7	346	208	12	.5	707	7.5
July 10-28	26.9	13	.00	95	33	25	2.2	170	256	13	.4	.8	.08	544		.74	39.5	373	234	13	.6	765	7.5
July 29	55.0	40	--	590	149	96	9.5	440	1,890	16	--	.5	.55	3,220	3,010	4.38	478	2,080	1,720	9	.9	3,120	7.4
July 30 - Aug. 3	30.8	20	--	157	50	32	3.4	191	470	13	.3	2.0	.16	882		1.20	73.3	596	439	10	.6	1,140	7.8
Aug. 4-23	19.5	14	--	109	35	30	2.6	185	308	11	.2	.4	.21	620		.84	32.6	416	264	13	.6	862	7.9
Aug. 24 - Sept. 7	21.5	11	--	135	37	37	2.5	208	363	15	.2	.3	.10	738		1.00	42.8	488	317	14	.7	994	8.1
Sept. 8-16	21.7	13	--	132	42	35	2.7	193	393	15	.2	.4	.14	762		1.04	44.6	503	345	13	.7	1,020	7.8
Sept. 17-30	21.7	12	--	142	34	33	2.8	203	370	17	.3	.4	.11	746		1.01	43.7	495	329	13	.6	1,000	7.8
Weighted average	49.7	14	0.00	102	32	22	2.0	177	266	11	0.3	1.9	0.10	562	--	0.76	75.4	386	241	11	0.5	776	--

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 1 p. m. and 6 p. m. October to March, between 7 a. m. and 11 a. m. April to September)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	43	32	--	--	--	--	46	52	66	68	--
2	a58	42	32	32	--	--	--	44	54	b77	--	--
3	--	42	32	32	a33	--	38	42	51	--	b68	--
4	--	41	32	--	42	--	44	41	51	--	--	--
5	46	42	--	32	36	42	--	45	b48	--	61	--
6	--	40	34	32	--	42	--	52	50	--	--	--
7	--	--	--	34	37	a38	b42	53	55	--	--	--
8	52	a34	34	34	40	46	--	49	b60	--	--	--
9	55	35	33	34	33	45	--	45	53	--	--	--
10	52	a33	34	--	34	47	--	47	b74	b70	--	--
11	a48	a33	32	34	--	48	--	39	b74	--	--	--
12	52	37	33	34	36	48	--	39	--	--	--	--
13	48	43	33	--	34	a42	--	40	58	--	--	--
14	44	--	33	32	39	43	b47	42	b71	--	--	b70
15	46	--	--	--	--	--	40	53	59	--	--	--
16	47	--	34	--	38	a38	48	--	58	b63	--	--
17	47	--	32	--	39	a39	--	b58	61	--	--	--
18	50	--	--	--	33	--	b43	54	61	--	--	--
19	--	--	--	--	--	a40	--	--	62	--	--	65
20	51	--	--	--	--	--	--	48	59	--	--	b60
21	50	--	--	37	--	43	--	45	59	--	--	52
22	--	--	--	--	--	44	--	41	--	--	--	52
23	51	--	33	--	--	44	52	49	--	--	--	57
24	48	33	32	--	32	48	--	49	58	--	--	52
25	48	--	--	41	--	--	b56	44	b60	--	--	48
26	50	32	32	39	32	50	b62	47	55	--	--	57
27	--	--	34	--	--	52	b62	49	--	--	--	51
28	--	33	--	a32	39	52	56	49	--	--	--	50
29	47	--	--	36	--	54	48	49	--	69	--	--
30	47	32	32	41	--	--	45	46	--	71	--	--
31	43	--	--	41	--	a45	--	52	--	67	--	--
Average	--	--	--	--	--	--	--	47	--	--	--	--

a Reading obtained between 9 a. m. and 11 a. m.
b Reading obtained between 1 p. m. and 5 p. m.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	--		39			41	104	12
2	28	--		39			42	101	11
3	29	--		36			41	--	
4	30	--		36			35	--	
5	30	--		37			37	--	
6	30	--	e 1	37	51	5	39	153	
7	30	--		37			39	--	
8	31	10		36			39	--	
9	32	--		32			37	--	
10	31	--		34			35	--	
11	31	--		35			36	--	e 15
12	32	--		36			37	--	
13	33	--		36	--		37	--	
14	37	--		36	--		38	--	
15	38	16	e 2	39	--		40	--	
16	39	--		36	--		38	142	
17	38	--		40	--		36	--	
18	37	--		40	--		34	--	
19	37	--	e 1	39	--		35	--	
20	36	9		37	--	e 5	37	--	
21	37	--	e 2	35	--		36	--	
22	36	--	e 3	32	--		36	--	
23	36			28	--		34	--	
24	37			30	--		32	--	
25	38			32	57		30	--	e 9
26	37	39	4	28	--		33	--	
27	37			25	--		36	108	
28	39			30	--		38	--	
29	39			35	--		40	77	
30	38			40	--		40	--	
31	38			--	--	--	38	--	
Total	1,069	--	66	1,052	--	150	1,146	--	386

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	38	--		41	--	e 15	41	--	e 20
2	38	--		39	--	e 10	35	--	e 15
3	40	--		40	65	7	37	--	e 10
4	38	--		40	90	10	40	--	e 15
5	36	--	e 9	37	95	9	42	167	19
6	35	--		38	--	e 10	44	152	18
7	40	79		38	115	12	44	128	15
8	48	--		38	--	e 10	44	120	14
9	52	163		35	108	10	44	110	13
10	56	--		33	238	21	45	108	13
11	48	--	e 25	30	208	17	46	118	15
12	50	--		32	280	24	44	107	13
13	44	244		35	230	22	45	110	13
14	35	--		36	235	23	47	105	13
15	25	--	e 10	37			44	--	e 15
16	35	--		38	--	e 25	48	118	15
17	40	--		41			47	110	14
18	43	--		35			43	--	e 10
19	45	--		30			45	100	12
20	46	--		28	--	e 10	46	--	e 15
21	49	116	e 15	31			44	80	10
22	45	--		34			44	82	10
23	44	--		35			44	95	11
24	44	--		34	118	11	44	68	8
25	42	--		38	--	e 20	46	--	e 9
26	42	--		43	225	26	48	72	9
27	38	82	8	41	--	e 20	49	75	10
28	37	155	15	41	178	20	50	87	12
29	39	205	22	--	--	--	52	102	14
30	42	--	e 25	--	--	--	54	--	e 15
31	39	--	e 20	--	--	--	51	98	13
Total	1,293	--	503	1,018	--	447	1,397	--	408

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

MIDDLE FORK POWDER ABOVE KAYCEE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	51	80	11	64	135	23	225	520	316
2	49	--	e10	60	400	65	210	--	e250
3	45	70	8	59	535	85	186	348	175
4	47	78	10	57	404	62	168	270	122
5	46	--		57	415	64	173	475	222
6	51	--		59	208	33	198	585	313
7	53	65		75	300	61	168	300	136
8	48	--		99	620	166	146	280	110
9	48	--	e9	120	805	261	138	198	74
10	47	74		94	275	70	130	151	53
11	47	--		77	140	29	122	135	44
12	46	--		70	122	23	111	--	e40
13	46			77	146	30	98	152	40
14	46			71	100	19	94	120	30
15	44			72	112	22	116	1,020	319
16	44			78	--	e35	92	185	46
17	46	37	4	90	248	60	77	110	23
18	44			105	385	109	72	166	s37
19	40			132	670	239	66	443	79
20	41			173	1,440	673	62	180	30
21	42			176	1,080	513	61	125	21
22	44			150	485	196	56	--	e15
23	50	72	10	148	435	174	48	--	e10
24	61	--	e15	210	1,660	s1,030	50	65	9
25	49	58	8	219	1,070	633	46	45	6
26	51	48	7	219	960	568	44	38	5
27	62	105	18	292	1,970	1,550	42		
28	68	135	25	361	2,140	2,090	39	--	e5
29	85	370	85	343	2,290	s2,250	39		
30	74	208	42	264	900	642	37		
31	--	--	--	250	665	449	--	--	--
Total	1,515	--	361	4,321	--	12,224	3,114	--	2,545

Day	July			August			September		
1	34	55	5	26	225	16	19	--	e2
2	34	35	3	30	--	e20	22	--	e3
3	34			34	278	26	25	52	4
4	32			24	--	e15	26		
5	31			20	180	10	26		
6	30	--	e3	20	--	e5	26	--	e4
7	29			19	--	e4	25		
8	29			18	--	e3	24		
9	30			17	--	e2	24		
10	27	39	3	18	--	e3	24		
11	27			23	--	e20	22	--	e2
12	27			21	296	17	20	--	
13	27	--	e3	20	--	e10	21	--	
14	26			19	--	e5	20	10	
15	27			18			20	--	e1
16	30	70	6	19			20	--	
17	31			18			21	--	
18	31			19			25		
19	31	--	e6	19			24	--	e2
20	28			18			22		
21	27			19			20	21	
22	27			20			19	--	
23	26			20	--	e2	20	--	
24	24			20			21	--	
25	24	--	e3	20			21	--	
26	24			20			20	--	e1
27	24			19			21	--	
28	24			18			22	--	
29	55	25,400	s8,080	19			24	--	
30	34	1,470	135	19			24	--	
31	30	350	28	19			--	--	--
Total	914	--	8,344	633	--	190	668	--	61

Total discharge for year (cfs-days) 18,140

Total load for year (tons) 25,685

e Estimated.

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, February 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	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. 28, 1953	4:20 p. m.	40	39	138	458	32	44	53	77	92	97	99	100	--	--		BWCM
Mar. 9	2:50 p. m.	45	45	92	629	23	37	50	68	75	89	94	98	--	100		BWCM
Mar. 17	10:20 a. m.	47	39	114	441	16	32	44	61	75	80	82	--	--	--		BWCM
Apr. 15	10:40 a. m.	47	40	44	300	--	51	--	--	--	98	--	--	--	--		SPWCM
Apr. 30	6:15 p. m.	70	52	172	544	30	38	50	66	82	92	--	--	--	--		BWCM
May 4	1:55 p. m.	58	51	309	1,700	--	56	--	86	--	100	--	--	--	--		SPWCM
May 18	11:15 a. m.	109	54	421	1,780	--	26	--	46	--	86	--	--	--	--		SPWCM
May 21	11:40 a. m.	173	45	869	2,140	--	24	--	35	--	79	95	99	99	--		SPWCM
May 25	5:55 p. m.	198	54	826	2,910	--	20	--	30	--	74	94	99	100	--		SPWCM
May 28	1:05 p. m.	318	50	1,230	2,060	--	20	--	32	--	71	--	--	--	--		SPWCM
May 29	12:30 p. m.	336	51	2,640	7,690	--	6	--	49	--	83	93	98	99	100		SPN
May 29	12:30 p. m.	336	51	2,640	7,430	--	36	--	57	--	83	93	98	99	100		SPWCM
May 30	12:35 p. m.	318	49	1,010	4,490	--	18	--	30	--	66	87	97	99	100		SPWCM
June 3	3:50 p. m.	170	--	247	1,250	17	22	25	33	46	71	--	--	--	--		BWCM
June 11	11:45 a. m.	124	--	130	339	18	26	30	42	59	82	93	98	--	100		BWCM
July 29	4:00 p. m.	41	76	17,800	7,040	--	0	--	78	--	100	--	--	--	--		SPN
July 29	4:00 p. m.	41	76	17,600	6,820	--	55	--	100	--	--	--	--	--	--		PWCM
Aug. 3	12:45 p. m.	39	68	278	1,220	31	43	62	84	97	99	--	--	--	--		BWCM

MIDDLE FORK POWDER RIVER NEAR KAYCEE, WYO.

LOCATION.--At gaging station cableway at Jay Bar U Ranch, 1½ miles downstream from North Fork Powder River and 6 miles east of Kaycee, Johnson County.
DRAINAGE AREA.--980 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1949 to November 1950, May 1952 to September 1953.
Water temperatures: March 1950 to September 1953.
Sediment records: March 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,180 ppm July 30-31; minimum, 366 ppm May 29 to June 5.
Hardness: Maximum, 1,420 ppm July 30-31; minimum, 204 ppm May 29 to June 5.
Specific conductance: Maximum daily, 2,330 micromhos July 31; minimum daily, 500 micromhos May 30.
Water temperatures: Maximum, 84°F July 9, 13, 15, 25; minimum, freezing point on several days during November to February.
Sediment concentrations: Maximum daily, 15,400 ppm June 6; minimum daily, no flow Aug. 8.
Sediment loads: Maximum daily, 30,800 tons June 6; minimum daily, 0 tons Aug. 8.
EXTREMES, 1950-53.--Dissolved solids (May 1952 to September 1953): Maximum, 2,180 ppm July 30-31, 1953; minimum, 366 ppm May 29 to June 5, 1953.
Hardness (May 1952 to September 1953): Maximum, 1,420 ppm July 30-31, 1953; minimum, 204 ppm May 29 to June 5, 1953.
Specific conductance (May 1952 to September 1953): Maximum daily, 2,330 micromhos July 31, 1953; minimum daily, 500 micromhos May 30, 1953.
Water temperatures: Maximum, 84°F July 9, 13, 15, 25, 1953, minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 36,600 ppm Sept. 7, 1951; minimum daily, no flow Aug. 8, 1953.
Sediment loads: Maximum daily, 82,700 tons Sept. 7, 1951; minimum daily, 0 tons Aug. 8, 1953.
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. 21 to Mar. 8. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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 $CaCO_3$: Non-carbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 1-31, 1952	34.5	8.9	0.01	143	56	140	4.1	247	555	80	0.4	0.7	0.16	1,190	1,110	1.62	111	586	383	34	2.5	1,580	7.5	
Nov. 1-12	62.3	14	.03	142	60	132	3.4	235	575	69	.2	1.3	.18	1,200	1,110	1.63	202	602	409	32	2.3	1,580	7.8	
Nov. 13-22 ...	87.6	12	.01	144	54	113	3.2	254	525	61	.3	1.6	.21	1,110	1,040	1.51	263	583	375	29	2.0	1,470	7.9	
Nov. 23-30 ...	61.9	13	.01	163	64	130	3.6	302	585	70	.3	2.7	.16	1,270	1,180	1.73	212	671	423	29	2.2	1,650	7.8	
Dec. 1-31.....	78.0	15	.01	129	53	106	3.2	251	480	63	.6	3.2	.12	1,020	977	1.39	215	541	335	30	2.0	1,380	8.1	
Jan. 1-31, 1953	93.2	13	.01	130	46	98	2.6	248	443	56	.4	3.1	.13	966	--	1.31	243	515	312	29	1.9	1,330	7.6	
Feb. 1-28.....	83.1	14	.01	127	48	106	2.3	246	460	59	.3	2.5	.13	992	--	1.35	223	514	312	31	2.0	1,350	8.0	
Mar. 1-31	94.9	13	.00	120	47	98	2.8	229	430	57	.4	1.6	.11	936	--	1.27	240	494	306	30	1.9	1,290	8.1	
Apr. 1-14	100	12	.00	114	45	94	3.0	223	408	53	.3	1.1	.10	902	--	1.23	244	470	287	30	1.9	1,250	8.0	
Apr. 15-26 ...	84.7	11	.00	111	42	87	3.0	209	388	53	.3	.8	.11	852	--	1.16	195	501	330	29	1.8	1,190	7.8	
Apr. 27-May 7	67.0	14	.01	92	36	72	2.6	200	290	42	.4	1.9	.11	692	--	.94	125	376	212	29	1.6	980	7.8	
May 8-19	98.8	15	.01	82	30	58	2.4	184	243	35	.4	1.4	.08	590	--	.80	157	328	177	28	1.4	848	7.8	
May 20-28	227	17	.01	60	21	37	2.0	148	158	20	.4	2.8	.07	410	--	.56	251	236	115	25	1.1	605	7.8	
May 29-June 5	365	18	.02	54	17	30	1.9	138	128	15	.6	1.6	.07	366	--	.50	361	204	91	24	.9	522	7.6	
June 6.....	530	14	.04	63	29	104	4.4	190	302	13	--	5.3	.12	664	--	.90	950	276	120	45	2.7	909	7.7	

YELLOWSTONE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				Hardness as $CaCO_3$		Per cent 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					
														Residue at 180°C	Sum									
June 7-14, 1953	226	14	0.00	62	23	46	2.4	148	186	21	0.4	1.9	0.07	456	--	0.67	278	248	127	28	1.3	666	7.6	
June 15.....	385	24	--	102	18	158	7.9	276	423	18	--	.5	.24	--	888	1.21	923	330	104	50	3.8	1,100	7.1	
June 16-19 ...	205	14	.03	68	23	54	7.4	162	210	21	.6	1.5	.05	504	--	.69	279	264	131	30	1.4	728	7.1	
June 20-26....	80.4	13	.00	88	35	78	3.4	184	299	39	.8	1.3	.08	676	--	.92	147	362	211	32	1.8	973	7.7	
June 27-July 1	15.6	15	.00	103	41	105	3.7	215	398	54	.4	.8	.15	850	--	1.16	35.8	424	248	35	2.2	1,180	7.5	
July 2-16	2.90	13	.00	130	50	152	5.0	229	520	94	.4	.5	.16	1,150	1,080	1.56	9.01	531	343	38	2.9	1,550	7.7	
July 17-28....	.30	17	.00	173	63	206	6.2	293	740	116	.6	2.0	.19	1,520	1,470	2.07	1.23	690	450	39	3.4	1,990	7.5	
July 29.....	61.0	18	--	102	32	102	7.9	--	345	55	--	.2	.11	782	--	1.06	129	388	--	36	2.2	1,090	7.5	
July 30-31....	8.85	24	--	463	65	59	7.9	200	1,310	33	--	1.8	.14	2,180	2,060	2.06	52.1	1,420	1,260	8	.7	2,310	7.4	
Aug. 1-31	.21	14	--	158	53	165	4.7	247	615	97	.4	1.1	.20	1,280	1,230	1.74	.73	610	407	37	2.9	1,730	7.9	
Sept. 1-30....	.29	12	--	153	55	195	4.5	233	655	129	.3	.4	.20	1,400	1,320	1.90	1.10	606	415	41	3.4	1,870	8.1	
Weighted average.....	75.0	14	0.01	104	39	84	2.8	209	359	45	0.4	2.0	0.11	799	--	1.09	162	420	249	30	1.8	1,100	--	

YELLOWSTONE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 7 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	40	34	35	35	--	a45	66	58	71	65	68
2	51	--	35	--	37	34	a45	--	60	a82	--	67
3	55	a42	37	--	35	33	42	44	56	--	67	57
4	50	38	33	34	35	33	44	44	62	75	70	60
5	42	40	35	--	35	34	44	44	55	70	67	63
6	39	34	34	34	35	34	42	50	54	a80	a82	62
7	46	38	--	34	34	33	44	55	60	72	73	63
8	40	32	32	--	34	34	40	--	59	71	--	66
9	41	37	32	a40	34	34	44	48	61	a84	73	63
10	39	a38	32	37	35	34	a45	45	85	a74	a70	64
11	42	a40	a32	38	34	35	42	45	70	71	67	59
12	39	39	32	--	35	38	a42	38	68	71	69	61
13	47	a41	33	a38	33	35	--	--	70	a64	a80	--
14	a47	37	35	a40	35	38	--	45	67	a80	70	62
15	39	38	--	33	35	a42	a44	49	61	a84	75	a73
16	47	a38	a37	34	32	40	a42	54	67	--	77	--
17	43	36	35	36	34	43	a40	52	--	76	70	63
18	41	38	a33	--	34	42	40	a65	70	70	68	--
19	42	35	33	--	33	a44	40	a63	70	64	68	60
20	41	36	33	34	a34	a45	42	55	64	74	--	55
21	42	a34	--	35	33	a44	a58	51	66	75	68	55
22	43	a52	33	35	a34	a44	a64	49	70	78	68	a65
23	40	33	a35	34	a34	42	57	49	70	68	73	59
24	42	a31	33	35	a34	a45	a54	a59	61	82	69	58
25	42	a33	34	a35	33	44	a60	49	65	a64	67	52
26	40	31	34	34	33	45	a65	54	60	74	67	--
27	38	31	--	34	33	43	a63	56	60	a82	71	59
28	39	32	34	32	34	a45	62	58	75	67	70	a60
29	41	32	33	36	--	a44	64	58	--	72	68	63
30	46	34	33	35	--	45	a52	55	74	a83	70	55
31	42	--	34	a38	--	46	--	53	--	70	65	--
Average	43	36	34	--	34	40	49	52	64	75	70	61

a Reading obtained between 1 p. m. and 5 p. m.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	2.7	72	1	47			90	237	58
2	5.4	120	s 8	55			90	190	46
3	30	158	13	55			90	--	
4	33			55			85	--	
5	32			55	86	13	88	--	
6	34			57			90	--	
7	37			56			90	--	
8	40			56			85	--	
9	38			61			80	--	
10	38			71	268	51	85	--	
11	39			87	252	59	82	--	
12	29			92	345	86	80	--	e 35
13	26			92	185	46	80	--	
14	34			90	155	38	85	--	
15	38			90	272	66	90	--	
16	39			96	202	52	80	--	
17	37			94	125	32	75	--	
18	40	58	6	96	210	54	70	--	
19	44			96	218	56	80	160	
20	44			92	154	38	85	--	
21	40			80	230	50	80	--	
22	40			50	175	24	65	--	e 30
23	35			45	140	17	60	--	e 25
24	35			55	168	25	55	--	e 20
25	35			65	215	38	50	--	e 15
26	34			55	--	e 30	60	--	e 20
27	35			50	--	e 20	65	--	e 25
28	37			60	--	e 30	70	--	e 30
29	38			80	--	e 40	75		
30	40			85	--	e 50	80	--	e 35
31	41			--	--	--	75		
Total	1,070.1	--	190	2,118	--	1,019	2,418	--	1,039

Day	January			February			March		
1	76			100	--	e 70	92	--	e 70
2	80			100	--	e 60	86	--	e 50
3	85			100	240	65	95	--	e 60
4	82	--	e 35	100	284	77	105	--	e 70
5	78			90	340	83	110	256	76
6	75			86	330	77	105		
7	85	--	e 40	88	174	41	105	--	e 80
8	95	--	e 40	90	230	56	105		
9	105	154	44	80	185	40	105	335	95
10	115	--	e 50	70	208	39	102	312	86
11	115	--	e 60	75	198	40	107	292	84
12	118	--	e 60	78	314	66	98	166	44
13	115	--	e 50	74	236	47	92	138	34
14	100	--	e 40	72	130	25	92	168	42
15	90	--	e 30	76	100	21	94	259	65
16	80			74	88	18	94	190	48
17	85			76	92	19	92	120	30
18	88	--	e 20	70	105	20	90	110	27
19	92			65			87	120	28
20	94			60	--	e 15	89	144	35
21	96	90	23	65			89	116	28
22	94	--	e 25	75			85	88	20
23	92	--	e 25	84	--	e 25	84	84	19
24	95	--	e 30	88			84	102	23
25	95	--	e 40	95	--	e 30	84	80	18
26	95	179	46	100	130	35	89	68	16
27	92	--	e 35	100	--	e 50	92	68	17
28	90	89	22	96	338	88	92	74	18
29	92	--	e 30	--	--	--	94	70	18
30	94	--	e 50	--	--	--	102	78	21
31	100	--	e 80	--	--	--	103	68	19
Total	2,888	--	1,130	2,327	--	1,187	2,943	--	1,401

e Estimated.
s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September --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	102	58	16	80	178	38	339	1,700	1,560
2	100	52	14	69	115	21	287	1,350	1,050
3	98	58	15	67	178	32	258	1,080	752
4	82	48	11	64	198	34	224	1,030	623
5	82	88	19	60	195	32	320	3,760	s 9,870
6	105	230	65	40	140	19	530	15,400	s 30,800
7	119	282	91	42	142	s 22	352	4,570	s 4,700
8	111	268	80	111	260	78	335	1,700	1,540
9	107	280	81	152	663	s 287	242	980	640
10	102	226	62	156	991	s 450	203	685	375
11	100	376	102	98	330	87	192	600	311
12	100	530	143	85	150	34	182	550	270
13	98	--	e 80	82	206	46	162	490	214
14	100	--	e 50	82	234	52	136	360	132
15	96	118	31	67	178	32	385	15,300	s 23,400
16	96	86	22	67	200	36	356	5,330	5,120
17	98	134	35	72	200	39	184	1,500	745
18	100	150	40	89	419	s 110	145	2,830	s 1,510
19	98	190	50	124	856	s 300	136	1,280	470
20	90	125	30	150	1,400	567	109	1,390	409
21	82	90	20	184	1,650	820	89	430	103
22	67	79	14	182	1,200	590	68	320	59
23	65	72	13	162	830	363	55	230	34
24	74	70	14	172	1,070	497	52	203	s 31
25	82	105	23	258	2,540	1,770	111	250	75
26	68	88	16	230	1,500	932	79	150	32
27	65	125	22	287	2,050	1,590	25	120	8
28	75	135	27	418	3,340	3,770	21	70	4
29	72	326	63	568	5,880	s 9,530	13	100	4
30	94	441	112	530	4,090	5,850	11	210	6
31	--	--	--	393	2,060	2,190	--	--	--
Total	2,728	--	1,361	5,150	--	30,218	5,601	--	84,847

Day	July			August			A September		
1	7.8			0.1			0.5		
2	4.4			.2	145	(t)	.5		
3	4.7			.3			.3		
4	4.7			1.2	404	1	.3		
5	4.7	110	1	.2			.3		
6	4.4			.1	186	(t)	.3		
7	4.1			.1			.2		
8	4.1			0	--	0	.2		
9	2.9			.1			.2		
10	.7			.1			.2		
11	.5			.2			.2		
12	.5	57	(t)	.2			.2		
13	.5			.2			.2		
14	.5			.1			.2		
15	5.9	2,750	s 103	.1			.2		
16	.9	250	1	.1			.2	108	(t)
17	.5			.1			.2		
18	.4			.1			.3		
19	.3			.1			.3		
20	.3			.1	129	(t)	.3		
21	.3			.2			.4		
22	.3			.2			.3		
23	.3	119	(t)	.2			.3		
24	.3			.2			.4		
25	.3			.2			.4		
26	.2			.2			.3		
27	.2			.2			.3		
28	.2			.3			.3		
29	61	9,490	s 2,380	.3			.3		
30	17	2,270	s 125	.4			.3		
31	.7	600	1	.4			--		--
Total	133.6	--	2,621	6.5	--	4	8.6		3

Total discharge for year (cfs-days) 27,391.8
Total load for year (tons) 125,020

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

YELLOWSTONE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, March 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	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, 1953 ..	12:25 p. m.	100	43	109	936	38	53	63	79	91	95	97	99	--	100	--	BWCM
Apr. 1	2:15 p. m.	100	45	56	357	20	30	40	48	62	70	76	88	--	94	98	BWCM
Apr. 9	1:40 p. m.	102	--	863	1,040	79	87	99	100	--	--	--	--	--	--	--	BWCM
Apr. 15	12:30 p. m.	98	44	112	647	55	62	70	86	94	97	98	99	--	100	--	BWCM
Apr. 30	1:35 p. m.	94	52	868	2,610	--	67	--	90	--	100	--	--	--	--	--	SPWCM
May 4	12:20 p. m.	64	50	159	749	50	59	76	86	93	96	98	100	--	--	--	BWCM
May 18	7:15 p. m.	109	--	522	724	31	40	54	66	83	95	98	99	--	100	--	BWCM
May 21	1:20 p. m.	198	--	1,460	1,850	--	15	--	50	--	88	--	--	--	--	--	SPN
May 21	1:20 p. m.	198	--	1,460	2,080	--	35	--	57	--	88	--	--	--	--	--	SPWCM
May 25	8:15 p. m.	246	--	1,840	2,950	--	10	--	43	--	82	--	--	--	--	--	SPN
May 25	8:15 p. m.	246	--	1,840	2,700	--	36	--	58	--	82	--	--	--	--	--	SPWCM
May 29	2:45 p. m.	656	58	6,980	7,480	--	2	--	37	--	75	88	95	96	97	99	SPN
May 29	2:45 p. m.	656	58	6,980	8,000	--	27	--	43	--	75	88	95	96	97	99	SPWCM
June 3	2:50 p. m.	255	--	971	2,010	--	42	--	42	--	75	91	98	99	99	--	SPWCM
June 6	5:00 a. m.	603	50	28,400	5,410	--	54	--	73	--	92	--	--	--	--	--	SPWCM
June 6	7:10 p. m.	369	59	5,100	3,230	--	51	--	66	--	88	--	--	--	--	--	SPWCM
June 11	2:20 p. m.	187	--	572	1,640	27	35	42	49	61	70	74	80	--	82	85	BWCM
June 19	3:55 p. m.	128	--	1,170	2,570	--	49	--	70	--	91	--	--	--	--	--	SPWCM

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 July 1953 (discontinued).
Water temperatures: March 1950 to August 1953 (discontinued).
Sediment records: March 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures: Minimum, freezing point probably on many days during November to March; maximum, not determined.
Sediment concentrations: Maximum daily, 83,300 ppm Aug. 3; minimum daily, not determined.
Sediment loads: Maximum daily, 279,000 tons Aug. 3; minimum daily, 1 ton on several days during September.
EXTREMES, 1950-53.--Water temperatures: Minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 83,300 ppm Aug. 3, 1953; 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. 21 to Mar. 9. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to July 1953

Date of collection	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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 20, 1952	63			199	58	228		212	825	140				--	--		734	560	40	3.7	2,150	7.9
Nov. 20	103			--	--	163	--	232	670	111				--	--		--	--	34	--	1,800	7.8
Dec. 19	a110			--	--	142	--	241	590	89				--	--		--	--	33	--	1,620	8.1
Jan. 28, 1953	a125			--	--	157	--	251	628	90				--	--		--	--	35	--	1,730	7.7
Feb. 26	a140			--	--	135	--	242	558	91				--	--		--	--	32	--	1,600	8.1
Mar. 17	176			--	--	253	--	169	940	96				--	--		--	--	44	--	2,220	7.5
Apr. 15	133			--	--	224	--	221	770	100				--	--		--	--	43	--	2,010	7.6
May 21	179			93	30	98	4.2	--	--	--				756	1.03		354	--	37	2.3	1,100	7.6
May 26	222	18	0.02	81	27	80		156	290	37	0.8	4.5	0.13	638	.87		314	186	36	2.0	925	7.7
June 3	290			75	24	68	3.1	--	--	--				592	.81		286	--	34	1.8	850	7.6
June 19	247			--	--	207	--	260	815	37				--	--		--	--	40	--	1,930	6.9
June 19	247			201	49	213	7.9	--	--	--				1,570	2.14		704	--	39	3.5	2,010	7.2
July 16	520			433	126	602	14	--	--	--				3,940	5.36		1,600	--	45	6.5	4,530	7.2
July 19	1,100			275	85	408	11	--	--	--				--	--		1,040	--	46	5.5	3,200	7.1
July 29	1,460			254	68	431	11	--	--	--				2,570	3.50		914	--	50	6.2	3,130	7.8

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Temperature (°F) of water, water year October 1952 to August 1953
(Once-daily measurement between 7 a. m. and 9 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a62	38	32	--	a34	--	40	a50	a68	a78	--	
2	--	36	--	--	a34	--	a48	43	64	a80	a62	
3	--	34	--	--	a36	--	40	42	59	--	62	
4	--	34	--	--	a36	--	41	45	59	--	65	
5	--	a41	--	--	33	--	52	47	57	--	68	
6	--	33	--	--	a35	--	43	52	54	65	64	
7	--	36	--	a34	a34	--	40	55	62	--	--	
8	--	33	--	--	--	--	37	55	58	--	--	
9	--	33	--	--	--	a39	34	45	62	67	--	
10	--	--	--	--	--	35	37	44	68	--	--	
11	--	35	--	--	--	39	37	42	70	--	--	
12	--	34	--	a36	--	36	38	36	70	--	--	
13	--	35	--	a35	--	39	38	38	72	--	a86	
14	--	a41	--	--	--	a41	39	44	68	--	--	
15	a49	38	--	--	--	34	36	52	66	--	--	
16	42	35	--	--	--	--	40	54	--	a67	--	
17	43	34	--	--	--	a46	39	50	--	61	--	
18	42	35	--	--	--	a44	38	--	--	67	--	
19	44	37	--	--	--	a47	37	55	a66	63	--	
20	44	--	a34	--	--	a46	a60	58	a70	66	--	
21	a54	a32	--	--	--	36	50	--	a75	62	--	
22	--	a31	--	a33	--	36	52	48	65	64	--	
23	44	a34	--	a34	--	43	55	55	67	67	--	
24	45	a33	--	--	--	38	47	--	60	--	--	
25	44	a32	--	--	--	44	44	a64	60	--	--	
26	42	--	a33	--	--	44	49	a65	60	--	--	
27	38	--	34	--	a34	47	54	59	62	--	--	
28	38	--	--	--	--	42	54	58	65	--	--	
29	39	--	--	--	--	49	49	57	65	a77	--	
30	44	--	--	--	--	a54	47	51	a76	68	--	
31	41	--	--	--	--	45	--	56	--	--	--	
Average	--	--	--	--	--	--	44	50	65	--	--	

a Reading obtained between 1 p. m. and 7 p. m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	10	82	2	61			47	586	74
2	11	--	e 2	67			55		
3	50			69			60		
4	55			73			56		
5	52			71	405	78	60		
6	58			75			65	--	e 85
7	64	--	e 60	77			70		
8	68			77			75		
9	64			71	880	169	65		
10	64			83	910	204	70		
11	66			93	1,000	251	75		
12	50			99	1,390	372	85		
13	44			111	1,680	503	95		
14	56			111	1,510	453	110		
15	59			113	1,500	458	130	--	e 100
16	61	328	50	115	1,100	342	130		
17	59			115	1,880	584	120		
18	56			113	1,130	345	100	--	e 80
19	61			111	610	183	110	270	80
20	61			95	860	221	120	238	77
21	56			84	1,080	245	115	--	e 85
22	56			72	950	185	114	302	93
23	52			65	400	70	100	--	e 80
24	52			58	250	39	90	--	e 70
25	52			50	400	54	70	--	e 50
26	51	269	39	42	--	e 30	75	273	55
27	52			35	--	e 15	80	286	62
28	54			38	--	e 25	85	--	e 65
29	56			42	--	e 35	90	--	e 70
30	56			45	--	e 50	100	--	e 80
31	56			--	--	--	95	--	e 70
Total	1,662	--	1,433	2,331	--	5,457	2,712	--	2,541

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	90	--	e 60	135	1,060	386	125	--	e 200
2	90	--	e 50	135	1,010	368	120	--	e 150
3	100	--	e 55	135	1,150	419	135	--	e 200
4	110	--	e 60	135	1,370	499	145	--	e 250
5	105	--	e 55	120	1,560	505	155	737	308
6	100	--	e 50	125	1,330	449	160	--	e 400
7	110	178	53	130	610	214	170	--	e 500
8	130	--	e 80	130			350	--	e 3,000
9	150	346	140	120			600	17,000	27,500
10	155	--	e 350	115			550	27,100	40,200
11	155	--	e 300	115			706	30,400	57,900
12	152	572	235	120	--	e 100	450	18,400	22,400
13	150	484	196	120			334	11,800	10,600
14	130	--	e 130	115			280	6,650	5,030
15	110	--	e 90	120			231	3,170	1,980
16	130	--	e 100	115			200	--	e 1,500
17	140	--	e 100	120			182	1,920	943
18	150	--	e 150	100	--	e 70	193	3,650	1,900
19	155	--	e 150	70	--	e 40	176	3,650	1,730
20	157	380	161	50	110	15	158	2,700	1,150
21	155	--	e 200	60	--	e 20	158	2,680	1,140
22	145	650	254	80	--	e 30	149	1,630	656
23	150	800	324	95	--	e 40	138	1,400	522
24	150	--	e 300	115	--	e 50	136	1,100	404
25	150	--	e 300	130	--	e 70	138	1,000	373
26	143	676	261	140	243	92	138	1,000	373
27	120	--	e 150	135	398	145	147	1,130	448
28	125	224	76	130	--	e 200	147	1,600	635
29	130	--	e 100	--	--	--	141	1,050	400
30	135	--	e 200	--	--	--	138	1,250	466
31	135	--	e 300	--	--	--	144	1,300	505
Total	4,107	--	5,030	3,210	--	4,612	6,994	--	183,763

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT SUSSEX, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	138	1,030	384	128	2,360	816	410	6,200	6,860
2.....	130	850	298	113	2,710	827	310	2,400	2,010
3.....	128	1,360	470	111	3,200	959	290	1,900	1,490
4.....	128	1,000	346	106	2,830	810	280	1,000	756
5.....	113	950	290	113	3,340	1,020	280	1,300	983
6.....	144	1,710	665	93	2,560	643	905	29,400	s 83,900
7.....	222	6,610	3,960	75	1,320	267	670	14,500	26,200
8.....	218	6,550	3,860	97	1,600	s 453	610	17,900	s 31,300
9.....	214	4,540	2,620	144	1,310	509	442	4,400	5,250
10.....	173	4,020	1,880	207	2,980	1,670	370	2,100	2,100
11.....	158	3,080	1,310	138	2,190	816	352	5,300	5,040
12.....	155	2,910	1,220	123	1,270	422	352	3,300	3,140
13.....	149	2,760	1,110	123	1,390	462	334	2,050	1,850
14.....	141	1,940	739	125	1,350	456	295	1,000	796
15.....	133	1,650	592	108	1,390	405	562	32,900	s 80,300
16.....	130	858	301	103	1,100	306	694	75,000	146,000
17.....	133	820	294	103	980	273	410	--	e 40,000
18.....	147	980	389	113	1,520	464	275	--	e 10,000
19.....	147	1,000	397	138	1,730	645	374	40,700	s 50,300
20.....	136	900	330	164	2,630	1,160	189	15,000	7,650
21.....	125	900	304	193	2,850	1,490	158	3,750	1,600
22.....	111	850	255	196	3,480	1,840	147	3,400	1,350
23.....	99	900	241	176	2,460	1,170	130	10,600	3,720
24.....	99	750	200	193	2,650	1,380	115	7,600	2,360
25.....	99	550	147	226	4,590	2,800	126	3,380	1,150
26.....	99	500	134	243	2,550	1,670	128	900	311
27.....	89	400	96	260	3,230	2,270	83	400	90
28.....	95	350	90	340	4,560	4,190	61	232	38
29.....	91	300	74	451	9,670	s 7,200	52	172	24
30.....	125	1,210	s 437	610	14,500	23,900	51	113	16
31.....		--	--	480	12,700	16,500	--	--	--
Total.	4,069	--	23,433	5,793	--	77,793	9,455	--	516,584

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.....	34	96	9	152	--	e 1,000	10	--	e 5
2.....	26	188	13	170	38,000	18,100	13		
3.....	23	--	e 9	1,090	83,300	s 279,000	13		
4.....	19	--	e 8	186	33,200	17,300	13	--	e 8
5.....	18	--	e 7	130	27,000	9,480	13		
6.....	18	150	7	61	26,000	4,280	13		
7.....	18	--	e 7	33	--	1,000	11	--	e 5
8.....	17	--	e 6	23	--	e 100	8.9	79	2
9.....	50	3,980	s 647	18	--	e 50	12		
10.....	33	--	e 100	13	--	e 30	12	--	e 2
11.....	31	--	e 50	12	--	e 20	9.0		
12.....	28	--	e 40	12	--	e 15	7.0	--	
13.....	27	--	e 30	12	350	11	6.4	--	e 1
14.....	26	--	e 20	11			6.4	38	
15.....	26	--	e 15	10			7.0	--	
16.....	220	73,500	s 69,100	9.5	--	e 7	9.0	--	e 2
17.....	222	75,000	46,600	9.0			12	--	e 2
18.....	158	31,000	13,200	8.5			15	--	e 50
19.....	445	63,700	s 108,000	8.0			13	--	e 40
20.....	97	25,000	6,550	7.7			11	--	e 10
21.....	37	5,500	549	7.5	211	4	10	--	
22.....	16	850	37	7.3	--	e 4	10	58	
23.....	10	400	11	15	--	e 800	10	--	e 2
24.....	9.0	--	e 9	13	--	e 50	9.5	--	
25.....	7.7	--	e 7	12	--	e 20	9.0	--	
26.....	5.9	--	e 5	11	252	7	9.5		
27.....	4.6	--	e 4	10			10		
28.....	5.9	--	e 6	10			10	--	e 1
29.....	407	28,600	s 92,600	10	--	e 5	10		
30.....	304	38,800	s 38,900	10			9.5		
31.....	167	--	e 5,000	10			--	--	--
Total.	2,510.1	--	381,546	2,091.5	--	331,345	312.2	--	181

Total discharge for year (cfs-days)..... 45,246.8
Total load for year (tons)..... 1,533,718

e Estimated.
s Computed by subdividing day.

POWDER RIVER AT SUSSEX, WYO.--Continued

Particle-size analyses of suspended sediment November 1952 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	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Nov. 20, 1952	3:05 p.m.	101	--	1,060	1,770	--	25	--	41	--	67	87	99	100	--	--	SPWCM
Mar. 10, 1953	3:15 p.m.	418	44	18,400	5,000	--	0	--	68	--	89	--	--	--	--	--	SPN
Mar. 10	3:15 p.m.	418	44	18,400	4,680	--	48	--	74	--	89	--	--	--	--	--	SPWCM
Mar. 17	3:10 p.m.	173	46	3,370	2,490	--	37	--	50	--	73	91	100	--	--	--	SPWCM
Apr. 1	3:10 p.m.	138	44	902	1,620	--	25	--	35	--	61	82	99	100	--	--	SPWCM
Apr. 15	2:00 p.m.	133	--	2,160	1,530	--	0	--	54	--	55	60	83	95	99	100	SPN
Apr. 15	2:00 p.m.	133	--	2,160	1,700	--	44	--	50	--	55	60	83	95	99	100	SPWCM
Apr. 23	12:20 p.m.	99	61	660	944	44	51	56	65	72	80	86	95	--	99	100	BWCM
Apr. 30	4:10 p.m.	155	--	1,720	1,510	--	32	--	50	--	81	--	--	--	--	--	SPWCM
May 18	6:05 p.m.	115	--	1,000	1,230	54	60	64	70	74	80	87	97	--	100	--	BWCM
May 21	3:45 p.m.	179	--	2,290	3,040	--	5	--	51	--	71	86	98	99	100	--	SPN
May 21	3:45 p.m.	179	--	2,290	4,070	--	41	--	54	--	71	86	98	99	100	--	SPWCM
June 8	2:25 p.m.	520	--	16,400	5,280	--	4	--	77	--	91	--	--	--	--	--	SPN
June 8	2:25 p.m.	520	--	16,400	5,420	--	54	--	74	--	91	--	--	--	--	--	SPWCM
June 15	9:10 p.m.	754	65	68,800	4,810	--	4	--	68	--	91	--	--	--	--	--	SPN
June 15	9:10 p.m.	754	65	68,800	4,770	--	46	--	70	--	91	--	--	--	--	--	SPWCM
June 19	1:00 p.m.	247	66	32,200	4,540	--	3	--	83	--	94	--	--	--	--	--	SPN
June 19	1:00 p.m	247	66	32,200	4,530	--	62	--	86	--	94	--	--	--	--	--	SPWCM
June 26	12:40 p.m.	128	--	820	1,920	38	47	57	65	75	86	95	99	--	100	--	BWCM
July 16	5:10 p.m.	434	68	138,000	7,310	--	0	--	81	--	94	--	--	--	--	--	SPN
July 16	5:10 p.m.	434	68	138,000	7,250	--	49	--	79	--	94	--	--	--	--	--	SPWCM
July 19	6:10 a.m.	1,180	60	125,000	6,320	--	0	--	67	--	93	--	--	--	--	--	SPN
July 19	6:10 a.m.	1,180	60	125,000	6,680	--	41	--	65	--	93	--	--	--	--	--	SPWCM
July 29	8:05 p.m.	1,440	--	90,700	5,640	--	18	--	70	--	93	--	--	--	--	--	SPN
July 29	8:05 p.m.	1,440	--	90,700	4,770	--	43	--	66	--	93	--	--	--	--	--	SPWCM
Aug. 3	4:30 p.m.	510	--	80,100	4,670	--	48	--	74	--	96	--	--	--	--	--	SPWCM

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.

LOCATION.--At county highway bridge, 200 feet downstream from gaging station which is a quarter of a mile upstream from mouth and 12 miles south of Arvada, Sheridan County.
DRAINAGE AREA.--956 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1950 to September 1953 (discontinued). Sediment records: March 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures: Maximum, 89°F July 20; minimum, freezing point probably on many days during November to March.
Sediment concentrations: Maximum daily, 46,800 ppm June 15; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 127,000 tons June 15; minimum daily, 0 tons on many days.
EXTREMES,1950-53.--Water temperatures: Maximum, 89°F July 20, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 46,800 ppm June 15, 1953; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 127,000 tons June 15, 1953; minimum daily, 0 tons on many days.
REMARKS.--Flow affected by ice Nov. 8 to Mar. 25. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, June 1953

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Dissolved solids: Parts per million (residue at 180°C)	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
June 1, 1953....	89	176	85	137	7.1	1,550	2.11	788	27	2.1	1,820	7.4
June 17.....	680	123	36	62	7.4	828	1.13	454	23	1.3	1,070	7.2
June 20.....	238	97	29	50	4.2	636	.86	360	23	1.1	853	7.4

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 7 a.m. and 10 a.m. No flow on many days during October, August and September)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	--			--	41	46	64	a 78	--	
2		--	32			--	37	38	53	67	--	
3		--	--			--	38	44	57	a 82	--	
4		--	--			--	41	44	56	--	62	
5		--	--			--	40	46	56	a 75	64	
6		--	--			--	a 47	51	54	--	72	
7		--	--			--	41	56	57	--	65	
8		--	--			--	a 40	51	a 64	a 74	--	
9		--	--			--	--	47	60	--	66	
10		31	--			--	34	a 45	65	--	a 69	
11		33	--			--	--	41	66	--	--	
12		32	--			--	37	35	70	a 80	--	
13		31	34			--	38	40	72	a 82	--	
14		31	--			--	--	42	71	--	--	
15		32	--			--	36	46	--	a 88	a 68	
16		34	--			--	38	a 61	65	a 83	60	
17		34	--			--	41	--	67	--	64	
18		32	--			--	--	54	67	--	--	
19		32	--			--	--	58	70	a 83	67	
20		31	--			--	41	56	60	a 89	65	
21		32	--			--	46	51	63	a 84	--	
22		31	--			a 34	a 49	49	61	63	--	
23		32	--			a 36	--	55	60	a 81	--	
24		32	--			a 36	--	a 64	64	--	--	
25		--	--			32	41	--	60	--	--	
26		--	--			34	48	a 66	59	a 84	--	
27		--	--			--	51	--	60	74	--	
28		--	--			33	54	a 64	54	--	--	
29		--	--			--	52	67	65	--	--	
30	38	--	--			33	42	55	67	--	--	
31		--	--			40	--	58	--	--	--	
Average		--	--			--	--	51	62	--	--	

a Reading obtained between 12 m. and 8 p.m.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	5.2			3.0	--	
2	0		0	4.2			2.5	104	
3	0		0	3.6			2.0	--	
4	0		0	7.7			2.5	--	
5	0		0	6.3			2.6	--	e1
6	0		0	6.0			3.0	--	
7	0		0	7.0	158	3	3.5	--	
8	0		0	6.5			4.0	--	
9	0		0	6.0			4.5	--	
10	0		0	8.0			5.0	--	
11	0		0	9.0			6.0		
12	0		0	10			7.0		
13	0		0	11			8.0	--	e2
14	0		0	12	170	6	9.0		
15	0		0	12	330	11	10		
16	0		0	11	135	4	12	--	
17	0		0	10			14	--	
18	0		0	10			15	--	
19	0		0	11			16	--	
20	0		0	11	112	3	16	--	e3
21	0		0	10			16	--	
22	0		0	8.0			15	--	
23	0		0	7.0			15	77	
24	0		0	7.5			13	--	
25	0		0	8.0			10	--	
26	0		0	7.0			9.5		
27	0		0	5.0	--	e2	9.0		
28	0		0	4.8			9.2	--	e1
29	1.1		e1	4.0			9.6		
30	3.0	219	2	3.5			10		
31	3.6		e2	--	--	--	10		
Total	7.7		5	232.3	--	96	271.9	--	56

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	10	--		21	--		18		
2	10	--		22	28		17		
3	10	--		22	--		17	--	e2
4	11	--		21	--		18		
5	9.6	--		20	--		20		
6	8.0	--		20	--		21	--	e3
7	8.5	--		20	--		23	--	e5
8	9.0	52		20	--		30	--	e10
9	9.5	--		20	--		35	--	e40
10	10	--		20	--		100	--	e200
11	11	--		19	--		90	620	151
12	11	--		18	--		80	470	102
13	10	--	e1	17	--		70	150	28
14	9.0	--		16	--		60		
15	7.0	--		16	--	e2	50	--	e20
16	8.0	--		15	40		46		
17	8.5	--		15	--		53	371	53
18	9.0	--		15	--		60	--	e100
19	9.0	56		15	--		55	--	e85
20	9.5	--		13	--		50	570	77
21	10	--		14	--		48	--	e75
22	11	--		15	--		46	--	e70
23	12	--		16	--		45	540	66
24	13	--		17	--		50	600	81
25	14	--		18	--		60	1,080	175
26	15			20	--		59	1,100	175
27	16			20	--		54	1,140	166
28	17	--	e2	19	--		51	1,350	s203
29	18			--	--	--	38	--	e100
30	19			--	--	--	32	615	53
31	20			--	--	--	30	330	27
Total	352.6	--	37	504	--	56	1,426	--	2,115

e Estimated.
s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	225	18	57	600	92	89	2,820	678
2	31	200	17	52	470	66	50	5,540	748
3	31			57	350	54	31	2,480	208
4	30			48	200	26	26	840	59
5	30			40	125	13	26	520	36
		136	11						
6	30			32			32	580	50
7	29			27			89	2,880	s 984
8	27			23			140	7,170	2,710
9	25			20			208	12,000	7,240
10	23			19	46	3	133	7,580	2,720
11	25			19			85	3,880	890
12	22			25			81	6,200	s 1,700
13	21	64	4	20			88	4,350	1,030
14	19			17			241	--	e30,000
15	18			14			822	46,800	s127,000
16	17			11			574	20,900	32,400
17	18			9.5			613	16,800	27,800
18	19			9.1			294	7,700	6,110
19	19			8.4			196	4,620	2,440
20	18			8.4			208	4,270	2,400
21	20			8.8	68	2	168	5,090	2,310
22	19			8.0			135	7,100	2,590
23	18	49	2	7.0			116	5,130	1,610
24	18			7.0			94	1,610	409
25	18			7.0			76	900	185
26	15			5.6			66	680	121
27	37	185	18	6.3			62	550	92
28	35	170	16	11	105	s 5	52	420	59
29	36	140	14	42	298	s 36	47	395	50
30	38	186	s 21	31	180	15	42	300	34
31	--	--	--	31	501	s 117	--	--	--
Total	736	--	226	681.1	--	477	4,884	--	254,663

Day	July			August			September		
1	37			0.3	--	(t)	0		0
2	34			16	--	e 900	.1		(t)
3	31			96	19,000	s 5,840	.1		(t)
4	26			37	5,200	519	0		0
5	23	164	12	17	2,490	s 134	0		0
6	21			13	430	15	0		0
7	17			19	550	28	0		0
8	15			13	--	e 15	0		0
9	14			9.8	260	7	0		0
10	12			6.5	180	3	0		0
11	12			4.5	150	2	0		0
12	9.2	129	3	3.3	--	e 1	0		0
13	7.5			1.9	--	e 1	0		0
14	5.9			1.0	121	(t)	0		0
15	4.5			115	20,800	s 17,600	0		0
16	6.9	130	2	32	15,300	s 1,570	0		0
17	5.0	--	e 1	12	1,390	45	0		0
18	4.2	--	e 1	5.3	--	e 7	0		0
19	4.2	51	1	3.1	345	3	0		0
20	3.3	88	1	1.9	155	1	0		0
21	8.5	185	4	1.3			0		0
22	11	118	4	.8			0		0
23	6.9	63	1	.6			0		0
24	3.8	--	e 1	.2	--	(t)	0		0
25	2.9	--	(t)	.1			0		0
26	2.2	59	(t)	.1			0		0
27	1.5	89	(t)	0	--	0	0		0
28	1.0	--	(t)	0	--	0	0		0
29	.7	--	(t)	0	--	0	0		0
30	2.2	--	(t)	0	--	0	0		0
31	.6	86	(t)	0	--	0	--		--
Total	334.0	--	135	410.7	--	26,692	0.2		(t)

Total discharge for year (cfs-days) 9,840.5
Total load for year (tons) 284,558

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

CRAZY WOMAN CREEK NEAR ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953...	9:05 a.m.	46	--	1,060	1,290	48	64	77	87	91	94	95	98		100		BWCM
Mar. 31.....	12:05 a.m.	30	48	276	1,080	44	57	74	84	90	93	97	99		100		BWCM
Apr. 17.....	11:40 a.m.	18	48	46	274	32	43	59	71	85	91	93	96		98	99	BWCM
May 1.....	12:55 p.m.	62	49	590	2,370	--	59	--	81	--	94	--	--		--		SPWCM
June 1	12:40 p.m.	89	69	3,180	3,170	--	0	--	86	--	99	--	--		--		SPN
June 1	12:40 p.m.	89	69	3,180	6,420	--	71	--	97	--	99	--	--		--		SPWCM
June 17	7:10 a.m.	683	--	24,200	6,450	--	2	--	77	--	90	--	--		--		SPN
June 17	7:10 a.m.	683	--	24,200	6,580	--	66	--	80	--	90	--	--		--		SPWCM
June 20	4:15 p.m.	233	--	4,040	2,610	--	9	--	47	--	79	--	--		--		SPN
June 20	4:15 p.m.	233	--	4,040	2,540	--	39	--	55	--	79	--	--		--		SPWCM
June 26	6:20 p.m.	65	--	632	2,520	--	58	--	75	--	85	--	--		--		SPWCM

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.

LOCATION.--At county highway bridge, 0.1 mile south of Arvada, Sheridan County, a quarter of a mile upstream from Wildhorse Creek, and half a mile downstream from gaging station.
DRAINAGE AREA.--6,050 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to July 1952, May to August 1953 (discontinued).
Water temperatures: March 1949 to September 1953.
Sediment records: April 1946 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 88°F July 8; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 103,000 ppm June 15; minimum daily, no flow Oct. 1-4, 9, Sept. 7-30.
Sediment loads: Maximum daily, 1,220,000 tons June 15; minimum daily, 0 tons Oct. 1-4, 9, Sept. 7-30.
EXTREMES, 1946-53.--Water temperatures (1949-53): Maximum, 88°F July 24, 26, 1951, July 8, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 103,000 ppm June 15, 1953; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 2,340,000 tons May 24, 1952; minimum daily, 0 tons on many days each year.
REMARKS.--There is no appreciable inflow between gaging station and sampling point except during periods of intense local rainfall. Flow affected by ice Nov. 22 to Mar. 12. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, May to August 1953

Date of collection	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					
May 13, 1953....	205			175	59	211	5.9							1,560	2.12		678		40	3.5	2,030	7.7	
May 30.....	382			126	46	135	5.9							1,100	1.50		503		37	2.6	1,460	7.4	
June 1.....	690			132	44	132	6.2							1,110	1.51		509		36	2.5	1,450	7.5	
June 17.....	1,340			243	48	82	8.6							1,420	1.93		804		18	1.3	1,650	6.9	
June 20	430			170	39	150	7.6							1,230	1.67		584		35	2.7	1,590	7.3	
Aug. 4	1,280			340	79	337	11							2,670	3.63		1,170		38	4.3	3,080	7.5	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 1 p. m. and 7 p. m. No flow Oct. 1-4, 9, Sept. 7-30./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	43	--	--	--	32	a40	a44	70	a70	a71	
2	--	a35	a32	--	--	--	46	46	65	a65	a70	a61
3	--	44	--	--	32	32	48	a44	60	86	65	
4	--	47	32	--	--	--	40	57	a55	--	74	
5	--	45	--	--	--	--	50	a46	55	--	77	
6	--	40	33	--	--	32	45	69	66	82	a65	
7	--	43	--	--	33	--	39	66	a58	a70	82	
8	--	36	--	32	--	--	38	66	a58	88	--	
9	--	42	32	--	--	34	a32	--	73	--	78	
10	57	38	--	--	--	36	38	50	75	a72	a63	
11	58	38	32	--	32	36	41	a38	82	a73	a58	
12	58	38	--	32	--	33	36	--	--	a75	a60	
13	45	41	--	--	--	35	45	43	83	--	78	
14	49	36	32	--	32	35	40	51	76	82	75	
15	51	39	--	--	--	37	38	62	66	78	76	
16	a40	37	--	--	32	40	38	a52	74	--	77	
17	a45	34	32	--	--	38	42	61	77	a60	78	
18	a40	38	--	32	--	40	a35	a52	77	a68	a73	
19	a41	38	--	--	--	--	45	65	61	a67	77	
20	a45	40	32	--	32	45	58	55	69	75	a66	
21	a43	--	--	32	--	a35	a45	52	74	a65	a67	
22	a40	--	--	--	32	a35	60	60	77	--	a60	
23	a43	--	--	--	--	36	65	a52	a64	a68	80	
24	a41	a32	32	32	--	44	61	a55	a60	--	73	
25	a44	--	--	--	--	48	a40	62	71	a65	78	
26	a40	--	--	32	33	51	59	62	a62	--	75	
27	a35	--	--	--	--	50	64	67	75	86	--	
28	a33	32	32	32	--	55	47	64	--	--	--	
29	a38	--	--	--	--	50	49	62	a64	68	--	
30	a42	32	--	--	--	54	46	66	80	--	a63	
31	a36	--	--	32	--	50	--	70	--	a65	a62	
Average	44	--	b32	b32	b32	41	46	57	69	--	71	

a Reading obtained between 6 a. m. and 10 a. m.
b Includes estimated temperature, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	51	350	48	26	--	e40
2	0	--	0	54	425	62	27	603	44
3	0	--	0	53	530	76	26	--	e35
4	0	--	0	54	580	85	27	460	34
5	.5			59	700	112	29	534	42
6	.4	--	(t)	63	720	122	35	402	38
7	.1			62	820	137	40	--	e40
8	.2			66	835	149	45	--	e45
9	0	--	0	66	925	165	43	384	45
10	8.7	110	s4	63	1,240	211	40	--	e30
11	19			65	1,290	226	43	254	30
12	23			83	2,260	s541	50	--	e35
13	28	160	11	81	1,860	407	56	--	e35
14	30			89	1,760	423	60	227	37
15	33			101	2,380	649	64	--	e35
16	34	223	20	107	2,460	711	64	--	e35
17	34			107	2,250	650	62	193	32
18	32			108	2,150	627	60	--	e30
19	34			108	2,000	583	62	--	e30
20	37			108	1,920	560	58	184	29
21	38			106	--	e500	60	--	e35
22	38			80	--	e250	58	--	e40
23	40			60	--	e100	56	264	40
24	44			50	232	31	50	299	40
25	44	311	36	35	--	e30	45	--	e35
26	44			25	--	e25	47		
27	44			21	--	e25	48		
28	44			19	436	22	49	276	37
29	44			22	--	e25	50		
30	47			24	451	29	51	--	e40
31	49			--	--	--	54		
Total	789.9	--	580	1,990	--	7,581	1,485	--	1,138

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	56			140	--	e90	135	204	74
2	60			134	224	81	130	--	e75
3	66			140	170	64	126	223	76
4	64	--	e50	150	--	e70	140	--	e80
5	62			155	--	e80	150	--	e90
6	54			153	190	79	155	250	105
7	60			140	228	86	160	--	e120
8	70	351	66	130	--	e80	160	--	e130
9	80	--	370	125	--	e70	162	300	131
10	82	--	e70	120	--	e60	200	565	305
11	64	--	e50	128	158	55	400	1,290	1,390
12	85	167	38	130	--	e50	1,400	10,200	s86,800
13	80			130	--	e40	1,240	18,700	62,600
14	70	--	e35	110	108	32	722	14,300	27,900
15	60			100	--	e35	521	13,300	18,700
16	70	--	e40	90	148	36	424	10,800	12,400
17	76	--	e50	95			437	11,900	14,000
18	80	237	51	90	--	e35	304	8,400	6,900
19	83	--	e60	85			260	5,600	3,930
20	80	--	e60	70	178	34	250	5,000	3,380
21	80	272	59	80	--	e40	220	4,520	2,680
22	80	--	e50	90	174	42	180	3,700	1,800
23	84	--	e40	100	--	e45	180	4,060	1,970
24	90	168	41	106	162	46	160	3,520	1,520
25	92	--	e45	110	--	e45	160	3,570	1,540
26	90	184	45	130	112	39	160	3,240	1,400
27	89	158	38	150	--	e50	160	3,140	1,360
28	90	248	60	140	--	e70	160	2,890	1,250
29	100	--	e70	--	--	--	165	2,980	1,330
30	120	--	e70	--	--	--	165	2,560	1,140
31	130	205	72	--	--	--	165	2,510	1,120
Total	2,467	--	1,600	3,321	--	1,524	9,351	--	256,296

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

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	170	2,400	1,100	155	2,300	963	626	14,700	24,800
2	185	2,550	1,270	185	2,100	1,050	472	14,200	18,100
3	190	2,430	1,250	205	2,200	1,220	388	14,300	15,000
4	175	2,600	1,230	230	2,550	1,580	346	8,590	8,020
5	165	2,100	936	155	2,170	908	288	5,950	4,630
6	175	2,100	992	118	2,000	637	334	5,250	4,730
7	190	2,340	1,200	127	1,860	638	575	17,000	s43,500
8	185	2,700	1,350	130	2,220	779	1,530	65,900	s326,000
9	250	3,010	2,030	116	--	e650	878	47,200	116,000
10	310	5,220	4,370	107	1,980	572	626	19,500	33,000
11	272	5,000	3,670	94	1,500	381	430	14,700	17,100
12	230	5,100	3,170	134	2,400	868	340	11,000	10,100
13	210	4,200	2,380	170	3,580	1,640	506	20,000	s29,400
14	195	4,030	2,120	141	2,800	1,070	424	13,600	15,600
15	165	3,410	1,520	120	2,200	712	4,340	103,000	s1,220,000
16	165	2,900	1,290	111	1,830	548	1,230	52,200	180,000
17	190	2,990	1,530	105	1,600	454	1,200	31,600	102,000
18	195	2,780	1,460	98	1,370	362	842	48,500	114,000
19	200	2,450	1,320	89	1,250	300	542	33,000	50,100
20	185	2,740	1,370	96	1,390	360	521	22,500	s35,100
21	175	2,620	1,240	111	1,580	474	493	17,500	s24,500
22	165	2,420	1,080	127	1,850	634	376	12,000	12,200
23	155	2,360	988	155	2,800	1,170	277	11,800	8,830
24	144	2,150	836	215	4,200	2,440	250	7,200	4,860
25	127	1,910	655	185	4,200	2,100	220	4,630	2,750
26	111	1,750	524	160	3,830	1,650	195	3,620	1,910
27	111	1,670	500	134	3,380	1,220	165	2,840	1,260
28	141	2,030	773	210	4,980	2,820	155	3,470	1,450
29	127	2,000	686	220	4,650	2,760	152	4,550	1,870
30	144	2,350	914	406	7,750	8,500	144	4,030	1,570
31	--	--	--	507	11,900	16,300	--	--	--
Total	5,402	--	43,754	5,116	--	55,760	18,865	--	2,428,380

Day	July			August			September		
1	116	2,050	642	159	65,200	29,000	0.4		
2	98	1,200	318	151	50,500	s38,900	1.0	174	1
3	85	880	202	2,870	77,400	s696,000	2.2		
4	74	--	e150	1,170	82,400	s306,000	1.5		
5	60	620	100	539	62,500	94,300	.5	--	(t)
6	50	480	65	220	41,800	25,700	.3	--	(t)
7	42	380	43	155	31,800	13,300	0	--	0
8	35	390	37	116	29,000	9,080	0	--	0
9	31	250	21	85	22,000	5,050	0	--	0
10	25	300	30	72	10,000	1,940	0	--	0
11	24	1,130	73	64	7,900	1,370	0	--	0
12	22	300	18	56	4,400	665	0	--	0
13	17	--	e10	41	2,000	221	0	--	0
14	15	200	8	31	1,500	126	0	--	0
15	115	150	6	351	38,400	s76,000	0	--	0
16	29	4,370	s364	298	46,200	s45,200	0	--	0
17	74	28,500	s18,400	78	15,500	s3,640	0	--	0
18	80	21,800	4,710	37	2,520	s293	0	--	0
19	96	16,800	s5,000	89	16,300	s4,860	0	--	0
20	87	23,500	5,520	52	12,000	1,680	0	--	0
21	261	89,900	68,200	97	16,000	sa11,000	0	--	0
22	141	64,800	25,600	91	6,890	s2,040	0	--	0
23	102	51,000	14,600	21	620	35	0	--	0
24	80	36,500	8,180	12	268	9	0	--	0
25	61	23,000	3,790	8.0	268	6	0	--	0
26	45	--	e1,000	4.5	228	3	0	--	0
27	39	4,200	442	2.0			0	--	0
28	37	4,200	420	1.7			0	--	0
29	146	11,000	sa15,000	1.5	180	1	0	--	0
30	26	--	e770	.9			0	--	0
31	36	13,000	sa9,100	.6			--	--	--
Total	2,149	--	182,809	6,874.2	--	1,366,423	5.9	--	4

Total discharge for year (cfs-days) 57,816.0
Total load for year (tons) 4,345,849

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

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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. 14, 1953	12:30 p.m.	626	34	14,400	3,240		2		81		89	--	--	--			SPN
Mar. 14	12:30 p.m.	626	34	14,400	3,170		65		89		89	--	--	--			SPWCM
Mar. 23	12:10 p.m.	240	36	5,950	4,450		0		42		74	91	99	100			SPN
Mar. 23	12:10 p.m.	240	36	5,950	4,470		34		50		74	91	99	100			SPWCM
Mar. 28	11:55 a.m.	175	45	2,700	4,170		45		63		78	93	99	100			SPWCM
Mar. 31	11:10 a.m.	180	48	2,500	4,220		43		60		78	93	99	100			SPWCM
Apr. 17	10:55 a.m.	195	36	3,280	1,870		3		63		73	90	99	--			SPN
Apr. 17	10:55 a.m.	195	36	3,280	1,990		48		70		73	90	99	--			SPWCM
Apr. 22	5:35 p.m.	155	60	2,320	3,650		44		60		77	94	100	--			SPWCM
May 1	10:35 a.m.	165	--	2,140	4,460		51		71		90	--	--	--			SPWCM
May 5	12:10 p.m.	165	--	2,220	2,650		45		59		79	93	100	--			SPWCM
May 13	11:25 a.m.	205	41	4,120	3,700		2		57		78	91	99	100			SPN
May 13	11:25 a.m.	205	41	4,120	3,810		46		65		78	91	99	100			SPWCM
May 30	2:10 p.m.	382	--	6,940	5,820		2		58		84	--	--	--			SPN
May 30	2:10 p.m.	382	--	6,940	5,950		44		68		84	--	--	--			SPWCM
June 1	10:15 a.m.	690	67	14,400	5,620		1		60		86	--	--	--			SPN
June 1	10:15 a.m.	690	67	14,400	5,680		42		66		86	--	--	--			SPWCM
June 4	4:15 p.m.	334	--	7,790	4,810		58		80		88	--	--	--			SPWCM
June 9	1:25 p.m.	914	--	40,200	3,920		56		80		93	--	--	--			SPWCM
June 16	6:25 p.m.	986	--	28,400	4,910		51		72		88	--	--	--			SPWCM
June 17	10:40 a.m.	1,360	--	35,400	4,710		2		59		90	--	--	--			SPN
June 17	10:40 a.m.	1,360	--	35,400	4,840		52		71		90	--	--	--			SPWCM
June 20	1:20 p.m.	430	69	15,400	3,400		5		88		95	--	--	--			SPN
June 20	1:20 p.m.	430	69	15,400	3,280		69		89		95	--	--	--			SPWCM
July 3	2:15 p.m.	89	86	840	2,090		64		78		88	--	--	--			SPWCM

July 18, 1953...	10:15 a.m.	84	--	25,100	4,190	84	88	99	--	--	--		SPWCM
July 21.....	9:35 a.m.	288	70	93,600	8,940	70	95	97	--	--	--		SPWCM
Aug. 1.....	11:40 a.m.	152	--	81,900	3,880	71	95	96	--	--	--		SPWCM
Aug. 3.....	10:45 a.m.	3,560	--	81,900	3,770	3	55	88	--	--	--		SPN
Aug. 3.....	10:45 a.m.	3,560	--	81,900	3,700	47	66	85	--	--	--		SPWCM
Aug. 4.....	5:10 p.m.	1,270	--	103,000	6,190	1	71	[illegible]	--	--	--		SPN
Aug. 4.....	5:10 p.m.	1,270	--	103,000	6,080	49	78	93	--	--	--		SPWCM
Aug. 20.....	10:40 a.m.	58	--	18,000	6,270	1	67	10[illegible]	--	--	--		SPN
Aug. 20.....	10:40 a.m.	58	--	18,000	5,300	80	100	--	--	--	--		PWCM

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 1953.
Water temperatures: March 1950 to September 1953 (discontinued).
Sediment records: March 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures: Maximum, 83°F July 8; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 17,600 ppm May 28; minimum daily, not determined.
Sediment loads: Maximum daily, 25,800 tons July 30; minimum daily, less than 0.50 ton July 7-12.
EXTREMES, 1950-53.--Water temperatures: Maximum, 83°F July 8, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 17,600 ppm May 28, 1953; minimum daily, not determined.
Sediment loads: Maximum daily, 25,800 tons July 30, 1953; minimum daily, less than 0.50 ton on many days.
REMARKS.--Flow affected by ice Nov. 24 to Mar. 15. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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. 23, 1952...	66			--	--	--	--	293	720	--				--	--		828	588	--	--	1,630	8.1	
Nov. 13	77			148	89	127		274	745	7.0				--	--		734	509	27	2.0	1,650	7.8	
Dec. 24	a58			--	--	94	--	309	555	6.5				--	--		--	--	24	--	1,420	8.1	
Jan. 27, 1953...	a112			--	--	78	--	250	475	6.5				--	--		--	--	24	--	1,220	7.6	
Feb. 16	a84			--	--	81	--	269	503	6.0				--	--		--	--	23	--	1,280	7.8	
Mar. 28.....	134			--	--	80	--	230	480	5.5				--	--		--	--	25	--	1,200	8.1	
Apr. 16	100			--	--	87	--	249	523	6.5				--	--		--	--	25	--	1,320	7.9	
May 20.....	54			--	--	71	--	206	388	4.5				--	--		--	--	27	--	1,050	8.2	
June 1	958			35	8.1	13	1.6	--	--	--				200	0.27		121	--	19	.5	301	7.5	
June 26	211			--	--	46	--	156	258	1.5				--	--		--	--	25	--	757	7.5	
Aug. 4	159			125	36	65	8.5	--	--	--				836	1.14		462	--	23	1.3	1,100	7.4	
Aug. 20	36			--	--	117	--	242	598	5.0				--	--		--	--	31	--	1,440	7.4	
Sept. 4	12			--	--	157	--	252	860	6.5				--	--		--	--	31	--	1,850	7.6	

a Mean daily discharge.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 6 a. m. and 10 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	50	a43				--	a54	46	57	73	69	66
2	a54	35	a32			--	43	--	60	65	70	64
3	52	--				--	37	--	57	80	64	54
4	--	--				--	40	--	54	--	61	52
5	42	--				--	43	a63	52	65	65	53
6	--	--				--	46	a70	52	--	64	56
7	37	--				--	a40	a64	55	66	65	58
8	--	--				--	--	a70	50	a83	68	64
9	45	32				--	a40	b2	59	67	67	63
10	--	--				--	a35	43	65	--	65	60
11	45	33				--	--	43	66	67	65	58
12	--	--				a32	31	a41	67	--	63	60
13	47	33				--	--	40	60	68	65	--
14	--	--				--	40	54	61	--	68	--
15	--	--				--	a48	43	60	73	60	55
16	--	--				--	a44	51	60	67	67	58
17	44	--				--	42	--	61	64	68	62
18	--	--				--	--	a50	67	--	68	54
19	42	--				--	a44	a65	68	70	66	54
20	--	--				--	44	--	60	70	66	54
21	43	--				--	46	51	--	65	67	47
22	--	--				--	56	a35	64	65	68	52
23	43	--				--	a60	51	65	68	66	58
24	--	--				--	50	54	62	--	66	56
25	45	--				--	43	a62	58	68	63	49
26	--	--				--	47	a62	a69	68	63	50
27	a48	--				--	57	a65	61	71	62	49
28	--	--				a52	--	57	65	70	64	a59
29	37	--				42	50	59	65	70	63	50
30	--	--				a55	46	54	70	71	65	50
31	38	--				a55	--	53	--	70	65	--
Average	--	--	b32	b32	b32	--	45	55	61	--	66	56

a Reading obtained between 11 a. 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 1952 to September 1953

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	92	32	8	68	18		68	--	
2	96	30	8	68	27		70	68	
3	61	41	7	68	--		72	--	
4	48			68	--		74	--	
5	48			67	--		75	--	
6	44			67	--		78	--	
7	44			70	--		80	--	
8	49			70	--	e 4	80	--	e 10
9	58			70	11		77	--	
10	61	24	3	72	--		74	--	
11	61			68	26		76	--	
12	58			66	--		78	--	
13	56			74	16		78	--	
14	62			84	--		76	--	
15	61			86	--		74	--	
16	60			90	--		72	--	
17	64			92	--		72	--	
18	64			96	--		72	--	
19	64			92	--		70	--	
20	62			96	--		66	--	
21	62			94	--		64	--	
22	62			74	--		62	--	
23	66			67	--	e 10	60	--	
24	66	15	3	66	48		58	20	e 4
25	61			64	--		56	--	
26	66			62	--		54	--	
27	68			60	--		54	--	
28	66			58	--		56	--	
29	68			62	--		58	--	
30	70			64	--		61	--	
31	68			--	--	--	64	--	
Total	1,936	--	107	2,203	--	210	2,129	--	214

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	66	--		130	--		84	--	
2	68	--		120	10		80	--	
3	70	--		125	--		82	24	e 5
4	68	--		120	--		90	--	
5	66	--		120	--	e 10	110	--	
6	62	--		118	56		130	--	e 10
7	66	--		110	--		150	--	e 25
8	70	20		100	--		165	--	e 50
9	76	--		90	--		190	202	104
10	80	--		75	--		215	--	e 150
11	82	--		71	34		250	--	e 200
12	82	--	e 4	74	--		235	248	157
13	76	--		78	--		230	176	109
14	66	--		80	--		230	--	e 90
15	50	--		82	--		230	120	74
16	54	--		84	14		226	252	154
17	56	--		86	--		187	114	58
18	58	--		80	--		185	123	61
19	60	--		72	--	e 5	169	110	50
20	62	--		60	--		151	38	15
21	68	--		68	--		151	--	e 15
22	76	--		78	--		144	--	e 10
23	86	--		87	--		126	--	e 8
24	100	--		89	23		108		
25	120	--		95	--		113		
26	115	--		100	--		120		
27	112	36	e 12	95	--		129	19	6
28	110	--		90	--		131		
29	115	--		--	--	--	122		
30	120	--		--	--	--	106		
31	125	--		--	--	--	110		
Total	2,485	--	88	2,577	--	180	4,749	--	1,413

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	113			198	86	46	988	1,580	4,210
2.....	148			154	40	17	982	888	2,350
3.....	138			126			1,010	655	1,790
4.....	124			113			982	660	1,750
5.....	117	21	7	100	20	5	735	598	1,150
6.....	124			83			650	565	992
7.....	122			67			625	422	712
8.....	126			72			590	1,430	2,280
9.....	129			154	62	26	586	425	672
10.....	110			229	90	56	506	262	358
11.....	90			224	84	51	775	648	1,360
12.....	100			179	25	12	1,020	864	2,380
13.....	98	15	4	141			1,000	626	1,690
14.....	94			131			1,210	599	1,960
15.....	96			115			1,810	4,450	s 24,200
16.....	92			84			1,860	1,800	9,040
17.....	96			67			1,220	936	3,080
18.....	96			62			940	570	1,450
19.....	83			62	17	4	946	577	1,470
20.....	79			53			850	853	1,960
21.....	72			58			710	337	646
22.....	77			88			486	206	270
23.....	68	18	4	92			360	143	139
24.....	60			84			286	98	76
25.....	98			86	54	13	234	68	43
26.....	122			248	390	s 277	192	50	26
27.....	96			283	12,700	s 12,500	151	32	13
28.....	92			498	17,600	s 25,200	110		
29.....	154	52	22	874	5,750	13,600	92	28	7
30.....	205	105	58	1,560	3,410	14,400	70		
31.....	--	--	--	1,120	1,220	3,690	--	--	--
Total.	3,219	--	219	7,405	--	69,966	21,976	--	66,128

Day	July			August			September		
1.....	50			51	400	55	17	32	1
2.....	32			243	7,600	s 14,700	18	382	19
3.....	19			455	11,100	s 17,300	15	168	7
4.....	11	32	2	187	1,950	984	12	130	4
5.....	7.8			187	572	289	12	135	4
6.....	19			117	226	71	13	160	6
7.....	9.2			88	125	30	14	160	6
8.....	3.7			81	84	18	12	158	5
9.....	1.7			56	50	8	10	120	3
10.....	1.7	49	(t)	48	52	7	10	121	3
11.....	4.4			48	44	6	12	78	2
12.....	1.7			54	58	8	11	22	1
13.....	16	46	2	50	48	6	11	--	e 1
14.....	31	--	e 4	43	90	10	9.2	--	e 2
15.....	18	61	3	47	48	6	7.1	90	2
16.....	27	872	s 94	50			7.1	95	2
17.....	12	225	7	44			7.7	80	2
18.....	30	--	e 15	39			10	50	1
19.....	34	220	20	39			16	88	4
20.....	27	175	13	37			18	52	3
21.....	19	150	8	35			18		
22.....	13	120	4	31			17		
23.....	10	110	3	30	56	5	18		
24.....	5.8	--	e 2	28			18		
25.....	33	157	s 17	28			12		
26.....	66	130	23	22			18	31	1
27.....	66	120	21	21			18		
28.....	67	132	24	23			9.2		
29.....	56	122	18	22			13		
30.....	475	13,300	s 25,800	21			11		
31.....	115	4,440	s 1,510	17			--	--	--
Total.	1,282.0	--	27,603	2,242	--	33,578	394.3	--	88

Total discharge for year (cfs-days) 52,597.3
Total load for year (tons) 199,894

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

YELLOWSTONE RIVER BASIN--Continued

CLEAR CREEK NEAR ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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. 15, 1953	5:00 p.m.	a230	--	347	508	10	18	27	46	61	80	89	97	--	100	--	BWCM
May 1	5:40 p.m.	187	--	52	431	40	54	63	76	89	95	97	99	--	100	--	BWCM
May 27	6:05 p.m.	502	63	33,900	5,520	--	45	--	74	--	95	--	--	--	--	--	SPWCM
May 30	8:20 a.m.	1,660	54	4,160	4,340	--	8	--	37	--	80	88	96	98	99	100	SPN
May 30	8:20 a.m.	1,660	54	4,160	4,530	--	33	--	53	--	80	88	96	98	99	100	SPWCM
June 1	2:40 p.m.	940	--	764	1,330	--	10	--	32	--	66	77	90	95	98	99	SPN
June 1	2:40 p.m.	940	--	764	1,210	--	35	--	41	--	66	77	90	95	98	99	SPWCM
June 17	12:40 p.m.	1,170	66	919	1,970	--	28	--	45	--	76	84	93	96	98	98	SPWCM
Aug. 4	11:15 a.m.	156	--	1,880	4,830	--	5	--	100	--	--	--	--	--	--	--	PN
Aug. 4	11:15 a.m.	156	--	1,880	3,980	--	84	--	99	--	100	--	--	--	--	--	SPWCM

a Mean daily discharge.

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 1953 (discontinued).
Water temperatures: February 1951 to September 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 3,460 ppm July 22-24; minimum, 412 ppm Oct. 1-7.
Hardness: Maximum, 1,510 ppm Aug. 2-3; minimum, 206 ppm Oct. 1-7.
Specific conductance: Maximum daily, 4,100 micromhos July 22; minimum daily, 234 micromhos Oct. 7.
Water temperatures: Maximum, 87°F July 19; minimum, freezing point on several days during November to January.
EXTREMES, 1951-53.--Dissolved solids: Maximum (1951, March 1952 to September 1953), 3,460 ppm July 22-24, 1953; minimum, 412 ppm Oct. 1-7, 1952.
Hardness: Maximum, 1,510 ppm Aug. 2-3, 1953; minimum, 206 ppm Oct. 1-7, 1952.
Specific conductance: Maximum daily (1951, March 1952 to September 1953), 4,100 micromhos July 22, 1953; minimum daily, 234 micromhos Oct. 7, 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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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					
Oct. 1-7, 1952 ..	62.6			46	22	45		84	219	8.5		1.3	0.06	412	0.56	69.6	206	137	32	1.4	615	7.4	
Oct. 8	45.0			126	88	155		240	790	10		5.7	.17	1,420	1.93	173	676	479	32	2.6	1,700	8.0	
Oct. 9-16	65.1			91	49	96		138	498	18		2.4	.09	880	1.20	155	430	317	32	2.0	1,180	7.4	
Oct. 17	86.0			212	99	216		260	1,070	70		2.0	.18	1,950	2.65	453	936	723	33	3.1	2,300	7.5	
Oct. 18	89.0			106	51	110		136	535	37		3.6	.12	986	1.34	237	476	364	33	2.2	1,280	7.8	
Oct. 19-20.....	89.0			175	97	194		252	955	63		1.6	.22	1,760	2.39	423	837	630	33	2.9	2,130	7.9	
Oct. 21-31.....	101			82	38	84		114	403	29		1.8	.09	738	1.00	201	360	267	33	1.9	1,030	7.4	
Nov. 1-2.....	114			172	91	183		262	885	64		.7	.18	1,670	2.27	514	804	589	32	2.8	2,050	7.8	
Nov. 3-22	151			196	90	192		271	945	70		3.0	.18	1,760	2.39	718	858	636	32	2.8	2,150	7.7	
Nov. 23-30	91.9			262	132	230		438	1,230	60		6.2	.25	2,330	3.17	578	1,200	841	29	2.9	2,670	7.9	
Dec. 1-2	87.5			268	127	230		434	1,200	59		6.7	.26	2,350	3.20	555	1,190	834	30	2.9	2,650	7.7	
Dec. 3-26	106			175	81	147		323	730	47		4.4	.16	1,480	2.01	424	770	505	29	2.3	1,830	7.8	
Dec. 27-31	106			201	100	184		356	865	79		6.1	.19	1,790	2.43	512	912	620	30	2.7	2,170	7.8	
Jan. 1-12, 1953 .	117			186	76	150		333	725	54		5.7	.16	1,520	2.07	480	783	510	29	2.3	1,870	7.8	
Jan. 13-Feb. 2 .	169			164	62	134		257	640	48		4.9	.12	1,300	1.77	562	665	454	30	2.3	1,640	7.8	
Feb. 3-8	238			143	56	119		223	588	49		4.5	.11	1,180	1.60	758	589	406	30	2.1	1,520	8.0	
Feb. 12	210			159	63	141		244	658	64		5.3	.13	1,340	1.82	760	656	456	31	2.4	1,700	8.2	
Feb. 23	170			191	73	167		296	770	76		6.5	.15	1,570	2.14	721	776	533	31	2.6	1,970	8.0	
Feb. 26	200			163	69	139		280	663	58		6.0	.13	1,370	1.86	740	690	480	30	2.3	1,730	8.1	
Mar. 2.....	180			149	60	124		246	608	52		6.0	.12	1,240	1.69	603	620	418	30	2.2	1,590	8.0	
Mar. 5.....	230			162	67	142		260	655	65		6.2	.12	1,370	1.86	851	680	467	31	2.4	1,730	8.0	
Mar. 8-10.....	260			113	47	97		188	460	38		4.0	.10	956	1.30	671	474	320	31	1.9	1,260	8.1	

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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					
Mar. 11-12, 1953.	450			111	45	94		178	455	39		4.3	0.11	922	1.25	1,120	462	316	30	1.9	1,230	8.2	
Mar. 13-14	1,210			175	54	185		198	800	51		6.3	.15	1,490	2.03	4,870	660	498	30	3.1	1,890	7.8	
Mar. 15-18	809			173	52	181		188	800	50		6.2	.15	1,470	2.00	3,210	646	492	37	3.1	1,870	7.6	
Mar. 19-31	386			168	60	170		213	765	57		4.5	.14	1,450	1.97	1,510	664	489	35	2.9	1,840	7.8	
Apr. 1-28.....	276			161	64	174		224	743	64		3.3	.14	1,450	1.97	1,080	665	481	36	2.9	1,840	8 0	
Apr. 29-May 25 ..	274			132	45	135		189	550	49		2.4	.14	1,090	1.48	806	513	358	36	2.6	1,440	7.3	
May 26-28	524			113	37	100		180	443	30		2.7	.13	890	1.21	1,260	434	286	33	2.1	1,190	7.1	
May 29	1,020			100	24	65		196	288	21		.7	.08	652	.89	1,800	348	187	29	1.5	914	7.5	
May 30-31	1,690			69	18	42		148	184	12		.9	.09	446	.61	2,040	244	123	27	1.2	641	7.3	
June 1-6.....	1,370			67	19	57		140	220	19		.7	.07	498	.68	1,840	246	131	33	1.6	717	7.3	
June 7	1,910			93	29	39		248	223	6.0		1.3	.11	596	.81	3,070	352	149	19	.9	807	6.9	
June 8	2,030			152	44	84		224	510	24		.5	.08	1,010	1.37	5,540	558	374	24	1.5	1,240	6.9	
June 9	1,720			246	60	108		278	820	18		.3	.10	1,530	2.08	7,110	862	634	21	1.6	1,780	6.6	
June 10-14	1,350			88	24	59		141	307	12		2.2	.06	614	.84	2,240	319	203	28	1.4	845	6.9	
June 15.....	4,850			239	53	59		180	740	7.0		13	.12	1,350	1.84	17,700	816	668	14	.9	1,560	6.9	
June 16	5,070			259	47	48		212	740	6.0		.2	.06	1,330	1.81	18,200	838	664	11	.7	1,490	6.8	
June 17-22.....	1,640			121	26	65		139	408	13		1.6	.11	768	1.04	3,400	410	296	25	1.4	1,010	7.2	
June 23-27	455			108	34	90		154	435	21		4.1	.11	814	1.11	1,000	409	283	32	1.9	1,110	7.6	
June 28-30.....	255			133	44	121		172	565	33		3.4	.17	1,090	1.48	750	514	373	34	2.3	1,390	7.7	
July 1-6	122			166	57	164		192	735	50		2.3	.12	1,380	1.88	455	649	492	35	2.8	1,750	7.2	
July 7-21	60.1			262	91	220		190	1,230	64		2.9	.17	2,140	2.91	347	1,030	874	31	3.0	2,460	7.2	
July 22-24	147			388	118	457		268	1,990	130		4.7	.32	3,460	4.71	1,370	1,450	1,230	40	5.2	3,850	6.8	
July 25-29	119			235	90	276		218	1,290	48		5.2	.24	2,230	3.03	716	956	777	38	3.9	2,660	7.0	
July 30-Aug. 1 ...	404			192	54	102		232	685	16		3.8	.15	1,280	1.74	1,400	702	512	24	1.7	1,570	7.0	
Aug. 2-3.....	1,610			452	93	134		194	1,560	23		14	.15	2,590	3.52	11,300	1,510	1,350	16	1.5	2,690	6.7	
Aug. 4	1,590			373	74	107		338	1,180	17		.3	.15	2,060	2.80	8,840	1,240	963	15	1.3	2,270	7.0	
Aug. 5	1,240			318	77	277		424	1,230	88		.2	.30	2,350	3.20	7,870	1,110	762	34	3.6	2,760	7.1	
Aug. 6-15	201			217	63	242		218	1,020	57		4.5	.28	1,860	2.53	1,010	802	623	40	3.7	2,270	7.2	
Aug. 16	326			403	107	253		402	1,560	118		.5	.27	2,790	3.79	2,460	1,450	1,120	26	2.9	3,060	6.9	

Aug. 17-24, 1953 .	116			275	70	147		173	1,070	26		6.0	.19	1,870	2.54	586	972	830	25	2.1	2.110	7.1
Aug. 25-Sept. 1 ..	27.4			178	81	153		192	900	16		4.7	.20	1,590	2.16	118	778	621	30	2.4	1,880	7.7
Sept. 2-4	28.0			141	57	121		172	665	9.0		5.4	.14	1,190	1.62	90.0	586	445	31	2.2	1,480	7.7
Sept. 5-18	10.9			194	107	219		213	1,150	20		3.3	.28	2,020	2.75	59.4	925	750	34	3.1	2,310	7.9
Weighted average [a]	325			166	50	117		203	641	34		3.5	0.13	1,220	1.66	1,070	620	454	29	2.0	1,510	--
Weighted average [b]	306			166	51	118		205	643	35		3.6	0.13	1,230	1.67	1,020	624	456	29	2.0	1,520	--

a Represents 96 percent of runoff for water year October 1952 to September 1953.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT MOORHEAD, MONT.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/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	60	47	32	34	--	--	47	56	67	77	--	72
2	65	45	31	36	--	a33	48	50	65	79	76	66
3	60	43	35	35	--	--	50	50	65	80	78	60
4	55	42	34	a38	33	--	54	54	55	80	72	67
5	--	40	33	32	34	a34	55	62	66	80	74	75
6	--	40	37	32	35	--	54	70	64	83	74	77
7	56	40	35	--	--	--	50	68	55	79	77	76
8	60	39	a38	35	--	--	38	60	56	78	76	77
9	62	38	34	35	--	38	38	75	70	85	78	73
10	61	40	35	35	--	a36	40	65	--	79	65	76
11	--	42	34	36	--	48	43	60	78	84	78	75
12	60	40	37	38	a33	50	45	55	76	84	80	73
13	51	42	36	35	--	38	47	a58	79	86	77	70
14	49	40	35	a32	--	--	41	58	75	--	75	72
15	50	39	34	32	--	35	--	60	65	85	--	70
16	49	a38	32	36	--	40	45	58	70	76	75	68
17	55	37	34	38	--	38	42	61	75	83	79	65
18	56	38	a34	37	--	38	43	63	76	82	80	65
19	57	36	32	a37	--	38	47	64	70	87	79	--
20	57	33	33	35	--	43	--	60	69	78	84	--
21	57	32	33	35	--	44	43	62	70	78	77	--
22	56	32	33	38	--	40	62	62	77	80	76	--
23	56	33	34	38	a33	41	59	60	77	--	79	--
24	--	32	34	39	--	43	60	62	65	75	80	--
25	--	32	33	38	--	45	59	65	71	84	79	--
26	50	32	34	37	a35	46	62	66	69	76	70	--
27	45	32	33	38	--	47	63	64	74	82	79	--
28	50	32	33	39	--	55	60	66	78	73	--	--
29	52	34	34	37	--	48	67	67	79	--	76	--
30	50	33	35	39	--	48	59	63	83	80	82	--
31	48	--	33	35	--	49	--	65	--	80	78	--
Average	55	37	34	36	--	--	51	62	70	80	77	--

a Reading obtained between 10 a. m. and 1 p. m.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 12 at present site of Locate, (5 miles west of former site of Locate), Custer County; 3 miles upstream from Locate Creek and 25 miles east of Miles City.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1953.
Water temperatures: February 1951 to September 1953.
Sediment records: March 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,750 ppm Nov. 27 to Dec. 7; minimum, 560 ppm June 3-8.
Hardness: Maximum, 1,200 ppm Aug. 6-7; minimum, 185 ppm May 10-11.
Specific conductance: Maximum daily, 3,290 micromhos Nov. 29; minimum daily, 727 micromhos June 8.
Water temperatures: Maximum, 85°F July 10, 15, 17-19; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 60,000 ppm Aug. 6; minimum daily, not determined.
Sediment loads: Maximum daily, 803,000 tons June 17; minimum daily, not determined.
EXTREMES, 1950-53.--Dissolved solids (1951-53): Maximum, 2,750 ppm Nov. 27 to Dec. 7, 1952; minimum, 278 ppm Mar. 29, 1952.
Hardness (1951-53): Maximum, 1,200 ppm Aug. 6-7, 1953; minimum, 108 ppm Mar. 29, 1952.
Specific conductance (1951-53): Maximum daily, 3,290 micromhos Nov. 29, 1952; minimum daily, 407 micromhos Feb. 14, 1952.
Water temperatures (1951-53): Maximum, 85°F on several days during July 1952, 1953; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 60,000 ppm Aug. 6, 1953; 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. 21 to Mar. 15. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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)	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				
Oct. 1-31, 1952	53.7			168	80	242		262	0	985	40		1.2	0.17	1,770	2.41	257	750	535	41	3.8	2,190	8.0
Nov. 1-22	104			179	89	237		267	0	1,010	59		2.2	.20	1,850	2.52	519	814	595	38	3.6	2,210	8.0
Nov. 23-26	104			234	108	271		334	0	1,230	77		3.9	.20	2,300	3.13	646	1,030	756	35	3.7	2,650	8.2
Nov. 27-Dec. 7	95.9			269	124	362		413	0	1,480	86		4.7	.23	2,750	3.74	712	1,180	841	39	4.6	3,140	7.8
Dec. 8-15	112			254	118	294		458	0	1,300	62		4.6	.21	2,460	3.35	744	1,120	744	35	3.8	2,800	8.0
Dec. 16-31	93.8			207	99	224		387	0	1,020	56		4.2	.19	1,940	2.64	491	922	605	33	3.2	2,290	8.0
Jan. 1-31, 1953	122			198	82	206		346	0	880	58		4.2	.14	1,780	2.42	586	830	546	35	3.1	2,160	7.8
Feb. 1-28	205			165	62	158		260	0	720	51		3.8	.12	1,400	1.90	775	668	455	33	2.7	1,780	8.0
Mar. 1-8	166			161	66	172		274	0	750	56		3.9	.14	1,440	1.96	645	672	447	34	2.9	1,810	8.1
Mar. 9-12	280			86	33	106		182	0	380	27		3.9	.08	769	1.05	581	350	201	39	2.5	1,090	7.9
Mar. 13-14	515			139	32	123		190	0	515	37		4.1	.07	1,010	1.37	1,400	480	324	36	2.4	1,360	7.7
Mar. 15	2,000			120	43	120		208	0	490	33		6.1	.07	984	1.34	5,310	476	305	35	2.4	1,310	8.0
Mar. 16	2,570			149	48	131		210	0	600	48		2.8	.08	1,180	1.60	8,190	568	396	33	2.4	1,480	7.9
Mar. 17	1,690			168	55	164		214	0	700	69		5.0	.12	1,370	1.86	6,250	644	469	35	2.8	1,750	7.9
Mar. 18-31	574			165	57	190		207	0	795	53		4.5	.13	1,470	2.00	2,280	644	474	38	3.3	1,880	8.0

POWDER RIVER NEAR LOCATE, MONT.

