

Quality of Surface Waters of the United States 1955

Parts 5 and 6

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

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*Prepared in cooperation with the States
of Iowa, Minnesota, and Wisconsin,
and with other agencies*



UNITED STATES DEPARTMENT OF THE INTERIOR

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PREFACE

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QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1955

PARTS 5 and 6

INTRODUCTION

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

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

The regular yearly publication of records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 1941. The annual records prior to 1948 were published in a single volume for the entire country. Beginning in 1948, the records were published in two volumes, and beginning in 1950, in four volumes, covering the drainage basins shown in figure 1. The samples for which data are given were collected from October 1, 1954, to September 30, 1955. Descriptive statements are given for each sampling station for which regular series of chemical analyses, temperature observations, 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

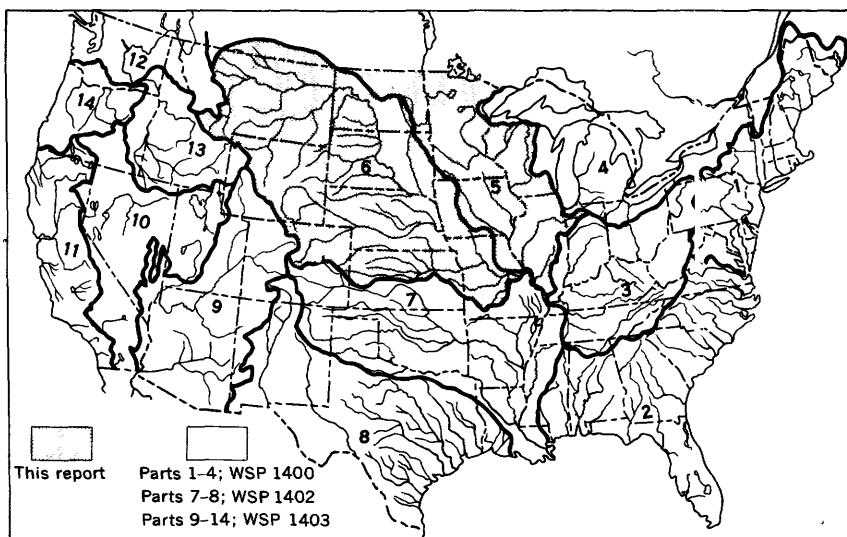


Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1955. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

other pertinent data. Records of water discharge of the streams at, or near, the sampling point for the sampling period are included in most tables of analyses. The records are arranged by drainage basins, according to Geological Survey practice in reporting records of stream flow.

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing station records was 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, 1955, 91 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 57 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 as noted in the table headings this information is available for reference at the district offices listed under Division of Work, on page 19.

Quantities of suspended sediment are reported for 44 stations during the year ended September 30, 1955. 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 40 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 streambed and the material that bounces along the bed in short skips or leaps is termed bed load and is not considered in this report. All other undissolved fragmental 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 of chemical analyses were usually collected at or near points on streams where gaging stations are maintained for measurement of water discharge. Two methods of compositing samples for analysis are used in Geological Survey Laboratories: (1) Equal volume method-For streams, mostly east of the Mississippi River, not subject to rapid and large fluctuations in chemical composition or concentration, 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. Samples were sometimes composited for shorter periods on the basis of the concentration of dissolved solids as indicated by measurements of specific conductance of the daily samples.

(2) Discharge method-Composites based on discharge consist of a volume taken from each sample in proportion to the product of the rate of water discharge when the sample was collected and the length of time the sample represents. With this method usually each daily sample was assumed to represent an equal time and the volumes composited were taken in proportion to the rates of discharge when the samples were collected.

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).

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

SEDIMENT

In general, suspended-sediment samples were collected daily with U. S. depth-integrating cable-suspended samplers (U. S. Interagency, 1948, p. 70-76 and U. S. Interagency, 1952, p. 86-90) 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 transverse distribution of sediment concentration ranges widely, 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 daily mean 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, daily mean 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 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 loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and suspended-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 suspended-sediment loads for individual days are not estimated, because numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates for individual days. However, estimated loads of suspended sediment for missing days in 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 quantities of suspended sediment transported, records of the particle sizes of sediment are included also. The particle sizes of the suspended sediments for many of the stations, and the particle sizes of the bed material for some of the stations were determined periodically. As much of the material carried in suspension is finer than 0.062 mm, the pipette method, (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U. S. Interagency, 1943, p. 82-90) were used in most of the analyses. Size fractions between 1.000 mm and 0.062 mm were usually analyzed by the visual accumulation tube method (U. S. Interagency 1957). Separations between sand and silt-clay sizes and some analyses of all sediment coarser than 0.062 mm were made by sieve analysis. 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. 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. Equivalents per million are calculated by dividing the concentration in parts per million by the chemical combining weights of the individual constituents. For convenience

in making this conversion the reciprocals of chemical combining weights of the most commonly reported constituents (ions) are given in the following table:

Constituent	Factor	Constituent	Factor
Iron (Fe^{++}).....	0.0358	Carbonate (CO_3^{--})..	0.0333
Iron (Fe^{+++}).....	.0537	Bicarbonate (HCO_3^-)..	.0164
Calcium (Ca^{++}).....	.0499	Sulfate (SO_4^{--}).....	.0208
Magnesium (Mg^{++})...	.0822	Chloride (Cl^-).....	.0282
Sodium (Na^+).....	.0435	Fluoride (F^-).....	.0526
Potassium (K^+).....	.0256	Nitrate (NO_3^-).....	.0161

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

The hardness, as calcium carbonate (CaCO_3), is calculated from the equivalents of calcium and magnesium, or is determined by direct titration. 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 per centimeter times 10^6 (micromhos per cm at 25°C). The discharge of the streams is reported in cubic feet per second (see Streamflow, p. 20) 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 for the water year is given for most daily sampling stations. Most of these averages are arithmetical or time-weighted; when analyses during a year are all on 10-day composites of daily samples with no missing days, the arithmetical and time-weighted averages are equivalent. A time-weighted 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. The discharge-weighted average reported for some station approximates 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. A discharge-weighted average is computed by multiplying the discharge for the sampling period by the concentrations of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. Discharge-weighted averages are usually lower than arithmetical averages for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

The concentration of sediment in parts per million 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, pH, and dissolved solids. Aluminum, manganese, color, 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 Re-

search Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding.

Boron (B)

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

Dissolved solids

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

PROPERTIES AND CHARACTERISTICS OF WATER

Oxygen consumed

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

Color

In water analysis the term "color" refers to the appearance of water that is free from suspended solids. Many turbid waters that appear yellow, red, or brown when viewed in the stream show very little color after the suspended matter has been removed.

The yellow-to-brown color of some waters is usually caused by organic matter extracted from leaves, roots, and other organic substances in the ground. In some areas objectionable color in water results from industrial wastes and sewage. Clear deep water may appear blue as the result of a scattering of sunlight by the water molecules. Water for domestic use and some industrial uses should be free from any perceptible color. A color less than 10 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 per centimeter 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

The U. S. Salinity Laboratory Staff (1954) introduced the term sodium-adsorption-ratio (SAR), a ratio for irrigation waters and soil extracts used to express the relative activity of sodium ions in exchange reactions with the soil. This ratio is expressed by the equation:

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

where the concentrations of the ions are expressed in milliequivalents per liter (or equivalents per million for most irrigation waters). It has more significance than percent sodium for use as an index of the sodium or alkali hazard of the water because it relates more directly to the adsorption of sodium by the soil.

Waters are divided into four classes with respect to sodium or alkali hazard: low, medium, high, and very high, depending upon the SAR value and the specific conductance. At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are at SAR values of approximately 2.5, 6.5, and 11. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are 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 characteristics, the size of particles transported, as well as the total sediment load, is in constant adjustment with the characteristics and physical features of the stream and drainage area.

PUBLICATIONS

Reports giving chemical analyses, suspended-sediment loads, and water temperatures of samples of surface water made by the Geological Survey have been published yearly since 1941. Records for many of the stations listed in this report for the water years ending September 30, 1941-1955 are listed below:

Numbers of water-supply papers containing records for
Parts 5 and 6, 1941-1955

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1945	1030	1949	1162	1953	1291
1942	950	1946	1050	1950	1187	1954	1351
1943	970	1947	1102	1951	1198	1955	1401
1944	1022	1948	1132	1952	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 south-eastern 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

The chemical quality of water and sediment investigations in the Missouri River and Red River of the North basins in North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, and Colorado were begun in 1945. Most of the investigations were made as part of the program of the United States Department of Interior for development of the Missouri River basin with funds provided directly to the Geological Survey. Financial assistance was provided by the Bureau of Reclamation and the Bureau of Land Management of the Interior Department for some of the sediment investigations in Montana, Wyoming, South Dakota, and Nebraska, and by the Soil Conservation Service of the Agriculture Department for some of the sediment investigations in Nebraska and Iowa.