Chemical analyses, in parts per million, water year October 1952 to September 1953--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. 1-30, 1953	347			165	63	195		241	0	780	59		03.3	.13	1,510	2.05	1,410	669	471	39	3.3	1,920	7.8
May 1-9	424			132	52	176		233	0	658	44		3.0	.09	1,280	1.74	1,470	542	351	41	3.3	1,680	7.1
May 10-11	1,360			47	16	163		202	0	338	15		5.6	.16	724	.98	2,660	185	19	65	5.2	1,060	7.3
May 12-29	383			112	46	177		210	0	613	38		3.0	.13	1,180	1.60	1,220	468	296	44	3.6	1,580	7.3
May 30-June 2	1,260			101	38	125		208	0	468	28		4.0	.15	908	1.23	3,090	410	239	39	2.7	1,260	7.3
June 3-8	1,357			65	21	79		160	0	255	17		.7	.13	560	.76	2,050	247	116	41	2.2	813	7.4
June 9-10	2,195			81	26	69		188	0	277	12		3.4	.07	608	.83	3,600	310	156	32	1.7	868	7.8
June 11-16	1,555			125	36	95		172	0	480	17		2.5	.08	908	1.23	3,810	459	318	31	1.9	1,210	7.6
June 17-20	5,393			143	38	95		176	0	515	8.0		2.8	.08	946	1.29	13,770	512	368	29	1.8	1,230	7.0
June 21-24	2,108			103	27	87		162	0	388	14		1.3	.11	762	1.04	4,340	368	235	34	2.0	1,040	7.3
June 25 July 2	683			103	29	104		164	0	423	16		2.9	.09	820	1.12	1,510	376	242	38	2.3	1,120	7.6
July 3-14	168			142	48	179		210	0	700	32		1.2	.07	1,300	1.77	590	550	378	41	3.3	1,690	7.8
July 15-27	53.5			130	51	242		250	0	790	32		1.3	.19	1,470	2.00	212	536	331	49	4.5	1,920	7.8
July 28-30	225			245	72	272		240	0	1,190	54		1.2	.31	2,100	2.86	1,280	908	11	39	3 9	2.520	7.5
July 31-Aug. 1	106			152	41	201		216	0	760	27		3.6	.22	1,350	1.84	386	548	371	43	3.7	1,760	7.5
Aug. 2	456			263	77	339		338	0	1,310	59		.5	.29	2,340	3.18	2,880	974	697	43	4.7	2,770	7.3
Aug. 3-4	639			189	57	158		222	0	830	23		7.1	.22	1,460	1.99	2,520	704	522	32	2.6	1,810	7.2
Aug. 5	2,500			144	40	105		274	0	480	14		.5	.16	1,000	1.36	6,750	522	297	30	2.0	1,300	7.3
Aug. 6-7	1,625			345	82	133		188	0	1,250	19		7.7	.18	2,120	2.88	9,300	1,200	1,050	19	1.7	2,330	6.9
Aug. 8-13	544			275	58	182		200	0	1,070	41		2.8	.17	1,850	2.52	2,720	924	760	30	2.6	2,180	7.7
Aug. 14-21	221			212	54	229		214	0	990	40		3.4	.27	1,710	2.33	1,020	752	577	39	3.6	2,140	7.5
Aug. 22-23	158			158	40	145		178	0	685	23		2.4	.24	1,200	1.63	512	560	414	36	2.7	1,560	7.6
Aug. 24	288			295	59	198		312	0	1,120	27		.4	.15	1,970	2.68	1,530	980	724	29	2.8	2,230	7.2
Aug. 25	144			108	26	151		208	0	515	12		.5	.14	962	1.31	374	378	207	45	3.4	1,270	7.6
Aug. 26-29	118			215	60	232		204	0	1,020	25		3.9	.20	1,700	2.31	542	784	617	39	3.6	2,030	7.6
Aug. 30	600			134	31	142		204	10	575	16		3.8	.15	1,050	1.43	1,700	464	280	38	2.9	1,400	8.3
Aug. 31	253			87	15	134		232	0	345	7.0		.4	.15	732	1.00	500	280	90	51	3.5	988	7.6
Sept. 1-4	59.0			124	32	156		190	0	585	18		1.7	.16	1,070	1.46	170	440	284	43	3.2	1,430	7.7
Sept. 5-30	18.0			173	61	277		266	0	1,000	33		.4	.20	1,780	2.42	86.5	684	466	46	4.6	2,240	7.8
Weighted average a	384			145	47	143		b211	--	688	31		3.1	0.14	1,190	1.62	1,230	556	383	36	2.6	1,520	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.
b Includes carbonate as bicarbonate.

POWDER RIVER NEAR LOCATE, MONT.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Twice-daily measurements between 6 a. m. and 8 a. m. and between 5 p. m. and 7 p. m., except November to February between 1 p. m. and 4 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	48	a51	38	--	--	a32	--	a34		a34	--	a34	46	54	44	43	60	73	68	75	74	78	65	75
2	36	--	38	--	--	a32	a32	--		a34	--	a34	36	45	38	40	62	66	64	77	72	70	62	57
3	45	--	a40	--	--	a32	--	a34		a34	--	a32	33	47	39	45	58	60	69	80	65	70	50	69
4	38	--	37	--	--	a34	--	a34		a34	--	a34	38	49	39	55	55	55	64	75	63	70	50	64
5	--	--	40	--	a32	--	--	a32		a34	--	a34	40	--	43	62	52	60	64	74	66	76	49	70
6	--	--	38	--	--	a33	--	--		a34	--	a34	41	--	50	67	55	58	62	73	65	73	58	74
7	34	--	36	--	--	a33	--	a32		a34	--	a34	41	44	54	68	56	56	65	75	62	74	55	80
8	35	--	a39	--	--	a34	--	a34		a34	--	a34	35	38	55	65	56	66	66	75	65	74	60	--
9	42	--	a36	--	--	a33	a34	--	a34	--	--	34	35	38	48	44	62	72	65	80	65	76	58	68
10	40	--	a35	--	--	a32	--	a32		a34	34	35	40	42	42	35	61	70	70	85	65	68	56	70
11	42	--	a36	--	--	a32	--	a34		a34	34	34	34	43	39	--	61	75	71	78	60	73	54	71
12	46	--	--	a49	a32	--	--	a34		a34	34	34	35	43	--	40	70	81	66	83	60	73	55	70
13	45	47	38	--	--	a33	--	a32		a34	35	34	38	45	35	42	74	81	67	81	63	74	58	72
14	44	--	--	a38	--	a34	--	a32		a34	34	34	37	34	--	--	72	75	68	80	65	69	54	67
15	42	--	--	a38	--	a35	--	--		34	34	a35	34	42	--	--	69	74	70	85	64	77	48	67
16	42	--	--	a38	--	32	--	a32		a33	36	36	36	47	--	--	67	75	66	79	65	76	52	69
17	38	--	a38	--	--	a32	--	a32		a33	35	36	38	42	--	--	72	74	62	85	67	80	56	64
18	40	--	a38	--	--	a32	--	a32		a34	34	36	36	38	--	--	70	75	66	85	66	80	48	68
19	44	--	--	a35	a32	--	--	a32		a32	34	36	36	48	--	60	67	64	67	85	65	77	52	58
20	42	--	--	a36	--	a33	--	a32		a32	36	36	38	54	55	50	60	62	68	73	66	81	42	50
21	42	--	--	a35	--	--	--	a32		a34	36	38	44	54	48	48	56	70	61	79	68	80	42	64
22	42	--	--	a35	--	--	--	a32		a34	36	36	50	54	50	55	61	74	70	80	69	76	45	68
23	44	--	--	a35	--	a32	--	a32		a34	34	34	54	63	48	64	65	76	63	78	65	80	58	66
24	44	--	--	a32	--	a32	--	a32		a34	34	38	50	48	50	60	65	61	68	78	67	76	55	--
25	44	--	--	--	--	a32	--	a33		a34	34	40	44	54	52	61	55	67	66	78	65	70	41	57
26	40	--	--	--	--	a32	--	a36		a34	38	42	45	54	58	65	58	68	65	74	60	76	46	54
27	40	--	--	--	--	a32	--	a32		a34	38	41	48	48	56	72	60	70	67	83	63	76	46	58
28	35	--	--	--	--	a32	--	a34		a34	44	45	48	50	64	64	65	75	70	75	65	a81	50	57
29	36	--	--	--	--	a32	--	a34		--	40	44	47	48	63	60	65	75	68	75	62	76	48	--
30	42	--	--	a32	--	a34	--	a34		--	38	46	44	44	55	60	68	75	67	81	67	76	54	54
31	36	--	--	--	--	a33	--	a34		--	40	50	--	--	55	70	--	--	69	78	66	80	--	--
Average	41	--	--	--	--	b33	--	b33		34	--	37	41	47	--	56	63	69	67	79	65	75	52	65

a Reading obtained between 9 a. m. and 11 a. m. or between 1 p. m. and 4 p. m.
b Includes estimated temperature, 32°F, on missing days.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	44			88			90	128	31
2	42			88			85	126	29
3	40	52	6	90	147	35	95	171	44
4	40			90			110	174	52
5	39			90			100	132	36
6	40			90			120	187	61
7	47	96	12	95			130	196	69
8	54			97			120	164	53
9	50			97	208	53	120	165	53
10	41			97			110	165	49
11	44			93			100	151	41
12	44			101			95	158	41
13	45			105			100	212	57
14	46	50	6	105			120	188	61
15	46			105	265	77	130	151	53
16	47			112			110		
17	47			112			100		
18	50			118			90		
19	50			128			85		
20	56			138	395	141	85	145	36
21	59			130			90		
22	60			120	438	142	95		
23	63	80	14	110	130	39	90		
24	65			110	60	18	85		
25	66			100			90		
26	67			95	52	13	90		
27	69			85			90	172	44
28	70			75	86	17	95		
29	74			80	117	25	95		
30	77	120	25	85	124	28	100		
31	82			--	--	--	110		
Total	1,664	--	350	3,029	--	1,763	3,125	--	1,370

Day	January			February			March		
1	110			220	91	54	150	349	141
2	100			230	184	114	130	295	104
3	110			240	223	145	130	310	109
4	100	155	41	230	216	134	135	115	42
5	95			220	316	188	180	90	44
6	80			220	268	159	170	108	50
7	85			230	146	91	200	159	86
8	95	100	26	240	130	84	230	270	168
9	120	110	36	230	102	63	260	1,300	913
10	110	88	26	230	205	127	300	7,800	6,320
11	140	87	33	220	218	129	280	2,000	1,510
12	150	74	30	220	420	249	280	1,300	983
13	130			220	266	158	380	1,900	1,950
14	120			220	372	221	650	3,700	6,490
15	110			210	210	119	2,000	9,500	51,300
16	130			200	168	91	2,570	14,000	97,100
17	130	61	21	200	154	83	1,690	15,400	70,300
18	130			210	133	75	1,170	12,400	39,200
19	130			180	73	35	1,000	10,600	28,600
20	140			150	162	66	769	8,800	18,300
21	130			150	104	42	626	6,700	11,300
22	110			160	144	62	550	5,400	8,020
23	120			165	126	56	492	4,200	5,580
24	120			190	172	88	500	4,250	5,740
25	110	48	15	200	192	104	476	3,600	4,630
26	110			200	233	126	434	2,800	3,280
27	110			190	233	120	414	2,300	2,570
28	130			175	138	65	408	2,010	2,210
29	150	44	18	--	--	--	402	1,880	2,040
30	200	69	37	--	--	--	402	1,990	2,160
31	180	60	29	--	--	--	395	1,750	1,870
Total	3,785	--	816	5,750	--	3,048	17,773	--	373,110

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Suspended sediment, water year October 1952 to September 1953--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	384	1,550	1,610	390	4,620	4,860	1,420	18,500	70,900
2	368	1,520	1,510	395	3,720	3,970	1,410	13,500	51,400
3	356	1,310	1,260	540	5,310	7,740	1,460	9,900	39,000
4	351	1,230	1,170	516	5,610	7,820	1,490	11,000	44,300
5	351	1,300	1,230	408	3,130	3,450	1,300	8,690	30,500
6	390	1,620	1,710	378	1,870	1,910	1,190	7,650	24,600
7	408	1,520	1,670	335	1,320	1,190	1,020	6,870	18,900
8	414	1,380	1,540	321	1,180	1,020	1,680	14,300	s 69,900
9	408	1,200	1,320	532	13,800	s 34,900	2,490	22,800	153,000
10	390	1,110	1,170	1,370	25,100	92,800	1,900	24,600	126,000
11	384	1,080	1,120	1,350	16,600	60,500	1,390	21,200	79,600
12	373	1,000	1,010	769	10,400	21,600	1,210	30,400	99,300
13	384	1,100	1,140	723	6,700	13,100	1,140	23,500	72,300
14	454	1,810	2,220	524	4,120	5,830	1,600	20,600	89,000
15	434	1,690	1,980	414	2,300	2,570	1,660	12,300	55,100
16	408	1,540	1,700	395	1,800	1,920	2,330	19,200	s 142,000
17	378	1,430	1,460	402	1,580	1,710	6,960	41,200	803,000
18	346	1,520	1,420	356	1,200	1,150	5,830	38,100	622,000
19	331	1,730	1,550	316	1,020	870	4,480	22,000	266,000
20	312	1,390	1,170	284	900	690	4,300	17,000	197,000
21	307	1,320	1,090	267	720	519	2,450	11,300	74,700
22	307	1,260	1,040	262	630	446	1,940	13,500	70,700
23	280	1,120	847	262	600	424	2,300	15,000	93,200
24	271	1,020	746	346	4,590	s 4,900	1,740	13,900	65,300
25	262	927	656	335	4,100	3,710	1,070	7,800	22,500
26	267	928	669	258	2,400	1,670	918	5,040	12,500
27	245	898	594	253	900	615	841	3,690	8,380
28	222	818	490	280	900	680	720	3,530	6,860
29	249	798	536	454	3,450	s 5,750	580	3,310	5,180
30	378	2,490	2,540	1,170	13,600	43,000	492	2,540	3,370
31	--	--	--	1,040	6,280	17,600	--	--	--
Total	10,412	--	38,168	15,645	--	348,914	59,311	--	3,416,490

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	456	2,280	2,810	99	4,100	1,100	113	2,190	s 739
2	388	2,060	2,160	456	29,000	35,700	60	740	120
3	340	1,550	1,420	325	31,800	27,900	45	420	51
4	295	1,250	996	952	25,900	66,600	18	290	14
5	265	778	557	2,500	44,200	309,000	47	320	41
6	229	668	413	1,820	60,000	306,000	43		
7	192	593	307	1,430	43,700	175,000	36		
8	156	459	193	929	30,400	76,300	32	179	15
9	132	333	119	665	36,400	67,800	22		
10	102	333	92	465	31,400	39,400	26		
11	76	230	47	456	25,800	31,800	17		
12	88	157	37	346	23,600	29,100	17		
13	79	133	28	295	19,100	15,200	14		
14	57	109	17	223	13,200	7,950	13		
15	43	100	12	192	6,900	3,580	12		
16	34			174	5,000	2,350	12	118	5
17	29			136	4,300	1,580	14		
18	34			124	3,200	1,070	16		
19	25			269	7,250	s 9,010	15		
20	17	57	4	429	20,200	23,400	14		
21	28			217	20,300	11,900	15		
22	21			156	9,600	4,040	14		
23	115	4,430	s 2,710	160	10,100	s 6,250	14		
24	88	5,180	s 1,390	288	25,400	s 23,100	14		
25	63	1,400	238	144	9,200	3,580	13		
26	102	3,700	1,020	116	2,600	814	12	34	1
27	96	1,500	389	102	1,500	413	11		
28	288	8,560	s 7,360	92	1,900	472	9.0		
29	235	25,400	16,100	160	10,200	s 4,980	8.2		
30	152	17,500	s 7,570	600	18,700	30,300	8.2		
31	113	6,000	1,830	253	8,710	s 6,480	--	--	--
Total	4,338	--	47,843	14,683	--	1,322,169	704.4	--	1,100

Total discharge for year (cfs-days) 140,219.4
Total load for year (tons) 5,555,141

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Particle-size analyses of suspended sediment, water year March 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	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Mar. 9, 1953	4:55 p.m.	a260	34	2,710	2,020	62	70	78	88	93	97	98	99		100		BWCM
Mar. 11	1:10 p.m.	a280	34	1,710	1,310	71	78	87	93	96	98	100	--		--		BWCM
Mar. 14	8:00 a.m.	a650	34	3,140	2,360	--	75	--	97	--	100	--	--		--		SPWCM
Mar. 20	3:15 p.m.	734	37	8,480	6,170	--	65	--	86	--	96	--	--		--		SPWCM
Mar. 25	7:10 a.m.	440	34	3,440	2,350	--	78	--	99	--	--	--	--		--		PWCM
Apr. 1	3:55 p.m.	384	--	1,630	3,350	--	68	--	84	--	90	--	--		--		SPWCM
Apr. 15	11:00 a.m.	440	--	1,640	4,900	--	56	--	75	--	84	--	--		--		SPWCM
Apr. 20	3:15 p.m.	312	--	1,280	4,900	--	76	--	92	--	94	--	--		--		SPWCM
Apr. 30	5:35 p.m.	414	44	4,140	2,940	--	74	--	88	--	98	--	--		--		SPWCM
May 1	5:55 p.m.	378	43	4,430	3,220	--	83	--	94	--	95	--	--		--		SPWCM
May 3	1:40 p.m.	559	45	5,810	3,990	--	59	--	74	--	84	--	--		--		SPWCM
May 5	2:30 p.m.	408	68	2,790	2,350	--	0	--	76	--	89	--	--		--		SPN
May 5	2:30 p.m.	408	68	2,790	3,740	--	66	--	81	--	89	--	--		--		SPWCM
May 19	2:35 p.m.	307	63	1,150	1,460	--	8	--	82	--	86	--	--		--		SPN
May 19	2:35 p.m.	307	63	1,150	1,510	--	76	--	84	--	86	--	--		--		SPWCM
May 24	1:10 p.m.	476	62	10,400	3,740	--	77	--	93	--	98	--	--		--		SPWCM
May 30	3:00 p.m.	1,340	--	15,600	5,650	--	64	--	81	--	94	--	--		--		SPWCM
June 3	5:45 p.m.	1,520	58	9,310	3,230	--	4	--	52	--	83	--	--		--		SPN
June 3	5:45 p.m.	1,520	58	9,310	3,240	--	37	--	54	--	83	--	--		--		SPWCM
June 17	6:10 p.m.	7,460	74	53,800	4,270	--	1	--	62	--	92	--	--		--		SPN
June 17	6:10 p.m.	7,460	74	53,800	4,190	--	51	--	72	--	92	--	--		--		SPWCM
July 3	6:05 p.m.	372	83	1,250	3,520	--	57	--	67	--	74	78	83	84	86	93	SPWCM
Aug. 1	4:00 p.m.	113	--	3,460	3,360	--	3	--	99	--	--	--	--		--		PN
Aug. 1	4:00 p.m.	113	--	3,460	3,240	--	88	--	99	--	--	--	--		--		PWCM
Aug. 2	6:00 a.m.	580	72	28,800	5,570	--	88	--	99	--	100	--	--		--		SPWCM

Aug. 4	9:00 a. m.	1,070	65	29,800	5,720	--	69	--	94	--	99	--	--		--	SPWCM
Aug. 5	6:00 a. m.	2,630	66	25,600	4,570	--	56	--	79	--	94	--	--		--	SPWCM
Aug. 6	6:10 a. m.	1,900	65	64,800	6,790	--	62	--	92	--	98	--	--		--	SPWCM
Aug. 9	7:00 p. m.	600	76	37,300	3,950	--	79	--	100	--	--	--	--		--	SPWCM
Aug. 13	7:00 p. m.	247	74	18,600	7,200	--	83	--	97	--	100	--	--		--	SPWCM
Aug. 17	5:45 p. m.	136	81	4,020	4,040	--	3	--	100	--	--	--	--		--	PN
Aug. 17	5:45 p. m.	136	81	4,020	4,180	--	91	--	100	--	--	--	--		--	PWCM
Aug. 31	3:50 p. m.	217	--	7,790	5,010	--	2	--	93	--	98	--	--		--	SPN
Aug. 31	3:50 p. m.	217	--	7,790	4,600	--	89	--	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, 4½ 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 1953.
Water temperatures: January 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 776 ppm Dec. 1-7; minimum, 218 ppm June 22-30.
Hardness: Maximum, 379 ppm Dec. 1-7; minimum, 112 ppm July 1-22.
Specific conductance: Maximum daily, 1,160 micromhos Dec. 7; minimum daily, 294 micromhos June 22.
Water temperatures: Maximum, 82°F July 14, 15; minimum, freezing point on several days during November to December and probably on many other days during winter months.
EXTREMES, 1951-53.--Dissolved solids: Maximum, 776 ppm Dec. 1-7, 1952; minimum, 208 ppm June 11-13, 1952.
Hardness: Maximum, 379 ppm Dec. 1-7, 1952; 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, 82°F July 14, 15, 1953; 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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952 ..	6,220			68	29	86		214	283	12		1.6	0.20	604	0.82	10,140	287	112	38	2.2	893	8.1	
Nov. 1-30	5,881			81	27	87		229	296	14		1.4	.20	650	.88	10,320	315	127	37	2.1	950	8.2	
Dec. 1-7	3,571			93	36	108		277	348	17		2.6	.23	776	1.06	7,480	379	152	38	2.4	1,110	7.9	
Dec. 8-11	6,250			92	36	99		271	335	17		3.2	.23	764	1.04	12,890	376	154	36	2.2	1,090	8.0	
Dec. 12-26	5,600			80	30	81		240	285	14		2.3	.19	644	.88	9,740	322	125	34	2.0	936	8.1	
Dec. 27-31.....	4,020			69	43	92		253	308	15		2.3	.27	694	.94	7,530	349	142	36	2.1	1,000	8.2	
Jan. 1-8, 1953 ...	4,388			88	33	91		260	320	16		2.6	.22	714	.97	8,460	356	143	35	2.1	1,030	8.0	
Jan. 9-23.....	5,440			79	31	79		236	280	14		2.7	.23	638	.87	9,370	323	129	34	1.9	933	8.0	
Jan. 24-Feb. 23..	6,529			73	27	74		208	265	14		2.0	.19	590	.80	10,400	291	120	34	1.9	867	7.9	
Feb. 24-Mar. 6 ..	4,455			77	29	82		239	282	15		2.1	.21	637	.87	7,660	313	117	35	2.0	916	8.1	
Mar. 7-29	7,122			70	26	82		189	282	14		2.0	.15	611	.83	11,750	283	128	38	2.1	884	8.0	
Mar. 30-Apr. 18 .	6,118			77	28	88		208	302	17		1.5	.18	668	.91	11,030	307	136	38	2.2	952	8.0	
Apr. 19-30.....	5,691			74	29	91		215	290	17		3.5	.19	648	.88	9,960	302	126	39	2.3	954	7.5	
May 1-30	9,032			53	18	89		178	231	10		3.2	.17	517	.70	12,610	204	58	48	2.7	780	7.6	
May 31-June 2 ...	21,900			60	19	73		175	221	8.5		2.6	.12	504	.69	29,800	226	82	41	2.1	750	7.4	
June 3-6.....	28,430			47	14	53		151	152	5.0		3.2	.09	390	.53	29,940	174	50	40	1.7	581	7.3	

June 7-14, 1953 ..	29,480			41	13	37		130	112	5.0		2.5	.09	312	.42	24,830	154	47	34	1.3	467	7.3
June 15-21	54,460			42	9.5	26		121	93	2.0		2.6	.04	264	.36	38,820	144	45	28	.9	403	7.1
June 22-30.....	35,520			32	8.3	24		103	73	3.0		1.4	.03	218	.30	20,910	114	30	31	1.0	337	7.4
July 1-22	18,340			29	9.6	28		100	80	4.3		.9	.03	224	.30	11,090	112	30	35	1.2	343	7.4
July 23-31	8,771			36	13	46		127	131	6.2		.7	.07	316	.43	7,480	145	41	40	1.7	490	7.1
Aug. 1-5.....	8,490			45	16	67		157	179	8.5		1.7	.14	414	.56	9,490	177	48	44	2.2	632	7.6
Aug. 6-10	10,320			67	22	70		171	250	10		3.3	.14	538	.73	14,990	258	118	36	1.9	793	7.5
Aug. 11-31.....	5,641			58	20	73		173	227	11		1.5	.16	502	.68	7,650	228	86	40	2.1	754	7.6
Sept. 1-30	4,060			64	27	94		196	288	13		.7	.24	598	.61	6,560	270	109	43	2.5	897	7.7
Weighted average [a]	9,451			55	19	60		165	192	8.9		2.0	0.12	448	0.61	11,430	215	80	37	1.8	665	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 3 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	47	33				--	a45	--	72	79	72
2	53	45	32				--	46	a68	a73	a76	64
3	a54	42	33				--	49	57	78	73	a62
4	--	44	35				--	55	58	74	74	67
5	47	a42	33				--	58	59	74	72	63
6	47	40	35				--	63	58	72	70	65
7	48	40	37				--	65	59	73	--	67
8	50	38	37				--	55	a60	73	73	--
9	52	39	34				--	57	65	74	71	70
10	51	40	32				--	47	68	78	70	72
11	--	41	32				38	43	72	79	71	68
12	--	39	33				40	44	76	78	70	68
13	51	40	32				37	49	78	81	69	68
14	52	40	--				41	50	77	82	a74	67
15	52	40	32				43	52	72	82	75	a65
16	--	a39	--				40	a56	72	78	74	62
17	50	--	32				39	59	71	79	74	60
18	a44	--	32				--	62	72	80	--	65
19	--	36	32				--	58	64	79	73	59
20	48	36	32				49	54	64	78	78	62
21	50	35	a32				--	57	65	74	a75	69
22	50	34	--				58	58	67	78	78	--
23	50	33	36				57	59	a68	78	--	62
24	51	31	33				a50	a57	64	77	74	57
25	51	--	a32				52	a55	66	74	--	a57
26	49	32	32				52	58	a66	78	--	58
27	45	31	--				54	67	--	--	a69	60
28	44	a32	--				48	65	68	78	73	62
29	43	33	--				48	62	73	a79	a72	58
30	45	34	32				46	60	70	80	--	61
31	44	--	--				--	a62	--	a79	--	--
Average	49	38	--				--	55	67	77	--	64

a Reading obtained between 10 a. m. and 2 p. m.

MISCELLANEOUS ANALYSES OF STREAMS IN YELLOWSTONE RIVER BASIN IN WYOMING

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): 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
WIND RIVER NEAR DUBOIS																							
June 14, 1953	1,410	20	--	--	--	1.8		74	0	2.0	2.0	0.1	--	--	--	--		62	1	6	0.1	143	6.9
Sept. 9	93	40	--	--	--	10		96	8	10	.0	--	--	--	--	--		80	0	22	.5	192	8.6
ALKALI CREEK AT RALSTON																							
Oct. 7, 1952	--	15	0.02	35	17	71		150	0	162	12	0.3	2.1	0.09	400	0.54		156	33	50	2.5	590	7.9
Jan. 6, 1953	--	--	--	72	58	251		335	0	595	49	--	--	--	--	--		418	143	57	5.3	1,720	8.1
Apr. 1	--	--	--	57	56	220		299	0	523	44	--	--	--	--	--		374	129	56	4.9	1,550	8.2
July 8	--	--	--	35	27	103		188	0	231	19	--	--	--	--	--		198	44	53	3.2	819	7.9
BITTER CREEK NEAR GARLAND																							
Oct. 7, 1952	388	18	0.11	63	18	108		208	0	263	9.0	0.6	6.3	0.14	594	0.81		229	58	51	3.1	874	7.6
Jan. 6, 1953	37	--	--	--	--	348	--	372	0	730	21	--	--	--	--	--		--	--	69	--	2,000	8.2
Apr. 1	17	--	--	--	--	374	--	243	0	835	21	--	--	--	--	--		--	--	74	--	2,060	8.2
July 9	230	--	--	--	--	133	--	229	0	290	11	--	--	--	--	--		--	--	57	--	983	7.6

YELLOWSTONE RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Instantaneous discharge (tons per day)
WIND RIVER BELOW DUBOIS [a]			
June 4, 1953	1,640	482	2,130
June 17	4,670	480	6,050
RED FORK NEAR BARNUM			
May 18, 1953	93	601	151
July 29	32	7,620	658
SAHARA IRRIGATION DITCH, 6 MILES EAST OF KAYCEE			
July 16, 1953	30	1,190	96
Aug. 3	48	480	62

a Daily suspended sediment concentration data from April to July for years 1951-53 on file at regional office in Lincoln, Nebr.

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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																
June 4, 1953	12:05 p.m.	1,640		482	2,240		8		12		29	40	55	65	77	94	SPWCM
June 17	12:05 p.m.	4,670		480	2,010		12		30		58	66	77	83	88	96	SPN
June 17	12:05 p.m.	4,670		480	2,030		19		34		58	66	77	83	88	96	SPWCM

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, 25 miles downstream from Yellowstone River, and at mile 1,650.2.
DRAINAGE AREA.--164,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1953.
Water temperatures: May 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 544 ppm Nov. 27; minimum, 310 ppm June 10-30.
Hardness: Maximum, 284 ppm Nov. 27; minimum, 148 ppm June 10-30.
Specific conductance: Maximum daily, 832 micromhos Apr. 17; minimum daily, 375 micromhos June 24.
Water temperatures: Maximum, 75°F Aug. 1.
EXTREMES, 1950-53.--Dissolved solids: Maximum, 576 ppm May 28-29, 1952; minimum, 272 ppm June 1-30, 1951, June 2-30, 1952.
Hardness: Maximum, 284 ppm Nov. 27, 1952; 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 (1951-53): 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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1952	27,570			57	21	56		190	179	9.0		1.1	0.12	444	0.60	33,050	228	72	34	1.6	669	8.0
Nov. 1-8	25,390			58	22	55		195	182	9.0		.7	.11	456	.62	31,260	236	76	33	1.6	688	7.9
Nov. 9-26	16,310			63	25	64		208	210	11		1.0	.13	508	.69	22,370	258	87	34	1.7	756	7.8
Nov. 27	12,800			71	26	69		226	229	11		2.3	.15	544	.74	18,800	284	99	34	1.8	808	7.3
Dec. 20-Jan. 6, 1953	10,380			68	25	66		219	217	11		1.5	.13	526	.72	14,740	274	94	34	1.7	781	7.9
Jan. 7-11	11,260			71	25	65		220	220	11		2.4	.16	528	.72	16,050	280	100	33	1.7	792	8.1
Jan. 12-31	11,700			65	24	61		207	205	11		1.9	.15	494	.67	15,610	260	90	33	1.6	745	7.7
Feb. 1-15	11,010			65	24	64		200	213	12		2.3	.15	514	.70	15,280	259	95	34	1.7	767	7.6
Feb. 16 - Mar. 11	9,618			67	25	68		205	224	13		1.8	.15	530	.72	13,760	268	100	35	1.8	798	8.0
Apr. 7-22	13,690			64	23	70		198	221	12		1.2	.14	528	.72	19,520	255	93	37	1.9	787	8.1
Apr. 7, sta. 860a	14,100			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	768	--
Apr. 7, sta. 900a	14,100			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	765	--
Apr. 7, sta. 910a	14,100			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	766	--
Apr. 7, sta. 990a	14,100			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	767	--
Apr. 23 - May 25	20,690			56	19	65		185	190	10		1.5	.12	464	.63	25,920	219	67	39	1.9	700	7.8
May 26 - June 9	34,800			52	16	66		166	191	7.0		3.6	.11	456	.62	42,850	194	58	41	2.1	671	7.1
June 10-30	51,930			40	12	41		132	118	4.0		2.3	.07	310	.42	43,470	148	40	37	1.5	468	7.3
July 1-31	27,990			39	13	43		148	118	6.0		1.3	.09	318	.43	24,030	151	30	37	1.5	487	7.8

a Not included in weighted average.

MISSOURI RIVER MAIN STEM--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--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)	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
July 2, 1953, sta. 440a	32,600			--	--	--		---	--	--		--	--	--	--	--	--	--	--	--	507	--
July 2, sta. 700a ...	32,600			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	508	--
July 2, sta. 970a ...	32,600			--	--	--		--	--	--		--	--	--	--	--	--	--	--	--	505	--
Aug. 1-25	27,480			59	16	59		181	178	9.0		0.9	0.14	430	0.58	31,900	212	64	37	1.8	651	7.7
Aug. 26 - Sept. 23..	29,360			57	19	55		181	180	8.5		.8	.14	422	.57	33,450	222	74	34	1.6	649	7.7
Sept. 24-30	30,760			61	18	55		184	185	9.0		.6	.15	436	.59	36,210	225	74	34	1.6	661	7.8
Weighted average b	23,260			54	18	56		176	172	8.3		1.5	0.12	422	0.57	26,500	209	65	36	1.7	637	--
Weighted average c	21,830			55	19	56		179	175	8.5		1.5	0.12	429	0.58	25,290	215	68	36	1.7	647	--

a Not included in weighted average.
b Represents 93 percent of runoff for water year October 1952 to September 1953.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1952 to September 1953.

MISSOURI RIVER MAIN STEM--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 6 a. m. and 11 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	48	--	34	a34	34	--		--	69	75	66
2	56	46	--	34	a34	34	--		--	70	65	68
3	54	47	--	34	34	34	--		--	70	71	62
4	51	48	--	--	a34	34	--		--	69	69	60
5	46	47	--	34	a34	a34	--		--	71	73	59
6	46	46	--	--	a34	--	--		--	64	70	64
7	46	42	--	--	a34	a34	67		--	68	68	59
8	46	39	--	--	34	a34	--		--	68	62	63
9	48	41	--	a35	34	a34	--		--	69	67	62
10	48	44	--	34	a34	a34	46		--	--	65	65
11	49	40	--	a34	34	--	--		--	71	68	63
12	50	42	--	a34	a34	--	--		--	70	66	62
13	50	42	--	34	a34	--	--		--	70	64	63
14	48	40	--	a34	--	--	--		--	71	--	65
15	44	42	--	34	--	--	--		--	74	70	64
16	44	43	--	a34	--	--	--		--	74	72	64
17	44	42	--	34	a34	--	--		--	72	72	63
18	46	38	--	34	--	--	--		--	72	72	61
19	47	38	--	34	a34	--	--		--	74	73	58
20	46	42	34	34	--	--	--		--	72	68	56
21	47	40	34	a34	34	--	--		--	70	70	--
22	56	--	34	34	a34	--	--		--	69	72	--
23	48	40	34	a34	--	--	--		67	69	71	--
24	52	--	34	a34	34	--	--		63	71	72	--
25	49	35	a34	34	34				62	70	69	--
26	49	--	34	34	34	--	--		65	68	69	56
27	46	34	34	34	--	--	--		67	70	68	56
28	46	--	34	a34	34	--	--		68	71	69	55
29	--	--	34	--	--	--	--		--	69	70	58
30	56	--	34	a34	--	--	--		70	71	71	59
31	48	--	34	a34	--	--	--		--	72	71	--
Average	49	42	--	34	--	--	--		--	70	69	61

a Reading obtained between 1 p. m. and 5 p. m.

LITTLE MISSOURI RIVER BASIN

LITTLE MISSOURI RIVER AT MARMARTH, N. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 12 in Marmarth, Slope County, 1½ miles donwstream from Little Beaver Creek.
DRAINAGE AREA.--4,570 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1951.
Water temperatures: August 1952 to September 1953.
Sediment records: August 1952 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 89°F June 13; minimum, freezing point on several days during December to April.
Sediment concentrations: Maximum daily, 25,700 ppm June 8; minimum daily, not determined.
Sediment loads: Maximum daily, 379,000 tons June 19; minimum daily, less than 0.50 ton on many days.
REMARKS.--Flow affected by ice Nov. 21. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 1 p.m. and 6 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	50	36	--	40	a 35	44	47	75	75	81	71
2	57	a 41	34	37	--	--	43	43	71	79	71	59
3	47	48	38	--	42	32	50	a 44	58	80	62	57
4	41	52	--	39	--	--	a 36	48	54	75	74	58
5	44	39	41	33	40	32	a 36	a 59	61	75	73	a 64
6	42	--	--	37	--	--	32	63	55	75	69	a 60
7	55	46	a 40	--	40	a 32	33	69	--	79	78	76
8	58	--	--	37	--	--	a 35	64	59	77	--	74
9	57	47	37	--	a 38	a 33	a 35	54	68	73	79	80
10	52	--	--	37	--	--	a 38	a 58	69	82	67	70
11	58	47	36	--	a 33	a 33	36	40	a 70	76	72	72
12	55	--	--	36	--	--	a 36	a 43	82	a 83	80	71
13	48	45	37	--	a 34	a 34	45	50	89	73	74	70
14	42	--	--	32	--	--	38	49	78	75	67	65
15	42	45	35	--	a 32	a 34	a 38	57	69	77	79	71
16	44	--	--	36	--	34	a 40	60	73	a 83	82	70
17	52	40	32	00	00	34	44	a 52	74	75	77	57
18	57	--	--	40	--	34	46	62	74	83	--	62
19	55	42	39	--	a 32	35	38	62	62	a 85	a 68	69
20	56	--	--	38	--	37	58	49	62	75	85	56
21	55	a 47	38	--	a 32	35	62	54	65	72	78	59
22	60	--	--	37	--	33	65	54	63	84	78	67
23	57	a 39	37	--	a 35	34	67	63	55	74	a 67	65
24	56	--	--	40	--	35	42	60	62	--	a 74	50
25	57	38	a 36	--	a 36	a 36	42	59	65	--	a 69	55
26	53	--	--	42	--	35	52	61	69	72	68	a 58
27	43	--	49	--	a 33	--	55	73	a 60	83	78	65
28	44	--	--	41	--	--	48	63	74	76	80	62
29	48	38	37	--	--	50	44	63	80	72	62	58
30	48	--	--	40	--	58	43	62	75	80	71	60
31	51	--	39	--	--	52	--	72	--	a 81	79	--
Average	51	--	--	--	--	--	44	57	68	78	74	64

a Reading obtained between 9 a.m. and 12 m.

LITTLE MISSOURI RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3.2			13			8		
2	3.2			17			7	49	1
3	3.2			14	126	5	6		
4	2.5			14			5		
5	2.5	53	(t)	14			4		
6	2.9			20			4		
7	4.9			40			4	97	1
8	3.6			34			4		
9	3.6			19			4		
10	6.2			18			4		
11	6.2			16			3		
12	4.2	72	1	20			3	56	(t)
13	6.8			23			3		
14	4.2			23	84	5	3		
15	4.9			25			2		
16	8.1			26			2		
17	8.1	61	1	28			2		
18	8.1			26			2		
19	11			24			2	70	(t)
20	11			25			2		
21	10			21			2		
22	10			17			2		
23	11			12			2		
24	10			12			2		
25	12	67	2	12			1		
26	12			10	61	2	1		
27	12			10			1	56	(t)
28	11			9			1		
29	9.4			8			1		
30	9.4			8			1		
31	13			--	--	--	1		
Total	228.2	--	40	558	--	126	89	--	17

Day	January			February			March		
1	1			4					
2	1			4	23				
3	1			6					
4	1			6					
5	1	60	(t)	8			3	107	1
6	1			8					
7	1			10	56	1			
8	1			10					
9	1			8			5	430	6
10	1			7			10	--	e 20
11	1			6			100	880	238
12	1			5	108	1	400	--	e 1,200
13	1			4			650	1,650	2,900
14	1						600	--	e 2,600
15	1						450	990	1,200
16	1						500	1,040	1,400
17	1						1,000	3,340	9,020
18	1	147	(t)				1,500	3,470	14,100
19	1						900	2,760	6,710
20	1						850	2,600	5,970
21	1			3	109	1	950	2,970	7,620
22	1						430	1,470	1,710
23	1						186	1,080	542
24	1						782	1,000	2,110
25	2						558	636	958
26	2						842	1,220	2,770
27	2	23	(t)				542	2,180	3,190
28	2						395	1,560	1,660
29	3			--	--	--	785	877	1,860
30	3			--	--	--	166	620	278
31	4			--	--	--	158	400	171
Total	42	--	9	131	--	25	12,783	--	68,241

e Estimated.
t Less than 0.50 ton.

LITTLE MISSOURI RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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.....	147	280	111	520	9,400	13,200	444	2,220	2,660
2.....	114	200	62	475	9,200	11,800	1,140	6,320	19,500
3.....	108	--	e44	806	9,100	19,800	661	5,920	19,600
4.....	111	120	36	569	5,750	8,830	374	4,000	4,040
5.....	100	120	32	540	4,080	5,950	330	3,350	2,980
6.....	80	130	28	1,230	5,840	19,400	294	3,220	2,560
7.....	70	300	57	1,220	5,000	16,500	769	4,850	10,100
8.....	75	160	32	850	5,340	12,300	1,230	25,700	85,400
9.....	77	150	31	636	3,570	6,130	1,020	16,600	45,700
10.....	86	420	98	550	2,600	3,860	660	5,300	9,440
11.....	111	800	240	498	2,620	3,520	684	2,700	4,990
12.....	126	800	259	521	2,940	4,140	468	3,000	3,790
13.....	129	990	345	1,380	7,540	28,100	400	3,210	s4,290
14.....	138	980	365	1,050	3,480	9,870	716	7,250	14,000
15.....	70	990	187	884	2,320	5,540	2,220	19,400	s128,000
16.....	70	1,070	202	791	1,870	3,990	2,620	15,300	108,000
17.....	68	1,100	202	774	1,550	3,240	2,420	7,410	48,400
18.....	70	1,100	208	782	1,450	3,060	4,300	13,100	152,000
19.....	55	900	134	668	1,100	1,980	5,430	19,300	s379,000
20.....	55	600	89	498	1,010	1,360	7,160	16,300	s348,000
21.....	44	580	69	409	940	1,040	3,470	7,520	70,500
22.....	34	290	27	354	720	688	2,150	4,580	26,600
23.....	34	260	24	300	710	575	1,340	2,380	8,610
24.....	34	780	72	294	2,090	1,660	1,240	2,330	7,800
25.....	42	500	57	270	2,110	1,540	1,240	3,220	10,800
26.....	51	250	34	230	2,120	1,320	850	3,690	8,470
27.....	50	410	55	170	2,280	1,050	558	3,240	4,880
28.....	34	420	39	273	4,130	3,040	430	2,470	2,870
29.....	57	960	148	1,150	16,300	s53,700	354	1,580	1,510
30.....	231	3,510	2,540	834	14,300	32,200	288	950	739
31.....	--	--	--	430	5,400	6,270	--	--	--
Total.	2,465	--	5,827	19,956	--	285,653	45,260	--	1,336,229

Day	July			August			September		
1.....	215	560	325	300	2,030	1,640	235	2,620	1,660
2.....	158	320	137	235	1,340	850	154	1,430	595
3.....	154	280	116	443	4,880	s 6,540	93	790	198
4.....	150	300	122	342	4,080	s 3,980	66	450	80
5.....	141	--	e90	270	5,300	3,860	66	280	50
6.....	130	130	46	258	6,050	4,210	50	187	25
7.....	110	120	36	170	2,860	1,310	30		
8.....	95			500	8,160	s 12,600	42		
9.....	85			868	11,700	27,400	34		
10.....	80			782	6,400	13,500	31	88	8
11.....	65	108	19	528	5,080	7,240	28		
12.....	55			264	4,550	3,240	25		
13.....	48			154	1,820	757	17		
14.....	45			117	998	315	14		
15.....	40			88	620	147	14	42	2
16.....	35			86	400	93	14		
17.....	30			90	330	80	14		
18.....	27			75	190	38	16		
19.....	27			55	190	28	11		
20.....	25	46	3	79	390	83	7.2		
21.....	25			190	2,800	1,440	14		
22.....	21			123	3,720	1,240	15		
23.....	15			141	5,090	1,940	14		
24.....	6.2			99	8,080	2,160	9.8	31	1
25.....	55	3,370	500	138	5,400	2,010	9.8		
26.....	75	4,150	840	102	--	e800	15		
27.....	123	1,580	525	68	1,270	233	12		
28.....	126	840	286	58	1,120	s 232	12		
29.....	174	1,950	916	2,040	19,600	s 118,000	7.8		
30.....	282	2,750	2,090	1,400	12,600	50,600	12		
31.....	367	1,530	1,520	565	5,970	9,110	--	--	--
Total.	2,984.2	--	7,728	10,628	--	275,676	1,082.6	--	2,680

Total discharge for year (cfs-days) 96,207.0
Total load for year (tons) 2,172,251

e Estimated.
s Computed by subdividing day.

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

Particle-size analyses of suspended sediment, March to September 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	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	
Mar. 18, 1953	5:20 p.m.	1,440	34	4,020	4,660	--	63	--	81	--	92	--	--	--	--	--	SPWCM
Mar. 18	5:20 p.m.	1,440	34	4,020	4,490	--	2	--	85	--	92	--	--	--	--	--	SPN
Mar. 19	1:45 p.m.	980	--	2,870	2,850	--	80	--	91	--	95	--	--	--	--	--	SPWCM
Mar. 20	10:45 a.m.	715	40	2,450	2,250	--	72	--	83	--	91	--	--	--	--	--	SPWCM
Mar. 21	11:30 a.m.	1,030	36	4,370	3,480	--	74	--	89	--	92	--	--	--	--	--	SPWCM
May 5	3:45 p.m.	620	59	4,240	5,230	--	76	--	87	--	89	90	97	100	--	--	SPWCM
June 1	2:00 p.m.	318	--	2,010	5,030	--	84	--	93	--	95	--	--	--	--	--	SPWCM
June 10	3:40 p.m.	684	--	4,620	4,840	--	85	--	96	--	97	--	--	--	--	--	SPWCM
June 10	3:40 p.m.	684	--	4,620	4,960	--	7	--	97	--	97	--	--	--	--	--	SPN
June 18	2:25 p.m.	4,850	--	13,300	5,000	--	67	--	86	--	95	--	--	--	--	--	SPWCM
June 18	2:25 p.m.	4,850	--	13,300	5,000	--	7	--	83	--	95	--	--	--	--	--	SPN
Aug. 4	1:00 p.m.	294	74	3,440	3,560	63	69	75	75	75	80	80	82	90	98	100	SPWCM
Aug. 4	1:00 p.m.	294	74	3,440	4,380	3	4	68	75	75	80	80	82	90	98	100	SPN
Sept. 1	5:30 p.m.	195	71	1,970	2,040	78	89	93	98	100	--	--	--	--	--	--	BWCM
Sept. 1	5:30 p.m.	195	71	1,970	1,930	7	10	60	--	--	--	--	--	--	--	--	BN

GRAND RIVER BASIN

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 October 1952, March to September 1953.
REMARKS.--Flow is regulated by an ungated spillway and by a regulated irrigation outlet. Reservoir spills at elevation 2,272. Gaging station, Grand River at Shadehill, is 1 mile downstream. Records of elevation furnished by Bureau of Reclamation.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Gage height (ft)	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. 3, 1952	2,271.39			--	--	--	--	--	--	--	--			--				--	--	--	--	723	--
Mar. 23, 1953	2,272.49			--	--	--	--	--	--	--	--			--				--	--	--	--	797	--
Mar. 30	2,272.54			--	--	--	--	--	--	--	--			--				--	--	--	--	804	--
Apr. 6	2,272.42			--	---	--	--	--	--	--	--			--				--	--	--	--	812	--
Apr. 13	2,272.38			--	--	--	--	--	--	--	--			--				--	--	--	--	851	--
Apr. 20	2,272.28			--	--	--	--	--	--	--	--			--				--	--	--	--	858	--
Apr. 27	2,272.26			--	--	--	--	--	--	--	--			--				--	--	--	--	854	--
May 4	2,272.46			--	--	--	--	--	--	--	--			--				--	--	--	--	845	--
May 11	2,272.46			--	--	--	--	--	--	--	--			--				--	--	--	--	839	--
May 17	2,272.38			--	--	--	--	--	--	--	--			--				--	--	--	--	844	--
May 25	2,272			--	--	--	--	--	--	--	--			--				--	--	--	--	844	--
June 1	2,273.35			--	--	--	--	--	--	--	--			--				--	--	--	--	841	--
June 4	2,273.18			--	--	--	--	--	--	--	--			--				--	--	--	--	846	--
June 8	2,272.33			--	--	--	--	--	--	--	--			--				--	--	--	--	856	--
June 15	2,273.17			--	--	--	--	--	--	--	--			--				--	--	--	--	854	--
June 18	2,275.01			--	--	--	--	--	--	--	--			--				--	--	--	--	883	--
June 22	2,276.24			30	14	144	6.4	244	6	230	6.0			0.21				132	0	69	5.4	880	8.3
June 24	2,275.51			--	--	--	--	--	--	--	--			--				--	--	--	--	861	--
June 29	2,273.73			--	--	--	--	--	--	--	--			--				--	--	--	--	842	--
July 6	2,272.89			--	--	--	--	--	--	--	--			--				--	--	--	--	835	--
July 13	2,272.49			--	--	--	--	--	--	--	--			--				--	--	--	--	837	--
July 15 a	2,272			31	13	138	6.5	240	0	218	7.0			.23				131	0	68	5.2	838	7.9
July 20 a	2,272.26			30	12	136	6.7	244	0	220	3.0			.24				126	0	69	5.3	840	8.2
July 27	2,272.75			--	--	--	--	--	--	--	--			--				--	--	--	--	861	--

Aug. 3, 1953	2,272.62			--	--	--	--	--	--	--	--			--				--	--	--	--	856	--
Aug. 10	2,272.69			--	--	--	--	--	--	--	--			--				--	--	--	--	856	--
Aug. 17 a	2,272.40			31	14	141	6.5	248	0	230	4.0			.25				134	0	68	5.3	868	8.2
Aug. 25	2,272.20			--	--	--	--	--	--	--	--			--				--	--	--	--	868	--
Aug. 31	2,272.15			--	--	--	--	--	--	--	--			--				--	--	--	--	876	--
Sept. 8	2,272.05			--	--	--	--	--	--	--	--			--				--	--	--	--	878	--
Sept. 14	2,271.98			--	--	--	--	--	--	--	--			--				--	--	--	--	904	--
Sept. 21 a	2,271.85			33	13	150	7.0	264	0	240	2.0			.26				136	0	69	5.6	908	8.2
Sept. 28 a	2,271.78			--	--	--	--	--	--	--	--			--				--	--	--	--	907	--
Weighted average b	--			--	--	--	--	--	--	--	--			--				--	--	--	--	858	--

a Sample collected from irrigation outlet of Shadehill Dam. All others collected from service spillway.
b Weighted with discharge at gaging station 1 mile downstream. Mean discharge for periods Oct. 1-31, 1952 and Mar. 21 to Sept. 30, 1953, was 185 cfs. Includes estimates where data are missing. Represents 99.8 percent of flow at gage for water year October 1952 to September 1953.

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 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,740 ppm Nov. 20-30; minimum, 198 ppm Mar. 22-24.
Hardness: Maximum, 802 ppm Nov. 20-30; minimum, 52 ppm Mar. 22-24.
Specific conductance: Maximum daily, 3,530 micromhos Nov. 20; minimum daily, 294 micromhos Mar. 23.
EXTREMES, 1951-53.--Dissolved solids: Maximum, 2,740 ppm Nov. 20-30, 1952; minimum, 184 ppm Mar. 24-25, 1951.
Hardness: Maximum, 802 ppm Nov. 20-30, 1952; minimum, 43 ppm Mar. 24-25, 1951.
Specific conductance: Maximum daily, 3,530 micromhos Nov. 20, 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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-12, 1952	4.03			80	36	279		413	595	11		0.8	0.21	1,260	1.71	13.7	348	9	62	6.5	1,750	8.1
Oct. 13 - Nov. 15	5.43			79	32	280		395	604	12		.8	.18	1,250	1.70	18.3	327	3	63	6.7	1,700	8.0
Nov. 16-19.....	6.43			63	26	224		286	495	12		1.0	.16	996	1.35	17.3	263	28	63	6.0	1,420	8.0
Nov. 20-30.....	4.00			199	74	590		908	1,310	24		1.2	.37	2,740	3.73	29.6	802	57	60	9.1	3,440	7.8
Dec. 1-12	.50			154	51	355		629	835	15		1.0	.21	1,770	2.41	2.39	594	78	55	6.3	2,350	7.7
Mar. 14-21, 1953	649			26	6.1	67		132	121	3.5		2.6	.07	321	.44	562	90	0	60	3.1	481	7.1
Mar. 22-24.....	3,823			12	5.4	44		120	50	2.0		.9	.07	198	.27	2,040	52	0	62	2.6	301	7.5
Mar. 25 - Apr. 2	433			28	6.3	99		190	153	4.0		1.9	.14	405	.55	473	96	0	67	4.4	624	7.5
Apr. 3-19.....	184			43	13	152		285	248	6.5		2.0	.38	642	.87	319	161	0	66	5.2	955	7.8
Apr. 20-28.....	175			50	16	183		317	303	8.5		10	.24	752	1.02	355	189	0	67	5.8	1,130	7.7
Apr. 29-30.....	565			34	8.3	107		192	185	2.0		1.5	.16	460	.63	702	119	0	66	4.3	702	7.4

May 1-3, 1953...	2,597			29	5.4	76		184	110	1.0		.8	0.16	342	.47	2,400	94	0	62	3.4	518	8.0
May 4-10	720			22	5.1	76		162	106	1.5		1.6	.24	328	.45	638	76	0	67	3.8	496	7.6
May 11-23	319			43	12	150		273	235	5.5		1.4	.20	638	.87	550	156	0	68	5.2	939	7.7
May 25 - June 1.	441			27	5.7	114		206	167	2.5		1.5	.25	464	.63	552	91	0	71	5.2	680	7.5
June 2-13.....	510			45	9.6	153		244	275	4.5		2.6	.26	658	.89	906	152	0	67	5.4	963	7.6
June 15-17.....	14,213			31	6.2	61		166	100	1.0		2.2	.44	314	.43	12,050	103	0	54	2.6	478	7.7
June 18-20.....	3,777			40	8.5	105		201	191	3.0		2.4	.20	476	.65	4,850	135	0	62	3.9	728	7.4
June 22-30.....	3,133			38	9.2	122		211	204	6.5		13	.31	530	.72	4,480	133	0	66	4.6	797	7.7
July 1-5	863			44	13	155		254	258	12		20	.30	656	.89	1,530	164	0	66	5.3	986	7.3
July 6-25	319			50	17	184		315	318	8.5		4.1	.28	744	1.01	641	193	0	66	5.8	1,140	7.8
July 26 - Aug. 19	278			43	14	184		308	300	7.5		1.6	.38	728	.99	546	166	0	69	6.2	1,090	7.9
Aug. 20	737			51	13	167		304	285	6.0		5.8	.24	706	.96	1,400	182	0	65	5.4	1,050	7.5
Aug. 21-23.....	726			25	7.2	103		203	142	3.0		3.9	.20	408	.55	800	92	0	70	4.7	634	7.7
Aug. 24-31.....	234			32	8.3	139		238	208	4.5		2.1	.22	556	.76	351	114	0	72	5.7	824	7.8
Sept. 1-30	43.7			56	19	220		341	398	9.0		1.9	.30	912	1.24	108	218	0	68	6.5	1,330	8.0
Weighted average a....	440			34	8.5	103		203	169	3.9		4.6	0.29	454	0.62	539	120	0	64	4.1	684	--
Weighted average b....	473			34	8.3	101		201	166	3.7		4.4	0.30	447	0.61	571	119	0	63	4.0	674	--

a Represents 92 percent of runoff water year October 1952 to September 1953.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1952 to September 1953.

GRAND RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Selenium (Se)
NORTH FORK GRAND RIVER NEAR WHITE BUTTE																								
Oct. 5, 1952.....	0.4			--	--	196	--	--	--	--	--		--	0.47	846		1.15	212	--	67	5.9	1,250	8.2	0.10
June 10, 1953....	48			48	27	222	7.8	297	0	460	4.0		2.1	.45	--		--	231	0	67	6.4	1,380	8.2	--
SOUTH FORK GRAND RIVER NEAR CASH																								
Oct. 5, 1952.....	a 9			--	--	610	--	--	--	--	--		--	0.52	1,750		2.38	76	--	95	30	2,590	8.8	0.09
June 10, 1953....	28			17	12	423	6.1	572	22	498	6.5		0.6	.36	--		--	92	0	90	19	1,940	8.6	--

a Mean daily discharge.

CHEYENNE RIVER BASIN

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.
Water temperatures: March to September 1953.
Sediment records: April 1950 to September 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 53,000 ppm Aug. 18; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 39,500 tons June 20; minimum daily, 0 tons on many days.
EXTREMES,1950-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 62,400 ppm June 20. No flow during period October to December; record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, August 1953

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Dissolved solids: Parts per million (residue at 180°C)	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium magnesium	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromos at 25°C)	pH
Aug. 5, 1953...	50	78	20	58	7.9	536	0.73	278	30	1.5	773	7.3
Aug. 19.....	116	74	18	48	8.0	430	.58	260	28	1.3	683	7.3

Temperature (°F) of water, March to September 1953
(Once-daily measurement between 3 p.m. and 8 p.m. No flow on many days)

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

a Reading obtained between 7 a.m. and 9 a.m.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	5.4	--	e0.1	0	--	0
2	0		0	.6	--	e .5	0	--	0
3	0		0	.3	22		0	--	0
4	0		0	.4	86		0	--	0
5	0		0	.3	--	(t)	0	--	0
6	0		0	.3	--		0	--	0
7	0		0	.3	--		.5	--	e .2
8	0		0	.2	--		2.0	--	e .6
9	.2			0	--	0	4.0	74	.8
10	.2		(t)	0	--	0	2.8	140	a1.1
11	.1			0	--	0	8.6	1,400	sa85
12	.1			0	--	0	86	6,000	a1,400
13	0		0	0	--	0	138	7,350	2,740
14	0		0	0	--	0	110	6,200	a1,800
15	0		0	0	--	0	106	--	e1,800
16	0		0	0	--	0	87	--	e1,200
17	0		0	0	--	0	80	4,050	875
18	0		0	0	--	0	60	2,610	423
19	0		0	0	--	0	44	1,530	182
20	0		0	0	--	0	52	--	e200
21	0		0	0	--	0	40	--	e150
22	0		0	0	--	0	35	--	e120
23	0		0	0	--	0	33	--	e110
24	0		0	0	--	0	21	1,250	71
25	0		0	0	--	0	18	--	e44
26	0		0	0	--	0	15	500	20
27	0		0	0	--	0	11	--	e12
28	0		0	0	--	0	11	--	e10
29	0		0	--	--	--	9.9	--	e8.0
30	0		0	--	--	--	9.1	--	e6.0
31	1.6		e2.0	--	--	--	8.3	--	e4.4
Total	2.2		2.1	7.8	--	6.7	992.2	--	11,263.1

Day	April			May			June		
1	9.1	190	4.7	45	1,330	162	28	6,800	a627
2	13	210	7.4	40	700	76	8.3	2,200	sa65
3	11	200	a6.0	45	970	118	.9	330	sa1.2
4	7.5	154	3.1	73	2,100	a420	.3	--	e.1
5	8.3	160	3.6	52	2,020	284	.3	--	e.1
6	13	182	6.4	40	3,900	a420	.1	--	(t)
7	16	212	9.2	25	1,600	a110	.3	--	e.2
8	13	200	a7.0	12	750	24	0	--	0
9	9.9	174	4.7	9.1	490	12	.2	--	e.3
10	9.9	176	4.7	6.1	380	a6.0	.1	--	(t)
11	8.3	170	a3.8	5.4	268	3.9	.1	--	(t)
12	6.1	180	3.0	4.7	224	2.8	.1	--	(t)
13	9.1	220	5.5	6.8	201	3.7	0	--	0
14	9.9	238	6.4	6.8	180	a3.4	0	--	0
15	6.8	210	a3.8	6.1	127	2.1	0	--	0
16	5.4	170	2.5	5.4	100	a1.4	0	--	0
17	3.4	140	1.3	4.0	82	.9	0	--	0
18	4.0	240	2.6	5.4	109	1.6	0	--	0
19	2.1	--	e1.1	4.7	132	1.7	16	2,980	s359
20	5.4	121	1.8	6.1	165	2.7	265	32,000	s39,500
21	3.4	110	a1.0	7.5	150	a3.0	163	27,000	s13,400
22	1.8	81	.4	6.1	121	2.0	44	12,500	1,480
23	1.0	118	.3	5.4	130	a1.9	18	4,740	s259
24	.8	--	e.4	6.8	190	a3.4	9.1	1,280	s37
25	.9	130	a.3	4.0	160	a1.7	2.8	400	a3.0
26	1.0	95	.2	2.8	99	.7	.9	180	a.4
27	.8	100	.2	2.8	76	.6	.3	110	.1
28	.6	100	a.2	2.4	70	.4	.1	107	(t)
29	7.9	152	s4.3	2.1	70	.4	0	--	0
30	13	920	45	6.0	--	e400	0	--	0
31	--	--	--	70	20,000	sa4,000	--	--	--
Total	207.4	--	140.9	518.5	--	6,070.3	557.9	--	55,732.5

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				0	--	0			
2.....				7.1	13,000	sa 300			
3.....				113	29,000	sa13,000			
4.....				224	36,000	22,600			
5.....				39	19,500	s 2,610			
6.....				4.0	646	s 11			
7.....				.8	225	.5			
8.....				.2	200	.1			
9.....				0	--	0			
10.....				0	--	0			
11.....				0	--	0			
12.....				0	--	0			
13.....				0	--	0			
14.....				0	--	0			
15.....				0	--	0			
16.....				71	18,000	s 8,820			
17.....				106	47,600	14,100			
18.....				160	53,000	a 24,000			
19.....				136	42,000	sa17,000			
20.....				25	--	e 1,600			
21.....				2.8	--	e 20			
22.....				1.3	--	e 3.0			
23.....				.3	--	e .4			
24.....				1.3	--	e 2.0			
25.....				.1	--	e .1			
26.....				0	--	0			
27.....				0	--	0			
28.....				0	--	0			
29.....				0	--	0			
30.....				0	--	0			
31.....				0	--	0			
Total	0		0	891.9	--	104,067.1	0		0

Total discharge for year (cfs-days) 3,177.9
Total load for year (tons) 177,282.7

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

CHEYENNE RIVER BASIN--Continued

LANCE CREEK AT SPENCER, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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. 13, 1953....	3:40 p.m.	141	42	6,930	3,750	--	64	--	82	--	90	96	100				SPWCM
Mar. 13	3:40 p.m.	141	42	6,930	3,780	--	2	--	81	--	90	96	100				SPNM
Mar. 17.....	2:00 p.m.	87	--	4,000	2,430	--	60	--	75	--	89	94	99		100		SPWCM
Mar. 19.....	9:45 a.m.	42	38	1,700	2,160	--	70	--	78	--	84	93	100				SPWCM
Mar. 24.....	3:00 p.m.	22	50	1,270	3,690	--	83	--	93	--	97	--	--				SPWCM
Mar. 26.....	4:00 p.m.	12	59	450	1,060	62	74	87	95	98	99	100	--				BWCM
May 1.....	8:50 a.m.	52	43	1,730	2,100	8	10	24	91	--	94	97	100				BN
May 5	3:10 p.m.	40	66	1,970	2,200	--	68	--	78	--	90	95	100				SPWCM
May 31.....	5:15 p.m.	78	72	14,400	3,710	--	81	--	96	--	98	--	--				SPWCM
May 31.....	5:15 p.m.	78	72	14,400	3,740	--	9	--	94	--	98	--	--				SPNM
June 20	8:00 p.m.	570	65	62,400	4,060	--	62	--	83	--	94	--	--				SPWCM
June 20	8:00 p.m.	570	65	62,400	4,160	--	6	--	82	--	94	--	--				SPNM
June 24	4:35 p.m.	6.8	72	954	3,140	--	93	--	98	--	99	--	--				SPWCM
Aug. 5.....	9:15 a.m.	49	70	21,800	6,020	78	88	96	97	99	--	--	--				PWCM
Aug. 5.....	9:15 a.m.	49	70	21,800	6,030	3	5	30	98	99	--	--	--				PNM

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, December 1952 to August 1953 (discontinued).
Sediment records: March 1950 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow Oct. 1 to Nov. 20.
Sediment loads: Maximum daily, 56,000 tons (estimated) May 30; minimum daily, 0 tons Oct. 1 to Nov. 20.
EXTREMES, 1950-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days during 1950, 1952-53.
Sediment loads: Maximum daily, 56,000 tons (estimated) May 30, 1953; minimum daily, 0 tons on many days during 1950, 1952-53.
REMARKS.--Maximum observed sediment concentration during water year, 16,500 ppm, June 15. Flow affected by ice Nov. 22 to Mar. 13. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, December 1952 to August 1953

Date of collection	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. 3, 1952	a6.0			668	217	756		323	2,470	970				--	--		2,560	2,300	39	6.5	6,510	7.5	
Jan. 7, 1953	a9.0			515	130	165		256	1,680	156				--	--		1,820	1,610	16	1.7	3,220	7.4	
Mar. 5	a8.0			528	152	705		248	1,820	978				--	--		1,940	1,740	44	7.0	6,550	7.5	
Mar. 10	a250			47	14	111		86	192	52				--	--		175	104	58	3.7	699	6.8	
Apr. 3	7.1			151	46	347		138	772	287				--	--		567	454	57	6.3	2,300	7.1	
May 6	29			188	77	600		119	1,500	304				--	--		784	686	62	9.3	3,200	7.3	
June 2	32			167	51	212		148	865	48				--	--		628	507	42	3.7	1,700	7.2	
June 21	1,580			187	24	94		141	585	32				--	--		566	450	26	1.7	1,360	7.2	
Aug. 4	679			173	26	126	7.6	--	--	--				1,090	1.48		540	--	33	2.4	1,490	7.2	
Aug. 5	240			152	31	123	7.8	--	--	--				1,070	1,46		508	--	34	2.4	1,440	7.3	

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	4.5	101	
2				0	--	0	5.0	--	
3				0	--	0	6.0	56	
4				0	--	0	7.0	--	
5				0	--	0	9.0	107	
6				0	--	0	10	--	
7				0	--	0	11	--	
8				0	--	0	12	105	
9				0	--	0	11	--	
10				0	--	0	10	72	
11				0	--	0	9.5	--	
12				0	--	0	9.0	127	
13				0	--	0	10	--	
14				0	--	0	12	--	
15				0	--	0	12	60	
16				0	--	0	12	--	e2.2
17				0	--	0	11	62	
18				0	--	0	10	--	
19				0	--	0	9.0	65	
20				0	--	0	9.5	--	
21				3.7	--		9.5	--	
22				4.0	--		9.0	66	
23				3.9	--		8.6	--	
24				3.8	97		8.4	77	
25				3.7	--		8.0	--	
26				3.6	72	e.9	8.4	89	
27				3.2	--		8.7	--	
28				3.3	90		9.0	--	
29				3.7	--		9.4	122	
30				4.0	--		9.8	--	
31				--	--	--	10	112	
Total	0		0	36.9	--	9.0	285.3	--	682

Day	January			February			March		
1	10	--		12	--		7.0	--	
2	10	76		12	122		6.5	--	
3	10	--		12	84		6.0	--	
4	10	--		11	258		6.6	--	e2.8
5	9.0	63		11	--		8.0	194	
6	8.0	--		10	190		9.0	54	
7	9.0	91		10	--		10	--	
8	10	--		10	--		15	--	
9	11	138		9.0	219		50	820	111
10	12	--		8.0	--		250	2,060	1,390
11	13	--		7.0	214		500	2,860	3,860
12	13	139		8.0	--		400	3,210	3,470
13	11	--		7.5	551		300	4,830	3,910
14	8.0	--		8.0	--	e8.0	226	4,240	2,590
15	6.0	22		9.0	--		198	--	e2,200
16	6.5	172	e3.2	9.0	398		88	3,210	763
17	7.0	--		9.5	--		76	2,720	s578
18	7.2	--		10	599		122	6,200	2,040
19	7.4	224		9.0	--		241	7,090	4,610
20	7.6	--		6.0	954		203	6,200	3,400
21	7.8	117		7.0	--		87	2,800	a650
22	8.0	--		7.5	--		94	1,900	a480
23	8.2	36		8.0	218		105	1,890	536
24	9.0	--		8.0	--		43	2,000	232
25	10	--		7.5	246		32	780	67
26	10	282		8.0	--		26	253	18
27	9.5	--		8.0	256		22	238	14
28	9.0	15		7.5	--		19	230	a12
29	9.5	--		--	--	--	28	240	a18
30	10	290		--	--	--	24	152	9.8
31	11	--		--	--	--	16	147	6.4
Total	287.7	--	99.2	249.5	--	224.0	3,218.1	--	30,987.6

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

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	14	112	4.2	8.4	110	2.5	93	5,680	s1,600
2	9.4	94	2.4	30	--	e32	33	1,630	s161
3	7.1	76	1.5	50	--	e40	16	305	s14
4	6.0	70	1.1	23	156	9.7	10	160	4.3
5	5.0	60	.8	14	118	4.5	7.4	128	2.6
6	4.7	47	.6	32	142	12	5.5	101	1.5
7	4.7	40	.5	18	70	3.4	4.2	95	1.1
8	5.0	67	.9	12	52	1.7	2.7	102	.7
9	7.0	88	s2.0	9.7	50	1.3	2.5	148	1.0
10	24	99	6.4	7.8	50	1.1	2.2	108	.6
11	20	65	a3.6	7.4	51	1.0	2.0	85	.5
12	14	60	a2.2	6.5	60	1.1	2.2	100	a.6
13	11	58	1.7	6.0	76	1.2	8.7	--	e5.0
14	5.7	65	1.0	5.0	90	1.2	30	--	e1,100
15	2.9	72	.6	6.5	115	2.0	280	16,000	sa13,000
16	3.1	68	.6	7.4	110	2.2	321	11,800	10,200
17	5.2	71	1.0	7.4	110	2.2	596	10,700	17,200
18	6.8	70	a1.2	5.2	113	1.6	150	10,200	4,130
19	6.8	85	a1.6	4.7	109	1.4	82	7,300	sa2,200
20	9.0	65	1.6	2.5	102	.7	93	4,400	sa1,200
21	8.4	50	1.1	1.2	79	.3	1,100	7,420	s18,200
22	6.2	151	2.5	.8	75	.2	1,030	3,510	s8,390
23	5.0	190	a2.6	.8	70	.2	157	3,000	a1,300
24	4.2	225	2.6	.5	70	.1	66	1,950	347
25	3.1	72	.6	.3	69	.1	42	750	85
26	2.0	42	.2	.3	71	.1	29	254	20
27	1.7	58	.3	.3	81	.1	20	150	a8.0
28	1.9	75	.4	.3	70	.1	31	--	e26
29	3.6	90	.9	49	--	e1,600	30	134	11
30	14	190	a7.0	1,060	--	e56,000	21	80	a4.6
31	--	--	--	661	11,000	a20,000	--	--	--
Total	221.5	--	53.7	2,038.0	--	77,724.0	4,267.4	--	79,214.5

Day	July			August			September		
1	14	58	2.2	198	--	e9,700	8.4	36	
2	9.7	53	1.4	987	--	e31,000	8.4	38	
3	7.4	80	1.6	722	5,000	a9,700	8.7	--	
4	5.7	85	1.3	731	4,250	8,390	7.8	21	
5	5.7	85	1.3	347	6,100	5,710	3.5	--	
6	4.7	85	1.1	57	2,200	sa400	2.9	--	
7	30	--	e500	24	362	26	2.5	--	e0.4
8	48	1,800	sa320	12	170	a5.5	2.9	25	
9	14	300	a11	7.1	140	2.7	3.5	42	
10	6.5	160	2.8	5.5	113	1.7	3.3	23	
11	3.1	100	.8	3.8	69	.7	3.3	23	
12	2.7	75	.5	3.5	67	.6	3.3	--	
13	1.9	52	.3	3.1	60	.5	2.5	--	
14	1.3	--		2.7	55	.4	1.3	--	
15	.8	--		3.1	60	.5	.7	14	
16	.5	36		7.5	--	e3.4	.7	--	
17	.7	75		50	--	e100	.5	--	
18	.9	--		43	300	a34	.4	12	
19	.8	--		13	105	3.7	.3	--	
20	1.2	76		7.8	50	1.1	.5	--	
21	1.6	--	e.2	8.8	95	4.4	.5	7	(t)
22	1.6	83		14	--	e6.0	.3	--	
23	.8	--		6.2	60	a1.0	.2	17	
24	.6	60		8.1	50	1.1	.2	13	
25	.7	--		6.8	--		.2	11	
26	.7	--		5.5	37		.2	--	
27	.5	55		6.2	80	e.9	.2	--	
28	1.7	--		6.0	35		.3	8	
29	51	--	e650	8.7	--		.3	--	
30	20	--	e50	9.0	--		.2	11	
31	6.2	270	4.5	8.7	37		--	--	--
Total	245.0	--	1,551.8	3,316.1	--	65,099.6	68.0	--	5.4

Total discharge for year (cfs-days) 14,233.5

Total load for year (tons) 255,037.0

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953....	10:00 a.m.	250	--	1,720	3,360	--	84	--	96	--	99						SPWCM
Mar. 14.....	10:00 a.m.	219	--	4,290	4,820	--	76	--	94	--	98						SPWCM
Mar. 19.....	5:40 p.m.	230	39	6,530	3,180	--	74	--	99	--	99						SPWCM
Mar. 24.....	6:15 p.m.	36	38	2,880	4,420	--	86	--	96	--	100						SPWCM
Mar. 26.....	12:00 m.	27	43	242	956	70	82	94	98	100	--						BWCM
May. 31.....	3:00 p.m.	334	--	11,900	3,420	--	81	--	97	--	99						SPWCM
June 2.....	12:00 m.	31	--	1,540	2,570	76	89	96	100	--	--						BWCM
June 15.....	5:30 p.m.	164	--	11,500	6,330	--	84	--	99	--	100						SPWCM
June 16.....	2:20 p.m.	283	--	11,100	3,280	--	84	--	98	--	100						SPWCM
June 16.....	2:20 p.m.	283	--	11,100	3,250	--	15	--	97	--	100						SPNM
June 17.....	3:15 p.m.	645	--	9,230	2,750	--	84	--	96	--	99						SPWCM
June 18.....	11:30 a.m.	91	72	11,500	6,450	--	80	--	99	--	100						SPWCM
June 18.....	11:30 a.m.	91	72	11,500	6,490	--	4	--	97	--	100						SPNM
June 21.....	7:00 p.m.	1,530	67	3,630	6,780	--	79	--	96	--	99						SPWCM
June	7:00 a.m.	1,640	--	2,030	4,260	--	83	--	96	--	99						SPWCM
June 24.....	12:15 p.m.	65	71	1,950	5,080	--	82	--	99	--	100						SPWCM
Aug. 4	12:15 p.m.	675	72	4,660	5,420	64	82	96	98	99	99						SPWCM
Aug. 4	12:15 p.m.	675	72	4,660	5,420	2	5	12	95	99	99						SPNM
Aug. 5	1:45 p.m.	233	73	8,900	5,540	65	78	90	98	99	100						SPWCM
Aug. 5	1:45 p.m.	233	73	8,900	4,670	1	2	13	94	99	100						SPNM

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 September 1953.
Sediment records: October 1950 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 84°F June 13; minimum, freezing point Feb. 10, 12, 24 and probably on several other days during November to March.
Sediment concentrations: Maximum daily, 25,000 ppm June 10; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 6,170 tons Mar. 13; minimum daily, 0 tons on many days.
EXTREMES, 1950-53.--Water temperatures (1951-53): Maximum, 87°F July 31, 1952; minimum, freezing point on several days each year.
Sediment concentrations: Maximum daily, 25,000 ppm June 10, 1953; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 28,500 tons July 29, 1951; minimum daily, 0 tons on many days.
REMARKS.--Flow affected by ice Nov. 24 to Mar. 12. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 12 m. and 7 p.m. No flow on many days/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	--	--	47	47	a60		--	
2				--	34	--	43	42	--		--	
3				--	--	a33	--	a45	65		--	
4				--	a35	--	50	a43	65		--	
5				--	--	--	--	58	--		--	
6				--	36	a35	--	a55	67		--	
7				--	34	--	--	a58	65		--	
8				--	--	37	48	a63	a55		--	
9				--	--	38	44	a57	a61		--	
10				--	32	36	a40	57	a63		--	
11				--	--	a38	42	47	a69		--	
12				--	32	--	47	--	a67		--	
13				--	--	a36	48	47	84		--	
14				--	33	36	44	--	a72		--	
15				--	--	a33	50	57	a65		--	
16				--	33	44	44	60	a60		76	
17				--	--	a41	a40	60	82		a64	
18				--	a33	a35	42	--	--		80	
19				--	--	a35	42	--	a69		a75	
20				--	a33	42	55	62	77		--	
21				--	--	--	--	57	a71		--	
22				--	33	a40	--	60	a63		--	
23				--	--	a35	--	57	81		a76	
24				--	a32	a37	--	65	a68		--	
25				--	--	--	--	65	73		--	
26				--	34	49	--	a53	75		--	
27				--	--	--	--	67	76		--	
28				--	--	56	--	76	74		--	
29				--	--	48	--	62	80		--	
30				a33	--	--	--	66	--		--	
31				35	--	--	--	--	--		--	
Average				--	--	--	--	57	70		--	

a Reading obtained between 5 a.m. and 12 m.

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	--		0.1		
2	0		0	.1	--		.1		
3	0		0	.1	--		.5		
4	0		0	.1	--		.2		
5	0		0	.1	12		.1		
6	0		0	.1	--		.1		
7	0		0	.1	--		.1		
8	0		0	.1	--		.1		
9	0		0	.1	--		.1		
10	0		0	.1	--		.1		
11	0		0	.1	--		.1		
12	0		0	.2	--		.1		
13	.1			.2	--		.1		
14	.1			.2	--		.1		
15	.1			.2	--		.1		
16	.1			.2	--	(t)	.1		(t)
17	.1			.2	--		.1		
18	.1			.2	4		.1		
19	.1			.2	--		.1		
20	.1			.2	--		.1		
21	.1		(t)	.2	--		.1		
22	.1			.2	--		.1		
23	.1			.2	--		.1		
24	.1			.1	--		.1		
25	.1			.1	--		.1		
26	.2			.1	--		.1		
27	.2			.1	--		.1		
28	.2			.1	--		.1		
29	.2			.1	--		.1		
30	.1			.1	--		.1		
31	.2			--	--	--	.1		
Total	2.4		0.4	4.2	--	0.6	3.6		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	0.1			10	73	2.0	3	--	e0.5
2	.1			9	51	1.2	2	--	e.4
3	.1			10	50	a1.4	2	77	.4
4	.1			12	68	2.2	4	--	s.7
5	.1	--	(t)	15	59	2.4	6	--	e.8
6	.1			13	61	2.1	5	50	.7
7	.1			11	52	1.5	10	82	2.2
8	.1			8	42	.9	20	192	10
9	.5			6	240	b3.8	50	268	36
10	1			4	280	3.0	120	948	s452
11	1	--	e0.1	2	140	b.8	300	2,660	2,150
12	1			3	40	.3	500	3,710	5,010
13	1			3	30	a.2	547	4,180	6,170
14	.5			3	27	.2	352	4,250	4,040
15	.2			3	32	a.2	213	3,100	1,780
16	.1			2	57	.3	132	1,600	570
17	.1	--	(t)	2	83	.4	99	1,190	318
18	.1			2	50	.3	105	940	266
19	.1			2	50	a.3	94	680	173
20	.5			2	50	.3	70	540	102
21	1	--	e.5	1	--	e.1	51	398	55
22	1			2	39	.2	60	368	60
23	2			2	--	e.3	55	341	51
24	4			3	69	.6	37	230	23
25	10			3	--	e.6	24	146	9.5
26	9	--	e1.0	4	69	.7	19	124	6.4
27	8			5	--	e.7	16	110	4.8
28	7			4	--	e.6	13	102	3.6
29	7			--	--	--	11	118	3.5
30	8	58	1.3	--	--	--	10	96	2.6
31	9	76	1.8	--	--	--	10	75	2.0
Total	72.9	--	11.8	146	--	27.6	2,940	--	21,304.1

e Estimated
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly estimated concentration graph.
b Computed frpm estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	10	36	1.0	43	3,000	sa 750	1.7	100	0.4
2	10	24	.6	93	13,000	a3,300	1.7	104	.5
3	7	30	a.6	57	5,870	s1,020	1.6	101	.4
4	7	40	.8	26	468	s37	1.3	101	.4
5	13	69	s2.8	103	3,730	s1,170	1.3	110	a.4
6	17	109	5.0	70	3,260	s737	3.6	100	1.0
7	15	132	5.3	27	1,210	s95	15	152	s7.6
8	10	128	3.5	16	248	11	45	1,300	sa340
9	9	90	2.2	16	278	12	43	7,350	s751
10	9	100	2.4	11	246	7.3	23	25,000	1,550
11	15	121	4.9	12	120	3.9	14	12,900	s535
12	23	142	8.8	10	65	1.8	11	1,500	45
13	19	130	6.7	8	60	1.3	48	6,600	a850
14	15	185	7.5	6	73	1.2	16	14,500	626
15	10	160	4.3	5	93	1.3	10	1,250	34
16	10	122	3.3	4.7	106	1.3	5	281	3.8
17	8	103	2.2	4.0	115	1.2	2.3	140	.9
18	7	106	2.0	3.4	103	.9	1.9	105	.5
19	7	105	2.0	3.8	110	1.1	1.3	139	.5
20	7	130	2.5	4.0	160	1.7	3.6	117	1.1
21	9	128	3.1	4.0	151	1.6	91	12,100	s4,730
22	9	129	3.1	3.8	160	1.6	67	4,070	s853
23	7	198	3.7	4.0	132	1.4	19	639	s39
24	5	260	3.5	4.7	112	1.4	7	230	4.3
25	3.4	199	1.8	3.4	120	1.1	2.4	126	.8
26	5	161	2.2	3.8	110	1.1	1.0	90	.2
27	5	191	2.6	3.6	108	1.0	.7	92	.2
28	3.2	155	1.3	3.6	91	.9	.2	96	.1
29	6	86	1.4	3.4	100	.9	.1	116	(t)
30	14	130	sa5	2.7	110	.8	0	--	0
31	--	--	--	2.7	112	.8	--	--	--
Total	294.6	--	96.1	562.6	--	7,167.6	438.7	--	10,376.1

	July			August			September		
1				0	--	0	0.2		(t)
2				0	--	0	.2		
3				0	--	0	.1		
4				.1	--	(t)	.1		
5				.9		e.5	.1		
6				2.1	--	e 1.5	0		0
7				3.3	--	e 1.5	0		0
8				.5	--		0		0
9				.3	--		0		0
10				.2	--		0		0
11				.2	--		0		0
12				.2	--	(t)	0		0
13				.1	--		0		0
14				.1	--		0		0
15				.1	--		0		0
16				.1	37		0		0
17				.1	76		0		0
18				1.3	120	b.4	0		0
19				1.5	88	.4	0		0
20				.2	103	.1	0		0
21				.1	--		0		0
22				.1	--		0		0
23				.1	92		0		0
24				.1	--		0		0
25				.1	--		0		0
26				.1	--	(t)	0		0
27				.1	--		0		0
28				.1	--		0		0
29				.1	--		0		0
30				.1	--		0		0
31				.1	--		--		--
Total	0		0	12.4	--	5.0	0.7		0.1

Total discharge for year (cfs-days) 4,478.1
Total load for year (tons) 38,990.0

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly estimated concentration graph.
b Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, March 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	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, 1953	12:50 p.m.	59	37	1,250	1,870		51		63		84						SPWCM
Mar. 10	6:20 p.m.	176	37	1,760	1,890		65		74		90						SPWCM
Mar. 11	10:30 a.m.	245	38	2,300	2,010		81		87		92						SPWCM
Mar. 14	5:30 p.m.	301	36	5,100	5,090		70		96		99						SPWCM
Mar. 14	5:30 p.m.	301	36	5,100	5,200		4		97		98						SPN
Mar. 24	10:15 a.m.	38	37	251	1,190	70	82	91	95	97	99	100					BWCM
May 3	12:20 p.m.	51	--	5,360	4,450		83		100		--						PWCM
May 3	12:20 p.m.	51	--	5,360	4,480		3		95		100						SPN
May 6	11:00 a.m.	70	55	3,100	3,750		78		98		99						SPWCM
May 6	11:00 a.m.	70	55	3,100	3,760		4		64		99						SPN
June 21	12:15 p.m.	196	--	17,900	6,180		84		98		100						SPWCM
June 21	12:15 p.m.	196	--	17,900	6,120		1		95		100						SPN

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 87, a quarter of a mile downstream from Cascade Creek and 10 miles southwest of Hot Springs, Fall River County.
DRAINAGE AREA.--8,710 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1951.
Water temperatures: July 1947 to September 1949, April 1951 to September 1953.
Sediment records: April 1946 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 81°F July 18; minimum, 34°F Mar. 14, 16.
Sediment concentrations: Maximum daily, 48,500 ppm May 30; minimum daily, not determined.
Sediment loads: Maximum daily, 150,000 tons May 31; minimum daily, less than 0.50 ton July 13, 14 and probably on several other days.
EXTREMES, 1946-53.--Water temperatures (1947-49, 1951-53): 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 on several days during 1946-47, 1950.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 2 p. m. and 7 p. m., except March and June between 5 and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	61	56	49	--	50	--	51	--	60	74	70	71
2	65	57	--	--	54	--	49	44	72	--	--	a65
3	60	56	--	--	--	46	--	57	55	78	a68	62
4	a55	--	--	54	a55	--	58	a44	54	72	--	65
5	55	--	56	--	46	--	64	a48	56	72	a68	69
6	a55	53	--	a48	--	50	56	a52	54	75	a67	70
7	58	--	50	--	54	--	49	a62	58	72	a62	70
8	58	52	--	58	50	--	57	a66	54	70	a76	74
9	a53	--	48	54	47	--	48	a58	62	74	a65	69
10	62	57	--	--	52	44	50	59	64	75	a67	71
11	63	--	51	54	--	40	50	47	67	79	a76	69
12	58	a57	--	--	--	36	57	46	66	76	76	71
13	--	--	51	52	--	38	55	52	--	76	76	70
14	58	55	--	--	51	34	54	66	70	78	70	70
15	55	--	50	42	48	36	56	62	64	80	74	68
16	a51	51	--	--	51	34	51	63	60	70	76	70
17	58	--	--	50	--	36	a49	69	65	78	a64	65
18	61	48	--	--	a50	35	54	75	70	81	a74	65
19	63	--	53	48	--	36	59	--	71	76	a64	70
20	60	a48	--	--	--	40	64	65	61	75	a70	62
21	62	--	--	--	--	40	65	58	63	72	a64	68
22	64	50	--	48	54	40	--	--	65	73	a76	68
23	--	--	--	52	--	36	--	61	68	77	a77	70
24	64	--	--	50	a48	36	--	66	70	a72	a78	64
25	63	45	49	50	--	38	--	67	58	80	77	66
26	63	--	--	50	54	45	--	a54	59	76	a80	a58
27	61	45	49	--	--	52	--	70	63	--	74	68
28	60	--	--	a48	48	50	--	74	62	--	74	a62
29	61	51	--	48	--	60	--	64	67	75	73	71
30	--	--	--	--	--	--	--	68	66	80	80	72
31	--	--	54	--	--	--	--	44	--	80	73	--
Average	60	--	--	--	--	--	--	59	63	76	72	68

a Reading obtained between 6 a. m. and 11 a. m.