The investigations in Minnesota, Iowa, and Wisconsin were made in cooperation with these States.

In addition to the above, many investigations were made through funds appropriated directly to the Geological Survey.

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.

Most of the investigations were made under the direction of P. C. Benedict, regional engineer, Lincoln, Nebr. The sediment investigations in Iowa were made under the direction of V. R. Bennion, district engineer, Iowa City, Iowa and those in Wisconsin under the direction of W. L. Lamar, district chemist, Columbus, Ohio.

Any additional basic data on file for the streams, lakes, and reservoirs shown in this report can be obtained from the Geological Survey district offices listed below:

<u>State</u>	<u>Office</u>
Colorado	Iowa
Kansas	(Chemical quality data)
Minnesota	North Dakota
Nebraska	South Dakota
Montana	1214 Big Horn Ave.
Wyoming	Worland, Wyo.
Iowa	508 Hydraulic Laboratory
(sediment data)	University of Iowa
Wisconsin	2822 East Main St.
(sediment data)	Columbus, Ohio

STREAMFLOW

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

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CHEMICAL ANALYSES, WATER TEMPERATURES, AND SUSPENDED SEDIMENT

PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN

SHEYENNE RIVER NEAR WARWICK, N. DAK.

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

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

RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1955.

Water temperatures: January 1951 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 1,230 ppm Mar. 21-23; minimum, 179 ppm Apr. 3-5.

Hardness: Maximum, 424 ppm Mar. 21-23; minimum, 76 ppm Mar. 30 to Apr. 2.

Specific conductance: Maximum daily, 1,940 micromhos Feb. 1; minimum daily, 240 micromhos Apr. 4.

Water temperatures: Maximum, 86°F July 21; minimum, freezing point Nov. 27.

EXTREMES, 1951-55.--Dissolved solids: Maximum, 1,230 ppm Mar. 21-23, 1955; minimum, 179 ppm Apr. 3-5, 1955.

Hardness: Maximum, 424 ppm Mar. 21-23, 1955; minimum, 76 ppm Mar. 30 to Apr. 2, 1955.

Specific conductance: Maximum daily, 1,940 micromhos Feb. 1, 1955; minimum daily, 240 micromhos Apr. 4, 1955.