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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	72			36	70	7	1,080	15,900	s49,700
2	68			110	1,960	s786	361	10,800	10,500
3	68			119	5,550	1,780	182	7,500	3,690
4	64			100	1,480	400	122	3,600	1,190
5	62			160	2,110	s983	83	1,440	323
6	61			165	4,350	s2,040	74	850	170
7	66			94	850	216	68	740	136
8	64			74	463	93	75	860	174
9	62	71	12	58	337	53	112	1,490	s519
10	62			41			68	7,410	1,360
11	60			43	103	12	50	6,650	898
12	61			43			42	1,950	221
13	64			42			68	5,280	s1,220
14	61			38			52	2,000	281
15	56			36			37	2,800	280
16	55			37	54	5	127	3,970	s2,320
17	50			38			230	12,000	7,450
18	49			35			718	22,500	43,600
19	48			32			368	12,700	s13,600
20	47			35			225	8,200	4,980
21	44			36	51	5	744	19,800	s44,600
22	44			34			1,130	28,100	85,700
23	41	24	3	32			1,200	8,880	28,800
24	36			32			388	5,000	5,240
25	33			32			210	3,500	1,980
26	33			32	21	2	122	1,500	494
27	30			32			92	672	167
28	29			32			62	320	54
29	33			33			48	170	22
30	42	58	7	328	48,500	s56,200	41	115	13
31	--	--	--	1,380	40,800	s150,000	--	--	--
Total	1,565	--	238	3,339	--	212,665	8,179	--	309,682

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	36	115	11	24	2,000	s155	18	46	2
2	32	87	8	39	2,080	219	27	530	39
3	29	58	5	916	14,200	35,100	25	136	9
4	22	35	2	990	8,610	s26,800	25	50	3
5	24	45	3	1,060	19,400	55,500	24	53	3
6	24	27	2	540	9,320	s14,500	24		
7	22	18	1	161	4,000	1,740	23		
8	21	18	1	70	1,800	340	24		
9	19	18	1	44	434	52	24		
10	23	35	2	35	147	14	24		
11	25	39	3	31	92	8	25		
12	21	19	1	26	50	4	25		
13	17	10	(t)	23	43	3	24		
14	16	8	(t)	22	50	3	25		
15	15			25	40	3	25		
16	14			279	15,200	s15,400	25		
17	14			138	7,550	s3,530	27		
18	13			119	16,700	5,370	26	16	1
19	13			186	46,200	s28,000	25		
20	13			292	47,200	s43,700	25		
21	13			85	23,400	5,370	25		
22	13			70	24,500	4,630	25		
23	13	18	1	49	16,200	2,140	25		
24	14			37	5,100	509	25		
25	14			27	1,100	80	25		
26	13			24	300	19	25		
27	13			22	190	11	26		
28	13			20	110	6	26		
29	13			19	75	4	26		
30	13			19	70	4	25		
31	13			19	60	3	--	--	--
Total	558	--	58	5,411	--	243,217	743	--	81

Total discharge for year (cfs-days) 32,316
Total load for year (tons) 866,274

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

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	18			22			20		
2	16			22			19		
3	17			22			19		
4	18			22			19		
5	17			22			19		
6	18			23			19		
7	18			22			19		
8	18			22			19		
9	18			22			18		
10	17			20			18		
11	18			19			18		
12	17			19			18		
13	18			18			18		
14	18			18			18		
15	18			18			18		
16	18	12	1	18	12	1	18	11	1
17	18			18			18		
18	18			18			18		
19	18			18			18		
20	17			18			18		
21	18			17			18		
22	19			17			18		
23	20			18			18		
24	20			18			18		
25	19			17			18		
26	18			18			18		
27	19			19			18		
28	18			20			18		
29	18			19			18		
30	21			19			18		
31	23			--		--	18		
Total	566		31	583		30	587	567	31

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	18			74	190	38	38	--	e 3
2	18			58	75	12	32	30	3
2	18			44	24	a 3	41	28	3
4	18			50	50	7	43	45	5
5	19			67	122	22	51	42	6
6	19			62	126	21	58	44	a 7
7	19			55	128	19	60	44	7
8	19			51	71	10	87	100	23
9	19			32	34	3	136	380	140
10	19			27	21	2	133	500	s 244
11	20	10	1	28	--	e 2	363	2,780	s 3,150
12	21			35	43	4	846	6,390	s 15,400
13	20			44			1,070	6,550	18,900
14	20			48			965	7,130	18,600
15	20			46			599	4,700	7,600
16	20			48			585	5,650	8,920
17	20			43			464	4,800	6,010
18	20			51			427	3,600	4,150
19	20			48			392	2,900	3,070
20	21			48			382	3,100	3,200
21	23			46	35	4	365	4,200	4,140
22	31			44			284	2,680	2,060
23	32			46			251	2,180	1,480
24	35			46			236	2,350	1,500
25	33	20	2	44			179	1,200	580
26	31			50			150	900	364
27	31			51			109	588	173
28	32			46			94	400	102
29	48	102	13	--	--	--	83	230	52
30	67	223	40	--	--	--	74	125	25
31	53	87	12	--	--	--	72	90	17
Total	804	--	100	1,332	--	207	8,669	--	99,934

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

CHEYENNE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, March 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 disperzed)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Mar. 17, 1953...	10:00 a.m.	494	36	6,030	4,210	--	66	--	86	--	94	--	--	--			SPWCM
Mar. 17.....	10:00 a.m.	494	36	6,030	4,120	--	4	--	86	--	94	--	--	--			SPN
Mar. 23.....	5:30 p.m.	240	--	2,160	3,780	--	82	--	94	--	96	--	--	--			SPWCM
May 3.....	1:30 p.m.	114	51	4,830	4,080	--	85	--	100	--	--	--	--	--			PWCM
May 6.....	11:50 a.m.	162	60	4,230	4,740	--	82	--	92	--	99	--	--	--			SPWCM
May 31.....	4:40 p.m.	1,580	44	32,400	4,970	--	63	--	81	--	95	--	--	--			SPWCM
May 31.....	4:40 p.m.	1,580	44	32,400	5,930	--	5	--	81	--	95	--	--	--			SPN
June 1.....	2:40 p.m.	853	73	13,800	5,540	--	70	--	87	--	96	--	--	--			SPWCM
June 1.....	2:40 p.m.	853	73	13,800	5,590	--	5	--	83	--	96	--	--	--			SPN
June 2.....	11:45 a.m.	360	72	10,900	3,600	--	85	--	96	--	98	--	--	--			SPWCM
June 16.....	6:50 p.m.	270	83	9,430	5,760	--	73	--	92	--	93	93	94	94	96	100	SPWCM
June 18.....	5:45 p.m.	754	--	21,600	2,910	--	79	--	93	--	97	--	--	--			SPWCM
June 18.....	5:45 p.m.	754	--	21,600	2,980	--	6	--	92	--	97	--	--	--			SPN
June 22.....	5:40 p.m.	1,340	77	20,700	2,670	--	61	--	83	--	94	--	--	--			SPWCM
June 22.....	5:40 p.m.	1,340	77	20,700	2,920	--	5	--	78	--	94	--	--	--			SPN
June 25.....	10:00 a.m.	218	66	3,830	4,590	--	82	--	92	--	96	--	--	--			SPWCM
Aug. 3.....	3:30 p.m.	961	--	9,470	5,530	--	65	--	81	--	92	97	99	100			SPWCM
Aug. 19.....	11:15 a.m.	104	75	45,200	6,200	65	95	96	97	98	99	--	--	--			SPWCM
Aug. 19.....	11:15 a.m.	104	75	45,200	6,210	0	3	7	93	98	99	--	--	--			SPN

CHEYENNE RIVER BASIN--Continued

CHEYENNE RIVER AT ANGOSTURA RESERVOIR OUTLET, S. DAK.

LOCATION.--At outlet to power plant below Angostura Dam, 800 feet upstream from gaging station and 6½ miles southeast of Hot Springs, Fall River County. Prior to July 8,1953, gaging station at site 4¾ miles downstream.
DRAINAGE AREA.--9,100 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: October 1951 to September 1953 (discontinued).
REMARKS.-- Maximum observed sediment concentration during water year, 75 ppm July 14. Discharge records for gaging station below Angostura Dam for water year October 1952 to September 1953 given in WSP 1279.

Monthly and annual summary of water and suspended sediment discharge, water year October 1952 to September 1953

Month	Discharge (cfs - days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October	3,233.9	6,410	52.7	1.7			6	8
November	3,102	6,150	51.0	1.7			6	8
December	3,342	6,630	62.0	2.0			7	9
January	3,673	7,290	31.0	1.0			3	4
February	3,405	6,750	72.8	2.6			8	11
March	3,694	7,330	108.5	3.5			11	17
April	3,342	6,630	132.0	4.4			15	25
May	3,641	7,220	235.6	7.6			24	34
June	61.3	122	6.0	.2			24	28
July	2,993.7	5,940	186.0	6.0			23	75
August	3,352	6,650	52.7	1.7			6	11
September	1,177	2,330	51.0	1.7			16	29
Water year 1952-53	35,016.9	69,450	1,041.3	2.9			11	75

CHEYENNE RIVER BASIN--Continued

RAPID CREEK NEAR PACTOLA, S. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 85A, three-quarters of a mile northwest of Pactola, Pennington County, and 5½ miles upstream from Deer Creek.
DRAINAGE AREA.--315 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: February to September 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, February to September 1953

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					
Feb. 13, 1953	26	11	0.03	48	22	3.5	2.4	197	52	1.5	0.2	1.0	0.02	242	0.33		210	48	3	0.1	404	8.0	
Mar. 30	60	--	--	42	18	3.0	3.0	166	--	--	--	--	.00	--	--		180	44	3	.1	363	7.9	
Apr. 16	26	--	--	41	22	3.3	2.6	174	--	--	--	--	.02	--	--		191	48	3	.1	369	7.6	
Apr. 20	26	--	--	44	21	3.2	2.0	177	--	--	--	--	.03	--	--		195	50	3	.1	381	8.1	
Apr. 27	50	--	--	41	18	3.2	2.8	159	--	--	--	--	.01	--	--		176	46	4	.1	348	7.5	
May 4	59	--	--	38	18	3.3	2.8	149	--	--	--	--	.03	--	--		171	49	4	.1	342	7.7	
May 11	90	--	--	33	15	3.0	2.6	135	--	--	--	--	.01	--	--		145	34	4	.1	287	7.6	
May 18	a90	--	--	39	16	3.0	2.8	156	--	--	--	--	.01	--	--		163	35	4	.1	331	7.8	
May 25	a88	--	--	38	19	3.0	3.0	170	--	--	--	--	.04	--	--		172	33	4	.1	338	7.7	
June 1	a68	--	--	38	20	3.1	3.0	172	--	--	--	--	.02	--	--		176	35	3	.1	346	7.9	
June 8	a64	--	--	41	19	2.9	2.9	177	--	--	--	--	.01	--	--		180	35	3	.1	348	7.7	
June 15	a96	--	--	37	18	2.8	3.2	148	--	--	--	--	.01	--	--		166	45	3	.1	315	7.1	
June 22	a108	--	--	33	21	3.2	3.1	168	--	--	--	--	.02	--	--		170	32	4	.1	339	7.5	
June 29	a66	--	--	39	18	3.4	3.0	170	--	--	--	--	.01	--	--		173	34	4	.1	344	7.5	
July 1	a54	--	--	40	18	3.9	3.2	170	--	--	--	--	.01	--	--		175	36	5	.1	351	7.5	
July 6	39	--	--	40	19	3.2	2.8	174	--	--	--	--	.01	--	--		178	35	4	.1	351	8.1	
July 13	a48	--	--	41	19	3.5	3.6	178	--	--	--	--	.00	--	--		179	33	4	.1	355	7.6	
July 15	a42	11	01	44	18	3.4	3.1	183	40	1.0	.3	.7	.01	210	.29		184	34	4	.1	365	7.9	1
July 20	a40	--	--	51	15	3.4	3.0	189	--	--	--	--	.01	--	--		189	34	4	.1	370	7.8	
July 27	a32	--	--	44	20	3.3	3.0	193	--	--	--	--	.01	--	--		192	34	3	.1	372	8.1	
Aug. 3	a60	--	--	43	19	3.1	3.0	190	--	--	--	--	.01	--	--		186	30	3	.1	366	7.7	
Aug. 12	36	--	--	47	20	3.9	3.6	201	--	--	--	--	.01	--	--		198	33	4	.1	387	7.5	
Aug. 18	33	--	--	47	20	3.4	3.5	201	--	--	--	--	.02	--	--		198	33	4	.1	383	8.0	
Aug. 24	39	--	--	47	20	3.1	3.3	201	--	--	--	--	.02	--	--		198	33	3	.1	384	7.9	
Aug. 31	27	--	--	47	21	3.3	3.3	205	--	--	--	--	.03	--	--		202	34	3	.1	389	7.9	
Sept. 8	27	--	--	47	21	3.3	3.2	208	--	--	--	--	.04	--	--		202	31	3	.1	391	8.0	
Sept. 14	26	--	--	47	21	3.2	3.3	209	--	--	--	--	.02	--	--		203	32	3	.1	396	7.6	
Sept. 21	26	--	--	47	21	3.0	3.2	211	--	--	--	--	.04	--	--		204	31	3	.1	399	7.8	
Sept. 28	27	--	--	48	21	3.2	3.2	213	--	--	--	--	.11	--	--		208	33	3	.1	400	8.0	

a Mean daily discharge.

RAPID CREEK BELOW HAWTHORN DITCH, AT RAPID CITY, S. DAK.

LOCATION.--At gaging station at highway bridge, half a mile upstream from diversion to Murphy ditch, 1½ miles downstream from diversion to Hawthorn ditch, and 2 miles south east of Rapid City, Pennington County.
RECORDS AVAILABLE.--Chemical analyses: February to September 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, December 1949, February to September 1953

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					
Dec. 22, 1949....	--	13	0.02	72	25	14		231	110	4.0	0.2	2.4	0.20	369	0.50		283	94	9	--	560	7.5	
Feb. 13, 1953....	37	12	.03	61	26	5.7	2.8	214	84	3.7	.2	1.3	.06	314	.43		258	83	5	0.2	501	8.2	
Mar. 30	63	--	--	53	22	5.1	3.0	188	--	--	--	--	.00	--	--		222	68	5	.1	432	7.9	
Apr. 6	68	--	--	60	20	5.1	2.8	196	84	--	--	--	.03	--	--		234	73	4	.1	468	7.8	
Apr. 13.....	48	--	--	62	21	5.3	2.8	190	97	--	--	--	.03	--	--		242	86	4	.1	489	7.8	
Apr. 20	46	--	--	56	23	5.4	2.8	182	--	--	--	--	.11	--	--		234	85	5	.2	473	--	
Apr. 27	77	--	--	51	21	4.7	4.4	177	--	--	--	--	.02	--	--		214	69	4	.1	420	8.0	
May 4	93	--	--	57	22	5.2	3.0	181	--	--	--	--	.08	--	--		231	83	5	.2	443	7.9	
May 11	129	--	--	48	18	4.1	2.8	162	--	--	--	--	.06	--	--		196	63	4	.1	393	7.4	
May 18	106	--	--	46	20	4.5	2.6	170	--	--	--	--	.01	--	--		199	60	5	.1	386	7.9	
May 25	96	--	--	46	20	4.7	2.8	174	--	--	--	--	.02	--	--		198	55	5	.1	404	7.9	
June 1.....	63	--	--	50	22	5.2	2.8	184	--	--	--	--	.03	--	--		215	64	5	.2	427	7.9	
June 8	54	--	--	50	21	5.5	3.0	186	--	--	--	--	.02	--	--		213	60	5	.2	428	8.0	
June 15	143	--	--	97	17	5.1	5.6	188	--	--	--	--	.06	--	--		312	158	3	.1	601	7.4	4
June 22	141	--	--	60	20	5.2	3.2	195	--	--	--	--	.05	--	--		233	73	5	.2	462	7.5	
June 30.....	82	--	--	60	21	6.0	3.2	187	--	--	--	--	.08	--	--		234	81	5	.2	470	7.2	
July 6	46	--	--	59	21	5.9	3.0	184	--	--	--	--	.16	--	--		235	84	5	.2	469	7.7	
July 13	48	--	--	54	21	5.6	3.4	183	--	--	--	--	.06	--	--		222	72	5	.2	446	7.6	
July 15	37	9.4	.01	60	23	6.1	4.1	198	92	3.0	.2	1.5	.06	298	.41		246	84	5	.2	482	7.6	
July 20	35	--	---	61	22	6.7	3.8	195	--	--	--	--	.13	--	--		241	81	6	.2	482	7.7	
July 27	48	--	--	61	20	7.5	4.1	180	--	--	--	--	.08	--	--		236	88	6	.2	480	7.6	
Aug. 3	127	--	--	59	21	6.4	3.2	207	--	--	--	--	.05	--	--		235	65	6	.2	467	7.4	
Aug. 11.....	68	--	--	62	22	5.8	3.2	210	--	--	--	--	.05	--	--		244	72	5	.2	477	7.5	
Aug. 17	57	--	--	53	21	5.8	3.1	174	--	--	--	--	.15	--	--		219	76	5	.2	438	7.8	
Aug. 24	62	--	---	54	19	5.4	3.2	198	--	--	--	--	.06	--	--		213	51	5	.2	424	7.8	
Aug. 31	42	--	--	62	22	6.1	3.3	204	--	--	--	--	.05	--	--		246	79	5	.2	490	7.5	
Sept. 8	40	--	--	55	24	6.1	4.3	193	--	--	--	--	.10	--	--		236	78	5	.2	467	7.8	
Sept. 14	34	--	--	67	21	6.6	3.2	207	--	--	--	--	.04	--	--		253	83	5	.2	501	7.5	
Sept. 21	42	--	--	65	22	6.4	3.7	212	--	--	--	--	.08	--	--		254	80	5	.2	500	7.5	
Sept. 28	34	--	--	64	23	6.2	4.0	206	--	--	--	--	.06	--	--		253	84	5	.2	499	7.5	

CHEYENNE RIVER BASIN--Continued

RAPID CREEK NEAR FARMINGDALE, S. DAK.

LOCATION.--At gaging station at highway bridge, 2 miles southeast of Farmingdale, Pennington County, and 3¼ miles downstream from Antelope Creek.
RECORDS AVAILABLE.--Chemical analyses: February to September 1953 (discontinued).
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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, December 1949, February to September 1953

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					
Dec. 22, 1949...	37	10	0.02	99	37	46		274	243	9.5	0.2	8.4	0.30	609	0.83	--	399	174	20	--	837	7.5	--
Feb. 13, 1953 ...	50	8.1	.03	94	38	28	4.2	256	215	11	.3	8.1	.06	548	.75	74	390	180	13	0.6	813	7.7	--
Feb. 15 24.....	43.7	6.9	.00	98	35	32	4.0	249	219	13	.4	8.4	.12	570	.78	67	387	183	15	.7	828	7.7	--
Feb. 25-Mar. 10	56.6	7.0	.00	92	33	29	4.0	237	204	11	.4	8.1	.10	518	.70	79	365	171	15	.7	783	7.6	--
Mar. 11-18	106	13	.01	93	41	52	5.6	217	306	10	.4	6.4	.14	680	.92	195	401	223	22	1.1	924	8.2	--
Mar. 19-27	67.8	11	.00	93	40	37	4.4	238	256	14	.4	3.5	.16	614	.84	112	394	199	17	.8	864	7.7	--
Mar. 31-Apr. 30	71.6	9.6	.03	88	38	34	4.8	247	227	11	.4	2.5	.10	558	.76	108	374	171	16	.8	820	7.5	--
May 4-8	95.6	13	.00	90	37	32	4.9	223	236	8.5	.3	2.4	.15	554	.75	143	377	194	15	.7	809	7.5	5
May 12-13	135	13	.01	89	37	33	5.6	336	154	8.0	.4	6.7	.14	516	.70	188	376	100	16	.7	807	7.5	12
May 22	100	26	.09	90	44	36	6.3	404	133	14	.3	.0	.15	550	.75	149	404	73	16	.8	856	7.8	7
May 30-31	64.0	6.1	.02	74	32	27	4.4	218	178	11	.4	1.9	.12	462	.63	80	318	139	15	.7	689	7.9	1
June 27-July 1..	92.8	2.3	.01	81	30	21	4.9	204	193	9.5	.4	6.1	.12	471	.64	118	324	157	12	.5	690	7.6	1
July 2-8	47.4	14	.01	82	36	27	4.9	210	220	11	.4	3.5	.12	524	.71	67	354	182	14	.6	761	7.7	1
July 15.....	5.1	7.5	.01	99	46	45	5.5	231	325	12	.5	1.4	.20	698	.95	9.6	438	249	18	.9	959	7.6	1
July 18-25	7.3	12	.01	109	53	62	6.7	233	408	14	.5	1.2	.27	839	1.14	17	491	300	21	1.2	1,110	8.1	1
Aug. 11-15	33.0	11	.01	81	40	32	5.2	217	248	11	.4	1.9	.17	556	.76	50	368	190	16	.7	802	7.6	1
Aug. 16-20	21.6	13	.01	83	42	37	5.4	205	270	21	.4	1.0	.17	583	.79	34	378	210	17	.8	839	7.8	1
Aug. 24-31	7.6	8.3	.01	92	47	46	5.9	219	328	14	.5	1.1	.22	679	.92	14	424	244	19	1.0	948	7.8	1
Sept. 8-14	4.0	8.4	.01	113	55	65	7.2	277	408	17	.5	.9	.26	866	1.18	9.4	508	281	21	.3	1,150	7.9	1

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 1953.
REMARKS.--No gaging station in vicinity of sampling station.

Chemical analyses in parts per million, water year October 1952 to September 1953

Date of collection	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			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, 1952				268	101	101		230	1,060	9.5							1,090	901	17	1.3	2,060	7.3	
Nov. 4				260	103	92		382	900	14							1,070	757	16	1.2	1,980	7.6	
Dec. 2				357	106	119		509	1,110	10							1,330	913	19	1.4	2,350	7.3	
Jan. 5, 1953				258	111	95		307	990	18							1,100	848	16	1.3	2,050	7.2	
Feb. 3				241	109	105		288	980	16							1,050	814	18	1.4	1,930	7.3	
Mar. 3				355	158	166		366	1,510	17							1,540	1,240	19	1.9	2,740	7.5	
Apr. 1				186	83	84		212	762	14							804	630	18	1.3	1,610	7.5	
May 5				163	63	99		182	690	10							666	517	24	1.7	1,480	7.4	
June 1				160	63	68		223	590	7.0							658	475	18	1.2	1,320	7.5	
July 2				187	76	59		216	685	13							781	604	14	.9	1,510	7.3	
Aug. 4				98	23	75		98	400	2.5							338	258	32	1.8	925	6.9	
Sept. 1				255	90	124		218	1,040	10							1,010	831	21	1.7	1,990	7.3	

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 1953 (discontinued).
Water temperatures: October 1951 to September 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,570 ppm Nov. 25 to Dec. 11; minimum, 664 ppm Mar. 21-24.
Hardness: Maximum, 1,250 ppm Nov. 25 to Dec. 11; minimum, 296 ppm Mar. 21-24.
Specific conductance: Maximum daily, 3,240 micromhos Dec. 8.
Water temperatures: Minimum, freezing point on many days during November to March.
EXTREMES, 1950-53.--Dissolved solids: Maximum, 2,570 ppm Nov. 25 to Dec. 11, 1952; minimum, 524 ppm Apr. 4-9, 1952.
Hardness: Maximum, 1,250 ppm Nov. 25 to Dec. 11, 1952; minimum, 264 ppm Apr. 4-9, 1952.
Specific conductance: Maximum daily, 3,240 micromhos Dec. 8, 1952; minimum daily (1950-52), 701 micromhos Apr. 4, 1952.
Water temperatures (1951-53): Maximum (1951-52), 85°F July 5, 1952; minimum, freezing point on many days during winter months each year.
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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-30, 1952	240			212	79	175		148	1,010	46		0.8	0.22	1,730	2.35	1,120	852	731	31	2.6	1,990	7.5
Oct. 31-Nov. 24	163			232	88	200		184	1,070	47		2.4	.24	1,900	2.58	836	940	789	32	2.8	2,220	7.3
Nov. 25-Dec. 11	132			311	115	271		277	1,460	69		5.0	.31	2,570	3.50	916	1,250	1,020	32	3.3	2,820	7.5
Dec. 12-Jan. 17, 1953	175			250	79	179		258	1,010	57		2.4	.25	1,860	2.53	879	950	738	29	2.5	2,110	7.4
Jan. 18-31	211			218	64	157		224	835	50		2.6	.19	1,570	2.14	894	807	623	30	2.4	1,910	7.4
Feb. 1-14	304			162	46	145		196	667	36		--	.16	1,250	1.70	1,030	594	433	35	2.6	1,580	7.4
Feb. 15-28	226			221	69	179		230	905	52		3.6	.18	1,700	2.31	1,040	836	647	32	2.7	2,010	7.3
Mar. 1-11	284			198	61	150		224	810	48		4.6	.19	1,490	2.03	1,140	744	560	30	2.4	1,840	7.5
Mar. 12-14	4,097			104	26	130		190	445	29		3.4	.21	870	1.18	9,620	366	210	43	3.0	1,210	7.7
Mar. 15-20	2,275			132	33	137		169	600	19		6.3	.19	1,050	1.43	6,450	466	327	37	2.8	1,400	7.3
Mar. 21-24	7,973			96	14	92		198	320	7.0		6.4	.18	664	.90	14,290	296	134	39	2.3	945	7.4
Mar. 25 - Apr. 1	1,733			114	29	118		163	508	17		3.0	.14	902	1.23	4,220	404	270	37	2.5	1,220	7.2
Apr. 2-8	723			153	45	167		179	725	32		2.2	.21	1,360	1.85	2,650	566	419	38	3.1	1,650	7.3
Apr. 9-13	1,734			111	27	162		197	555	18		5.7	.17	1,000	1.36	4,680	386	224	46	3.6	1,370	7.4
Apr. 14-29	501			163	51	192		189	825	35		1.2	.20	1,450	1.97	1,960	616	461	39	3.4	1,840	7.3
Apr. 30 - May 1	3,480			156	36	172		194	735	21		3.6	.25	1,270	1.73	11,930	538	379	39	3.2	1,650	7.6

May 2-6, 1953	8,254			98	18	136		202	430	10		2.0	.18	830	1.13	18,500	318	152	47	3.3	1,150	7.5
May 7-30	949			151	50	171		176	755	30		2.6	.19	1,330	1.81	3,410	582	438	38	3.1	1,700	7.4
May 31-June 1	2,055			178	53	190		260	830	22		1.2	.31	1,490	2.03	8,270	662	449	37	3.2	1,880	7.6
June 2-10	912			132	38	163		175	660	22		3.7	.19	1,170	1.59	2,880	484	340	41	3.2	1,540	7.3
June 11-12	1,345			91	22	123		182	410	14		3.7	.17	808	1.10	2,930	318	169	45	3.0	1,120	7.7
June 13-20	4,863			128	26	136		202	550	11		.9	.26	990	1.35	13,000	428	262	40	2.9	1,330	7.4
June 21-25	8,870			102	21	107		182	418	6.5		.5	.20	776	1.06	18,580	340	191	39	2.5	1,070	7.8
June 26-29	2,005			137	36	144		155	645	17		3.0	.18	1,120	1.52	6,060	488	361	38	2.8	1,450	7.2
June 30	1,340			110	21	100		200	403	7.0		4.6	.18	778	1.06	2,810	360	196	36	2.3	1,080	7.5
July 1-25	447			173	56	195		166	895	31		3.1	.29	1,540	2.09	1,860	660	524	38	3.3	1,920	7.2
July 26 - Aug. 3	1,226			177	41	181		163	830	28		2.6	.26	1,410	1.92	4,670	612	478	38	3.2	1,790	7.4
Aug. 4-11	2,470			118	23	138		184	515	12		2.4	.28	936	1.27	6,240	388	237	42	3.0	1,270	7.4
Aug. 12-31	548			166	53	163		144	800	31		1.9	.31	1,370	1.86	2,030	630	512	36	2.8	1,710	7.5
Sept. 1-30	341			216	78	161		140	1,010	30		1.4	.33	1,710	2.33	1,570	858	743	29	2.4	2,020	7.3
Weighted average a	1,010			135	35	143		187	603	20		2.6	0.22	1,090	1.48	2,970	481	328	38	2.8	1,420	

a Represents 100 percent of runoff for water year October 1952 to September 1953.

CHEYENNE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 9 a. m. and 11 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	--	a34	--	--	--	44	42	67	78	--	--
2	--	--	--	a35	32	32	41	--	--	a 85	--	74
3	a67	a43	34	--	--	--	37	44	67	69	--	--
4	--	--	--	--	a 32	32	50	45	58	72	--	58
5	--	a44	32	33	32	--	a 53	a 53	59	--	69	--
6	a 46	--	--	--	--	--	44	55	--	72	--	--
7	--	a 39	--	a 32	--	--	a 41	--	56	a 78	68	--
8	44	--	34	--	--	--	44	60	68	69	--	61
9	--	--	--	a 34	31	32	--	56	a 68	--	--	70
10	49	--	33	--	--	--	38	53	68	a 80	a 73	--
11	--	--	--	--	32	32	a 39	43	--	--	--	65
12	--	a 42	33	--	--	a 34	41	--	75	--	70	--
13	.56	--	--	--	32	34	44	--	71	76	--	--
14	a 54	38	--	32	--	--	a 49	--	--	--	73	65
15	a 46	--	32	--	--	--	38	50	--	73	--	--
16	--	--	--	32	32	32	37	--	a 66	--	--	63
17	45	40	33	--	--	--	38	--	71	71	72	--
18	--	--	--	--	32	36	--	60	--	--	--	59
19	--	34	33	31	--	--	--	--	73	--	72	--
20	44	--	--	--	32	38	40	57	68	75	--	--
21	--	38	32	32	--	--	54	a 58	68	--	70	52
22	a 50	--	--	--	--	--	54	55	68	73	--	--
23	--	--	--	32	--	33	--	--	--	--	--	60
24	--	36	32	--	32	--	49	--	69	75	72	--
25	--	--	--	--	32	32	--	--	--	--	--	58
26	--	32	32	33	--	--	--	a 67	67	74	--	--
27	43	--	--	--	32	40	48	59	--	73	72	56
28	--	32	--	32	--	42	--	a 67	70	--	--	66
29	38	--	32	--	--	a 50	45	73	76	73	--	--
30	--	--	--	31	--	40	43	68	66	--	--	53
31	44	--	a 34	--	--	a 49	--	--	--	74	77	--
Average	--	--	--	--	--	--	--	--	--	--	--	--

a Reading obtained between 1 p. m. and 4 p. m.

MISCELLANEOUS ANALYSES OF STREAMS IN THE CHEYENNE RIVER BASIN

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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				
CASTLE CREEK BELOW DEERFIELD RESERVOIR, S. DAK.																							
Aug. 11, 1949	16.9	5.4	0.02	50	30	0.5		291	0	8.0	0.8	0.0	1.6	--	242	0.33		249	10	0	--	444	7.4
Feb. 25, 1953	2.16	5.9	.10	47	30	2.6	3.2	284	0	11	1.0	.2	1.1	0.02	250	.34		239	6	2	0.1	442	8.0
RAPID CREEK AT BIG BEND BELOW DEER CREEK, S. DAK.																							
Feb. 13, 1953	21.8	12	0.01	47	22	3.7	2.6	197	0	50	2.5	0.2	1.0	0.05	242	0.33		206	44	4	0.1	399	8.2
July 15	42.2	10	.00	43	19	3.6	3.2	183	0	41	1.5	.1	.3	.01	212	.29		184	34	4	.1	367	7.6
RAPID CREEK ABOVE CANYON LAKE NEAR RAPID CITY, S. DAK.																							
Feb. 13, 1953	18.0	12	0.01	48	21	4.0	2.6	198	0	48	3.0	0.0	0.8	0.06	238	0.32		205	43	4	0.1	397	8.2
July 15	39.2	9.9	.00	44	17	3.6	3.2	178	0	43	1.5	.1	.4	.03	210	.29		179	33	4	.1	363	7.6
RAPID CREEK AT RAPID CITY, S. DAK.																							
Dec. 22, 1949	a37	14	0.02	69	22	15		226	0	100	3.5	0.2	2.1	0.20	352	0.48		263	78	11	--	537	7.6
Feb. 13, 1953	35.6	11	.03	63	23	5.9	2.8	214	0	84	4.8	.3	1.4	.02	310	.42		250	75	5	0.2	490	8.0
July 15	49.9	10	.00	60	19	4.4	3.2	191	0	74	2.0	.1	1.2	.03	270	.37		227	70	4	.1	445	7.5
RAPID CREEK BELOW LITTLE GIANT DITCH, S. DAK.																							
Dec. 22, 1949	--	14	0.02	79	27	27		231	0	138	18	0.2	9.2	0.30	441	0.60		308	119	16	--	654	8.2
Feb. 13, 1953	--	10	.02	75	28	13	3.8	222	0	126	10	.2	6.5	.03	390	.53		301	119	9	0.3	621	7.1
July 15	11.4	4.3	.00	96	31	17	4.2	240	0	188	11	.2	5.3	.11	486	.66		369	172	9	.4	738	7.5
RAPID CREEK AT CAPUTA, S. DAK.																							
Dec. 22, 1949	--	12	0.02	102	36	36		256	7	218	16	0.3	10	0.30	579	0.79		403	182	16	--	799	8.3
Feb. 13, 1953	40.6	9.9	.02	88	34	24	4.2	248	0	185	14	.3	9.1	.07	502	.68		361	158	12	0.5	755	7.6
July 15	4.94	4.9	.00	99	49	41	6.1	222	0	318	12	.3	2.1	.22	682	.93		449	267	16	.8	959	7.3

a Mean daily discharge.

CHEYENNE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	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				
CHEYENNE RIVER NEAR WASTA, S. DAK.																							
Dec. 4, 1952	a130	--	--	242	67	150		248	0	870	70	--	--	--	--	--		891	678	27	2.2	2,920	7.5
Mar. 5, 1953	a150	--	--	160	42	105		204	0	550	42	--	--	--	--	--		570	403	29	1.9	1,440	7.2
Mar. 11	a2,600	--	--	56	8.4	107		174	0	243	8.5	--	--	--	--	--		174	31	57	3.5	833	7.5
June 4	185	--	--	51	5.1	203		236	0	350	22	--	--	--	--	--		148	0	75	7.3	1,150	7.8
BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.																							
Mar. 21, 1953	a95	--	--	93	47	239		327	0	640	6.5	--	--	--	--	--		424	156	55	5.0	1,690	7.2
Apr. 2	14	--	--	47	19	61		110	0	225	2.0	--	--	--	--	--		194	104	41	1.9	645	7.0
June 9	5.3	--	--	72	32	144		110	0	435	5.0	--	--	--	--	--		310	148	50	3.5	1,150	7.2
July 7	2.1	--	--	101	47	280		393	0	695	7.0	--	--	--	--	--		446	124	58	5.8	1,740	7.5
Aug. 3	500	--	--	49	17	37		109	0	175	1.5	--	--	--	--	--		193	104	29	1.2	553	6.9

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 1952 to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
CHEYENNE RIVER NEAR SPENCER, WYO.			
Mar. 9, 1953	4.1	323	3.6
Mar. 13	163	8,850	3,890
Mar. 17	49	2,550	337
Mar. 19	49	2,110	279
Mar. 19	49	1,840	244
Mar. 24	43	3,890	452
Mar. 26	28	1,530	116
Apr. 1	a18	444	22
Apr. 2	19	736	38
Apr. 8	17	250	11
Apr. 16	5.6	150	2.3
Apr. 20	4.6	124	1.5
May 1	8.4	674	15
May 5	45	1,970	239
May 11	6.5	282	4.9
May 19	6.1	108	1.8
May 26	2.3	14	.1
May 31	347	17,800	16,500
June 1	215	12,500	7,260
June 2	110	7,520	2,230
June 8	9.8	194	5.1
June 10	3.2	51	.4
June 15	.27	102	.1
June 18	82	22,900	5,070
June 20	132	18,100	6,450
June 20	1,160	56,200	183,000
June 21	352	23,200	22,000
June 22	190	16,400	8,410
June 24	66	3,550	633
July 1	11	161	4.8
Aug. 5	58	25,300	3,960
Aug. 18	151	51,600	21,800
Aug. 6, 1954	1,750	52,600	258,000

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 1952 to September 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; V, visual accumulation tube)

Date of collection	Time	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.																	
Mar. 13, 1953	6:00 p.m.	163	--	8,850	4,540	--	69	--	86	--	92						SPWCM
Mar. 13	6:00 p.m.	163	--	8,850	4,510	--	7	--	86	--	92						SPN
Mar. 17	11:00 a.m.	49	--	2,550	1,540	77	85	92	95	95	96						BWCM
Mar. 24	4:45 p.m.	43	48	3,890	2,780	--	89	--	94	--	98						SPWCM
Mar. 26	2:15 p.m.	228	57	1,530	4,660	--	91	--	96	--	97						SPWCM
May 5	1:00 p.m.	45	65	1,970	3,210	--	81	--	91	--	96						SPWCM
June 2	1:15 p.m.	110	--	7,520	4,010	--	83	--	89	--	91						SPWCM
June 18	1:00 p.m.	82	82	22,900	4,340	--	89	--	97	--	99						SPWCM
June 21	5:30 p.m.	352	73	23,200	5,740	--	79	--	96	--	99						SPWCM
June 21	5:30 p.m.	352	73	23,200	5,850	--	8	--	93	--	99						SPN
June 24	2:15 p.m.	66	74	3,550	4,040	--	90	--	96	--	97						SPWCM
June 24	2:15 p.m.	66	74	3,550	4,100	--	9	--	95	--	97						SPN
Aug. 5	11:15 a.m.	58	77	25,300	3,800	73	86	96	99	100	--						PWCM
Aug. 5	11:15 a.m.	58	77	25,300	3,800	4	8	59	98	99	100						SPN
Aug. 18	2:00 p.m.	151	80	51,600	5,160	--	64	--	95	--	99						SPWCM
Aug. 18	2:00 p.m.	151	80	51,600	5,060	--	5	--	96	--	99						SPN
Aug. 6, 1954	3:35 p.m.	1,750	69	52,600	4,810	--	68	--	88	--	97	99	100				VPWCM

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.
DRAINAGE AREA.--243,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1953.
Water temperatures: March 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 704 ppm May 1-3; minimum, 332 ppm July 19-25.
Hardness: Maximum, 335 ppm Dec. 14-17; minimum, 144 ppm July 19-25.
Specific conductance: Maximum, 994 micromhos May 1-3; minimum daily, 464 micromhos July 2.
Water temperatures: Maximum, 74°F July 19; minimum, freezing point on many days during November to March.
EXTREMES, 1951-53.--Dissolved solids: Maximum, 704 ppm May 1-3, 1953; minimum, 264 ppm June 18-26, 1952.
Hardness: Maximum, 335 ppm Dec. 14-17, 1952; minimum, 134 ppm July 9, 1951.
Specific conductance: Maximum, 994 micromhos May 1-3, 1953; minimum daily, 394 micromhos July 3, 1951.
Water temperatures: Maximum, 80°F Aug. 2, 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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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. 1-29, 1952	28,210			58	19	59		189	0	184	9.5		1.2	0.31	436	0.59	33,210	224	69	35	1.7	676	7.6
Oct. 30 - Nov. 22	23,510			59	22	62		194	0	193	11		1.1	.30	454	.62	26,820	239	68	36	1.7	699	7.7
Nov. 23-26	16,400			65	24	70		209	0	219	12		1.0	.18	512	.70	22,670	262	91	36	1.9	776	8.1
Nov. 27 - Dec. 13	8,265			73	27	80		236	0	252	13		1.2	.16	574	.78	12,810	291	97	37	2.0	867	7.9
Dec. 14-17	6,075			82	32	91		259	0	290	15		1.3	.16	646	.88	10,600	338	123	37	2.2	962	7.8
Dec. 18-23	11,250			80	31	91		264	0	276	14		1.3	.31	652	.89	19,800	327	112	37	2.2	950	7.7
Dec. 24-26	14,330			74	29	81		220	17	252	13		1.0	.12	602	.82	23,230	264	95	36	2.0	883	8.6
Dec. 27-31	11,740			77	28	84		250	0	255	14		1.3	.17	598	.81	18,960	307	102	37	2.1	910	7.8
Jan. 1-31, 1953	11,960			74	27	77		238	0	253	13		1.4	.14	596	.81	19,250	296	101	35	2.0	866	7.8
Feb. 1-28	12,250			67	24	71		216	0	221	12		1.5	.14	540	.73	17,860	266	91	36	1.9	756	7.7
Mar. 1-14	10,960			66	25	75		202	0	242	13		1.4	.12	548	.75	16,220	266	100	37	2.0	805	7.3
Mar. 15-16	17,850			79	21	98		170	0	336	13		2.5	.21	666	.91	32,100	282	143	42	2.5	938	7.3
Mar. 17-23	27,270			72	21	84		166	0	303	11		2.5	.10	594	.81	43,740	266	130	39	2.2	840	7.4
Mar. 24-25	36,650			62	14	70		143	10	212	5.0		2.6	.15	474	.64	46,900	212	78	42	2.1	694	8.4
Mar. 26-31	28,120			50	16	65		164	0	183	7.8		2.5	.10	414	.56	31,430	190	56	42	2.1	652	7.5

MISSOURI RIVER MAIN STEM--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--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. 1-30, 1953...	20,010			62	20	75		193	0	225	11		1.9	0.09	512	0.70	27,660	237	79	40	2.1	771	7.9
May 1-3.....	37,670			82	20	109		190	0	343	10		3.4	.22	704	.96	71,600	288	132	45	2.8	994	7.8
May 4-31.....	26,920			57	19	86		199	0	233	10		2.4	.16	530	.72	38,520	222	59	44	2.5	790	7.4
June 1-15.....	46,470			56	18	82		201	0	215	7.5		4.1	.17	526	.72	66,000	213	48	44	2.4	768	7.7
June 16.....	88,500			85	22	101		216	0	323	8.0		6.8	.22	688	.94	164,400	302	125	41	2.5	955	7.4
June 17-21.....	91,580			56	14	66		184	0	190	4.0		3.5	.17	454	.62	112,300	198	47	42	2.0	673	7.6
June 22-23.....	106,500			63	16	67		200	0	205	4.0		3.6	.12	486	.66	139,700	222	58	38	2.0	720	8.1
June 24-30.....	76,900			46	13	52		165	0	138	4.0		3.0	.05	368	.50	76,410	167	32	39	1.7	557	7.6
July 1-18.....	37,920			38	13	52		148	0	135	4.5		6.1	.17	340	.46	34,810	148	27	41	1.9	524	7.4
July 19-25.....	26,860			37	13	49		147	0	128	5.5		.8	.10	332	.32	24,080	144	23	41	1.8	502	7.9
July 26 - Aug. 12..	29,520			60	7.4	57		160	0	165	7.0		.9	.18	394	.54	31,400	180	49	39	1.8	598	8.0
Aug. 13-31.....	28,020			54	17	66		182	0	183	8.5		.9	.16	456	.62	34,500	206	57	41	2.0	677	7.7
Sept. 1-30.....	28,990			61	16	60		182	0	190	9.0		.7	.14	448	.61	35,070	218	69	36	1.8	672	7.5
Weighted average a	25,710			58	18	68		b188	--	201	8.6		2.3	0.17	473	0.64	32,830	219	65	39	2.0	706	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.
b Includes carbonate as bicarbonate.

MISSOURI RIVER MAIN STEM--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 7 a. m. and 11 a. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	43	32	32	32	32	38	45	61	69	71	67
2	53	42	31	32	32	32	38	43	62	68	73	67
3	53	41	32	32	32	32	44	43	61	67	72	61
4	--	41	32	32	32	32	37	46	63	69	69	58
5	48	41	33	32	32	32	41	47	59	69	65	58
6	a47	40	33	32	32	32	40	51	57	66	66	55
7	a48	39	33	32	32	32	41	54	55	67	64	56
8	44	39	33	32	32	33	41	56	55	66	64	56
9	46	39	32	32	32	33	38	58	57	66	67	58
10	47	35	32	33	a32	33	36	56	57	67	66	58
11	47	38	32	33	32	33	35	51	59	69	65	59
12	48	37	32	33	32	33	41	44	61	71	64	58
13	49	37	32	33	32	33	38	45	64	71	64	60
14	49	36	33	32	32	33	38	46	66	71	65	56
15	46	37	32	32	32	32	36	47	66	71	67	57
16	45	40	32	32	32	32	36	51	62	70	69	57
17	44	39	a32	32	32	33	36	53	64	69	68	56
18	44	36	32	32	32	33	38	56	64	70	64	54
19	45	34	32	32	32	33	37	54	--	74	64	55
20	44	34	32	32	32	33	39	53	65	73	64	55
21	44	35	32	32	32	34	42	49	66	71	62	56
22	44	35	32	32	32	35	47	51	65	70	61	56
23	44	33	32	32	32	35	49	50	63	70	61	57
24	45	32	32	32	32	32	52	53	61	68	62	57
25	46	31	32	32	32	33	43	52	60	71	64	55
26	46	31	32	32	32	35	44	54	61	69	64	56
27	46	31	32	32	32	36	46	56	63	69	65	56
28	42	31	33	32	32	37	47	57	--	72	67	56
29	41	31	32	32	--	40	47	61	64	71	66	55
30	41	32	32	32	--	40	45	62	67	70	68	55
31	42	--	32	32	--	39	--	61	--	70	67	--
Average	46	35	32	32	32	34	41	52	62	69	66	57

a Reading obtained between 3 p. m. and 5 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.
DRAINAGE AREA.--1,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1950 to September 1953.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, November 1952 to September 1953

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			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, 1952	0.1			248	53	405		199	1,390	74							835	672	51	6.1	2,880	7.5	
Dec. 3	.8			335	68	516		343	1,760	88							1,120	839	50	6.7	3,680	7.4	
Jan. 6, 1953	.8			380	80	634		358	2,120	109							1,280	986	52	7.7	4,130	7.5	
Feb. 4	1.1			332	66	364		388	1,840	112							1,100	782	42	4.8	3,780	7.5	
Mar. 6	2.4			285	50	480		376	1,470	87							9.8	610	53	6.9	3,330	7.3	
Apr. 2	166			91	18	107		138	390	12							303	190	43	2.7	979	7.1	
May 6	817			85	15	96		196	298	7.5							273	112	43	2.5	690	7.5	
June 2	22			258	72	403		280	1,460	47							940	710	48	5.7	3,060	7.5	
July 1	15			153	35	279		227	865	31							524	338	54	5.3	2,030	7.3	
Aug. 5	1,040			60	8.6	37		152	130	4.0							185	80	30	1.2	499	7.5	
Sept. 2	2.8			189	36	295		2 4	995	34							618	443	51	5..	2,2.0	7.7	

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

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			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					
BAD RIVER NEAR FORT PIERRE																							
Nov. 6, 1952	0.7			280	98	296		242	1,400	65							1,000	802	37	3.9	3,010	7.5	
Feb. 4	1.4			338	61	559		360	1,820	195							1,250	955	49	6.9	3,950	7.6	
May 6	2,180			78	26	66		150	289	13							300	177	32	1.6	854	7.5	

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 June 1953 (discontinued).
Water temperatures: April 1949 to September 1953.
Sediment records: April 1949 to September 1953.
EXTREMES, 1952-53.--Dissolved solids (October to June): Maximum, 1,360 ppm Oct. 1-24; minimum, 258 ppm Mar. 8-9.
Hardness (October to June): Maximum, 200 ppm Dec. 6-Jan. 9; minimum, 14 ppm Mar. 10-14, Apr. 30-May 3.
Specific conductance (October to June): Maximum, 2,280 micromhos Oct. 18-20; minimum daily, 320 micromhos Mar. 12.
Water temperatures: Minimum, freezing point Dec. 4, Jan. 6, and probably on several other days during winter months.
Sediment concentrations: Maximum daily, not determined; minimum daily, no flow Oct. 11-16.
Sediment loads: Maximum daily, 1,500,000 tons (estimated) July 28; minimum daily, 0 tons Oct. 11-16.
EXTREMES, 1949-53.--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 (1949-52), 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, September, October 1952.
Sediment loads: Maximum daily, 1,500,000 tons (estimated) July 28, 1953; minimum daily, 0 tons on several days during January 1950, September, October 1952.
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. 20, Nov. 24 to Feb. 5, Feb. 10 to Mar. 13. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to June 1953

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Selenium (Se)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-24, 1952	1.01			16	2.9	437		499	19	510	30		1.6	1,360	1.85	3.7	52	0	94	26	1,920	8.3	0.16
Oct. 25-Nov. 18	13.4			31	4.5	170		362	0	154	12			594	.81	21	96	0	78	7.5	887	8.0	.10
Nov. 19-23	93.2			11	.1	121		259	8	57	6.0			390	.53	98	28	0	89	9.9	569	8.3	.09
Nov. 24-Dec. 5	7.42			17	1.6	186		393	17	105	8.5			586	.80	12	49	0	86	12	870	8.2	.11
Dec. 6-Jan. 9, 1953	12.9			64	9.8	185		514	0	175	14			780	1.06	27	200	0	65	5.7	1,110	8.1	.13
Jan. 10-28	30.3			22	1.2	108		272	0	59	6.0			380	.52	31	60	0	80	6.1	561	7.9	.12
Jan. 29-Feb. 5	328			9.5	.6	90		218	0	39	4.0			308	.42	273	26	0	87	7.7	432	8.0	.10
Feb. 6-9	862			6.0	.6	104		233	0	53	3.0			316	.43	735	18	0	90	11	480	8.1	.11
Feb. 10-Mar. 7	71.5			14	.2	112		262	0	65	5.0			376	.51	73	36	0	84	8.1	549	8.2	.19
Mar. 8-9	650			7.4	.4	83		196	0	34	3.6			258	.35	453	20	0	90	8.1	381	8.2	--
Mar. 10-14	4,008			4.5	.7	82		168	4	40	2.0			270	.37	2,920	14	0	93	9.5	363	8.3	.18
Mar. 15-25	1,283			13	1.1	93		178	0	86	2.5			332	.45	1,150	37	0	85	6.6	480	8.0	.14
Mar. 26-Apr. 2	182			34	3.3	109		226	0	143	4.7			466	.63	229	98	0	70	4.8	668	8.0	.11

WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, October 1952 to June 1953--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)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Selenium (Se)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Apr. 3-12, 1953....	812			8.0	0.4	102		221	0	52	4.0			338	0.46	741	21	0	92	9.6	472	8.1	0.15
Apr. 13-14	183			15	1.2	132		265	0	101	6.5			442	.60	218	43	0	87	8.8	653	8.1	.16
Apr. 15-16	661			7.2	.5	111		201	5	78	4.7			374	.51	667	20	0	92	11	506	8.2	.19
Apr. 17-28	213			18	1.5	115		240	10	83	5.4			436	.59	251	51	0	81	7.0	698	8.3	.11
Apr. 29	1,020			9.2	.2	134		210	24	108	6.0			--	--	--	24	0	88	12	623	8.9	.17
Apr. 30-May 3	7,390			5.1	.5	97		206	8	43	3.0			--	--	--	14	0	91	11	435	8.4	.01
May 4 a	3,740			13	.2	132	6.5	--	--	--	--			424	.58	--	34	--	87	9.9	602	8.0	--
May 4-5	2,855			5.0	.7	113		192	18	78	3.0			400	.54	3,080	16	0	90	12	508	8.5	.02
May 6-24	352			36	4.0	141		255	0	198	8.0			580	.79	551	107	0	72	5.9	823	8.1	.06
May 25-June 4	79.3			28	6.2	135		299	0	135	12			538	.73	115	95	0	73	6.0	762	8.1	.10
June 5-15	255			13	.6	133		275	0	93	8.0			446	.61	307	35	0	87	9.8	635	8.1	.03
June 16-20	411			10	1.0	143		264	12	104	6.0			480	.65	533	29	0	88	12	679	8.5	.03
June 21-30	516			6.4	.2	121		234	12	61	5.0			428	.58	596	17	0	93	13	535	8.6	.02
Weighted average b	414			10	1.0	103		c 219	--	68	3.8			d 359	d0.49	d401	29	0	88	8.3	492	--	--

a Not included in weighted average.
b Represents 80 percent of runoff for water year October 1952 to September 1953. Mean discharge for water year was 385 cfs.
c Includes carbonate as bicarbonate.
d Includes estimated dissolved solids for period Apr. 29-May 3.

WHITE RIVER BASIN--Continued

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

Temperatare (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 8 a. m. and 11 a. m. No flow Oct. 11-16/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	45	--	33	a34	--	46	41	76	80	--	74
2	--	43	34	--	34	--	46	a39	78		--	73
3	53	39	--	34	a36	33	43	43	66		--	63
4	44	a53	a32	--	35	33	45	44	65		--	57
5	40	42	--	33	36	35	43	49	--		--	61
6	36	--	a34	a32	34	33	43	55	57		--	60
7	42	a42	--	--	34	36	46	59	66		--	--
8	43	--	35	--	34	34	44	61	62		--	64
9	44	41	--	--	--	34	40	62	68		--	67
10	45	--	a34	a36	34	a37	38	54	74		--	64
11	--	36	--	36	34	a34	41	45	75		--	62
12	--	--	a34	34	35	a38	50	42	82		--	56
13	--	35	--	35	34	--	45	43	84		--	62
14	--	--	a34	33	a34	35	48	46	87		--	58
15	--	38	--	--	a33	39	34	47	73		--	59
16	--	--	34	a35	33	35	36	60	70		--	60
17	43	38	--	35	35	39	40	61	73		--	--
18	44	--	a33	--	35	40	39	68	--		--	66
19	44	--	--	35	33	40	a46	67	--		--	61
20	41	a39	a33	--	33	45	a53	a63	69		--	59
21	41	a34	--	a35	33	45	a61	a63	a73		--	50
22	55	a35	a33	--	34	45	a58	59	72		--	54
23	45	--	--	35	34	36	a65	59	74		--	a64
24	44	a36	33	--	--	35	a50	61	75		--	a66
25	44	--	--	a35	33	39	42	a68	68		a78	a65
26	44	a36	a33	--	--	44	--	a73	68		70	60
27	44	--	--	a36	33	45	--	70	66		74	60
28	a41	a34	a33	a36	33	45	47	69	--		73	58
29	36	--	--	a33	--	51	a44	80	79		71	54
30	45	a34	33	a33	--	50	42	72	--		72	52
31	47	--	--	a33	--	48	--	--	--		74	--
Average	44	--	--	--	34	39	46	57	72		--	61

a Reading obtained between 2 p. m. and 6 p. m.

WHITE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	1.2			11			3	--	e 2
2	1.1			11			3	193	2
3	.5			10			3	--	e 2
4	.6			11			2	129	1
5	.4	221	(t)	9			4	--	e 30
6	.4			9			10	2,890	78
7	.3			8			15	--	e 100
8	.2			8	100	3	20	507	27
9	.2			7			20	--	e 10
10	.2			8			18		
11	0	--	0	9			16		
12	0	--	0	12			14		
13	0	--	0	22			10		
14	0	--	0	19			10		
15	0	--	0	19	927	48	12	89	3
16	0	--	0	23	--	e 60	12		
17	.3			29	938	73	10		
18	1.8			33	--	e 80	10		
19	1.8			50	--	e 1,000	10		
20	2.8	99	1	100	14,600	3,940	12		
21	3.0			117	13,400	4,230	13		
22	2.8			119	11,800	3,790	13		
23	3.2			80	--	e 2,000	12		
24	3.5			40	7,760	838	10		
25	8			20	--	e 200	10		
26	11			5	--	e 50	10	38	1
27	11	240	7	3	--	e 25	12		
28	11			2	2,090	11	12		
29	12			2	--	e 5	12		
30	12			2	--	e 2	13		
31	11			--	--	--	14		
Total	100.3	--	60	798	--	16,394	345	--	298

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	14			300	3,940	3,190	70	--	e 700
2	14			220	3,700	2,200	80	4,600	994
3	14			150	3,630	1,470	90	3,590	872
4	14			200	4,000	2,160	100	3,820	1,030
5	14	48	2	450	6,700	8,140	110	3,690	1,100
6	13			2,040	28,300	156,000	130	3,740	1,310
7	12			753	24,300	49,400	250	3,150	2,130
8	12			453	16,800	20,500	400	4,000	4,320
9	14			200	--	e 7,000	900	5,250	12,800
10	30	4,260	345	100	9,900	2,670	2,800	12,100	91,500
11	40	4,340	469	70	8,600	1,620	3,600	18,000	175,000
12	45	4,460	542	60	6,800	1,100	5,450	23,600	347,000
13	40	630	68	50	6,660	899	4,300	24,800	288,000
14	30	627	51	45	5,720	695	3,890	24,600	258,000
15	10	--	--	40	4,370	472	2,040	13,400	73,800
16	10			40	3,130	338	1,930	10,800	56,300
17	15			45	2,600	a 320	1,840	10,300	51,200
18	20			50	2,430	328	1,500	9,630	39,000
19	25			60	2,450	397	1,080	6,600	19,200
20	28			60	2,310	374	863	5,400	12,600
21	26	193	11	60	2,150	348	2,030	26,000	s 161,000
22	24			55	2,070	307	1,460	27,800	110,000
23	22			50	1,910	258	747	16,800	33,000
24	20			50	1,710	231	363	8,200	8,040
25	20			45	1,530	186	284	4,200	3,220
26	30			40	2,010	217	243	2,300	1,510
27	40	2,100	227	50	2,650	358	226	1,500	915
28	100	2,110	570	60	3,000	486	196	1,100	582
29	400	4,310	4,650	--	--	--	176	930	442
30	500	5,410	7,300	--	--	--	163	720	317
31	400	4,440	4,800	--	--	--	151	470	192
Total	1,996	--	19,172	5,796	--	261,664	37,442	--	1,756,074

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

WHITE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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	135	370	135	6,670	42,900	801,000	66	300	53
2	168	2,710	s1,450	9,800	39,800	1,090,000	54	380	55
3	479	9,530	12,300	6,920	32,200	624,000	66	370	66
4	790	14,200	30,300	3,740	22,800	230,000	74	410	82
5	874	12,400	29,300	1,970	14,600	77,700	324	31,000	b27,000
6	640	8,200	14,200	1,250	8,300	28,000	196	19,200	10,200
7	530	8,420	12,000	1,050	5,500	15,600	116	18,000	5,640
8	1,520	24,400	s120,000	782	4,500	9,500	279	14,900	11,200
9	1,760	30,200	144,000	599	3,210	5,190	279	18,100	13,600
10	818	17,400	38,400	413	1,990	2,220	414	17,500	19,600
11	442	9,400	11,200	295	1,130	900	253	16,300	11,100
12	265	3,700	2,650	234	850	537	169	12,200	5,570
13	199	2,900	1,560	200	710	383	124	10,000	b3,300
14	167	2,700	1,220	205	600	332	279	9,000	6,780
15	810	18,500	s44,500	196	530	280	376	33,000	sa43,000
16	512	14,200	19,600	200	530	286	640	38,100	68,300
17	405	10,300	11,300	187	790	399	382	32,500	34,800
18	428	10,300	11,900	187	1,800	b900	243	28,000	b18,000
19	254	6,400	4,390	160	1,700	734	290	24,000	b19,000
20	209	3,820	2,160	148	950	380	501	24,800	s37,200
21	176	2,800	1,330	124	890	298	2,080	56,000	a330,000
22	148	2,120	847	120	820	266	726	33,000	67,100
23	129	2,000	697	160	1,350	583	269	19,700	14,300
24	123	2,000	664	169	3,650	1,670	116	13.100	4,100
25	172	6,620	s3,960	128	4,080	1,410	68	10,400	1,910
26	229	18,700	11,600	98	1,740	460	54	9,300	1,360
27	160	11,000	b4,800	80	1,500	324	447	26,600	s36,400
28	120	7,600	2,460	77	1,060	220	668	53,000	b99,000
29	1,020	29,000	sa180,000	84	650	147	425	29,700	34,100
30	6,170	53,100	917,000	77	470	98	306	12,000	b9,900
31	--	--	--	68	--	e70	--	--	--
Total	19,852	--	1,635,923	36,391	--	2,893,887	10,284	--	932,716

	July			August			September		
1	234	8,000	5,050	230	--	e12,000	33	2,500	223
2	178		e2,900	4,220	--	e700,000	31	1,600	134
3	120		e1,200	924	--	110,000	94	13,700	s3,970
4	54		e440	672	--	e66,000	124	18,000	b6,000
5	42		e300	489	--	e40,000	105	16,900	4,790
6	77		e2,000	460	--	e34,000	51	11,000	b1,500
7	46		e1,000	436	--	e29,000	32	9,500	821
8	33		e500	360	--	e24,000	24	10,000	648
9	29		e200	269	--	e15,000	22	10,000	b600
10	29		e200	200	--	e9,500	21	7,900	448
11	140		e6,000	124	--	e5,700	18	5,600	272
12	62		e2,000	71	--	e2,000	15	4,200	170
13	32		e500	42	--	e1,000	14	2,500	94
14	54		e1,400	31	--	e500	12	1,800	58
15	35		e500	29	--	e400	9	800	b19
16	23		e200	30	--	e250	9	700	17
17	20		e140	30	--	e150	8	700	15
18	18		e100	27	--	e100	8	506	11
19	18		e100	154	--	e6,300	8	796	17
20	226		e13,000	365	--	e25,000	8	495	11
21	105		e3,400	344	--	e23,000	6		
22	98		e2,500	300	--	e18,000	6		
23	49		e1,000	187	--	e8,600	4.8		
24	33		e450	511	30,000	sb59,000	4.4		
25	68		e2,000	331	32,700	30,300	3.6	334	4
26	164		e7,200	132	23,700	8,450	3.8		
27	1,160		e130,000	87	18,100	4,250	2.9		
28	10,200		e1,500,000	77	13,500	2,810	3.0		
29	1,200		e140,000	54	8,600	1,250	3.6		
30	556		e50,000	54	2,600	379	2.8		
31	333		e22,000	47	1,400	178	--	--	--
Total	15,436		1,896,280	11,287	--	1,237,117	686.9	--	19,858

Total discharge for year (cfs-days) 140,414.2
Total load for year (tons) 10,669,443

e Estimated.
s Computed by subdividing day.

a Computed from partly estimated concentration graph.
b Computed from estimated concentration graph.

WHITE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, February 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	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, 1953	6:00 p. m.	1,480	33	29,700	4,560	--	73	--	88	--	96	--	--	--	--	--	SPWCM
Feb. 6	6:00 p. m.	1,480	33	29,700	4,760	--	56	--	89	--	96	--	--	--	--	--	SPN
Feb. 7	3:30 p. m.	700	34	24,000	3,220	--	84	--	95	--	99	--	--	--	--	--	SPWCM
Mar. 10	2:10 p. m.	2,830	37	18,700	6,830	--	54	--	73	--	93	--	--	--	--	--	SPWCM
Mar. 10	2:10 p. m.	2,830	37	18,700	6,480	--	12	--	73	--	93	--	--	--	--	--	SPN
Mar. 11	1:15 p. m.	3,390	--	15,400	4,000	--	54	--	67	--	91	--	--	--	--	--	SPWCM
Mar. 12	12:30 p. m.	4,670	35	19,200	4,610	--	49	--	67	--	90	--	--	--	--	--	SPWCM
Mar. 13	10:10 a. m.	3,880	--	22,800	4,390	--	39	--	59	--	93	--	--	--	--	--	SPWCM
Mar. 13	4:30 p. m.	3,350	--	21,200	3,420	--	40	--	59	--	93	--	--	--	--	--	SPWCM
Mar. 16	8:00 p. m.	2,050	--	12,600	4,740	--	40	--	58	--	90	95	98	99	99	100	SPWCM
Mar. 16	8:00 p. m.	2,050	--	12,600	4,400	--	7	--	55	--	90	95	98	99	99	100	SPN
Mar. 20	3:00 p. m.	802	52	4,990	3,790	--	70	--	86	--	96	--	--	--	--	--	SPWCM
Mar. 23	1:10 p. m.	597	38	16,100	6,070	--	75	--	89	--	98	--	--	--	--	--	SPWCM
Mar. 24	1:30 p. m.	363	38	7,710	6,320	--	84	--	89	--	99	--	--	--	--	--	SPWCM
Mar. 26	4:00 p. m.	236	--	2,120	3,000	--	87	--	97	--	99	--	--	--	--	--	SPWCM
Apr. 3	3:45 p. m.	453	--	9,820	7,270	--	69	--	89	--	96	--	--	--	--	--	SPWCM
Apr. 10	2:30 p. m.	794	40	16,200	5,370	--	82	--	94	--	98	--	--	--	--	--	SPWCM
Apr. 10	2:30 p. m.	794	40	16,200	5,390	--	69	--	92	--	98	--	--	--	--	--	SPN
Apr. 21	3:00 p. m.	179	--	2,790	4,490	--	75	--	84	--	85	85	86	93	97	100	SPWCM
Apr. 30	5:20 p. m.	7,500	42	51,600	4,780	--	43	--	62	--	94	--	--	--	--	--	SPWCM
Apr. 30	5:20 p. m.	7,500	42	51,600	4,790	--	41	--	60	--	94	--	--	--	--	--	SPN
May 2	1:30 p. m.	10,600	39	39,100	2,790	--	41	--	57	--	84	93	96	97	98	99	SPWCM
May 3	11:10 a. m.	7,470	43	31,900	5,350	--	45	--	62	--	91	--	--	--	--	--	SPWCM
May 4	5:00 p. m.	3,390	--	22,000	3,990	49	55	60	72	82	94	--	--	--	--	--	SPWCM
May 4	5:00 p. m.	3,390	--	22,000	4,090	6	8	24	71	81	94	--	--	--	--	--	SPN
May 6	9:15 p. m.	1,130	--	6,680	3,900	--	68	--	81	--	96	--	--	--	--	--	SPWCM
May 9	12:35 p. m.	658	54	3,220	4,040	--	72	--	89	--	97	--	--	--	--	--	SPWCM
June 16	2:00 p. m.	796	--	42,100	3,730	--	74	--	92	--	98	--	--	--	--	--	SPWCM

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

LOCATION.--At gaging station, 1 mile upstream from small tributary, 2 miles downstream from Pine Creek, and 2½ miles northeast of White River, Mellette County. Prior to October 1, 1952, at site 1 mile upstream.
DRAINAGE AREA.--1,570 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1953.
Water temperatures: February 1951 to September 1953.
Sediment records: December 1950 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 948 ppm Aug. 3; minimum, 248 ppm Dec. 6-12.
Hardness: Maximum, 435 ppm June 15; minimum, 114 ppm Dec. 6-12.
Specific conductance: Maximum daily, 1,200 micromhos Aug. 3; minimum daily, 306 micromhos Dec. 9.
Water temperatures: Maximum, 97°F June 18, minimum, freezing point on several days during November to March.
Sediment concentrations: Maximum daily, 15,200 ppm June 15; minimum daily, 25 ppm Dec. 1,2.
Sediment loads: Maximum daily, 41,600 tons June 27; minimum daily, 3 tons Dec. 1, Feb. 23.
EXTREMES, 1950-53.--Water temperatures (1951-53): Maximum, 97°F June 18, 1953; minimum, freezing point on many 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.--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 November 26 to March 13. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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, 1952	28	58	0.08	40	5.4	24	8.6	198	0	14	1.0	0.4	0.8	0.07	252	0.34	19	122	0	28	0.9	349	7.7
Oct. 2	41	45	--	62	6.2	24	10	244	0	35	.4	.4	2.1	.06	308	.42	34	180	0	21	.8	434	7.3
Oct. 3-11	47.1	52	.02	42	5.6	23	8.2	193	0	19	2.0	.3	.8	.09	262	.36	33	128	0	27	.9	346	8.1
Oct. 12	58	67	.02	43	6.9	27	8.8	171	18	25	2.0	.4	1.1	.07	300	.41	47	136	0	28	1.0	364	8.6
Oct. 13 - Nov. 23	74.2	54	.04	42	4.4	22	8.0	183	0	26	2.0	.4	1.2	.05	270	.37	54	123	0	26	.9	348	8.0
Nov. 24-25	52.5	54	.03	47	4.5	24	8.4	196	0	23	2.0	--	1.8	.04	288	.39	41	136	0	26	.9	387	8.0
Nov. 26 - Dec. 1	42.5	64	.03	54	8.5	30	10	236	0	44	2.0	.6	2.3	.05	328	.45	38	170	0	26	1.0	462	8.1
Dec. 2-5	70.0	56	.04	44	5.2	23	9.0	190	0	27	2.5	1.1	2.4	.05	268	.36	51	132	0	26	.9	364	7.3
Dec. 6-12	61.4	49	.04	36	6.0	19	8.0	166	0	22	2.0	.4	2.3	.05	248	.34	41	114	0	25	.8	322	7.7
Dec. 13-31	59.5	55	.05	43	5.5	22	8.4	189	0	25	2.0	.6	2.3	.04	264	.36	42	130	0	25	.8	355	7.7
Jan. 1-15, 1953	80.3	53	.07	42	6.0	22	7.8	180	0	36	2.5	.3	2.1	.15	256	.35	56	130	0	26	.8	358	7.6
Jan. 16-18	41.7	55	.06	56	7.1	30	7.5	173	13	74	3.0	.3	1.7	.25	334	.45	38	168	5	27	1.0	456	8.4
Jan. 19 - Feb. 21	87.4	53	.06	41	6.2	23	7.8	176	0	36	2.0	.3	2.0	.28	274	.37	65	128	0	27	.9	359	7.5
Feb. 22-24	51.7	52	--	58	5.7	32	9.0	212	0	68	3.0	.3	1.6	.18	342	.47	48	168	0	28	1.1	468	7.6
Feb. 25 - Mar. 10	136	48	.09	40	6.6	22	7.4	168	0	39	2.0	.3	1.9	.19	254	.35	93	127	0	26	.9	359	7.6

WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				
Mar. 11-13, 1953	783	31	--	56	7.9	31	7.9	148	0	117	2.5	0.3	2.2	0.22	332	0.45	702	172	51	27	1.0	481	7.5
Mar. 14-25	869	30	.11	44	5.8	25	8.8	162	0	61	2.3	.4	1.8	.04	282	.38	662	134	1	27	.9	392	7.3
Mar. 26-31	380	36	.10	42	7.8	30	10	170	0	63	5.7	.5	1.8	.05	284	.39	291	137	0	30	1.1	414	8.0
Apr. 1-23	270	47	.00	54	5.7	36	10	207	0	70	3.5	.5	1.9	.07	331	.45	241	158	0	31	1.2	471	7.4
Apr. 24-29	330	43	.00	63	10	47	11	213	0	125	4.5	.6	2.1	.11	416	.57	371	198	23	32	1.4	585	7.6
Apr. 30-May 4	1,914	29	.00	55	4.6	32	8.3	168	0	93	4.0	.3	1.6	.07	316	.43	1,630	156	18	29	1.1	449	7.5
May 5 a	781	--	--	68	9.6	43	12	--	--	--	--	--	--	--	410	.56	--	209	--	29	1.3	584	7.3
May 5-8	621	36	.01	63	8.5	47	12	220	0	118	4.0	.7	1.8	.08	409	.56	686	192	12	33	1.5	578	7.4
May 9	638	37	--	61	7.3	37	14	259	0	65	7.0	.6	1.0	.10	370	.50	637	182	0	29	1.2	543	7.5
May 10-31	288	40	.00	65	10	53	13	241	0	125	4.5	.7	1.3	.07	436	.59	339	204	6	34	1.6	622	7.6
June 1-14	128	60	.00	66	11	53	12	245	0	130	6.0	.6	1.0	.12	466	.63	161	210	9	34	1.6	633	7.9
June 15	345	35	.02	141	20	87	15	246	0	410	6.0	.8	.8	.18	860	1.17	801	435	233	29	1.8	1,140	7.3
June 16-26	257	54	.00	66	10	49	11	207	0	143	4.5	.5	.8	.12	448	.61	311	207	37	33	1.5	614	7.8
June 27	1,510	36	.06	122	14	55	12	225	0	295	3.0	.4	9.5	.14	672	.91	2,740	361	176	24	1.3	889	7.2
June 28-July 5	259	45	.00	59	4.9	42	10	196	0	100	3.5	.5	2.1	.10	370	.50	259	167	6	34	1.4	514	7.6
July 1 a	177	--	--	60	8.9	57	13	--	--	--	--	--	--	--	480	.65	--	186	--	38	1.8	586	8.9
July 6 - Aug. 2	87.4	63	.00	53	7.5	41	11	213	0	78	3.0	.5	1.3	.11	373	.51	88	163	0	33	1.4	497	8.2
Aug. 3	102	84	.05	121	26	109	13	193	12	445	9.0	.6	1.8	.29	948	1.29	261	407	229	36	2.4	1,200	8.5
Aug. 4-31	67.1	60	.00	44	5.1	29	10	191	0	43	2.0	.5	.7	.09	295	.40	53	131	0	30	1.1	390	7.8
Sept. 1-30	54.0	57	.00	45	5.0	29	9.8	203	0	33	2.0	.6	1.2	.07	285	.39	42	133	0	30	1.1	388	7.7
Weighted average b	189	42	c0.03	54	6.9	35	9.8	d192	--	86	3.4	c 0.5	1.8	0.09	350	0.48	176	163	6	30	1.2	478	

a Not included in weighted average.
b Represents 100 percent of runoff for water year October 1952 to September 1953.
c Includes estimates where data are missing.
d Includes carbonate as bicarbonate.

WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953
/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	55	48	34	--	a34	a33	48	41	a67	85	85	82
2	61	43	35	34	33	a33	46	40	a70	a72	--	61
3	55	43	35	34	34	a32	48	a45	76	a78	a70	a56
4	47	45	35	34	34	33	51	53	a64	a76	81	a54
5	--	42	35	34	32	a32	50	a48	a60	a68	a70	a50
6	45	37	35	34	--	a32	47	64	a56	a65	a70	a66
7	a45	41	35	34	34	a32	46	67	54	--	a66	a60
8	52	38	36	34	--	--	45	68	76	78	a65	a63
9	59	--	34	35	34	a35	39	65	67	a67	a70	55
10	56	35	34	35	--	a34	42	55	a66	a68	a72	75
11	57	42	34	35	a32	a34	40	a46	87	a74	a64	71
12	--	40	34	35	a32	a34	48	a41	89	a76	83	70
13	54	43	34	--	33	a34	55	a42	91	a69	83	a71
14	49	45	34	34	a33	--	48	a42	85	85	77	76
15	45	43	35	34	33	35	43	64	71	--	a65	70
16	44	--	34	a34	a33	35	45	a55	78	75	a73	73
17	47	--	--	34	33	46	48	--	85	83	79	a71
18	50	34	34	a34	--	a39	44	a55	97	82	73	a55
19	52	34	34	34	--	46	--	72	80	a80	77	73
20	48	34	34	34	32	48	52	a64	70	85	75	a68
21	a43	34	--	--	--	45	60	a55	76	78	75	57
22	a44	34	34	32	a32	44	65	a55	a69	81	75	66
23	53	34	34	--	a33	40	66	a56	80	80	a70	a57
24	53	34	34	35	a33	a33	43	--	71	85	80	a56
25	55	32	34	a34	a33	a34	40	a59	75	85	--	70
26	a54	34	34	--	a33	47	52	a61	80	a72	a73	65
27	42	33	34	35	a33	47	56	a60	72	a72	--	a60
28	43	33	34	33	a33	51	48	a65	75	a74	--	a50
29	47	33	34	34	--	54	44	76	85	a69	--	50
30	48	34	34	35	--	a43	44	--	86	a71	--	64
31	49	--	34	34	--	53	--	--	--	86	85	--
Average	50	38	34	34	33	39	48	56	75	77	74	64

a Reading obtained between 7 a. m. and 11 a. m.