Water temperatures: Maximum, 86°F July 21, 1955; 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 adsorption (25°C)	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-8, 1954.....	41.6	--	--	--	--	176	--	593	5	109	--	--	--	--	--	720	0.98	80.9	242	0	61	4.9	1,080	8.2
Oct. 9.....	32.0	--	--	--	--	110	--	456	0	85	--	--	--	--	--	536	.73	46.3	228	0	51	3.2	827	7.9
Oct. 10-16.....	35.9	--	--	--	--	191	--	627	0	124	--	--	--	--	--	769	1.05	74.5	242	0	63	5.4	1,160	7.9
Oct. 17-19.....	28.7	--	--	--	--	123	--	483	0	92	--	--	--	--	--	587	.80	45.5	237	0	53	3.5	900	8.1
Oct. 20-Nov. 14.....	23.5	--	--	--	--	172	--	582	0	129	--	--	--	--	--	740	1.01	47.0	262	0	59	4.6	1,130	8.1
Nov. 15-16.....	19.0	--	--	--	--	133	--	476	16	114	--	--	--	--	--	638	.87	32.7	256	0	53	3.6	975	8.3
Nov. 17-27.....	18.0	12	0.01	51	34	167	12	592	0	127	24	0.5	0.5	0.31	739	1.01	35.9	288	0	56	4.5	1,120	8.1	
Nov. 28-Dec. 15.....	12.4	--	--	--	--	121	--	497	0	104	--	--	--	--	--	613	.83	20.5	268	0	50	3.2	945	8.1
Dec. 16-Jan. 13, 1955	5.15	--	--	--	--	155	--	614	0	134	--	--	--	--	--	769	1.05	10.7	327	0	51	3.7	1,170	8.1
Jan. 14-16.....	3.30	--	--	--	--	249	--	702	24	208	--	--	--	--	--	1,010	1.37	9.00	318	0	63	6.1	1,510	8.4
Jan. 17-19.....	3.30	--	--	--	--	131	--	504	9	126	--	--	--	--	--	676	.92	6.02	283	0	49	3.3	1,030	8.3
Jan. 20.....	3.30	--	--	--	--	263	--	716	33	220	--	--	--	--	--	1,070	1.46	9.53	322	0	64	6.4	1,590	8.5
Jan. 21-23.....	3.30	--	--	--	--	146	--	569	12	140	--	--	--	--	--	762	1.04	6.79	332	0	49	3.5	1,140	8.3
Jan. 24-26.....	3.30	--	--	--	--	228	--	790	10	195	--	--	--	--	--	1,050	1.43	9.36	388	0	56	5.0	1,560	8.2
Jan. 27-30.....	1.95	--	--	--	--	126	--	518	14	133	--	--	--	--	--	695	.95	3.66	324	0	46	3.0	1,050	8.3
Jan. 31-Feb. 1.....	2.00	--	--	--	--	268	--	778	30	228	--	--	--	--	--	1,110	1.51	5.99	372	0	61	6.1	1,660	8.3
Feb. 2.....	3.24	--	--	--	--	12	--	230	6	36	--	--	--	--	--	274	.37	1.48	210	12	11	4	437	8.3
Feb. 3-11.....	3.24	--	--	--	--	266	--	844	16	223	--	--	--	--	--	1,150	1.56	10.1	404	0	59	5.7	1,690	8.3

RED RIVER OF THE NORTH BASIN--Continued
SHEYENNE RIVER NEAR WARWICK, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium adsorption	Specific conductance (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Tons per million	Calcium	Non-carbonate					
Feb. 12-14, 1955.....	2.07	--	--	--	--	130	--	518	20	133	--	--	--	--	--	702	0.95	3.92	322	0	47	3.2	1,060	8.3
Feb. 15-17.....	1.60	--	--	--	--	242	--	817	8	205	--	--	--	--	--	1,070	1.46	4.62	404	0	57	5.2	1,600	8.2
Feb. 18-Mar. 9.....	2.06	--	--	--	--	147	--	611	0	134	--	--	--	--	--	761	1.03	4.23	345	0	48	3.4	1,180	8.1
Mar. 10-20.....	20.2	16	0.03	62	36	131	15	554	0	130	24	0.3	3.7	--	0.43	699	.95	38.1	302	0	47	3.3	1,060	8.0
Mar. 21-23.....	47.3	--	--	--	--	270	--	827	21	264	--	--	--	--	--	1,230	1.67	157	424	0	58	5.7	1,760	8.4
Mar. 24-29.....	43.0	--	--	--	--	73	--	264	0	104	--	--	--	--	--	446	.61	51.8	172	0	48	2.4	665	7.8
Mar. 30-Apr. 2.....	576	--	--	--	--	25	--	111	0	40	--	--	--	--	--	190	.26	295	76	0	41	1.3	281	7.4
Apr. 3-5.....	1,237	--	--	--	--	23	--	106	0	44	--	--	--	--	--	179	.24	598	78	0	38	1.1	273	7.7
Apr. 6-7.....	706	--	--	--	--	44	--	161	0	67	--	--	--	--	--	279	.38	532	103	0	47	1.9	409	7.8
Apr. 8-17.....	188	--	--	--	--	80	--	219	0	86	--	--	--	--	--	357	.49	181	135	0	49	2.2	530	7.7
Apr. 18-May 8.....	92.6	--	--	--	--	106	--	372	0	118	--	--	--	--	--	536	.73	134	205	0	53	3.2	826	8.1
May 9-23.....	51.3	--	--	--	--	142	--	485	0	150	--	--	--	--	--	687	.93	95.2	263	0	54	3.8	1,040	8.0
May 23-June 8.....	111	--	--	--	--	170	--	592	0	164	--	--	--	--	--	782	1.06	234	291	0	56	4.3	1,170	7.8
June 9-July 7.....	62.3	--	--	--	--	220	--	660	9	186	--	--	--	--	--	916	1.25	154	279	0	63	5.7	1,360	8.2
July 8-18.....	22.5	--	--	--	--	220	--	662	0	179	--	--	--	--	--	862	1.17	52.4	243	0	66	6.1	1,290	7.9
July 19-Aug. 2.....	9.13	--	--	--	--	162	--	526	0	126	--	--	--	--	--	680	.92	16.8	210	0	63	4.9	1,030	8.0
Aug. 3-16.....	5.89	--	--	--	--	121	--	440	0	87	--	--	--	--	--	557	.76	8.11	204	0	56	3.7	852	7.9
Aug. 17-Sept. 4.....	2.97	--	--	--	--	78	--	372	0	70	--	--	--	--	--	448	.61	3.59	205	0	45	2.4	705	7.9
Sept. 5-30.....	2.21	28	.01	55	18	30	4.0	279	0	50	4.5	.1	.4	.08	--	321	.44	1.92	211	0	23	.9	510	8.1
Weighted average a.....	50.8	--	--	--	--	97	--	477	--	100	--	--	--	--	--	477	0.85	6.54	175	0	55	3.2	718	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