WHITE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	28	50	4	82	150	33	50	25	3
2	41	1,240	s201	76	170	35	55	25	4
3	37	294	s24	83	165	37	65	40	7
4	46	160	20	78	95	20	85	140	32
5	44	260	s44	75	130	26	75	70	14
6	35	90	9	75	250	51	70	60	11
7	34	80	7	71	180	35	65	50	9
8	61	230	38	66	185	33	60	55	9
9	55	180	27	62	180	30	60	100	16
10	50	150	20	72	190	37	60	70	11
11	62	120	20	62	--	e290	60	80	13
12	58	49	8	80	200	43	55	70	10
13	59	80	13	71	180	34	35	60	6
14	70	120	23	80	145	31	45	50	6
15	62	125	21	78	145	31	55	70	10
16	68	150	28	80	145	31	60	75	12
17	65	150	26	92	--	e75	60	60	10
18	61	155	26	106	370	106	60	40	6
19	54	150	22	90	370	90	60	40	6
20	71	150	29	74	360	72	60	40	6
21	54	150	22	75	270	55	55	50	7
22	68	125	23	86	250	58	55	50	7
23	68	90	17	71	215	41	50	50	7
24	70	80	15	55	100	15	50	50	7
25	61	508	s83	50	75	10	50	40	5
26	76	310	64	45	50	6	35	50	5
27	71	310	59	40	40	4	65	50	9
28	88	265	63	35	40	4	75	50	10
29	97	270	71	40	35	4	80	50	11
30	88	260	62	45	30	4	90	55	13
31	79	160	34	--	--	--	90	75	18
Total	1,881	--	1,123	2,095	--	1,341	1,890	--	300
	January			February			March		
1	90	60	15	100	80	22	100	80	22
2	90	82	20	100	80	22	80	50	11
3	80	80	18	100	100	27	70	50	9
4	75	85	17	120	140	45	90	50	12
5	70	91	17	145	240	94	200	280	151
6	75	67	14	135	220	80	190	320	164
7	80	75	16	125	190	64	170	165	76
8	50	100	14	115	125	39	150	125	51
9	80	170	37	85	75	17	180	125	61
10	85	144	33	75	60	12	230	720	447
11	95	125	32	45	50	6	300	1,050	851
12	100	172	46	60	45	7	800	2,150	4,640
13	90	140	34	65	70	12	1,250	5,800	19,600
14	80	120	26	70	75	14	1,420	9,000	a35,000
15	65	90	16	75	80	16	618	3,810	s6,850
16	45	55	7	70	80	15	434	3,100	3,630
17	30	50	4	65	60	11	767	5,510	s13,300
18	50	50	7	70	55	10	1,340	5,400	19,500
19	70	75	14	70	--	e10	1,090	3,020	8,890
20	75	95	19	65	65	11	975	3,140	8,270
21	75	75	15	55	60	9	1,320	4,100	14,600
22	80	70	15	50	50	7	910	3,050	7,490
23	85	90	21	35	30	3	592	2,000	3,200
24	90	75	18	70	70	13	515	1,290	1,790
25	90	65	16	100	80	22	441	1,140	1,360
26	95	75	19	110	75	22	419	1,390	1,570
27	100	80	22	110	60	18	399	1,980	2,130
28	100	80	22	120	85	28	385	1,300	1,350
29	100	80	22	--	--	--	370	1,050	1,050
30	100	80	22	--	--	--	370	1,120	1,120
31	100	80	22	--	--	--	339	780	714
Total	2,490	--	619	2,405	--	656	16,514	--	157,909

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

WHITE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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.....	296	700	559	1,600	6,310	s 28,800	135	380	139
2.....	310	750	628	2,440	5,900	38,900	129	240	84
3.....	325	1,050	921	2,210	4,280	25,500	130	1,880	s 702
4.....	334	1,200	1,080	1,190	3,750	12,000	120	2,000	648
5.....	315	1,000	851	781	2,260	4,770	112	1,050	318
6.....	301	800	650	646	1,130	1,970	112	1,340	s 436
7.....	306	750	620	548	1,100	1,630	125	757	s 296
8.....	394	3,400	s 3,920	509	1,070	1,470	155	3,810	s 1,730
9.....	374	2,500	2,520	638	2,640	s 5,740	144	900	350
10.....	292	1,040	820	478	1,220	1,570	138	420	156
11.....	240	950	616	453	1,000	1,220	132	420	150
12.....	235	720	457	435	700	822	124	280	94
13.....	248	1,810	1,210	424	1,030	1,180	117	300	95
14.....	230	1,990	1,240	419	3,620	4,100	120	350	113
15.....	245	1,080	714	388	3,290	3,450	345	15,200	s 15,100
16.....	250	930	628	372	1,410	1,420	274	2,000	1,480
17.....	257	800	555	354	1,100	1,050	244	600	395
18.....	232	620	388	325	1,050	921	228	380	234
19.....	217	790	463	283	750	573	234	220	139
20.....	202	790	431	259	610	427	721	5,120	s 11,900
21.....	209	680	384	236	590	376	279	2,210	1,660
22.....	205	550	304	232	580	363	210	720	408
23.....	198	560	299	224	590	357	171	400	185
24.....	309	3,330	s 3,020	228	600	369	162	420	184
25.....	252	2,100	1,430	202	600	327	151	600	245
26.....	218	2,450	1,440	191	610	315	150	300	122
27.....	278	1,400	1,050	188	670	340	1,510	8,980	s 41,600
28.....	253	1,150	786	184	410	204	659	3,770	s 7,370
29.....	670	5,350	s 16,200	167	400	180	308	1,100	915
30.....	2,130	6,300	36,200	157	400	170	221	540	322
31.....	--	--	--	141	470	179	--	--	--
Total.	10,325	--	80,384	16,902	--	140,693	7,660	--	87,570

	July			August			September		
1.....	177	594	284	75	170	34	42	110	12
2.....	177	720	344	88	190	45	20	110	6
3.....	180	463	225	102	290	80	18	110	5
4.....	188	440	223	32	120	10	26	100	7
5.....	160	396	171	75	100	20	17	110	a 5
6.....	161	352	153	75	100	20	47	120	15
7.....	154	297	123	70	100	19	58	110	17
8.....	157	297	126	62	90	15	58	100	16
9.....	120	286	93	58	80	13	60	100	16
10.....	91	253	62	51	70	10	72	120	23
11.....	72	198	38	60	90	15	78	120	25
12.....	91	165	41	49	90	12	68	100	18
13.....	105	187	53	34	80	7	29	90	7
14.....	94	187	47	47	100	13	49	60	8
15.....	83	165	37	83	100	22	49	150	20
16.....	102	165	45	68	80	15	47	1,020	129
17.....	96	2,550	s 602	62	80	13	62	400	67
18.....	42	810	92	65	70	12	58	100	16
19.....	83	120	27	60	60	10	54	40	6
20.....	78	120	25	60	50	8	63	110	19
21.....	78	160	34	58	60	9	57	150	23
22.....	70	160	30	58	80	13	58	100	16
23.....	83	150	34	68	100	18	61	100	16
24.....	75	210	43	94	110	28	63	100	17
25.....	32	100	9	100	110	30	68	1,650	303
26.....	29	180	14	80	120	26	68	1,480	272
27.....	70	150	28	88	--	e 32	70	720	136
28.....	123	260	86	96	--	e 38	68	510	94
29.....	47	220	28	100	170	46	66	1,270	226
30.....	70	120	23	100	190	51	65	630	111
31.....	78	140	29	26	160	11	--	--	--
Total.	3,166	--	3,169	2,144	--	695	1,619	--	1,651

Total discharge for year (cfs-days)..... 69,091
Total load for year (tons)..... 476,110

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

WHITE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, November 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	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. 13, 1952	1:50 p.m.	94	--	282	726	21	24	26	30	36	59	75	96	99	100	--	SBWCM
Mar. 13, 1953	5:45 p.m.	1,050	--	9,500	2,520	--	32	--	48	--	73	82	94	98	100	--	SPWCM
Mar. 13	5:45 p.m.	1,050	--	9,500	2,460	--	10	--	47	--	73	82	94	98	100	--	SPN
Mar. 16	4:30 p.m.	472	46	2,740	2,530	--	30	--	42	--	73	86	98	100	--	--	SPWCM
Mar. 20	11:00 a.m.	926	44	2,810	3,040	--	40	--	58	--	76	80	96	99	100	--	SPWCM
Mar. 24	9:15 a.m.	522	33	1,260	1,780	21	26	33	40	47	54	63	93	98	98	98	SBWCM
Mar. 27	9:45 a.m.	396	45	1,100	1,690	20	24	30	37	44	53	60	96	100	--	--	SBWCM
Apr. 17	5:00 p.m.	278	48	1,860	936	5	7	8	10	13	17	25	39	58	82	98	SBWCM
Apr. 22	5:15 p.m.	209	65	548	1,070	23	31	36	44	52	60	72	89	97	100	--	SBWCM
Apr. 30	8:00 p.m.	1,570	--	5,710	6,050	--	41	--	55	--	69	78	94	99	100	--	SPWCM
May 1	1:20 p.m.	1,460	--	5,290	5,380	--	38	--	52	--	68	76	95	99	100	--	SPWCM
May 2	2:20 p.m.	2,290	--	4,970	2,770	--	43	--	56	--	68	76	92	98	100	--	SPWCM
May 2	2:20 p.m.	2,290	--	4,970	2,850	--	5	--	56	--	68	76	92	98	100	--	SPN
May 5	7:00 p.m.	744	--	2,000	2,560	23	32	36	42	50	62	--	--	--	--	--	BWCM
May 5	7:00 p.m.	744	--	2,000	2,560	7	12	27	37	46	61	--	--	--	--	--	BN
May 6	11:00 a.m.	646	--	1,080	3,520	28	30	41	51	56	63	69	96	99	100	--	SPWCM
May 19	3:40 p.m.	310	72	941	1,890	19	22	25	28	32	36	43	--	--	--	--	BWCM
June 3	4:15 p.m.	132	76	2,940	3,350	--	19	--	33	--	88	94	98	98	99	100	SPWCM
June 15	7:15 p.m.	360	72	7,880	3,370	--	54	--	66	--	79	85	92	95	99	100	SPWCM
June 15	7:15 p.m.	360	72	7,880	3,430	--	0	--	67	--	79	85	92	95	99	100	SPN
June 27	5:00 p.m.	1,350	--	6,250	2,800	--	55	--	70	--	78	84	95	99	100	--	SPWCM
June 27	5:00 p.m.	1,350	--	6,250	2,920	--	4	--	65	--	78	85	95	99	100	--	SPN

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

Particle size analyses of bed material, March to September 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	Number of sampling points	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		
Mar. 13, 1953	2	1,050					0	2	18	90	100	--		S
Mar. 17	4	814					0	3	30	96	100	--		S
Apr. 17	4	278					0	1	14	74	87	91		S
May 19	4	320					0	1	27	84	87	87		S
June 15	4	375					0	1	20	82	96	98		S
July 14	4	88					0	1	22	76	86	89		S
Aug. 17	4	62					--	0	28	77	93	96		S
Sept. 14	4	55					0	1	28	88	99	100		S

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 1952 to September 1953

Date of collection	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					
WHITE RIVER NEAR OACOMA																							
Oct. 14, 1952 ...	56			100	11	94	214	263	34								294	119	41	2.4	947	7.5	
Jan. 22, 1953 ...	49			100	18	86	226	263	36								322	137	37	2.1	965	7.6	
Mar. 13.....	9,030			56	4.0	106	230	183	5.0								156	0	60	3.7	749	7.6	
Apr. 1.....	1,190			81	11	91	198	265	6.0								248	86	44	2.5	844	7.4	
June 17.....	1,710			128	23	151	189	555	5.5								413	258	44	3.2	1,350	7.5	
Sept. 24.....	60			63	7.1	152	238	288	15								186	0	64	4.8	976	7.4	

MISCELLANEOUS ANALYSES OF STREAMS IN PONCA CREEK BASIN IN NEBRASKA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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					
PONCA CREEK AT ANOKA																							
Mar. 10, 1953	14	--	--	--	--	--	--	246	255	--	--	--	0.09	--	--		416	214	--	--	860	7.8	
Mar. 17	388	13	0.01	66	16	18	9.3	155	128	6.5	0.3	4.1	.05	357	0.49		230	103	14	0.5	535	7.7	
Apr. 20	60	15	.02	113	31	34	9.8	297	235	13	.4	.2	.08	618	.84		411	167	15	.7	891	8.1	
Aug. 3	11	21	.00	110	31	25	14	246	241	7.5	.3	3.4	.20	596	.81		401	199	12	.5	844	7.3	

Periodic determinations of suspended-sediment discharge, January to June 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
PONCA CREEK AT ANOKA			
Jan. 27, 1953	4.9	40	0.5
June 11	121	1,600	523

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, October 1952 to September 1953.
Sediment records: February to December 1951, October 1952 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 92°F Aug. 29; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 2,060 ppm July 29; minimum daily, not determined.
Sediment loads: Maximum daily, 1,830 tons July 29; minimum daily, 0.5 ton Aug. 15.
EXTREMES, 1951, 1952-53.--Water temperatures: Maximum, 92°F Aug. 29, 1953; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 16,600 ppm Sept. 4, 1951; minimum daily, not determined.
Sediment loads: Maximum daily, 68,700 tons July 28, 1951; minimum daily, 0.5 ton Aug. 15, 1953.
REMARKS.--Flow affected by ice Nov. 17, Nov. 21 to Jan. 29, Feb. 9 to Mar. 8. Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1953 to August 1953

Date of collection	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. 8, 1952	23	52		40	6.3	27	9.0	208	20						302	0.41		160	0	25	0.9	408	8.6
Aug. 18, 1953	34					22	11								230	.31		126		26	.9	342	7.5

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 1 p. m. and 6 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	42	--	32	--	--	42	a45	74	81	79	78
2	--	47	32	--	32	32	a41	43	68	89	77	73
3	60	43	-	32	--	--	42	a42	71	91	77	71
4	57	47	32	-	44	32	62	55	71	77	81	63
5	46	44	--	32	42	--	--	69	59	80	90	82
6	53	--	32	--	40	32	60	64	61	76	81	72
7	54	42	--	32	--	--	47	a66	63	77	79	77
8	58	--	32	a32	a32	32	56	61	84	70	78	a77
9	56	44	--	a32	--	--	40	a61	75	a71	88	76
10	57	57	32	32	32	43	45	56	a80	77	70	79
11	a56	44	--	-	--	45	a42	51	--	91	75	73
12	56	--	32	32	32	44	53	44	84	84	78	a64
13	53	42	-	-	--	--	49	52	80	a85	--	82
14	47	--	32	--	a32	39	45	62	a86	87	--	74
15	50	41	--	32	--	--	41	63	79	83	--	80
16	54	--	32	--	a32	55	47	a60	83	a76	78	76
17	52	32	--	a32	--	--	46	64	84	89	76	74
18	a52	34	32	--	32	--	46	70	--	80	a80	73
19	56	34	--	a32	--	--	53	70	79	--	75	75
20	46	--	32	--	a32	56	59	65	83	82	90	61
21	56	36	--	32	--	--	73	63	a83	89	80	60
22	58	--	32	--	32	54	75	a69	74	91	a90	68
23	a50	--	--	32	--	--	69	63	90	77	80	65
24	a49	32	a32	--	32	48	52	66	83	a87	85	61
25	62	--	--	a32	32	--	56	72	a77	a82	85	65
26	57	32	32	--	32	57	--	72	77	89	85	72
27	48	--	--	32	--	--	55	76	81	85	a80	a68
28	48	a32	32	--	32	a50	52	79	84	75	80	63
29	55	--	--	32	--	--	43	71	85	76	92	65
30	a49	a32	32	--	--	50	48	a79	85	84	80	62
31	50	--	--	a32	--	--	--	84	--	85	81	--
Average	53	--	--	--	--	--	51	63	78	82	81	71

a Reading obtained between 10 a. m. and 12 m.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	13	120	sa 9.0	19	105	5.4	28	--	
2	33	200	b 18	19	96	4.9	31	18	
3	27	50	a 3.6	22	108	6.4	30	--	
4	20	49	2.6	23	178	11	23	22	
5	18	72	3.5	23	70	4.3	22	--	
6	20	50	2.7	22	60	b 3.6	21	17	
7	22	68	4.0	20	65	3.5	22	--	
8	20	85	b 4.6	19	65	b 3.4	22	22	
9	22	102	6.1	20	67	3.6	23	--	
10	19	73	3.7	22	96	5.7	21	16	
11	19	38	2.0	20	39	2.1	25	--	
12	19	32	1.6	23	30	b 1.9	24	14	
13	19	34	1.7	25	25	1.7	24	--	
14	25	80	5.4	27	30	b 2.2	22	12	
15	23	48	3.0	27	70	5.1	24	--	
16	23	26	1.6	30	100	a 8.0	23	17	c 1.3
17	20	25	1.4	24	420	b 28	23	--	
18	22	40	a 2.4	34	500	b 46	22	16	
19	20	82	4.4	40	400	b 44	19	--	
20	22	66	3.9	48	360	a 46	21	23	
21	19	49	2.5	40	320	b 34	23	--	
22	18	33	1.6	40	--	e 26	23	19	
23	19	29	1.5	36	--	e 20	20	--	
24	19	27	1.4	34	170	16	21	--	
25	20	50	2.7	30	--	e 10	21	--	
26	22	66	3.9	24	70	4.5	23	28	
27	22	65	3.9	22	--	e 2.0	22	--	
28	23	57	3.5	19	14	.7	22	18	
29	23	43	2.7	17	--	e .6	23	--	
30	23	60	3.7	22	38	2.3	23	48	
31	22	53	3.2	--	--	--	23	--	
Total	656	--	115.8	791	--	352.9	714	--	40.3

Day	January			February			March		
1	23	16		42	--		29	--	
2	22	--		42	161		28	36	
3	23	11		40	--		28	28	c 2.8
4	25	--		40	110		28	46	
5	26	9		44	--	c 11	29	--	
6	27	--		40	84		39	30	3.2
7	26	17		38	--		50	150	a 20
8	26	24		36	40		50	245	33
9	27	20		31	--		55	460	68
10	31	23		30	22		55	600	89
11	34	--		30	--		54	370	54
12	38	25	c 2.1	30	33		48	168	22
13	39	107		28	--		50	160	a 22
14	25	--		25	20		50	240	32
15	23	37		25	--		50	150	a 20
16	22	--		23	72		48	83	11
17	20	34		28	--		40	180	a 19
18	20	--		29	--	c 2.1	34	300	28
19	21	29		28	--		34	260	a 24
20	22	--		23	21		36	215	21
21	21	66		20	--		38	160	a 16
22	21	--		21	34		36	106	10
23	21	19		28	--		33	100	b 9.0
24	25	--		30	13		33	95	8.5
25	28	40		29	25		34	110	b 10
26	31	--		29	--		30	134	11
27	36	164		29	--		30	130	b 10
28	48	--	c 11	30	18		30	120	10
29	55	--		--	--	--	27	143	10
30	44	--		--	--	--	27	110	8.0
31	46	103		--	--	--	28	140	a 11
Total	896	--	127.4	868	--	130.0	1,181	--	593.7

e Estimated.
s Computed by subdividing day.
c Computed on basis of infrequent samples.
a Computed from estimated concentration graph.
b Computed from partly estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	38	250	b26	44	388	46	15	67	2.7
2.....	48	440	57	50	250	34	16	57	2.5
3.....	38	160	16	45	130	16	18	55	a2.6
4.....	36	168	16	40	120	13	12	65	a2.0
5.....	31	180	b15	37	108	11	16	75	a3.2
6.....	31	122	13	35	100	b9.5	19	88	4.5
7.....	36	160	16	34	93	8.5	19	107	5.5
8.....	36	122	12	33	80	7.1	15	110	b4.5
9.....	36	100	9.7	32	105	9.1	14	124	4.7
10.....	36	83	8.1	31	83	7.0	13	130	a4.6
11.....	36	80	7.8	30	138	11	12	120	a3.8
12.....	31	75	6.3	30	124	10	12	120	3.9
13.....	30	96	7.8	30	142	12	12	95	3.1
14.....	33	190	17	25	200	14	12	98	3.2
15.....	31	145	12	24	150	9.7	12	140	4.5
16.....	31	95	8.0	23	222	14	12	120	3.9
17.....	30	95	7.7	23	96	6.0	13	100	3.5
18.....	33	124	11	23	130	8.1	12	82	2.7
19.....	33	130	12	23	130	8.1	18	128	s7.3
20.....	31	182	15	20	100	5.4	27	420	b30
21.....	28	170	13	20	129	7.0	24	2,000	b130
22.....	30	195	16	16	123	5.3	28	350	26
23.....	30	200	16	18	200	9.7	20	140	a7.5
24.....	27	205	15	28	95	7.2	18	150	a7.5
25.....	27	120	8.8	24	58	3.8	18	162	7.9
26.....	27	178	13	20	68	3.7	17	192	8.8
27.....	27	290	21	18	48	2.3	15	103	4.2
28.....	30	105	8.5	17	93	4.3	16	111	4.8
29.....	33	100	b9.0	14	115	4.3	14	80	3.0
30.....	38	228	23	12	78	2.5	12	98	3.2
31.....	--	--	--	14	--	--	--	--	--
Total.	982	--	436.7	833	--	312.2	481	--	305.6

	July			August			September		
1.....	14	210	7.9	36	85	8.3	14	63	2.4
2.....	15	131	5.3	38	174	18	15	82	3.3
3.....	12	68	2.2	28	141	11	15	100	4.0
4.....	11	61	1.8	19	141	7.2	16	106	4.6
5.....	11	130	3.9	15	159	6.4	17	98	4.5
6.....	10	87	2.3	12	100	3.2	16	60	2.6
7.....	9.3	138	3.5	13	90	a3.2	18	44	2.1
8.....	12	128	4.1	15	90	a3.6	16	69	3.0
9.....	12	80	2.6	13	95	3.3	13	52	1.8
10.....	12	65	2.1	12	105	3.4	11	46	1.4
11.....	12	70	2.3	12	76	2.5	9.3	51	1.3
12.....	10	89	2.4	11	59	1.8	11	49	1.4
13.....	8.7	80	1.9	11	38	1.1	12	58	1.9
14.....	8.7	71	1.7	12	21	.7	14	58	2.2
15.....	9.3	65	1.6	12	15	.5	13	50	1.8
16.....	11	78	2.3	16	28	1.2	14	41	1.5
17.....	15	105	4.2	15	32	1.3	12	41	1.3
18.....	13	78	2.7	25	300	sb46	11	45	1.3
19.....	12	80	2.6	30	244	s23	9.9	58	1.6
20.....	12	70	2.3	23	480	b30	9.3	80	2.0
21.....	11	65	1.9	16	190	b8.0	9.3	48	1.2
22.....	11	60	1.8	13	160	b5.5	9.9	36	1.0
23.....	11	38	1.1	16	300	b13	8.7	51	1.2
24.....	10	53	1.4	11	147	4.4	9.3	35	.9
25.....	11	96	2.8	11	91	2.7	11	20	.6
26.....	11	76	2.3	11	90	2.7	13	35	1.2
27.....	10	49	1.3	12	100	3.2	13	29	1.0
28.....	25	170	sb55	12	86	2.8	12	29	.9
29.....	263	2,060	s1,830	13	63	2.2	12	40	1.3
30.....	97	378	s111	14	60	2.3	12	30	a1.0
31.....	58	122	19	14	72	2.7	--	--	--
Total.	748.0	--	2,087.3	511	--	225.2	376.7	--	56.3

Total discharge for year (cfs-days)..... 9,037.7
Total load for year (tons)..... 4,783.4

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

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Particle-size analyses of suspended sediment, June 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000
June 19, 1951	2:45 p.m.	18	76	501	614	40	49	60	66	71	77	85	95		100		BWCM
June 19	2:45 p.m.	18	76	501	598	34	34	47	62	70	75	90	97		99	100	BN
Aug. 18, 1953	6:45 p.m.	48	--	843	2,110	8	12	18	21	26	36	48	74		100		BWCM
Aug. 18	6:45 p.m.	48	--	843	1,900	3	5	10	17	26	40	60	85		100		BN

Particle-size analyses of bed material, March to September 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	Number of sampling points	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			
Mar. 11, 1953	3	46						0	1	12	77	92	96			S
Apr. 16	3	31						0	3	27	86	95	97			S
May 20	3	19						0	2	34	91	98	--			S
June 17	3	12						1	3	29	84	92	95			S
July 15	3	8.7						0	2	26	91	97	98			S
Aug. 19	3	60						0	2	31	95	99	99			S
Sept. 15	3	14						0	2	25	82	90	92			S

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.

LOCATION.--At gaging station at bridge on State Highway 27, 4 miles downstream from Rush Creek and 11 miles south of Gordon, Sheridan County.
DRAINAGE AREA.--2,595 square miles.
RECORDS AVAILABLE.--Water temperatures: July to September 1953.
Sediment records: October 1947 to December 1950, July to Septemher 1953.
EXTREMES, July to September 1953.--Water temperatures: Maximum, 88°F July 25, Aug. 13.
Sediment concentrations: Maximum daily, 1,840 ppm July 29; minimum daily, not determined.
Sediment loads: Maximum daily, 1,840 tons July 29; minimum daily, not determined.
EXTREMES, 1947-50, 1953.--Sediment concentrations: Maximum daily, 5,360 ppm Mar. 15, 1948; minimum daily, not determined.
Sediment loads: Maximum daily, 22,900 tons June 17, 1948; minimum daily, 2 tons Feb. 3, 1950.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Temperature (°F) of water, July to September 1953
[Once-daily measurement usually between 5 p.m. and 6 p.m. prior to Sept. 1, and at approximately 9 a.m., Sept. 1-30]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1										--	79	74
2										82	78	73
3										--	78	55
4										76	83	56
5										71	85	--
6										82	78	--
7										75	81	--
8										68	82	67
9										68	83	65
10										79	72	67
11										78	79	--
12										70	82	--
13										85	88	--
14										82	76	68
15										82	75	60
16										73	76	63
17										83	78	67
18										82	70	58
19										85	78	--
20										85	78	--
21										85	77	53
22										85	80	55
23										85	78	61
24										81	71	57
25										88	81	54
26										82	84	--
27										87	82	--
28										80	87	63
29										75	84	54
30										85	80	--
31										87	84	--
Average										80	80	--

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Suspended sediment, July to September 1953

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	72	408	79	135	605	221	80	154	a 33
2.....	75	268	54	131	492	174	70		
3.....	70	237	45	131			70	136	26
4.....	68	228	42	121	364	119	70		
5.....	65	206	36	102	288	79	72	188	37
6.....	65	195	34	88	430	102	75		
7.....	65	162	28	82	254	56	75		
8.....	68	173	32	75	173	35	75		
9.....	72			70	234	44	75		
10.....	72	265	51	72	265	52	75	229	45
11.....	72			77	307	64	72		
12.....	72			77	265	55	70		
13.....	70			70	215	41	68		
14.....	68	262	48	70	185	35	65	135	24
15.....	65			65	200	35	70	126	24
16.....	63	234	39	77	187	39	70	190	36
17.....	63			72	145	28	65	225	39
18.....	63			88	295	70	63	185	31
19.....	58			102	662	182	65	228	40
20.....	70	190	36	105	652	185	65	288	51
21.....	70	317	61	96	300	78	68	354	65
22.....	65	420	74	88	302	72	75		
23.....	60			85	269	62	75	382	77
24.....	56			88	262	62	75		
25.....	60	275	44	77	288	60	75		
26.....	60			75	180	36	77		
27.....	125	313	106	72			77		
28.....	108	264	77	72	119	a 24	80	252	a 55
29.....	241	1,840	s 1,840	70			80		
30.....	168	1,760	798	75	139	28	77		
31.....	176	883	420	82	133	29	--	--	--
Total.	2,545	--	4,436	2,690	--	2,289	2,166	--	1,401

Total discharge for period July 1 to Sept. 30, 1953 (cfs-days) 7,401
Total load for period July 1 to Sept. 30, 1953 (tons) 8,126

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

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, October 1952 to June 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 2, 1952	80	208	45
Oct. 14	111	977	293
Oct. 21	94	278	71
Nov. 4	125	537	181
Nov. 10	102	506	139
Nov. 18	172	868	403
Nov. 19	128	882	305
Dec. 3	90	65	16
Dec. 6	109	44	13
Dec. 15	101	102	28
Dec. 29	102	136	37
Jan. 7, 1953	101	115	31
Jan. 12	154	694	289
Jan. 26	200	1,640	894
Feb. 5	193	748	390
Feb. 12	170	1,390	638
Feb. 25	120	230	75
Mar. 4	134	869	314
Mar. 9	263	1,530	1,090
Mar. 11	233	780	491
Mar. 17	180	682	331
Mar. 28	135	594	217
Apr. 2	157	666	282
Apr. 6	138	486	181
Apr. 15	125	416	140
Apr. 20	135	720	262
May 5	180	680	330
May 20	142	274	105
May 25	105	381	108
June 3	99	233	62
June 8	131	464	164
June 17	91	197	48

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Particle-size analyses of suspended sediment, February 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	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. 5, 1953	10:20 a.m.	193	37	748	580	24	28	32	41	53	81	100	--	--	--	--	BWCM
Mar. 4	9:30 a.m.	134	34	869	629	--	--	16	19	28	75	100	--	--	--	--	BWCM
Mar. 11	3:40 p.m.	233	53	780	--	--	--	--	--	--	38	69	98	100	--	--	S
Apr. 15	5:00 p.m.	125	53	416	--	--	--	--	--	--	38	71	96	99	99	100	S
July 29	3:20 p.m.	678	75	4,380	3,550	--	12	--	18	--	48	81	97	99	100	--	SPWCM
Aug. 18	10:30 a.m.	85	--	209	--	--	--	--	--	--	34	64	92	98	99	100	S

Particle-size analyses of bed material, March to September 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	Number of sampling points	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	
Mar. 11, 1953	4	233								0	6	59	89	99	100	--	S
Apr. 15	4	125								1	4	39	97	99	99	100	S
May 20	3	142								0	1	29	86	99	99	100	S
June 17	4	91								0	3	39	95	98	100	--	S
July 15	4	68								0	3	28	92	98	99	100	S
Aug. 18	5	85								1	3	34	94	97	98	100	S
Sept. 15	4	70								0	2	32	95	99	99	100	S

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 1953.
Sediment records: April 1948 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 87°F June 18, 29, July 14, Aug. 13; minimum, freezing point on several days during October to March.
Sediment concentrations: Maximum daily, 3,300 ppm Mar. 17, 18; minimum daily, 140 ppm Jan. 15.
Sediment loads: Maximum daily, 5,000 tons May 2; minimum daily, 50 tons Jan. 15.
EXTREMES, 1948-53.--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 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, September to October 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				
Sept. 26, 1952.. ...	a 234			29	4.3	12	13	136	0									90	0	20	0.5	232	8.2
Oct. 9, ...	302	54				12	5.7	126	6						196	0.27		92	0	21	0.5	231	8.4

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Twice-daily measurements between 5 a. m. and 8 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	53	62	--	a 47	--	a 36	--	33	--	a 42	--	a 32	44	52	40	42	60	75	71	85	72	82	70	83
2	46	61	39	45	--	a 35	--	a 35	--	a 41	--	a 35	37	46	38	42	64	70	69	82	71	75	70	76
3	49	60	32	49	--	a 35	--	36	--	44	--	a 35	33	53	40	49	59	75	65	a 79	70	76	56	63
4	46	a 52	43	50	--	a 35	--	35	--	a 42	--	a 35	33	53	44	55	58	69	70	82	67	77	51	65
5	40	45	43	50	--	a 38	--	a 35	--	42	--	38	40	56	46	62	57	65	66	72	67	84	50	70
6	33	48	a 39	43	--	a 36	--	a 32	a 43	--	--	a 35	46	53	45	68	53	58	61	79	68	82	55	72
7	32	55	39	50	--	a 35	--	a 37	--	a 41	33	47	48	49	52	65	57	62	66	80	62	80	57	78
8	38	56	38	41	--	a 36	--	a 38	--	a 41	34	a 48	43	52	55	66	56	80	65	70	62	79	60	a 77
9	40	58	a 36	41	--	a 37	--	a 38	--	a 33	39	51	40	a 39	55	70	65	a 65	64	73	68	a 84	60	77
10	45	62	a 32	44	--	a 36	--	a 35	--	33	39	55	34	a 41	50	54	--	--	64	81	70	70	64	80
11	45	59	36	46	a 36	a 36	--	a 38	--	a 33	41	53	38	43	44	50	71	82	70	a 84	63	79	60	72
12	48	56	a 37	47	--	a 37	--	a 39	--	a 35	40	53	37	a 52	35	45	70	83	70	83	60	79	55	a 70
13	48	58	40	50	--	a 33	--	a 39	--	a 37	41	52	38	56	37	54	72	80	--	86	63	87	56	70
14	46	49	--	a 58	--	a 34	--	a 33	--	37	39	37	41	a 52	40	64	77	80	68	87	67	74	56	75
15	39	a 50	--	a 47	--	a 38	--	a 33	--	a 36	33	46	33	48	48	67	70	73	66	79	62	a 69	56	74
16	43	50	--	a 42	--	a 36	a 33	--	--	a 33	37	51	34	a 43	51	59	60	79	68	75	64	70	55	73
17	43	54	--	a 39	--	a 34	--	a 33	--	a 39	42	54	35	48	53	62	--	84	65	80	64	73	59	69
18	42	55	--	a 42	--	a 34	--	a 32	--	a 37	39	47	35	a 47	53	69	--	87	70	85	63	70	53	a 70
19	48	59	--	a 33	--	a 34	34	--	--	--	38	40	33	51	55	72	--	75	70	84	63	a 72	56	72
20	43	51	--	a 39	--	a 37	--	a 35	--	--	44	58	37	59	60	69	64	78	68	85	64	75	54	60
21	42	55	--	a 38	--	a 34	--	34	--	a 33	43	49	38	65	52	66	a 69	80	70	78	63	76	47	a 62
22	43	a 57	--	a 37	--	a 32	--	a 32	a 33	--	40	46	49	72	51	70	65	75	65	81	65	71	52	70
23	42	58	--	a 34	--	a 32	--	a 36	--	a 37	38	56	51	66	58	65	--	82	68	80	66	72	54	70
24	45	58	--	a 33	--	a 32	--	a 38	--	a 32	33	45	50	60	57	75	--	76	70	85	62	81	55	65
25	47	58	--	a 32	--	a 32	--	a 39	--	a 36	32	50	37	47	58	75	58	78	71	85	67	a 83	54	62
26	44	55	--	a 32	--	a 32	--	a 40	--	a 35	40	55	38	60	58	72	63	75	a 85	84	70	83	a 55	62
27	45	45	--	a 32	--	a 32	--	a 39	--	a 37	40	52	45	67	60	75	65	80	70	85	70	82	52	67
28	35	49	--	a 35	--	a 36	--	a 37	--	a 33	38	56	46	48	64	75	67	78	73	82	72	a 80	50	79
29	35	49	--	a 37	a 34	--	--	a 42	--	--	45	59	45	45	65	75	69	87	70	75	69	84	56	63
30	40	49	--	a 35	a 36	--	a 35	--	--	--	45	53	40	43	56	75	72	80	67	82	68	85	a 59	65
31	54	42	--	--	--	a 35	--	a 39	--	--	45	60	--	--	59	78	--	--	71	83	71	84	--	--
Average	43	54	--	42	--	35	--	36	--	37	39	47	40	52	51	64	64	76	69	81	66	78	56	70

a Reading obtained between 9 a. m. and 3 p. m.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	250	740	500	270	1,760	1,280	282	1,380	1,050
2.....	246	730	480	274	1,670	1,240	290	1,560	1,220
3.....	246	770	510	274	1,890	1,400	294	1,700	a1,300
4.....	254	1,120	770	274	1,610	1,190	306	1,760	1,450
5.....	266	1,090	780	286	1,770	1,370	302	1,570	1,280
6.....	258	1,120	780	286	1,780	1,370	310	1,570	1,310
7.....	258	1,220	850	290	2,060	1,610	314	1,480	1,250
8.....	266	1,150	830	290	1,660	1,300	324	1,760	1,540
9.....	275	1,350	1,000	286	1,660	1,280	324	2,140	1,870
10.....	274	1,070	790	290	1,440	1,130	314	2,050	1,740
11.....	274	990	730	290	1,520	1,190	324	1,940	1,700
12.....	270	990	720	294	1,860	1,480	314	2,360	2,000
13.....	270	1,190	870	306	1,690	1,400	302	1,840	1,500
14.....	286	1,200	930	302	1,400	a1,100	290	1,420	1,110
15.....	290	1,420	1,110	306	1,500	a1,200	302	1,380	1,130
16.....	290	1,510	1,180	306	1,760	1,450	324	1,800	1,570
17.....	278	1,420	1,070	342	2,500	2,310	310	2,180	1,820
18.....	278	1,340	1,010	337	2,310	2,100	324	2,020	1,770
19.....	266	1,470	1,060	342	--	e2,000	319	1,840	1,580
20.....	286	1,400	1,080	319	1,860	1,600	310	1,640	1,370
21.....	274	1,360	1,010	332	1,940	1,740	310	1,900	a1,600
22.....	266	1,380	990	342	1,940	1,790	319	2,110	1,820
23.....	282	1,400	1,070	298	1,700	1,370	306	1,640	1,350
24.....	274	1,620	1,200	282	1,480	1,130	290	1,480	1,160
25.....	266	1,380	990	246	1,380	920	262	1,290	910
26.....	258	1,420	990	170	940	430	250	1,630	1,100
27.....	266	1,610	1,160	175	740	350	266	1,600	a1,100
28.....	258	1,400	980	200	860	460	286	1,520	1,170
29.....	258	1,440	1,000	220	930	550	302	1,580	1,290
30.....	258	1,630	1,140	250	1,190	800	310	1,580	1,320
31.....	282	1,570	1,200	--	--	--	314	1,670	1,420
Total.	8,322	--	28,780	8,479	--	38,540	9,394	--	43,800

Day	January			February			March		
1.....	319	1,780	1,530	395	1,760	1,880	400	--	e1,500
2.....	319	1,740	1,500	400	1,690	1,830	220	1,300	a750
3.....	310	1,620	1,360	400	2,010	2,170	260	950	a650
4.....	328	1,800	1,590	400	2,100	2,270	300	1,200	a950
5.....	332	1,770	1,590	430	2,040	2,370	490	1,600	a2,100
6.....	298	1,580	1,270	415	2,070	2,320	465	2,400	a3,000
7.....	282	1,660	1,260	400	2,010	2,170	430	2,700	a3,100
8.....	319	1,820	1,570	395	1,540	1,640	445	2,110	2,540
9.....	314	1,700	1,440	340	--	e1,200	470	2,070	2,630
10.....	355	1,860	1,780	160	--	e340	500	2,310	3,120
11.....	365	1,880	1,850	200	1,410	760	522	2,350	3,310
12.....	370	1,500	a1,500	310	1,740	1,460	527	2,090	2,970
13.....	380	1,080	1,110	350	1,780	1,680	560	2,200	3,330
14.....	290	760	600	375	1,780	1,800	596	2,800	4,510
15.....	140	140	50	375	1,650	1,670	554	2,970	4,440
16.....	130	570	200	350	1,780	1,680	614	2,700	4,480
17.....	170	1,430	660	310	1,720	1,440	554	3,300	4,940
18.....	275	1,520	1,130	330	1,460	1,300	500	3,300	4,460
19.....	315	--	e1,300	250	--	e340	445	2,630	3,230
20.....	380	1,900	a1,900	160	--	e70	430	2,510	2,910
21.....	380	1,800	a1,800	190	--	e80	430	2,280	2,650
22.....	395	1,700	a1,800	290	--	e240	425	2,460	2,820
23.....	390	1,970	2,070	360	--	e800	400	2,660	2,870
24.....	405	2,200	2,410	400	--	e1,400	380	2,380	2,440
25.....	420	2,170	2,460	380	--	e1,100	360	2,080	2,020
26.....	415	1,830	2,050	410	--	e1,500	346	2,060	1,920
27.....	425	1,940	2,230	440	--	e1,800	337	2,240	2,040
28.....	395	1,710	1,820	440	--	e1,800	337	1,850	1,680
29.....	370	1,690	1,690	--	--	--	328	1,700	1,510
30.....	385	1,580	1,640	--	--	--	319	1,790	1,540
31.....	390	1,680	1,770	--	--	--	314	1,810	1,530
Total.	10,361	--	46,930	9,655	--	39,110	13,268	--	81,940

e Estimated.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR CODY, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	324	2,000	1,750	674	1,960	3,570	254	1,040	710
2.....	370	2,110	2,110	662	2,800	5,000	246	950	630
3.....	370	2,360	2,360	656	2,610	4,620	254	1,190	820
4.....	375	2,040	2,070	632	2,410	4,110	250	1,300	880
5.....	370	2,280	2,280	572	2,900	4,480	254	950	650
6.....	370	1,860	1,860	485	2,790	3,650	266	1,180	850
7.....	395	2,420	2,580	445	2,970	3,570	286	900	690
8.....	415	2,090	2,340	400	2,220	2,400	302	1,160	950
9.....	410	2,530	2,800	375	1,830	1,850	314	1,070	910
10.....	400	2,230	2,410	350	1,960	1,850	310	990	830
11.....	385	2,090	2,170	342	1,860	1,720	286	970	750
12.....	365	2,060	2,030	337	1,820	1,660	302	1,050	860
13.....	355	1,900	1,820	328	1,820	1,610	294	980	760
14.....	360	2,060	2,000	319	2,050	1,770	282	800	610
15.....	365	2,580	2,540	319	1,840	1,410	266	740	530
16.....	355	2,080	1,990	319	1,900	1,640	262	720	510
17.....	355	2,210	2,120	328	1,780	1,580	266	940	680
18.....	360	1,940	1,890	332	1,870	1,680	254	600	410
19.....	370	1,860	1,860	328	1,900	1,680	298	1,200	s1,200
20.....	355	2,080	1,990	319	1,820	1,570	395	2,070	2,210
21.....	346	1,800	1,680	328	1,760	1,560	332	1,580	1,420
22.....	337	1,550	1,410	310	1,790	1,500	360	1,450	1,410
23.....	342	1,560	1,440	324	1,690	1,480	342	1,090	1,010
24.....	400	2,400	a2,600	319	2,160	1,860	337	1,140	1,040
25.....	370	1,990	1,990	294	1,760	1,400	306	1,350	1,120
26.....	342	1,690	1,560	294	1,570	1,250	282	910	690
27.....	350	1,900	1,800	286	1,400	1,080	266	770	550
28.....	365	1,850	1,820	278	1,220	920	254	650	450
29.....	460	1,730	2,150	270	1,240	900	242	720	470
30.....	596	1,890	3,040	258	1,320	920	234	700	440
31.....	--	--	--	250	1,190	800	--	--	--
Total.	11,332	--	62,460	11,733	--	65,090	8,596	--	25,040

Day	July			August			September		
1.....	226	550	340	314	1,600	1,360	219	480	280
2.....	230	600	370	310	1,210	1,010	223	500	300
3.....	250	650	440	310	1,150	960	219	550	330
4.....	234	520	330	298	1,100	890	219	750	440
5.....	226	650	400	290	1,040	810	226	630	380
6.....	230	750	470	262	810	570	226	660	400
7.....	234	640	400	254	740	510	226	800	490
8.....	266	750	540	246	680	450	226	830	510
9.....	258	1,160	810	230	620	390	230	740	460
10.....	250	1,120	760	242	700	460	230	700	430
11.....	250	840	570	250	740	500	230	730	450
12.....	246	690	460	234	820	520	226	730	450
13.....	238	610	390	226	620	380	223	710	430
14.....	230	530	330	219	470	280	215	660	380
15.....	219	560	330	215	480	280	219	710	420
16.....	219	400	240	230	570	350	223	680	410
17.....	219	460	270	246	640	420	223	750	450
18.....	230	490	300	266	690	500	223	700	420
19.....	226	390	240	310	1,190	1,000	223	700	420
20.....	238	530	340	270	1,010	740	223	700	420
21.....	226	600	370	278	1,000	750	230	870	540
22.....	226	520	320	266	750	540	226	850	520
23.....	230	530	330	258	650	450	219	750	a440
24.....	223	490	300	258	780	540	215	830	480
25.....	223	520	310	250	580	390	223	750	450
26.....	219	470	280	238	500	320	223	760	460
27.....	234	520	330	234	480	300	219	710	420
28.....	254	830	570	234	480	300	219	780	460
29.....	246	810	540	226	480	290	208	1,000	560
30.....	460	1,670	s2,300	226	480	290	208	950	530
31.....	342	1,840	1,700	230	460	290	--	--	--
Total.	7,602	--	15,680	7,920	--	16,840	6,662	--	13,130

Total discharge for year (cfs-days)..... 113,324
Total load for year (tons)..... 477,340

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 1952 to September 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	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									
								0.062	0.125	0.250	0.500	1.000	2.000		
Oct. 11, 1952	10:35 a.m.	290	52	1,220				9	23	69	98	100	--		S
Oct. 23	10:20 a.m.	286	47	1,500				7	17	53	96	99	100		S
Dec. 11	11:30 a.m.	328	36	1,520				7	20	63	95	98	98		S
Jan. 9, 1953	1:55 p.m.	298	--	1,660				14	32	69	96	99	100		S
Feb. 3	9:40 a.m.	405	--	2,220				13	31	73	97	99	100		S
Mar. 11	8:05 a.m.	532	42	2,060				16	37	81	99	100	--		S
Apr. 22	8:45 a.m.	370	54	1,400				12	34	75	97	99	100		S
May 3	11:25 a.m.	668	47	2,340				14	30	72	98	100	--		S
May 20	9:35 a.m.	355	63	1,560				12	36	75	98	100	--		S
June 2	11:20 a.m.	258	68	1,000				11	27	68	96	99	100		S
June 10	3:15 p.m.	298	82	954				15	33	70	96	99	100		S
June 29	3:30 p.m.	230	86	490				11	31	74	98	100	--		S
July 8	3:20 p.m.	278	68	792				15	36	70	94	97	100		S
July 27	3:15 p.m.	230	84	480				16	34	69	97	100	--		S
Aug. 4	3:40 p.m.	282	79	1,080				18	34	61	87	92	100		S
Aug. 27	10:10 a.m.	234	--	507				16	32	66	96	98	100		S
Sept. 10	4:05 p.m.	226	77	659				10	22	64	96	99	100		S
Sept. 22	1:00 p.m.	226	64	666				10	25	60	94	99	100		S

NIOBRARA RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN THE NIOBRARA RIVER BASIN IN NEBRASKA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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				
NIOBRARA RIVER NEAR NORDEN																							
Apr. 21, 1953	986	52	0.01	32	4.4	12	8.0	144		11	1.0	0.5	0.2	0.03	194	0.26		98	0	19	0.5	255	8.1
May 21	1,180	58	.02	32	4.4	14	9.1	152		9.0	.4	.4	.5	.08	208	.28		98	0	22	.6	263	7.7
June 9	789	56	.02	30	3.9	11	8.0	137		6.0	.5	.4	1.2	.05	188	.26		91	0	19	.5	241	7.7
July 8	813	54	.00	30	3.6	10	7.6	131		10	.5	.4	.7	.04	190	.26		89	0	18	.5	230	7.2
Sept. 11	670	57	.00	29	3.8	8.9	6.2	125		5.0	1.0	.3	.5	.02	179	.24		88	0	17	.4	232	7.3

NIOBRARA RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
SNAKE RIVER NEAR BURGE			
Oct. 10, 1952	224	337	204
Oct. 13	235	351	223
Oct. 22	230	503	312
Oct. 30	232	466	292
Nov. 12	230	698	433
Nov. 28	265	946	677
Dec. 9	260	885	621
Dec. 23	218	967	569
Jan. 8, 1953	271	920	673
Jan. 23	302	927	756
Feb. 2	299	750	605
Feb. 27	317	930	796
Mar. 12	523	658	929
Mar. 25	249	974	655
Mar. 31	249	960	645
Apr. 13	262	979	693
Apr. 23	254	495	339
NIOBRARA RIVER NEAR SPARKS			
Oct 2, 1952	760	480	985
Oct 11	687	540	1,000
Oct. 15	739	514	1,030
Oct 31	760	704	1,440
Nov. 19	909	862	2,120
Dec. 4	818	562	1,240
Dec. 17	863	624	1,450
Jan. 2, 1953	823	222	493
Jan. 29	981	438	1,160
Mar. 26	921	587	1,460
Apr. 8	1,160	1,100	3,450
Apr. 22	850	660	1,510
May 21	957	728	1,880
May 27	885	509	1,220
June 11	909	792	1,940
June 25	839	528	1,200
July 8	718	425	824
July 22	687	552	1,020
July 30	1,040	631	1,770
Aug. 20	793	462	989
NIOBRARA RIVER NEAR NORDEN			
Oct. 1, 1952	745	934	1,880
Oct. 12	826	1,180	2,630
Oct. 14	839	1,020	2,310
Oct. 24	917	1,380	3,420
Nov. 3	839	1,780	4,030
Nov. 18	1,000	2,140	5,780
Nov. 20	1,070	1,900	5,490
Dec. 3	a 917	437	1,080
Dec. 19	732	743	1,470
Jan. 2, 1953	904	568	1,390
Jan. 8	a 815	642	1,410
Feb. 6	1,260	2,770	9,420
Mar. 12	1,880	2,860	14,500
Mar. 13	1,840	3,080	15,300
Mar. 23	1,130	3,520	10,700

NIOBRARA RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
NIOBRARA RIVER NEAR NORDEN--Continued			
Apr. 1, 1953	1,060	1,620	4,640
Apr. 14	1,170	1,600	5,050
Apr. 21	958	1,630	4,220
May 4	2,180	2,420	14,200
May 21	1,180	1,110	3,540
May 31	800	721	1,560
June 9	778	858	1,800
June 30	701	509	963
July 8	800	714	1,540
July 30	958	1,060	2,740
Aug. 4	944	924	2,360
Aug. 25	734	682	1,350
Sept. 11	701	566	1,070
Sept. 24	650	802	1,410

a Mean daily discharge.

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

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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	0.016	0.031	0.062	0.125	0.250	0.500	1.000		
SNAKE RIVER NEAR BURGE																
Oct. 10, 1952 ..	3:30 p. m.	224	--	337						12	35	83	100	--		S
Oct. 13.....	1:05 p. m.	235	--	351						12	32	86	99	100		S
Oct. 22.....	11:50 a. m.	230	50	503						10	31	84	100	--		S
Oct. 30.....	2:10 p. m.	232	--	466						13	35	84	100	--		S
Nov. 12.....	1:00 p. m.	230	44	698						10	33	84	100	--		S
Nov. 28	2:45 p. m.	265	32	946						10	28	82	99	100		S
Dec. 9.....	12:50 p. m.	260	36	885						10	32	88	100	--		S
Dec. 23.....	10:15 a. m.	218	33	967						6	25	86	100	--		S
Jan. 8, 1953 ...	3:00 p. m.	271	35	920						12	35	88	100	--		S
Jan. 23.....	12:30 p. m.	302	--	927						22	46	92	100	--		S
Feb. 2.....	1:45 p. m.	299	43	750						10	31	86	99	100		S
Feb. 27.....	10:20 a. m.	317	--	930						22	55	92	100	--		S
Mar. 12	11:10 a. m.	523	48	658						31	57	94	100	--		S
Mar. 25	12:15 p. m.	249	44	974						8	28	83	100	--		S
Mar. 31	12:20 p. m.	249	--	960						10	31	82	100	--		S
Apr. 13	10:50 a. m.	262	--	979						8	28	86	100	--		S
Apr. 23	2:10 p. m.	254	64	495						16	44	92	100	--		S
NIOBRARA RIVER NEAR SPARKS																
Oct. 11, 1952 ..	4:25 p. m.	687		540						7	22	88	100	--		S
Oct. 15..	1:35 p. m.	739	--	514						9	29	92	100	--		S
Nov. 19	2:35 p. m.	909	--	862						8	25	87	100	--		S
Dec. 4	1:50 p. m.	818	33	562						7	22	81	100	--		S
Dec. 17.....	1:20 p. m.	863	--	624						8	25	85	99	100		S
Jan. 2, 1953 ...	2:30 p. m.	823	--	222						14	29	80	99	100		S
Jan. 29	1:45 p. m.	981	--	438						37	57	89	100	--		S
Mar. 26	3:30 p. m.	921	--	587						22	50	98	100	--		S

NIOBRARA RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1952 to September 1953--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	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	0.016	0.031	0.062	0.125	0.250	0.500	1.000		
NIOBRARA RIVER NEAR SPARKS--Continued																
Apr. 8, 1953	12:05 p.m.	1,160	--	1,100						15	38	96	100	--		S
Apr. 22	11:30 a.m.	850	--	660						13	44	96	100	--		S
May 21	8:15 a.m.	957	54	728						8	31	94	100	--		S
May 27	11:10 a.m.	885	67	509						15	47	95	100	--		S
June 11	12:40 p.m.	909	75	792						10	30	78	99	100		S
June 25	1:15 p.m.	839	69	528						19	43	95	100	--		S
July 8	11:40 a.m.	718	69	425						12	43	96	100	--		S
July 22	2:10 p.m.	687	--	552						9	44	97	100	--		S
July 30	6:05 p.m.	1,040	77	631						16	40	94	100	--		S
Aug. 20	11:00 a.m.	793	72	462						12	33	90	100	--		S
NIOBRARA RIVER NEAR NORDEN																
Oct. 12, 1952	--	826	--	1,180	--	--	--	--		17	52	95	100	--		S
Oct. 14	3:30 p.m.	839	--	1,020	--	--	--	--		12	43	90	99	100		S
Oct. 24	11:25 a.m.	917	54	1,380	--	--	--	--		11	40	87	99	100		S
Nov. 3	2:10 p.m.	839	--	1,780	--	--	--	--		13	44	93	100	--		S
Nov. 18	5:30 p.m.	1,000	--	2,140	--	--	--	--		8	30	85	100	--		S
Nov. 20	4:30 p.m.	1,070	42	1,900	--	--	--	--		9	31	81	96	100		S
Dec. 3	1:30 p.m.	a917	33	437	--	--	--	--		9	23	82	100	--		S
Dec. 19	12:45 p.m.	732	34	743	--	--	--	--		5	26	93	100	--		S
Jan. 2, 1953	2:00 p.m.	904	32	568	--	--	--	--		9	34	88	99	100		S
Jan. 8	2:15 p.m.	a815	32	642	--	--	--	--		8	30	84	100	--		S
Feb. 6	1:50 p.m.	1,260	--	2,770	3,670	2	3	7		20	49	94	100	--		SPWCM
Mar. 12	6:45 p.m.	1,880	--	2,860	2,940	2	2	6	8	18	34	77	99	100		SPWCM
Mar. 13	12:15 p.m.	1,840	--	3,080	--	--	--	--		13	27	72	99	100		S
Mar. 23	2:30 p.m.	1,130	45	3,520	--	--	--	--		11	32	85	100	--		S
Apr. 1	11:45 a.m.	1,060	--	1,620	--	--	--	--		15	42	94	100	--		S

Apr. 14	10:20 a.m.	1,170	--	1,600	--	--	--	--		12	32	86	100	--			S
Apr. 21	3:30 p.m.	958	--	1,630	--	--	--	--		12	30	75	99	100			S
May 4	2:50 p.m.	2,180	55	2,420	--	--	--	--		12	32	78	99	100			S
May 21	10:20 a.m.	1,180	59	1,110	--	--	--	--		11	28	76	100	--			S
May 31	6:00 p.m.	800	77	721	--	--	--	--		17	44	88	99	100			S
June 9	4:00 p.m.	778	--	858	--	--	--	--		13	34	90	100	--			S
June 30	1:30 p.m.	701	--	509	--	--	--	--		24	52	96	100	--			S
July 8	10:10 a.m.	800	--	714	--	--	--	--		14	33	88	100	--			S
July 30	1:43 p.m.	958	75	1,060	--	--	--	--		46	59	93	100	--			S
Aug. 4	11:15 a.m.	944	--	924	--	--	--	--		27	46	90	100	--			S
Aug. 25	1:00 p.m.	734	82	682	--	--	--	--		14	31	67	96	100			S
Sept. 11	11:35 a.m.	701	--	566	--	--	--	--		18	45	94	100	--			S
Sept. 24	2:30 p.m.	650	67	802	--	--	--	--		11	32	90	100	--			S

a Mean daily discharge.

NIOBRARA RIVER BASIN--Continued

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

Particle-size analyses of bed material, water year October 1952 to September 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	Number of sampling points	Discharge (cfs)	Water temperature (°F)	Bed material: Concentration of sample (ppm)	Bed material: Concentration of suspension analyzed (ppm)	Bed material: Percent finer than indicated size, in millimeters										Methods of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000		
SNAKE RIVER NEAR BURGE																
Oct. 10, 1952	2	224					--	0	24	90	98	100				S
Oct. 22	3	230					0	2	49	91	100					S
Apr. 23, 1953	2	254					0	2	46	97	100					S
NIOBRARA RIVER NEAR SPARKS																
Oct. 11, 1952	3	687					0	1	38	91	96	98	99	99		S
Apr. 21, 1953	3	a909					0	7	63	100	---	--	--			S
May 21	3	957					0	2	41	98	100	--	--			S
June 9	3	a760					0	2	53	95	99	99	100			S
July 8	3	718					0	3	58	98	100	--	--			S
Sept. 11	3	a666					0	1	39	94	100	--	--			S
NIOBRARA RIVER NEAR NORDEN																
Sept. 14, 1952	2	745					1	12	81	100	---	--	--	--		S
Sept. 25	3	732					0	6	49	99	100	--	--	--		S
Oct. 24	1	917					1	5	67	99	100	--	--	--		S
Mar. 12, 1953	2	1,880					0	1	17	88	96	97	98	98		S
Apr. 21	3	958					0	1	22	97	100	--	--	--		S
May 21	3	1,180					0	1	26	89	98	99	100	--		S
June 9	2	778					0	1	37	97	100	--	--	--		S
July 8	3	800					0	3	35	85	97	99	100	--		S
Aug. 4	2	944					0	4	50	97	100	--	--	--		S
Sept. 11	3	701					0	1	29	78	89	93	97	100		S

a Mean daily discharge.

JAMES RIVER AT JAMESTOWN, N. DAK.

LOCATION.--At gaging station at Asylum bridge at southeast corner of Jamestown, Stutsman County, and 2.5 miles downstream from Pipestem Creek.
DRAINAGE AREA.--2,840 square miles, approximately, of which about 500 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1951, August 1952 to June 1953 (discontinued).
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1279.

Chemical analyses, in parts per million, October 1952 to June 1953

Date of collection	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. 9, 1952	2.7			--	--	--		399	0	--	--			0.33				322	0	--	--	976	8.2
Oct. 27	1.9			--	--	--		398	0	--	--			.70				384	58	--	--	1,420	7.9
Dec. 6	1.9			--	--	--		247	0	--	--			.58				228	25	--	--	1,210	7.9
Jan. 12, 1953	2.2			--	--	--		285	0	--	--			.39				235	1	--	--	968	7.9
Jan. 31	1.9			103	34	176		447	0	283	85			.56				398	31	49	3.8	1,430	7.1
Mar. 18	72			--	--	--		186	0	--	--			.21				138	0	--	--	447	7.0
Mar. 23	38			28	10	28		119	0	58	11			.14				112	14	35	1.2	361	6.6
Apr. 10	20			--	--	--		185	0	--	--			.16				164	12	--	--	531	7.3
May 3	64			55	26	65		267	0	134	20			.16				245	26	37	1.8	723	7.6
June 11	38			--	--	--		378	17	--	--			.28				397	58	--	--	1,120	8.6
June 29	176			48	35	69		290	0	154	10			.16				263	25	36	1.8	760	7.9

JAMES RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN S. DAK.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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				
JAMES RIVER AT COLUMBIA																							
Mar. 19, 1953	a47			40	20	61		182		98	46			0.18				184	34	42	2.0	641	7.1
Apr. 1	6.8			67	24	65		167		207	39			.20				266	129	35	1.7	763	6.9
Apr. 9	2.4			130	55	135		245		510	79			.12				550	349	35	2.5	1,480	7.2
Apr. 23	.2			160	90	285		371		856	138			.26				770	466	45	4.5	2,070	7.4
May 9	7.7			70	48	133		314		306	59			.34				370	113	44	3.0	1,180	7.4
May 28	52			72	45	132		338		287	55			.27				366	89	44	3.0	1,150	8.1
June 19	a45			46	27	85		227		161	41			.18				227	41	45	2.5	770	7.2
June 24	a196			44	17	66		186		120	32			.17				178	25	45	2.2	611	7.2

a Negative figures indicate reverse flow.

PART 6B. 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 1953.
Sediment records: May 1950 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 79°F June 19 and July 26; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 7,390 ppm June 8; minimum daily, not determined.
Sediment loads: Maximum daily, 85,500 tons June 8; minimum daily, not determined.
EXTREMES, 1950-53.--Water temperatures (1951-53): Maximum, 81°F June 13, 1952; minimum, freezing point 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. 27 to Mar. 12. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement at approximately 7 a. m. except Oct. 18 to Mar. 5 between 11 a. m. and 2 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	53	--	--	--	--	44	48	69	76	78	77
2	53	--	--	--	--	--	43	47	68	78	78	77
3	51	47	32	32	--	--	41	47	68	75	78	71
4	50	49	--	--	--	--	--	49	71	76	75	64
5	46	--	--	--	32	32	--	57	67	75	75	62
6	--	--	34	--	--	--	46	53	62	71	75	64
7	44	41	--	--	--	--	45	56	--	72	72	61
8	44	42	--	--	--	--	46	60	60	73	71	64
9	45	39	--	--	--	--	45	62	62	71	70	66
10	46	41	--	32	--	--	42	62	65	70	71	68
11	49	47	--	--	--	--	--	59	70	71	74	68
12	50	46	--	--	--	--	--	54	74	70	70	63
13	48	44	32	--	--	--	41	48	75	70	73	60
14	45	47	--	--	33	--	46	53	76	73	74	60
15	--	48	--	--	--	--	43	54	77	73	70	61
16	44	--	--	--	--	--	40	58	74	74	71	69
17	--	--	--	32	--	--	--	58	74	74	70	62
18	53	45	--	--	--	--	--	60	77	76	70	63
19	--	41	--	--	--	--	--	60	79	78	70	60
20	47	41	32	--	--	40	--	64	78	78	70	62
21	46	41	--	--	--	50	--	58	75	76	70	56
22	--	40	--	--	--	43	50	58	74	73	68	53
23	52	40	--	--	32	40	52	60	74	75	66	57
24	--	31	--	32	--	--	56	60	75	74	70	55
25	--	35	--	--	--	--	57	68	71	77	73	56
26	--	--	--	--	--	--	44	67	--	79	73	57
27	48	--	33	--	--	39	44	65	71	77	74	55
28	41	--	--	--	--	--	48	64	70	77	73	58
29	43	32	--	--	--	42	47	70	73	77	75	64
30	48	--	--	--	--	46	48	72	76	74	76	55
31	49	--	--	32	--	43	--	69	--	76	77	--
Average	--	--	--	a32	a32	--	--	59	72	74	73	62

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953

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	120	65	21	118	65	21	75	--	
2	115	55	17	117	66	21	75	--	
3	117	28	9	114	60	18	75	26	
4	113	23	7	117	58	18	76	--	
5	111	55	16	118	58	18	78	--	
6	111	61	18	117	61	19	80	58	
7	113	37	11	112	49	15	82	--	
8	118	52	17	117	45	14	84	--	
9	119	62	20	119	45	14	86	--	
10	120	66	21	117	40	13	88	--	
11	119	75	24	119	46	15	90	--	
12	121	78	25	119	49	16	88	--	
13	123	70	23	121	56	18	86	35	
14	121	58	19	121	63	21	82	--	
15	119	50	a16	121	58	19	80	--	
16	119	46	15	121	68	22	78	--	e13
17	120	45	15	124	80	27	76	--	
18	119	53	17	124	82	27	73	--	
19	119	49	16	123	57	19	70	--	
20	119	48	15	121	44	14	70	42	
21	119	60	19	124	40	13	72	--	
22	119	41	13	124	25	8	72	--	
23	118	53	17	124	21	7	72	--	
24	119	60	a19	124	18	6	74	--	
25	119	65	21	126	14	5	74	--	
26	119	63	20	84	13	a3	72	--	
27	117	65	21	80	--		76	146	
28	114	36	11	78	--	e7	76	--	
29	115	32	10	76	35		78	--	
30	119	32	10	75	--		78	--	
31	119	32	10	--	--		80	--	
Total	3,653	--	513	3,395	--	439	2,416	--	403

Day	January			February			March		
1	80	--		105	--		170	--	
2	82	--		105	--		210	--	
3	82	46		105	--		220	--	
4	84	--		105	--		210	--	
5	84	--		105	18		203	10	e7
6	86	--		105	--		190	--	
7	86	--		105	27		180	18	
8	88	--		105	--		180	--	
9	88	14		105	--		200		
10	90	45		105	--		300	--	e100
11	90	--		105	--		450		
12	90	--		105	--		800	580	1,250
13	92	--		105	--		1,240	1,020	3,410
14	92	--		105	14		1,990	1,980	10,600
15	94	--		105	--	e16	2,140	1,520	8,780
16	94	--	e7	105	--		1,790	1,010	4,880
17	96	22		105	--		1,740	1,010	4,750
18	96	--		105	--		2,090	1,260	7,110
19	96	--		105	--		2,490	1,440	9,680
20	99	--		105	--		2,340	1,160	7,330
21	99	--		105	--		2,140	1,060	6,120
22	99	--		105	--		2,090	926	5,230
23	100	--		105	159		2,090	817	4,610
24	100	17		105	--		1,740	715	3,360
25	100	--		105	--		1,500	580	2,350
26	105	--		110	--		1,320	466	1,660
27	105	--		120	--		1,190	300	964
28	105	--		150	--		1,070	316	913
29	105	--		--	--	--	990	345	922
30	105	--		--	--	--	1,110	754	2,260
31	105	9		--	--	--	1,110	502	1,500
Total	2,917	--	217	3,005	--	448	35,483	--	88,035

e Estimated.
a Computed from estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	1,070	291	841	1,220	309	1,020	587	204	323
2.....	1,070	291	841	1,380	431	1,610	566	188	287
3.....	1,110	286	857	1,550	540	2,260	556	206	309
4.....	1,070	256	740	1,660	560	2,510	552	188	280
5.....	1,030	253	740	1,730	596	2,780	545	194	286
6.....	1,010	242	660	1,740	673	3,160	552	203	303
7.....	970	223	584	1,660	598	2,680	880	3,000	sb 13,000
8.....	950	190	488	1,550	570	2,390	4,500	7,390	s 85,500
9.....	910	170	a 420	1,420	547	2,100	7,780	2,950	62,000
10.....	870	156	366	1,320	560	b 2,000	9,940	1,350	36,200
11.....	830	139	312	1,210	437	1,430	6,750	720	13,100
12.....	790	135	288	1,090	361	1,060	13,600	1,100	40,400
13.....	755	159	324	1,010	300	818	13,400	494	17,900
14.....	720	179	348	962	235	610	9,350	340	8,580
15.....	772	225	469	918	222	550	7,790	295	6,200
16.....	850	249	571	890	247	594	7,000	295	5,580
17.....	850	208	477	834	216	486	6,060	310	5,070
18.....	810	144	315	822	211	468	5,170	448	6,250
19.....	790	122	260	772	238	496	4,110	688	7,630
20.....	755	101	206	727	124	243	3,440	752	6,980
21.....	738	97	193	706	186	355	2,960	720	5,750
22.....	702	117	222	734	224	444	2,600	683	4,970
23.....	668	127	229	724	228	446	2,300	584	3,630
24.....	685	160	296	762	260	535	2,020	595	3,250
25.....	755	164	334	822	218	484	4,240	4,650	53,200
26.....	755	115	234	776	127	266	3,190	2,260	19,500
27.....	810	110	241	720	239	465	2,200	1,580	9,390
28.....	830	176	442	682	207	381	2,530	2,800	19,100
29.....	1,030	269	748	654	213	376	2,300	1,430	8,880
30.....	1,150	294	913	629	204	346	2,250	1,060	6,440
31.....	--	--	--	594	218	350	--	--	--
Total.	26,205	--	213,923	32,268	--	33,713	129,718	--	450,108
	July			August			September		
1.....	2,390	988	6,380	720	513	997	337	113	103
2.....	2,840	1,220	9,350	910	1,210	2,970	324	98	86
3.....	3,240	854	7,470	1,400	1,800	7,490	312	97	82
4.....	3,140	670	5,680	1,500	1,660	6,720	303	88	72
5.....	2,590	607	4,240	1,500	1,090	4,410	285	76	58
6.....	2,140	538	3,110	2,240	2,060	s 13,100	271	78	57
7.....	1,840	504	2,500	2,390	1,450	9,360	257	70	49
8.....	1,640	494	2,190	2,140	895	5,170	247	69	46
9.....	1,600	555	2,400	1,990	715	3,840	234	81	51
10.....	1,550	578	2,420	1,550	620	2,590	225	83	50
11.....	1,370	500	1,850	1,420	745	2,860	213	81	47
12.....	1,240	459	1,540	1,280	660	2,280	201	64	35
13.....	1,150	456	1,420	1,150	466	1,450	192	59	31
14.....	1,070	443	1,280	1,150	484	1,500	186	58	29
15.....	1,010	419	1,140	1,240	572	1,920	182	62	31
16.....	950	390	1,000	1,190	446	1,430	174	65	31
17.....	890	393	945	1,030	387	1,080	167	59	27
18.....	850	390	895	930	361	906	160	52	22
19.....	790	360	768	850	331	760	155	64	27
20.....	755	372	758	772	315	657	148	61	24
21.....	738	364	725	720	303	589	141	57	22
22.....	720	349	678	650	273	479	138	58	22
23.....	685	300	555	615	251	417	135	67	24
24.....	650	294	516	562	221	335	134	64	23
25.....	615	286	475	528	203	289	133	65	22
26.....	598	293	473	494	176	235	131	63	22
27.....	598	310	501	462	166	207	128	59	20
28.....	562	290	440	431	150	175	127	66	23
29.....	650	850	sb 1,800	388	137	144	125	76	26
30.....	1,010	1,700	b 4,600	375	130	132	123	77	26
31.....	910	1,220	3,000	362	126	123	--	--	--
Total.	40,781	--	71,090	32,939	--	74,615	5,888	--	1,188

Total discharge for year (cfs-days) 318,668
Total load for year (tons) 734,701

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Particle-size analyses of suspended sediment, water year October 1952 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000
Oct. 7, 1952	10:10 a.m.	113	46	35	--	--	--	--	--	--	97	98	100		--		S
Dec. 3	12:40 p.m.	a75	32	26	--	--	--	--	--	--	86	94	97		100		S
Feb. 5, 1953	11:30 a.m.	a105	32	18	--	--	--	--	--	--	85	90	100		--		S
Mar. 5	10:55 a.m.	a203	32	10	--	--	--	--	--	--	95	100	--		--		S
Mar. 20	1:55 p.m.	2,240	45	1,160	3,350	2	8	20	39	66	90	94	98		100		SPNM
Mar. 20	1:55 p.m.	2,240	45	1,160	3,060	23	30	38	52	74	90	94	98		100		SPWCM
Apr. 2	11:25 a.m.	1,070	44	283	1,430	3	13	32	50	77	93	95	98		100		SPNM
Apr. 2	11:25 a.m.	1,070	44	283	1,220	26	29	41	54	73	93	96	100		--		SPWCM
May 5	11:30 a.m.	1,740	55	604	2,610	12	32	39	53	77	92	96	99		100		SPWCM
June 2	8:15 a.m.	566	66	184	754	38	39	56	67	84	96	98	99		100		SPWCM
June 10	11:00 a.m.	10,100	--	1,570	6,380	66	82	90	91	95	98	98	99		100		SPWCM
July 3	6:35 a.m.	3,180	75	864	2,440	32	35	38	52	76	93	97	99		100		SPWCM
Aug. 4	10:00 a.m.	1,520	74	1,690	5,060	29	42	55	74	89	97	98	98		100		SPWCM

a Mean daily discharge.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA

LOCATION.--At gaging station at bridge on county road A, 1.3 miles south of Kennebec, 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 1953.
Sediment records: May 1950 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 82° F July 26; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 15,900 ppm June 25; minimum daily, not determined.
Sediment loads: Maximum daily, 137,000 tons June 25; minimum daily, not determined.
EXTREMES, 1950-53.--Water temperatures (1951-53): Maximum, 83° F June 24, 1952; minimum, freezing point on many days during winter months.
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. 27 to Mar. 8. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement, October to January, between 3 and 5 p. m.; after Mar. 14, between 6 and 8 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	--	--	--	--	42	46	--	74	76	70
2	--	52	--	--	--	--	42	44	68	78	74	--
3	--	50	--	--	32	--	40	45	68	76	74	70
4	--	53	32	--	--	--	40	40	68	76	74	62
5	--	50	--	--	--	--	40	48	66	77	70	62
6	--	47	--	--	--	32	46	--	63	74	70	64
7	--	48	--	--	--	--	44	--	64	72	70	60
8	61	45	--	--	--	37	46	--	64	70	66	64
9	61	45	--	--	--	32	46	--	62	70	66	66
10	60	45	33	--	32	32	40	--	64	71	--	68
11	--	47	35	--	--	32	40	--	70	72	--	68
12	58	--	34	--	--	36	40	--	74	69	--	62
13	55	50	--	32	--	36	40	--	74	70	--	--
14	53	48	--	--	--	40	44	--	76	72	--	59
15	52	49	--	--	--	32	--	--	78	72	--	60
16	50	--	--	--	--	32	39	--	--	74	--	58
17	51	--	--	--	--	38	--	--	74	75	66	62
18	57	46	--	--	32	38	--	--	78	75	--	62
19	--	43	--	--	--	36	--	--	76	--	66	--
20	49	43	--	32	--	40	--	--	78	76	70	--
21	50	42	--	--	--	48	--	--	78	78	70	54
22	56	42	--	--	--	42	51	--	74	--	68	54
23	--	42	--	--	--	40	52	--	74	76	70	55
24	59	40	--	--	32	--	54	--	74	74	70	54
25	57	--	33	--	--	--	50	--	68	76	72	56
26	58	--	--	--	--	38	50	--	70	82	74	56
27	50	--	--	--	--	38	50	--	--	--	72	52
28	46	--	--	32	--	38	47	--	70	72	72	58
29	50	--	--	--	--	42	45	--	74	72	73	63
30	52	--	--	--	--	45	48	--	76	70	76	54
31	--	--	--	--	--	--	--	--	--	72	74	--
Average	--	--	--	a32	a32	--	45	--	71	74	--	60

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953

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	150	--		150			125	331	112
2	145	171		150			130	--	
3	140	96		150			130	--	
4	140	--	e 50	150			132	39	
5	145	--		150			135	--	
6	145	--		155			135	--	
7	145	122		150	90	36	140	--	
8	145	139		150			140	60	
9	150			150			140	--	
10	150			150			140	86	
11	150	130	53	150			140	114	
12	145			150			140	78	
13	155			150			135	--	
14	155			155			135	--	
15	150			155	110	47	130	--	
16	150			160			125	--	e26
17	150			165			120	--	
18	150	100	40	150			115	--	
19	150			150			110	--	
20	150			150			110	--	
21	150			155	55	23	110	--	
22	150			155			110	--	
23	150			155			110	--	
24	155	140	57	155			110	--	
25	150			155			110	105	
26	155			140			115	--	
27	150			135			115	--	
28	150			130	--	e20	115	--	
29	150	120	49	125			115	--	
30	150			120			115	--	
31	155			--	--	--	115	--	
Total	4,625	--	1,566	4,465	--	967	3,847	--	892

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	115	--		138	--		350	--	
2	115	--		138	--		330	--	
3	115	--		138	28		320	--	
4	115	36		138	--		310	--	e130
5	115	--		138	--		300	--	
6	119	26		140	--		298	167	
7	120	--		140	--		300	--	
8	120	--		140	--		320	131	
9	120	--		140	--		361	200	195
10	120	--		140	32		402	1,110	1,200
11	120	--		140	--		470	1,000	1,270
12	120	--		140	--	e12	808	2,130	4,650
13	120	27		140	--		1,240	2,550	8,540
14	120	--		140	--		1,630	3,340	14,700
15	120	--		130	--		2,180	4,030	23,700
16	125	--	e9	120	--		2,060	2,420	13,500
17	125	--		130	--		1,880	1,920	9,750
18	125	--		130	42		1,980	2,100	11,200
19	125	--		130	--		2,310	2,500	15,600
20	125	26		130	--		2,510	2,500	16,900
21	130	--		120	--		2,260	1,990	12,100
22	130	--		130	--		2,180	1,780	10,500
23	130	--		135	--		2,180	1,570	9,240
24	130	--		140	30		2,020	1,310	7,140
25	130	--		170			1,770	1,080	5,160
26	135	--		200	--	e120	1,600	687	2,970
27	135	--		350			1,420	1,050	4,030
28	135	16		400			1,240	938	3,140
29	135	--		--	--	--	1,140	948	2,920
30	135	--		--	--	--	1,140	1,080	3,320
31	135	--		--	--	--	1,240	1,200	4,020
Total	3,859	--	279	4,365	--	768	38,549	--	186,785

e Estimated.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	1,210	690	2,250	1,260	635	2,160	710	360	690
2.....	1,180	598	1,910	1,390	706	2,650	713	390	751
3.....	1,240	684	2,290	1,590	1,010	4,340	674	370	673
4.....	1,210	542	1,770	1,700	1,020	4,680	660	347	618
5.....	1,140	517	1,590	1,770	1,030	4,920	644	396	689
6.....	1,140	505	1,550	1,820	1,030	5,060	644	370	643
7.....	1,100	471	1,400	1,810	978	4,780	705	1,100	sa2,400
8.....	1,070	398	1,150	1,760	890	4,230	2,350	10,500	s71,600
9.....	1,040	414	1,160	1,650	1,020	4,540	5,510	6,570	97,700
10.....	1,000	405	1,090	1,550	1,250	5,230	8,380	4,900	110,900
11.....	965	281	732	1,450	900	3,520	9,070	2,480	60,700
12.....	895	282	681	1,320	695	2,480	7,150	2,270	43,800
13.....	878	286	678	1,220	553	1,820	9,840	2,340	62,200
14.....	825	119	265	1,150	455	1,410	11,200	1,610	48,700
15.....	790	130	b280	1,110	460	1,380	10,800	1,280	37,300
16.....	895	374	904	1,090	2,360	6,950	9,300	1,330	33,400
17.....	930	310	b800	1,040	740	2,080	7,070	1,190	22,700
18.....	930	416	1,040	976	460	1,210	5,790	1,250	19,500
19.....	878	390	b900	948	525	1,340	4,790	1,350	17,500
20.....	878	326	773	909	500	a1,200	3,800	1,420	14,600
21.....	842	330	750	888	1,900	a4,600	3,150	1,380	11,700
22.....	790	290	619	898	1,700	a4,100	2,760	1,300	a9,700
23.....	738	275	548	892	850	2,050	2,480	1,070	7,160
24.....	738	358	764	888	686	1,640	2,250	1,500	sa9,700
25.....	790	232	495	954	850	2,190	3,190	15,900	137,000
26.....	808	330	720	951	530	1,360	4,080	5,280	58,200
27.....	825	305	679	902	460	1,120	2,480	2,430	16,300
28.....	930	390	979	864	460	1,070	2,460	1,880	12,500
29.....	1,080	525	1,530	818	463	1,020	2,470	2,300	15,300
30.....	1,200	622	2,020	772	445	928	2,350	1,590	10,100
31.....	--	--	--	730	393	775	--	--	--
Total.	28,935	--	32,317	37,070	--	86,833	127,470	--	934,724

	July			August			September		
1.....	2,380	1,280	8,230	872	1,350	3,180	373	320	322
2.....	2,580	1,310	9,130	802	910	1,970	349	290	b280
3.....	3,010	1,470	11,900	1,060	1,430	4,090	335	281	254
4.....	3,210	1,320	11,400	1,620	2,390	10,500	316	196	167
5.....	2,860	1,110	8,570	1,540	2,210	9,190	302	133	108
6.....	2,420	986	6,440	1,660	1,680	7,530	284	188	144
7.....	2,100	880	4,990	2,420	2,640	17,200	274	152	112
8.....	1,820	836	4,110	2,220	1,920	11,500	261	137	97
9.....	1,700	811	3,720	2,140	1,390	8,030	245	218	144
10.....	1,700	798	3,660	1,940	1,070	5,600	236	223	142
11.....	1,540	803	3,340	1,580	938	4,000	224	192	116
12.....	1,380	752	2,800	1,540	944	3,930	216	168	98
13.....	1,280	732	2,530	1,310	868	3,070	212	122	70
14.....	1,200	1,300	sa4,700	1,200	675	2,190	203	160	88
15.....	1,030	2,540	7,060	1,280	699	2,420	195	168	88
16.....	960	1,200	3,110	1,380	694	2,590	191	159	82
17.....	908	984	2,410	1,240	602	2,020	188	157	80
18.....	855	812	1,870	1,060	557	1,590	178	168	81
19.....	802	780	b1,700	960	542	1,400	173	151	71
20.....	755	751	1,530	872	529	1,250	169	113	b50
21.....	725	694	1,360	802	524	1,130	166	106	48
22.....	695	691	1,300	740	576	1,150	166	140	63
23.....	680	676	1,240	680	486	892	167	119	54
24.....	620	641	1,070	635	466	799	165	129	57
25.....	575	638	990	590	483	769	170	195	90
26.....	560	810	a1,200	560	434	656	167	152	69
27.....	545	851	1,250	515	409	569	164	141	62
28.....	530	692	990	470	370	470	163	141	62
29.....	470	700	888	441	361	430	157	175	74
30.....	695	1,350	a2,500	414	351	392	157	215	91
31.....	1,140	2,270	6,990	386	312	325	--	--	--
Total.	41,725	--	122,978	34,929	--	110,832	6,566	--	3,264

Total discharge for year (cfs-days) 336,405
Total load for year (tons) 1,482,205

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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. 9, 1952	2:55 p.m.	155	48	102	--	--	--	--	--	--	94	96	100		--		S
Nov. 14	12:00 m.	155	42	97	--	--	--	--	--	--	77	86	97		100		S
Dec. 4	3:15 p.m.	a132	32	39	--	--	--	--	--	--	92	96	98		100		S
Feb. 3, 1953	10:35 a.m.	a138	32	18	--	--	--	--	--	--	92	96	100		--		S
Mar. 19	5:00 p.m.	2,460	42	2,460	6,680	3	6	15	30	57	91	96	99		100		SPNM
Mar. 19	5:00 p.m.	2,460	42	2,460	5,960	14	22	28	42	64	91	96	99		100		SPWCM
Apr. 3	1:05 p.m.	1,240	45	660	1,340	2	4	20	30	60	85	94	98		100		SPNM
Apr. 3	1:05 p.m.	1,240	45	660	1,330	22	27	35	46	66	85	94	98		100		SPWCM
May 7	9:25 a.m.	1,800	56	922	4,390	20	26	33	42	72	88	94	99		100		SPWCM
June 1	12:10 p.m.	702	70	344	--	--	--	--	--	--	88	94	98		100		S
June 10	7:00 p.m.	9,100	67	4,320	8,450	2	5	29	57	71	91	95	99		100		SPNM
June 10	7:00 p.m.	9,100	67	4,320	8,730	46	50	55	59	73	91	95	99		100		SPWCM
July 1	4:00 p.m.	2,380	78	1,100	3,360	33	37	46	57	74	86	92	99		100		SPWCM
Aug. 5	11:15 a.m.	1,460	75	1,780	6,040	26	38	50	66	83	92	95	97		100		SPWCM
Sept. 1	10:50 a.m.	373	78	326	--	--	--	--	--	--	96	98	100		--		S

a Mean daily discharge.

PLATTE RIVER BASIN

NORTH PLATTE RIVER NEAR GOOSE EGG, WYO.

LOCATION.--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, April to September 1953 (discontinued).
Sediment records: June 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures (April to September): Maximum, 77°F June 11.
Sediment concentrations: Maximum daily, 13,700 ppm May 29; minimum daily, 1 ppm Oct. 5, 9, and possibly on other days.
Sediment loads: Maximum daily, 191,000 tons May 29; minimum daily, less than 0.50 ton on many days during October to February.
EXTREMES, 1950-53.--Water temperatures (1950-52): Minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 13,700 ppm May 29, 1953; minimum daily, 1 ppm Oct. 5, 9, 1952, and possibly on other days during 1952-53.
Sediment loads: Maximum daily, 191,000 tons May 29, 1953; minimum daily, less than 0.50 ton on many days during October 1951, January 1952, October 1952 to February 1953.
REMARKS.--Flow affected by ice Nov. 21 to Jan. 23, Feb. 10 to Mar. 12. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, April to September 1953
(Once-daily temperature measurement between 2 p. m. and 10 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	--	54	64	66	66
2							--	a42	53	68	--	62
3							--	42	57	65	68	62
4							--	45	52	64	70	65
5							--	a43	a48	a64	68	66
6							--	--	55	66	70	68
7							--	57	54	64	67	67
8							--	--	64	64	69	66
9							--	--	65	64	--	64
10							--	--	61	--	62	66
11							--	--	77	65	63	66
12							--	--	69	67	68	67
13							--	--	73	68	71	66
14							--	--	69	70	67	65
15							--	--	--	67	66	66
16							--	--	72	56	68	65
17							--	--	67	66	67	60
18							--	--	62	--	66	65
19							--	55	56	64	65	64
20							--	53	58	66	68	61
21							--	47	62	70	66	62
22							--	51	66	--	67	64
23							59	49	65	--	69	62
24							47	48	58	70	68	60
25							--	56	60	a65	69	62
26							50	54	60	63	66	58
27							51	54	64	67	68	58
28							49	55	67	66	67	55
29							a43	52	68	63	67	58
30							a44	54	63	a67	69	--
31							--	a52	--	70	66	--
Average							--	--	62	66	67	63

a Reading obtained between 7 a. m. and 11 a. m.

PLATTE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953

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	2,040	7	39	42			35		
2	2,240	8	48	40			35		
3	1,310	3	11	37			33		
4	274	2	1	39			32		
5	131	1	(t)	40			31		
6	96	--	(t)	40			31		
7	87	--	(t)	40			30		
8	82	--	(t)	40			30		
9	82	1	(t)	40			29		
10	82			39			28		
11	76			39			45		
12	74			39			42		
13	76			37			45		
14	74			36	8		45		
15	70			36			42		
16	68			35		(t)	42		(t)
17	66			39			42		
18	62			39			39		
19	64			36			37		
20	60	--		32			39		
21	60		(t)	31			39		
22	55			30			35		
23	55			29			33		
24	55			29			31		
25	52			28			30		
26	52			28			29		
27	50			25			28		
28	46			26			28		
29	46			27			29		
30	45			30			29		
31	43			--		--	30		
Total	7,673	--	105	1,048		6	1,073		6

Day	January			February			March		
1	31			29			45		
2	32			29			35		
3	33			29			30		
4	32			29			33		
5	31			29			35		
6	30			26			40		
7	30			26			43		
8	30			28			45		
9	30			27			50		
10	32			25			60		
11	35			25			65		
12	40			25			60		
13	40			25			59		
14	35			25			55		
15	30			25			50		
16	25		(t)	25		(t)	48		e 10
17	30			25			47		
18	32			25			38	130	
19	32			25			40		
20	32			25			40		
21	32			25			37		
22	30			26			35		
23	30			28			32		
24	35			30			32		
25	33			40	7		31		
26	33			45			32		
27	26			52			31		
28	23			45			32		
29	33			--		--	35		
30	30			--		--	38		
31	28			--		--	37		
Total	975		3	818		8	1,290		310

e Estimated.
t Less than 0.50 ton.

PLATTE RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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	33	--		1,040	20	56	3,110	203	1,700
2	33	--		1,070	40	116	3,120	182	1,530
3	29	--		1,090	212	624	3,110	157	1,320
4	29	--		1,070	240	693	3,300	273	s 2,560
5	28	--		963	129	335	3,800	2,900	s 32,500
6	27	--		298	--	e 100	3,660	1,520	15,000
7	27	--		301	116	94	2,940	175	1,390
8	29	--		298	140	a 110	398	63	68
9	31	--		323	450	a 390	294	40	32
10	29	--		316	160	a 140	270	16	12
11	27	--		312	110	a 90	259	16	11
12	24	--		200	100	a 55	252	18	12
13	23	--	e 2	164	--	e 30	451	371	s 518
14	23	31		158	--	e 15	538	70	102
15	22	--		152	--	e 15	561	390	591
16	23	--		155	--	e 15	962	269	s 1,200
17	26	--		158	--	e 15	2,960	248	1,980
18	26	--		152	36	15	3,340	238	s 2,370
19	26	--		170	225	117	4,440	591	s 7,440
20	24	--		144	279	118	4,290	667	s 8,670
21	23	--		1,470	920	3,650	3,060	80	661
22	23	58	4	2,490	255	1,710	2,900	58	454
23	353	150	s 183	2,530	107	731	2,700	46	335
24	570	151	232	2,540	88	604	3,090	53	442
25	1,730	368	1,720	2,550	65	448	3,240	61	534
26	1,870	122	616	2,570	57	396	3,640	82	806
27	1,880	80	406	2,740	80	592	3,640	73	717
28	1,890	58	296	3,970	5,560	s 133,000	3,630	65	637
29	1,770	40	191	4,260	13,700	s 191,000	3,800	88	903
30	1,060	30	86	3,200	742	6,410	4,340	160	1,870
31	--	--	--	3,140	280	2,370	--	--	--
Total	11,708	--	3,776	39,994	--	344,054	76,095	--	86,365

Day	July			August			September		
1	4,880	238	3,140	4,420	46	549	4,200		
2	5,240	297	4,200	4,210	249	2,830	4,200	52	584
3	5,210	212	2,980	3,540	55	526	4,070		
4	5,220	178	2,510	3,510			3,750		
5	5,220	168	2,370	3,520			3,750		
6	5,300	170	2,430	3,520			3,610	32	
7	5,450	160	2,350	3,520			2,980		283
8	5,450	142	2,090	3,520			2,290		
9	5,450	130	1,910	3,520			2,280		
10	5,460	--	e 1,800	3,550	19	182	2,280		
11	5,020	95	1,290	3,560			2,300	12	
12	4,140	55	615	3,560			2,220		71
13	4,160			3,560			2,100		
14	4,170			3,570			2,100		
15	4,180	66	777	3,580			2,110		
16	4,340			3,580	112	1,080	2,870	68	s 806
17	4,640			3,560	470	4,520	4,140	36	402
18	4,640			3,540	106	1,010	3,850	26	270
19	4,640			3,510			3,720	20	201
20	4,250			3,500			2,970	26	208
21	3,570	35	379	3,500			2,180	12	71
22	3,570			3,500	40	378	1,600	10	43
23	4,020			3,500			680	9	17
24	5,090			3,490			284	6	5
25	5,100			3,490			133		
26	5,120	76		3,490			97		
27	5,150		1,060	3,660			83	6	1
28	5,280			4,100			75		
29	5,280	140	2,000	4,220	68	749	71		
30	5,280	70	998	4,210			63		
31	4,960	46	616	4,210			--	--	--
Total	149,480	--	43,156	113,720	--	19,466	67,056		5,693

Total discharge for year (cfs days) 470,930
Total load for year (tons) 502,950

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

PLATTE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, April to July 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	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. 23, 1953..	12:10 p.m.	502	58	229	545	68	76	85	89	93	96	98	--	--	--	--	BWCM
Apr. 25.....	8:10 a.m.	1,740	--	451	951	46	57	69	78	84	89	91	94	--	97	--	BWCM
May 5.....	8:35 p.m.	764	--	160	1,200	65	75	86	91	93	96	97	99	--	100	--	BWCM
May 21.....	2:05 a.m.	1,100	--	1,200	2,920	--	13	--	95	--	99	--	--	--	--	--	SPN
May 21.....	2:05 a.m.	1,100	--	1,200	2,510	--	67	--	94	--	99	--	--	--	--	--	SPWCM
May 25.....	1:50 p.m.	2,550	51	52	616	39	44	46	57	68	81	89	94	--	96	--	BWCM
May 27.....	5:10 p.m.	3,020	53	88	943	25	32	37	45	57	77	88	95	--	98	--	BWCM
May 28.....	11:00 p.m.	10,600	--	58,600	24,000	--	60	--	96	--	99	--	--	--	--	--	SPWCM
June 18.....	7:00 p.m.	4,040	66	465	3,100	--	24	--	35	--	80	96	99	99	100	--	SPWCM
July 1.....	3:30 p.m.	5,060	64	239	1,150	--	18	--	24	--	59	83	96	98	99	100	SPWCM

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 June 1953 (discontinued).
Water temperatures: June 1949 to September 1952.
Sediment records: April 1947 to September 1952.
REMARKS.--Discharge records for gaging station near Douglas for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, October 1952 to June 1953

Date of collection	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)	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, 1952	2,840			116	78	197		547	0	380	140					612	163	41	3.5	1,790	7.5	0.000
Nov. 6	172			95	37	128		224	0	415	36					388	204	42	2.8	1,200	8.3	.034
Dec. 2	a135			135	47	164		326	0	536	43					530	263	40	3.1	1,530	7.8	.005
Jan. 8, 1953	a140			114	70	83		272	0	455	41					573	350	24	1.5	1,350	7.8	.002
Feb. 4	162			103	40	144		227	0	472	39					419	233	43	3.1	1,330	7.5	.001
Mar. 4	a135			118	36	152		266	0	475	43					442	224	43	3.2	1,410	7.6	.001
Apr. 2	194			74	37	123		174	0	396	35					336	193	44	2.9	1,130	7.9	.002
May 6	1,390			53	17	50		148	0	166	13					204	83	35	1.5	603	7.5	.001
June 3	3,400			50	14	33		143	0	122	8.5					184	67	28	1.1	505	7.5	.000

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.

LOCATION.--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 June 1953 (discontinued).
Sediment records: March 1947 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Water temperatures: Maximum, 74°F June 11, 19; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 23,400 ppm May 31; minimum daily, not determined.
Sediment loads: Maximum daily, 275,000 tons May 31; minimum daily, not determined.
EXTREMES, 1947-53.--Water temperatures (1949-53): Maximum, 78°F July 11, 1950; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 23,400 ppm May 31, 1953; minimum daily, not determined.
Sediment loads: Maximum daily, 275,000 tons May 31, 1953; minimum daily, not determined.
REMARKS.--Maximum observed sediment concentration October 1952 to June 1953, 37,700 ppm May 31. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, June 1952 to April 1953

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	Color
June 4, 1952 ...	7,400	15	0.04	49	11	31		141	103	7.5	0.3	1.4	0.07	312		0.42		168	52	29	1.0	460	7.7	
Apr. 26, 1953..	245			64	15	55	3.9							458		.62		222		34	1.6	662	7.1	
Apr. 28	2,360			89	18	48	4.4							522		.71		298		26	1.2	752	7.1	

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Temperature (°F) of water, water year October 1952 to June 1953
/Once-daily measurement between 6 and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	61	a47	--	a32	--	--	--	47	57			
2	65	40	32	--	32	32	39	43	64			
3	58	33	--	32	--	--	--	42	59			
4	55	32	a32	32	37	a32	42	43	58			
5	50	43	--	--	--	--	50	--	56			
6	50	32	a32	32	32	a32	50	--	56			
7	48	--	--	--	--	--	a47	--	59			
8	50	--	a32	32	32	32	--	58	61			
9	52	--	--	--	--	--	39	54	63			
10	49	32	a32	32	a32	a33	36	48	71			
11	50	--	--	--	--	--	--	46	74			
12	50	33	32	32	32	33	--	40	--			
13	47	--	--	--	--	a43	a51	42	71			
14	44	a39	a32	32	32	36	--	43	68			
15	a52	--	--	--	--	35	a51	49	72			
16	a55	35	32	32	a32	43	--	53	62			
17	a53	--	--	--	--	41	--	59	70			
18	a56	a39	32	a32	--	a44	--	56	--			
19	a55	--	--	--	--	a45	a56	57	74			
20	a52	34	32	32	33	--	--	55	71			
21	55	--	--	--	--	a43	a57	59	68			
22	61	a35	32	32	32	--	--	50	62			
23	48	--	--	--	--	a40	62	59	--			
24	a56	a32	32	32	32	--	59	59	--			
25	a60	--	--	32	--	a49	44	55	60			
26	a55	32	32	--	32	--	50	57	64			
27	50	--	--	32	--	45	51	56	62			
28	38	a32	--	--	--	--	53	64	66			
29	40	--	32	32	--	49	50	65	66			
30	44	a32	32	--	--	--	a50	59	62			
31	45	--	--	32	--	--	--	56	--			
Average	52	--	b32	b32	b32	--	--	52	64			

a Reading obtained between 1 and 5 p. m.
b Includes estimated temperature 32°F, on missing days.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, October 1952 to June 1953

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	140	1,080	269			180		
2	2,830	94	718	265			190		
3	2,560	75	518	261			195		
4	2,200	211	s1,320	257			205		
5	1,830	106	524	253			210		
6	1,330	64	230	249			210		
7	826	150	334	241			210		
8	657	55	98	241			205		
9	569	10	15	241			200		
10	522	16	22	233			195		
11	425			225			195		
12	454			225			195		
13	430			221			200		
14	436			221			205		
15	420			217	6	4	205		
16	405			217			205	8	4
17	390			225			200		
18	370	5	5	225			205		
19	355			245			210		
20	345			241			210		
21	340			245			210		
22	330			205			205		
23	321			180			195		
24	316			145			180		
25	316			150			170		
26	308			150			160		
27	298			155			160		
28	294	18	14	165			160		
29	285			170			165		
30	281			175			170		
31	277			--		--	175		
Total	23,580	--	5,018	6,512		120	5,980		124

Day	January			February			March		
1	180			250			205		
2	190			260			200		
3	190			265			185		
4	190			269			195		
5	190			245			200	10	6
6	185			237			210		
7	180			210			230		
8	190			200			260		
9	205			200			290	60	a46
10	215			165			315	177	151
11	220			155			325	240	a220
12	230			160			330	158	141
13	225			170			316	100	85
14	210			180			308	22	18
15	195			190	14	8	308	16	13
16	185	6	3	200			303	12	10
17	190			200			290	35	27
18	200			200			285		
19	220			200			277		
20	240			180			265		
21	240			185			257		
22	235			195			249		
23	225			205			245		
24	220			215			237	7	5
25	240			225			237		
26	220			230			237		
27	210			230			237		
28	210			220			241		
29	220			--		--	245		
30	240			--		--	265		
31	245			--		--	298		
Total	6,535		93	5,841		224	8,045	--	829

s Computed by subdividing day.