b Includes carbonate as bicarbonate.

RED RIVER OF THE NORTH BASIN--Continued

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

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement between 2 p.m. and 5 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	54	35	38	--	35	a 35	41	--	66	74	81	66
2	58	37	40	--	34	a 36	42	68	67	74	84	67
3	50	36	37	36	37	36	--	64	68	--	81	71
4	48	37	39	37	35	a 36	40	54	68	--	74	--
5	48	38	--	37	35	36	--	57	--	78	78	--
6	--	42	38	37	--	--	41	56	65	75	72	68
7	56	--	40	38	36	39	a 43	53	68	78	--	63
8	53	40	39	38	36	39	46	--	60	70	74	60
9	60	41	39	--	a 35	37	48	55	57	71	70	59
10	--	40	36	38	35	38	--	54	55	--	72	58
11	52	a 39	38	38	35	37	55	60	55	72	75	--
12	54	40	--	36	36	36	53	60	--	75	76	57
13	54	37	39	36	--	--	59	67	59	74	74	58
14	52	--	40	40	37	36	55	64	63	74	--	62
15	51	37	37	38	36	36	54	--	70	79	72	62
16	50	37	40	--	36	39	53	58	74	80	72	60
17	49	37	39	35	36	37	--	67	73	--	75	63
18	50	36	36	40	35	36	50	65	71	80	75	--
19	60	37	--	36	35	36	51	69	--	80	71	60
20	49	38	37	36	--	--	54	70	71	82	75	60
21	51	--	38	37	35	35	52	74	71	86	--	58
22	52	37	38	36	--	--	46	--	72	79	71	59
23	50	37	37	--	36	--	47	63	70	76	72	60
24	--	35	40	37	35	35	--	61	70	--	71	57
25	45	--	b 37	37	36	36	51	58	70	77	b 67	--
26	43	34	--	36	37	35	56	57	--	74	--	58
27	45	32	35	37	--	--	57	58	73	72	75	59
28	48	--	36	37	a 35	35	55	52	75	76	--	68
29	--	34	38	36	--	a 38	58	--	85	79	67	69
30	42	37	36	--	--	39	60	--	73	84	66	68
31	--	--	37	37	--	37	--	59	--	--	71	--
Average	51	37	38	37	36	37	51	61	68	77	74	62

a Reading obtained between 12 m. and 1 p.m.

b Reading obtained between 9 a.m. and 10 a.m.

RED RIVER OF THE NORTH BASIN--Continued

MAUVAIS COULEE NEAR CHURCHS FERRY, N. DAK.

LOCATION.--At gaging station at bridge on U. S. Highway 281, 6 miles south of Churchs Ferry, Ramsey County.

RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1955.