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Suspended sediment, water year October 1952 to June 1953--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.....	316			2,620	255	1,800	3,860	8,110	84,500
2.....	345			1,950	119	627	3,660	1,520	15,000
3.....	355			1,820	100	491	3,480	903	8,480
4.....	360			1,770	103	492	3,320	704	6,310
5.....	370			1,720	156	724	3,260	567	4,990
6.....	360			1,800	207	1,010	3,500	609	5,760
7.....	370			2,000	308	1,660	3,800	2,310	23,700
8.....	385			1,980	394	2,110	3,690	2,050	20,400
9.....	395			1,980	303	1,620	3,070	630	5,220
10.....	390	26	24	1,940	190	995	1,430	252	973
11.....	380			1,830	163	805	890	64	154
12.....	375			1,650	74	330	705	33	63
13.....	350			1,490	73	294	705	152	s 272
14.....	340			1,370	75	277	529	467	667
15.....	326			1,220	63	208	466	105	132
16.....	312			1,090	60	177	503	96	130
17.....	316			1,020	60	165	562	75	114
18.....	321			1,040	60	168	562	79	120
19.....	321			1,060	44	126	1,930	890	s 5,690
20.....	312			1,120	28	85	3,140	944	s 8,400
21.....	312	21	18	1,160	63	197	4,240	1,780	20,400
22.....	360	40	a 40	1,230	46	153	3,260	1,390	12,200
23.....	454	66	81	1,410	78	s 420	2,930	605	4,790
24.....	555	113	169	3,030	609	4,980	2,760	293	2,180
25.....	714	176	339	3,150	509	4,330	2,590	234	1,640
26.....	862	202	470	3,170	317	2,710	2,910	242	1,900
27.....	1,400	355	s 1,720	3,120	333	2,810	3,100	244	2,040
28.....	2,390	516	3,330	3,190	246	2,120	3,330	270	2,430
29.....	2,640	280	2,000	3,590	534	s 5,530	3,350	209	1,890
30.....	2,730	290	2,140	5,360	2,420	s 37,400	3,370	190	1,730
31.....	--	--	--	4,360	23,400	275,000	--	--	--
Total	19,416	--	10,787	65,240	--	349,814	74,902	--	242,275

Total discharge (cfs-days) 216,051
Total load (tons) 609,284

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

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER NEAR CASSA, WYO.--Continued

Particle-size analyses of suspended sediment, April 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	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. 26, 1953	3:40 p.m.	880	--	208	3,130	44	53	63	73	83	92	98	100		--		BWCM
Apr. 28	11:45 a.m.	2,320	--	499	2,230	33	43	51	60	74	88	98	100		--		BWCM
May 6	2:30 p.m.	1,790	--	220	1,010	32	40	50	62	76	85	88	94		100		BWCM
May 24	9:15 a.m.	3,080	56	562	2,500	26	34	41	52	67	84	95	100		--		BWCM
May 30	3:15 p.m.	6,630	61	3,100	4,380	33	41	49	60	70	82	88	92		100		BWCM
May 30	3:15 p.m.	6,630	61	3,100	4,390	6	10	21	42	63	79	89	96		100		BNM
June 3	12:30 p.m.	3,480	63	941	2,740	31	39	49	60	74	80	89	96		100		BWCM
June 7	8:45 a.m.	3,800	59	719	3,780	24	32	38	48	60	71	78	86		100		BWCM
June 20	7:15 a.m.	2,730	--	653	3,410	31	40	49	60	72	83	88	100		--		BWCM

Particle-size analyses of bed material, March 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	Number of sampling points	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	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 10, 1953	5	329										0	2	16	44	77	S
Apr. 2	5	350										0	1	11	40	72	S
May 21	3	1,160										--	0	12	69	89	S
June 18	4	562										0	3	25	58	77	S

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.

LOCATION.--Three hundred feet downstream from gaging station, 1 mile northwest of Guernsey, Platte County, and 1.1 miles downstream from Guernsey Dam.
DRAINAGE AREA.--16,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1953.
Water temperatures: October 1951, April to September 1952, March to September 1953.
Sediment records: April 1947 to June 1953 (discontinued).
EXTREMES, 1952-53.--Dissolved solids: Minimum, 300 ppm May 17-31.
Hardness: Minimum, 162 ppm May 17-31.
Specific conductance: Minimum daily, 429 micromhos May 21.
Sediment concentrations (October to June): Maximum daily, 5,720 ppm June 1; minimum daily, not determined.
Sediment loads (October to June): Maximum daily, 52,000 tons June 1; minimum daily, not determined.
EXTREMES, 1947-53.--Dissolved solids (1951-53): Minimum, 300 ppm May 17-31, 1953.
Hardness (1951-53): Minimum, 160 ppm May 2-10, 1952.
Specific conductance (1951-53): Minimum daily, 429 micromhos May 21, 1953.
Sediment concentrations: Maximum daily, 5,720 ppm June 1, 1953; minimum daily, no flow on many days during November and December 1951.
Sediment loads: Maximum daily, 52,000 tons June 1, 1953; minimum daily, 0 tons on many days during November and December 1951.
REMARKS.--Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses in parts per million, water year October 1952 to September 1953

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: Parts per million: Residue at 180°C	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
Oct. 1-5, 1952	1,370	15	0.02	50	17	37	3.9	152	0	128	10	0.4	0.9	0.09	352	0.48	1,300	194	69	29	1.2	524	7.9
Oct. 29 - Nov. 1	60.8	9.9	.02	69	23	64	4.8	193	0	211	18	.4	1.5	.08	504	.69	82.7	266	108	34	1.7	762	7.7
Nov. 5-10	87.0	9.6	.03	66	22	60	4.6	189	0	201	16	.4	1.5	.08	476	.65	112	256	101	33	1.6	729	7.6
Nov. 21-22	15.0	9.9	.02	69	24	64	4.6	192	0	224	18	.4	1.0	.08	524	.71	21.2	272	115	34	1.7	781	7.6
Dec. 1-4	15.0	10	.03	79	30	80	5.6	208	0	271	22	.4	1.5	.09	604	.82	24.5	319	148	35	1.9	895	7.6
Dec. 5-8	15.0	12	.01	80	29	84	5.4	218	0	281	23	.4	2.0	.10	628	.85	25.4	317	138	36	2.1	916	7.7
Jan. 1-9, 1953	160	16	.00	110	34	111	6.5	262	0	383	31	.5	4.9	.11	858	1.17	371	415	200	36	2.4	1,190	7.4
Jan. 10-16	139	18	.00	108	34	108	6.1	262	0	375	29	.4	4.1	.19	858	1.17	322	410	195	36	2.3	1,170	7.8
Jan. 26-31	161	14	.00	91	32	95	5.4	228	0	335	27	.4	2.9	.09	766	1.04	333	360	173	36	2.2	1,060	7.4
Feb. 1-6	157	15	.00	87	31	94	5.9	199	10	328	31	.5	3.5	.11	754	1.03	320	346	166	37	2.2	1,020	8.4
Mar. 1-6	152	16	.00	97	33	103	5.7	231	0	360	23	.4	3.1	.11	792	1.08	325	376	167	37	2.3	1,110	7.4
Mar. 20-26	502	22	.00	90	33	100	5.9	227	0	340	27	.4	2.4	.16	756	1.03	1,020	361	175	37	2.3	1,070	7.7
Mar. 27- Apr. 15	1,060	22	.00	83	30	96	6.6	201	0	335	26	.3	.1	.08	718	.98	2,050	329	164	38	2.3	1,010	7.7
Apr. 16-24	852	20	.01	73	26	78	5.0	178	0	273	21	.3	1.3	.14	620	.84	1,430	288	142	37	2.0	876	7.6
Apr. 25 - May 7	412	17	.01	56	17	49	3.9	142	0	184	15	.4	2.4	.14	418	.57	465	210	94	33	1.5	625	7.4

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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: Parts per million: Residue at 180°C	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
May 8-16, 1953	1,290	17	0.01	51	14	37	3.2	140	0	135	11	0.3	1.1	0.09	344	0.47	1,200	183	68	30	1.2	517	7.4
May 17-31	2,840	17	.01	45	12	32	2.9	126	0	115	8.5	.3	.2	.07	300	.41	2,300	162	59	30	1.1	456	7.7
June 1-7	3,400	21	.00	76	16	39	4.4	156	0	195	9.0	.3	2.8	.08	442	.60	4,060	254	126	25	1.1	652	7.5
June 8-14	903	22	.00	53	16	33	3.5	146	0	132	9.0	.4	1.2	.14	344	.47	839	196	76	26	1.0	518	7.8
June 15-19	2,890	21	.00	55	15	35	3.6	153	0	136	9.0	.3	1.0	.08	354	.48	2,760	200	75	27	1.1	535	7.8
June 20-30	2,690	21	.00	56	15	40	3.7	158	0	141	11	.4	1.0	.06	368	.50	2,670	202	72	30	1.2	564	7.7
July 1-31	4,460	16	.04	49	15	34	3.3	151	0	121	9.0	.4	.9	.08	328	.45	3,950	184	60	28	1.1	499	7.5
Aug. 1-31	3,590	16	.02	52	15	35	3.6	154	0	126	9.5	.3	.6	.08	342	.47	3,320	192	66	28	1.1	518	8.0
Sept. 1-26	3,030	15	.04	53	16	37	3.3	157	0	132	10	.4	.9	.08	360	.49	2,950	196	67	29	1.2	539	7.9
Sept. 27-30	404	12	.02	61	18	46	4.2	178	0	160	13	.4	1.6	.08	404	.55	441	228	82	30	1.3	624	8.1
Weighted average a	2,003	17	0.02	55	16	40	3.6	b160	--	145	11	0.4	0.9	0.08	373	0.51	2,020	203	72	30	1.2	558	--
Weighted average c	1,451	17	0.02	56	17	41	3.7	b162	--	150	11	0.4	1.0	0.08	383	0.52	1,500	210	77	29	1.2	570	--

a Represents 96 percent of runoff for water year October 1952 to September 1953.
b Includes carbonate as bicarbonate.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1952 to September 1953.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Temperature (°F) of water, March to September 1953
/Once-daily measurement between 6 a. m. and 8 a. m. /

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

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, October 1952 to June 1953

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	1,900	22		81	--		15	--	
2	1,570	22		15	--		15	--	
3	1,120	--		72	--		15	2	
4	1,130	--		74	--		15	--	
5	1,140	--	e60	98	--		15	17	
6	1,150	--		108	--		15	--	
7	1,140	--		98	--		15	--	
8	1,100	--		99	7		15	--	
9	966	--		15	--		415	--	
10	690	--		104	--		177	--	
11	422	--		52	--		181	--	
12	260	--		135	--		181	--	
13	91	--		139	--		160	--	
14	118	--		90	--		160	--	
15	100	6		72	--	e2	161	--	e3
16	91	--		15	--		160	--	
17	80	--		136	--		159	--	
18	15	--		152	--		159	--	
19	15	--		123	--		159	--	
20	119	--	e2	82	--		158	--	
21	40	--		15	5		160	--	
22	78	--		15	--		160	--	
23	77	--		183	--		160	--	
24	77	--		56	--		161	--	
25	52	--		37	--		158	--	
26	15	--		52	--		161	--	
27	51	--		15	--		160	--	
28	46	--		52	--		160	--	
29	44	--		772	--		159	--	
30	59	--		671	--		159	--	
31	59	9		--	--	--	159	--	
Total	13,815	--	642	3,628	--	60	4,107	--	93

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	159	--		151			158	--	
2	161	--		161			161	--	
3	161	--		162	3		126	--	
4	160	--		162			126	14	
5	160	--		152			181	--	
6	159	--		156			161	--	
7	157	10		159			160	--	
8	160	--		159			159	--	
9	161	--		162			161	--	
10	161	--		166			136	8	
11	161	--		158			137	--	e5
12	160	--		173			147	--	
13	55	18		165			178	--	
14	141	--		164		e4	182	--	
15	138	--	e4	158			181	--	
16	158	--		159			200	--	
17	112	--		157			217	--	
18	171	--		156			216	9	
19	134	17		157			215	--	
20	162	--		162			216	--	
21	163	--		156			216	--	
22	159	--		156			305	--	
23	159	--		158			450	10	12
24	158	--		161			630	17	29
25	163	--		159			809	13	28
26	174	--		159			886	11	26
27	162	--		157			990	15	a40
28	157	--		157			1,020	21	58
29	159	--		--		--	1,010	24	65
30	159	4		--		--	1,010	18	49
31	157	--		--		--	1,010	13	35
Total	4,761	--	124	4,462	--	112	11,754	--	452

e Estimated.

a Computed from partly estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Suspended sediment, October 1952 to June 1953--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.....	1,010	11	30	367	28	28	3,370	5,720	52,000
2.....	1,020	16	44	428	24	a28	3,400	3,140	28,800
3.....	1,040	20	56	438	22	a26	3,500	69	652
4.....	1,040	20	56	444	20	24	3,860	70	730
5.....	1,040	18	50	416	19	21	3,890	60	630
6.....	1,070	14	40	406	18	20	3,450	60	a550
7.....	1,120	17	a50	416	15	17	2,310	59	368
8.....	1,120	17	51	600	13	a22	1,330	46	165
9.....	1,120	10	30	704	12	23	725	42	82
10.....	1,100	9	.27	704	12	23	624	35	59
11.....	1,110	11	a32	1,020	11	30	636	30	52
12.....	1,100	13	39	1,400	10	38	648	29	51
13.....	1,090	10	29	1,570	9	38	1,060	20	57
14.....	1,060	9	26	1,770	9	43	1,300	14	a50
15.....	1,030	10	28	1,890	8	41	1,780	15	72
16.....	910	10	24	1,950	10	b55	2,580	19	132
17.....	846	10	23	2,410	10	b65	3,200	17	147
18.....	862	13	30	2,510	9	61	3,440	16	149
19.....	854	15	34	2,480	9	60	3,450	21	196
20.....	854	17	39	2,720	7	51	2,140	22	b130
21.....	862	27	63	2,850	9	69	1,970	22	b120
22.....	862	49	114	2,910	8	63	2,110	23	b130
23.....	838	130	b300	2,930	8	63	2,330	24	151
24.....	781	164	346	2,840	10	a75	2,350	26	165
25.....	416	120	b130	2,880	13	101	2,660	23	a160
26.....	438	110	b130	2,950	19	151	3,040	22	180
27.....	472	106	135	2,980	13	104	3,030	24	b200
28.....	482	95	124	2,910	12	94	3,040	28	b220
29.....	345	69	64	2,900	11	86	3,280	29	257
30.....	285	53	41	3,060	11	91	3,640	26	a260
31.....	--	--	--	3,230	2,200	b19,000	--	--	--
Total.	26,177	--	2,185	57,083	--	20,611	74,143	--	86,915

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs days) 199,930
Total load for period Oct. 1, 1952 to June 30, 1953 (t ns) 111,194

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

Particle size analyses of suspended sediment, August 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; V, visual accumulation tube)

Date of collection	Time	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. 19, 1952	2:15 p.m.	4,820	73	71	493	91	97	98	99	100							BWCM
June 2, 1953	7:10 a.m.	3,450	--	5,030	3,820	59	77	90	99	100							PWCM
June 2	7:10 a.m.	3,450	--	5,030	3,800	4	6	58	98	100							PN

PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.

LOCATION.--At gaging station at private bridge, 7½ miles east of Uva, Platte County, and 9½ miles downstream from Chugwater Creek.
RECORDS AVAILABLE.--Water temperatures: October 1952 to September 1953.
Sediment records: October 1952 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 82°F July 3; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 1,900 ppm July 31; minimum daily, not determined.
Sediment loads: Maximum daily, 2,950 tons July 31; minimum daily, not determined.
REMARKS.--Flow affected by ice Nov. 23 to Dec. 9, Dec. 24, 25, Jan. 15-17, Feb. 10-13.
Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 1 p. m. and 6 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	a48	33	--	45	32	--	a48	a64	79	69	73
2	a49	--	--	--	--	--	--	a43	a65	77	70	63
3	a53	a47	32	36	37	a32	a58	a49	68	82	--	65
4	a48	--	--	--	a43	a34	a52	a50	68	a79	76	65
5	a45	a51	36	33	37	--	a55	a52	59	a78	74	68
6	a37	--	--	--	--	--	a52	a52	60	a76	74	--
7	a39	44	31	34	39	36	a42	a56	a68	76	75	67
8	a48	--	--	a36	--	48	a34	a62	a64	78	75	76
9	a48	a40	33	43	a35	50	a38	a57	76	76	75	76
10	a48	--	--	--	--	56	--	a52	79	72	76	76
11	a48	a45	34	33	33	48	--	a49	78	a76	76	76
12	--	--	--	--	--	40	a36	a41	78	a76	75	76
13	54	a45	34	33	34	40	a38	a48	78	a76	73	76
14	a44	--	--	--	--	34	a36	a50	78	a76	80	76
15	a36	a47	--	33	33	46	--	a62	75	70	--	76
16	a47	--	--	--	--	42	a42	a59	75	a68	--	69
17	55	38	32	33	33	a45	a38	a63	--	70	76	69
18	a48	--	--	--	--	38	a46	--	71	a80	76	69
19	55	41	34	40	32	44	a46	a56	69	80	78	65
20	55	--	--	--	--	48	a55	a50	71	78	76	65
21	55	34	36	43	32	44	a48	a46	75	80	76	65
22	56	--	--	--	--	38	--	a47	79	80	76	70
23	a48	--	a34	40	32	48	a56	a54	--	81	76	70
24	a55	--	--	--	--	48	a52	--	76	76	75	65
25	a55	31	32	40	a32	52	a58	--	75	77	75	65
26	57	--	--	--	--	64	a60	a72	72	73	76	65
27	50	31	a32	a39	a32	58	a60	--	--	73	76	65
28	50	--	--	--	--	64	a56	--	78	80	76	62
29	50	34	a32	40	--	66	a54	--	79	a72	78	62
30	50	--	--	--	--	44	a52	a60	79	a69	78	--
31	--	--	a33	a37	--	a44	--	a64	--	75	76	--
Average	49	--	--	--	--	46	49	54	72	76	75	69

a Reading obtained between 8 and 11 a. m.

PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	54			100			133		
2	57			102			133		
3	59			104			130		
4	57			102			133		
5	57			96			132		
6	61	41	7	100	48	13	132	95	35
7	66			102			135		
8	68			104			143		
9	70			102			143		
10	72			102			132		
11	74			104			132		
12	82			104			139		
13	84			104			139		
14	90			104			146		
15	98			104			146		
16	100	51	13	102	38	11	146	85	32
17	96			106			146		
18	98			108			141		
19	100			108			128		
20	102			114			124		
21	104			120			124		
22	104			120			126		
23	104			66			122		
24	104			75			115		
25	104			86			113		
26	104	53	15	97	57	15	130	85	28
27	104			102			120		
28	102			102			124		
29	104			110			126		
30	104			120			120		
31	100			--	--	--	124		
Total	2,683	--	359	3,070	--	382	4,077	--	978

Day	January			February			March		
1	116			124			128		
2	112			122			128		
3	112			122	46	15	124		
4	116	68	21	120			108		
5	118			118			100	132	42
6	114			112			110		
7	118			112			120		
8	122			114			130		
9	122			108			140		
10	128	106	36	100			149		
11	128			102	72	21	150		
12	128			108			160		
13	128			110			163	83	35
14	126			112			160		
15	115			114			160		
16	118	105	33	108			156		
17	120			90			152		
18	135			70			124		
19	146			64			137		
20	141			46			135	99	35
21	141	77	28	78			130		
22	139			90	79	19	122		
23	132			96			118		
24	130			97			116		
25	130			100			120	67	21
26	128			105			116		
27	126			112			110		
28	110			122			104		
29	122	52	17	--	--	--	102	45	13
30	126			--	--	--	102		
31	124			--	--	--	106		
Total	3,871	--	324	2,876	--	534	3,980	--	983

PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.--Continued

Suspended sediment, water year October 1952 to September 1953--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	108			100			22		
2	118			106			22		
3	122			198	75	20	20		
4	120			98			19		
5	110	47	14	94			19		
6	108			86			22	61	4
7	108			84			29		
8	104			86			32		
9	102			84	71	16	27		
10	122			86			24		
11	124			88			22		
12	122			86			22		
13	120			94			21		
14	116	56	18	100			18		
15	108			96			19		
16	106			96	73	19	18	70	3
17	110			98			15		
18	118			96			12		
19	120			98			12		
20	120			90			14		
21	116			88			15		
22	110			86			15		
23	110			82	70	14	14		
24	118			66			16	90	4
25	118	75	22	61			16		
26	112			57			14		
27	100			45			14		
28	98			32			14		
29	100			27	42	3	14		
30	102			22			14		
31	--	--	--	23			--	--	--
Total	3,370	--	548	2,451	--	463	555	--	110

Day	July			August			September		
1	12			274	1,080	800	10		
2	11	133	5	154	520	217	9.4		
3	18			116	260	a 80	9.4		
4	45			74			10		
5	37			64			12		
6	37			61			12	82	2
7	30	143	13	36	180	23	12		
8	30			35			11		
9	30			32			12		
10	29			33			13		
11	20			49			11		
12	9.4			45			12		
13	10			40			11		
14	10			36			10		
15	9.4			33			10		
16	10	110	3	37	98	10	10	59	2
17	11			36			9.4		
18	11			33			10		
19	12			36			10		
20	10			33			12		
21	9.4			35			14		
22	12			26			18		
23	11			20			15		
24	9.4			17			15		
25	9.4	83	2	14			14	57	2
26	9.4			12	101	4	9.4		
27	9.4			11			12		
28	19	124	s 12	10			12		
29	20	286	s 16	10			13		
30	80	809	s 454	11			13		
31	575	1,900	2,950	11			--	--	--
Total	1,155.8	--	3,582	1,434	--	1,402	351.6	--	60

Total discharge for year (cfs-days) 29,874.4
Total load for year (tons) 10,225

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

PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.--Continued

Particle-size analyses of suspended sediment, March 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; V, visual accumulation tube)

Date of collection	Time	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, 1953...	10:30 a.m.	88	46	90	475	53	61	--	82	89	96	--	--		--		BWCM
July 31	8:00 p.m.	600	74	1,490	2,650	66	73	80	83	86	89	95	97		100		BWCM
July 31.....	8:00 p.m.	600	74	1,490	2,750	11	20	56	77	82	88	92	96		100		BN
Aug. 1	10:20 a.m.	251	73	1,210	1,890	59	68	75	79	81	82	--	--		--		BWCM
Aug. 1	10:20 a.m.	251	73	1,210	2,050	19	28	61	76	77	78	--	--		--		BN

LARAMIE RIVER NEAR UVA, WYO.--Continued

Particle-size analyses of bed material, March to September 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	Number of sampling points	Dis-. charge (cfs)	Water temper-ature (°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				
Mar. 10, 1953 ..	3	88				6	22	30	43	63	77	100				S
Apr. 1	2	120				1	4	7	34	72	92	100				S
May 21	3	84				2	8	16	29	60	76	100				S
June 18	2	12				2	11	20	42	74	92	100				S
July 16	2	8.7				2	10	18	45	79	96	100				S
Aug. 19	2	33				0	2	8	46	82	96	100				S
Sept. 15	2	12				0	2	9	42	76	90	100				S

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.

LOCATION.--At gaging station at highway bridge 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 1952 to September 1953.

Sediment records: April 1952 to September 1953.

EXTREMES,1952-53.--Water temperatures: Maximum, 64°F July 7, 24, 26; minimum, freezing point Nov. 22, 30, Dec. 27, Mar. 4 and probably on many other days during winter months.

Sediment concentrations: Maximum daily, 2,380 ppm May 28; minimum daily, 8 ppm Sept. 28.

Sediment loads: Maximum daily, 4,120 tons June 13; minimum daily, 1.5 tons Sept. 28.

EXTREMES,April 1952 to September 1953.--Water temperatures: Maximum, 64°F July 7, 24, 26, 1953; minimum, freezing point Nov. 22, 30, Dec. 27, 1952, Mar. 4, 1953 and probably on many other days during winter months.

Sediment concentrations: Maximum daily, 3,900 ppm June 10, 1952; minimum daily, 8 ppm Sept. 28, 1953.

Sediment loads: Maximum daily, 22,000 tons June 10, 1952; minimum daily, 1 ton Apr. 16, 1952.

REMARKS.--Flow affected by ice Nov. 24 to Mar. 15. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
/Twice-daily measurements between 7 and 11 a.m. and between 4 and 7 p.m./

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
1	42	--	42	--		33	--	--	--	--	--	--	35	a48	36	46	42	50	48	58	53	--	--	a62
2	--	53		38		--	--	--	35	--	--	--	--	a43	35	43	43	55	46	59	54	57	53	--
3	45	--		40		--	--	33	--	--	--	--	--	a49	36	35	40	55	48	63	49	59	--	55
4	--	52		41		--	--	--	--	--	32	--	36	36	36	42	43	50	48	61	50	62	45	--
5	41	43		42		a34	--	34	--	--	--	a35	37	--	35	55	43	49	50	58	50	59	--	58
6	--	44		35		--	--	--	--	--	--	35	38	a43	39	57	41	50	50	61	50	--	54	--
7	--	48		39		--	--	--	--	a36	38	--	--	a43	42	58	42	51	48	64	51	63	--	59
8	37	--		35		--	--	--	--	--	35	37	36	--	41	57	41	58	45	59	51	62	48	--
9	--	51		a36		--	--	35	--	--	37	--	--	38	42	50	43	60	51	61	51	--	--	55
10	39	--		35		33	--	--	--	--	36	--	--	35	40	47	42	60	52	57	52	--	--	47
11	--	50		38		--	--	--	34	--	38	--	--	--	36	49	45	55	51	56	58	--	--	61
12	42	--		40		--	--	36	--	--	--	a43	--	a39	37	40	47	55	50	60	50	--	47	--
13	--	50		a37		34	--	--	--	--	37	--	33	45	34	45	46	58	50	62	--	--	57	--
14	38	--		38		--	--	--	34	--	--	40	35	37	37	50	48	52	51	a59	52	--	--	59
15	--	a43		35		--	--	--	--	--	38	--	--	47	39	50	46	58	51	58	55	--	49	--
16	41	--		a34		35	--	a35	--	--	37	a46	35	49	39	43	45	57	52	55	56	--	--	56
17	--	--		34		--	--	--	35	--	33	43	--	35	42	a55	46	56	50	57	--	a58	47	--
18	--	a48		33		--	--	--	--	a35	35	a46	--	41	40	50	46	53	50	--	--	a58	--	57
19	--	46		34		--	--	a35	--	--	36	42	--	45	43	52	45	46	--	59	--	57	47	--
20	--	43		34		35	--	--	--	--	37	41	38	--	45	53	45	57	50	62	48	--	52	--
21	37	--		33		--	--	--	--	--	--	a38	40	--	47	60	45	59	51	--	--	58	--	54
22	--	45		32		--	--	--	--	a35	--	33	41	52	45	58	44	57	53	59	51	--	45	a54
23	--	47		--		--	--	--	--	--	37	--	41	44	42	53	44	58	50	--	--	a59	--	57
24	--	47		--		--	38	--	--	--	35	47	38	50	47	58	45	59	52	64	--	62	--	44
25	--	47		--		--	--	--	--	--	39	--	37	50	42	58	45	57	53	--	52	--	--	55
26	40	--		--		--	47	--	--	35	35	a47	46	--	44	55	45	57	58	64	--	--	45	--
27	40	--		--		32	--	--	--	a39	36	--	41	--	43	52	45	57	54	--	--	--	--	61
28	--	45		--		a34	--	--	--	a39	39	a49	42	46	43	56	49	60	53	60	52	--	48	--
29	--	43		--		--	--	--	--	--	40	43	39	51	41	52	45	57	53	--	--	61	--	56
30	--	43		32		--	36	--	--	--	34	37	36	49	38	55	49	55	57	57	53	--	50	--
31	--	46		--		--	--	--	--	--	--	44	--	--	43	55	--	--	53	57	--	--	--	--
Average	--	--		--		--	--	--	--	--	--	--	--	--	40	51	44	55	51	60	--	--	--	--

a Reading obtained between 12 m. and 3 p.m.

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	104	16	4.5	66	25	4.4	46	35	
2	98	13	3.4	70	18	3.4	47	--	
3	100	35	a9.5	59	25	4.0	48	--	
4	94	40	10	60	40	6.5	47	--	
5	94	18	4.6	65	32	5.6	44	22	
6	96	14	3.6	60	22	3.6	44	--	
7	92	20	5.0	62	33	5.5	44	--	
8	88	17	4.0	65	24	4.2	44	--	
9	81	13	2.8	58	29	4.5	44	--	
10	75	18	3.6	56	47	7.1	41	30	
11	81	19	4.2	63	45	7.6	43	--	
12	79	22	4.7	63	120	sa24	43	--	
13	77	17	3.5	62	48	8.0	43	44	
14	77	45	9.4	58	55	8.6	43	--	
15	64	31	5.4	58	30	4.7	43	--	
16	74	37	7.4	51	38	5.2	41	38	e3.8
17	75	34	6.9	60	41	6.6	41	--	
18	70	22	4.2	54	28	4.1	41	--	
19	70	21	4.0	53	19	2.7	40	--	
20	75	28	5.7	62	23	3.8	38	29	
21	69	24	4.5	56	20	3.0	38	--	
22	70	21	4.0	52	15	2.1	39	--	
23	68	53	9.7	47			41	--	
24	68	47	8.6	48			40	--	
25	66	27	4.8	49			36	--	
26	64	22	3.8	49	--	e4.0	36	--	
27	65	19	3.3	46			39	14	
28	62	24	4.0	46			42	52	
29	62	34	5.7	47			42	--	
30	65	22	3.9	47	39	5.0	41	--	
31	63	58	9.9	--	--	--	42	--	
Total	2,386	--	168.6	1,692	--	162.2	1,301	--	117.8

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	43	--		39	--		40	--	e13
2	46	--		39	27		40	--	e12
3	46	14		43	--		37	--	e11
4	44	--		44	--		35	105	9.9
5	43	16		41	--		37	110	11
6	43	--		41	--		40	124	13
7	43	--		40	41		40	106	11
8	40	--		40	--		40	190	20
9	40	30		40	--		40	205	22
10	41	--		37	--		40	--	e17
11	40	--		36	18		39	82	8.6
12	38	42		38	--		39	70	7.4
13	38	--		39	--		39	97	10
14	37	--		42	81	e6.0	37	94	9.4
15	35	--		44	--		35	80	7.6
16	34	27	e2.8	44	--		38	133	14
17	36	--		43	62		38	108	11
18	40	--		42	59		36	111	11
19	39	31		42	--		38	81	8.3
20	38	--		40	--		36	55	5.3
21	39	--		38	--		31	60	a5.0
22	39	--		37	56		28	63	4.8
23	40	--		38	--		37	60	6.0
24	40	16		41	--		39	78	8.2
25	38	--		41	--		38	92	9.4
26	37	34		40	81		40	99	11
27	36	--		40	91	10	40	66	7.1
28	35	--		40	135	14	42	75	8.5
29	36	--		--	--	--	44	65	7.7
30	40	24		--	--	--	45	70	8.5
31	40	--		--	--	--	43	60	7.0
Total	1,224	--	86.8	1,129	--	180.0	1,191	--	315.7

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

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	42	53	6.0	66	90	16	725	490	959
2.....	41	42	4.6	60	134	22	832	550	1,240
3.....	35	52	4.9	62	62	10	885	470	1,120
4.....	40	45	4.9	60	47	7.6	864	320	746
5.....	38	54	5.5	58	77	12	796	180	387
6.....	42	41	4.6	62	50	8.4	730	150	296
7.....	39	42	a4.4	72	100	19	710	120	230
8.....	34	75	a7.0	84	149	34	680	158	s308
9.....	37	114	11	98	196	52	826	290	s706
10.....	34	74	6.8	92	118	29	1,020	597	s1,740
11.....	36	85	a8.5	81	140	31	1,140	695	2,140
12.....	36	88	8.6	84	98	22	1,280	620	2,140
13.....	40	67	7.2	81	108	24	1,510	1,010	4,120
14.....	36	53	5.2	79	91	19	1,530	970	4,010
15.....	36	37	3.6	77	76	16	1,330	510	1,830
16.....	37	50	5.0	90	271	66	1,260	290	986
17.....	37	65	6.5	88	230	55	1,290	270	940
18.....	37	40	4.0	96	195	50	1,270	260	892
19.....	38	50	5.1	96	175	45	1,360	390	1,430
20.....	40	38	4.1	116	419	131	1,190	170	546
21.....	44	59	7.0	118	420	134	1,050	131	371
22.....	53	71	10	165	1,410	s657	997	112	301
23.....	65	163	29	215	2,000	1,160	1,040	113	317
24.....	62	121	20	242	2,200	1,440	1,000	94	254
25.....	56	68	10	301	2,000	1,620	941	81	206
26.....	60	61	10	354	1,880	1,800	885	68	162
27.....	77	190	a40	462	1,950	2,430	864	64	149
28.....	98	379	100	640	2,380	4,110	857	62	143
29.....	90	211	51	760	1,120	2,300	832	64	144
30.....	74	178	36	640	475	821	796	47	101
31.....	--	--	--	670	502	908	--	--	--
Total.	1,434	--	430.5	6,169	--	18,049.0	30,490	--	28,914

Day	July			August			September		
1.....	784	78	165	350	48	45	128	21	7.2
2.....	748	60	121	408	60	66	124	19	6.4
3.....	705	60	114	370	37	37	120	14	4.5
4.....	670	46	83	322	31	27	118	14	4.5
5.....	630	50	85	298	34	27	112	13	3.9
6.....	610	41	68	274	29	21	106	13	3.7
7.....	560	36	54	259	29	20	102	14	3.8
8.....	515	42	58	245	46	30	104	17	4.8
9.....	495	64	86	238	26	17	104	25	7.0
10.....	525	50	71	235	26	16	104	26	7.3
11.....	670	130	235	228	28	17	102	27	7.4
12.....	550	38	56	212	29	16	100	21	5.7
13.....	480	64	83	200	30	16	92	17	4.2
14.....	444	55	66	202	27	15	86	14	3.2
15.....	417	58	65	205	24	13	88	11	2.6
16.....	408	81	89	202	27	15	90	12	2.9
17.....	458	150	sa220	195	33	17	86	11	2.6
18.....	490	91	120	192	38	20	88	9	2.1
19.....	412	61	68	185	50	25	83	11	2.5
20.....	378	70	71	172	28	13	81	11	2.4
21.....	294	51	40	165	26	a12	81	11	2.4
22.....	336	69	62	175	100	a48	79	14	3.0
23.....	308	71	59	188	56	28	74	12	2.4
24.....	284	85	65	158	18	7.7	70	10	1.9
25.....	271	90	66	143	17	6.6	70	15	2.8
26.....	277	90	sa80	139	20	7.5	69	13	2.4
27.....	315	177	150	141	23	8.8	68	13	a2.4
28.....	354	152	145	146	25	9.8	68	8	1.5
29.....	362	62	60	139	28	10	66	13	2.3
30.....	336	75	sa75	137	28	10	66	26	4.6
31.....	336	54	49	128	24	8.3	--	--	--
Total.	14,422	--	2,829	6,651	--	629.7	2,729	--	114.4

Total discharge for year (cfs days) 70,818

Total load for year (tons) 51,997.7

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Particle-size analyses of suspended sediment, water year May 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; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 22, 1953.....	7:10 a.m.	160	45	1,320	--	--	--	--	--	--	40	71	95	98	100	--	S
May 22	10:45 p.m.	212	50	3,270	1,940	4	4	8	13	24	44	73	93	98	100	--	SBWCM
May 23	8:05 p.m.	222	48	1,970	--	--	--	--	--	--	21	52	90	98	99	100	S
May 23	10:20 p.m.	232	48	2,370	--	--	--	--	--	--	23	51	87	96	98	99	S
May 24	8:45 a.m.	232	47	1,720	--	--	--	--	--	--	16	41	85	98	100	--	S
May 25	4:40 p.m.	271	58	1,100	1,110	2	3	4	7	11	22	51	88	99	100	--	SBWCM
May 27	1:00 p.m.	390	52	918	242	2	3	5	6	10	18	45	81	--	--	--	SBWCM
May 29	4:10 p.m.	690	52	724	--	--	--	--	--	--	17	40	70	90	98	100	S
May 31	7:35 a.m.	645	43	441	--	--	--	--	--	--	11	30	63	88	--	--	S
June 1	6:40 a.m.	725	42	347	--	--	--	--	--	--	19	35	66	91	--	--	S
June 1	6:00 p.m.	700	59	430	--	--	--	--	--	--	14	30	62	88	100	--	S
June 1	9:30 p.m.	760	48	619	--	--	--	--	--	--	13	30	62	88	100	--	S

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.

LOCATION.--At gaging station, 2.3 miles upstream from mouth and 4¼ miles southeast of Blackhawk, Gilpin County.
DRAINAGE AREA.--55.8 square miles.
RECORDS AVAILABLE.--Water temperatures: April 1952 to September 1953.
Sediment records: April 1952 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 71°F Aug. 7; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 6,460 ppm July 27; minimum daily, not determined.
Sediment loads: Maximum daily, 601 tons July 27; minimum daily, less than 0.050 ton on many days.
EXTREMES, April 1952 to September 1953.--Water temperatures: Maximum, 72°F Aug. 15, 1952; minimum daily, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 28,000 ppm June 11, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 10,000 tons June 7, 1952; minimum daily, less than 0.050 ton on many days.
REMARKS.--Maximum observed sediment concentration during water year, 117,000 ppm July 27. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, July to August 1953

Date of collection	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 27, 1953, 1:10 p.m.	70			62	21	11	15								466	0.63		239		8	0.3	725	3.5
July 27, 2:30 p.m.	18			45	12	6.6	5.0								274	.37		162		8	.2	403	4.1
Aug. 17	36			60	25	7.3	6.6								438	.60		253		6	.2	607	4.1

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 8 a. m. and 11 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	50	--	a32	--	a32	--	a49	42	44	62	61	--
2	44	--	--	--	a32	a32	a35	40	51	--	61	a58
3	58	33	--	--	32	--	a42	a42	52	a68	60	--
4	48	33	--	--	a32	--	--	a40	--	--	60	a64
5	43	34	a32	--	a32	a32	a47	a57	--	a60	62	--
6	41	34	--	--	--	a32	a40	51	a52	63	50	51
7	39	38	--	--	a32	a32	a45	43	47	--	a71	--
8	43	a34	--	--	--	a35	a38	53	46	a63	a67	56
9	38	--	--	a32	a32	33	32	46	--	55	a67	--
10	a56	a34	a32	--	--	34	32	46	a58	a64	a65	47
11	a46	34	--	a32	a32	37	a32	a44	51	56	65	--
12	a46	a40	--	--	--	32	33	36	a57	--	61	49
13	a47	--	--	--	--	a36	34	40	57	--	51	--
14	a40	--	--	--	a32	a40	36	45	51	a63	a60	a58
15	35	34	32	a32	--	a37	a41	52	56	62	62	--
16	40	--	--	--	--	36	a50	a43	a57	53	62	a56
17	a49	a35	--	--	--	37	a32	40	52	57	66	--
18	46	a32	32	--	a32	a43	34	44	48	--	63	a62
19	39	a32	--	--	--	--	41	51	a50	a63	58	--
20	40	32	--	a32	--	a42	--	a53	50	a60	48	52
21	38	a32	--	--	a32	a36	55	40	a56	62	--	--
22	39	a32	--	--	--	33	51	56	56	a63	59	--
23	36	a32	--	--	a32	33	40	45	a63	52	60	--
24	--	--	--	a32	--	40	a49	54	53	a67	58	39
25	39	--	32	--	--	43	44	49	48	a64	59	--
26	--	--	--	32	32	35	44	51	a63	63	62	47
27	36	a32	a32	--	--	a55	41	54	--	68	--	--
28	--	--	a32	--	--	a48	42	48	a68	62	56	a49
29	36	--	--	32	--	a43	49	50	57	63	60	--
30	--	a32	--	--	--	34	a50	48	a59	55	66	a58
31	43	--	32	--	--	a41	--	48	--	a68	a63	--
Average	43	--	--	--	--	37	41	47	54	61	61	--

a Reading obtained between 2 p. m. and 7 p. m.

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Suspended sediment, water year October 1952 to September 1953

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	16	0.1	1.8	30	a 0.1	2.1	14	
2	1.8	25	.1	1.8	22	a .1	2.2	--	
3	1.8	23	.1	1.8	18	.1	2.4	--	
4	1.8	20	.1	1.7	23	.1	2.6	--	
5	1.8	25	.1	2.0	21	.1	2.6	5	
6	2.1	32	.2	1.8	19	.1	2.5	--	
7	2.0	27	.1	2.0	70	a .4	2.5	--	
8	2.0	25	.1	2.1	17	.1	2.4	--	
9	2.0	25	.1	2.0	24	.1	2.4	--	
10	2.0	27	.1	2.0	44	.2	2.2	5	
11	2.0	35	.2	2.0	52	.3	2.3	--	
12	2.0	33	.2	2.0	23	.1	2.4	--	
13	2.1	32	.2	2.0	28	b .2	2.2	5	
14	2.0	28	.2	2.0	26	.1	2.1	--	
15	1.8	48	a .2	2.0	16	.1	2.1	3	
16	1.8	23	.1	2.0	22	.1	2.0	--	(t)
17	1.8	18	.1	2.1	33	.2	2.0	--	
18	1.8	26	.1	2.0	21	.1	2.0	8	
19	1.8	20	.1	2.1	19	.1	1.9	--	
20	1.8	20	.1	2.0	24	a .1	1.8	--	
21	2.1	20	.1	2.0	23	.1	2.0	--	
22	2.1	28	.2	1.8	11	.1	2.0	9	
23	1.8	22	.1	1.7	7	(t)	2.0	--	
24	1.8	24	.1	1.8	--		1.8	--	
25	1.8	20	.1	1.8	--		1.7	6	
26	1.8	20	a .1	1.6	--	e .1	1.8	--	
27	1.8	25	.1	1.5	13		1.9	8	
28	1.8	30	a .1	1.6	--		2.0	11	
29	1.8	32	.2	1.8	--		2.1	--	
30	1.8	32	a .2	1.9	13		2.1	--	
31	1.8	32	.2	--	--	--	2.1	13	
Total	58.4	--	4.1	56.7	--	3.7	66.2	--	1.4

Day	January			February			March		
1	2.1	--		2.2			3.4	100	b 0.9
2	2.2	--		2.3			3.2	101	.9
3	2.2	--		2.3			3.2	85	b .7
4	2.2	--		2.3			3.0	60	b .5
5	2.2	13		2.3	35	0.2	3.0	42	.3
6	2.2	--		2.3			2.9	64	.5
7	2.2	--		2.2			2.8	53	s .7
8	2.1	--		2.2			2.8	69	s .9
9	2.1	22		2.1			3.2	89	s 1.1
10	2.1	--		1.9			3.2	52	.4
11	2.1	22		1.7	11		3.3	50	.4
12	2.0	--		1.7	--		3.4	48	.4
13	2.0	--		1.8	--		3.2	35	.3
14	2.0	--		1.8	--		3.0	28	.2
15	1.9	12		1.9	11		3.0	70	.6
16	1.9	--	e 0.1	1.8	--		3.0	55	.4
17	2.1	--		1.8	--		3.0	48	a .4
18	2.4	--		1.9	13		3.2	55	a .5
19	2.2	--		1.9	--		3.0	24	.2
20	2.5	25		1.8	--	e .1	2.8	27	.2
21	2.5	--		1.7	29		2.6	38	a .3
22	2.4	--		1.8	--		2.6	36	a .2
23	2.6	--		2.0	27		3.2	39	.3
24	2.4	15		2.1	--		3.2	42	.4
25	2.4	--		2.1	--		2.8	30	.2
26	2.3	30		2.3	24		3.9	19	.2
27	2.2	--		2.8	--		3.9	24	.2
28	2.2	--		3.4	--		5.0	38	.5
29	2.2	6		--	--	--	5.3	32	.4
30	2.3	--		--	--	--	5.7	43	.7
31	2.3	--		--	--	--	5.0	45	.6
Total	68.5	--	3.1	58.4	--	3.8	104.8	--	14.5

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly estimated concentration graph.
b Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	3.9	55	0.6	11	56	1.7	79	490	104
2.....	4.3	22	.2	9.5	59	1.5	79	470	100
3.....	3.2	25	.2	9.1	42	1.0	78	370	78
4.....	3.9	20	.2	9.1	20	.5	81	320	70
5.....	3.5	22	.2	8.1	66	1.4	83	290	65
6.....	4.3	15	.2	10	41	1.1	83	185	41
7.....	3.5	15	.1	13	70	a2.4	78	160	34
8.....	2.8	16	.1	14	145	5.5	65	160	28
9.....	2.8	30	.2	16	109	4.7	63	227	39
10.....	2.7	60	.4	15	91	3.7	65	262	46
11.....	2.6	59	.4	15	70	2.8	70	197	37
12.....	2.8	78	.6	15	74	3.0	65	201	35
13.....	3.2	61	.5	14	120	a4.5	70	248	47
14.....	3.2	49	.4	15	89	3.6	68	271	50
15.....	2.8	52	.4	15	47	1.9	72	183	36
16.....	3.2	44	.4	16	139	6.0	70	172	32
17.....	3.2	50	.4	16	223	s12	68	110	20
18.....	3.2	71	.6	20	260	14	62	109	18
19.....	3.2	34	.3	19	66	3.4	66	650	116
20.....	3.5	32	.3	23	135	8.4	58	232	s38
21.....	6.2	240	s5.2	24	287	s20	46	94	12
22.....	9.1	490	s13	34	663	s68	42	50	5.7
23.....	10	920	25	45	960	117	44	35	4.2
24.....	9.1	390	9.6	52	1,050	147	38	23	2.4
25.....	8.1	270	5.9	55	1,060	157	37	33	3.3
26.....	13	360	13	66	1,030	184	33	33	2.9
27.....	14	650	24	93	1,860	s513	30	30	2.4
28.....	15	400	16	100	2,020	545	28	26	2.0
29.....	14	230	8.7	100	1,680	454	25	40	2.7
30.....	11	152	4.5	89	880	211	25	90	6.1
31.....	--	--	--	79	730	156	--	--	--
Total.	175.3	--	131.6	1,019.8	--	2,655.1	1,771	--	1,077.7

	July			August			September		
1.....	23	27	1.7	9.5	1,500	s54	2.5		
2.....	22	18	1.1	17	2,680	s227	2.5		
3.....	19	20	1.0	10	240	6.5	2.1		
4.....	16	29	1.2	7.6	89	1.8	2.5		
5.....	16	24	1.0	6.2	48	.8	2.1		
6.....	16	11	.5	5.3	43	.6	2.0		
7.....	14	17	.6	5.0	37	.5	2.0		
8.....	13	20	.7	4.6	40	.5	2.0	22	0.1
9.....	12	14	.4	4.6	48	.6	2.1		
10.....	15	35	s1.8	5.0	82	1.1	2.5		
11.....	24	150	sb11	4.6	51	.6	2.1		
12.....	15	30	1.2	4.3	35	.4	2.1		
13.....	12	28	.9	3.9	35	.4	2.0		
14.....	12	281	s10	3.9	60	a.6	2.0		
15.....	11	52	1.5	5.0	2,400	sa42	2.0		
16.....	12	58	1.9	4.6	515	s9.1	1.8		
17.....	13	44	1.5	7.7	4,420	s306	1.8		
18.....	12	25	.8	5.0	327	s5.4	1.8		
19.....	9.5	29	.7	5.0	85	1.1	1.7		
20.....	8.1	29	.6	4.6	48	.6	1.7		
21.....	7.1	20	.4	3.9	35	.4	1.8		
22.....	7.1	21	.4	4.6	62	.8	1.8		
23.....	6.7	18	.3	5.0	50	.7	1.7	15	.1
24.....	5.7	18	.3	3.9	28	.3	1.7		
25.....	5.7	19	.3	3.2	29	.2	1.8		
26.....	6.2	50	sb1.0	2.8	30	.2	1.7		
27.....	9.1	6,460	s601	3.5	800	sb20	1.6		
28.....	10	828	s40	3.5	80	.8	1.6		
29.....	10	152	4.1	2.8	38	.3	1.6		
30.....	9.5	700	sb28	2.8	33	.2	1.7		
31.....	9.1	130	3.2	2.5	31	.2	--	--	--
Total.	380.8	--	719.1	161.9	--	683.7	58.3	--	3.1

Total discharge for year (cfs-days) 3,980.1
Total load for year (tons) 5,300.9

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

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Particle-size analyses of suspended sediment, April 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; V, visual accumulation tube)

Date of collection	Time	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. 21, 1953 ...	6:20 p. m.	6.7	50	516	--	--	--	--	--	--	13	16	24	52	81	97	S
Apr. 21.....	10:55 p. m.	10	43	690	--	--	--	--	--	--	14	23	35	52	68	86	S
Apr. 22	10:00 a. m.	6.7	51	199	--	--	--	--	--	--	24	27	32	52	76	--	S
Apr. 22	5:40 p. m.	8.6	50	517	--	--	--	--	--	--	7	10	16	42	80	--	S
Apr. 22.....	9:35 p. m.	12	45	1,070	--	--	--	--	--	--	9	15	27	55	81	98	S
Apr. 23	7:30 a. m.	9.5	40	1,520	--	--	--	--	--	--	3	4	7	24	51	85	S
Apr. 23	11:55 p. m.	12	38	369	--	--	--	--	--	--	12	15	26	60	79	--	S
May 27.....	3:45 p. m.	118	48	4,590	2,690	11	15	20	24	29	41	50	66	85	95	--	SBWCM
May 27	5:50 p. m.	120	49	3,520	--	--	--	--	--	--	26	32	45	64	78	88	S
May 27.....	9:30 p. m.	110	--	3,080	1,320	--	4	--	8	--	13	18	35	47	66	80	SPWCM
May 28.....	5:45 p. m.	125	52	1,910	--	--	--	--	--	--	23	33	51	74	89	94	S
May 28	10:30 p. m.	115	44	2,760	--	--	--	--	--	--	14	21	34	53	70	84	S
May 29	11:30 a. m.	98	50	1,590	--	--	--	--	--	--	7	11	22	40	58	75	S
May 30	6:00 p. m.	95	53	1,220	--	--	--	--	--	--	9	15	27	49	74	92	S
May 31	10:00 a. m.	74	48	612	--	--	--	--	--	--	10	15	27	48	71	85	S
June 19	12:30 p. m.	72	50	1,750	--	--	--	--	--	--	73	77	82	88	94	99	S
July 27	1:10 p. m.	70	65	117,000	5,960	21	28	37	49	65	81	94	98	99	100	--	SPWCM
July 27	1:10 p. m.	70	65	117,000	6,010	2	2	6	34	64	81	93	98	99	100	--	SPNM
July 27	2:30 p. m.	18	64	39,800	4,160	30	42	58	75	88	93	97	99	100	--	--	SPWCM
July 27	2:30 p. m.	18	64	39,800	4,250	5	10	35	67	90	92	97	99	100	--	--	SPNM
July 27.....	4:05 p. m.	9.1	65	6,820	6,670	--	58	--	88	--	97	99	100	--	--	--	SPWCM
Aug. 1.....	6:00 p. m.	10	62	6,790	6,390	--	68	--	94	--	98	100	--	--	--	--	SPWCM
Aug. 17	3:45 p. m.	36	62	33,400	4,900	27	35	45	59	74	85	91	96	99	100	--	SPWCM
Aug. 17	3:45 p. m.	36	62	33,400	4,920	2	2	5	28	73	84	90	96	99	100	--	SPNM

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 1953.
Water temperatures: December 1950 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,430 ppm Nov. 1-30; minimum, 586 ppm June 21-22.
Hardness: Maximum, 747 ppm Nov. 1-30; minimum, 310 ppm June 21-22.
Specific conductance: Maximum daily, 1,850 micromhos Nov. 29, 30; minimum daily, 799 micromhos June 15.
Water temperatures: Maximum, 70°F June 14; minimum, freezing point on several days during November to February.
EXTREMES, 1950-53.--Dissolved solids: Maximum, 1,430 ppm Nov. 1-30, 1952; minimum, 256 ppm June 8-12, 1952.
Hardness: Maximum, 747 ppm Nov. 1-30, 1952; minimum, 141 ppm June 8-12, 1952.
Specific conductance: Maximum daily, 1,850 micromhos Nov. 29, 30, 1952; minimum daily, 388 micromhos June 11, 1952.
Water temperatures: Maximum, 72° Aug. 1, 2, 6, 1951; minimum, freezing point on many days during winter months.
REMARKS.--Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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
Oct. 1-31, 1952	385					140		363	650	39				1,370		1.86	1,420	708	410	30	2.3	1,730	7.8
Nov. 1-30	442					146		423	630	42				1,430		1.94	1,710	747	400	30	2.3	1,800	7.4
Dec. 1-31	529					141		461	555	48				1,310		1.78	1,870	704	326	30	2.3	1,740	7.5
Jan. 1-31, 1953	527					136		347	570	47				1,280		1.74	1,820	650	365	31	2.3	1,650	7.8
Feb. 1-26	428					140		334	610	46				1,310		1.78	1,510	664	390	31	2.4	1,680	8.0
Feb. 27-Mar. 31	404					144		316	608	47				1,310		1.78	1,430	648	389	33	2.5	1,670	7.8
Apr. 1-30	406					145		309	650	46				1,370		1.86	1,500	674	421	32	2.4	1,740	7.9
May 1-17	196					144		296	625	43				1,310		1.78	693	652	409	32	2.5	1,660	7.5
May 18-19	573					93		230	360	34				820		1.12	1,270	414	225	33	2.0	1,130	7.3
May 20-29	129					134		291	583	38				1,220		1.66	425	619	380	32	2.3	1,570	7.6

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				Hardness as $CaCO_3$		Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
														Residue at 180°C	Sum								
May 30-31, 1953	474					74		224	318	28				714		.97	914	382	198	29	1.7	1,000	7.4
June 1-13	208					111		259	500	32				1,040		1.41	584	530	338	31	2.1	1,380	7.4
June 14-16	780					65		188	288	20				640		.87	1,350	345	191	29	1.5	895	7.9
June 17-20	465					93		229	423	27				892		1.21	1,120	462	274	30	1.9	1,190	7.3
June 21-22	1,220					61		174	260	22				586		.80	1,930	310	167	30	1.5	843	7.6
June 23-24	659					81		208	368	27				790		1.07	1,410	410	239	30	1.7	1,080	7.8
June 25 - July 19	216					118		270	555	32				1,160		1.58	677	584	363	30	2.1	1,470	7.9
July 20-31	309					122		272	565	32				1,160		1.58	968	584	361	31	2.2	1,490	7.6
Aug. 1-6	503					106		246	420	40				934		1.27	1,270	467	265	33	2.1	1,260	7.6
Aug. 7-24	160					145		323	660	39				1,360		1.85	588	687	422	31	2.4	1,710	8.0
Aug. 25 - Sept. 1	252					134		297	640	33				1,290		1.75	878	662	418	30	2.3	1,620	7.7
Sept. 2-30	142					151		326	695	39				1,410		1.92	541	718	451	31	2.4	1,770	7.7
Weighted average a	365					134		338	580	42				1,260		1.71	1,240	646	369	31	2.3	1,620	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.

PLATTE RIVER--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 7 a. m. and 9 a. m. /

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

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 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 140,000 tons (estimated) July 30; minimum daily, 0 ton on many days.
EXTREMES,1950-53.--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 from October to March, record is deleted. Maximum observed sediment concentration during water year, 209,000 ppm Aug. 17. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, August 1952 to August 1953

Date of collection	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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 22, 1952	1,380			100	41	42		234	300	4.5							420	228	18	0.9	827	7.1
Aug. 17, 1953	244			189	25	66	7.2							940	1.28		574		20	1.2	1,220	7.8

PLATTE RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0		0	0		0
2				0		0	0		0
3				0		0	0		0
4				0		0	0		0
5				0		0	0		0
6				0		0	0		0
7				0		0	0		0
8				0		0	0		0
9				0		0	0		0
10				0		0	0		0
11				0		0	0		0
12				0		0	0		0
13				0		0	0		0
14				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	.1		e 30
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				.2		e 48	0		0
28				1.0		e 300	0		0
29				0		0	0		0
30				0		0	0		0
31				0		0	--		--
Total	0	--	0	1.2		348	0.1		30

	July			August			September		
1	0		0	3.3	--	e 550			
2	0		0	2.7	--	e 460			
3	0		0	0	--	0			
4	0		0	0	--	0			
5	0		0	0	--	0			
6	0		0	0	--	0			
7	0		0	0	--	0			
8	0		0	0	--	0			
9	0		0	0	--	0			
10	0		0	0	--	0			
11	0		0	0	--	0			
12	0		0	0	--	0			
13	0		0	0	--	0			
14	0		0	0	--	0			
15	0		0	0	--	0			
16	0		0	0	--	0			
17	0		0	31	29,800	s 13,200			
18	0		0	38	98,200	s 11,400			
19	0		0	21	98,700	s 7,170			
20	0		0	9.5	91,500	s 2,840			
21	0		0	8.9	85,300	s 2,660			
22	0		0	24	92,800	s 5,800			
23	0		0	6.4	13,300	s 527			
24	0		0	0	--	0			
25	0		0	.4	--	e 55			
26	0		0	0	--	0			
27	0		0	0	--	0			
28	0		0	0	--	0			
29	13	69,000	sa 3,100	0	--	0			
30	358		e 140,000	0	--	0			
31	82		e 18,000	0	--	0			
Total	453		161,100	145.2	--	44,462	0	--	0

Total discharge for year (cfs-days) 599.5
Total load for year (tons) 205,940

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

PLATT RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Particle-size analyses of suspended sediment, July 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	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 29, 1953	10:25 a.m.	11		52,400	5,200	--	95	--	100	--	--	--	--		--		PWCM
Aug. 17.....	7:00 p.m.	188		209,000	5,570	--	72	--	93	--	99	--	100		--		SPWCM
Aug. 17.....	9:15 p.m.	237		154,000	5,880	63	75	86	94	96	97	98	99		100		SPWCM
Aug. 17.....	9:15 p.m.	237		154,000	5,890	2	3	12	95	97	97	98	99		100		SPNM
Aug. 18.....	1:30 a.m.	159		112,000	5,620	--	78	--	94	--	98	98	99		100		SPWCM
Aug. 18.....	7:30 a.m.	37		82,700	6,500	--	84	--	98	--	100	--	--		--		SPWCM
Aug. 18.....	6:00 p.m.	10		112,000	4,710	--	88	--	99	--	100	--	--		--		SPWCM
Aug. 19.....	9:00 a.m.	4.1		63,600	5,670	--	92	--	97	--	99	--	100		--		SPWCM
Aug. 20.....	5:30 a.m.	24		90,200	5,890	--	86	--	100	--	--	--	--		--		PWCM
Aug. 20.....	5:30 p.m.	3.7		94,500	7,230	--	89	--	96	--	100	--	--		--		SPWCM
Aug. 21.....	5:30 p.m.	12		104,000	4,510	--	87	--	99	--	100	--	--		--		SPWCM
Aug. 23	3:20 p.m.	4.8		6,620	3,880	--	94	--	99	--	100	--	--		--		SPWCM

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 1953.
Water temperatures: October 1945 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,560 ppm Nov. 12-30; minimum, 446 ppm Aug. 19.
Hardness: Maximum, 757 ppm Dec. 1-31; minimum, 228 ppm Aug. 19.
Specific conductance: Maximum daily, 2,110 micromhos Dec. 25; minimum daily, 617 micromhos Aug. 19.
Water temperatures: Maximum, 93°F July 28, Aug. 1; minimum, freezing point on several days during November to March.
EXTREMES, 1945-53.--Dissolved solids: Maximum, 1,610 ppm Feb. 1, 1951; minimum, 446 ppm Aug. 19, 1953.
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, 617 micromhos Aug. 19, 1953.
Water temperatures: Maximum (1946-49, 1950-53), 93°F July 28, Aug. 1, 1953; 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 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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
Oct. 1-6, 1952	61.8	--	---	--	--	153	--	230	655	62	--	--	--	1,300	--	1.77	217	598	409	35	2.7	1,700	8.0
Oct. 7 - Nov. 11	123	37	0.01	195	48	166	26	369	685	70	0.5	0.7	0.23	1,430	1,410	1.94	475	683	380	34	2.8	1,910	7.5
Nov. 12-30	265	--	--	--	--	180	--	365	760	69	--	--	--	1,560	--	2.12	1,120	746	447	33	2.9	2,030	7.6
Dec. 1-31	308	--	--	--	--	179	--	398	740	71	--	--	--	--	--	--	--	757	431	33	2.8	1,990	7.4
Jan. 1-31, 1953	382	--	--	--	--	172	--	326	730	64	--	--	--	1,490	--	2.03	1,540	712	445	33	2.8	1,920	7.7
Feb. 1-28	320	34	.01	198	49	172	16	300	705	63	.8	5.2	.22	1,470	1,390	2.00	1,270	696	450	34	2.8	1,880	8.0
Mar. 1-31	327	--	--	186	54	172	--	287	715	64	--	--	--	1,460	--	1.99	1,290	686	451	35	2.9	1,870	8.1
Apr. 1-30	412	--	--	--	--	171	--	274	730	63	--	--	--	1,460	--	1.99	1,620	674	449	35	2.9	1,870	8.1
May 1-31	192	--	--	--	--	163	--	243	705	62	--	--	--	1,380	--	1.88	715	640	441	35	2.8	1,780	7.3
June 1-30	50.3	38	.01	171	45	155	17	254	645	61	.7	3.7	.18	1,310	1,260	1.78	178	613	405	35	2.7	1,700	7.8
July 1	232	--	--	--	--	97	--	162	360	36	--	--	--	768	--	1.04	481	338	205	38	2.3	1,050	7.6
July 2-31	38.9	--	--	--	--	148	--	222	620	59	--	--	--	1,240	--	1.69	130	564	382	35	2.7	1,620	7.9
Aug. 1-18	46.3	--	--	--	--	138	--	248	560	55	--	--	---	1,180	--	1.60	148	550	347	35	2.6	1,550	7.8
Aug. 19	197	--	--	--	--	44	--	176	154	18	--	--	--	446	--	.61	237	228	84	29	1.3	617	7.3
Aug. 20-31	80.2	--	--	--	--	123	--	252	493	50	--	--	--	1,070	--	1.46	232	505	298	34	2.4	1,420	7.8
Sept. 1-30	38.5	33	.01	162	36	146	18	241	620	57	.6	2.6	.24	1,200	1,190	1.63	125	554	356	35	2.7	1,580	7.8
Weighted average a	205	--	--	--	--	169	--	309	710	64	--	--	--	1,450	--	1.97	803	687	434	34	2.8	1,870	--

a Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1952 to September 1953.

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 2 p. m. and 4 p. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	a 50	a 32	a 34	45	b 32	61	58	a 80	b 79	93	84
2	66	a 51	a 33	a 35	a 40	38	--	49	81	81	a 70	76
3	66	54	a 36	a 34	a 42	a 36	54	a 45	b 78	90	90	b 67
4	a 59	a 44	a 33	a 37	a 42	43	57	54	80	85	88	71
5	a 53	a 52	a 33	a 34	44	42	59	a 53	60	a 80	b 80	78
6	56	a 47	a 37	a 35	44	a 40	b 58	b 64	64	84	b 79	b 78
7	58	a 43	a 34	35	a 41	48	48	69	a 60	82	85	a 66
8	a 52	a 44	a 36	a 36	a 40	a 51	a 51	66	80	89	b 80	78
9	61	a 44	36	39	b 32	52	a 49	b 62	85	b 78	b 86	80
10	62	a 38	35	41	a 34	--	46	a 55	b 84	84	73	80
11	62	a 39	32	a 35	a 36	a 48	a 41	60	88	77	79	b 72
12	a 57	a 40	a 36	a 36	37	53	a 42	55	b 80	a 89	80	--
13	61	a 43	a 37	a 37	a 34	a 49	54	56	b 80	87	89	70
14	a 47	a 40	a 33	34	40	a 42	b 52	64	a 78	87	83	80
15	54	46	b 36	a 32	a 41	a 45	a 44	67	82	83	74	76
16	a 50	a 42	a 35	33	a 34	a 42	a 43	61	80	b 70	72	72
17	a 53	36	b 34	a 32	43	b 53	--	a 63	85	84	76	b 71
18	61	a 39	b 34	a 34	a 38	50	a 39	69	b 80	78	83	b 70
19	a 55	42	a 35	a 34	a 32	a 48	a 42	b 70	79	a 82	72	b 70
20	a 52	a 38	a 35	a 38	b 33	--	b 54	69	a 76	--	b 71	b 65
21	a 50	39	a 35	a 37	33	a 45	b 62	73	a 75	84	80	70
22	61	a 35	a 37	a 37	a 34	--	b 66	74	83	87	b 77	b 67
23	61	a 34	a 34	a 37	a 34	a 43	65	68	83	86	a 68	73
24	a 55	33	a 33	b 44	a 33	51	59	a 72	a 81	b 81	b 79	69
25	61	a 33	a 32	43	34	b 52	55	b 74	b 75	83	86	b 67
26	60	a 32	a 34	44	a 40	59	a 50	73	80	87	86	72
27	57	a 32	a 33	a 41	a 37	b 56	65	75	a 79	89	86	a 65
28	--	a 33	a 34	39	b 32	a 57	b 54	80	a 80	93	b 89	74
29	58	a 33	a 34	a 39	--	60	48	77	b 84	85	86	b 66
30	a 52	a 32	a 35	42	--	a 55	a 47	77	a 84	85	a 79	68
31	58	--	a 33	a 39	--	b 54	--	79	--	b 81	86	--
Average	58	40	34	37	37	48	52	66	79	84	81	72

a Reading obtained between 10 a. m. and 12 m.
b Reading obtained between 6 p. m. and 7 p. m.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging stations at highway bridges, half a mile and 2½ miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte Rivers.
DRAINAGE AREA.--56,900 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: Nov. 1950 to September 1953.
Water temperatures: March 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 896 ppm Feb. 19-22; minimum, 278 ppm Nov. 26.
Hardness: Maximum, 333 ppm Feb. 19-22; minimum, 152 ppm Nov. 26.
Specific conductance: Maximum daily, 1,070 micromhos Feb. 19 (chan. 1); minimum daily, 345 micromhos Nov. 26 (chan. 1).
Water temperatures: Maximum, 85°F Aug. 13 (chan. 1); minimum, freezing point on several days during November to March.
EXTREMES, 1951-53.--Dissolved solids: Maximum, 896 ppm Feb. 19-22, 1953; minimum, 278 ppm Nov. 26, 1952.
Hardness: Maximum, 333 ppm Feb. 19-22, 1953; minimum, 151 ppm June 8, 1951.
Specific conductance: Maximum daily, 1,070 micromhos Feb. 19, 1953 (chan. 1); minimum daily, 345 micromhos Nov. 26, 1952 (chan. 1).
Water temperatures (1951-53): 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 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Carbonate (CO_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
Oct. 1-30, 1952 ..	121			53	13	56	203	0	125	16		0.6	0.11	411		0.56	134	186	20	38	1.8	603	8.2
Oct. 31 - Nov. 25.	128			52	13	49	198	0	114	15		1.3	.10	386		.52	133	182	20	35	1.6	575	8.2
Nov. 26	98.0			50	6.6	21	172	8	40	6.0		3.8	.08	278		.38	73.6	152	0	22	.7	390	8.3
Nov. 27	100			76	19	77	276	0	194	23		3.2	.14	574		.78	155	268	42	36	2.0	842	8.1
Nov. 28-30	127			70	17	60	253	0	151	20		2.1	.16	504		.69	173	245	38	33	1.7	739	7.6
Dec. 1-26	195			55	12	47	205	0	111	13		1.4	.10	402		.55	212	187	19	34	1.5	574	7.9
Dec. 27-28	386			72	18	71	242	0	183	21		2.6	.12	542		.74	565	254	56	37	1.9	792	7.8
Dec.29-Jan 15,1953	342			54	13	46	197	0	110	14		1.8	.08	404		.55	373	186	24	34	1.5	568	7.9
Jan. 16-18.....	406			76	20	75	258	0	193	23		2.4	.12	578		.79	634	272	60	36	2.0	834	8.0
Jan. 19-20.....	558			61	16	57	214	0	145	17		2.2	.10	462		.63	696	218	43	35	1.7	674	8.0
Jan. 21-28.....	335			51	11	41	185	0	97	12		1.6	.08	358		.49	324	172	20	33	1.4	527	7.7
Jan. 29 - Feb. 18	190			55	12	43	200	0	106	13		1.8	.09	380		.52	195	188	24	32	1.4	560	8.2
Feb. 19-22	201			89	27	96	258	0	286	31		2.8	.16	896		1.22	486	333	121	38	2.3	1,030	8.2
Feb. 23-26	425			72	18	69	223	0	193	22		2.2	.11	540		.73	620	254	71	36	1.9	788	8.0
Feb. 27 - Mar. 31	237			56	13	41	197	0	102	13		1.6	.10	380		.52	243	193	31	31	1.3	556	8.1
Apr. 1-28	156			53	13	42	190	0	108	13		1.0	.09	378		.51	159	186	30	32	1.3	551	7.8
Apr. 29 - May 29.	155			53	13	43	190	0	110	13		.8	.10	380		.52	159	184	28	32	1.4	555	8.0

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids				Hardness as $CaCO_3$		Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million		Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
														Residue at 180°C	Sum								
May 30-June 12, 1953	154			56	13	50	193	0	129	15		1.1	.11	432		.59	180	194	36	34	1.6	605	7.7
June 13-23	93.7			54	12	50	188	0	124	15		.6	.10	404		.55	102	184	30	36	1.6	585	7.7
June 24 - July 2	195			62	16	63	213	0	163	19		1.2	.11	500		.68	263	221	46	37	1.8	712	7.8
July 3-31	1,287			59	17	70	229	0	157	20		1.3	.12	502		.68	1,740	215	27	40	2.1	727	7.8
Aug. 1-11	1,143			57	15	74	238	0	150	19		1.0	.18	460		.63	1,420	202	7	42	2.3	710	7.7
Aug. 12-24	262			56	15	68	232	0	145	17		.6	.19	443		.60	313	200	10	40	2.1	673	7.7
Aug. 25-28	595			57	14	66	222	0	145	17		1.0	.15	449		.61	721	199	17	40	2.0	667	7.9
Aug. 29 - Sept. 12	443			56	14	68	228	0	145	18		1.0	.16	459		.62	549	198	11	41	2.1	679	8.1
Sept. 13-30	141			56	13	63	216	0	140	16		.5	.21	432		.59	164	192	15	40	2.0	646	8.0
Weighted average a	323			57	15	60	b 217	--	139	17		1.3	0.12	452		0.61	394	204	178	38	1.8	660	--

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Channel 1

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 9 a. m. and 12 m. /

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

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

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Channel 4

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement between 9 a. m. and 11 a. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	49	33	a35	37	32	45	47	a76	77	75	78
2	51	47	a34	34	39	33	48	46	--	74	74	70
3	54	41	a42	33	a46	33	41	45	--	72	72	65
4	51	42	36	34	a45	--	41	50	a75	76	73	60
5	52	45	35	36	a45	--	45	50	b63	76	73	59
6	40	42	36	a35	a44	36	48	52	--	67	73	65
7	42	40	36	a34	36	42	46	--	57	--	70	65
8	52	42	39	34	38	40	45	55	b76	70	68	66
9	47	40	36	35	39	42	47	60	b76	65	71	66
10	48	36	33	36	a36	44	43	a52	68	70	74	69
11	50	40	36	37	a33	41	42	50	b82	70	69	66
12	52	42	35	39	a36	43	42	49	b80	72	69	60
13	50	43	34	41	33	46	44	46	74	73	a84	63
14	48	42	33	37	36	a42	48	48	78	72	72	62
15	44	43	--	a33	35	38	a52	54	62	72	68	64
16	46	44	35	a34	33	40	42	55	66	71	65	62
17	50	43	35	33	a44	--	38	55	68	70	69	65
18	49	41	33	34	a46	43	39	55	77	75	66	61
19	49	33	34	38	33	42	41	60	73	74	68	59
20	47	38	37	a42	--	46	43	64	69	70	65	62
21	44	42	34	37	a34	44	48	57	75	74	65	52
22	48	37	34	36	a35	41	56	58	69	70	65	56
23	48	38	34	32	a35	41	55	60	71	79	67	60
24	51	37	--	37	a33	37	54	62	68	75	70	60
25	50	34	--	37	32	37	43	63	65	77	74	57
26	49	a34	--	39	35	44	42	66	67	79	72	57
27	48	a33	a34	40	37	45	51	65	70	75	71	56
28	41	--	a34	35	37	44	54	69	70	76	70	57
29	42	a33	a35	35	--	46	55	67	74	76	--	63
30	49	--	a38	38	--	47	a52	65	76	74	--	54
31	46	--	a38	36	--	47	--	67	--	74	--	--
Average	48	40	35	36	37	41	46	56	69	73	70	62

a Reading obtained between 1 p. m. and 3 p. m.
b Reading obtained at 7 p. m.

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 1953.
Water temperatures: March 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 696 ppm Feb. 19-22; minimum, 455 ppm Oct. 1-30.
Hardness: Maximum, 310 ppm Feb. 19-22; minimum, 194 ppm Oct. 1-30, Aug. 29 to Sept. 12.
Specific conductance: Maximum daily, 1,070 micromhos Feb. 20; minimum daily, 661 micromhos Nov. 16.
Water temperatures: Maximum, 84°F June 14; minimum, freezing point Nov. 26.
EXTREMES, 1951-53.--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 identical to those of Platte River at Brady, Nebr. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1952 to September 1953 given in reports of State Engineer.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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
Oct. 1-30, 1952..	1,577			54	14	70		220	153	20		1.6	0.12	455		0.62	1,940	194	14	41	2.2	693	8.0
Oct. 31 - Nov. 25.	1,290			57	16	67		218	151	20		2.1	.13	460		.63	1,600	207	28	40	2.0	692	8.1
Nov. 26.....	1,020			64	19	79		240	186	23		2.6	.13	524		.71	1,440	236	39	41	2.2	777	8.2
Nov. 27.....	1,200			70	16	81		244	192	24		2.4	.13	536		.73	1,740	242	42	40	2.3	796	8.2
Nov. 28-30.....	1,303			69	16	76		238	181	23		2.2	.11	526		.72	1,850	236	41	39	2.2	786	8.1
Dec. 1-26.....	1,294			66	18	72		233	185	22		2.2	.12	524		.71	1,830	240	49	38	2.0	795	7.8
Dec. 27-28.....	1,180			79	22	89		251	241	28		2.2	.15	630		.86	2,010	287	81	39	2.3	941	7.8
Dec. 29-Jan.15,1953	1,262			77	21	83		244	231	26		2.4	.13	608		.83	2,070	279	79	38	2.2	897	8.0
Jan. 16-18.....	1,163			83	23	93		257	257	28		2.4	.15	660		.90	2,070	303	92	39	2.3	976	8.0
Jan. 19-20.....	1,310			84	21	87		246	250	28		2.5	.26	650		.88	2,300	296	94	38	2.2	941	8.1
Jan. 21-28.....	1,734			75	20	77		234	216	24		2.1	.12	586		.80	2,740	270	78	37	2.0	857	8.0
Jan. 29-Feb. 18..	1,549			77	22	79		229	239	25		2.2	.14	612		.83	2,560	282	94	36	2.1	895	8.1
Feb. 19-22.....	1,113			83	25	95		226	295	31		2.1	.13	696		.95	2,090	310	125	38	2.3	1,020	8.0
Feb. 23-26.....	1,185			81	23	89		229	270	29		2.1	.13	664		.90	2,120	297	109	38	2.3	968	7.8
Feb. 27 - Mar. 31	1,563			78	22	80		221	246	26		2.8	.13	630		.86	2,660	286	105	37	2.1	904	7.7
Apr. 1-28.....	1,476			76	21	81		216	247	27		2.0	.12	616		.84	2,450	277	100	37	2.1	898	8.2
Apr. 29 - May 29.	1,532			71	21	82		206	244	26		1.7	.14	596		.81	2,470	264	95	39	2.2	882	8.1
May 30 - June 12.	1,663			74	24	92		200	274	29		1.5	.14	644		.88	2,890	283	119	41	2.4	943	7.3

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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			Hardness as $CaCO_3$		Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
														Parts per million		Tons per acre-foot	Calcium, magnesium	Noncarbonate				
														Residue at 180°C	Sum							
June 13-23, 1953	1,489			64	22	87		199	238	26		1.8	0.14	578		0.79	2,320	248	85	42	2.4	860	7.5
June 24 - July 2	1,841			56	19	83		208	201	23		1.8	.14	522		.71	2,590	219	48	44	2.4	788	7.8
July 3-31	2,033			53	16	77		218	168	21		1.7	.13	488		.66	2,680	199	20	44	2.4	738	7.4
Aug. 1-11	2,022			53	17	78		231	155	20		1.8	.17	472		.64	2,580	201	12	45	2.4	736	7.6
Aug. 12-24	1,919			54	15	76		230	153	20		1.9	.16	480		.65	2,490	198	9	44	2.3	724	7.5
Aug. 25-28	1,983			54	17	75		226	155	20		1.8	.17	470		.64	2,520	203	18	43	2.3	721	7.9
Aug. 29 - Sept. 12	1,995			52	16	76		222	155	20		1.7	.15	466		.63	2,510	194	12	44	2.4	718	7.7
Sept. 13-30	1,764			51	17	75		220	154	19		1.6	.18	462		.63	2,200	196	16	44	2.3	714	7.5
Weighted average a	1,588			64	19	78		221	201	23		1.9	0.14	542		0.74	2,320	238	57	46	2.8	808	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 4 p. m. and 5 p. m. /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	a48	a33	34	a37	a33	53	53	a64	a74	78	--
2	a56	50	33	a33	41	33	a48	a45	75	78	a74	77
3	62	a43	a33	34	a39	a33	50	49	a65	a70	79	a66
4	a55	49	34	a34	43	34	a47	a45	76	81	a72	66
5	52	a44	a34	35	a38	a34	54	51	a64	a73	79	a63
6	a47	48	36	a33	42	34	a45	a49	60	77	a74	72
7	55	a41	a33	33	a38	a37	45	64	a60	a70	78	a65
8	a48	44	37	a33	41	45	a45	a55	71	72	a70	72
9	57	a40	a34	35	a37	a39	47	67	a66	75	82	a68
10	a50	43	35	a37	33	45	a44	a52	72	--	a74	74
11	58	a38	a34	38	a33	a42	45	61	a71	a71	76	a66
12	a52	45	--	a36	36	47	a42	a46	83	71	a70	71
13	56	a41	a33	38	a33	a44	52	55	a73	a71	78	a65
14	a49	46	35	a36	37	40	a45	a46	84	79	a72	72
15	52	a40	a34	33	a34	a36	46	61	a74	a73	69	a63
16	a46	45	38	a33	33	48	a39	a54	80	77	a66	69
17	54	a41	a36	34	a33	a41	40	61	a70	a72	73	a64
18	a41	42	38	a35	41	47	a36	a55	81	78	a64	68
19	55	a36	a36	36	a33	a43	47	69	a73	a72	68	a61
20	a47	41	36	a35	33	52	a38	a60	79	79	a65	66
21	51	a38	a35	35	a33	a45	56	64	a70	a72	72	a57
22	a47	36	36	a36	33	48	a49	a58	78	79	a65	63
23	54	a33	a33	35	a33	a40	58	66	a71	a71	72	a59
24	a49	34	34	--	33	45	a52	a59	80	80	a68	66
25	57	a33	a33	37	a33	a39	48	73	a67	a72	71	a58
26	a49	32	--	a36	33	51	a45	a61	75	78	a72	64
27	54	a33	a33	41	a33	a44	58	69	a69	a75	77	a57
28	a44	33	33	a35	35	50	a50	a64	77	82	a70	66
29	54	a33	a33	41	--	a45	53	75	a71	a75	--	--
30	a46	33	33	a38	--	53	a46	a63	80	80	--	63
31	54	--	a33	40	--	a45	--	73	--	a73	--	--
Average	52	40	34	36	36	43	47	59	73	75	72	66

a Reading obtained between 8 a. m. and 9 a. m.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (TOTAL LOAD SECTION)

LOCATION.--At downstream measuring sill of turbulence flume beneath bridge on State Highway 2 at northeast limits of Dunning, Blaine County, 1,150 feet downstream from gaging station, and 1 mile upstream from Dismal River.
DRAINAGE AREA.--1,760 square miles, approximately, of which about 80 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1953.
Sediment records: March 1950 to September 1952.
EXTREMES, 1952-53.--Water temperatures: Maximum, 91°F June 13; minimum, freezing point on many days during November to March.
EXTREMES, 1949-53.--Water temperatures: Maximum, 91°F June 13, 1953; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
/7-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	64	55	50	46	32	32	34	32	47	37	32	32	56	43	45	43	78	62	88	70	86	71	81	69
2	62	49	48	40	32	32	34	32	44	38	32	32	50	40	44	40	79	64	81	69	84	74	80	67
3	62	48	46	36	32	32	34	32	45	38	32	32	52	35	50	41	76	63	76	67	82	73	69	58
4	58	48	50	38	32	32	39	33	45	37	32	32	58	40	56	43	79	62	86	68	85	69	66	56
5	52	44	49	40	32	32	37	35	42	37	33	32	55	43	62	46	68	60	76	68	86	69	72	53
6	50	37	46	38	33	32	35	32	43	33	32	32	56	45	69	49	60	56	80	62	84	70	74	58
7	52	38	45	36	32	32	33	32	43	34	47	32	46	46	68	54	61	57	82	65	80	66	73	60
8	57	42	44	38	32	32	37	32	45	40	51	38	55	45	66	54	76	54	72	66	82	65	76	60
9	57	44	42	34	36	32	42	32	40	32	54	40	48	38	70	54	69	64	76	64	84	68	77	64
10	57	45	42	32	35	32	43	38	33	32	54	43	46	34	59	48	79	54	79	64	78	71	79	66
11	59	48	47	36	37	32	44	35	33	32	52	45	46	39	60	44	84	68	76	68	76	65	72	63
12	56	49	48	37	35	32	46	39	34	32	55	42	53	38	49	40	87	71	82	66	81	64	73	58
13	57	47	48	40	33	32	45	38	38	32	54	45	57	40	59	39	91	73	84	68	82	66	73	58
14	50	44	48	38	33	32	42	32	39	32	50	37	56	42	60	44	88	75	84	68	79	67	69	57
15	52	40	47	39	35	32	32	32	40	33	49	32	46	34	66	52	83	69	81	67	69	63	64	52
16	52	43	44	39	40	32	32	32	33	32	54	38	47	35	65	56	82	63	80	66	72	62	60	47
17	53	44	42	36	36	33	33	32	43	32	58	42	46	35	62	55	81	66	83	68	74	64	64	50
18	57	44	40	35	34	32	32	32	46	35	49	41	50	36	65	53	84	70	85	72	74	62	63	51
19	57	45	39	32	32	32	32	32	37	32	52	39	48	33	70	55	87	70	83	70	70	64	68	52
20	50	44	43	32	36	32	32	32	32	32	57	45	55	35	70	60	80	69	84	68	73	63	65	55
21	52	39	40	36	35	32	33	32	32	32	52	42	67	44	67	54	82	66	81	71	74	62	65	50
22	56	44	38	34	32	32	32	32	32	32	50	38	70	52	70	55	76	67	82	66	70	62	63	51
23	57	45	40	32	32	32	33	32	32	32	45	38	66	55	66	59	83	67	82	66	73	63	68	55
24	58	47	34	32	32	32	34	33	33	32	47	34	60	43	74	57	82	65	83	68	80	64	67	57
25	58	48	32	32	32	32	42	33	32	32	50	34	44	38	78	60	78	60	90	72	80	66	65	53
26	57	47	32	32	32	32	45	37	32	32	55	40	60	36	74	61	76	63	86	73	80	66	64	53
27	50	41	32	32	32	32	44	38	32	32	55	42	67	45	75	61	81	66	84	71	81	66	66	52
28	48	35	32	32	33	32	40	33	32	32	55	42	62	50	75	62	82	66	88	71	80	66	69	55
29	51	38	32	32	33	32	44	34	--	--	54	42	55	49	78	63	83	67	78	72	82	70	65	57
30	53	42	32	32	33	32	42	37	--	--	53	45	49	44	74	60	84	70	82	69	86	70	63	52
31	54	42	--	--	33	32	45	35	--	--	54	44	--	--	78	62	--	--	83	70	83	71	--	--
Average	55	44	42	36	33	32	38	34	38	34	48	38	54	41	65	52	79	65	82	68	79	66	69	56

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (TOTAL LOAD SECTION)--Continued

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 9, 1952	387	1,620	1,610
Oct. 21	399	1,240	1,320
Oct. 30	419	1,060	1,170
Nov. 6	401	2,280	2,470
Nov. 20	368	1,620	1,610
Dec. 17	357	2,160	2,080
Jan. 7, 1953	367	2,420	2,400
Jan. 19	a410	848	939
Feb. 5	482	1,700	2,210
Feb. 8	478	1,680	2,170
Feb. 18	496	1,850	2,480
Mar. 4	a430	194	225
Mar. 13	444	1,560	1,870
Mar. 16	543	2,320	3,400
Mar. 31	436	946	1,110
Apr. 4	351	1,240	1,180
Apr. 21	437	1,800	2,120
May 7	472	1,060	1,350
May 18	417	990	1,110
June 3	401	979	1,060
June 9	413	1,020	1,140
June 26	369	672	670
June 26	349	506	477
June 30	370	630	629
July 14	335	1,010	914
July 22	330	706	629
Aug. 5	354	558	533
Aug. 28	358	746	721
Sept. 10	347	576	540
Sept. 25	345	821	765

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (TOTAL LOAD SECTION)--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 9, 1952	1:30 p. m.	367	56	1,620	--	--	--		--	--	5	16	42	73	90	97	S
Oct. 21	3:40 p. m.	395	53	1,240	--	--	--		--	--	8	22	61	87	96	99	S
Oct. 30	9:00 a. m.	410	42	1,060	--	--	--		--	--	8	31	67	93	98	100	S
Nov. 6	3:20 p. m.	401	45	2,280	--	--	--		--	--	3	13	50	77	83	96	S
Nov. 20	3:05 p. m.	368	41	1,620	--	--	--		--	--	6	23	67	94	98	100	S
Dec. 17	11:30 a. m.	357	34	2,160	--	--	--		--	--	6	21	62	90	96	99	S
Jan. 7, 1953	4:30 p. m.	367	32	2,420	--	--	--		--	--	6	22	59	91	97	100	S
Feb. 8	1:15 p. m.	478	39	1,680	2,490	1	2		3	3	9	27	65	92	98	99	SPWCM
Feb. 18	3:00 p. m.	496	45	1,850	--	--	--		--	--	7	24	54	86	97	100	S
Mar. 4	10:20 a. m.	a430	32	194	--	--	--		--	--	16	37	70	90	100	--	S
Mar. 13	11:45 a. m.	444	49	1,560	3,190	3	4		8	8	14	40	75	96	99	100	SPWCM
Mar. 31	2:00 p. m.	436	50	946	--	--	--		--	--	6	46	79	96	100	--	S
Apr. 4	6:00 p. m.	351	57	1,240	--	--	--		--	--	9	33	65	90	97	99	S
Apr. 21	9:30 a. m.	437	49	1,800	--	--	--		--	--	7	26	60	90	98	100	S
May 19	8:10 a. m.	417	57	990	--	--	--		--	--	9	32	68	92	97	99	S
June 3	10:00 a. m.	401	67	979	--	--	--		--	--	10	28	64	90	97	99	S
June 9	11:45 a. m.	413	68	1,020	--	--	--		--	--	12	28	60	93	98	100	S
June 26	9:15 a. m.	369	65	672	--	--	--		--	--	15	37	73	95	99	100	S
June 26	6:50 p. m.	349	75	506	--	--	--		--	--	17	40	74	94	98	100	S
June 30	10:00 a. m.	370	75	630	--	--	--		--	--	13	30	67	94	99	100	S
July 14	5:55 p. m.	335	84	1,010	--	--	--		--	--	8	18	35	67	86	98	S
July 22	9:45 a. m.	330	69	706	--	--	--		--	--	11	30	67	92	98	100	S
Aug. 5	12:10 p. m.	354	78	558	--	--	--		--	--	6	24	56	78	88	95	S
Aug. 28	9:05 a. m.	358	66	746	--	--	--		--	--	10	28	61	91	98	99	S
Sept. 10	11:15 a. m.	347	71	576	--	--	--		--	--	14	36	67	90	96	98	S
Sept. 25	2:40 p. m.	345	65	821	--	--	--		--	--	8	28	67	93	99	100	S

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.

LOCATION.--At gaging station at 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.--Water temperatures: October 1952 to June 1953 (discontinued). Sediment records: June 1946 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Water temperatures: Maximum, 92°F June 13, 14; minimum, freezing point on many days during November to February. Sediment concentrations: Maximum daily 16,200 ppm May 10; minimum daily, not determined. Sediment loads: Maximum daily, 75,500 tons May 27; minimum daily, not determined.
EXTREMES, 1946-53.--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. 26 to Feb. 5, Feb. 12, 13, Feb. 20 to Mar. 2. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, October 1952 to June 1953
/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	68	53	32	32	--	--	65	50	79			
2	62	54	--	a32	--	--	46	a50	80			
3	65	50	32	--	--	--	50	49	81			
4	60	53	32	a32	--	--	52	57	84			
5	55	52	32	32	--	--	50	58	78			
6	54	46	32	a32	--	--	a48	--	62			
7	55	47	32	a32	--	--	48	68	64			
8	64	41	32	a32	35	--	a48	72	75			
9	58	40	32	--	--	--	a47	76	a65			
10	64	40	32	--	--	--	51	51	85			
11	60	49	32	a32	34	46	48	68	--			
12	--	48	32	a32	32	58	48	52	90			
13	67	50	32	--	34	58	--	48	92			
14	55	50	32	--	33	42	57	60	92			
15	55	50	32	--	34	49	48	60	87			
16	55	45	32	--	35	58	48	60	a70			
17	55	42	32	--	37	61	39	65	--			
18	55	42	32	32	40	55	40	--	88			
19	60	40	32	32	37	a49	39	72	--			
20	50	42	32	32	--	59	58	75	85			
21	53	40	32	a32	a32	56	68	71	86			
22	60	39	32	--	a32	58	70	71	85			
23	60	38	32	--	34	48	68	71	87			
24	62	36	32	--	33	49	56	80	86			
25	58	36	32	--	34	52	a43	84	80			
26	60	--	32	--	--	60	a42	79	80			
27	52	--	--	--	--	55	68	63	82			
28	49	32	32	--	--	58	70	a65	87			
29	55	32	32	--	--	56	60	80	87			
30	48	32	32	--	--	58	--	79	86			
31	55	--	32	--	--	a49	--	a79	--			
Average	58	44	32	--	--	--	53	66	83			

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

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, October 1952 to June 1953

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	102			168			175		
2	100			166			184		
3	100			161	360	160	185		
4	100			156			184		
5	102			158			189		
6	100			168			191		
7	107	150	45	170			193	500	250
8	113			170			195		
9	121			168			194		
10	124			166	410	190	194		
11	124			178			186		
12	124			185			188		
13	138			187			182		
14	149	450	170	192			170		
15	152			199			159		
16	154			204			154	430	190
17	156			211			156		
18	154			216	550	310	180		
19	161			209			157		
20	163	340	150	209			153		
21	161			214			171	110	47
22	163			221			146		
23	166			235	450	280	165		
24	170			230			157		
25	166			218			151	170	69
26	161			178			156	140	a 60
27	166			211	500	260	151	66	27
28	163	360	160	184			152	60	a 24
29	163			166			144	110	43
30	161			168	450	200	154	190	79
31	166			--	--	--	176	220	100
Total	4,350	--	3,500	5,666	--	7,140	5,292	--	4,944
1	178	150	72	272			282		
2	185	130	65	360	370	280	254		
3	185	120	60	299			274		
4	185	140	70	393	490	540	306	1,300	1,020
5	184	100	50	426			306		
6	182	100	49	400			290		
7	184	74	37	350	1,560	1,470	277		
8	178	100	48	300			277		
9	178	120	58	260			283	--	e 500
10	175	120	57	247			277		
11	182	140	69	260	650	450	290	1,170	920
12	201	140	76	260			296	1,270	1,010
13	208	160	90	265			326	910	800
14	208	140	79	263	560	400	326	1,400	1,230
15	212	210	120	263			364	2,480	2,440
16	208	210	120	204			337	1,260	1,150
17	146			228			286	1,040	800
18	128			235	650	390	277		
19	147	--	e 80	238			272		
20	178			200			280	760	570
21	214			139			277		
22	232			150			274		
23	234			152	170	70	260		
24	236			136			233		
25	243	--	e 200	189			240		
26	248			318			235		
27	267			263	1,300	1,020	218	670	420
28	275			316			221		
29	297	340	270	--	--	--	228		
30	283	370	280	--	--	--	230		
31	283			--	--	--	223		
Total	6,444	--	3,870	7,286	--	14,690	8,519	--	23,100

e Estimated
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Suspended sediment, October 1952 to June 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	214			230			316	910	780
2.....	223			230			299	730	590
3.....	214	440	250	235	520	330	290	630	490
4.....	206			242			263	610	430
5.....	199			240	1,060	1,060	266	710	510
6.....	199	360	190	250	1,530	1,030	260	600	420
7.....	202			247	1,300	870	277	540	400
8.....	206	560	310	242	1,260	a820	388	4,170	4,370
9.....	238			238	1,040	670	401	4,100	4,440
10.....	233			1,190	16,200	s58,400	401	3,300	3,570
11.....	235			624	6,790	s12,600	368	3,040	3,020
12.....	242			341	2,100	1,930	272	1,190	870
13.....	247			293	2,200	1,740	245	970	640
14.....	255	650	410	260	1,500	1,050	230	690	430
15.....	230			247	960	640	223	490	300
16.....	240			250	910	610	209	130	73
17.....	230			242	910	590	192	200	a100
18.....	223			230	1,020	630	173	380	180
19.....	216			218	840	490	158	340	150
20.....	211			221	790	490	149	340	140
21.....	202			221	700	420	147	270	110
22.....	209			218	550	320	143	270	100
23.....	204			216	540	310	143	260	100
24.....	214			223	510	310	147	150	60
25.....	206	540	290	216	460	270	141	180	69
26.....	197			218	500	a290	143	280	110
27.....	185			2,070	11,000	s75,500	126	250	85
28.....	185			1,870	8,350	42,200	121	230	75
29.....	211			875	5,580	13,200	113	220	67
30.....	230	370	230	510	2,880	3,970	107	180	52
31.....	--	--	--	376	1,400	1,420	--	--	--
Total	6,506	--	9,520	13,290	--	223,150	6,711	--	22,731

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs days) 64,064
Total load for period Oct 1, 1952 to June 30, 1953 (tons) 312,645

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

Periodic determinations of suspended-sediment discharge, July to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
July 1, 1953	a107	176	51
Sept. 21	86	156	36

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 9, 1952	11:45 a.m.	117	52	214	869	27	27	30	44	53	59	78	98	100			SPWCM
Oct. 23	11:00 a.m.	163	49	382	1,240	20	23	28	35	40	59	77	99	100			SPWCM
Nov. 6	5:20 p.m.	170	45	421	1,050	14	18	25	32	37	47	66	97	100			SPWCM
Nov. 7	3:45 p.m.	170	45	421	2,710	16	20	25	32	38	53	71	98	100			SPWCM
Dec. 3	12:00 m.	a 185	33	200	449	5	9	--	21	24	38	55	97	100			SPNM
Dec. 18	12:00 m.	a 180	33	488	846	4	6	--	13	17	28	49	98	100			SPNM
Dec. 18	6:00 p.m.	a 180	32	507	1,300	6	7	9	--	14	27	49	97	99	100		SPWCM
Dec. 31	12:45 p.m.	a 176	--	234	485	6	9	--	20	27	37	53	98	100			SPNM
Feb. 8, 1953	5:45 p.m.	a 300	35	1,780	5,460	8	11	16	22	32	47	71	99	100			SPWCM
Feb. 24	2:00 p.m.	a 136	--	153	--	--	--	--	--	--	80	90	99	100			S
Mar. 11	1:30 p.m.	252	48	892	2,670	7	9	--	22	--	64	85	100	--			SPWCM
Mar. 25	10:20 a.m.	206	40	951	--	--	--	--	--	--	43	72	99	100			S
Apr. 1	2:45 p.m.	211	58	700	--	--	--	--	--	--	50	71	99	100			S
Apr. 20	3:30 p.m.	209	50	600	--	--	--	--	--	--	70	83	97	100			S
May 7	3:15 p.m.	247	72	1,260	--	--	--	--	--	--	39	54	96	100			S
May 10	7:00 p.m.	1,660	51	12,200	27,600	27	36	43	52	61	83	92	99	100			SPWCM
May 20	3:40 p.m.	228	--	819	--	--	--	--	--	--	59	77	99	100			S
May 27	4:50 p.m.	3,570	63	15,800	19,400	2	5	26	58	69	80	88	98	100			SPNM
May 27	4:50 p.m.	3,570	63	15,800	20,100	28	39	49	58	68	81	88	98	100			SPWCM
June 2	4:30 p.m.	299	--	739	3,290	30	37	44	54	69	87	97	100	--			SPWCM
July 1	10:45 a.m.	a 107	83	176	--	--	--	--	--	--	86	93	99	100			S
Sept. 21	12:50 p.m.	86	64	156	--	--	--	--	--	--	84	92	99	100			S

a Mean daily discharge.

SOUTH LOUP RIVER AT ST. MICHAEL, NEBR.--Continued

Particle-size analyses of bed material, November 1952 to September 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	Number of sampling points	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	8.000	
Nov. 7, 1952 ..	3	170					1	10	70	95	99	99	100		S
Dec. 18.....	3	a180					0	4	53	86	93	97	100		S
Feb. 8, 1953..	3	a300					2	15	65	94	99	100	--		S
Apr. 7...	3	199					0	5	59	89	95	98	100		S
May 7	3	247					1	14	83	99	100	--	-		S
June 2	3	299					1	10	68	95	97	99	100		S
July 1	3	a107					1	7	62	90	95	98	99	100	S
Sept. 21	3	86					1	6	60	91	96	99	100		S

a Mean daily discharge.

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 June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Sediment concentrations: Maximum daily, 7,220 ppm May 11; minimum daily, not determined.
Sediment loads: Maximum daily, 82,000 tons May 10; minimum daily, 200 tons Jan. 15, 16.
EXTREMES, 1946-53.--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. 25 to Feb. 27, Mar. 1-8. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Suspended sediment, October 1952 to June 1953

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.....	711	300	580	1,190	1,020	3,280	349	--	e300
2.....	680	400	730	1,160	1,190	3,730	402	280	300
3.....	680	390	720	1,030	1,190	3,310	614	440	a750
4.....	711	440	840	1,100	1,010	3,000	941	470	1,190
5.....	660	320	570	1,100	1,090	3,240	1,330	--	e2,900
6.....	733	480	950	1,050	1,270	3,600	1,330	1,120	a4,000
7.....	777	1,000	2,100	1,070	1,160	3,350	1,450	--	e6,000
8.....	744	770	1,550	1,100	1,270	3,770	1,470	2,370	a9,400
9.....	799	860	1,860	1,130	1,040	3,170	1,180	2,950	9,400
10.....	744	650	1,310	982	1,180	3,130	1,140	3,080	9,480
11.....	777	570	1,200	918	850	2,110	920	--	e6,300
12.....	906	690	1,690	930	830	2,080	770	1,500	3,120
13.....	943	490	1,250	943	1,170	2,980	740	--	e3,400
14.....	1,100	520	1,540	1,050	1,190	3,370	720	--	e3,900
15.....	1,010	1,020	2,780	1,160	1,200	3,760	850	2,250	5,160
16.....	982	1,250	3,310	1,200	1,130	3,660	900	1,800	4,370
17.....	711	1,700	3,260	1,350	1,070	3,900	950	1,830	4,690
18.....	834	1,880	4,230	1,290	1,020	3,550	880	--	e4,000
19.....	956	1,260	3,250	1,380	930	3,470	808	--	e3,500
20.....	956	870	2,250	1,290	990	3,450	724	--	e2,500
21.....	982	810	2,150	1,290	1,080	3,760	686	--	e2,500
22.....	969	1,200	3,140	1,290	930	3,240	721	--	e2,500
23.....	882	1,350	3,210	1,410	1,090	4,150	730	--	e2,500
24.....	940	950	2,410	1,430	900	3,470	735	--	e3,000
25.....	982	750	1,990	1,200	730	e2,400	672	--	e2,000
26.....	1,280	890	3,080	800	--	e1,000	475	--	e600
27.....	1,450	760	2,980	500	--	e400	487	--	e600
28.....	1,400	1,070	4,040	300	--	e250	580	--	e1,500
29.....	1,410	1,100	4,190	257	--	e250	710	1,700	3,260
30.....	1,320	1,010	3,600	320	--	e250	800	2,120	4,580
31.....	1,340	810	2,930	--	--	--	850	--	e5,000
Total.	29,369	--	69,690	31,220	--	85,080	25,914	--	112,700

e Estimated.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Suspended sediment, October 1952 to June 1953--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	900	--	e 5,000	1,870	470	2,370	2,150	--	e 22,000
2	950	--	e 6,000	1,850	--	e 3,000	1,410	--	e 13,000
3	1,010	--	e 7,000	1,950	820	4,320	1,360	3,200	11,800
4	1,120	--	e 8,000	2,050	--	e 7,000	1,370	3,070	11,400
5	1,070	--	e 6,000	2,100	1,930	10,900	1,260	2,470	8,400
6	939	--	e 4,000	2,290	2,100	a 13,000	1,260	2,350	7,990
7	962	--	e 5,000	1,950	2,380	12,500	1,840	1,970	9,790
8	873	--	e 3,000	1,540	2,020	a 8,400	2,500	1,890	12,800
9	882	1,170	2,790	1,530	1,810	7,480	1,990	1,820	9,780
10	854	1,230	a 2,800	1,480	2,980	11,900	1,840	1,780	8,840
11	1,010	1,370	3,740	1,340	--	e 11,000	1,530	2,480	10,200
12	1,160	2,270	7,110	1,200	--	e 10,000	1,450	1,650	6,460
13	1,190	1,800	5,780	1,210	--	e 10,000	1,940	1,460	7,650
14	700	--	e 1,500	1,360	--	e 12,000	1,810	1,510	7,380
15	400	--	e 200	1,330	3,350	12,000	1,840	1,660	8,250
16	400	--	e 200	1,040	--	e 8,000	1,580	1,550	6,610
17	520	450	630	890	3,100	7,450	1,140	1,700	5,230
18	600	--	e 800	800	--	e 5,600	1,120	2,190	6,620
19	680	--	e 1,100	600	--	e 2,700	1,170	2,300	7,270
20	655	--	e 1,000	300	--	e 600	1,120	2,290	6,920
21	703	--	e 1,100	300	--	e 500	1,060	2,360	6,750
22	846	760	1,740	300	--	e 400	1,160	1,730	5,420
23	936	--	e 1,800	310	390	330	1,280	1,860	6,430
24	948	--	e 1,900	600	600	970	1,100	1,720	5,110
25	978	--	e 2,000	1,000	--	e 3,400	969	2,000	5,230
26	1,060	--	e 2,100	1,600	2,380	10,300	810	1,920	4,200
27	1,170	--	e 2,200	2,300	4,200	26,100	882	1,630	3,880
28	1,360	--	e 2,300	3,510	4,000	37,900	1,070	1,500	4,330
29	1,610	560	2,430	--	--	--	1,010	1,520	4,150
30	1,930	--	e 2,600	--	--	--	1,070	1,460	4,220
31	1,890	--	e 2,500	--	--	--	1,090	1,480	4,360
Total	30,306	--	94,320	38,600	--	240,120	43,181	--	242,470

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	1,050	1,500	4,250	1,990	3,120	16,800	995	840	2,260
2	1,050	2,250	6,380	2,130	2,900	16,700	969	780	2,040
3	1,220	1,900	6,260	1,840	2,540	12,600	943	600	1,530
4	1,140	990	3,050	1,660	2,560	11,500	1,010	560	1,530
5	1,030	1,170	3,250	1,460	2,170	8,550	1,060	650	1,860
6	930	1,760	4,420	1,170	2,170	6,860	1,010	660	1,800
7	1,120	2,020	6,110	1,140	1,370	4,220	1,260	860	2,930
8	1,280	1,760	6,080	1,140	1,270	3,910	1,860	2,100	10,500
9	1,200	2,020	6,540	1,140	1,620	4,990	1,310	2,000	7,070
10	1,160	1,940	6,080	3,420	6,240	s 82,000	1,190	1,050	3,370
11	943	1,940	4,940	3,450	7,220	s 72,800	1,340	1,090	3,940
12	943	1,880	4,790	1,840	2,620	s 13,900	1,060	920	2,630
13	943	1,510	3,840	1,460	1,450	5,720	969	880	2,300
14	1,010	1,670	4,550	1,430	1,400	5,410	982	650	1,720
15	1,120	1,520	a 4,600	1,300	1,530	a 5,400	969	490	1,280
16	906	1,400	3,420	1,160	1,380	4,320	906	420	1,030
17	846	1,820	4,160	1,240	1,070	3,580	894	500	1,210
18	834	2,370	5,340	1,300	1,120	3,930	810	450	980
19	984	1,350	3,260	1,290	1,110	3,870	755	420	860
20	943	1,520	3,870	1,190	1,070	3,440	744	370	740
21	982	1,530	4,060	1,050	1,100	3,120	799	380	820
22	1,010	1,380	3,760	1,020	830	2,290	822	510	1,130
23	982	1,080	2,860	956	750	1,940	822	310	690
24	1,220	1,100	3,620	982	830	2,200	834	370	830
25	1,650	1,400	6,240	810	620	1,360	846	480	1,100
26	1,400	1,820	6,880	858	730	1,690	882	370	880
27	1,120	1,330	4,020	3,000	4,890	s 52,200	788	330	700
28	870	650	1,530	2,300	5,320	a 34,000	766	340	700
29	1,290	920	3,200	1,600	3,700	16,000	680	360	660
30	1,890	1,800	9,190	1,020	2,200	6,060	630	300	510
31	--	--	--	995	1,180	3,170	--	--	--
Total	32,976	--	140,550	47,341	--	414,530	28,905	--	59,600

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs-days) 307,812
Total load for period Oct. 1, 1952 to June 30, 1953 (tons) 1,459,060

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

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, July to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
July 7, 1953	555	260	390
July 14	711	402	772
Aug. 6	502	376	510
Aug. 26	462	228	284
Sept. 9	519	246	345
Sept. 23	700	458	866

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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, 1952	4:00 p.m.	690	66	333	--	--	--	--	--	--	27	53	93	100	--		S
Oct. 6	4:15 p.m.	711	--	560	--	--	--	--	--	--	19	37	87	100	--		S
Oct. 13	3:00 p.m.	870	--	472	--	--	--	--	--	--	25	47	92	100	--		S
Nov. 3	2:30 p.m.	918	48	1,300	--	--	--	--	--	--	22	50	92	100	--		S
Nov. 10	2:00 p.m.	744	38	1,320	--	--	--	--	--	--	23	48	84	100	--		S
Dec. 2	3:15 p.m.	a402	--	293	--	--	--	--	--	--	26	46	84	100	--		S
Mar. 9, 1953	2:15 p.m.	1,880	47	1,840	--	--	--	--	--	--	28	54	96	100	--		S
Mar. 16	5:00 p.m.	1,600	54	1,480	--	--	--	--	--	--	34	64	95	100	--		S
Mar. 24	2:15 p.m.	1,120	41	1,640	--	--	--	--	--	--	21	44	89	100	--		S
Mar. 31	2:00 p.m.	1,130	44	1,520	--	--	--	--	--	--	20	40	87	100	--		S
Apr. 14	3:45 p.m.	1,020	50	1,720	--	--	--	--	--	--	17	33	76	98	100		S
Apr. 21	1:15 p.m.	1,130	58	1,720	--	--	--	--	--	--	20	40	90	100	--		S
Apr. 28	12:00 m.	846	--	578	--	--	--	--	--	--	38	68	97	100	--		S
May 7	2:00 p.m.	1,090	70	1,280	--	--	--	--	--	--	26	59	97	100	--		S
May 13	3:15 p.m.	1,240	47	1,220	2,030	22	24	27	28	30	43	68	98	100	--		SPWCM
May 18	2:00 p.m.	1,370	68	1,200	--	--	--	--	--	--	32	53	89	100	--		S
May 26	4:00 p.m.	822	--	741	--	--	--	--	--	--	19	39	85	99	100		S
June 2	4:00 p.m.	906	80	789	--	--	--	--	--	--	38	58	86	99	100		S
June 10	3:45 p.m.	1,050	--	918	1,400	43	52	57	63	69	82	92	99	100	--		SPWCM
June 16	4:00 p.m.	943	81	431	--	--	--	--	--	--	54	70	90	99	100		S
June 23	2:30 p.m.	810	85	246	--	--	--	--	--	--	59	71	94	100	--		S
June 30	2:30 p.m.	630	85	286	--	--	--	--	--	--	47	68	93	100	--		S
July 7	3:00 p.m.	555	84	260	--	--	--	--	--	--	46	64	91	100	--		S
July 14	4:00 p.m.	711	88	402	--	--	--	--	--	--	38	53	84	99	100		S
Aug. 6	1:40 p.m.	502	78	376	--	--	--	--	--	--	27	35	60	90	99	100	S
Aug. 26	8:30 a.m.	462	70	228	--	--	--	--	--	--	33	50	86	100	--		S
Sept. 9	12:40 p.m.	519	80	246	--	--	--	--	--	--	43	59	90	100	--		S
Sept. 23	12:00 m.	700	60	458	--	--	--	--	--	--	14	30	69	98	100		S

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.--Continued

Particle-size analyses of bed material, April to September 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	Number of sampling points	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	
Apr. 24, 1953	3	a1,220								0	3	46	96	100	--	--	S
May 21	3	a1,050								0	2	48	95	99	100	--	S
June 12	3	a1,060								0	4	37	87	97	99	100	S
Aug. 6	3	502								0	1	43	90	998	100	--	S
Aug. 26	3	462								0	3	43	90	98	99	100	S
Sept. 9	3	519								0	6	55	92	98	99	--	S
Sept. 23	3	700								1	6	49	93	99	100	--	S

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.

LOCATION.--At bridge on U. S. Highway 281, 60 feet upstream from gaging station, 3 miles north of St. Paul, Howard County, and 4 miles upstream from confluence with the Middle Loup River.
DRAINAGE AREA.--4,460 square miles, approximately, of which about 1,270 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.--Water temperatures: April to November 1948.
Sediment records: April 1946 to June 1953 (discontinued).
EXTREMES, October 1952 to June 1953.--Sediment concentrations: Maximum daily, 8,750 ppm May 10; minimum daily, not determined.
Sediment loads: Maximum daily, 126,000 tons May 10; minimum daily, 20 tons (estimated) Feb. 22.
EXTREMES, 1946-53.--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, Feb. 22, 1953.
REMARKS.--Flow affected by ice Nov. 25 to Mar. 4. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Suspended sediment, October 1952 to June 1953

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.....	607	170	280	859	620	1,440	811	480	a1,100
2.....	627	200	340	930	430	1,080	1,020	420	1,160
3.....	646	200	350	942	370	940	1,110	460	a1,400
4.....	656	240	430	930	380	950	1,180	550	1,750
5.....	685	280	520	942	360	a900	1,160	600	a1,900
6.....	716	310	600	980	360	950	1,220	580	1,910
7.....	727	330	650	980	390	1,030	1,250	600	a2,000
8.....	696	310	580	992	380	1,020	1,300	630	2,210
9.....	675	240	440	1,020	370	1,020	1,370	600	a2,200
10.....	646	220	380	1,000	530	1,430	1,260	590	2,010
11.....	706	240	a460	1,000	420	1,130	1,150	650	a2,000
12.....	738	280	560	992	400	1,070	1,030	760	2,110
13.....	748	320	650	1,020	400	1,100	956	700	a1,800
14.....	790	330	700	1,030	410	1,140	869	600	a1,400
15.....	824	390	870	992	380	1,020	608	570	940
16.....	813	260	570	980	380	1,010	905	610	1,490
17.....	836	260	590	992	640	1,710	1,150	--	e2,000
18.....	824	330	730	1,060	730	2,090	1,220	--	e2,000
19.....	870	360	850	1,000	840	2,270	1,140	--	e2,000
20.....	905	360	880	924	740	1,880	764	--	e1,000
21.....	930	360	900	859	560	1,300	722	--	e1,000
22.....	905	450	1,100	882	520	1,240	799	--	e1,000
23.....	859	300	700	918	600	1,490	712	--	e1,000
24.....	905	250	610	942	--	e1,600	644	--	e800
25.....	930	360	a900	800	--	e1,000	615	--	e800
26.....	930	510	1,280	635	--	e600	525	--	e600
27.....	942	440	1,120	310	--	e100	535	--	e600
28.....	918	400	990	350	140	130	603	410	670
29.....	882	460	1,100	500	--	e400	742	560	1,120
30.....	848	360	820	600	500	810	870	610	1,430
31.....	848	480	1,100	--	--	--	874	--	e1,400
Total.	24,632	--	22,050	26,379	--	33,850	29,114	--	44,800

e Estimated.
a Computed from partly estimated concentration graph.

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Suspended sediment, October 1952 to June 1953--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	868	--	e 1,400	1,240	650	a 2,200	1,370	1,900	a 7,000
2	915	--	e 1,400	1,280	680	2,350	1,300	1,800	a 6,300
3	925	--	e 1,400	1,380	700	a 2,600	1,210	1,700	5,550
4	955	540	1,390	1,380	680	2,530	1,220	1,640	5,400
5	966	670	1,750	1,390	700	a 2,600	1,320	2,060	7,340
6	970	760	1,990	1,310	680	2,410	1,380	2,370	8,830
7	880	700	a 1,700	1,300	600	a 2,100	1,380	2,530	9,430
8	750	620	1,260	1,280	570	1,970	1,430	2,300	8,880
9	755	600	a 1,200	1,300	920	3,230	1,400	1,210	4,570
10	864	620	1,450	1,350	1,280	4,670	1,430	770	2,970
11	1,040	600	a 1,700	1,200	1,000	a 3,200	1,580	960	4,100
12	1,260	620	2,110	820	680	1,510	1,700	1,030	4,730
13	1,340	--	e 2,000	780	650	a 1,400	1,980	1,190	6,360
14	1,390	--	e 2,000	1,200	760	2,460	2,430	1,900	12,500
15	860	--	e 800	1,180	1,000	a 3,200	1,910	1,560	8,040
16	430	--	e 400	960	1,180	3,060	1,790	1,140	5,510
17	327	300	260	1,050	1,200	a 3,400	1,790	830	4,010
18	369	300	a 300	1,070	1,270	3,670	1,740	950	4,460
19	630	310	530	1,030	--	e 3,000	1,510	740	3,020
20	905	380	a 950	350	--	e 400	1,340	530	1,920
21	1,080	490	1,430	250	--	e 100	1,340	730	2,640
22	1,250	550	a 1,900	140	--	e 20	1,400	730	2,760
23	1,320	570	2,030	165	80	36	1,290	620	2,160
24	1,340	500	a 1,800	350	380	360	1,260	640	2,180
25	1,380	430	1,600	850	650	a 1,500	1,140	560	1,720
26	1,380	550	a 2,000	980	880	2,330	1,020	500	1,380
27	1,360	790	2,900	1,200	1,650	5,350	1,000	450	1,220
28	1,510	800	a 3,300	1,450	2,000	7,830	1,000	430	1,160
29	1,450	820	3,210	--	--	--	980	410	1,080
30	1,300	750	a 2,600	--	--	--	930	410	1,030
31	1,250	640	2,160	--	--	--	894	470	1,130
Total	32,019	--	50,920	28,235	--	69,486	43,464	--	139,380
	April			May			June		
1	942	530	1,350	1,720	1,500	6,970	769	220	a 460
2	1,060	520	1,490	1,760	1,450	6,890	813	290	640
3	1,260	800	2,720	1,850	1,290	6,440	813	260	570
4	1,180	660	2,100	1,810	1,280	6,260	836	300	680
5	1,070	500	1,440	1,740	930	4,370	824	290	650
6	1,000	530	1,430	1,670	700	3,160	813	280	610
7	1,040	610	1,710	1,580	670	2,860	1,070	650	sa 2,000
8	1,060	630	1,800	1,430	420	1,620	1,850	5,300	sa 29,000
9	1,160	560	1,750	1,340	820	2,970	1,350	2,200	8,020
10	1,240	590	1,980	3,770	8,750	s126,000	1,200	680	2,200
11	1,220	550	1,810	1,550	1,550	6,490	1,180	420	1,340
12	1,140	460	a 1,400	1,260	1,100	3,740	1,030	300	830
13	1,100	410	1,230	955	1,000	2,580	1,360	750	s 2,950
14	1,020	460	1,270	918	700	1,740	968	560	1,460
15	1,180	820	2,610	955	520	1,340	870	300	700
16	1,090	700	2,060	980	460	1,220	824	200	440
17	1,070	680	1,960	968	510	1,330	790	220	470
18	1,020	540	1,490	968	400	1,050	748	210	420
19	980	550	a 1,500	968	360	940	769	200	420
20	918	460	1,140	968	400	1,050	748	230	460
21	894	480	1,160	942	350	890	790	370	790
22	918	360	890	930	320	800	813	260	570
23	905	290	710	905	340	830	930	270	680
24	1,020	1,980	s 5,860	918	380	940	1,360	2,300	s 10,400
25	1,170	1,020	3,220	918	410	1,020	992	1,280	s 3,630
26	980	550	1,500	894	370	890	918	350	870
27	955	350	900	836	300	680	859	280	650
28	918	250	620	1,000	560	1,510	824	210	470
29	1,810	2,630	s 15,500	955	560	1,440	758	160	330
30	1,830	2,130	10,500	848	370	850	716	150	290
31	--	--	--	790	230	490	--	--	--
Total	33,160	--	75,100	39,096	--	199,360	28,585	--	73,000

Total discharge for period Oct. 1, 1952 to June 30, 1953 (cfs-days) 284,684
Total load for period Oct. 1, 1952 to June 30, 1953 (tons) 707,946

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

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, July to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
July 4, 1953	2,100	4,400	24,900
Aug. 26	436	89	105
Sept. 9	509	187	257
Sept. 23	579	196	306

PLATTE RIVER BASIN--Continued

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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. 14, 1952	2:00 p.m.	802	--	316	--	--	--	--	--	--	33	49	84	100	--		S
Nov. 17	4:15 p.m.	1,020	--	719	--	--	--	--	--	--	22	36	81	99	100		S
Dec. 2	1:45 p.m.	a1,020	--	403	--	--	--	--	--	--	11	19	73	100	--		S
Dec. 8	3:00 p.m.	a1,300	--	655	--	--	--	--	--	--	18	34	81	100	--		S
Dec. 15	4:00 p.m.	a608	33	550	--	--	--	--	--	--	20	38	83	100	--		S
Dec. 29	2:30 p.m.	716	--	592	--	--	--	--	--	--	9	19	76	100	--		S
Jan. 12, 1953	4:45 p.m.	1,270	32	655	--	--	--	--	--	--	17	32	80	99	100		S
Jan. 19	4:30 p.m.	715	32	307	--	--	--	--	--	--	23	38	75	99	100		S
Feb. 9	4:05 p.m.	a1,300	33	1,010	--	--	--	--	--	--	11	26	74	97	100		S
Feb. 16	12:05 p.m.	a960	32	1,200	--	--	--	--	--	--	10	20	62	96	100		S
Feb. 23	11:00 a.m.	a165	--	26	--	--	--	--	--	--	75	93	100	--	--		S
Mar. 3	3:40 p.m.	a1,210	33	1,700	--	--	--	--	--	--	24	50	92	100	--		S
Mar. 10	11:45 a.m.	1,320	46	801	--	--	--	--	--	--	31	57	88	100	--		S
Mar. 16	12:30 p.m.	1,830	43	1,300	--	--	--	--	--	--	29	54	84	100	--		S
Mar. 23	2:30 p.m.	1,350	48	653	--	--	--	--	--	--	30	54	96	99	100		S
Apr. 6	4:40 p.m.	1,030	55	571	--	--	--	--	--	--	28	50	82	100	--		S
Apr. 24	9:10 a.m.	1,160	--	15,400	9,820	22	28	34	46	73	96	98	100	--	--		SPWCM
Apr. 30	2:00 p.m.	1,720	50	2,240	3,400	22	26	31	36	40	51	67	86	98	100		SPWCM
May 5	3:35 p.m.	1,760	55	828	--	--	--	--	--	--	33	60	88	99	100		S
May 11	3:00 p.m.	1,600	61	1,700	3,290	15	18	20	23	31	49	63	72	83	94	100	SPWCM
May 19	1:30 p.m.	993	68	299	--	--	--	--	--	--	60	78	97	100	--		S
May 26	1:00 p.m.	882	70	396	--	--	--	--	--	--	34	51	84	99	100		S
June 2	1:00 p.m.	802	76	313	--	--	--	--	--	--	46	62	89	100	--		S
June 9	1:55 p.m.	1,400	76	2,080	3,860	47	58	66	73	81	88	94	99	100	--		SPWCM
June 16	12:30 p.m.	813	76	192	--	--	--	--	--	--	66	89	100	--	--		S
June 23	12:00 m.	943	81	292	--	--	--	--	--	--	79	94	100	--	--		S
June 30	12:15 p.m.	727	83	138	--	--	--	--	--	--	81	97	100	--	--		S
July 4	3:45 p.m.	2,100	81	4,400	7,260	26	38	51	63	74	84	91	97	100	--		SPWCM
Aug. 26	10:10 a.m.	436	--	89	--	--	--	--	--	--	74	85	96	100	--		S
Sept. 9	11:25 a.m.	509	75	187	--	--	--	--	--	--	66	81	93	100	--		S
Sept. 23	10:35 a.m.	579	58	196	--	--	--	--	--	--	54	67	90	99	100		S

a Mean daily discharge.

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.--Continued

Particle-size analyses of bed material, February 1952 to September 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	Number of sampling points	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	
Feb. 25, 1952....	3	1,320							0	2	19	62	77	86	92	--	S
Apr. 24, 1953....	3	1,160							0	1	46	93	99	99	100	--	S
May 21	3	--							--	0	35	89	96	97	98	100	S
June 2	3	802							0	1	32	91	98	100	--	--	S
Aug. 26	3	436							0	2	27	71	85	91	96	98	S
Sept. 9	3	509							1	4	31	79	94	97	99	100	S
Sept. 23	3	579							1	2	23	65	83	90	95	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 and 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 August 1953 (discontinued).
REMARKS.--Records of discharge for October 1952 to May 1953 given in WSP 1280.

Chemical analyses, in parts per million, October 1952 to August 1953

Date of collection	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. 3, 1952	1,850			--	--	--		230	0	34	--							186	0	--	--	430	7.7
Jan. 19, 1953	3,970			--	--	--		229	0	83	--							205	17	--	--	553	7.7
Feb. 16	6,410			--	--	--		216	0	57	--							191	14	--	--	472	7.6
Feb. 27	9,070			--	--	--		229	0	53	--							201	13	--	--	491	7.5
May 20	--	31	0.01	59	12	21	86	231	4	38	6.5	0.4	2.1	0.05	314	0.43		197	1	18	0.6	470	8.3
June 12	--			44	8.0	14		171	0	28	2.5							143	3	17	.5	342	7.4
Aug. 10	--			45	8.1	14		173	0	28	4.5							146	4	18	.5	353	7.1

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.

LOCATION.--At gaging station at bridge on North 27th Street at north edge of Lincoln, Lancaster County, 1 mile downstream from Oak Creek.
RECORDS AVAILABLE.--Water temperatures: May to September 1951.
Sediment records: March to September 1951, March 1952 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 14,400 ppm July 21; minimum daily, not determined.
Sediment loads: Maximum daily, 44,900 tons July 21; minimum daily, 1 ton June 20 and possibly on several other days during September.
EXTREMES, 1951, 1952-53.--Sediment concentrations: Maximum daily, 41,100 ppm Mar. 31, 1952; minimum daily, not determined.
Sediment loads: Maximum daily, 857,000 tons June 2, 1951; minimum daily, 1 ton June 20 and possibly on several other days during September.
REMARKS.--Maximum observed sediment concentration during water year, 40,700 ppm July 21.
Records of discharge for water year October 1952 to September 1953 in WSP 1280.

Suspended sediment, water year October 1952 to September 1953

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.....	56	51	8	58			66		
2.....	61	53	9	59			71	--	e 10
3.....	50	54	7	59			75		
4.....	48	32	4	59			80		
5.....	50	32	4	59	--	e 7	92		
6.....	50	38	5	59			90	--	
7.....	54	30	4	59			86	--	
8.....	54	32	5	64			98	--	
9.....	58	24	4	58			98	--	e 20
10.....	61	47	8	68			92	--	
11.....	56	38	6	68			96	26	
12.....	62	37	6	70			92	--	
13.....	59	27	4	73	--	e 10	92	125	
14.....	54	38	6	77			64	--	
15.....	54	34	5	71			64	--	
16.....	58	39	6	78			66	--	
17.....	54	32	5	161	846	368	61	87	
18.....	69	38	a 7	122	120	40	58	--	
19.....	54	47	7	90	90	22	61	--	
20.....	54	33	5	78	70	a 15	62	--	
21.....	58	42	7	66	70	a 12	56	--	
22.....	58	44	7	62	60	a 10	56	--	e 15
23.....	56	48	7	59	--		59	--	
24.....	58	52	8	61	--		68	84	
25.....	58	58	9	59	--		78	--	
26.....	58	49	8	54	60	e 8	66	--	
27.....	61	50	8	56	--		66	--	
28.....	58	37	6	59	--		66	--	
29.....	58	52	8	58	--		77	--	
30.....	58	42	7	61	36		75	--	
31.....	58	--	e 7	--	--	--	71	88	
Total.	1,755	--	197	2,085	--	664	2,302	--	490

e Estimated.
a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	75	--		200			109	350	103
2	78	--		174	--	e 200	98	300	79
3	78	117		168			90	340	83
4	75	--		259	--		100	340	92
5	80	--		266	--	e 500	168	110	a 50
6	77	--		274	704		193	60	31
7	75	--		274	--		200	80	43
8	73	--		238	--	e 400	117	85	27
9	75	14		193	221	120	115	85	26
10	75	--		248	--	e 400	111	85	25
11	69	--		234	--	e 400	122	70	23
12	73	--		153	--	e 150	113	95	29
13	94	--		82	--		115	80	25
14	88	--		90	--		120	80	26
15	84	--	e 20	104	--		115	75	23
16	71	120		84	--	e 40	113	70	21
17	73	--		50	--		106	70	20
18	64	--		80	188		102	70	19
19	64	--		77	--		92	90	22
20	78	101		84	--		100	60	16
21	90	--		42	--	e 15	96	50	13
22	82	--		53	165	24	102	55	15
23	75	--		94	--		84	110	25
24	90	--		117	--		92	100	25
25	80	38		111	--	e 100	86	110	26
26	78	--		129	--		86	45	10
27	86	--		142	--		82	45	10
28	90	--		132	290		82	190	42
29	98	--	e 40	--	--	--	80	190	41
30	115	--	e 60	--	--	--	78	220	46
31	280	--	e 500	--	--	--	127	350	120
Total	2,683	--	1,160	4,152	--	5,029	3,394	--	1,156

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	82	80	18	274			98	30	8
2	130	190	a 65	274	--	e 400	75	35	7
3	113	80	a 24	252			75	24	5
4	100	80	22	203			71	26	5
5	96	110	29	137	230	85	94	--	e 15
6	90	60	15	132	420	150	82	--	e 12
7	96	45	12	127	430	147	64	56	10
8	96	45	12	117	400	126	339	5,670	s 6,060
9	124	143	s 64	96	270	70	200	1,600	a 850
10	180	55	27	224	876	s 632	120	--	e 60
11	127	45	15	159	500	215	73	--	e 15
12	98	45	12	106	210	60	66	25	4
13	102	55	15	96	200	a 50	62	51	9
14	86	60	14	86	230	53	59	22	4
15	77	50	10	75	360	73	58	41	6
16	80	60	13	71	240	46	61	67	11
17	80	50	11	111	210	63	48	49	6
18	75	55	11	94	220	56	45	76	9
19	78	45	9	75	220	45	44	40	5
20	78	45	9	78	210	44	41	12	1
21	78	55	12	80	150	a 32	48	16	2
22	77	50	10	77	160	a 34	53	17	2
23	75	50	10	77	240	50	50	20	3
24	137	3,080	s 1,750	75	280	57	59	19	3
25	180	2,200	1,070	86	230	53	58	19	3
26	94	300	a 75	98	350	93	66	45	8
27	84	52	12	456	5,330	s 10,600	96	31	8
28	77	110	23	401	6,300	6,820	33	45	4
29	187	510	s 298	263	1,300	923	30	150	12
30	252	550	374	190	40	a 20	31	130	11
31	--	--	--	134	30	11	--	--	--
Total	3,229	--	4,041	4,724	--	22,208	2,299	--	7,158

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

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	32			51			70	--	e 15
2.....	32	--	e 10	51			100	--	e 60
3.....	33			56			168	844	383
4.....	100	--	e 80	56		e 6	90	--	e 40
5.....	70			58			54		
		--	e 70					--	e 6
6.....	56			64			58		
7.....	51	460	63	145		e 200	60		
8.....	50	420	57	132		e 130	31	--	
9.....	50	550	74	100		e 50	30	--	
10.....	50	550	74	80		e 26	38	--	
11.....	53	480	69	50			45	--	
12.....	51	480	66	56			40	--	
13.....	53	550	79	62			35	--	
14.....	54	530	77	61			40	--	
15.....	56	520	79	61			38	--	
16.....	59	430	68	58			36	--	
17.....	59	460	73	58			37	--	
18.....	61	470	77	61			37	--	
19.....	62	450	75	58			38	--	e 3
20.....	68	460	84	56			31	--	
						e 6			
21.....	759	14,400	s 44,900	56			40	43	
22.....	159	4,600	a 2,000	53			37	--	
23.....	111	1,800	539	53			30	--	
24.....	45	--	e 20	53			33	--	
25.....	44			51			34	--	
26.....	45			51			33	--	
27.....	45			53			29	9	
28.....	48	--	e 5	48			33	--	
29.....	50			52			34	--	
30.....	50			56			31	--	
31.....	53			50			--	--	--
Total	2,509	--	48,774	1,950		568	1,410	--	585

Total discharge for year (cfs days)	32,492
Total load for year (tons)	92,030

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

PLATTE RIVER BASIN--Continued

SALT CREEK AT LINCOLN, NEBR.--Continued

Particle-size analyses of suspended sediment, May to July 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	Discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
May 27, 1953	5:10 p.m.	910		10,400	14,500	1	1	3	74	84	91	92	94	99	100	SPN
May 27	5:10 p.m.	910		10,400	14,800	51	57	64	72	84	91	92	94	99	100	SPWCM
July 21	9:00 a.m.	1,540		23,700	18,800	4	7	38	71	89	97	99	100	--	--	SPN
July 21	9:00 a.m.	1,540		23,700	19,800	37	47	60	74	89	97	99	100	--	--	SPWCM

MISCELLANEOUS ANALYSES OF STREAMS IN THE PLATTE RIVER BASIN

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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)	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
NORTH PLATTE RIVER BELOW CASPER, WYO.																								
Nov. 20, 1952	74			131	45	149	217	0	560	55		--						514	336	39	2.9	1,520	7.3	0.213
Dec. 19.....	62			138	50	144	287	0	533	51		--						549	314	36	2.7	1,510	7.8	.065
Jan. 26, 1953	55			145	44	169	232	0	605	63		--						542	352	40	3.2	1,610	7.3	.339
Mar. 18.....	68			136	57	196	207	0	690	79		--						574	404	43	3.5	1,840	7.2	.154
Apr. 14.....	55			132	47	178	240	0	585	74		--						523	326	43	3.4	1,720	7.6	.766
May 25.....	2,460			52	16	33	149	0	127	11		--						197	75	27	1.0	527	7.6	.023
July 17.....	4,700			47	15	36	148	0	113	14		--						181	60	30	1.2	495	7.4	.005
ST. VRAIN CREEK AT MOUTH NEAR PLATTEVILLE, COLO.																								
Oct. 6, 1952.	85			--	--	142	308	0	595	24		--						598	345	34	2.5	1,540	8.0	--
Dec. 28.....	74			136	80	154	444	0	578	26		--						668	304	33	2.6	1,660	7.4	--
Feb. 18, 1953	a 65			137	92	164	383	0	700	24		--						720	406	33	2.7	1,830	7.5	--
June 4.....	103			87	59	99	226	0	445	18		--						458	273	32	2.0	1,210	7.6	--
Sept. 20.....	78			119	88	147	303	0	665	26		--						657	409	33	2.5	1,660	7.6	--
BIG THOMPSON RIVER AT MOUTH NEAR LASALLE, COLO.																								
Oct. 6, 1952.	a 29			220	134	218	337	0	1,210	25		0.44						1,100	824	30	2.9	2,460	7.8	--
Dec. 28.....	a 64			--	--	--	429	0	1,080	--		.37						1,080	728	--	--	2,340	7.7	--
Feb. 18, 1953	a 44			252	167	222	416	0	1,360	28		.41						1,310	969	27	2.7	2,850	7.6	--
June 4.....	a 29			191	154	213	265	8	1,240	37		.52						1,110	880	29	2.8	2,640	8.3	--
Sept. 20.....	a 32			221	139	226	350	0	1,240	25		.35						1,120	833	30	2.9	2,520	7.8	--
CACHE LA POUDRE RIVER NEAR GREELEY, COLO.																								
Oct. 6, 1952.	32			186	82	124	335	0	730	26		--						801	526	25	1.9	1,790	7.8	--
Dec. 28.....	75			195	93	132	423	0	740	28		--						868	521	25	2.0	1,870	7.6	--
Feb. 18, 1953	71			--	--	--	355	0	830	--		--						885	594	--	--	1,960	7.6	--
June 4.....	20			148	64	98	283	0	558	23		--						633	401	25	1.7	1,480	7.5	--
Sept. 20.....	20			182	83	138	319	0	765	26		--						795	533	27	2.1	1,830	7.3	--

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 1952 to September 1953

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
BIG THOMPSON RIVER AT ESTES PARK, COLO.			
Oct. 4, 1952	34	4	0.4
Oct. 23	27	1	.1
Dec. 1	162	3	1.3
Apr. 8	22	3	.2
May 28	532	56	80
May 31	440	15	18
June 2	495	14	19
June 3	521	24	34
June 4	505	11	15
June 5	510	3	4.1
June 5	490	11	14
June 6	455	13	16
June 7	455	2	2.4
June 8	366	10	9.9
June 9	505	17	23
June 10	673	17	31
June 11	724	33	64
June 12	839	42	95
June 13	1,040	56	157
June 14	1,000	44	119
June 15	744	98	197
June 16	750	6	12
June 17	637	8	14
June 18	679	15	27
June 19	866	45	105
June 20	673	11	20
June 20	649	10	18
June 21	619	2	3.3
June 21	543	10	15
June 21	532	2	2.9
June 21	565	11	17
June 22	577	11	17
June 22	560	9	14
June 22	554	4	6.0
June 22	510	10	14
June 22	485	8	10
June 22	500	11	15
June 23	510	10	14
June 23	505	10	14
June 23	500	4	5.4
June 23	470	8	10
June 23	460	16	20
June 24	500	6	8.1
June 24	455	8	9.8
June 24	445	9	11
June 25	485	5	6.5
June 25	435	8	9.4
June 25	410	8	8.8
June 26	406	3	3.3
June 26	386	6	6.2
June 26	374	7	7.1
June 27	406	6	6.6
June 27	378	7	7.1
June 27	362	12	12
June 28	410	7	7.7
June 28	386	6	6.2
June 28	382	11	11
June 29	430	11	13
June 29	390	6	6.3
June 29	358	6	5.8
June 30	382	7	7.2
June 30	362	22	22
June 30	346	7	6.5
July 1	402	9	9.8
July 1	378	7	7.1

PLATTE RIVER BASIN--Continued

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

Periodic determinations of suspended sediment discharge, water year October 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
BIG THOMPSON RIVER AT ESTES PARK, COLO.--Continued			
July 1, 1953	382	6	6.2
July 2	406	7	7.7
July 2	390	3	3.2
July 3	370	4	4.0
July 3	350	7	6.6
July 4	342	6	5.5
July 5	302	8	6.5
July 16	302	92	75
Aug. 11	189	5	2.6
Aug. 12	175	4	1.9
Aug. 12	172	4	1.8
Aug. 12	171	4	1.8
Sept. 24	32	4	.3
Sept. 24	36	7	.7
Sept. 24	39	4	.4
Sept. 24	36	5	.5
SOUTH PLATTE RIVER NEAR WELDONA, COLO.			
Oct. 7, 1952	336	506	459
Dec. 28	135	128	47
Feb. 17, 1953	160	60	26
Feb. 19	162	66	29
Apr. 10	297	431	346
Apr. 28	135	33	12
Apr. 29	160	28	12
May 23	293	631	499
June 4	273	137	101
June 5	257	174	121
June 21	636	348	598
June 24	440	180	214
July 16	135	60	22
July 17	190	106	54
Aug. 5	583	1,200	1,890
Aug. 5	583	940	1,480
Aug. 5	589	678	1,080
Aug. 12	237	84	54
Aug. 13	245	86	57
Aug. 18	188	74	38
Aug. 20	190	128	66
Aug. 26	208	95	53
Sept. 10	194	100	52
Sept. 20	204	84	46
Sept. 21	222	83	50
Sept. 22	249	91	61
Sept. 24	218	424	250
SOUTH PLATTE RIVER AT FORT MORGAN, COLO.			
Oct. 3, 1952	110	277	82
Oct. 20	185	184	92
Oct. 23	190	171	88
Nov. 6	112	109	33
Nov. 7	112	104	31
Nov. 28	a 150	379	153
Dec. 2	a 280	908	686
Dec. 28	240	932	604

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 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
PLATTE RIVER NEAR OVERTON, NEBR.			
Oct. 9, 1952	1,020	58	160
Oct. 10	424	11	13
Nov. 6	1,600	66	285
Nov. 6	1,620	88	385
Nov. 7	478	52	67
Nov. 7	1,170	115	363
Dec. 3	a 1,880	149	756
Dec. 4	a 1,070	94	272
Jan. 21, 1953	2,330	76	478
Jan. 22	1,760	98	466
Feb. 4	2,120	97	555
Feb. 5	1,090	67	197
Feb. 18	2,310	108	674
Mar. 4	1,480	113	452
Mar. 4	2,310	330	2,060
Mar. 17	2,200	155	921
Mar. 18	1,800	99	481
Apr. 1	2,090	112	632
Apr. 2	755	18	37
Apr. 15	1,930	154	802
Apr. 16	755	59	120
Apr. 28	1,530	129	533
Apr. 29	1,600	82	354
Apr. 30	838	104	235
Apr. 30	1,620	124	542
May 14	1,960	77	407
May 15	772	21	44
May 28	1,340	81	293
May 29	660	24	43
June 11	1,170	74	234
June 12	524	22	31
June 24	166	12	5.4
June 25	179	16	7.7
July 9	253	27	18
July 10	253	31	21
Aug. 20	135	26	9.5
Aug. 21	130	28	9.8
Sept. 24	203	28	15
Sept. 24	191	30	15
DISMAL RIVER AT DUNNING, NEBR.			
Oct. 2, 1952	297	692	555
Oct. 14	339	834	763
Oct. 30	333	884	795
Nov. 5	345	935	871
Nov. 11	333	962	865
Dec. 10	330	1,180	1,050
Dec. 16	324	804	703
Dec. 23	336	1,320	1,200
Jan. 7, 1953	271	1,080	790
Jan. 21	430	857	995
Feb. 5	372	1,150	1,160
Feb. 8	348	1,100	1,030
Mar. 4	336	1,320	1,200
Mar. 17	348	785	738
Mar. 31	360	1,000	972
Apr. 20	327	777	686
May 6	315	672	572
May 18	327	794	701
June 3	330	674	601
June 15	300	492	399
June 30	300	515	417
July 22	306	517	427

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 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.			
Oct. 2, 1952	808	550	1,200
Oct. 8	706	556	1,060
Oct. 15	848	580	1,330
Oct. 29	864	666	1,550
Nov. 11	834	856	1,930
Dec. 9	934	b 353	890
Jan. 6, 1953	829	126	282
Jan. 20	1,390	c 2,000	7,510
Feb. 6	872	1,440	3,390
Feb. 7	808	1,050	2,290
Mar. 10	904	1,290	3,150
Mar. 17	1,050	1,100	3,120
Apr. 2	1,030	1,400	3,890
Apr. 3	853	1,250	2,880
Apr. 21	855	968	2,230
May 6	937	890	2,250
May 19	806	486	1,060
June 3	806	565	1,230
June 16	795	605	1,300
June 30	806	d 304	662
July 21	795	d 353	758
Aug. 5	773	d 501	1,050
Aug. 28	710	356	682
Sept. 9, 1953	680	431	791
Sept. 24	784	455	963
MIDDLE LOUP RIVER AT ARCADIA, NEBR.			
Oct. 15, 1952	882	1,020	2,430
Oct. 28	865	1,200	2,800
Nov. 5	821	882	1,960
Dec. 1	785	608	1,290
Dec. 18	852	2,440	5,610
Jan. 7, 1953	964	1,720	4,480
Feb. 6	1,110	1,620	4,860
Feb. 17	619	2,120	3,540
Mar. 5	1,130	2,000	6,100
Mar. 16	1,290	1,900	6,620
Mar. 31	830	1,010	2,260
Apr. 2	1,040	2,020	5,670
Apr. 13	838	904	2,050
May 5	1,040	1,180	3,310
May 12	985	1,330	3,540
June 4	865	428	1,000
June 11	730	526	1,040
June 19	661	452	807
June 29	534	508	732
July 6	541	380	555
July 23	495	341	456
Aug. 6	495	376	503
Aug. 26	440	322	383
Sept. 24	617	359	598
NORTH LOUP RIVER AT BURWELL, NEBR.			
Oct. 7, 1952	399	397	428
Oct. 13	407	292	321
Oct. 27	502	351	476
Nov. 4	582	384	603
Nov. 11	484	513	670
Nov. 19	635	1,170	2,010
Nov. 25	270	426	311
Dec. 10	684	589	1,090
Jan. 7, 1953	471	401	510
Jan. 20	497	273	366
Feb. 6	798	1,320	2,840
Feb. 17	475	632	811
Mar. 4	611	395	652
Mar. 10	985	1,480	3,940
Mar. 16	956	1,210	3,120
Mar. 31	590	736	1,170

b Observation made about half a mile upstream from established sampling section.
c Observation made about 7½ miles upstream from established sampling section.
d Observation made about three quarters of a mile upstream from established sampling section.

PLATTE RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
NORTH LOUP RIVER AT BURWELL, NEBR.--Continued			
Apr. 20, 1953	432	1,040	1,210
May 18	599	864	1,400
May 25	475	232	298
June 12	900	2,270	5,520
June 22	546	392	578
July 9	407	228	251
July 21	261	169	119
Aug. 3	326	247	217
Aug. 27			
Sept. 8	274	154	114
Sept. 24	303	214	175
CALAMUS RIVER NEAR BURWELL, NEBR.			
Oct. 7, 1952	270	175	128
Oct. 13	299	247	199
Oct. 27	299	260	210
Nov. 4	306	186	154
Nov. 12	302	260	212
Nov. 19	340	289	265
Dec. 10	286	345	266
Dec. 23	362	579	566
Jan. 8, 1953	a 278	367	275
Jan. 20	a 387	126	132
Feb. 5	374	358	362
Feb. 17	323	448	391
Mar. 4	a 378	207	211
Mar. 10	394	424	451
Mar. 17	492	428	569
Mar. 31	323	281	245
Apr. 20	306	241	199
Apr. 28	302	212	173
May 18	374	223	225
May 25	312	148	125
June 12	366	350	346
June 22	306	178	147
July 7	319	171	147
July 21	280	153	116
Aug. 3	440	192	228
Aug. 27	292	126	99.3
Sept. 8	299	188	152
Sept. 23	292	185	146
NORTH LOUP RIVER AT ORD, NEBR.			
Oct. 7, 1952	705	926	1,760
Nov. 3	868	522	1,220
Nov. 11	855	509	1,180
Nov. 21	906	503	1,230
Jan. 6, 1953	720	360	700
Jan. 7	796	178	383
Feb. 17	906	1,140	2,790
Mar. 3	1,080	1,160	3,380
Mar. 13	2,060	1,430	7,950
Mar. 30	880	282	670
Apr. 7	944	686	1,750
Apr. 20	893	475	1,150
May 4	1,860	1,440	7,230
May 18	1,030	342	951
June 4	798	1,250	2,690
June 12	1,690	1,150	5,250
July 1	631	234	399
July 7	705	324	617
July 20	614	202	335
Aug. 3	667	251	452
Aug. 25	506	172	235
Sept. 9	614	214	355
Sept. 23	639	195	336

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 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
DAVIS CREEK NEAR COTESFIELD, NEBR.			
May 8, 1950	36.8	30,500	3,030
Jan. 27, 1952	a2.2	43	.3
Oct. 22	.57	84	.1
Nov. 6	.99	24	.06
Nov. 17	2.0	28	.2
Dec. 3	1.4	106	.4
Dec. 16	1.6	226	1
May 11, 1953	8.3	2,100	47
Aug. 11	8.6	5,180	120
NORTH LOUP RIVER NEAR COTESFIELD, NEBR.			
Oct. 22, 1952	896	332	803
Oct. 30	958	332	859
Nov. 3	896	368	890
Nov. 3	885	364	870
Nov. 10	1,040	581	1,630
Nov. 21	927	457	1,140
Dec. 2	904	210	513
Dec. 8	a1,280	81	280
Jan. 26, 1953	a1,350	429	1,560
Feb. 5	1,500	330	1,340
Feb. 24	310	155	130
Mar. 3	1,190	1,180	3,730
Mar. 9	1,620	1,180	5,160
Mar. 17	1,540	976	4,060
Mar. 30	1,040	346	970
Apr. 6	1,080	258	752
Apr. 20	990	447	1,190
May 4	1,710	850	3,920
May 11	1,850	912	4,560
May 18	990	370	989
June 6	835	192	433
June 18	766	199	412
June 29	835	182	410
July 20	766	170	352
Aug. 3	690	313	583
Aug. 25	498	128	172
Sept. 9	574	192	298
Sept. 21	636	243	417
LOUP RIVER AT FULLERTON, NEBR.			
Oct. 6, 1952	1,400	322	1,220
Oct. 14	2,000	430	2,320
Oct. 20	1,670	360	1,620
Oct. 28	2,250	735	4,470
Nov. 2	1,790	530	2,560
Nov. 12	2,140	425	2,460
Nov. 17	2,280	1,030	6,340
Nov. 25	2,460	1,520	10,100
Dec. 15	1,640	1,840	8,150
Dec. 30	1,090	1,820	5,360

PLATTE RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
LOUP RIVER AT FULLERTON, NEBR.--Continued			
Jan. 6, 1953	1,970	2,140	11,400
Jan. 13	2,750	1,860	13,800
Jan. 26	2,050	664	3,680
Feb. 9	2,860	1,550	12,000
Feb. 17	1,990	139	747
Mar. 9	3,190	1,780	15,300
Mar. 23	2,740	1,400	10,400
Apr. 2	2,360	725	4,620
Apr. 8	2,530	916	6,260
Apr. 14	2,060	796	4,430
Apr. 24	2,010	672	3,650
Apr. 28	1,710	607	2,800
May 4	3,670	1,180	11,700
May 11	6,050	6,350	104,000
May 19	2,130	686	3,950
May 28	6,480	7,220	126,000
June 2	1,890	566	2,890
June 9	3,550	3,260	31,200
June 13	1,890	700	3,570
June 18	1,520	459	1,880
LOUP RIVER POWER CANAL NEAR GENOA, NEBR.			
Oct. 6, 1952	1,490	31	125
Oct. 14	1,710	48	222
Oct. 20	1,980	62	331
Jan. 13, 1953	763	70	139
Apr. 7	2,290	342	2,110
Apr. 24	2,340	326	2,060
May 19	2,100	484	2,740
June 13	2,290	758	4,690
July 1	1,230	115	382
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.			
Oct. 3, 1952	a506	191	261
Oct. 7	488	119	157
Oct. 23	616	145	241

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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 NEAR WELDONA, COLO.																
Oct. 7, 1952	11:30 a.m.	336	55	506	--	--	--	--	--	--	8	12	15	74	96		S
Apr. 10, 1953	4:00 p.m.	297	42	431	--	--	--	--	--	--	19	26	37	64	86		S
May 23	5:30 p.m.	293	60	631	1,930	10	14	17	22	29	40	48	56	68	90		SBWCM
June 21	6:00 p.m.	636	76	348	1,930	30	38	48	58	66	77	87	100	--	--		SBWCM
Aug. 5	11:55 a.m.	583	72	1,200	--	--	--	--	--	--	14	18	27	51	84		S
Aug. 5	12:05 p.m.	583	72	940	--	--	--	--	--	--	26	30	40	70	90		S
Aug. 5	12:30 p.m.	589	75	678	--	--	--	--	--	--	27	33	44	72	92		S
SOUTH PLATTE RIVER AT FORT MORGAN, COLO.																
Oct. 3, 1952	3:30 p.m.	110	67	277							17	28	38	78	98	100	S
Dec. 2	11:00 a.m.	a280	33	908							27	40	57	86	98	99	S
PLATTE RIVER NEAR OVERTON, NEBR.																
Oct. 9, 1952	4:35 p.m.	1,020	87	58							63	--	--	98	---		S
Oct. 10	10:20 a.m.	424	52	11							78	--	--	100	--		S
Nov. 6	2:40 p.m.	1,600	--	66							57	63	85	98	--		S
Nov. 6	5:00 p.m.	1,620	47	88							38	--	--	86	--		S
Nov. 7	9:40 a.m.	478	--	52							28	--	--	98	--		S
Nov. 7	12:05 p.m.	1,170	--	115							36	--	--	93	--		S
Dec. 3	4:30 p.m.	a1,880	--	149							26	--	--	77	--		S
Dec. 4	10:50 a.m.	a1,070	33	94							16	--	--	81	--		S
Jan. 21, 1953	4:35 p.m.	2,330	33	76							24	--	--	69	--		S
Jan. 22	10:00 a.m.	a1,760	32	98							10	--	--	96	--		S

PLATTE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1952 to September 1953--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	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	
PLATTE RIVER NEAR OVERTON, NEBR.--Continued																	
Feb. 4, 1953	3:30 p.m.	2,120	55	97							--	36	--	92	--		S
Feb. 5	9:40 a.m.	1,090	--	67							43	--	--	94	--		S
Feb. 18	3:50 p.m.	2,310	--	108							38	--	--	92	--		S
Mar. 4	10:20 a.m.	1,480	--	113							20	--	--	83	--		S
Mar. 4	4:00 p.m.	2,310	39	330							11	--	--	68	--		S
Mar. 17	4:10 p.m.	2,200	--	155							17	--	--	54	--		S
Mar. 18	10:25 a.m.	1,800	50	99							36	--	--	94	--		S
Apr. 1	4:00 p.m.	2,090	54	112							42	--	--	93	--		S
Apr. 2	10:00 a.m.	755	51	18							57	--	--	96	--		S
Apr. 15	4:25 p.m.	1,930	51	154							64	--	--	94	--		S
Apr. 16	10:05 a.m.	755	--	59							56	--	--	98	--		S
Apr. 28	4:45 p.m.	1,530	--	129							49	51	63	84	94		S
Apr. 29	5:45 p.m.	1,500	--	82							63	66	80	98	100		S
Apr. 30	10:10 a.m.	838	--	104							22	23	35	85	100		S
Apr. 30	7:20 p.m.	1,820	--	124							56	58	73	96	100		S
May 14	3:15 p.m.	1,960	62	77							60	--	--	92	--		S
May 15	9:50 a.m.	772	51	21							62	--	--	99	--		S
May 28	3:20 p.m.	1,340	80	81							64	--	--	99	--		S
May 29	9:30 a.m.	660	69	24							78	--	--	99	--		S
June 11	3:50 p.m.	1,110	87	74							39	--	--	74	--		S
June 12	8:05 a.m.	524	72	22							71	--	--	98	--		S
June 24	2:30 p.m.	166	89	12							91	--	--	99	--		S
June 25	7:30 a.m.	179	--	16							81	--	--	99	--		S
July 9	3:30 p.m.	[illegible]	[illegible]	27							82	84	92	100	--		S
July 10	8:40 a.m.	[illegible]	--	31							80	83	90	98	--		S

Aug. 20, 1953 ...	3:50 p.m.	135	--	26							91	92	96	100	--		S
Aug. 21.	9:30 a.m.	130	69	28							80	85	93	100	--		S
Sept. 24.....	9:15 a.m.	203	--	28							81	84	92	100	--		S
Sept. 24.....	3:10 p.m.	191	76	30							85	86	87	92	100		S

DISMAL RIVER AT DUNNING, NEBR.

Oct. 14, 1952 ...	5:45 p.m.	339	47	834							14	44	94	100	--		S
Nov. 5.....	4:50 p.m.	345	--	935							14	46	81	97	99	100	S
Nov. 11.....	5:15 p.m.	333	46	962							16	56	94	100	--		S
Dec. 16.....	6:15 p.m.	324	41	804							16	40	92	100	--		S
Jan. 7, 1953.....	2:00 p.m.	271	32	1,080							15	47	92	100	--		S
Jan. 21.....	11:05 a.m.	430	--	857							13	33	86	100	--		S
Feb. 5.....	3:45 p.m.	372	44	1,150							20	46	90	99	100		S
Mar. 4.....	12:55 p.m.	336	--	1,320							29	67	94	100	--		S
Mar. 31..	10:40 a.m.	360	41	1,000							20	50	94	100	--		S
Apr. 20.....	5:30 p.m.	327	57	777							20	55	95	100	--		S
May 6	3:30 p.m.	315	70	672							18	51	92	100	--		S
May 18..	6:10 p.m.	327	--	794							18	53	93	100	--		S
June 3.	11:30 a.m	330	69	674							18	42	92	100	--		S
June 15	5:15 p.m.	300	82	492							24	56	96	100	--		S
June 30	12:00 m.	300	76	515							21	50	91	100	--		S
July 22	11:15 a.m.	306	72	517							17	45	81	98	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 1952 to September 1953--Continued
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically disperzed; M, mechanically disperzed)

Date of collection	Time	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	0.006	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000
MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.																
Oct. 8, 1952	5:15 p.m.	706	57	556	--	--	--		--	--	14	55	94	100	--		S
Oct. 29	2:15 p.m.	864	50	666	--	--	--		--	--	22	57	96	100	--		S
Nov. 11	1:50 p.m.	834	45	856	--	--	--		--	--	22	60	98	100	--		S
Dec. 9 b	3:00 p.m.	934	32	353	--	--	--		--	--	38	57	93	100	--		S
Jan. 6, 1953	3:30 p.m.	829	32	126	--	--	--		--	--	27	49	92	99	100		S
Feb. 6	12:30 p.m.	872	39	1,440	1,380	3	4	6	4	6	18	59	98	100	--		SPWCM
Feb. 7	5:30 p.m.	808	36	1,050	1,760	5	5		8	10	23	62	97	100	--		SPWCM
Mar. 10	12:20 p.m.	904	--	1,290	--	--	--		--	--	22	57	97	100	--		S
Apr. 2	12:30 p.m.	1,030	--	1,400	--	--	--		--	--	16	50	94	100	--		S
Apr. 3	5:50 p.m.	853	--	1,250	--	--	--		--	--	12	41	80	98	100		S
Apr. 21	12:40 p.m.	855	--	968	--	--	--		--	--	18	53	94	100	--		S
May 6	11:45 a.m.	937	--	890	--	--	--		--	--	17	56	96	100	--		S
May 19	3:10 p.m.	806	72	486	--	--	--		--	--	24	65	97	100	--		S
June 3	3:30 p.m.	806	74	565	--	--	--		--	--	20	47	89	100	--		S
June 16	11:40 a.m.	795	72	605	--	--	--		--	--	15	53	96	100	--		S
June 30 c	3:30 p.m.	806	84	304	--	--	--		--	--	31	58	94	100	--		S
July 21 c	3:30 p.m.	795	--	353	--	--	--		--	--	27	53	92	100	--		S
Aug. 5 c	3:45 p.m.	773	85	501	--	--	--		--	--	21	51	92	99	100		S
Aug. 28	3:25 p.m.	710	--	356	--	--	--		--	--	24	51	90	100	--		S
Sept. 9	4:20 p.m.	680	76	431	--	--	--		--	--	27	57	94	100	--		S
Sept. 24	4:10 p.m.	784	--	455	--	--	--		--	--	22	51	92	100	--		S

b Observation made about half a mile upstream from established sampling section.
c Observations made about three quarters of a mile upstream from established sampling section.

MIDDLE LOUP RIVER AT ARCADIA, NEBR.

Oct. 15, 1952....	1:00 p.m.	882	49	1,020	--	--	--	--	--	--	17	52	94	100	--		S
Oct. 28.....	3:50 p.m.	865	--	1,200	--	--	--	--	--	--	16	58	99	100	--		S
Nov. 5.....	12:35 p.m.	821	48	882	--	--	--	--	--	--	18	51	92	99	100		S
Dec. 1.....	3:00 p.m.	785	32	608	--	--	--	--	--	--	22	52	89	100	--		S
Dec. 18.....	2:40 p.m.	852	--	2,440	--	--	--	--	--	--	7	36	93	100	--		S
Feb. 6, 1953....	3:30 p.m.	1,110	34	1,620	2,700	7	10	13	16	22	36	69	98	100	--		SPWCM
Feb. 17.....	12:30 p.m.	619	33	2,120	--	--	--	--	--	--	12	42	91	100	--		S
Mar. 5.....	12:20 p.m.	1,130	37	2,000	--	--	--	--	--	--	20	60	97	100	--		S
Mar. 16.....	2:50 p.m.	1,290	54	1,900	2,570	7	11	12	14	17	27	52	90	100	--		SPWCM
Mar. 31.....	3:30 p.m.	830	46	1,010	--	--	--	--	--	--	19	61	98	100	--		S
Apr. 2.....	7:00 p.m.	1,040	42	2,020	--	--	--	--	--	--	20	59	96	100	--		S
Apr. 13.....	1:00 p.m.	838	53	904	--	--	--	--	--	--	28	63	96	100	--		S
May 5.....	6:25 p.m.	1,040	--	1,180	--	--	--	--	--	--	22	54	88	100	--		S
May 12.....	3:40 p.m.	985	48	1,330	--	--	--	--	--	--	16	51	95	100	--		S
June 4.....	2:30 p.m.	865	82	428	--	--	--	--	--	--	28	56	91	100	--		S
June 11.....	2:45 p.m.	730	88	526	--	--	--	--	--	--	25	59	94	100	--		S
June 19.....	11:00 a.m.	661	80	452	--	--	--	--	--	--	20	46	91	100	--		S
June 29.....	4:00 p.m.	534	84	508	--	--	--	--	--	--	16	39	80	98	100		S
July 6.....	3:00 p.m.	541	--	380	--	--	--	--	--	--	23	50	91	100	--		S
July 23.....	10:30 a.m.	495	75	341	--	--	--	--	--	--	27	65	96	100	--		S
Aug. 6.....	11:05 a.m.	495	73	376	--	--	--	--	--	--	27	56	95	100	--		S
Aug. 26.....	2:15 p.m.	440	--	322	--	--	--	--	--	--	27	52	90	100	--		S
Sept. 24.....	11:10 a.m.	617	61	359	--	--	--	--	--	--	21	50	93	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 1952 to September 1953--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	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	
NORTH LOUP RIVER AT BURWELL, NEBR.																	
Oct. 7, 1952	11:35 a.m.	399	--	397							12	34	88	100	--	--	S
Oct. 13	3:20 p.m.	407	--	292							21	49	90	100	--	--	S
Oct. 27	12:30 p.m.	502	--	351							17	47	90	100	--	--	S
Nov. 4	1:22 p.m.	582	48	384							15	45	90	100	--	--	S
Nov. 19	11:10 a.m.	635	--	1,170							8	30	82	99	100	--	S
Dec. 10	2:00 p.m.	684	34	589							9	28	82	98	100	--	S
Feb. 6, 1953	11:00 a.m.	798	33	1,320							15	43	82	98	100	--	S
Feb. 17	2:00 p.m.	475	32	632							23	62	96	100	--	--	S
Mar. 10	2:00 p.m.	985	--	1,480							17	47	82	94	99	100	S
Mar. 16	4:30 p m.	956	52	1,210							16	49	92	100	--	--	S
Mar. 31	10:00 a.m.	590	46	736							12	42	91	100	--	--	S
Apr. 20	2:50 p.m.	432	--	1,040							8	25	54	84	97	99	S
May 18	1:40 p.m.	599	65	864							7	22	51	86	97	99	S
May 25	4:00 p.m.	475	--	232							22	50	91	100	--	--	S
June 12	11:00 a.m.	900	--	2,270	7,970	28	37	46	52	61	83	85	94	100	--	--	SPWCM
June 22	11:00 a.m.	546	71	392							27	61	94	100	--	--	S
July 9	3:20 p.m.	407	--	228							39	42	96	100	--	--	S
July 21	8:15 a.m.	261	75	169							35	57	89	99	100	--	S
Aug. 3	4:25 p.m.	326	85	247							37	58	90	99	100	--	S
Aug. 27	9:15 a.m.	255	--	192							24	44	92	100	--	--	S
Sept. 8	4:40 p.m.	274	79	154							31	55	92	100	--	--	S
Sept. 24	9:05 a.m.	303	56	214							19	44	86	100	--	--	S

CALAMUS RIVER NEAR BURWELL, NEBR.

Oct. 7, 1952	2:30 p.m.	270	53	175							18	44	90	100	--		S
Oct. 13	5:30 p.m.	299	--	247							16	48	90	100	--		S
Oct. 27	3:20 p.m.	299	--	260							20	43	90	100	--		S
Nov. 4	6:00 p.m.	306	50	186							16	45	90	100	--		S
Nov. 12.....	11:00 a.m.	302	42	260							12	37	92	100	--		S
Nov. 19.....	12:30 p.m.	340	37	289							14	39	88	100	--		S
Dec. 10.....	10:00 a.m.	286	33	345							13	40	89	100	--		S
Dec. 23.....	3:00 p.m.	362	33	579							11	28	81	99	100		S
Jan. 8, 1953.....	10:05 a.m.	a 278	33	367							8	30	88	99	100		S
Feb. 5.....	5:20 p.m.	374	34	358							20	52	90	100	--		S
Feb. 17.....	4:15 p.m.	323	--	448							21	47	89	100	--		S
Mar. 10.....	10:00 a.m.	394	46	424							16	43	86	99	100		S
Mar. 17.....	10:10 a.m.	492	44	428							16	43	91	100	--		S
Apr. 20.....	4:35 p.m.	306	55	241							22	50	91	100	--		S
Apr. 28.....	3:15 p.m.	302	62	212							28	54	92	100	--		S
May 18.....	3:05 p.m.	374	--	223							23	50	90	100	--		S
May 25.....	6:20 p.m.	312	--	148							35	62	96	100	--		S
June 12	9:10 a.m.	366	75	350							33	54	87	99	100		S
June 22	1:00 p.m.	306	71	178							40	65	89	100	--		S
July 7	3:40 p.m.	319	78	171							47	67	92	99	100		S
July 21.....	9:00 a.m.	280	73	153							35	56	92	100	--		S
Aug. 3.....	6:10 p.m.	440	80	192							35	68	94	100	--		S
Aug. 27.....	3:00 p.m.	292	80	126							39	65	91	99	100		S
Sept. 28.....	5:40 p.m.	299	73	188							28	62	93	100	--		S
Sept. 23.....	4:30 p.m.	292	67	185							24	47	89	100	--		S

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1952 to September 1953--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	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
NORTH LOUP RIVER AT ORD, NEBR.																
Oct. 7, 1952	4:20 p.m.	705	52	926	--	--	--	--	--	--	7	14	28	52	87	99	S
Nov. 11	1:30 p.m.	855	43	509	--	--	--	--	--	--	14	35	80	100	--	--	S
Nov. 21	10:50 a.m.	906	37	503	--	--	--	--	--	--	15	43	88	100	--	--	S
Jan. 6, 1953	5:00 p.m.	720	--	360	--	--	--	--	--	--	4	12	47	73	88	100	S
Jan. 7	11:25 a.m.	796	32	178	--	--	--	--	--	--	11	24	73	100	100	--	S
Feb. 17	11:00 a.m.	906	32	1,140	--	--	--	--	--	--	8	36	84	99	100	--	S
Mar. 3	4:15 p.m.	1,080	32	1,160	--	--	--	--	--	--	22	55	94	100	--	--	S
Mar. 13	4:00 p.m.	2,060	--	1,430	1,850	2	3	4	5	8	15	32	58	93	99	100	SPWCM
Apr. 7	1:30 p.m.	944	47	686	--	--	--	--	--	--	12	37	86	99	100	--	S
Apr. 20	12:00 m.	893	48	475	--	--	--	--	--	--	14	41	89	100	--	--	S
May 4	12:10 p.m.	1,860	--	1,440	--	--	--	--	--	--	22	58	90	100	100	--	S
May 18	11:10 a.m.	1,030	61	342	--	--	--	--	--	--	20	43	80	99	100	--	S
June 4	1:20 p.m.	798	--	1,250	--	--	--	--	--	--	6	13	30	76	97	100	S
June 12	2:00 p.m.	1,690	--	1,150	4,170	29	40	48	55	66	79	87	97	100	--	--	SPWCM
July 1	11:00 a.m.	631	80	234	--	--	--	--	--	--	37	54	91	99	100	--	S
July 7	9:50 a.m.	705	--	324	--	--	--	--	--	--	42	59	89	100	--	--	S
July 20	3:05 p.m.	614	80	202	--	--	--	--	--	--	47	63	90	100	--	--	S
Aug. 25	5:45 p.m.	506	--	172	--	--	--	--	--	--	38	58	88	100	--	--	S
Sept. 9	8:20 p.m.	614	67	214	--	--	--	--	--	--	41	64	93	100	--	--	S
Sept. 23	8:50 a.m.	639	54	195	--	--	--	--	--	--	28	51	88	100	--	--	S

a Mean daily discharge.

DAVIS CREEK NEAR COTESFIELD, NEBR.

Oct. 22, 1952	10:45 a.m.	.57		84	--	--	--	--	--	--	29	60	82	98	100		S
May 11, 1953	12:05 p.m.	8.3		2,100	4,410	76	90	96	98	100	--	--	--	--	--		PWCM

NORTH LOUP RIVER NEAR COTESFIELD, NEBR.

Oct. 22, 1952	3:25 p.m.	896	55	332							30	48	82	99	100		S
Nov. 3	1:00 p.m.	896	46	368							23	49	90	100	--		S
Nov. 3	4:45 p.m.	885	47	364							22	44	82	99	100		S
Nov. 21	5:40 p.m.	927	--	457							21	45	82	98	100		S
Dec. 8	3:00 p.m.	a1,280	33	81							72	89	98	100	--		S
Feb. 24, 1953	11:00 a.m.	310	--	155							19	39	88	100	--		S
Mar. 3	11:50 a.m.	1,190	32	1,160							10	33	73	97	100		S
Mar. 9	1:30 p.m.	1,620	45	1,180							25	47	85	99	100		S
Apr. 6	4:35 p.m.	1,080	56	258							35	63	91	100	--		S
May 4	6:25 p.m.	1,710	--	850							31	61	89	100	--		S
May 11	3:00 p.m.	1,850	60	912							43	65	96	100	--		S
May 18	1:00 p.m.	990	--	370							31	53	93	100	--		S
June 6	1:00 p.m.	835	64	192							47	68	90	100	--		S
June 18	11:25 a.m.	766	--	199							58	75	96	100	--		S
July 20	11:30 a.m.	766	78	170							67	81	95	100	--		S
Aug. 3	11:15 a.m.	690	76	313							45	59	80	95	98	100	S
Aug. 25	11:00 a.m.	498	--	128							54	67	94	100	--		S
Sept. 9	10:45 a.m.	574	73	192							57	74	94	100	--		S
Sept. 21	4:00 p.m.	636	63	243							40	55	77	99	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 1952 to September 1953--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	Discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
LOUP RIVER AT FULLERTON, NEBR.																	
Oct. 6, 1952	2:20 p.m.	1,400	52	322	--	--	--	--	--	--	35	50	85	99	100		S
Oct. 14	12:00 m.	2,000	58	430	--	--	--	--	--	--	33	55	88	98	100		S
Oct. 20	1:15 p.m.	1,670	--	360	1,010	7	8	9	12	16	38	60	91	100	--		SPWCM
Nov. 2	12:00 m.	1,790	48	530	--	--	--	--	--	--	31	46	86	99	100		S
Nov. 12	3:00 p.m.	2,140	45	425	--	--	--	--	--	--	57	80	98	100	--		S
Nov. 17	3:15 p.m.	2,280	--	1,030	1,580	4	4	6	8	13	30	49	86	99	100		SPWCM
Nov. 25	12:25 p.m.	2,460	33	1,520	--	--	--	--	--	--	20	41	78	99	100		S
Dec. 15	3:45 p.m.	1,640	--	1,840	--	--	--	--	--	--	16	32	79	98	100		S
Dec. 30	5:10 p.m.	1,090	32	1,820	2,000	2	2	3	4	7	17	31	80	100	--		SPWCM
Jan 6, 1953	12:30 p.m.	1,970	32	2,140	--	--	--	--	--	--	8	20	70	98	100		S
Jan. 13	4:30 p.m.	2,750	32	1,860	2,980	2	2	3	4	8	17	34	92	100	--		SPWCM
Jan. 26	3:30 p.m.	2,050	32	864	2,120	2	4	--	7	18	45	65	86	98	100		SPNM
Feb. 9	4:15 p.m.	2,860	--	1,550	4,170	4	6	--	10	14	28	50	88	99	100		SPWCM
Feb. 17	12:20 p.m.	1,990	--	139	--	--	--	--	--	--	80	86	92	100	--		S
Mar. 9	2:15 p.m.	3,190	--	1,780	4,920	6	6	6	11	18	36	56	91	99	100		SPWCM
Mar. 23	12:50 p.m.	2,740	--	1,400	5,380	4	5	--	10	--	35	55	89	100	--		SPWCM
Apr. 2	2:00 p.m.	2,360	--	725	--	--	--	--	--	--	17	39	82	99	100		S
Apr. 8	1:40 p.m.	2,530	55	916	--	--	--	--	--	--	62	87	99	100	--		S
Apr. 14	5:20 p.m.	2,060	--	796	--	--	--	--	--	--	33	54	90	100	--		S
Apr. 24	3:05 p.m.	2,010	--	672	--	--	--	--	--	--	40	61	92	99	100		S
Apr. 28	11:30 a.m.	1,710	58	607	--	--	--	--	--	--	32	55	93	100	--		S
May 4	2:50 p.m.	3,670	60	1,180	--	--	--	--	--	--	35	56	92	100	--		S
May 11	5:00 p.m.	6,050	63	6,350	5,660	41	51	58	62	69	79	87	95	100	--		SPWCM
May 11	5:00 p.m.	6,050	63	6,350	5,780	38	47	56	64	71	80	87	95	100	--		SPNM
May 19	10:55 a.m.	2,130	52	686	--	--	--	--	--	--	42	63	97	100	--		S
May 28	3:00 p.m.	6,480	--	7,220	14,900	3	4	40	80	85	91	95	99	100	--		SPNM

May 28, 1953.....	3:00 p.m.	6,480	--	7,220	14,800	49	62	74	79	84	90	94	99	100	--		SPWCM
June 2.....	1:30 p.m.	1,890	75	566	1,720	29	34	40	46	53	63	74	95	100	--		SPWCM
June 9.....	11:00 a.m.	3,550	75	3,260	8,960	36	49	59	65	72	81	88	96	100	--		SPWCM
June 13.....	12:20 p.m.	1,890	--	700	2,500	34	41	43	48	57	77	88	98	100	--		SPWCM
June 18.....	2:00 p.m.	1,520	--	459	--	--	--	--	--	--	57	73	92	98	99	100	S
LOUP RIVER POWER CANAL NEAR GENOA, NEBR.																	
Oct. 20, 1952.....	9:50 a.m.	1,980	46	62							97	99	100	--			S
Jan. 13, 1953.....	10:25 a.m.	736	32	70							85	88	95	100			S
Apr. 7.....	4:00 p.m.	2,290	48	342							92	99	100	--			S
Apr. 24.....	4:40 p.m.	2,340	56	326							96	99	100	--			S
May 19.....	4:20 p.m.	2,100	--	484							97	99	100	--			S
June 13.....	2:45 p.m.	2,290	--	758	2,180	51	62	70	73	81	98	100	--	--			SPWCM
July 1.....	3:00 p.m.	1,230	92	115							97	98	99	100			S
ELKHORN RIVER, 2 MILES NORTH OF WATERLOO, NEBR.																	
Oct. 3, 1952.....	4:30 p.m.	a 506		191							57	66	92	100			S
Oct. 7.....	5:15 p.m.	488	52	119							76	88	99	100			S

a Mean daily discharge.

PLATTE RIVER BASIN--Continued

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

Periodic determinations of bed material, water year October 1952 to September 1953--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	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	8.000	
SOUTH PLATTE RIVER NEAR WELDONA, COLO.																	
Apr. 28, 1953....	4	135								0	5	25	52	74	92		S
Sept. 22.....	4	249								1	9	25	41	59	82	94	S
PLATTE RIVER NEAR OVERTON, NEBR.																	
Aug. 14, 1952....	6	674								0	8	41	75	92	--	--	S
Sept. 25.....	7	683								0	5	25	52	75	--	--	S
Apr. 16, 1953....	5	755								0	5	30	64	84	94	98	S
Sept. 24.....	8	204								0	7	36	68	88	98	100	S
DISMAL RIVER AT DUNNING, NEBR.																	
Nov. 5, 1952.....	3	345							3	7	29	71	82	89	94	98	S
Dec. 16.....	3	324							0	2	35	79	89	93	98	100	S
Feb. 8, 1953.....	3	348							0	2	28	73	87	93	97	99	S
Apr. 4.....	3	330							0	2	31	72	86	92	97	100	S
May 6.....	3	315							0	2	28	62	78	87	94	98	S
June 3.....	3	330							0	2	45	75	82	88	94	97	S
June 30.....	3	300							0	2	36	65	75	84	92	98	S
July 22.....	3	306							0	1	23	56	78	89	96	99	S

MIDDLE LOUP RIVER, 7½ MILES NORTHWEST OF MILBURN, NEBR.

Oct. 8, 1952	3	706								0	1	28	88	96	98	99	S
Jan. 14, 1953	3	902								0	5	58	97	99	100	--	S
Feb. 7	3	808								0	2	30	84	96	98	100	S
Apr. 3	3	853								0	1	25	62	82	91	98	S
May 6	3	937								0	2	36	83	95	98	99	S
June 3	3	806								0	1	22	64	79	89	95	S
June 30	3	806								0	5	27	50	67	80	92	S
July 21	3	795								0	6	45	76	89	94	98	S
Aug. 5	3	773								0	3	41	75	87	94	98	S
Aug. 28	5	--								0	2	22	59	78	88	95	S
Sept. 9	3	--								0	2	25	56	71	82	93	S
Sept. 24	5	--								0	2	36	74	87	93	98	S

MIDDLE LOUP RIVER AT ARCADIA, NEBR.