REMARKS.--Records of miscellaneous discharge measurements for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October, 1954 to September, 1955																							
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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million		Tons per acre-foot	Tons per day	Calcium	Non-magnesium carbonate				
														Residue at 180°C	Sum								
Oct. 5, 1954.....	74.3	--	--	55	26	28	--	264	73	14	--	--	--	370	0.50		245	29	20	0.8	576	8.1	
Nov. 4.....	35.6	--	--	67	29	36	--	320	90	17	--	--	--	446	.61		288	26	21	.9	695	7.6	
Dec. 6.....	23.0	25	0.01	58	38	38	20	333	95	17	0.3	4.9	0.14	470	.64		300	27	19	.9	727	7.7	
Dec. 28.....	22.3	--	--	76	38	38	--	378	106	18	--	--	--	541	.74		344	34	19	.9	810	8.1	
Jan. 24, 1955....	13.8	36	.03	91	47	45	27	464	135	21	.5	4.3	.18	663	.90		422	42	18	1.0	969	7.8	
Mar. 1.....	5.71	47	.05	144	78	72	42	740	218	34	.4	5.3	.25	1,050	1.43		679	72	18	1.2	1,480	7.9	
Apr. 3.....	88.3	8.2	.04	31	14	21	11	122	71	11	.3	5.1	.06	241	.33		134	34	24	.8	382	7.1	
Apr. 20.....	356	8.2	.05	57	25	24	10	198	128	10	.3	1.9	.10	388	.53		246	84	17	.7	579	7.6	
Apr. 25.....	319	--	--	50	24	28	--	232	87	12	--	--	--	375	.51		224	34	21	.8	560	7.5	
May 31.....	109	14	.07	52	27	28	15	234	102	13	.2	2.0	.10	386	.52		240	48	19	.8	596	7.9	
June 25.....	70.7	17	.05	56	28	29	16	257	100	13	.8	1.9	.12	408	.55		255	44	19	.8	629	7.9	
Aug. 12.....	10.8	21	.04	63	32	34	19	308	108	15	.2	3.5	.19	486	.66		290	37	19	.9	713	7.9	
Sept. 9.....	3.93	17	.05	65	36	40	22	324	123	17	.3	5.3	.16	498	.68		308	42	21	1.0	769	7.8	
Sept. 23.....	--	23	.05	78	35	51	19	280	203	19	.4	4.7	.10	584	.79		335	105	24	1.2	853	7.5	

Chemical analyses, in parts per million, water year October 1954 to September 1955

RED RIVER OF THE NORTH BASIN--Continued
SNAKE RIVER AT WARREN, MINN.

LOCATION.--At gaging station at bridge on Minnesota Street in Warren, Marshall County.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1955 (discontinued).

Water temperatures: October 1953 to September 1954.

REMARKS.--No flow during October to March, August, and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, April to July 1955

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent so- adorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium, mag- nesium	Non- carbon- ate					
Apr. 11, 1955.....	206	9.4				7.4	101	101	57	0.5	0.1	5.8	0.06	195	0.97	132	49	11	302	7.2	40	8
Apr. 18.....	24					10	190	114	114	3.0				373	.51	256	100	8	526	7.5	55	1
May 31.....	7.5					17	351	143	6.0	6.0				553	.73	308	120	8	783	7.7	35	3
June 7.....	114					14	233	133	133	5.6				442	.66	314	107	9	623	7.6	100	2
June 21 a.....	6.5					16	339	125	1.0	1.0				516	.70	440	111	8	548	8.9	80	2
July 29 a.....	.1					29	402	125	25	25				579	.79	432	102	13	861	7.5	49	--

a Collected at bridge 3 miles upstream from gage.

b Includes equivalent of 8 ppm of carbonate (CO₃).

RED RIVER OF THE NORTH BASIN--Continued

SNAKE RIVER AT ALVARADO, MINN.

LOCATION.--At gaging station at bridge on State Highway 1, on west edge of Alvarado, Marshall County, and 22 miles upstream from mouth.
 RECORDS AVAILABLE.--Chemical analyses: April 1954 to September 1955 (discontinued).

REMARKS.--No flow during October to March and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, April to August 1955

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 (micro- mhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre- foot	Calcium magnesium	Non- carbonate						
Apr. 18, 1955.....	31					27	189	119	23					391	0.53	252	97	19	0.8	589	7.5	50	8
May 31.....	2.8					66	345	153	70					644	.86	398	115	26	1.4	983	7.9	45	4
June 7.....	146					20	261	153	4.0					481	.95	335	121	12	.5	682	7.6	90	50
June 21.....	5.5					31	352	134	18					544	.74	387	98	15	1.7	786	8.2	100	8
July 7.....	3.9					47	400	122	42					606	.82	411	83	20	1.0	913	7.7	85	3
Aug. 4.....	.1					59	374	87	61					566	.77	335	43	27	1.4	895	7.7	50	4

RED RIVER OF THE NORTH BASIN--Continued
MIDDLE RIVER NEAR STRANDQUIST, MINN.