Nov. 5, 1952	3	821								0	6	51	92	99	100	--	S
Dec. 18	2	852								0	2	39	93	100	--	--	S
Apr. 2, 1953	3	1,040								0	3	45	92	99	100	--	S
May 5	3	1,040								0	2	29	90	100	--	--	S
June 4	3	865								0	9	59	94	99	99	100	S
June 19	5	661								0	2	31	83	97	99	99	S
June 29	3	534								0	3	46	85	97	98	99	S
July 6	5	541								0	3	33	85	97	98	99	S
Aug. 6	3	495								0	2	34	85	97	100	--	S
Aug. 26	5	440								0	3	32	81	97	99	100	S

PLATTE RIVER BASIN--Continued

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

Periodic determinations of bed material, water year October 1952 to September 1953--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	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	8.000	
NORTH LOUP RIVER AT BURWELL, NEBR.																	
Oct. 7, 1952	3	399							0	5	45	87	95	98	100		S
Nov. 4	3	582							0	1	30	87	96	98	99		S
Nov. 19	3	635							0	1	20	84	92	96	98		S
Mar. 10, 1953	3	985							--	0	11	55	81	89	94		S
May 18	3	599							0	1	25	75	87	93	96		S
June 12	3	900							0	5	37	96	99	100	--		S
June 26	5	441							0	1	31	80	92	97	99		S
July 9	5	407							0	6	29	70	85	92	96		S
July 21	3	261							0	2	30	78	91	96	98		S
Aug. 3	3	326							0	1	20	62	81	92	98		S
Aug. 27	5	255							0	2	31	70	86	93	98		S
CALAMUS RIVER NEAR BURWELL, NEBR.																	
Oct. 7, 1952	3	270							0	1	22	67	84	92	97	100	S
Nov. 4	3	306							0	1	27	75	90	95	98	100	S
Nov. 19	3	340							0	1	27	73	85	91	96	98	S
Mar. 10, 1953	3	394							0	1	25	80	93	96	98	100	S
Apr. 20	3	306							0	1	26	77	90	94	97	100	S
May 18	3	374							0	2	30	76	89	93	96	98	S
June 12	3	366							0	2	27	72	88	93	98	100	S
June 26	5	299							0	3	35	78	90	94	98	99	S
July 7	5	319							0	2	25	65	81	88	95	99	S
July 21	3	280							0	2	31	69	85	91	96	99	S
Aug. 3	3	440							0	2	26	66	82	89	95	98	S
Aug. 27	5	292							0	2	34	76	87	92	96	99	S

NORTH LOUP RIVER AT ORD, NEBR.

Oct. 7, 1952	3	705							1	7	24	68	88	95	98		S
Nov. 21	3	906							0	1	27	79	89	93	97		S
Mar. 13, 1953	3	2,060							0	2	27	74	87	91	94		S
Apr. 20	3	893							0	3	45	87	95	97	98		S
May 18	3	1,030							0	19	34	77	90	96	99		S
June 12	3	1,690							0	1	21	67	88	94	97		S
July 7	5	705							0	2	28	69	84	92	98		S
July 20	3	614							0	1	17	48	66	79	91		S
Aug. 3	3	667							0	2	25	59	73	82	94		S
Aug. 25	5	506							0	1	18	60	80	89	96		S
Sept. 23	3	639							0	1	29	81	94	97	99		S

NORTH LOUP RIVER NEAR COTESFIELD, NEBR.

Nov. 3, 1952	3	885							0	1	19	63	82	91	97	100	S
Apr. 6, 1953	3	1,080							0	2	21	66	87	92	96	99	S
May 4	3	1,710							0	2	25	85	97	98	99	100	S
June 6	3	835							15	39	81	95	96	97	97	98	S
June 29	3	835							1	3	21	71	89	95	99	100	S
July 20	3	766							0	2	23	64	86	94	97	100	S
Aug. 3	3	690							1	8	56	85	94	98	99	100	S
Aug. 25	5	498							0	2	26	75	91	96	98	100	S
Sept. 21	3	636							0	2	25	68	89	96	99	100	S

PLATTE RIVER BASIN--Continued

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

Periodic determinations of bed material, water year October 1952 to September 1953--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	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	8.000	
LOUP RIVER AT FULLERTON, NEBR.																	
Oct. 6, 1952	3	1,400							0	2	39	91	98	99	100	--	S
Oct. 20	3	1,670							0	1	19	80	96	98	100	--	S
Nov. 2	3	1,790							4	18	53	88	98	99	100	--	S
Nov. 17	3	2,280							0	1	24	74	99	100	--	--	S
Dec. 15	3	1,640							0	3	50	95	99	100	--	--	S
Jan. 26, 1953	2	2,050							--	0	2	24	58	82	94	98	S
Feb. 9	3	2,860							0	3	29	79	95	99	100	--	S
Mar. 9	3	3,190							1	4	45	88	98	99	100	--	S
Apr. 24	3	2,010							0	2	36	78	91	96	98	100	S
May 11	3	6,050							0	5	43	92	100	--	--	--	S
June 2	3	1,890							0	3	63	96	99	100	--	--	S
June 18	5	1,520							0	3	33	85	96	98	100	--	S

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 1953.
Water temperatures: May 1951 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 589 ppm Jan. 4-14; minimum, 348 ppm June 10-13.
Hardness: Maximum, 307 ppm Jan. 1-3; minimum, 180 ppm July 5-31.
Specific conductance: Maximum daily, 936 micromhos Jan. 6; minimum daily, 517 micromhos Aug. 9.
Water temperatures: Maximum, 84°F Aug. 1, 2; minimum, freezing point on several days during November to February.
EXTREMES, 1951-53.--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, 936 micromhos Jan. 6, 1953; minimum daily, 361 micromhos Mar. 29, 1951.
Water temperatures: Maximum, 85°F July 25, 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. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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)	Chlorides (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, 1952	34,300			58	21	56		196	169	17		2.2	0.12	452	0.61	41,860	232	71	34	1.6	687	7.7
Nov. 1-28	31,410			61	20	56		202	167	17		2.4	.09	450	.61	38,160	234	68	33	1.6	690	7.9
Nov. 29 - Dec. 1	13,570			68	22	60		229	170	24		3.0	.11	494	.67	18,100	259	71	33	1.6	748	7.8
Dec. 2-7	14,120			74	25	66		258	178	31		3.4	.11	534	.73	20,360	286	74	32	1.7	814	7.8
Dec. 8-20	17,500			70	22	58		244	157	25		3.5	.10	496	.67	23,440	267	67	31	1.5	750	7.7
Dec. 21-31	12,760			64	35	64		280	173	30		3.8	.11	558	.76	19,220	304	74	31	1.6	838	8.0
Jan. 1-3, 1953	16,900			81	26	67		274	190	27		4.3	.12	577	.78	26,330	307	82	31	1.7	863	7.9
Jan. 4-14	20,780			80	26	73		265	211	26		3.7	.11	589	.80	33,050	306	89	33	1.8	878	7.9
Jan. 15-30	17,960			78	25	71		260	201	26		4.1	.13	572	.78	27,740	297	84	33	1.8	860	7.9
Jan. 31-Feb. 22	25,950			64	20	54		216	158	20		3.6	.10	465	.63	32,580	242	65	32	1.5	704	7.8
Feb. 23-28	22,130			69	20	56		231	165	22		4.4	.13	482	.66	28,800	256	67	31	1.5	736	7.9
Mar. 1-13	30,020			65	20	50		216	144	19		5.1	.06	445	.61	36,070	244	67	30	1.4	686	7.8
Mar 14-23	64,900			63	18	46		187	152	13		5.1	.07	434	.59	76,050	233	80	30	1.3	639	8.1
Mar. 24-31	67,680			67	19	58		172	210	13		4.6	.08	490	.67	89,540	246	105	33	1.6	728	8.0
Apr. 1-18	47,320			63	17	57		180	180	15		3.5	.06	454	.62	58,000	226	78	35	1.7	691	7.7
Apr. 19-30	33,310			67	20	57		199	183	18		3.2	.06	486	.66	43,710	248	85	33	1.6	725	8.0

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1-5, 1953	53,980			72	19	52		205	179	16		4.8	0.10	488	0.66	71,120	258	90	30	1.4	716	7.4
May 6-7	109,500			77	20	67		195	241	13		*2.9	.12	570	.78	168,500	276	116	34	1.8	816	7.7
May 8-11	73,780			76	20	76		188	257	13		4.7	.14	586	.80	116,700	271	117	37	2.0	844	7.6
May 12-31	45,690			69	18	63		197	194	16		4.2	.11	498	.68	61,430	246	84	35	1.8	749	7.4
June 1-9	44,320			66	18	67		198	193	17		3.2	.10	496	.67	59,350	237	75	37	1.9	748	7.5
June 10-13	89,880			56	12	39		167	119	9.5		3.8	.09	348	.47	84,450	189	52	31	1.2	538	7.4
June 14-19	82,030			59	16	62		174	184	12		3.9	.12	452	.61	100,100	213	70	38	1.8	682	7.2
June 20-25	101,500			61	17	77		169	225	10		3.6	.15	510	.69	139,800	220	81	43	2.3	759	7.5
June 26-July 4	99,760			57	14	63		174	181	9.0		4.5	.12	444	.60	119,600	198	55	39	1.9	663	7.6
July 5-31	42,800			50	13	54		166	143	13		2.8	.11	386	.52	44,610	180	44	38	1.8	591	7.8
Aug. 1-31	36,910			51	14	55		168	146	17		2.3	.14	396	.54	39,460	185	47	38	1.8	609	7.7
Sept. 1-30	35,030			62	17	67		184	200	17		1.0	.13	474	.64	44,830	224	73	38	1.9	722	7.5
Weighted average a.	39,370			62	18	59		191	177	16		3.3	0.11	462	0.63	49,110	229	72	35	1.7	697	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement between 1 p.m. and 2 p.m./

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

15 7372

NISHNABOTNA RIVER BASIN

DAVIDS CREEK NEAR HAMLIN, IOWA

LOCATION.--At gaging station, downstream side of bridge on State Highway 64, 5.2 miles east of Hamlin, Audubon County, and 8 miles upstream from mouth and East Nishnobotna River.
DRAINAGE AREA.--26.1 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1953.
Sediment records: July 1952 to September 1953.
EXTREMES, 1952-53.--Water temperatnres: Maximum, 83°F July 30, Aug. 1, 14; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 6,570 ppm June 4; minimum daily, no flow on many days during September.
Sediment loads: Maximum daily, 6,290 tons June 4; minimum daily, 0 tons on many days during September.
EXTREMES, July 1952 to September 1953.--Water temperatures: Maximum, 83°F July 30, Aug. 1, 14, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 6,570 ppm June 4, 1953; minimum daily, no flow on many days during September 1953.
Sediment loads: Maximum daily, 6,290 tons June 4, 1953; minimum daily, 0 tons on many days during September 1953.
REMARKS.--Flow affected by ice Nov. 28, Dec. 14, 15, 25-30, Jan. 2-7, 15-17, Jan. 23 to Feb. 3, Feb. 7-9, 16-18, Mar. 7-10. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, July to September 1952
(Once-daily measurement generally in the forenoon)

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

NISHNABOTNA RIVER BASIN

DAVIDS CREEK NEAR HAMLIN, IOWA

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement generally in the forenoon. No flow on many days during September/

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

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

NISHNABOTNA RIVER BASIN--Continued

DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953

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	6.6			4.4			55	--	e60
2	6.1			4.4			27	--	e15
3	6.1			4.1			12	--	e6.0
4	6.1			4.4			9.1	--	
5	6.1			4.4	175	2.0	7.4	--	
6	6.1	180	3.0	3.8			6.6	83	
7	6.1			4.1			5.7	--	
8	6.6			4.1			6.6	126	
9	6.6			3.8			5.7	--	e2.0
10	6.1			3.8			7.0	--	
11	6.1			3.8	--		6.1	--	
12	5.7			3.8	140		7.0	--	
13	5.7			3.8	--		5.7	127	
14	5.7			3.8	--	e1.4	5.0	--	
15	5.7			3.6	130		4.7	--	
16	5.3			3.8	--		5.3	--	
17	5.3	168	2.5	17	260	sa13	5.0	--	
18	5.3			7.0	249	4.7	4.4	135	
19	5.3			5.3	142	2.0	4.4	--	
20	5.3			4.7	134		4.4	115	
21	5.3			4.7	--		4.4	--	
22	5.3			4.4	166	e1.7	4.4	--	e1.5
23	4.7			4.1	--		4.4	--	
24	5.3			4.4	--		4.4	127	
25	5.3	131	1.8	3.8	--		4.1	--	
26	5.3			.2			3.7	--	
27	5.0			.6			3.4	--	
28	4.4	162	1.9	1.0	--	e1.0	3.1	--	
29	4.7	194	2.5	2.7			3.8	109	
30	4.7	177	2.2	29	--	e20	4.4	--	
31	4.7	--	e2.2	--	--	--	6.6	--	
Total	172.6	--	78.3	152.8	--	82.3	240.8	--	128.0

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	7.4	--		4.5	--		16	290	sa13
2	3.5	116		3.8	96	e1.0	19	190	sa11
3	3.1	118		3.5	--		20	190	10
4	2.9	--		7.0	116	b2.2	12	101	3.3
5	2.7	--	e1.3	20	322	17	12	97	3.1
6	2.7	--		16	225	9.7	14	110	4.2
7	2.9	187		23	406	25	15	190	sa8.8
8	3.1	--		18	400	19	17	240	sa14
9	3.1	--		20	428	23	18	386	s23
10	3.4	93		106	2,070	s705	20	530	29
11	3.1	--		53	390	s68	22	472	28
12	3.6	--		44	950	a110	20	370	20
13	3.8	100		34	1,100	101	19	282	14
14	3.8	--	e1.0	25	720	49	37	2,050	s221
15	3.0	--		20	170	9.2	32	524	s48
16	2.5	--		17	100	b4.6	23	314	19
17	2.9	--		14	140	b5.3	21	281	16
18	3.6	--		11	240	7.1	21	340	19
19	4.4	--		101	--	e1,600	18	187	9.1
20	3.1	108		149	--	e1,600	18	202	9.8
21	3.1	--		46	800	b99	16	265	11
22	3.1	--		21	320	b18	15	170	6.9
23	3.1	--		37	670	sa95	15	189	7.7
24	3.1	--		34	620	57	13	166	5.8
25	2.9	--	e.8	23	340	21	12		
26	2.9	--		18	240	12	12		
27	2.9	--		15	230	b9.3	12	126	3.9
28	2.9	80		19	240	b12	11		
29	2.9	--		--	--	--	11		
30	3.2	92		--	--	--	35	1,630	s193
31	5.0	--		--	--	--	27	313	23
Total	103.7	--	30.7	902.8	--	4,681.4	573	--	790.2

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

NISHNABOTNA RIVER BASIN--Continued

DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	29	350	27	27	319	23	8.2		
2	23	237	15	23	218	14	8.2	125	2.8
3	34	870	sa 89	21	201	11	8.2		
4	22	232	14	20	178	9.6	112	6,570	s 6,290
5	20	186	10	18	150	7.3	47	2,310	s 498
6	20	163	8.8	17	152	7.0	20	460	25
7	19			17	142	6.5	24	1,000	sa 220
8	18			15			60	3,000	sa 960
9	19	139	6.9	14			13	410	14
10	18			13			178	4,400	sa 3,700
					98	3.4			
11	15			12			25	490	33
12	15			12			19	410	21
13	14	96	3.8	12			18	354	17
14	15			12			15	340	14
15	18	174	8.5	11			15	313	13
16	14	120	sa 4.9	11	51	1.6	13		
17	12	75	2.4	11			12	268	8.7
18	12	101	3.3	12			11		
19	11	89	2.6	12			9.5		
20	11			13			8.7		
21	11	54	1.6	12	137	4.4	9.1	240	5.7
22	11			11	90	2.7	8.7		
23	10			9.5	58	1.5	7.8		
24	20	300	sa 28	40	2,500	sa 440	8.7		
25	19	323	17	17	430	20	13	847	34
26	14	180	6.8	14	236	8.9	8.2		
27	14	125	4.7	12			8.2		
28	12	120	3.9	11			7.8	188	3.9
29	18	300	sa 16	11	185	5.2	7.4		
30	36	1,160	113	9.1			6.6		
31	--	--	--	--			--	--	--
Total	524	--	424.1	458.3	--	613.5	710.3	--	11,927.2

Day	July			August			September		
1	6.6	166	3.0	1.8			0	--	0
2	11	509	s 16	1.6			0	--	0
3	7.0	356	6.7	1.8	61	0.3	0	--	0
4	7.0			2.1			0	--	0
5	6.6			2.3			0	--	0
6	6.6	136	2.3	8.0	700	sa 19	0	--	0
7	5.7			2.9	134	1.0	0	--	0
8	5.0			2.1	104	.6	0	--	0
9	4.7			1.8	94	.5	0	--	0
10	4.4			1.8			0	--	0
		60	.7						
11	4.1			1.6			0	--	0
12	4.7			1.6			0	--	0
13	5.3			1.4			0	--	0
14	6.1			1.2	41	.1	0	--	0
15	5.0			1.2			.1	--	(t)
		87	1.2						
16	4.4			1.2			0	--	0
17	4.3			1.0			0	--	0
18	4.2	155	1.8	1.0			0	--	0
19	3.4	60	.6	.9			0	--	0
20	3.4	52	.5	.9			0	--	0
21	12	1,400	sa 82	.8			.1	--	(t)
22	4.1	131	1.5	.7	55	.1	.1	--	(t)
23	3.4			.7			0	--	0
24	3.1			.7			.1	--	
25	2.7			.6			.1	--	
		78	.5						
26	2.5			.5	--		.1	92	(t)
27	2.7			.3	--		.1	--	
28	2.3			.2	--		.1	--	
29	2.5			.3	80	e .1	.1	--	
30	2.3			.2	--		.1	69	
31	2.0			.4	--		--	--	--
Total	149.1	--	136.9	43.6	--	24.8	1.0	--	0.2

Total discharge for year (cfs days) 4,032.0
Total load for year (tons) 18,917.6

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN

REPUBLICAN RIVER AT STRATTON, NEBR.

LOCATION (revised).--At gaging station, half a mile south of Stratton, Hitchcock County, half a mile downstream from Muddy Creek, 10 miles upstream from Trenton Dam, and 19 miles downstream from South Fork Republican River.
DRAINAGE AREA.--7,940 square miles, approximately, of which about 4,740 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.--Water temperatures: December 1950 to September 1951; February to September 1953.
Sediment records: December 1950 to September 1951, February to September 1953.
EXTREMES, February to September 1953.--Sediment concentrations: Maximum daily, 6,800 ppm Aug. 21; minimum daily, no flow on many days during June to September.
Sediment loads: Maximum daily, 2,290 tons Feb. 28; minimum daily, 0 tons on many days during June to September.
EXTREMES, 1950-51, 1953.--Water temperatures (1950-51): Maximum, 94°F July 20, Aug.2,1951.
Sediment concentrations: Maximum daily, 19,400 ppm Sept. 3, 1951; minimum daily, no flow on many days during June to September 1953.
Sediment loads: Maximum daily, 485,000 tons Sept. 3, 1951; minimum daily, 0 ton on many days during June to September 1953.
REMARKS.--Flow affected by ice Feb. 26 to Mar. 2, Apr. 18. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, February to September 1953
(Once-daily temperature measurement between 7 a. m. and 1 p. m. Many days of no flow)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--	32	54	50	63			
2					--	33	46	46	65			
3					--	a36	50	43	58			
4					--	a43	54	45	64			
5					--	42	49	46	60			
6					--	a44	60	46	56			
7					--	43	47	54	73			
8					--	49	58	54	57			
9					--	48	45	55	63			
10					--	58	47	48	72			
11					--	47	42	50	73			
12					--	55	46	40	73			
13					--	54	54	42	70			
14					--	45	60	43	73			
15					--	53	48	50	72			
16					--	50	55	55	65			
17					--	55	35	53	68			
18					--	48	42	55	--			
19					--	56	46	59	--			
20					--	52	52	64	--			
21					--	43	a75	58	--		a76	
22					--	45	72	56	--			
23					--	45	a66	58	--			
24					--	44	60	60	--			
25					--	48	56	60	--			
26					a38	a63	62	63	--			
27					40	55	65	64	--			
28					a49	54	65	65	--			
29					--	56	60	64	--			
30					--	55	58	55	--			
31					--	49	--	60	--			
Average					--	48	54	54	--			

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

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Suspended sediment, February to September 1953

Day	Janusry			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.....				--	--	--	240	2,410	1,560
2.....				--	--	--	230	1,310	810
3.....				--	--	--	289	2,860	2,230
4.....				--	--	--	250	3,040	2,050
5.....				--	--	--	256	2,480	1,710
6.....				--	--	--	282	1,870	1,420
7.....				--	--	--	289	1,280	930
8.....				--	--	--	211	1,020	580
9.....				--	--	--	161	1,010	440
10.....				--	--	--	167	1,090	490
11.....				--	--	--	156	910	380
12.....				--	--	--	152	800	a320
13.....				--	--	--	161	650	280
14.....				--	--	--	156	460	190
15.....				--	--	--	152	420	170
16.....				--	--	--	138	390	140
17.....				--	--	--	119	390	120
18.....				--	--	--	142	380	140
19.....				--	--	--	138	330	120
20.....				--	--	--	128	260	90
21.....				--	--	--	123	410	140
22.....				--	--	--	106	480	140
23.....				--	--	--	84	440	100
24.....				--	--	--	99	250	67
25.....				--	--	--	110	270	80
26.....				160	4,200	a1,800	119	350	110
27.....				220	2,700	1,600	138	310	120
28.....				240	3,540	2,290	138	220	82
29.....				--	--	--	119	300	a95
30.....				--	--	--	119	360	129
31.....				--	--	--	142	420	160
Total.				620	--	5,690	5,094	--	15,384

Day	April			May			June		
1.....	172	480	220	161	1,790	780	36	260	25
2.....	172	460	210	147	960	380	36	390	38
3.....	156	460	190	133	1,030	370	78	840	s190
4.....	133	440	160	147	970	380	99	680	180
5.....	138	320	120	142	920	350	70	320	60
6.....	142	350	130	133	870	310	58	220	34
7.....	152	440	a180	133	830	300	73	300	a60
8.....	189	940	480	138	530	200	91	260	64
9.....	200	620	330	114	540	140	64	190	44
10.....	200	830	450	95	570	150	664	120	21
11.....	243	920	600	87	510	120	49	120	16
12.....	211	1,130	640	87	410	96	38	120	12
13.....	206	1,100	610	91	440	110	32	120	10
14.....	211	900	510	91	500	120	28	100	8
15.....	195	620	320	84	500	a110	26	95	7
16.....	167	570	260	119	650	a210	21	45	3
17.....	147	540	210	156	720	300	9.7	57	2
18.....	135	900	a320	156	590	250	1.4	--	(t)
19.....	123	570	190	152	540	220	0	--	0
20.....	128	780	270	138	280	100	0	--	0
21.....	119	600	190	123	220	73	0	--	0
22.....	103	510	140	95	360	92	0	--	0
23.....	103	370	100	80	360	78	0	--	0
24.....	110	360	110	70	220	42	0	--	0
25.....	174	3,200	sa1,800	61	180	30	0	--	0
26.....	183	840	420	55	190	28	0	--	0
27.....	156	740	310	55	150	22	0	--	0
28.....	142	400	150	59	260	sa44	0	--	0
29.....	200	2,900	sb1,900	87	700	a160	0	--	0
30.....	200	2,270	1,230	87	970	230	0	--	0
31.....	--	--	--	449	540	71	--	--	--
Total.	4,910	--	12,750	3,325	--	5,896	894.1	--	774

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

REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Suspended sediment, February to September 1953--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	.1	--	e1			
6	0		0	.2	--	(t)			
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	2.6	2,200	sb32			
19	0		0	0	--	0			
20	0		0	0	--	0			
21	0		0	7.2	6,800	sa240			
22	0		0	1.4	460	sb17			
23	0		0	0	--	0			
24	.7	360	sa2	0	--	0			
25	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	0.7		2	11.5	--	290	0		0

Total discharge for period Feb. 26 to Sept. 30, 1953 (cfs-days) 14,855.3
Total load for period Feb. 26 to Sept. 30, 1953 (tons) 40,786

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.

REPUBLICAN RIVER AT STRATTON, NEBR.--Continued

Particle-size analyses of suspended sediment, March 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	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, 1953	1:00 p.m.	243		3,010							48	64	81		97	100	S
Aug. 21	5:45 p.m.	12	78	10,800	3,480		98		100								PWCM

Particle-size analyses of bed material, April 1953
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically disperzed; M, mechanically dispersed)

Date of collection	Time	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	0.250	0.062	0.125	0.250	0.500	1.000	2.000	4.000
Apr. 2, 1953	12:00 m.	161								1	4	35	86	96	98	100	S
Apr. 28	3:30 p.m.	133								1	2	18	72	92	98	100	S

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT TRENTON, NEBR.

LOCATION.--At gaging station at bridge on State Highway 25, half a mile upstream from Elm Creek and three-quarters of a mile south of Trenton, Hitchcock County.
DRAINAGE AREA.--8,120 square miles, approximately, of which about 4,910 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: November 1946 to September 1949.
Water temperatures: November 1946 to October 1950; February to September 1953 (discontinued).
Sediment records: November 1946 to October 1950; February to September 1953 (discontinued).
EXTREMES, February to September 1953.--Sediment concentrations: Maximum daily, 3,000 ppm Apr. 30; minimum daily, no flow on many days during May and July to September.
Sediment loads: Maximum daily, 2,000 tons Apr. 30; minimum daily, 0 ton on many days during May and July to September.
EXTREMES, 1946-50, 1953.--Water temperatures (1946-50): Minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 492,000 tons June 16, 1948; minimum daily, 0 ton on many days each year.
REMARKS.--Flow affected by ice Feb. 26-28. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, February to September 1953
/Once-daily temperature measurement between 1 p.m. and 4 p.m. prior to April 30, and between 8 a.m. and 10 a.m. after May 1. Many days of no flow/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--		--	50	--			
2					--		49	47	a 83			
3					--		50	44	66			
4					--		--	--	68			
5					--		--	--	62			
6					--		--	66	--			
7					--		52	--	65			
8					--		57	--	64			
9					--		48	--	69			
10					--		46	--	73			
11					--		45	--	76			
12					--		50	--	78			
13					--		53	--	78			
14					--		58	--	--			
15					--		50	--	75			
16					--		56	--	71			
17					--		37	--	73			
18					--		42	--	76			
19					--		49	--	75			
20					--		54	--	68			
21					--		64	--	a 93			
22					--		71	--	75			
23					--		63	--	72			
24					--		59	--	79			
25					--		--	--	65			
26					37		--	--	65			
27					40		67	--	74			
28					42		64	--	--			
29					--		60	--	73			
30					--		55	--	--			
31					--		--	--	--			
Average					--		54	--	73			

a Observation made between 1 p.m. and 2 p.m.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment, February to September 1953

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.....				--	--	--	217	--	e 1,000
2.....				--	--	--	191	--	e 700
3.....				--	--	--	252	1,550	1,060
4.....				--	--	--	336	--	e 1,800
5.....				--	--	--	228	--	e 900
6.....				--	--	--	234	--	e 900
7.....				--	--	--	212	--	e 800
8.....				--	--	--	154	--	e 420
9.....				--	--	--	162	--	e 500
10.....				--	--	--	191	--	e 750
11.....				--	--	--	186	--	e 700
12.....				--	--	--	176	--	e 600
13.....				--	--	--	162	--	e 500
14.....				--	--	--	128	--	e 340
15.....				--	--	--	96	--	e 200
16.....				--	--	--	106	--	e 280
17.....				--	--	--	121	1,220	398
18.....				--	--	--	145	--	e 550
19.....				--	--	--	145	--	e 500
20.....				--	--	--	158	--	e 650
21.....				--	--	--	150	--	e 550
22.....				--	--	--	150	--	e 550
23.....				--	--	--	141	--	e 460
24.....				--	--	--	121	--	e 360
25.....				--	--	--	110	--	e 300
26.....				108	1,300	379	124	--	e 400
27.....				150	2,040	826	132	--	e 460
28.....				211	2,150	1,220	132	--	e 420
29.....				--	--	--	128	--	e 380
30.....				--	--	--	117	--	e 320
31.....				--	--	--	121	1,040	340
Total.				469	--	2,425	5,026	--	18,088

Day	April			May			June		
1.....	141	900	343	252	1,930	1,310	15	--	e 10
2.....	145	1,220	478	191	755	389	17	185	8
3.....	128	880	304	162	470	206	12	138	4
4.....	132	--	e 320	97	300	sa 90	11	111	3
5.....	124	--	e 240	8.2	140	a 3	15	124	5
6.....	132	--	e 220	2.8	110	1	18	180	b 9
7.....	162	1,010	442	2.0			19	182	9
8.....	196	2,770	1,460	1.2			21	182	10
9.....	217	2,000	1,170	.9			23	176	11
10.....	186	1,890	949	2.6			21	126	7
11.....	181	1,310	640	.9			22	145	9
12.....	212	1,720	984	.7			22	132	8
13.....	212	1,570	899	.9			19	188	10
14.....	207	930	520	.9			18	140	b 7
15.....	162	840	367	.9			18	104	5
				4	--	(t)			
16.....	141	1,100	419	1.7			17	88	4
17.....	110	1,100	327	1.7			15	100	4
18.....	121	1,220	398	.9			13	105	4
19.....	114	960	295	.9			12	120	4
20.....	124	980	328	.5			12	118	4
21.....	132	770	274	.4			11	82	2
22.....	132	620	221	.2			9.6	82	2
23.....	128	540	187	.3			8.9	93	2
24.....	121	550	a 180	.4			6.9	90	2
25.....	141	1,200	sa 600	0	--	0	4.8	117	2
26.....	176	1,240	s 616	0	--	0	3.6	128	1
27.....	158	670	286	3.7			2.8	175	1
28.....	145	580	227	4.2	--	e 3	2.4	140	b 1
29.....	196	1,300	sb 750	1.5			1.2	98	(t)
30.....	246	3,000	b 2,000	3.2			.7	120	(t)
31.....	--	--	--	15	--	e 15	--	--	--
Total.	4,722	--	16,444	758.6	--	2,031	391.9	--	148

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

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Suspended sediment, February to September 1953--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	0.6	141	(t)						
2	.1		(t)						
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	.1		(t)						
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	0.8		(t)	0		0	0		0

Total discharge for period Feb. 26 to Sept. 30, 1953 (cfs-days) 11,368.3
Total load for period Feb. 26 to Sept. 30, 1953 (tons) 39,136

t Less than 0.50 ton.

REPUBLICAN RIVER AT TRENTON, NEBR.--Continued

Particle-size analyses of bed material, April 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	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	
Apr. 2, 1953.....	4	150								15	22	46	80	94	98	100	S
Apr. 28.....	4	158								0	2	21	79	95	99	99	S

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.

LOCATION.--At gaging station at bridge on U.S. Highways 6 and 34, three-quarters of a mile north of Red Willow, Red Willow County, and 2½ miles upstream from mouth.
DRAINAGE AREA.--710 square miles, approximately, of which about 400 square miles contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to October 1952.
Water temperatures: January 1950 to September 1953.
Sediment records: January 1950 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 82°F Aug. 2; minimum, freezing point Nov. 30 and probably on several other days during winter months.
Sediment concentrations: Maximum daily, 13,800 ppm July 12; minimum daily, not determined.
Sediment loads: Maximum daily, 15,200 tons July 11; minimum daily, 6 tons Sept. 30.
EXTREMES, 1950-53.--Water temperatures: Maximum, 88°F June 14, 1952; minimum, 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. 25 to Jan. 13, Jan. 15-24, Feb. 9 to Mar. 6. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, October 1952 to July 1953

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
Oct. 1, 1952....	19					17	--	277										207	0	15	0.5	486	7.9	
July 12, 1953 ..	314			37	3.3	8.8	12							190		0.26		106		14	.4	264	7.6	

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 1 a.m. and 6 p.m. Oct. 1 to May 15, and between 7 a.m. and 12 m. thereafter/

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

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

KANSAS RIVER BASIN--Continued

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	19	740	38	29	1,040	81	31	--	
2	19	640	33	29	1,040	81	30	481	
3	19	650	33	29	990		30	--	
4	19	590	30	29	--		30	--	
5	19	580	30	29	--		29	--	
6	20	590	32	29	--	e 80	30	--	
7	20	540	29	30	984		31	--	
8	21	550	31	30	985		32	547	
9	21	640	36	30	--		32	--	
10	22	670	40	31	--		32	--	
11	22	740	44	31	1,030		35	--	
12	23	800	50	31	--		33	--	
13	24	800	52	31	--		32	809	
14	24	780	50	31	--		28	--	
15	24	770	50	31	--		33	--	
16	24	760	49	31	1,160		34	312	e 34
17	25	840	57	32	--		36	--	
18	26	940	66	32	1,040		31	--	
19	26	980	69	33	--	e 90	28	--	
20	26	940	66	33	--		28	--	
21	27	810	59	34	1,020		29	--	
22	27	820	60	34	--		30	--	
23	27	880	64	34	--		33	--	
24	27	910	66	34	--		23	--	
25	28	940	71	33	--		29	--	
26	28	1,000	76	32	--		41	--	
27	28	1,020	77	32	--		42	--	
28	28	930	70	29	--	e 32	42	163	
29	28	970	73	26	--	e 28	41	--	
30	29	1,020	80	32	441	38	33	224	
31	29	1,010	79	--	--	--	30	178	
Total	749	--	1,660	931	--	2,440	998	--	1,054

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	39	--		43	--	e 340	46	3,200	a 400
2	32	--	e 22	42	--	e 320	52	3,200	449
3	35	213		41	--	e 300	57	4,100	b 650
4	41	--		41	--	e 300	49	5,480	725
5	48	--	e 38	42	--	e 300	50	5,120	691
6	45	--	e 36	42	2,620	297	53	3,580	512
7	38	--	e 30	42	2,820	320	56	3,710	561
8	49	--	e 80	42	2,500	284	54	3,800	554
9	60	--	e 130	37	2,350	235	56	3,900	590
10	66	896	160	36	2,240	218	54	3,510	512
11	63	--	e 150	35	2,720	257	52	3,120	438
12	83	--	e 340	31	2,520	211	49	2,810	372
13	88	2,000	b 480	34	3,220	296	48	2,600	337
14	49	--	e 65	36	3,700	360	77	13,000	sa 3,300
15	40	--	e 44	34	2,910	267	45	4,020	488
16	22	212	12	35	2,920	276	41	2,550	282
17	25	--	e 34	34	2,540	233	38	2,000	205
18	31	831	70	35	2,760	261	39	2,100	221
19	40	--	e 100	34	2,600	a 240	42	2,210	251
20	42	--	e 100	29	1,600	b 130	41	2,100	232
21	51	1,110	153	22	600	b 36	40	2,030	219
22	73	--	e 600	28	380	29	39	1,780	187
23	76	--	e 600	31	540	45	37	1,500	150
24	56	6,500	b 1,000	40	900	97	36	1,260	122
25	48	5,280	684	38	1,250	128	34	1,270	116
26	48	4,200	a 550	46	2,130	265	33	1,240	110
27	46	3,840	477	65	2,900	509	33	1,150	102
28	46	--	e 440	40	3,430	370	33	1,070	95
29	46	--	e 420	--	--	--	33	1,150	102
30	45	--	e 380	--	--	--	33	1,190	106
31	44	--	e 360	--	--	--	35	1,410	133
Total	1,515	--	7,621	1,055	--	6,924	1,385	--	13,212

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

RED WILLOW CREEK NEAR RED WILLOW, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	34	1,360	125	39	1,300	137	30	1,170	95
2	36	1,380	134	40	1,340	145	33	1,750	156
3	36	1,870	133	32	1,480	166	31	1,430	120
4	36	1,220	119	42	1,820	207	32	1,530	132
5	37	1,260	126	47	1,750	222	32	1,320	114
6	36	1,240	120	46	1,820	225	32	1,210	105
7	38	1,500	154	45	1,770	215	33	1,240	107
8	42	2,080	236	44	1,680	200	31	1,240	104
9	44	2,130	253	42	1,690	192	30	1,350	109
10	44	1,820	216	43	1,640	190	30	1,350	109
11	45	1,730	210	41	1,500	166	30	1,550	126
12	48	1,920	238	38	1,320	135	31	1,700	142
13	48	2,050	266	37	1,050	108	30	1,710	138
14	48	2,150	279	36	1,050	102	29	1,560	122
15	48	1,970	256	34	1,050	96	28	1,330	100
16	46	1,720	214	42	2,500	sa 320	26	1,180	83
17	46	1,380	168	42	2,490	282	25	1,090	74
18	42	1,350	151	38	1,540	158	23	1,030	64
19	40	1,360	147	38	1,470	151	21	920	52
20	38	1,230	126	38	1,660	170	20	950	51
21	37	1,250	125	36	1,490	145	20	1,040	56
22	37	1,430	143	35	1,420	134	19	1,080	55
23	37	1,390	139	35	1,280	121	18	990	48
24	38	1,570	161	34	1,600	147	17	750	34
25	38	1,510	155	33	1,400	125	16	720	31
26	38	1,400	144	32	1,240	107	16	700	30
27	36	1,240	120	32	1,090	94	15	690	28
28	35	1,210	114	33	1,360	121	15	640	26
29	37	1,260	126	32	1,660	143	15	810	33
30	38	1,290	132	32	1,690	146	15	800	32
31	--	--	--	31	1,160	97	--	--	--
Total	1,200	--	5,029	1,183	--	4,968	742	--	2,476

Day	July			August			September		
1	14	830	31	14	279	10	15	454	18
2	13	720	25	16	550	a 24	15	485	20
3	13	630	22	16	584	25	15	468	19
4	13	670	24	16	518	22	15	342	14
5	13	680	24	16	447	19	15	322	13
6	13	530	19	29	4,700	sb 650	15	348	14
7	13	920	32	23	4,220	s 300	15	380	15
8	15	1,250	51	18	1,680	82	15	369	15
9	15	790	32	17	1,100	50	15	362	15
10	15	1,050	42	17	810	37	14	354	13
11	379	7,940	s 15,200	29	5,400	sb 650	14	343	13
12	225	13,800	s 10,200	19	2,890	s 166	15	319	13
13	78	7,350	s 2,040	16	730	32	15	344	14
14	40	1,810	195	16	680	29	14	325	12
15	37	1,490	149	15	400	16	14	314	12
16	36	1,300	126	15	370	15	14	288	11
17	37	1,300	130	16	430	18	14	312	12
18	33	1,080	96	16	580	25	14	305	12
19	46	3,000	sb 700	16	540	23	14	305	12
20	28	1,430	108	16	470	20	14	290	11
21	28	1,310	99	16	540	23	14	234	9
22	28	1,300	98	16	540	23	14	240	9
23	27	1,200	87	17	640	29	14	270	10
24	24	980	64	17	660	30	14	250	9
25	23	940	58	49	4,000	sa 700	15	266	11
26	21	880	50	23	2,310	s 157	15	267	11
27	21	880	50	16	880	38	15	213	9
28	20	760	41	15	610	25	14	238	9
29	17	472	22	15	580	23	14	243	9
30	15	378	15	15	420	17	14	171	6
31	15	330	13	14	460	17	--	--	--
Total	1,315	--	29,843	569	--	3,295	434	--	370

Total discharge for year (cfs-days) 12,076
Total load for year (tons) 78,892

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 September 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. 14, 1953	4:00 p.m.	85	44	16,900	4,960	--	37	--	58	--	94	100	--				SPWCM
May 4	9:40 a.m.	46	--	1,610	4,230	--	18	--	30	--	85	98	100				SPWCM
July 11	5:30 p.m.	1,120	66	14,800	5,380	--	29	--	43	--	91	99	100				SPWCM
July 12	2:40 a.m.	317	66	14,000	5,350	24	31	41	51	69	92	98	100				SPWCM
July 12	2:40 a.m.	317	66	14,000	5,520	9	17	31	43	66	92	99	100				SPNM
July 12	3:45 a.m.	250	66	13,400	4,110	--	36	--	54	--	97	100	--				SPWCM
July 12	11:30 a.m.	78	71	7,040	4,540	--	49	--	73	--	97	100	--				SPWCM
July 12	7:50 p.m.	507	65	23,800	4,370	--	36	--	56	--	92	100	--				SPWCM
July 13	1:20 a.m.	191	--	15,800	6,200	25	35	44	54	70	93	99	100				SPWCM
July 13	1:20 a.m.	191	--	15,800	6,330	6	15	32	47	69	93	99	100				SPNM
July 13	6:45 a.m.	88	69	10,800	5,490	--	44	--	69	--	94	99	100				SPWCM
Aug. 12	10:20 a.m.	19	--	2,670	3,620	--	71	--	90	--	99	100	--				SPWCM
Sept. 2	3:20 p.m.	15	--	473	4,600	--	55	--	75	--	96	--	--				SPWCM

Particle-size analyses of bed material, May to September 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	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
May 15, 1953	3	35								5	27	57	82	91	96	99	S
Sept. 3	3	15								9	32	61	84	97	100		S

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 1953.
Water temperatures: December 1950 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 444 ppm Nov. 26 to Dec. 3; minimum, 190 ppm Sept. 1-5.
Hardness: Maximum, 272 ppm Nov. 26 to Dec. 3; minimum, 113 ppm Sept. 1-5.
Specific conductance: Maximum daily, 760 micromhos Dec. 3; minimum daily, 273 micromhos July 14.
Water temperatures: Maximum, 97°F July 28; minimum, freezing point on several days during November to January, March.
EXTREMES, 1950-53.--Dissolved solids: Maximum (1951-53), 444 ppm Nov. 26 to Dec. 3, 1952; minimum, 190 ppm Sept. 1-5, 1953.
Hardness: Maximum, 272 ppm Nov. 26 to Dec. 3, 1952; minimum, 113 ppm Sept. 1-5, 1953.
Specific conductance: Maximum daily (1951-53), 830 micromhos Aug. 21, 1952; minimum daily, 273 micromhos July 14, 1953.
Water temperatures: Maximum, 97°F Aug. 19, 1952, July 28, 1953; 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. Water discharge computed by subtracting the discharge of Medicine Creek at Cambridge from that of the Republican River at Cambridge. Discharge records for the Republican River at Cambridge and Medicine Creek at Cambridge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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	Color
Oct. 8-31, 1952	70.5	41	0.01	52	17	27	15	269	39	9.5	0.9	3.5	0.13	338		0.46	64.3	201	0	21	0.8	518	7.9	
Nov. 1-25	142	45	.01	59	19	29	14	292	46	9.5	.8	4.5	.10	372		.51	143	224	0	21	.8	556	8.0	
Nov. 26-Dec. 3.	59.4	50	.03	73	22	34	16	355	54	11	1.0	4.0	.14	444		.60	71.2	272	0	20	.9	658	8.2	
Dec. 4-23	192	48	.02	60	19	29	14	290	50	8.5	.9	4.0	.09	378		.51	196	226	0	21	.8	557	8.1	
Dec. 24-30	163	51	.01	69	21	33	15	327	57	9.5	1.0	4.0	.09	431		.59	190	258	0	21	.9	622	8.2	
Dec. 31-Jan. 5, 1953	182	44	.01	60	17	27	14	286	44	7.5	.9	4.0	.09	363		.49	178	220	0	20	.8	539	8.2	
Jan. 6-15	278	40	.01	52	15	24	12	246	42	7.0	.9	3.6	.07	322		.44	242	193	0	20	.7	478	8.0	
Jan. 16-20	236	44	.01	60	18	29	14	284	55	8.0	1.0	3.8	.10	379		.52	241	225	0	21	.8	554	8.0	
Jan. 21-27	398	39	.01	50	15	24	12	235	44	6.5	.8	3.8	.08	319		.43	343	187	0	20	.8	472	8.0	
Jan. 28-Feb. 28	298	53	.01	61	18	29	14	280	52	8.5	1.0	4.2	.09	390		.53	314	224	0	21	.8	568	7.8	
Mar. 1-31	363	54	.00	61	16	30	14	273	55	8.0	.9	4.5	.09	382		.52	374	217	0	22	.9	556	8.1	
Apr. 1-30	392	54	.00	58	16	34	14	273	57	10	1.0	3.5	.11	382		.52	404	211	0	24	1.0	568	7.8	
May 1-27	172	48	.00	53	18	35	15	263	61	10	1.1	2.4	.10	384		.52	178	206	0	25	1.1	555	7.5	
May 28	696	26	.10	50	8.0	9.7	14	204	20	1.0	.4	.6	.04	234		.32	440	158	0	11	.3	308	7.2	
May 29-June 13.	145	44	.00	44	16	29	15	232	44	10	.9	1.3	.09	328		.45	128	174	0	25	1.0	483	7.7	
June 14-July 4	16.7	62	.02	45	21	38	18	274	54	13	1.0	.9	.14	392		.53	17.7	197	0	27	1.2	563	7.8	
July 11-14	607	29	.11	41	7.2	7.0	12	162	3.0	2.0	.4	2.1	.05	196		.27	321	132	0	9	.3	300	8.5	
July 15-Aug. 2	50.5	46	.02	53	13	28	18	250	42	9.5	.8	2.1	.11	342		.47	46.6	186	0	23	.9	496	7.8	

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--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				Hardness as $CaCO_3$		Per cent 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					
														Residue at 180°C	Sum									
Aug. 3-4, 1953	68.5	50	0.06	38	7.2	20	16	179	24	3.0	0.6	7.4	0.14	264		0.36	48.8	124	0	23	0.8	356	7.8	
Aug. 5-6	41.0	54	.05	52	13	27	17	252	35	8.0	.9	1.7	.14	332		.45	36.8	183	0	22	.9	483	7.9	
Aug. 7-8	178	31	.03	40	7.3	11	13	179	11	4.0	.4	6.1	.09	214		.29	103	130	0	14	.4	326	7.4	
Aug. 9-12	39.3	50	.03	51	13	26	18	246	32	8.5	.8	2.3	.14	328		.45	34.8	179	0	22	.8	474	7.8	
Aug. 13-27	6.5	50	.05	56	16	33	16	276	46	11	.8	2.1	.14	370		.50	6.49	204	0	24	1.0	547	7.6	
Sept. 1-5	13.2	26	.06	34	6.8	8.6	14	158	10	2.0	.4	2.1	.10	190		.26	6.77	113	0	12	.3	287	7.6	
Weighted average [a]	196	49	0.01	57	16	29	14	b267	49	8.5	0.9	3.6	0.09	364		0.50	193	208	0	22	0.9	535	--	

a Represents 100 percent of runoff for water year October 1952 to September 1953.
b Includes carbonate as bicarbonate.

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily temperature measurement between 12 m. and 5 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	56	a32	34	a35	33	57	57	80	--	a81	--
2	--	52	a33	35	a40	35	49	53	80	--	--	--
3	--	46	a33	34	50	a33	58	51	82	--	--	67
4	--	--	a33	a34	49	a32	55	--	82	--	--	71
5	--	47	a33	a35	a42	a36	a45	62	-	--	87	--
6	--	44	a32	33	a37	46	59	a58	74	--	90	--
7	--	44	34	a32	a35	40	48	a62	75	--	67	--
8	50	42	35	a34	43	a42	59	a60	80	a67	80	--
9	56	42	35	a33	39	50	51	--	87	--	90	--
10	56	38	34	a35	34	46	51	58	90	--	--	--
11	58	a34	34	35	34	50	44	65	93	a69	--	--
12	54	44	34	34	34	53	--	56	92	80	--	--
13	--	46	34	36	35	54	a45	--	91	74	87	--
14	47	46	34	33	37	50	a53	62	--	83	84	--
15	50	56	34	32	35	49	a41	--	--	83	78	--
16	--	a45	35	33	34	--	a47	62	86	83	a68	--
17	56	43	34	35	34	56	a37	69	a74	87	a72	--
18	50	43	34	34	--	47	47	72	--	87	--	--
19	52	40	35	36	34	--	53	76	73	a72	a77	--
20	50	37	34	36	--	47	--	78	83	76	--	--
21	--	--	34	36	34	48	62	71	93	87	--	--
22	54	34	34	34	35	--	68	75	91	84	--	--
23	56	37	34	36	--	45	66	71	92	88	--	--
24	52	34	33	35	35	a39	--	--	93	91	--	--
25	58	32	33	35	35	a42	54	a71	82	90	--	--
26	a46	33	34	37	40	62	67	72	82	--	--	--
27	57	32	33	36	40	62	65	a64	82	a84	--	--
28	52	32	34	36	40	62	71	a70	91	97	--	--
29	56	33	--	--	--	--	60	a74	--	87	--	--
30	59	33	34	34	--	58	58	a72	--	a86	--	--
31	48	--	--	40	--	46	--	a68	--	a82	--	--
Average	--	41	34	35	38	46	54	66	--	--	--	--

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

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 1953.
Sediment records: April 1951 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 86°F July 13; minimum, freezing point Dec. 13 and probably on several other days during winter months.
Sediment concentrations: Maximum daily, 918 ppm Aug. 20; minimum daily, 34 ppm Oct. 28.
Sediment loads: Maximum daily, 92 tons Mar. 14; minimum daily, 2 tons Oct. 27, 28.
EXTREMES, 1951-53.--Water temperatures: Maximum, 86°F July 13, 1953; minimum, freezing point Dec.15, 1951, Jan.23, Dec.13,1952, and probably on other days during winter months.
Sediment concentrations: Maximum daily, 20,000 ppm July 12, 1951; minimum daily, 34 ppm Oct. 28, 1952.
Sediment loads: Maximum daily, 22,700 tons May 20, 1951; minimum daily, 2 tons Oct. 27, 28, 1952.
REMARKS.--Flow affected by ice Nov. 25 to Dec. 14, Dec. 23 to Jan. 3, Jan. 7, 8, 15-19, Feb. 10-13, 16-28, Mar. 2. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily temperature measurement between 8 a. m. and 8 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	--	33	--	37	--	58	53	70	85	--	71
2	56	--	--	--	--	36	47	52	68	82	--	73
3	59	--	35	37	--	--	55	46	66	83	--	73
4	56	--	--	--	47	40	55	47	--	72	71	60
5	51	50	33	37	42	39	57	51	64	73	--	68
6	48	--	--	--	41	38	49	54	57	72	77	62
7	44	--	39	--	--	--	48	64	62	68	75	67
8	45	42	40	36	40	49	48	67	65	65	65	68
9	53	--	--	41	41	--	50	66	66	69	71	68
10	--	--	33	39	--	50	49	52	74	73	75	67
11	54	42	--	43	35	--	43	51	84	68	--	69
12	55	40	37	37	--	50	45	55	74	74	66	69
13	54	--	32	--	--	--	53	54	--	86	67	69
14	--	--	35	--	37	--	52	53	76	75	68	62
15	53	45	39	--	38	--	49	53	77	71	67	67
16	54	--	33	35	--	56	53	59	72	78	66	61
17	50	--	--	--	40	--	40	55	79	72	66	--
18	53	44	--	--	--	52	44	63	82	72	72	63
19	50	--	35	38	--	--	47	70	75	74	68	--
20	48	--	36	--	--	44	55	70	75	72	72	62
21	49	--	--	42	34	--	60	67	70	71	63	--
22	48	--	--	--	--	50	62	67	--	70	70	66
23	53	--	33	34	34	--	63	67	76	69	68	--
24	48	--	33	45	--	40	55	77	81	72	70	68
25	--	--	--	37	35	--	51	67	66	70	73	--
26	57	33	--	--	37	50	47	68	74	--	72	58
27	49	--	33	36	39	--	55	65	70	76	71	--
28	48	34	--	--	40	55	57	65	75	74	70	65
29	45	33	--	44	--	--	58	65	80	80	70	--
30	52	33	35	38	--	--	54	--	--	73	78	60
31	50	--	34	--	--	48	--	72	--	73	72	--
Average	51	--	--	--	--	--	52	60	72	74	70	--

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	16	94	4	23	--		23	62	4
2	16	86	4	23	--		24	60	a 4
3	16	87	4	23	--		25	80	5
4	17	133	6	23	--		25		
5	17	88	4	24	62		25		
6	17	66	3	24	--		25		
7	18	60	3	24	--		26	88	6
8	19	60	3	24	55		25		
9	20	68	4	24	--		26		
10	20	66	4	24	--		26		
11	21	66	4	24	51		26		
12	21	72	4	25	57		26	66	5
13	21	68	4	26	--	e 4	25	76	5
14	22	65	b 4	26	--		25	100	b 7
15	24	74	5	26	53		22	72	4
16	24	76	5	26	--		23	58	4
17	24	64	4	28	81		23		
18	23	78	5	28	87		23		
19	23	58	4	27	--		22		
20	23	50	3	26	--		22		
21	23	48	3	26	--		23		
22	23	50	3	28	--		24		
23	23	48	3	28	--		21		
24	23	50	3	28	--		21	96	6
25	23	66	4	25	--		24		
26	23	60	4	24	148	10	25		
27	22	38	2	20	130	a 7	21		
28	22	34	2	23	110	7	19		
29	22	50	3	22	84	5	21		
30	23	58	4	22	80	5	22		
31	23	46	3	--	--	--	24		
Total	652	--	115	744	--	134	732	--	176

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	26	--		29			35		
2	29	--		28			32		
3	34	110		29			29		
4	25	--		29			28		
5	27	91	e 7	30			33		
6	27	--		28			33	151	11
7	24	--		27			30		
8	26	140	10	27	73	s 5	29		
9	28	84	6	27			29		
10	30	97	8	26			28		
11	32	118	10	25			28		
12	32	114	10	26			28	114	9
13	33	--		26			31	600	sb 70
14	32	--		26			38	789	s 92
15	26	108		25	57		33	190	a 17
16	25	173		25	--		29	138	11
17	26	--		26	82		28	100	8
18	28	--	e 11	25	--		29	115	9
19	30	152		25	--	e 9	27	--	
20	31	--		20	--		26	135	
21	31	123		19	209		25	--	
22	30	--		22	--		24	85	
23	29	94	7	24	216		24	--	
24	29	110	9	26	--		24	68	e 6
25	30	112	9	28	264	20	24	--	
26	30			30	354	29	24	75	
27	32			35	276	26	24	--	
28	30	101	8	35	200	19	24	86	
29	29			--	--	--	25	--	
30	29			--	--	--	25	--	
31	29			--	--	--	27	121	9
Total	899	--	276	748	--	254	873	--	418

e Estimated.
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 1952 to September 1953--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	126	10	29	366	29	19	495	25
2	27	144	10	26	237	17	26	900	63
3	26	122	9	27	239	17	25	725	49
4	25	114	8	28	302	23	25	840	57
5	25	142	10	28	352	27	21	440	25
6	24	161	10	26	372	26	21	354	20
7	27	211	15	25	391	26	22	466	28
8	37	480	b48	24	380	25	23	588	36
9	36	442	43	23	373	23	23	557	35
10	33	290	26	25	484	33	22	581	34
11	30	174	14	28	500	38	20	518	28
12	29	184	14	24	350	23	18	485	24
13	28	172	13	22	245	15	17	414	19
14	26	196	14	22	257	15	16	360	16
15	27	209	15	22	394	23	15	339	14
16	24	185	12	25	508	34	14	316	12
17	24	162	10	25	398	27	13	296	10
18	25	146	10	25	397	27	13	326	11
19	26	184	13	24	485	31	12	328	11
20	26	234	16	23	454	28	12	295	10
21	25	252	17	22	377	22	13	332	12
22	25	252	17	21	330	19	14	330	12
23	25	275	19	20	331	18	14	300	11
24	27	318	23	20	338	18	13	298	10
25	28	240	18	19	328	17	12	256	8
26	24	167	11	19	336	17	12	268	9
27	23	283	18	18	292	14	12	311	10
28	23	264	16	21	544	31	12	320	10
29	28	508	38	24	650	b42	11	318	10
30	35	620	58	23	460	a28	11	320	b10
31	--	--	--	21	452	26	--	--	--
Total	816	--	555	729	--	759	502	--	629

	July			August			September		
1	11	348	10	11	246	7	13	231	8
2	11	340	10	11	225	7	13	196	7
3	11	306	9	12	246	8	13	190	7
4	10	298	8	14	272	10	12	156	5
5	10	255	7	14	366	14	13	176	6
6	10	252	7	15	330	13	13	180	6
7	12	350	11	17	430	20	14	232	9
8	16	440	b19	15	246	10	14	238	9
9	21	760	43	14	247	9	14	238	9
10	19	452	23	15	405	16	14	231	9
11	18	429	21	16	328	14	13	179	6
12	22	750	b44	15	225	9	13	180	6
13	21	560	32	14	230	9	13	205	7
14	18	366	18	14	204	8	13	200	7
15	15	321	13	14	240	9	13	190	7
16	14	269	10	15	258	10	13	190	a7
17	13	267	9	16	292	13	13	200	a7
18	13	261	9	16	270	12	14	200	8
19	14	257	10	18	332	14	14	190	b7
20	14	278	10	21	918	s54	14	180	7
21	14	280	11	19	432	22	14	156	6
22	14	249	9	17	314	14	14	184	7
23	14	241	9	16	385	17	15	190	b8
24	13	256	9	18	378	18	15	194	8
25	13	229	8	19	414	21	15	180	b7
26	12	240	8	17	362	17	15	158	6
27	12	232	8	15	264	11	15	160	b6
28	12	230	7	14	240	9	15	192	8
29	11	212	6	14	264	10	15	180	b7
30	11	206	6	13	254	9	15	141	6
31	11	222	7	14	235	9	--	--	--
Total	430	--	411	471	--	423	414	--	213

Total discharge for year (cfs-days) 8,010
Total load for year (tons) 4,363

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

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, March 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	
Mar.. 14, 1953 ..	2:20 a.m.	49		2,560	1,600	40	49	63	74	84	98	100					SBWCM
July 9	10:05 a.m.	21		812	2,170		42		62		95	100					SPWCM
Aug. 20	7:55 a.m.	26	64	1,220	4,960		8		27		94	100					SPNM

Particle-sise analyses of bed material, June to September 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	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	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
June 11, 1953....	2	20					4	6	10	42	61	68	73	76	82	92	SPWCM
Sept. 10.....	3	14					6	8		35	60	65	71	81	91		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 1953.
Sediment records: April 1951 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 89°F Aug. 1; minimum, freezing point Nov. 29, Dec. 10, 16, Jan. 8 and probably on many other days during winter months.
Sediment concentrations: Maximum daily, 5,900 ppm May 16; minimum daily, no flow Aug. 8,9.
Sediment loads: Maximum daily, 2,240 tons Aug. 10; minimum daily, 0 ton Aug. 8, 9.
EXTREMES, 1951-53.--Water temperatures: Maximum, 89°F Aug. 1, 1953; minimum, freezing point probably on many days during winter months.
Sediment concentrations: Maximum daily, 22,700 ppm June 8, 1951; minimum daily, no flow Aug. 8, 9, 1953.
Sediment loads: Maximum daily, 58,000 tons Sept. 2, 1951; minimum daily, 0 ton on several days during September 1951, Aug. 8, 9, 1953.
REMARKS.--Flow affected by ice Nov. 2 to Mar. 9. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
(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	60	--	35	--	--	--	52	50	75	69	89	76
2	57	--	--	--	--	--	47	48	81	68	78	75
3	60	45	--	--	47	--	58	50	82	68	74	65
4	52	--	--	34	--	--	56	53	60	65	72	62
5	50	--	35	--	--	44	--	60	63	62	70	68
6	47	--	--	--	38	--	60	67	60	--	61	67
7	48	41	--	--	36	--	--	69	61	75	63	69
8	54	--	36	32	--	--	45	64	73	68	--	78
9	53	--	--	33	--	50	--	69	76	68	--	69
10	55	--	32	--	--	--	48	48	82	80	69	72
11	50	--	--	--	--	48	--	49	85	69	61	68
12	47	35	35	--	36	--	42	47	79	66	65	66
13	50	--	--	37	--	57	--	57	85	80	72	69
14	47	--	--	--	--	44	50	65	70	79	75	--
15	36	--	38	--	--	52	--	65	78	76	68	64
16	47	--	32	--	--	--	54	55	76	77	72	--
17	45	42	--	--	40	59	--	53	80	78	74	68
18	43	--	33	47	--	--	42	68	81	72	74	--
19	40	--	--	--	--	58	--	72	69	65	63	63
20	42	--	--	--	--	--	57	67	78	76	70	--
21	--	--	34	33	--	45	--	66	65	74	72	58
22	42	--	--	--	37	--	72	70	77	75	73	--
23	43	34	--	36	--	46	--	58	80	78	69	64
24	43	--	--	--	--	--	58	62	79	78	75	--
25	48	--	--	--	--	51	--	75	75	76	77	60
26	43	--	34	40	--	--	45	68	76	78	76	--
27	50	--	--	--	42	61	--	70	68	79	78	55
28	44	--	--	--	--	--	66	77	65	85	79	--
29	35	32	--	--	--	47	57	77	80	80	78	58
30	44	--	35	35	--	--	--	73	69	79	76	--
31	--	--	--	37	--	55	--	60	--	80	75	--
Average	47	--	--	--	--	--	--	62	74	74	72	--

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	58	(t)	0.6	22	(t)	0.7	13	(t)
2	.2			.6			.7		
3	.2			.6			.7		
4	.2			.6			.7		
5	.3			.6			.7		
6	.6	26	(t)	.7	8	(t)	.7	28	0.1
7	.6			.7			.7		
8	.6			.7			.6		
9	.6			.7			.6		
10	.6			.7			.6		
11	.6			.7	24	(t)	.6	33	.1
12	.6			.7			.6	45	.1
13	.6			.7			.6	1,500	sa 10
14	.6			.7			.6	173	.9
15	.6			.7			.6	100	a .4
16	.6			.7			.6	58	.2
17	.6			.7			.6		
18	.6			.7			.6		
19	.6			.7			.6		
20	.6			.7			.6		
21	.6			.7			.6	20	(t)
22	.6			.7			.6		
23	.6			.7			.6		
24	.6			.7			.6		
25	.6			.7			.6		
26	.6			.7			.6		
27	.6			.7			.7		
28	.6			.7			.7		
29	.6			.7			.8		
30	.6			.7			.7		
31	.6			.7	--	--	.7		
Total	16.7	--	1.2	20.5	--	1.0	19.9		0.6

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	0.8	11	(t)	0.7	24	(t)	0.8	20	(t)
2	.8			.7			1.0		
3	.8			.7			.9		
4	.8			.7			.9		
5	.8			.7			.9		
6	.8			.7			.9		
7	.8			.7			.9		
8	.9			.7			.9		
9	.9			.7			1.0		
10	.9			.7			.9		
11	.8			.7			.8		
12	.8			.8			.7		
13	.8			.8			.7		
14	.8			.8			2.7		
15	.8			.8			2.0		
16	.8			.8			1.5		
17	.8			.8			1.5		
18	.8			.8			1.1		
19	.8			.8			1.1		
20	.8			.7			1.0		
21	.8			.7			.8		
22	.8			.8			.6		
23	.8			.8			.6		
24	.8			.8			.5		
25	.8			.8			.6		
26	.8			.8			.6		
27	.8			.8			.6		
28	.7			.8			.6		
29	.7			--		--	.6		
30	.7			--		--	.6		
31	.7			--		--	.9		
Total	24.7		0.6	21.1		1.4	29.2	--	13.4

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

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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			0.9			0.4	75	a0.1
2	.6			.9			1.1	413	s1.6
3	.6			.8			.6	36	.1
4	.6			.8			2.9	3,900	sa65
5	.6			.8			1.1	180	.5
6	.6	39	0.1	.7	13	(t)	1.0	73	.2
7	1.0			.7			.8	83	.2
8	1.2			.6			.8		
9	.9			.6			.8		
10	.9			1.1	97	0.3	.5		
11	.9			.7			.4		
12	.9			.5	30	(t)	.4		
13	.9			.5			.4	39	(t)
14	.9			.7			.4		
15	.9			4.1	1,920	s378	.4		
16	.9	25	.1	7.0	5,900	s295	.4		
17	.9			1.3	372	1.3	.4		
18	.9			.9	64	.2	.3		
19	.9			.8	43	.1	.3		
20	1.0			.8			.3		
21	.8			.7			.4		
22	.8			.7			.4		
23	.7			.9	28	(t)	.2		
24	.7			1.0			.2	24	(t)
25	.6			.8			.2		
26	.6	10	(t)	.5			.2		
27	.8			.4			.2		
28	.7			.6	107	.2	.2		
29	1.1	42	.1	.4	59	.1	.2		
30	1.0	24	.1	.4	28	(t	.1		
31	--	--	--	.4	21	(t)	--	--	--
Total	24.6	--	2.6	32.0	--	676.1	16.0	--	68.4

Day	July			August			September		
1	0.2			0.1			0.1		
2	.2			.1	40	(t)	.1		
3	.2	18	(t)	.1			.1		
4	.1			.1			.1		
5	.2			3.6	3,600	sb150	.1		
6	.2			1.9	2,600	sa44	.1		
7	.4	50	a0.1	.1	225	.1	.1	33	(t)
8	.4	111	.1	0	--	0	.1		
9	.2	31	(t)	0	--	0	.1		
10	.2	40	(t)	52	4,150	s2,240	.1		
11	1.1	460	sb1.6	7.1	2,470	s107	.1		
12	.2	91	(t)	.2	330	.2	.1		
13	.2	55	(t)	.2	126	.1	.1		
14	.1			.1	119	(t)	.1		
15	.1			.2	88	(t)	.1		
16	.1			.2	60	(t)	.1		
17	.1			.2	63	(t)	.1		
18	.1			.2	64	(t)	.1		
19	.2			28	4,810	s780	.2		
20	.2			5.4	1,500	sa40	.1		
21	.2			.5	251	.3	.1	30	(t)
22	.1	23	(t)	.2	116	.1	.1		
23	.1			.3	178	.1	.1		
24	.1			4.0	2,300	sb60	.1		
25	.1			.4	440	.5	.1		
26	.1			.2	95	(t)	.1		
27	.1			.2	87	(t)	.1		
28	.1			.2	55	(t)	.2		
29	.1			.2			.1		
30	.1			.1	48	(t)	.2		
31	.1			.1			--	--	--
Total	5.9	--	2.2	106.2	--	3,422.8	3.3	--	0.3

Total discharge for year (cfs-days) 320.1
Total load for year (tons) 4,190.6

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

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

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, water year March 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	
Mar. 13, 1953	8:00 p.m.	3.6	--	4,610	3,270		69		97		100	--	--				SPWCM
May 15	10:50 p.m.	31	--	81,000	6,870		20		36		92	99	100				SPWCM
May 15	11:30 p.m.	81	--	50,400	8,460		21		34		88	99	100				SPWCM
May 16	1:10 a.m.	26	--	23,600	3,200		35		52		96	100	--				SPWCM
June 4	7:15 a.m.	5.9	60	10,800	7,500		63		92		99	100	--				SPWCM
Aug. 10	7:10 p.m.	178	--	8,810	3,310		32		49		94	--	--				SPWCM
Aug. 10	7:40 p.m.	238	--	16,800	2,820		31		51		95	--	100				SPWCM
Aug. 10	7:50 p.m.	300	--	22,200	4,450		24		38		95	99	100				SPWCM
Aug. 10	8:45 p.m.	369	--	17,200	3,090		29		48		96	100	--				SPWCM
Aug. 10	9:00 p.m.	364	--	22,100	4,240		28		47		98	100	--				SPWCM
Aug. 10	10:00 p.m.	238	--	12,600	4,440		36		56		98	100	--				SPWCM
Aug. 19	2:35 p.m.	1.2	65	33,500	5,140		43		66		99	100	--				SPWCM
Aug. 19	8:30 p.m.	75	--	5,580	3,350		53		78		99	100	--				SPWCM
Aug. 24	2:10 p.m.	4.4	--	2,100	1,280	74	79	82	86	90	99	100	--				SPWCM

Particle-size analyses of bed material, June to September 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	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	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
June 11, 1953	1	0.4					3	5	16	46	58	61	64	69	83	98	SPWCM
Sept. 10	3	.1					10	15		55	77	81	86	90	95		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.
Sediment records: April 1951 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 2,500 ppm Aug. 11; minimum daily, not determined.
Sediment loads: Maximum daily, 260 tons Aug. 11; minimum daily, less than 0.50 ton on many days.
EXTREMES, 1951-53.--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 many days each year.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Suspended sediment, water year October 1952 to September 1953

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.....	5.6	52	0.8	7.4	--		7.3	17	
2.....	5.5	49	.7	7.4	--		7.3	--	
3.....	5.6			7.3	--		7.5	15	
4.....	5.6			7.4	--		7.7	--	
5.....	5.8			7.5	26		7.7	--	
6.....	5.9			7.6	--		7.6	--	e0.4
7.....	6.1			7.6	--	e0.4	7.7	21	
8.....	6.4			7.7	--		7.7	--	
9.....	6.4	24	.4	7.7	15		7.6	--	
10.....	6.5			7.6	--		7.7	21	
11.....	6.5			7.7	--		7.8	--	
12.....	6.7			7.7	24		7.7	--	
13.....	6.7			7.7	--		7.7	--	
14.....	6.8			7.7	--		7.6	33	
15.....	6.9			7.6	--		7.7	32	
16.....	7.0			7.6	9		7.6	--	
17.....	6.9			7.8	--		7.6	30	
18.....	6.8			7.7	--		7.5	--	
19.....	6.8			7.7	12		7.6	--	
20.....	6.9	17	.3	7.6	--		7.7	--	
21.....	7.0			7.6	--		7.8	--	e.7
22.....	6.9			7.8	--	e.2	8.0	31	
23.....	7.1			7.8	10		7.7	--	
24.....	7.2			7.7	--		7.3	43	
25.....	7.1			7.6	7		7.4	--	
26.....	7.2			7.4	--		7.5	--	
27.....	7.1	23	.4	7.3	--		7.5	38	
28.....	7.0			7.1	--		7.5	--	
29.....	7.3			7.3	11		7.7	--	
30.....	7.4			7.3	--		7.9	--	
31.....	7.5			--	--	--	7.8	21	
Total	206.2	--	12.3	226.9	--	8.6	236.4	--	18.4

e Estimated.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	7.8	21		8.5	34		9.3	26	
2	7.8	--		8.5	--		8.8	--	
3	7.8	--		8.5	--		8.6	--	
4	7.9	--		8.5	--		8.5	41	
5	8.3	--		8.5	51		8.6	--	
6	8.0	--	e0.5	8.4	--		8.6	--	e0.8
7	7.8	--		8.5	--		8.5	--	
8	8.2	31		8.5	23		8.4	31	
9	8.4	--		8.5	--		8.5	--	
10	8.4	--		8.5	--		8.5	--	
11	8.5	24		8.4	88		8.5	--	
12	8.5	--		8.6	--		8.5	--	
13	8.5	--		8.5	--		8.7	80	a1.9
14	8.4	38		8.8	--		9.3	140	3.5
15	7.6	27		8.8	80	e1.2	8.5	95	2.2
16	8.5	--		8.8	--		8.4	26	
17	8.4	--		8.8	53		8.5	--	
18	8.7	32		8.9	42		8.4	55	
19	8.9	--		8.4	--		8.4	--	
20	8.8	--		6.5	--		8.6	--	
21	8.8	33		9.9	--		8.7	--	
22	8.8	47	e.8	9.7	84		8.6	62	
23	8.7	--		9.6	--		8.7	--	
24	8.7	--		9.4	--		8.6	--	e1.4
25	8.7	28		9.3	23		8.6	--	
26	8.6	--		9.4	--		8.7	84	
27	8.6	--		9.3	--		8.7	--	
28	8.6	46		9.2	--		8.5	--	
29	8.6	--		--	--	--	8.4	70	
30	8.5	--		--	--	--	8.4	--	
31	8.5	--		--	--	--	8.5	--	
Total	260.3	--	21.2	245.2	--	33.6	266.5	--	39.6

Day	April			May			June		
1	8.5			8.9	58	1.4	7.6	230	4.7
2	8.3			8.7	48	1.1	8.6	378	8.8
3	8.2			8.8	45	1.1	7.8	216	4.6
4	8.2	58	1.3	8.6	106	2.5	7.6	210	4.3
5	8.3			8.4	142	3.2	7.4	196	3.9
6	8.3			8.3	144	3.2	7.4	190	3.8
7	8.5	70	b1.6	8.0	124	2.7	7.5	190	3.8
8	8.9	80	1.9	8.0	114	2.5	7.3	230	4.5
9	8.6	41	1.0	8.3	120	2.7	7.0	344	6.5
10	8.4	35	.8	8.5	102	2.3	6.9	278	5.2
11	8.4	38	.9	8.6	120	2.8	6.7	240	b4.4
12	8.3	49	1.1	8.0	124	2.7	6.4	244	4.2
13	8.2	54	1.2	7.9	136	2.9	6.2	256	4.3
14	8.2	45	1.0	8.0	146	3.2	6.1	290	4.8
15	8.0	44	1.0	8.0	184	4.0	6.1	310	5.1
16	8.0	27	.6	8.2	152	3.4	6.1	288	4.7
17	8.2	30	.7	8.2	112	2.5	6.1	288	4.7
18	8.0	51	1.1	8.0	142	3.1	6.0	290	4.7
19	8.0	103	2.2	8.0	170	3.7	6.0	328	5.3
20	7.9	94	2.0	8.0	148	3.2	5.8	364	5.7
21	8.2	69	1.5	8.0	114	2.5	5.9	362	5.8
22	8.0	84	1.8	8.0	134	2.9	6.3	440	b7.5
23	8.2	80	1.8	8.0	136	2.9	5.9	244	3.9
24	8.7	60	1.4	8.0	184	4.0	5.6	138	2.1
25	8.4	63	1.4	7.8	182	3.8	5.3	146	2.1
26	8.4	67	1.5	7.6	120	2.5	5.3	210	3.0
27	8.6	67	1.6	7.6	156	3.2	5.3	240	3.4
28	8.9	35	.8	8.5	332	7.6	5.1	254	3.5
29	9.9	160	4.3	8.7	264	6.2	5.1	238	3.3
30	9.9	110	2.9	7.9	242	5.2	4.9	198	2.6
31	--	--	--	7.6	216	4.4	--	--	--
Total	252.6	--	43.9	253.1	--	99.4	191.3	--	135.2

e Estimated.

b Computed from partly-estimated concentration graph.

a Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	4.8	202	2.6	4.4	168	2.0	5.0	95	1.3
2	4.8	206	2.7	5.0	220	b3.0	4.9	79	1.0
3	4.8	236	3.1	5.0	204	2.8	5.0	86	1.2
4	4.7	220	2.8	4.8	210	2.7	5.0	52	.7
5	4.6	238	3.0	5.2	202	2.8	5.0	72	1.0
6	4.8	262	3.4	5.0	232	3.1	5.2	75	1.1
7	5.3	244	3.5	5.6	190	b2.8	5.1	76	1.0
8	6.6	352	6.3	5.1	182	2.5	5.0	71	1.0
9	6.5	304	5.3	5.3	182	2.6	5.1	72	1.0
10	5.5	204	3.0	6.4	350	sb7.0	5.0	83	1.1
11	5.9	280	4.5	19	2,500	sa260	4.9	63	.8
12	6.0	274	4.4	5.4	303	4.4	4.9	63	.8
13	5.6	264	4.0	5.1	176	2.4	5.0	63	.9
14	5.3	260	3.7	5.0	180	2.4	4.9	67	.9
15	5.4	228	3.3	5.1	164	2.3	4.9	76	1.0
16	5.5	202	3.0	5.4	122	1.8	5.0	54	.7
17	5.4	228	3.3	5.4	110	b1.6	5.1		
18	5.4	232	3.4	5.4	104	1.5	4.9		
19	5.5	220	3.3	5.6	110	1.7	5.2		
20	5.8	230	3.6	6.2	114	1.9	5.0		
21	5.9	240	3.8	5.8	110	1.7	5.0		
22	5.6	220	b3.4	5.4	110	b1.6	5.1		
23	5.5	198	2.9	6.4	212	3.7	5.2		
24	5.4	190	b2.8	5.8	110	1.7	5.1	42	.6
25	5.1	186	2.6	5.5	102	1.5	5.1		
26	5.0	192	2.6	5.3	114	1.6	5.1		
27	4.8	221	2.9	5.1	110	b1.5	5.1		
28	4.7	165	2.1	5.0	106	1.4	5.1		
29	4.4	170	2.0	5.0	114	1.5	5.1		
30	4.9	170	b2.2	5.1	114	1.6	5.1		
31	4.7	164	2.1	5.0	110	1.5	--	--	--
Total	164.2	--	101.6	178.8	--	330.6	151.1	--	23.9

Total discharge for year (cfs-days) 2,632.6
Total load for year (tons) 868.3

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

FOX CREEK AT CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, 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 disperzed; 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
Aug. 10, 1953 ...	11:45 p.m.	8.6	68	877	1,020	50	67	74	81	89	98	100					BWCM
Aug. 11.....	12:45 p.m.	8.2		1,290	1,670	64	71	80	85	90	98	100					BWCM

Particle-size analyses of bed material, June to September 1953
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically disperzed; 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 10, 1953 ...	2	6.9					6		14	62	76	78	82	88	93	97	SPWCM
Sept. 10	3	5.1					12		20	52	59	63	73	89	96		SPWCM

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.

LOCATION.--At gaging station at highway bridge, 2½ miles upstream from month and 3½ miles east of Curtis, Frontier County.
DRAINAGE AREA.--20 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: April 1951 to September 1953.
EXTREMES,1952-53.--Sediment concentrations: Maximum daily, 7,980 ppm Aug. 10; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 5,410 tons Aug. 10; minimum daily, 0 ton on many days.
EXTREMES,1951-53.--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 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 43,800 ppm Aug. 10. No flow during October to June, record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, August 1953

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Dissolved solids: Parts per million (residue at 180°C)	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Aug. 10,1953, 6:40 p.m.	282	45	4.7	2.7	10	208	0.28	132	4	0.1	306	7.3
Aug. 10, 7:50 p.m...	251	58	4.7	2.4	12	222	.30	164	3	.1	348	7.4

Suspended sediment, water year October 1952 to September 1953

Day	July: Mean discharge (cfs)	July: Suspended sediment: Mean concentration (ppm)	July: Suspended sediment: Tons per day	August: Mean discharge (cfs)	August: Suspended sediment: Mean concentration (ppm)	August: Suspended sediment: Tons per day	September: Mean discharge (cfs)	September: Suspended sediment: Mean concentration (ppm)	September: 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	13	4,600	a 700			
7.....	0		0	21	5,600	a 600			
8.....	.3	854	s 3.5	.3	1,130	s 1.7			
9.....	0		0	0	--	0			
10.....	0		0	62	7,980	s 5,410			
11.....	0		0	11	3,050	s 275			
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	0	--	0			
28.....	0		0	0	--	0			
29.....	0		0	0	--	0			
30.....	0		0	0	--	0			
31.....	0		0	0	--	0			
Total.	0.3		3.5	107.3	--	6,986.7	0	--	0

Total discharge for year (cfs-days) 107.6
Total load for year (tons) 6,990.2

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

DRY CREEK NEAR CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, July 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; V, visual accumulation tube)

Date of collection	Time	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 8, 1953	6:55 a.m.	2.6	--	9,240	5,370	--	74	--	97	--	100	--	--				SPWCM
July 8	8:15 a.m.	1.1	--	2,180	1,700	--	79	--	97	--	100	--	--				SPWCM
July 8	8:35 a.m.	.8	--	1,800	1,150	--	88	--	96	--	100	--	--				SPWCM
Aug. 6	11:05 a.m.	7.0	68	4,650	2,890	78	93	99	100	--	---	--	--				BWCM
Aug. 7	10:30 a.m.	10.4	--	4,380	3,370	--	89	--	98	--	100	--	--				SPWCM
Aug. 10	6:30 p.m.	288	--	43,800	6,410	--	22	--	39	--	96	--	100				SPWCM
Aug. 10	7:15 p.m.	263	68	38,400	5,380	--	25	--	41	--	95	--	100				SPWCM
Aug. 10	7:50 p.m.	249	--	32,900	5,250	18	24	33	42	60	93	100	--				SPWCM
Aug. 10	7:50 p.m.	249	--	32,900	5,350	5	9	25	38	58	93	100	--				SPNM
Aug. 10	9:30 p.m.	156	--	26,000	7,960	20	28	38	50	71	96	--	100				SPWCM
Aug. 10	9:30 p.m.	156	--	26,000	8,160	4	8	29	47	70	97	100	--				SPNM
Aug. 10	12:00 m.	120	68	14,800	4,160	--	37	--	58	--	98	100	--				SPWCM

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.

LOCATION.--At gaging station, a third of a mile downstream from top of Harry Strunk Lake flood-control pool, Frontier County, 3 3/4 miles southeast of Stockville, and 13½ miles upstream from Medicine Creek Dam.
RECORDS AVAILABLE.--Water temperatures: October 1952 to September 1953.
Sediment records: April 1951 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Minimum, freezing point Dec. 2, 9, 15 and probably on many other days during winter months.
Sediment concentrations: Maximum daily, 7,600 ppm July 12; minimum daily, not determined.
Sediment loads: Maximum daily, 37,000 tone July 12; minimum daily, 5 tons Sept. 17, 30.
EXTREMES, 1951-53.--Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.
Sediment loads: Maximum daily, 490,000 tons (estimated) June 22, 1951; minimum daily, 5 tons Sept. 17, 30, 1953.
REMARKS.--Flow affected by ice Nov. 10, 20, Nov. 25 to Dec. 20, Dec. 23 to Jan. 11, Jan. 15-23; Feb. 10-13, 19-26. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, June 1951 to August 1953

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	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
June 8, 1951 ..	2,690	34	0.04	62	9.1	15		270	1.0	0.2	0.4	0.5	0.05	276		0.38		192	0	14	--	415	7.3	
July 13, 1953..	127			44	3.4	7.3	13							214		.29		124		10	0.3	300	7.4	
Aug. 11	252			39	4.7	8.0	11							192		.26		117		12	.3	275	8.0	

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 3 p. m. and 7 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	--	--	--	--	56	--	78	89	--	83
2	--	--	32	--	40	36	46	--	a 66	82	--	--
3	--	--	--	--	49	--	56	--	81	86	a 81	75
4	--	51	--	--	--	42	58	61	82	88	--	69
5	--	--	--	--	45	--	56	--	67	79	87	76
6	--	--	--	--	--	46	54	--	--	81	82	--
7	a 44	--	--	--	42	--	55	--	65	82	73	72
8	--	--	--	33	--	50	--	--	81	72	85	80
9	--	--	32	--	a 39	--	49	--	84	72	82	80
10	--	42	--	--	--	48	48	--	90	79	81	85
11	--	--	--	--	36	--	a 44	--	89	70	78	76
12	--	--	--	34	--	--	54	a 50	83	78	83	80
13	59	--	--	--	40	--	58	--	90	--	86	75
14	--	--	--	--	--	a 42	56	--	88	a 77	78	a 74
15	--	--	a 32	--	38	52	48	--	83	--	--	71
16	--	--	--	--	39	42	50	--	80	--	75	--
17	--	--	--	--	45	48	38	--	88	--	60	76
18	--	46	--	--	--	--	50	--	83	--	82	72
19	a 50	--	--	33	34	50	52	74	79	--	68	--
20	--	--	--	--	--	--	51	75	79	--	a 67	69
21	--	--	--	--	--	50	67	75	89	a 76	a 62	--
22	--	--	--	--	--	--	71	74	83	--	a 68	68
23	--	--	--	--	--	--	60	70	84	--	73	--
24	--	a 34	--	--	--	53	60	--	83	--	a 68	69
25	--	--	--	--	--	56	57	80	76	--	84	--
26	--	--		--	35	--	66	71	--	--	83	--
27	a 47	--		--	--	56	54	74	82	--	80	72
28	--	--		--	36	--	70	80	83	a 79	87	--
29	--	--	--	--	--	52	59	--	83	--	84	67
30	--	--	--	--	--	a 49	--	79	84	--	87	a 55
31	--	--	--	--	--	50	--	79	--	--	79	--
Average	--	--	--	--	--	--	55	--	82	--	78	--

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	37			53	--		49	--	
2	37			52	--		47	89	
3	37			52	--		52	--	
4	38			52	358		55	476	e 36
5	38			52	--		56	--	
6	39	160	17	53	396		57	189	
7	39			53	--		56	--	
8	42			54	--		68	274	
9	43			54	290	e 46	67	261	
10	44			54	318		66	319	
11	45	250	30	53	275		58	--	e 50
12	46	220	27	53	--		59	397	
13	47	220	28	53	409		56	--	
14	48	220	28	53	--		44	--	
15	48	210	27	53	218		51	280	38
16	49	270	36	53	--		54	650	a 95
17	50	320	43	56	350	53	56	650	a 100
18	49	280	37	55	320	48	55	580	86
19	50	280	38	55	--		60	550	b 90
20	49	410	54	54	383		58	470	74
21	48	220	28	54	--	e 50	59	680	110
22	48	280	36	55	304		62	--	
23	49	--		56	--		52	--	
24	50	--		56	209		40	51	
25	51	279		49	--		40	--	
26	51	298	e 44	40	--	e 20	47	--	e 22
27	51	296		35	--		49	250	
28	51	399		38	--		48	--	
29	51	--		35	--		58	169	
30	53	--		44	149		51	--	
31	52	--		--	--	--	48	167	
Total	1,430	--	978	1,529	--	1,227	1,678	--	1,415

Day	January			February			March		
1	58	170	b 26	63	850	b 140	79	--	
2	55	170	25	62	730	120	75	1,140	
3	52	190	a 26	60	850	140	72	--	
4	64	250	43	62	900	b 150	71	972	
5	63	290	49	62	880	150	68	--	
6	62	290	48	62	800	b 130	72	751	
7	52	110	15	62	650	110	71	--	e 170
8	76	220	45	60	700	b 110	68	707	
9	76	290	a 60	62	790	130	67	--	
10	71	260	a 50	62	--		67	1,040	
11	67	870	160	62	797		66	--	
12	67	980	180	61	--		66	--	
13	64	520	90	60	596		66	--	
14	66	380	b 70	59	--		78	1,360	290
15	53	380	54	60	865		75	1,180	240
16	51	420	b 60	59	758	e 90	68	900	160
17	51	430	59	59	348		66	900	160
18	56	240	a 36	59	--		64	--	
19	64	260	45	53	163		65	950	
20	76	640	130	41	--		65	--	
21	79	800	a 170	46	--		64	860	e 120
22	70	1,330	250	56	--		62	--	
23	65	1,200	a 220	52	--		60	--	
24	67	930	170	61	--		59	547	
25	67	950	b 170	90	480	120	59	761	
26	68	960	180	106	1,100	a 320	59	--	
27	68	900	b 160	78	1,500	a 320	59	642	
28	67	850	150	75	980	200	59	--	
29	64	850	b 150	--	--	--	60	740	120
30	64	900	b 160	--	--	--	62	520	87
31	63	950	160	--	--	--	63	480	82
Total	1,986	---	3,211	1,754	--	3,490	2,055	--	4,669

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	64	530	92	66	890	160	47	640	81
2.....	65	580	100	59	620	99	58	1,040	160
3.....	63	480	82	58	510	80	57	950	150
4.....	63	360	61	57	590	91	57	1,170	180
5.....	62	310	52	59	660	100	59	1,020	160
6.....	62	380	64	58	720	110	52	750	b110
7.....	66	430	77	56	660	100	51	740	100
8.....	73	600	120	53	600	86	50	620	84
9.....	82	640	140	53	650	93	49	620	82
10.....	73	700	140	65	1,100	190	49	670	89
11.....	71	470	90	63	1,010	170	47	660	84
12.....	67	620	110	63	830	140	44	700	83
13.....	64	520	90	57	640	98	41	680	75
14.....	62	490	82	55	500	74	39	580	61
15.....	57	450	69	55	530	79	38	520	53
16.....	56	270	41	84	2,000	sb550	37	450	45
17.....	55	270	40	73	1,800	b360	36	480	47
18.....	54	360	52	63	1,100	190	34	510	47
19.....	54	320	47	59	850	140	34	480	44
20.....	54	280	41	56	610	92	34	460	42
21.....	55	260	39	54	580	85	34	460	42
22.....	55	190	28	51	620	85	37	480	48
23.....	54	200	29	50	630	85	35	480	45
24.....	58	480	75	49	600	b80	34	460	42
25.....	56	350	53	48	580	75	32	430	37
26.....	54	300	44	47	610	77	32	340	b30
27.....	53	420	60	47	570	72	32	300	26
28.....	53	440	63	55	700	100	32	300	26
29.....	59	520	83	55	750	b110	30	320	26
30.....	66	740	130	54	710	100	30	300	24
31.....	--	--	--	51	620	85	--	--	--
Total.	1,830	--	2,194	1,773	--	3,956	1,241	--	2,123

	July			August			September		
1.....	30	330	27	26	150	10	27	160	12
2.....	30	350	28	62	2,000	sb2,100	27	250	18
3.....	29	340	27	127	6,000	sb3,200	27	150	11
4.....	28	380	29	34	600	55	27	120	9
5.....	28	470	36	33	420	37	28	130	10
6.....	29	420	33	35	550	52	28	130	10
7.....	30	410	33	70	5,300	b1,000	28	120	9
8.....	37	820	82	37	900	90	29	120	9
9.....	39	820	86	32	300	26	29	120	9
10.....	38	660	68	30	240	19	29	120	9
11.....	40	710	77	191	6,190	s3,520	29	120	9
12.....	571	7,600	sb37,000	63	2,250	s430	29	120	9
13.....	94	3,800	s1,490	37	480	48	29	110	9
14.....	49	400	53	32	260	22	28	100	8
15.....	42	280	32	31	220	b18	28	94	7
16.....	37	290	29	32	210	18	28	76	b6
17.....	36	240	23	32	220	19	28	64	5
18.....	35	250	24	32	200	17	29	76	6
19.....	35	240	23	32	180	16	29	75	6
20.....	36	210	20	49	2,100	sb360	29	74	6
21.....	36	210	20	44	1,340	160	29	77	6
22.....	34	230	21	37	490	49	29	82	6
23.....	34	230	21	59	2,420	s500	29	81	6
24.....	33	230	20	44	1,170	s150	30	78	6
25.....	32	220	b19	38	450	46	30	74	6
26.....	30	190	15	37	390	39	30	69	6
27.....	29	190	b15	32	270	23	30	68	6
28.....	28	200	15	30	220	18	31	68	6
29.....	27	180	13	29	210	16	30	73	6
30.....	27	170	12	29	190	15	29	68	5
31.....	26	120	8	28	170	13	--	--	--
Total.	1,629	--	39,399	1,424	--	12,086	862	--	236

Total discharge for year (cfs-days) 19,191
Total load for year (tons) 74,984

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, July 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	
July 12, 1953	3:50 p. m.	114	78	11,200	2,920	--	32	--	56	--	84	93	97		100		SPWCM
July 12	9:10 p. m.	2,950	--	21,200	5,240	30	40	52	64	80	94	98	99		100		SPWCM
July 12	9:10 p. m.	2,950	--	21,200	5,210	7	15	34	54	79	94	98	99		100		SPNM
July 13	3:50 a. m.	125	--	7,700	7,740	43	57	72	83	92	98	99	100		--		SPWCM
July 13	3:50 a. m.	125	--	7,700	7,770	5	10	63	83	92	98	99	100		--		SPNM
Aug. 2	10:25 p. m.	362	--	19,000	6,070	--	40	--	72	--	97	100	--		--		SPWCM
Aug. 3	1:30 p. m.	65	81	3,660	2,240	--	58	--	82	--	97	100	--		--		SPWCM
Aug. 11	7:15 a. m.	216	--	9,470	3,370	--	51	--	73	--	96	100	--		--		SPWCM
Aug. 11	8.20 a. m.	237	--	8,420	4,450	--	50	--	73	--	97	--	100		--		SPWCM
Aug. 11	9:00 a. m.	252	--	8,230	5,420	--	51	--	74	--	96	--	--		--		SPWCM
Aug. 11	9:20 a. m.	250	69	8,270	3,870	38	55	69	77	84	96	--	100		--		SPWCM
Aug. 11	9:20 a. m.	250	69	8,270	3,940	16	36	67	78	87	97	--	100		--		SPNM
Aug. 11	10:15 a. m.	242	--	8,200	4,150	--	58	--	77	--	98	--	--		--		SPWCM
Aug. 11	4:45 p. m.	325	--	7,190	3,180	--	48	--	67	--	94	98	100		--		SPWCM
Aug. 11	6:15 p. m.	368	--	6,440	3,130	--	54	--	72	--	95	--	--		--		SPWCM
Aug. 23	1:20 p. m.	87	--	9,100	3,680	--	55	--	86	--	98	--	--		--		SPWCM

Particle-size analyses of bed material, May to September 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	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	0.016	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	
May 4, 1953	3	57							1	7	20	47	70	86	96	--	S
July 13	3	124							20	25	34	51	71	82	92	98	S
Sept. 22	3	30					7	12	37	45	54	69	85	95	99	100	SP

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, 2¼ miles southwest of Orafino, 9½ 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 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 6,030 ppm July 13; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 739 tons July 13; minimum daily, 0 ton on many days.
EXTREMES, 1951-53.--Sediment concentrations: Maximum daily, 7,300 ppm Aug. 11, 1952; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 1,020 tons Aug. 11, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--No flow during period October to December, record is deleted. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, June 1951 to August 1953

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
June 8, 1951	760	21	0.09	32	5.8	12		156	1.0	0.2	0.2	0.5	0.03	156		0.21		104	0	20	--	247	7.1	
July 13, 1953, 1:25 a.m.	130			42	1.5	3.5	12							172		.23		111		6	0.1	248	7.4	
July 13, 2:10 a.m.	107			36	4.4	3.3	9.1							154		.21		100		6	.1	224	7.3	
Aug. 7	12			40	5.4	2.5	12							178		.24		122		4	.1	267	7.6	

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, January to September 1953

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0		0	0		0
2				0		0	0		0
3				0		0	0		0
4				0		0	0		0
5				0		0	.1		e.1
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	.1		e.1
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				.1		e.1	0		0
28				0		0	0		0
29				--		--	0		0
30				--		--	0		0
31				--		--	0		0
Total	0		0	0.1		0.1	0.2		0.2

Day	April			May		June		
1				0.1	e0.1			
2				.1	e.1			
3				.1	e.1			
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				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	0.3	0.3	0		0

e Estimated.

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, January to September 1953--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	19	5,510	s596			
8.....	0	--	0	1.9	3,400	sa18			
9.....	0	--	0	.7	1,300	sa3.8			
10.....	0	--	0	0	--	0			
11.....	0	--	0	.4	1,200	sa9.5			
12.....	0	--	0	2.6	3,300	sa36			
13.....	25	6,030	s739	.2	450	a,2			
14.....	.6	2,000	3.2	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.	25.6	--	742.2	24.8	--	663.5	0		0

Total discharge for year (cfs-days) 51.0
Total load for year (tons) 1,406.3

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

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, July 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	
July 13, 1953	12:45 a.m.	132		16,000	7,330	--	46	--	78	--	99	100					SPWCM
July 13	1:25 a.m.	130		14,400	6,840	33	48	65	82	96	99	100					SPWCM
July 13	1:25 a.m.	130		14,400	6,980	10	18	41	69	95	99	100					SPNM
July 13	2:10 a.m.	102		12,800	6,170	37	52	69	85	97	100	--					SPWCM
July 13	2:10 a.m.	102		12,800	6,200	11	22	46	72	98	100	--					SPNM
Aug. 7	9:40 a.m.	88		14,400	4,500	42	59	78	93	100	--	--					PWCM
Aug. 7	9:40 a.m.	88		14,400	4,580	11	25	63	88	100	--	--					PNM
Aug. 7	11:30 a.m.	48		9,030	2,810	--	67	--	94	--	100	--					SPWCM
Aug. 7	5:25 p.m.	12		7,240	4,830	--	80	--	99	--	100	--					SPWCM
Aug. 12	11:00 a.m.	2.6		2,040	1,310	91	98	98	98	100	--	--					BWCM

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION.--At county highway bridge 100 feet downstream from gaging station, three-quarters of a mile north of Cambridge, Furnas County, 2¼ miles upstream from mouth, and 7½ miles downstream from Medicine Creek Dam.
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 1953.
Sediment records: November 1945 to December 1949, March 1951 to September 1953.
EXTREMES, 1952-53.--Water temperatures: Maximum, 88°F June 10; minimum, freezing point Feb. 26 and probably on several other days during winter months.
Sediment concentrations: Maximum daily, 8,130 ppm May 28; minimum daily not determined.
Sediment loads: Maximum daily, 14,500 tons May 28, minimum daily, 1 ton Oct. 1, 2.
EXTREMES, 1945-49, 1951-53.-- Water temperatures (1951-53): Maximum, 94°F June 20, 1952; minimum, freezing point on several days during winter months each year.
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. 25 to Dec. 11, Dec. 13, 14, 16, 18-21, Dec. 23 to Jan. 2, 7, 15, 15-18, Feb. 10-13, 15-17, 19-25, Mar. 4. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily temperature measurement between 1 p.m. and 6 p.m. October to April, and between 7 a.m. and 10 a.m. May to September)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	55	--	--	--	--	--	47	68	74	74	74
2	67	53	--	--	45	--	48	a 53	63	71	74	72
3	71	45	--	40	--	38	59	42	63	70	74	65
4	67	--	--	--	--	--	59	46	67	75	74	65
5	69	--	--	--	--	--	55	46	63	73	73	65
6	--	49	--	--	44	--	58	51	60	a 79	74	66
7	60	--	--	39	--	51	37	51	66	69	72	66
8	64	--	34	--	--	--	61	52	68	68	70	66
9	63	--	--	--	--	--	50	58	69	69	74	66
10	59	--	--	--	39	--	52	a 58	a 88	70	74	67
11	65	--	--	45	--	46	46	49	72	70	72	65
12	65	--	46	--	--	--	56	a 49	72	69	70	62
13	59	--	--	--	--	--	58	46	74	--	72	64
14	52	--	33	--	41	--	60	47	72	71	72	63
15	60	--	--	--	--	--	52	52	69	71	69	64
16	61	--	42	--	--	--	52	54	66	69	70	63
17	55	43	--	37	--	--	41	54	68	70	69	64
18	63	--	--	--	--	52	50	55	71	72	72	62
19	61	--	--	34	--	--	55	57	73	71	69	60
20	54	--	--	--	--	--	59	57	68	71	70	59
21	57	--	--	41	--	--	66	56	72	75	66	56
22	61	--	--	--	--	--	58	56	72	71	68	57
23	62	--	--	--	35	49	61	57	71	69	a 77	61
24	61	--	--	--	--	--	58	a 77	73	79	72	60
25	63	--	--	44	--	--	55	60	66	75	71	57
26	62	--	36	--	32	--	64	60	66	74	70	57
27	56	--	--	--	45	59	68	64	71	75	71	58
28	53	--	--	--	--	--	67	62	71	74	72	58
29	54	--	--	44	--	--	55	67	74	74	72	61
30	58	--	--	--	--	--	59	a 79	72	75	a 78	53
31	58	--	--	--	--	48	--	64	--	75	72	--
Average	61	--	--	--	--	--	55	56	70	72	72	62

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953

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	12	35	1	28	35	3	20	--	
2	14	39	1	27	34	2	20	--	
3	16	60	3	26	39	3	23	--	
4	24	120	8	27	--		24	--	
5	24	85	6	27	--		27	90	
6	24	71	5	28	90		35	--	e 8
7	24	65	4	28	--		37	--	
8	26	70	5	28	--		36	100	
9	25	67	4	28	--		35	--	
10	27	54	4	28	--		35	--	
11	26	54	4	28	--		36	--	
12	26	56	4	11	--		46	200	sa 30
13	27	55	4	5.3	--		56	360	b 55
14	29	55	4	5.0	--		65	390	68
15	29	60	5	23	--		63	340	a 60
16	29	53	4	26	--	e 3	63	310	53
17	29	58	5	15	55		63	280	a 48
18	29	68	5	4.3	--		66	240	43
19	29	60	5	3.1	--		63	200	a 34
20	29	58	5	2.4	47		62	190	32
21	30	63	5	7.2	--		63	--	e 30
22	30	58	5	28	--		64	--	e 30
23	30	63	5	28	--		39	--	e 16
24	29	56	4	28	--		22	--	e 8
25	29	45	4	24	--		16	--	e 6
26	29	46	4	17	--		22	140	
27	29	48	4	12	--		30	--	
28	30	40	3	13	--		41	--	e 18
29	29	42	3	15	--		54	--	
30	26	40	3	17	--		68	130	
31	28	33	2	--	--	--	79	--	
Total	819	--	128	587.3	--	89	1,373	--	709

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	84	--	e 80	88	--		78	--	
2	64	--	e 60	88	180		75	--	
3	69	340	63	88	--		71	200	
4	66	--		88	--		70	--	
5	66	--		88	--	e 36	67	--	
6	66	--		88	160		67	--	
7	65	290		88	--		67	140	
8	64	--		88	--		67	--	
9	64	--	e 40	85	120		67	--	
10	63	--		79	170		67	110	
11	64	180		78	--		67	130	
12	63	--		77	--		67	--	
13	63	--		75	--		70	--	
14	64	--		73	120		73	240	
15	64	--		73	--		70	--	
16	64	150	26	72	--		69	--	e 28
17	60	160	26	74	--		69	--	
18	66	200	b 36	73	--		69	160	
19	69	290	54	72	--	e 48	69	--	
20	68	220	a 40	65	--		69	--	
21	69	160	30	60	--		69	--	
22	74	--		62	--		69	--	
23	81	--		68	220		69	130	
24	86	--		75	--		67	--	
25	87	280		80	--		68	96	
26	87	--	e 50	77	480		69	--	
27	88	210		75	190		69	160	
28	88	--		75	--		69	--	
29	88	180		--	--	--	69	--	
30	88	--		--	--	--	69	--	
31	88	--		--	--	--	71	150	
Total	2,240	--	1,395	2,172	--	1,236	2,146	--	868

e Estimated.
s Computed by subdividing day.
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 1952 to September 1953--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	70	--	e 30	60	190	31	60	470	76
2	70	170	32	61	180	30	70	1,200	sa 240
3	69	190	35	61	160	26	61	490	81
4	69	160	30	60	180	29	61	500	82
5	68	120	22	60	170	28	61	480	79
6	64	120	21	60	160	26	61	440	72
7	66	130	23	60	150	24	61	430	71
8	66	220	39	60	150	24	61	390	64
9	66	200	36	59	160	25	61	450	74
10	64	200	35	60	180	29	62	470	79
11	64	180	31	59	160	25	61	400	66
12	64	170	29	59	160	25	61	370	61
13	63	180	31	59	140	22	61	360	59
14	63	200	34	58	130	20	61	410	68
15	63	200	34	58	140	22	62	420	70
16	63	170	29	58	140	22	61	410	68
17	63	150	26	59	140	22	61	400	66
18	61	140	23	59	140	22	61	380	63
19	59	160	26	59	150	24	60	350	57
20	59	160	26	59	150	24	60	370	60
21	59	160	26	58	140	22	60	320	52
22	56	200	b 30	58	140	22	61	380	63
23	60	460	a 75	58	120	19	60	430	70
24	58	400	a 65	58	130	20	60	320	52
25	58	400	63	58	150	23	58	330	52
26	59	330	52	57	130	20	57	300	46
27	58	270	42	80	2,600	sb 1,500	48	260	34
28	59	260	41	404	8,130	s 14,500	46	230	29
29	61	250	41	69	950	180	42	230	26
30	60	240	39	64	660	110	34	200	18
31	--	--	--	62	560	94	--	--	--
Total	1,882	--	1,066	2,214	--	17,010	1,754	--	1,998

Day	July			August			September		
1	34	190	17	182	620	300	104	460	130
2	36	240	23	186	610	310	113	700	sa 240
3	47	340	43	186	630	320	122	740	240
4	52	390	55	180	540	260	119	500	160
5	55	400	59	178	510	240	107	470	140
6	67	560	100	180	530	260	109	470	140
7	78	690	150	168	460	210	109	370	110
8	88	750	180	167	470	210	109	460	140
9	86	720	170	163	510	220	99	350	94
10	75	610	120	156	520	220	89	360	86
11	79	630	130	144	540	210	79	290	62
12	44	280	33	120	420	140	74	260	52
13	42	240	27	114	410	130	69	200	37
14	41	300	33	112	430	130	69	210	39
15	38	230	24	77	300	62	74	270	54
16	33	160	14	75	260	57	64	230	40
17	32	170	15	74	310	62	58	180	28
18	31	180	15	96	470	120	53	160	23
19	31	140	12	93	420	110	47	120	15
20	31	160	13	96	420	110	45	140	17
21	31	140	12	93	370	93	44	130	15
22	31	120	10	82	320	71	43	140	16
23	36	200	a 19	84	370	84	42	130	15
24	49	420	b 55	82	310	69	42	140	16
25	72	690	130	81	300	66	42	130	15
26	84	650	a 150	80	300	65	42	120	14
27	99	720	190	82	320	71	42	110	12
28	103	630	180	80	340	73	42	120	14
29	116	720	230	85	400	a 90	41	120	13
30	143	660	260	97	440	120	41	120	13
31	190	790	400	96	460	120	--	--	--
Total	1,974	--	2,869	3,689	--	4,603	2,133	--	1,990

Total discharge for year (cfs-days) 22,983.3
Total load for year (tons) 33,961

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment May 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 analysed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
May 28, 1953....	6:40 a.m.	1,650	62	14,700	5,220		35		58		97	100	--				SPWCM
May 28	9:00 a.m.	898	--	10,600	6,960		45		69		96	99	100				SPWCM
June 5.....	10:00 a.m.	61	63	483	2,420		18		29		85	98	100				SPWCM
Aug. 26	3:10 p.m.	79	82	287	930	9	12	18	22	37	74	--	--				SBNM

Particle-size analyses of bed material, April to September 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	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	
Apr. 2, 1953.....	3	89							0	1	7	39	77	95	98		S
Apr. 28	3	53							1	2	9	61	90	98	100		S
Sept. 2	3	10e							0	2	18	53	79	91	97	99	S

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 July 1953 (discontinued).
Sediment records: October 1947 to September 1948.
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, November 1952 to July 1953

Date of collection	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 $CaCO_3$		Per cent 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					
														Residue at 180°C	Sum									
Nov. 4, 1952..	90			53	17	34		269	42	8.5								202	0	27	1.0	493	7.9	
Dec. 4	97			--	--	--		330	--	--								255	0	--	--	602	8.2	
Dec. 31	185			68	20	34		319	48	9.0								250	0	23	.9	585	7.9	
Feb. 9, 1953..	398			--	--	--		265	--	--								208	0	--	--	505	8.0	
Feb. 26.....	387			--	--	--		244	--	--								188	0	--	--	466	8.0	
Apr. 2.....	333			--	--	--		255	--	--								202	0	--	--	503	7.6	
Apr. 28	287			--	--	--		251	--	--								196	0	--	--	509	7.6	
May 26	133			--	--	--		254	36	--								187	0	--	--	498	7.6	
June 30.....	23			--	--	--		296	--	--								230	0	--	--	563	7.3	
July 28	14			--	--	--		291	--	--								220	81	--	--	541	8.1	

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.

LOCATION.--At gaging station at bridge on U. S. Highway 283, 3½ miles west of Beaver City, Furnas County.
DRAINAGE AREA.--2,060 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: December 1950 to September 1953 (discontinued).
Sediment records: December 1950 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures: Maximum, 81°F July 5; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 6,060 ppm June 5; minimum daily, no flow on several days during July and September.
Sediment loads: Maximum daily, 3,480 tons June 5; minimum daily, 0 ton on several days during July and September.
EXTREMES, 1950-53.--Water temperatures: Maximum, 81°F July 5, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 12,100 ppm June 8, 1951; minimum daily, no flow on several days during July and September 1953.
Sediment loads: Maximum daily, 22,600 tons June 8, 1951; minimum daily, 0 ton on several days during July and September 1953.
REMARKS.--Flow affected by ice Nov. 10, 11, Nov. 25 to Jan. 27, Feb. 21-23. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, June to July 1953

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				
June 5, 1953, 1:20p. m.	321			26	5.1	8.8	13								160	0.22		86		16	0.4	238	7.6
June 5, 3:55 p. m. ..	317			34	4.6	6.3	12								178	.24		104		10	.3	252	7.2
July 16	80			38	5.6	11	17								216	.29		118		15	.4	313	7.5

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily measurement generally between 6 a. m. and 12 m. Several days of no flow during July and September/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	a54	--	a32	a32	a32	41	49	68	76	75	74
2	53	--	a32	--	--	a32	47	47	68	76	73	73
3	50	--	--	32	a32	a32	38	46	69	73	75	67
4	--	a48	33	--	--	32	41	45	70	76	74	62
5	48	--	32	a32	a32	a42	45	47	64	81	73	63
6	38	--	--	--	--	a43	44	48	59	--	72	65
7	36	--	a32	--	a32	a44	42	52	64	--	58	--
8	40	a46	--	32	--	38	48	54	62	67	66	--
9	39	--	--	--	a32	39	43	58	67	--	71	--
10	42	--	a32	32	--	--	44	52	72	68	72	--
11	a54	--	a34	--	a32	46	44	52	76	70	72	65
12	40	--	--	--	--	42	44	46	76	69	68	62
13	47	39	a32	a32	a32	47	45	44	75	68	70	72
14	45	--	--	--	--	45	53	44	76	71	71	62
15	48	40	a32	--	32	38	41	52	75	71	71	62
16	45	--	--	--	--	40	46	56	67	71	70	58
17	44	--	32	a34	a32	42	37	56	69	71	68	62
18	49	39	--	--	--	44	41	56	75	74	69	60
19	54	--	--	a32	32	42	40	58	73	72	67	59
20	44	--	a32	--	--	47	44	62	72	67	67	62
21	a40	35	--	a32	a32	47	49	60	72	71	67	54
22	a49	--	a32	--	--	44	59	63	71	71	66	--
23	48	--	--	a32	a32	43	55	63	72	73	68	--
24	44	32	32	--	--	41	55	66	74	--	68	--
25	a50	--	--	a32	--	35	48	68	64	77	70	--
26	a56	36	--	--	--	40	45	69	68	77	71	--
27	40	--	a32	a32	--	43	56	65	74	75	72	--
28	a48	--	--	--	--	41	62	68	75	74	72	--
29	a53	a32	--	--	--	--	51	70	74	74	73	--
30	a55	--	--	a32	--	44	51	70	75	73	75	--
31	a50	--	--	--	--	43	--	70	--	78	73	--
Average	47	--	--	--	--	41	47	57	70	73	70	64

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 1952 to September 1953

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	0.3			1.1	68		1.1	--	
2	.2			1.2	--		1.2	61	
3	.4			1.2	--		1.3	--	
4	.2			1.2	39		1.3	34	
5	.1			.9	--		1.4	59	
6	.1			.9	--		1.7	--	
7	.4			1.1	--		1.9	25	
8	.6			1.0	31		2.1	--	
9	.6	60	0.1	1.1	--		2.2	--	
10	.4			1.0	--		3.3	29	
11	.5			1.0	--		2.3	61	
12	.9			1.0	--		2.2	--	
13	.6			1.2	27		2.3	95	
14	1.0			1.2	--		2.1	--	
15	.9			1.2	28		2.1	48	
16	.9			.9	--	a0.2	2.6	--	a0.2
17	1.3			.9	--		2.9	86	
18	1.1			1.5	38		2.8	--	
19	1.6			.9	--		2.9	--	
20	1.4			.9	--		2.6	37	
21	1.5			1.1	28		2.7	--	
22	1.4			1.7	--		2.6	29	
23	1.1			1.5	--		2.3	--	
24	1.2	82	.3	1.6	23		1.8	15	
25	1.8			1.6	--		1.3	--	
26	1.5			1.6	89		1.4	--	
27	1.3			1.3	--		1.4	35	
28	.5			1.3	--		1.5	--	
29	1.4			1.7	122		1.8	--	
30	1.2			1.2	--		1.6	--	
31	.9			--	--	--	1.6	--	
Total	27.3	--	6.1	36.0	--	6.0	62.3	--	6.2

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1.7	26		6.3	--		4.5		
2	1.9	--		6.2	--		5.5		
3	2.3	13		4.8	299		3.7		
4	2.9	--		5.3	--		6.2		
5	2.9	--		5.3	23		5.1		
6	2.8	--		4.4	--		6.2		
7	2.8	--		4.1	163		5.3		
8	2.8	10		3.8	--		5.0		
9	2.8	--		3.7	72		5.0		
10	3.3	9		3.5	--		5.3		
11	3.2	--		3.0	31		5.1		
12	3.3	--		3.2	--		5.1		
13	3.2	75		3.7	18		4.8		
14	2.8	--		3.5	--		5.0		
15	2.8	14		3.8	22	a0.8	6.0		
16	2.7	--	a0.2	3.1	--		5.6	27	0.4
17	1.8	18		3.4	122		5.5		
18	3.3	--		3.2	--		8.0		
19	3.8	7		3.0	18		9.2		
20	4.2	--		3.0	--		7.2		
21	5.2	8		3.5	15		5.6		
22	6.0	--		3.0	--		5.3		
23	6.0	8		3.0	15		5.0		
24	6.7	--		2.9	--		4.8		
25	7.0	6		4.5	--		5.1		
26	6.8	--		6.2	--		5.1		
27	6.0	15		5.8	--		4.6		
28	5.8	--		5.6	--		4.4		
29	6.0	--		--	--	--	4.4		
30	6.3	37		--	--	--	4.4		
31	5.8	--		--	--	--	5.0		
Total	124.9	--	6.2	114.8	--	22.4	167.0		12.4

a Computed on basis of infrequent samples.

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	5.0			7.0	27	0.5	32	600	sb 85
2	5.8			6.0	16	.3	61	1,240	204
3	4.5			5.8	17	.3	40	900	97
4	4.4			5.6	9	.1	30	750	61
5	4.6			6.0	10	.2	182	6,060	s 3,480
6	4.4			5.8	15	.2	44	2,330	s 312
7	4.8			5.8	13	.2	51	3,640	s 878
8	5.8			10	23	.6	28	1,570	s 124
9	6.3			9.8	28	.7	20	790	43
10	6.7			8.8	30	.7	14	480	18
11	6.2			8.8			12	265	8.6
12	6.2			8.4			11	220	6.5
13	6.0			8.0			8.6	192	4.4
14	5.8			7.8			7.6	180	3.7
15	5.3			7.8	34	.6	6.9	157	2.9
16	5.0	16	0.2	7.8			5.8	135	2.1
17	4.8			7.6			6.3	120	2.0
18	5.1			7.6			7.6	122	2.5
19	5.0			7.4			8.2	142	3.1
20	5.3			7.3			5.3	135	1.9
21	5.8			5.3			4.8	125	1.6
22	6.5			5.0			4.3	125	1.4
23	6.0			4.6			3.8	91	.9
24	6.0			4.3			3.6	110	1.1
25	5.6			4.0			4.8	144	1.9
26	5.5			4.3	97	1.1	3.2	105	.9
27	5.1			7.9	300	sb 18	2.7	86	.6
28	5.5			28	1,480	s 229	2.3	114	.7
29	6.0			19	196	s 13	2.1	80	.4
30	7.0			13	153	5.4	1.7	91	.4
31	--		--	14	184	7.0	--	--	--
Total	166.0		6.0	258.5	--	286.3	614.6	--	5,349.6

Day	July			August			September		
1	1.6	86	0.4	1.1	145	0.4	0.1	83	
2	1.4	88	.3	.8	126	.3	.1	65	
3	1.3	90	.3	.6	111	.2	.2	81	
4	1.1	82	.2	.7	112	.2	.1	94	(t)
5	.7	71	.1	5.8	156	2.4	.1	75	
6	0	--	0	7.3	210	b 4.2	.1	73	
7	0	--	0	25	5,740	s 414	0	--	0
8	.6	72	.1	8.9	815	s 24	0	--	0
9	0	--	0	6.9	700	sb 28	0	--	0
10	.1	85	(t)	30	2,690	169	0	--	0
11	5.8	250	s 7.8	16	1,600	69	.2	85	(t)
12	51	1,650	s 264	7.6	600	12	.9	108	.3
13	28	1,000	76	3.2	303	2.6	1.2	82	.3
14	34	1,350	124	2.1	220	1.2	0	--	0
15	79	1,890	403	1.2	169	.5	.4	80	.1
16	87	2,710	637	1.8	143	.7	.9	76	.2
17	30	2,180	176	11	480	sb 17	1.8	55	.3
18	15	1,140	46	9.2	430	11	3.6	50	.5
19	9.9	800	b 22	4.5	217	2.6	5.8	66	1.0
20	72	2,750	s 1,170	2.7	176	1.3	4.3	41	.5
21	7.3	260	5.1	1.6	145	.6	1.7	85	.4
22	16	650	sb 55	1.2	135	.4	0	--	0
23	45	2,370	288	.9	112	.3	0	--	0
24	19	1,850	95	.6	104	.2	0	--	0
25	11	630	19	.5	91	.1	0	--	0
26	7.3	289	5.7	.4	90	.1	0	--	0
27	3.0	155	1.2	.3	86	.1	0	--	0
28	1.2	143	.5	.2	82	(t)	0	--	0
29	.4	124	.1	.1	89	(t)	0	--	0
30	1.1	163	.5	.1	65	(t)	0	--	0
31	1.3	146	.5	.1	72	(t)	--	--	--
Total	531.1	--	3,397.8	152.4	--	762.5	21.5	--	3.8

Total discharge for year (cfs-days) 2,276.4
Total load for year (tons) 9,865.3

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

KANSAS RIVER BASIN--Continued

BEAVER CREEK NEAR BEAVER CITY, NEBR.--Continued

Particle-size analyses of suspended sediment, June 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	[1] 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 5, 1953	1:20 p.m.	316	65	9,980	4,000	43	55	66	77	92	99	100					SPWCM
June 5.....	1:20 p.m.	316	65	9,980	4,160	13	27	56	73	90	100	--					SPNM
June 5.....	3:55 p.m.	315	--	9,050	6,180	47	61	74	82	92	99	100					SPWCM
June 5	3:55 p.m.	315	--	9,050	6,180	6	13	66	83	93	99	100					SPNM
June 6	7:15 a.m.	48	59	2,600	1,630	80	90	96	97	99	100	--					BWCM
July 12.....	11:10 a.m.	77	--	3,280	2,490	55	62	72	80	94	99	100					SBWCM
July 16.....	2:15 p.m.	82	78	2,680	2,850	74	86	94	97	98	100	--					SPWCM
July 16.....	2:15 p.m.	82	78	2,680	2,970	15	34	90	96	99	100	--					SPNM
July 20.....	6:00 a.m.	372	67	8,470	5,380	--	32	--	51	--	99	100					SPWCM
Aug. 7	6:15 a.m.	34	58	8,280	3,240	--	79	--	98	--	100	--					PWCM
Aug. 7.....	8:00 p.m.	17	64	4,460	3,040	--	93	--	99	--	100	--					SPWCM
Aug. 10	7:45 a.m.	33	72	2,080	1,560	80	94	96	98	100	--	--					BWCM

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.

LOCATION.--At county 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.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949.
Water temperatures: November 1949 to September 1953 (discontinued).
Sediment records: March 1947 to September 1953 (discontinued).
EXTREMES, 1952-53.--Water temperatures: Maximum, 92°F Aug. 31, Sept. 10; minimum, freezing point probably on many days during winter months.
Sediment concentrations: Maximum daily, 8,440 ppm June 8; minimum daily, no flow Sept. 12-30.
Sediment loads: Maximum daily, 14,100 tons May 31; minimum daily, 0 ton Sept. 12-30.
EXTREMES, 1947-53.--Water temperatures (1949-53): Maximum, 92°F Aug. 31, Sept. 10, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 15,900 ppm Mar. 3, 1949; minimum daily, no flow Sept. 12-30, 1953.
Sediment loads: Maximum daily, 180,000 tons (estimated) June 22, 1947; minimum daily, 0 ton Sept. 12-30, 1953.
REMARKS.--Flow affected by ice Nov. 20, 21, Nov. 25 to Feb. 8, Feb. 10 to Mar. 4. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, May to July 1953

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
May 28, 1953..	639			40	5.6	8.3	12							200		0.27		123		12	0.3	294	7.1	
May 30, 6:45 p.m.	691			54	6.7	16	15							278		.38		162		16	.5	401	7.2	
May 30, 7:00 p.m.	686			48	7.8	16	16							254		.35		152		17	.6	396	7.5	
June 1.....	963			37	3.3	6.6	12							176		.24		106		11	.3	252	8.5	
July 14	342			48	4.4	8.7	13							230		.31		138		11	.3	322	7.8	
July 21	782			41	5.2	7.7	12							198		.27		124		11	.3	295	7.4	

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 1 p.m. and 7 p.m. No flow Sept. 12-30/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a67	--	--	--	--	--	--	a52	74	a82	a76	89
2	68	56	--	--	--	--	--	a51	74	a72	--	85
3	--	--	--	33	a35	34	59	--	78	85	90	74
4	70	58	a33	--	--	--	61	a52	a75	--	a79	70
5	--	--	--	--	--	48	--	a51	67	a83	90	85
6	56	--	a35	33	a35	--	61	70	64	85	--	86
7	64	--	--	--	--	50	--	a58	63	87	a73	a65
8	a56	--	36	--	37	--	a55	--	68	72	78	84
9	a53	47	--	34	a35	52	51	a68	74	75	a67	a65
10	--	--	--	--	--	--	53	59	a72	84	80	92
11	68	--	34	--	a33	--	--	--	a75	68	75	75
12	--	52	--	35	--	a45	57	56	a81	74	a69	--
13	68	--	35	--	--	--	62	57	--	76	a71	--
14	--	--	--	--	a35	51	a59	67	88	82	a74	--
15	63	--	--	--	--	--	52	72	a80	75	80	--
16	65	50	--	--	--	--	--	--	80	78	82	--
17	--	--	a33	a33	--	a45	--	66	82	a78	79	--
18	67	--	--	--	a34	--	a40	73	a82	84	81	--
19	61	--	--	35	--	--	--	75	--	75	74	--
20	--	42	--	--	--	61	a48	80	82	76	81	--
21	a42	--	--	--	33	--	--	--	81	75	82	--
22	--	--	--	--	--	--	75	78	a80	76	a75	--
23	64	--	33	a34	36	--	65	72	--	78	78	--
24	66	--	--	--	--	--	--	--	89	81	--	--
25	70	--	--	--	37	54	57	84	a58	a77	a79	--
26	68	--	--	a35	38	--	--	a66	75	a79	a77	--
27	--	--	--	--	--	--	70	80	80	a78	a83	--
28	52	--	--	--	45	59	73	75	--	a83	a77	--
29	--	--	--	37	--	--	62	78	87	a77	85	--
30	65	--	a33	--	--	--	57	75	87	a75	--	--
31	58	--	--	a35	--	48	--	74	--	87	92	--
Average	--	--	--	--	--	--	--	68	76	78	79	79

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 1952 to September 1953

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	1.6	169	0.7	6.4	170	a3.0	5.3	--	
2	1.0	108	.3	3.8	113	1.2	5.5	--	
3	2.4	140	a.9	2.2	--		6.1	43	
4	2.4	111	.7	2.8	80		6.7	36	
5	1.4	100	b.4	2.4	--		7.3	--	
6	1.2	109	.4	8.5	--		8.0	32	
7	1.0	139	.4	6.2	--		8.3	--	
8	.8	109	.2	4.2	--		8.5	30	
9	.8	102	.2	3.4	66		8.9	--	
10	.7	100	b.2	3.0	--		9.4	--	
11	.7	98	.2	4.0	--		8.9	54	
12	.7	95	b.2	2.8	60		8.8	--	
13	.7	86	.2	3.6	--		8.6	44	
14	.8	80	b.2	3.8	--		7.0	--	
15	1.2	78	.2	3.8	--		5.9	--	
16	1.0	88	.2	3.4	51	c.6	7.0	--	c0.9
17	1.0	85	b.2	4.0	--		5.5	41	
18	1.2	82	.3	3.8	--		6.0	--	
19	1.2	99	.3	3.6	--		5.8	--	
20	2.2	120	a.7	3.5	37		6.7	--	
21	.7	91	.2	3.5	--		6.7	--	
22	1.0	75	b.2	5.2	--		6.8	--	
23	2.4	90	.6	5.2	--		6.7	54	
24	2.2	116	.7	6.4	--		6.0	65	
25	1.0	140	.4	4.0	--		5.8	--	
26	1.4	131	.5	3.5	--		5.7	--	
27	2.2	103	.6	3.5	--		5.3	--	
28	2.2	95	b.6	3.5	50		5.0	--	
29	1.4	90	b.3	4.1	--		5.3	--	
30	2.0	90	.5	4.9	--		5.6	65	
31	3.2	125	1.1	--	--	--	5.9	98	
Total	43.7	--	12.8	123.0	--	21.0	209.0	--	27.9

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	6.1	--		17			9.9	--	
2	6.2	--		20			9.6	--	
3	6.6	44		22			10	162	
4	6.8	--		21			15	--	
5	6.9	--		23			17	78	
6	7.2	23		31			18	--	
7	7.6	--		29			17	78	
8	7.3	18		20	62	3.4	17	--	
9	7.6	18		18			16	76	
10	8.0	--		18			14	--	
11	9.0	--	c0.6	20			16	--	
12	9.5	19		22			16	67	
13	10	18		14			16	--	
14	11	--		13			17	104	
15	11	--		11	--		16	--	
16	7.9	--		10	--		15	--	c3.0
17	8.5	41		12	--		14	61	
18	8.9	--		8.7	37	c1.0	14	--	
19	9.9	11		7.5	--		14	--	
20	10	--		8.1	--		14	68	
21	11	--		7.5	46		16	--	
22	12			9.9	--		15	--	
23	12			9.5			13	--	
24	13			11			12	--	
25	14			13	66	2.1	12	57	
26	14	17	.7	17			10	--	
27	15			12			11	--	
28	16			10			12	91	
29	15			--	--	--	13	--	
30	16			--	--	--	13	--	
31	18			--	--	--	13	58	
Total	322.0	--	19.6	435.2	--	70.3	435.5	--	93.0

a Computed from estimated concentration graph.
b Computed from partly-estimated concentration graph.
c Computed on basis of infrequent samples.

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Suspended sediment, water year October 1952 to September 1953--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	14	60	2.3	37	622	62	888	4,580	11,000
2	14	60	b2.2	24	257	17	970	4,350	11,400
3	14	54	2.0	38	300	sa34	471	4,780	6,080
4	14	49	1.8	34	193	18	238	3,000	1,930
5	14	48	b1.8	29	167	13	353	4,960	s5,710
6	14	49	1.8	23	174	11	356	5,480	5,270
7	15	50	b2.0	22	194	12	408	5,790	s7,360
8	15	55	2.2	20	190	b10	480	8,440	10,900
9	17	63	2.9	18	168	8.2	373	6,910	s7,320
10	18	59	2.9	22	235	14	160	3,940	1,700
11	18	38	b1.8	22	140	b8.5	131	3,500	1,240
12	18	28	1.4	20	117	6.3	132	2,790	994
13	18	44	2.1	20	88	4.8	98	1,700	b450
14	17	91	4.2	18	90	4.4	69	1,230	229
15	16	62	2.7	18	117	5.7	61	1,260	208
16	15	50	b2.0	18	120	b6.0	52	1,180	166
17	15	42	b1.7	20	120	6.5	43	810	94
18	14	34	1.3	19	151	7.7	40	584	63
19	14	36	b1.4	17	149	6.8	37	480	b48
20	13	35	1.2	17	160	7.3	35	430	41
21	14	55	b2.0	16	140	b6.0	35	391	37
22	14	95	3.6	13	135	4.7	28	355	27
23	14	88	3.3	12	150	4.9	26	320	b22
24	14	85	b3.2	12	150	b4.8	26	300	21
25	14	79	3.0	11	142	4.2	125	5,300	sa2,200
26	14	80	b3.0	9.7	147	3.8	53	2,560	s412
27	13	88	3.1	10	168	4.5	58	1,100	b170
28	13	90	3.2	291	6,420	s6,690	45	650	a80
29	15	114	4.6	320	5,610	s5,180	43	1,300	151
30	58	2,800	sb500	290	5,880	s5,790	32	1,040	90
31	--	--	--	778	6,720	14,100	--	--	--
Total	490	--	570.7	2,218.7	--	32,056.1	5,866	--	* 75,413

Day	July			August			September		
1	25	425	29	12	276	8.9	1.6	68	0.3
2	30	740	60	13	220	b7.5	1.6	110	b.5
3	23	398	25	12	162	5.2	2.8	170	1.3
4	20	360	b19	8.4	107	2.4	2.2	72	.4
5	16	377	16	7.1	69	1.3	1.8	75	.4
6	14	295	11	6.2	65	b1.1	1.6	70	.3
7	13	237	8.3	48	2,000	sa500	1.6	98	.4
8	12	222	7.2	94	3,400	sb900	1.2	58	.2
9	14	252	9.5	80	4,750	s1,170	.9	82	.2
10	13	204	7.2	111	2,830	848	.5	56	.1
11	26	1,100	sb110	142	4,600	1,760	.2	30	(t)
12	87	2,900	sb750	83	3,880	870	0	--	0
13	268	5,640	4,080	39	1,600	190	0	--	0
14	258	3,900	2,720	21	1,370	78	0	--	0
15	282	4,620	3,520	14	1,150	43	0	--	0
16	208	3,800	2,130	11	3,000	89	0	--	0
17	179	3,220	1,560	10	2,000	54	0	--	0
18	106	2,180	624	7.7	460	9.6	0	--	0
19	69	1,490	278	12	400	b13	0	--	0
20	181	3,800	s2,560	11	220	6.5	0	--	0
21	778	5,790	12,200	6.8	160	2.9	0	--	0
22	623	5,060	8,510	5.6	135	2.0	0	--	0
23	348	4,600	4,320	4.4	110	1.3	0	--	0
24	185	3,050	1,520	3.8	95	b1.0	0	--	0
25	90	2,790	678	3.8	90	.9	0	--	0
26	52	1,400	196	3.4	98	.9	0	--	0
27	38	940	96	2.8	105	.8	0	--	0
28	28	687	52	3.0	92	.7	0	--	0
29	23	530	33	2.8	78	.6	0	--	0
30	18	424	21	1.8	65	b.3	0	--	0
31	14	320	12	1.6	66	.3	--	--	--
Total	4,041	--	46,162.2	782.2	--	6,569.2	16.0	--	4.1

Total discharge for year (cfs-days) 14,982.3
Total load for year (tons) 161,019.9

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

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Particle-size analyses of suspended sediment, April to August 1953
(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	0.350	0.500	1.000	
Apr. 30, 1953	11:00 a.m.	74	54	5,080	3,500	--	76	--	95	--	100	--	--		--		SPWCM
May 28	6:45 p.m.	548	71	8,420	5,700	46	58	68	78	88	98	99	100		--		SPWCM
May 28	6:45 p.m.	548	71	8,420	5,780	9	17	54	74	89	98	99	100		--		SPNM
May 30	4:35 p.m.	471	71	7,300	3,430	--	53	--	78	--	98	--	--		--		SPWCM
May 30	6:45 p.m.	589	73	8,080	5,670	37	48	64	78	89	98	100	--		--		SPWCM
May 30	6:45 p.m.	589	73	8,080	5,680	4	8	33	73	91	98	100	--		--		SPNM
May 31	1:10 a.m.	718	67	7,750	4,220	--	64	--	86	--	98	100	--		--		SPWCM
June 1	2:50 p.m.	883	--	4,270	5,320	55	66	74	81	89	98	99	100		--		SPWCM
June 1	2:50 p.m.	883	--	4,270	5,510	11	24	67	80	91	98	99	100		--		SPNM
June 5	2:30 p.m.	516	67	13,600	4,070	--	53	--	79	--	95	96	97		100		SPWCM
June 6	5:25 p.m.	304	64	5,950	6,360	--	68	--	90	--	99	100	--		--		SPWCM
June 7	8:00 p.m.	651	65	11,000	3,850	--	51	--	71	--	98	100	--		--		SPWCM
July 13	8:00 a.m.	295	70	5,880	4,080	--	60	--	86	--	99	100	--		--		SPWCM
July 14	2:40 p.m.	292	82	4,510	5,410	49	61	76	88	95	99	100	--		--		SPWCM
July 14	2:40 p.m.	292	82	4,510	5,510	11	22	66	88	96	99	100	--		--		SPNM
July 21	1:45 a.m.	541	--	6,040	4,220	--	52	--	72	--	97	--	--		--		SPWCM
July 21	4:00 a.m.	695	71	5,900	5,670	36	49	59	70	85	96	98	99		100		SPWCM
July 21	4:00 a.m.	695	71	5,900	5,670	11	22	49	67	84	96	98	99		100		SPNM
July 21	5:25 a.m.	750	71	7,060	3,690	--	--	--	75	--	98	100	--		--		SPWCM
July 21	1:00 p.m.	844	77	6,120	3,710	--	61	--	80	--	98	100	--		--		SPWCM
July 21	4:30 p.m.	863	76	5,140	5,680	--	59	--	75	--	97	100	--		--		SPWCM
Aug. 10	8:00 a.m.	135	72	2,740	1,880	54	73	83	92	97	99	100	--		--		SBWCM
Aug. 11	1:30 p.m.	159	75	3,560	2,250	62	72	85	91	97	99	100	--		--		SBWCM
Aug. 11	7:00 p.m.	135	75	5,520	4,060	--	72	--	95	--	100	--	--		--		SPWCM

KANSAS RIVER BASIN--Continued

SAPPA CREEK NEAR STAMFORD, NEBR.--Continued

Particle-size analyses of bed material, May 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)	Bed material												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.004	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.00	
May 26, 1953	3	9.7				6	9	12	21	22	30	44	60	77	91		SPWCM
June 1	4	885							0	1	15	47	72	87	95	99	S

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.
RECORDS AVAILABLE.--Water temperatures: February 1950 to September 1953.
Sediment records: February 1950 to September 1953.
EXTREMES, 1953-53.--Water temperatures: Maximum, 89°F July 1; minimum, freezing point Jan. 6, 19, and probably on many other days during winter months.
Sediment concentrations: Maximum daily, 15,900 ppm June 8; minimum daily, no flow on many days during July to September.
Sediment loads: Maximum daily, 42,900 tons June 8; minimum daily, 0 ton on many days during July to September.
EXTREMES, 1950-53.--Water temperatures: Maximum, 89°F July 1, 1953; minimum daily, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 32,000 ppm Apr. 25, 1951; minimum daily, no flow on many days during July to September 1953.
Sediment loads: Maximum daily, 284,000 tons July 10, 1950; minimum daily, 0 ton on many days during July to September 1953.
REMARKS.--Flow affected by ice Nov. 25 to Feb. 18, Feb. 20-23, Mar. 1-9. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, May to September 1953

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				
May 27, 1953.....	929			31	4.5	5.9	8.0								160	0.22		96		11	0.3	236	7.4
June 9.....	925			73	9.7	20	11								350	.48		222		16	.6	521	7.7
Sept. 3.....	991			37	3.3	5.3	7.7								150	.20		106		9	.2	245	8.0
Sept. 4.....	1,150			38	3.2	6.2	7.9								166	.23		108		10	.3	249	8.1

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/Once-daily temperature measurement between 7 a. m. and 12 m. Several days of no flow during summer months/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	63	47	--	a 33	--	a 35	a 55	57	a 79	a 89	--	--
2	a 64	48	--	--	34	a 36	49	a 54	--	79	--	--
3	62	48	a 33	--	--	a 36	45	48	a 80	77	--	65
4	a 56	a 50	--	--	--	33	a 56	a 55	a 83	a 83	--	63
5	53	44	--	a 33	--	a 42	48	a 57	68	78	--	--
6	51	43	--	32	a 36	a 45	a 54	55	a 67	a 72	--	63
7	48	48	33	--	--	40	50	55	a 75	69	76	a 71
8	a 53	--	--	--	--	43	--	60	63	a 71	72	65
9	a 57	41	--	a 33	--	42	49	62	65	67	70	68
10	a 55	--	--	--	a 35	44	45	65	64	--	74	69
11	a 55	--	34	--	--	a 56	--	59	a 84	a 72	74	70
12	53	--	--	--	--	a 55	47	54	a 78	68	70	65
13	51	42	--	34	--	a 55	47	a 49	a 88	69	71	65
14	a 51	--	--	--	a 35	a 52	49	53	--	72	72	64
15	48	--	--	--	a 38	43	a 47	55	--	71	74	66
16	a 54	--	--	--	33	45	a 46	61	a 79	69	72	63
17	47	a 49	a 33	a 34	33	44	42	60	a 79	--	70	a 66
18	49	--	--	--	a 40	49	a 47	61	a 81	--	68	65
19	47	--	--	a 32	39	47	40	60	a 80	--	68	59
20	44	--	a 34	--	a 35	52	42	a 62	a 79	--	68	62
21	a 50	a 41	--	a 34	36	--	48	67	a 81	--	68	54
22	a 47	--	--	--	35	a 55	55	a 74	a 82	--	a 78	55
23	44	--	--	--	36	49	60	61	75	--	--	a 63
24	51	--	a 33	--	36	44	51	68	85	--	--	59
25	50	a 33	--	a 34	37	40	a 54	a 86	70	--	--	58
26	52	--	--	--	a 40	a 58	58	78	69	--	--	67
27	49	--	--	--	a 45	a 58	a 59	62	74	--	--	59
28	43	--	a 33	--	40	a 57	61	a 78	73	--	--	a 72
29	42	a 33	--	33	--	a 59	a 64	a 80	a 88	--	--	54
30	43	--	--	--	--	55	a 59	72	78	--	--	54
31	49	--	--	--	--	48	--	77	--	--	--	--
Average	51	--	--	--	--	47	51	63	77	74	72	63

a Observation made between 2 p. m. and 7 p. m.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3.6	144	1.4	6.5	109	1.9	8.0	--	
2	3.9	108	1.1	6.7	108	2.0	9.0	--	
3	3.5	98	.9	6.4	93	1.6	9.5	112	
4	3.5	111	1.0	7.0	103	1.9	10	--	
5	3.5	119	1.1	7.8	78	1.6	10	--	
6	3.5	85	.8	8.0	80	1.7	11	--	
7	3.4	90	.8	7.8	100	2.1	10	101	
8	3.4	99	.9	7.7	--		9.5	--	
9	4.2	81	.9	8.6	56		9.5	--	
10	4.2	72	.8	8.0	--		9.0	--	
11	4.5	88	1.1	7.4	--		8.5	57	
12	4.6	93	1.2	7.8	--		8.5	--	
13	5.1	92	1.3	8.1	56		8.5	--	
14	4.9	78	1.0	8.4	--		8.0	--	
15	4.3	54	.6	8.1	--		8.0	82	
16	4.3	53	.6	8.1	--		8.0	--	a2.0
17	4.3	65	.8	11	130		8.3	70	
18	4.3	68	.8	12	--		8.0	--	
19	4.3	108	1.2	8.9	--	a2.0	8.0	--	
20	4.5	110	1.3	13	--		7.5	76	
21	4.3	84	1.0	14	76		7.0	--	
22	4.4	83	1.0	11	--		7.0	--	
23	4.4	125	1.5	9.4	--		7.0	--	
24	4.4	132	1.6	8.9	--		7.0	102	
25	5.6	164	2.5	11	82		6.5	--	
26	5.2	161	2.3	10	--		6.5	--	
27	4.6	130	1.6	7.0	--		6.5	--	
28	6.3	240	sb6.0	8.0	--		7.0	122	
29	10	172	4.6	8.0	101		7.5	--	
30	7.2	84	1.6	8.5	--		8.0	--	
31	6.5	95	1.7	--	--	--	8.5	--	
Total	144.7	--	45.0	263.1	--	58.8	255.3	--	62.0

	January			February			March		
1	9.0	143		14	--		8.0	82	1.8
2	9.5	--		14	22		7.0	65	1.2
3	10	--		14	--		6.0	40	.6
4	10	--		14	--		4.8	69	.9
5	10	113		14	--		6.0	71	1.2
6	9.0	--		13	61		7.0	105	2.0
7	9.0	--		12	--	a1.3	8.0	88	1.9
8	9.0	--		11	--		9.0	90	2.2
9	9.0	101		10	--		9.5	99	2.5
10	9.0	--		9.0	47		10	138	3.7
11	9.5	--		8.5	--		10	80	2.2
12	10	--		8.0	--		9.9	150	4.0
13	10	102		7.5	--		9.6	111	2.9
14	9.0	--		7.0	72	1.4	9.7	70	1.8
15	8.0	--		7.0	55	1.0	9.7	81	2.1
16	7.0	--	a2.2	7.0	53	1.0	9.1	83	2.0
17	7.5	104		6.5	20	.4	8.4	68	1.5
18	8.0	--		6.2	53	.9	8.4	67	1.5
19	8.7	115		9.4	50	1.3	8.3	67	1.5
20	9.0	--		10	40	1.1	8.1	62	1.4
21	9.0	51		9.0	56	1.4	8.3	74	1.6
22	9.5	--		8.5	55	1.3	8.4	67	1.5
23	9.5	--		9.0	44	1.1	8.3	55	1.2
24	9.5	--		10	40	1.1	7.5	50	1.0
25	10	93		11	31	.9	7.2	42	.8
26	11	31		9.7	37	1.0	7.2	45	.9
27	11	--		9.1	38	.9	7.4	46	.9
28	12	--		9.1	66	1.6	7.5	45	.9
29	13	10		--	--	--	7.5	54	1.1
30	14	--		--	--	--	7.5	80	1.6
31	14	--		--	--	--	8.1	75	1.6
Total	302.7	--	68.2	277.5	--	33.3	251.4	--	52.0

s Computed by subdividing day.
a Computed on basis of infrequent samples.
b Computed from estimated concentration graph.

KANSAS RIVER BASIN--Continued

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Suspended sediment, water year October 1952 to September 1953--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	8.1	70	1.5	9.7	104	2.7	7.5	261	5.3
2	8.1	82	1.8	8.1	91	2.0	5.2	189	2.6
3	8.0	44	1.0	7.5	64	1.3	4.0	254	2.7
4	8.1	53	1.2	7.2	58	1.1	4.8	380	4.9
5	8.1	68	1.5	7.5	95	1.9	49	4,800	sc 750
6	8.1	72	1.6	7.5	97	2.0	11	1,600	s 54
7	8.4	83	1.9	7.5	98	2.0	60	2,000	sb 2,200
8	8.9	78	1.9	7.4	111	2.2	966	15,900	s 42,900
9	9.6	73	1.9	7.0	107	2.0	752	13,900	28,200
10	8.8	48	1.1	8.0	80	1.7	134	12,000	s 4,550
11	8.4	52	1.2	8.1	88	1.9	45	7,800	948
12	8.4	48	1.1	7.5	118	2.4	20	3,200	173
13	8.4	66	1.5	6.8	95	1.7	12	1,050	34
14	8.1	84	1.8	6.2	80	1.3	8.0	595	13
15	8.1	52	1.1	6.3	109	1.8	6.1	398	6.6
16	8.3	55	1.2	6.7	142	2.6	4.8	395	5.1
17	7.8	64	1.3	7.5	128	2.6	6.9	500	c 9.5
18	7.7	50	1.0	8.8	130	3.1	4.8	343	4.4
19	7.7	54	1.1	8.3	143	3.2	3.8	340	c 3.4
20	7.7	56	1.2	7.4	130	2.6	62	6,300	sb 1,700
21	7.7	76	1.6	7.2	107	2.1	21	1,800	sc 130
22	7.7	102	2.1	7.0	102	1.9	14	1,300	49
23	8.6	115	2.7	6.4	119	2.0	11	1,080	32
24	7.8	109	2.3	6.2	130	2.2	6.4	850	15
25	6.7	80	1.4	6.2	120	2.0	4.0	500	5.4
26	6.8	63	1.2	5.4	103	1.5	3.0	177	1.4
27	6.3	108	1.8	587	13,800	s 25,400	2.6	202	1.4
28	6.2	138	2.3	91	2,200	sc 650	2.1	180	1.0
29	7.8	145	3.0	31	830	69	1.7	143	.6
30	9.7	121	3.2	12	750	24	1.5	121	.5
31	--	--	--	8.3	376	8.4	--	--	--
Total	240.1	--	49.5	918.7	--	26,205.2	2,234.2	--	81,802.8

Day	July			August			September		
1	1.1	99	0.3	0	--	0	0	--	0
2	1.0	137	.4	0	--	0	0	--	0
3	.6	116	.2	0	--	0	667	5,050	s 12,000
4	.2	76	(t)	0	--	0	1,040	4,850	13,600
5	.2	90	(t)	0	--	0	359	3,810	s 3,870
6	.1	80	(t)	6.1	950	sb 75	76	2,860	587
7	.1	80	(t)	10	800	sc 36	22	2,250	134
8	.1	100	(t)	1.9	140	.7	8.9	1,500	36
9	.1	113	(t)	.8	111	.2	4.0	760	8.2
10	0	--	0	.4	71	.1	2.4	500	3.2
11	.1	100	(t)	.3	31	(t)	1.7	340	1.6
12	.1	101	(t)	8.0	360	c 8.0	1.2	240	.8
13	.1	133	(t)	7.3	800	sb 40	.8	138	.3
14	.4	161	.2	22	1,200	sc 80	.6	136	.2
15	.1	120	(t)	4.6	580	7.2	.5	115	.2
16	.1	105	(t)	1.8	340	1.6	.3	137	.1
17	0	--	0	.8	250	.5	.3	84	.1
18	0	--	0	.4	136	.1	.3	100	.1
19	0	--	0	.3	114	.1	.2	58	
20	0	--	0	.2	50	(t)	.2	62	
21	0	--	0	.1	48	(t)	.1	51	
22	0	--	0	.1	26	(t)	.1	46	
23	0	--	0	0	--	0	.1	30	
24	0	--	0	0	--	0	.1	30	(t)
25	0	--	0	0	--	0	.1	49	
26	0	--	0	0	--	0	.1	28	
27	0	--	0	0	--	0	.1	23	
28	0	--	0	0	--	0	.1	22	
29	0	--	0	0	--	0	.1	24	
30	0	--	0	0	--	0	.1	26	
31	0	--	0	0	--	0	--	--	--
Total	4.4	--	1.4	65.1	--	249.6	2,186.4	--	30,242.0

Total discharge for year (cfs-days) 7,143.6
Total load for year (tons) 138,869.8

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

WHITE ROCK CREEK AT LOVEWELL, KANS.--Continued

Particle-size analyses of suspended sediment, May to September 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	
May 27, 1953	7:35 a.m.	1,460	62	13,100	4,430	--	68	--	88	--	100						SPWCM
May 27	9:30 a.m.	1,300	62	17,400	6,150	--	71	--	92	--	100						SPWCM
May 27	11:10 a.m.	943	62	11,500	5,620	64	78	88	97	99	100						SPWCM
May 27	11:10 a.m.	943	62	11,500	5,880	18	44	77	94	99	100						SPNM
May 27	3:20 p.m.	383	65	13,800	4,200	--	72	--	93	--	100						SPWCM
May 27	7:15 p.m.	221	67	13,000	4,250	--	75	--	94	--	100						SPWCM
June 8	7:00 a.m.	1,170	63	17,600	6,370	--	73	--	93	--	100						SPWCM
June 8	4:45 p.m.	876	67	14,100	5,420	--	76	--	92	--	100						SPWCM
June 9	8:55 a.m.	926	64	18,300	5,080	60	75	90	99	100	--						PWCM
June 9	8:55 a.m.	926	64	18,300	5,260	3	14	44	94	99	100						SPNM
June 9	10:35 a.m.	974	--	20,100	4,420	--	78	--	96	--	100						SPWCM
Sept. 3	8:45 a.m.	430	65	4,230	2,640	70	76	84	90	95	97	100					SBWCM
Sept. 3	11:15 a.m.	717	65	7,680	4,640	--	64	--	89	--	100						SPWCM
Sept. 3	1:15 p.m.	938	67	9,240	2,930	--	76	--	94	--	100						SPWCM
Sept. 3	2:35 p.m.	1,030	65	8,090	7,050	64	77	90	97	99	100						SPWCM
Sept. 3	2:35 p.m.	1,030	65	8,090	7,180	6	14	81	96	99	100						SPNM
Sept. 3	4:55 p.m.	1,090	65	6,880	5,040	--	77	--	96	--	100						SPWCM
Sept. 3	6:55 p.m.	1,130	67	6,630	4,230	--	79	--	98	--	100						SPWCM
Sept. 3	11:40 p.m.	1,140	65	5,540	3,710	--	64	--	98	--	100						SPWCM
Sept. 4	9:30 a.m.	1,120	--	5,720	5,670	70	85	95	98	100	--						PWCM
Sept. 4	9:30 a.m.	1,120	--	5,720	5,770	7	17	90	99	100	--						PNM

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.

LOCATION.--At gaging station at highway bridge, half a mile south of Tescott, Ottawa County, and half a mile upstream from Dry Creek.
DRAINAGE AREA.--2,820 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1953 (discontinued).
Water temperatures: April 1950 to September 1953.
EXTREMES, 1952-53.--Dissolved solids: Maximum, 3,180 ppm Sept. 12-30; minimum, 418 ppm July 18-19.
Hardness: Maximum, 656 ppm Jan. 1-16; minimum, 201 ppm July 27-30.
Specific conductance: Maximum daily, 5,550 micromhos Sept. 30; minimum daily, 631 micromhos Aug. 14.
Water temperatures: Maximum, 83°F June 12-14; minimum, freezing point Dec. 21, 24, 25, 27.
EXTREMES, 1950-53.--Dissolved solids: Maximum 3,180 ppm Sept. 12-30, 1953; minimum, 170 ppm June 8-10, 1951.
Hardness: Maximum, 656 ppm Jan. 1-16, 1953; minimum, 1950.
Specific conductance: Maximum daily, 5,550 micromhos Sept. 30, 1953; minimum daily, 253 micromhos June 8, 1951.
Water temperatures: Maximum, 83°F June 16, 1952, June 12-14, 1953; 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 1952 to September 1953 given in WSP 1280.

Chemical analyses, in parts per million, water year October 1952 to September 1953

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 $CaCO_3$: Non-carbonate	Per cent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 1-31, 1952	54.9			145	54	778		334	480	1,080		3.4	0.33	2,790		3.79	414	584	310	74	14	4,590	7.6	
Nov. 1-16.....	66.8			179	50	736		393	480	997		3.2	.31	2,710		3.69	489	652	330	71	13	4,420	7.5	
Nov. 17-24.....	90.1			175	47	632		375	455	870		5.6	.27	2,450		3.33	596	628	320	68	11	3,970	7.7	
Nov. 25-27.....	66.7			165	42	542		331	433	746		6.4	.23	2,170		2.95	391	584	313	66	9.7	3,460	8.0	
Nov. 28-Dec.31	58.8			168	49	508		386	415	704		10	.23	2,120		2.88	337	619	302	63	8.9	3,390	7.8	
Jan. 1-16, 1953	70.1			186	47	544		412	460	748		13	.27	2,270		3.09	430	656	318	63	9.2	3,680	8.0	
Jan. 17-Feb. 28	82.6			156	45	490		336	388	648		8.8	.22	1,950		2.65	435	572	296	65	8.9	3,210	7.8	
Mar. 1-31	89.7			149	41	460		314	395	635		6.8	.19	1,920		2.61	465	541	284	64	8.6	3,130	7.9	
Apr. 1-30	74.2			135	46	536		287	418	722		5.8	.21	2,070		2.82	415	526	291	69	10	3,410	7.9	
May 1-26	67.4			134	40	544		269	410	747		3.7	.29	2,090		2.84	380	501	280	69	11	3,440	7.6	
May 27	200			120	40	514		246	372	718		4.3	.27	1,980		2.69	1,070	463	261	70	10	3,300	7.5	
May 28-29	146			118	35	470		238	348	646		5.5	.28	1,810		2.46	714	439	244	69	9.7	3,030	7.7	
May 30	158			86	14	195		182	171	274		6.8	.13	878		1.19	375	272	123	59	5.2	1,490	7.6	
May 31-June 6 .	57.6			103	29	326		254	230	471		4.6	.19	1,410		1.92	219	378	170	64	7.3	2,360	7.7	
June 7-30	45.9			118	46	680		254	410	977		2.4	.31	2,390		3.25	296	484	276	73	13	3,990	7.6	
July 1	267			106	44	673		250	407	925		1.0	.31	2,340		3.18	1,690	446	241	76	14	3,720	7.6	
July 2-7	96.0			68	15	248		184	160	328		3.6	.13	958		1.30	248	233	82	69	7.0	1,650	7.7	
July 8-14	44.0			104	28	374		220	303	510		3.3	.19	1,480		2.01	176	376	196	67	8.4	2,470	7.6	
July 15	284			126	36	578		254	360	806		3.6	.24	2,130		2.90	1,630	464	256	73	12	3,540	7.4	
July 16-17	608			82	15	156		169	182	197		2.7	.12	760		1.03	1,250	267	128	56	4.2	1,260	7.6	

July 18-19, 1953	309			62	14	58		161	90	73		4.7	.10	418		.57	349	214	82	37	1.7	670	7.8
July 20-26	242			77	14	121		165	151	159		3.7	.11	656		.89	429	250	115	51	3.3	1,070	7.2
July 27-30	127			64	10	71		152	104	92		3.5	.12	476		.65	163	201	76	42	2.2	755	7.5
July 31-Aug. 6 .	75.4			110	23	298		225	245	414		3.1	.18	1,290		1.75	263	369	184	63	6.7	2,110	7.6
Aug. 7-8.....	155			90	22	334		180	230	465		3.6	.26	1,310		1.78	548	314	166	69	8.2	2,190	7.3
Aug. 9-12	386			69	11	153		161	131	202		5.0	.13	698		.95	727	217	85	60	4.5	1,170	7.4
Aug. 13-16	128			75	7.5	63		177	92	86		5.5	.10	454		.62	157	218	73	37	1.8	749	7.4
Aug. 17-21	69.0			93	15	180		219	160	250		3.8	.18	866		1.18	161	293	113	56	4.6	1,440	7.6
Aug. 22-27	53.5			128	30	454		251	313	648		1.6	.28	1,770		2.41	256	442	236	68	9.4	2,950	7.5
Aug. 28-Sept. 11	40.8			131	47	740		252	443	1,050		1.8	.38	2,610		3.55	288	522	315	75	14	4,350	7.5
Sept. 12-30	27.2			136	57	912		281	515	1,310		2.1	.46	3,180		4.32	234	572	342	76	17	5,240	7.6
Weighted average a...	80.6			128	37	453		279	343	622		5.5	0.22	1,790		2.43	390	472	243	67	9.1	2,940	--

a Represents 100 percent of runoff for water year October 1952 to September 1953.

KANSAS RIVER BASIN--Continued

SALINE RIVER AT TESCOTT, KANS.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
/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	66	a 59	33	--	39	--	51	59	76	80	81	76
2	62	52	33	a 34	40	a 40	53	57	76	80	81	77
3	60	48	35	33	41	a 40	49	51	77	--	79	--
4	60	47	35	34	42	--	50	55	77	78	79	61
5	--	48	35	33	44	39	52	--	a 74	80	79	64
6	52	48	37	33	41	40	51	52	68	--	79	68
7	51	46	36	33	40	38	a 52	58	70	76	a 82	69
8	51	45	37	a 35	41	42	53	60	a 78	75	75	69
9	52	45	37	33	43	43	53	63	78	72	76	70
10	52	42	36	36	--	45	49	66	81	72	76	72
11	54	41	37	34	a 41	47	48	54	82	74	77	72
12	54	42	37	35	a 41	49	a 50	59	83	a 73	75	67
13	55	45	34	35	a 41	51	48	55	83	70	75	67
14	55	45	--	35	39	52	52	53	83	74	76	68
15	50	45	a 35	33	39	--	50	58	82	76	77	68
16	51	42	34	--	a 39	41	49	62	81	74	77	68
17	51	a 53	35	--	37	49	48	60	79	75	74	70
18	48	48	a 34	--	39	51	45	61	80	77	72	69
19	50	45	34	--	39	50	41	64	80	79	72	63
20	50	42	34	33	--	53	42	65	76	a 80	72	65
21	49	42	32	34	33	57	51	--	78	79	71	61
22	48	42	a 33	34	34	53	53	68	75	80	72	60
23	49	42	a 34	33	37	51	60	69	77	80	72	61
24	51	42	32	35	40	50	60	69	80	79	75	63
25	53	--	32	35	40	48	54	74	75	80	75	63
26	54	a 33	a 34	35	39	49	50	78	73	81	76	63
27	54	--	32	36	41	50	54	75	78	82	75	62
28	49	a 33	a 34	35	42	50	61	75	a 78	82	75	61
29	42	33	33	36	--	52	63	76	72	80	75	63
30	48	a 33	33	37	--	52	59	72	78	80	72	63
31	50	--	a 34	39	--	55	--	75	--	80	77	--
Average	52	45	34	35	40	48	52	64	78	78	76	66

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

MISCELLANEOUS ANALYSES OF STREAMS IN THE KANSAS RIVER BASIN

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
ROCK CREEK AT PARKS, NEBR.																							
Dec. 23, 1952	a 14	--	--	48	11	17		222		15	3.5	--	--	0.05	--		--	165	0	19	0.6	379	7.9
Mar. 31, 1953	16	53	0.01	46	11	19	8.5	217		20	5.5	1.0	3.0	.06	274		0.37	161	0	19	.7	395	7.9
May 13	13	47	.00	46	11	17	11	215		20	3.0	.9	.6	.05	264		.36	159	0	18	.6	382	7.5
Sept. 29	13	45	.03	40	9.7	16	10	195		16	2.5	.8	2.0	.05	246		.33	140	0	19	.6	348	7.6
SOUTH FORK REPUBLICAN RIVER NEAR HALE, COLO.																							
Jan. 5, 1953		45	0.01	54	18	43		315		27	8.0	1.2	0.5	0.13	352		0.48	208	0	31	1.3	531	7.8
Apr. 1		45	.00	58	15	42		312		27	9.0	1.2	1.1	.18	352		.48	208	0	31	1.3	544	8.0
June 22 b		17	.00	42	12	34		212		39	7.0	1.1	1.0	.07	260		.35	155	0	32	1.2	425	8.2
ENDERS RESERVOIR, NEBR.																							
Dec. 8, 1952	c 30,200			33	14	23		207		18	3.0							142	0	26	0.8	355	8.2
Mar. 23, 1953	c 34,350			41	14	22		221		20	4.0							160	0	23	.8	389	8.1
June 16	c 34,560			39	13	22		206		23	4.0							151	0	24	.8	374	7.0
HARRY STRUNK LAKE, NEBR.																							
Dec. 28, 1952	c 39,580			47	13	18		233		14	4.0							171	0	19	0.6	387	8.1
Mar. 12, 1953	c 38,100			49	13	19		233		17	4.5							174	0	19	.6	404	8.1
June 11	c 37,580			40	12	17		200		18	4.5							151	0	20	.6	363	7.3
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.																							
Nov. 10, 1952, sta. 7	164	41		60	15	27	--	278		40	8.0				--		--	212	0	21	0.8	524	7.9
Nov. 10, sta. 21	164	41		57	16	26	--	274		38	8.0				--		--	208	0	21	.8	509	8.0
Nov. 10, sta. 32	164	38		55	16	24	--	268		36	8.0				--		--	202	0	19	.7	498	8.0
Nov. 10, sta. 62	164	40		54	16	25	--	266		35	8.0				--		--	202	0	20	.8	493	8.2
Nov. 10, sta. 96	164	38		54	16	24	--	264		33	8.0				--		--	202	0	20	.7	485	8.1

a Mean daily discharge.
b Sample collected in Bonny Reservoir.
c Reservoir contents, acre-feet.

KANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.--Continued																							
Apr. 20, 1953, sta. $5\frac{1}{2}$	390	--		--	--	--	--	--		--	--				--		--	--	--	--	--	577	--
Apr. 20, sta. $28\frac{1}{2}$	390	--		--	--	--	--	--		--	--				--		--	--	--	--	--	561	--
Apr. 20, sta. 87	390	--		--	--	--	--	--		--	--				--		--	--	--	--	--	524	--
Apr. 20, sta. 174	390	--		--	--	--	--	--		--	--				--		--	--	--	--	--	547	--
Apr. 20, sta. $219\frac{1}{2}$	390	--		--	--	--	--	--		--	--				--		--	--	--	--	--	542	--
July 13, 8:00 a.m.	1,480	--		56	7.2	5.2	13	--		--	--				248		0.34	169	--	6	.2	376	7.7
July 13, 10:20 a.m.	1,390	--		37	5.7	9.0	13	--		--	--				188		.26	116	--	13	.4	281	7.5
SAPPA CREEK NEAR OBERLIN, KANS.																							
Dec. 24, 1952	0.21			125	33	198		664		99	164							447	0	49	4.1	1,600	7.5
Mar. 24, 1953	.33			118	28	122		461		118	123							410	32	39	2.6	1,330	7.2
May 29	812			32	4.4	6.9		136		1.0	.5							98	0	13	.3	237	7.3
REPUBLICAN RIVER NEAR HARDY, NEBR.																							
Dec. 11, 1952	250	--	--	--	--	--	--	276		56	--	--	--	0.05	--		--	239	13	--	--	550	7.8
Mar. 3, 1953	243	31	0.01	67	15	23	11	262		52	11	0.6	3.2	.07	348		0.47	228	13	17	0.7	539	7.6
June 9	1,400	20	.15	37	6.9	5.6	11	146		20	3.5	.4	.6	.06	185		.25	121	1	8	.2	269	7.3
Aug. 26	64	14	.00	55	15	25	15	242		44	11	.6	2.2	.07	306		.42	200	2	20	.8	497	7.6
Sept. 4	980	11	.01	40	5.8	8.8	9.9	152		21	3.5	.8	1.1	.04	192		.26	124	0	12	.3	298	7.4
CEDAR BLUFF RESERVOIR NEAR ELLIS, KANS.																							
Oct. 17, 1952	c122,880	10	0.01	95	17	39		165		220	16	0.5	1.5	0.10	500		0.68	305	170	22	1.0	721	7.8
Apr. 23, 1953	c122,110			95	18	40		164		229	17							311	177	22	1.0	741	7.8
June 30	c116,395			94	21	38		160		239	17							321	190	21	.9	763	8.0
KANOPOLIS RESERVOIR NEAR KANOPOLIS, KANS.																							
Dec. 9, 1952	c 44,670			--	--	170		154		220	279							380	254	49	3.8	1,510	7.6
Mar. 23, 1953	c 44,705			128	23	193		174		228	322							414	271	50	4.1	1,700	7.3
June 29	c 42,380			129	25	215		162		239	363							426	293	52	4.5	1,810	6.9

c Reservoir contents, acre-feet.

SOLOMON RIVER AT BELOIT, KANS.

Oct. 1, 1952	76					114	299		188	114						354	109	41	2.6	1,150	7.6
Dec. 10	118					85	358		223	77						450	156	29	1.7	1,160	8.0
Mar. 12, 1953	192					72	283		248	54						410	178	28	1.5	1,040	7.9
June 15	86			71	14	48	208		92	52						235	64	31	1.4	688	7.7
Aug. 25	70					74	254		110	78						271	63	37	2.0	852	7.2

SMOKY HILL RIVER AT JUNCTION CITY, KANS.

Mar. 19, 1953	725	13	0.03	127	28	222	297		245	294	0.3	2.5	0.15	1,110	1,080	1.51	434	190	53	4.6	1,810	8.1
May 29, 10:30 a.m.	13,200	--	.14	--	--	26	166		42	28	--	--	--	--	--	--	162	26	26	.9	444	7.7
May 29, 10:38 a.m.	13,200	11	.13	39	5.0	28	118		37	29	.2	3.0	.05	224	--	.30	118	21	34	1.1	373	7.8
Sept. 15	310	5.4	.01	102	25	311	245		200	441	.4	.7	.16	1,250	1,210	1.70	357	156	65	7.2	2,140	7.7

LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.

Mar. 16, 1953	183					37	215		35	33							179	3	31	1.2	502	8.0
June 9	4,990			19	4.3	7.6	87		5.0	3.5							65	0	20	.4	164	6.5

BIG BLUE RIVER NEAR MANHATTAN, KANS.

Mar. 19, 1953	890	17	.11	68	13	30	230		64	19	.4	4.2	.06	a 330		0.45	222	33	23	0.9	527	8.1
May 29	4,330	14	.12	51	9.7	27	162		61	17	.3	5.1	.05	b 266		.36	167	34	26	.9	431	7.7
Sept. 15	265	26	.04	66	14	42	252		49	39	.4	1.3	.09	c 376		.51	224	17	29	1.2	608	7.9

a Dissolved aluminum 0.01
b Dissolved aluminum 0.14
c Dissolved aluminum 0.03

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	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: Parts per million: Residue at 180°C	Dissolved solids: Parts per million: Sum	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
KANSAS RIVER AT TOPEKA, KANS.																							
Mar. 20, 1953	2,270	14	0.05	82	17	89		244		117	102	0.3	3.3	0.09	a 558		0.76	276	76	41	2.3	908	7.9
June 1	10,100	11	.12	40	6.1	27		125		39	25	.3	5.3	.05	b 220		.30	125	22	32	1.1	368	7.9
Sept. 15	920	12	.03	70	16	101		214		88	135	.6	3.0	.07	c 558		.76	242	67	48	2.8	949	7.7
KANSAS RIVER AT LAWRENCE, KANS.																							
Mar. 19, 1953		14	0.09	71	16	68		226		94	73	0.4	3.9	0.08	d 464		0.63	242	57	38	1.9	760	8.1
June 1		10	.12	39	6.7	22		132		32	18	.2	5.8	.04	e 208		.28	125	17	27	.8	347	7.8
Sept. 15		15	.03	70	17	99		215		88	133	.6	4.5	.07	f 570		.78	245	69	47	2.7	952	7.6

a Dissolved aluminum 0.00
b Dissolved aluminum 0.26
c Dissolved aluminum 0.03
d Dissolved aluminum 0.00
e Dissolved aluminum 0.16
f Dissolved aluminum 0.05

KANSAS RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.			
Oct. 6, 1952	23	81	5.0
Oct. 21	123	337	112
Nov. 3	154	273	114
Nov. 10	164	459	203
Nov. 20	168	558	253
Dec. 8	339	192	176
Dec. 18	302	242	197
Dec. 31	439	153	181
Jan. 7, 1953	491	261	346
Jan. 16	287	82	64
Jan. 28	498	1,340	1,800
Feb. 6	408	793	874
Feb. 9	420	772	875
Feb. 26	317	430	368
Feb. 27	465	1,100	1,380
Mar. 5	510	1,470	2,020
Mar. 10	491	906	1,200
Mar. 25	339	561	513
Apr. 2	414	744	832
Apr. 6	396	656	701
Apr. 8	515	1,570	2,180
Apr. 9	527	1,500	2,130
Apr. 20	390	751	791
Apr. 28	420	712	807
Apr. 30	420	982	1,110
May 18	194	734	384
June 2	472	3,580	4,560
June 4	194	324	170
July 3	55	274	41
July 13	1,180	12,000	38,200
July 13	1,390	11,700	43,900
July 15	182	528	259
July 28	110	594	176
Aug. 4	236	570	363
Aug. 13	132	298	106
Aug. 15	88	255	61
Aug. 26	84	323	73
Sept. 1	114	460	142
Sept. 2	110	471	140
Sept. 10	97	364	95
Sept. 14	69	220	41
Sept. 24	43	137	16
Sept. 25	43	96	11
Sept. 30	39	96	10
LITTLE BLUE RIVER NEAR DEWEESE, NEBR.			
Feb. 12, 1953	78	75	16
Feb. 24	86	143	33
Mar. 9	81	99	22
Mar. 24	77	93	19
May 7	79	452	96
May 22	76	201	41
June 5	84	459	104
June 15	93	396	99
July 6	58	106	16
July 20	62	80	13
Aug. 3	51	1,190	164
Aug. 31	42	107	12
Sept. 15	54	142	21
LITTLE BLUE RIVER AT ANGUS, NEBR.			
Oct. 7, 1952	68	35	6.4
Nov. 3	69	23	4.3
Dec. 15	106	116	33
Dec. 29	72	76	15

KANSAS RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1952 to September 1953--Continued

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.			
Oct. 14, 1952	148	69	28
Oct. 28	166	108	48
Nov. 24	170	52	24
Dec. 8	193	90	47
Jan. 6, 1953	190	137	70
Jan. 20	a185	252	126
Feb. 3	236	350	223
Mar. 3	188	115	58
Mar. 16	183	107	53
Apr. 7	177	77	37
Apr. 27	212	145	83
May 19	212	209	120
June 9	4,920	9,640	128,000
June 30	152	176	72
July 27	107	184	53

a Mean daily discharge

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

Particle-size analyses of suspended sediment, water year October 1952 to September 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	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	
REPUBLICAN RIVER AT CAMBRIDGE, NEBR.																	
July 13, 1953	8:00 a.m.	1,180		12,000	4,490	40	49	59	67	76	92	99	100	--			SPWCM
July 13	8:00 a.m.	1,180		12,000	4,540	3	6	42	66	75	91	99	100	--			SPNM
July 13	10:30 a.m.	1,390		11,700	3,840	36	48	58	66	73	90	97	99	100			SPWCM
July 13	10:30 a.m.	1,390		11,700	3,940	11	24	51	64	73	90	97	99	100			SPN
LITTLE BLUE RIVER NEAR DEWEESE, NEBR.																	
July 6, 1953	12:15 p.m.	58	76	106	393	47	54	58	68	82	93	--	--	--			SBWCM
Aug. 3	12:50 p.m.	51	77	1,190	4,150	48	56	68	72	78	82	84	96	100			SBWCM
LITTLE BLUE RIVER NEAR ENDICOTT, NEBR.																	
Oct. 14, 1952	2:10 p.m.	148	55	69	--	--	--	--	--	--	84	89	93	100			S
Nov. 24	2:30 p.m.	170	40	52	--	--	--	--	--	--	85	87	98	100			S
Dec. 8	3:05 p.m.	193	--	90	--	--	--	--	--	--	79	82	92	100			S
Jan. 20, 1953	3:45 p.m.	a185	34	252	1,010	37	49	56	84	85	99	100	--	--			SPWCM
Feb. 3	2:00 p.m.	236	40	350	--	--	--	--	--	--	96	97	100	--			S
Mar. 3	3:15 p.m.	188	34	115	--	--	--	--	--	--	90	92	96	100			S
Mar. 16	2:00 p.m.	183	50	107	--	--	--	--	--	--	87	91	93	100			S
Apr. 27	2:00 p.m.	212	62	145	--	--	--	--	--	--	91	93	97	100			S
May 19	2:15 p.m.	212	67	209	--	--	--	--	--	--	89	90	94	97	97	100	S
June 9	3:25 p.m.	4,920	76	9,640	20,400	45	62	74	86	96	100	--	--	--			SPN
June 9	3:25 p.m.	4,920	76	9,640	20,800	55	71	82	88	96	100	--	--	--			SPWCM
June 30	2:15 p.m.	152	88	176	--	--	--	--	--	--	95	99	100	--			S
July 27	2:25 p.m.	107	90	184	--	--	--	--	--	--	97	98	99	100			S

a Mean daily discharge.

CHARITON RIVER BASIN

HONEY CREEK NEAR RUSSELL, IOWA

LOCATION.--At gaging station on downstream side of highway 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 1952 to September 1953.
EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 1,500 ppm June 8; minimum daily, no flow on many days during October, November, July, August, and September. Sediment loads: Maximum daily, 970 tons Mar. 30; minimum daily, 0 ton on many days during October, November, July, August and September.
EXTREMES, June 1952 to September 1953.--Sediment concentrations: Maximum daily, 9,840 ppm June 20, 1952; minimum daily, no flow on many days each year. Sediment loads: Maximum daily, 2,500 tons (estimated) June 21, 1952; minimum daily, 0 ton on many days each year.
REMARKS.--Flow affected by ice Dec. 13-20, 23-29, Jan. 3-6, 16-18, 23, 24, Jan. 30 to Feb. 1, Feb. 4-17, 21-25. Records of discharge for water year October 1952 to September 1953 given in WSP 1280.

Suspended sediment, water year October 1952 to September 1953

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	1.3	13	
2				0	--	0	1.3	--	
3				0	--	0	1.2	--	
4				0	--	0	1.2	--	(t)
5				0	--	0	1.2	--	
6				0	--	0	1.2	--	
7				0	--	0	1.3	--	
8				0	--	0	1.7	--	
9				0	--	0	2.0	--	
10				0	--	0	2.0	--	e 0.1
11				0	--	0	2.0	22	
12				0	--	0	1.7	--	
13				0	--	0	1.1	--	
14				0	--	0	.7		
15				0	--	0	.8	--	(t)
18				0	--	0	.8		
17				95	770	sa 240	.9		
18				11	120	sb 6.3	1.0		
19				2.6			1.1		
20				1.8			3.0		
21				1.3	--	e .5	2.4	--	e .5
22				1.3			2.0		
23				1.1			1.6		
24				1.2			1.4		
25				4.6	110	sb 2.3	1.2		
26				22	520	sb 62	1.1		
27				2.7	--	e 1.5	1.0		
28				1.9			.9		
29				1.6	--	e .3	.8	--	e .1
30				1.5			.9		
31				--	--	--	1.0		
Total	0		0	149 6	--	316.0	41.8	--	5.2

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

CHARITON RIVER BASIN--Continued

HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	1.0	--		2.0			1.3		
2	1.0	--		.8	--	e 0.7	1.3		
3	.7	--		.9			1.5		
4	.6	--		1.5			2.0		
5	.5	--		30	560	sb 93	1.8	28	0.1
6	.4	--	(t)	40	500	sa 56	1.8		
7	.5	--		43	170	b 20	1.9		
8	.5	--		20	140	b 7.6	1.9		
9	.6	--		5.0	100	1.4	11	240	sa 12
10	.7	8		14	390	sb 18	49	720	sa 140
11	.6	--		9.0	135	3.3	76	690	sa 150
12	.8	22		4.0			34	363	s 38
13	6.5	82	sb 1.5	2.5	--	e 1.2	16	160	6.5
14	11	120	sa 4.8	3.0			79	1,200	s 384
15	14	92	3.5	1.3			58	692	s 171
16	4.0	32	sb .7	.8	--	e .3	14	170	6.4
17	.8			1.1			10	120	b 3.2
18	.9	--	e .3	1.3			37	759	s 98
19	1.0			16	380	sb 77	11	192	5.7
20	1.0	--		122	1,200	sa 480	8.1	156	3.4
21	1.1	12		12	160	b 5.2	14	1,060	s 69
22	1.1	--		5.0	--	e 1.0	19	600	sb 40
23	1.1	--	(t)	3.7			97	860	sa 290
24	1.0	--		3.3			14	230	8.7
25	.9	--		4.0	--	e .4	9.0	160	b 3.9
26	1.0	--		4.3			6.9	90	1.7
27	.9	--		4.2	33	.4	5.6	49	.7
28	2.0	51		2.2	29	.2	4.0	50	b .5
29	1.0	--	e .3	--	--	--	11	120	sa 15
30	1.4	--		--	--	--	287	1,200	sa 970
31	4.0	--	e 2.5	--	--	--	208	690	388
Total	62.6	--	15.4	356.9	--	772.3	1,092.1	--	2,806.9

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	92	273	s 91	12	115	s 4.1	0.7		
2	14	110	b 4.2	5.8			.7		
3	10	90	b 2.4	5.9	51	.8	.7		
4	8.5	65	1.5	5.5			.7	136	0.3
5	7.4	--	e 1.2	5.3			.9		
6	5.9			10	111	3.0	.9		
7	4.7			6.4	50	.9	.9		
8	4.2			4.3			7.8	1,500	sa 74
9	4.3			3.4			20	920	sa 250
10	4.2	40	.4	3.1			86	1,100	sa 450
11	3.2			2.6			1.9	100	b .5
12	3.1			2.4	41	.3	.9	70	b .2
13	2.4			2.2			.7	46	
14	3.4	110	sa 1.4	2.4			.5	--	
15	12	520	17	2.4			.4	--	
16	6.2	150	sb 2.9	2.2			.4	--	e .1
17	2.8	26	.2	2.4			.3	105	
18	2.0	--		2.7			.2	--	
19	1.7	--		2.0			.2	--	
20	1.7	26		1.9			.1		
21	1.3	24	e .1	2.4	75	.4	.1		
22	1.0	--		2.0			.1		
23	.8	--		1.8			.1	--	(t)
24	11	338	s 20	2.0			.1		
25	12	203	s 8.0	1.9			.1		
26	4.9	90	b 1.2	1.3			.1		
27	2.4			1.2	130	.4	4.7	1,400	sb 93
28	1.6	45	.3	1.2	154	.5	5.5	980	sa 22
29	2.2			1.1			.4	160	b .2
30	38	440	sa 50	.9	--	e .3	.2	100	b .1
31	--	--	--	.7			--	--	--
Total	268.9	--	205.7	101.4	--	19.7	136.3	--	892.9

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

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

CHARITON RIVER BASIN--Continued

HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, water year October 1952 to September 1953--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	0.4	220	sb0.4						
2	.8	270	b.6						
3	.2	230	b.1						
4	.1	210	b.1						
5	3.3	1,400	sb62						
6	.4	180	sb.4						
7	.1	--	e.1						
8	.1	--	(t)						
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	5.4	--	63.7	0		0	0		0

Total discharge for year (cfs-days) 2,215.0
Total load for year (tons) 5,097.8

e Estimated.
s Computed by subdividing day.
t Less than 0.050 ton.
b Computed from estimated concentration graph.

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