LOCATION.--At gaging station at bridge on highway, half a mile north of entrance to Old Mill State Park and 9½ miles southwest of Strandquist, Marshall County.
RECORDS AVAILABLE.--Chemical analyses: April 1954 to September 1955 (discontinued).
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, November 1954 to September 1955

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 (micro- mhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre- foot	Calcium, mg-	Non- carbon- ate						
Nov. 8, 1954.....	0.1	12	0.01	66	36	14		381	22	4.0	0.2	1.3	0.23	359	0.49	312	0	9	0.3	596	7.7	27	4
Nov. 29.....	.1	11	.01	62	36	15		374	19	4.0	.2	.9	.22	343	.47	301	0	10	.4	581	7.7	24	3
Dec. 16.....	.2	17	.11	67	44	18		446	14	4.5	.2	1.4	.13	410	.56	348	0	10	.4	682	7.7	12	.8
Jan. 17, 1955.....	.2	22	.00	96	44	23		542	15	6.0	.2	2.0	.01	480	.65	420	0	11	.5	801	7.7	18	2
Apr. 5.....	10	6.6	.09	31	14	6.0		123	36	.5	.2	9.6	.04	189	.26	134	33	9	.2	288	7.2	50	3
Apr. 6.....	20	--	--	--	--	--	--	107	--	--	--	--	--	--	--	126	38	--	--	285	7.0	65	--
Apr. 20.....	88	--	--	--	--	6.7		196	98	1.5	--	--	--	338	.46	250	89	5	.2	495	7.8	60	8
May 9.....	11	--	--	--	--	7.6		321	90	2.0	--	--	--	429	.58	343	80	6	.2	642	7.9	65	.9
June 8.....	590	--	--	58	23	2.5		230	53	1.5	--	--	--	328	.45	240	51	2	.1	457	7.6	120	10
June 22.....	15	--	--	78	43	4.6		371	72	2.0	--	--	--	466	.63	372	68	3	.1	684	8.0	85	3
Aug. 10.....	.1	--	--	--	--	10		330	38	3.0	--	--	--	358	.49	292	21	7	.3	566	7.9	46	2
Aug. 26.....	.1	--	--	--	--	11		325	36	2.0	--	--	--	344	.47	283	16	8	.3	543	8.2	44	2
Sept. 27.....	.1	--	--	--	--	10		316	30	2.0	--	--	--	315	.43	271	12	8	.3	522	7.8	28	--

RED RIVER OF THE NORTH BASIN--Continued

MIDDLE RIVER AT ARGYLE, MINN.

LOCATION.--At gaging station at bridge on U. S. Highway 75 in Argyle, Marshall County, and 14 miles upstream from mouth.
 RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1955 (discontinued).
 Water temperatures: October 1953 to September 1955 (discontinued).

EXTREMES, 1954-55.--Dissolved solids: Maximum, 533 ppm Dec. 29; minimum, 180 ppm Apr. 8-12.
 Hardness: Maximum, 467 ppm Dec. 29; minimum, 124 ppm Apr. 8-12.

Specific conductance: Maximum daily, 847 microhmhos Dec. 29; minimum daily, 269 microhmhos Apr. 8, 10.
 EXTREMES, 1953-55.--Dissolved solids: Maximum, 533 ppm Dec. 29, 1954; minimum, 180 ppm Apr. 8-12, 1955.

Hardness: Maximum, 467 ppm Dec. 29, 1954; minimum, 124 ppm Apr. 8-12, 1955.
 Specific conductance: Maximum daily, 847 microhmhos Dec. 29, 1954; minimum daily, 263 microhmhos Apr. 13, 1954.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Little or no flow during November to March and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, December 1954 to August 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Dec. 29, 1954.....	0.1	20	0.00	101	52	11	7.4	536	43	11	0.4	3.7	0.07	533	0.72	0.14	467	27	5	0.2	847	7.3	23
Apr. 3-7, 1955.....	13.0			--	--	5.3		242	25	5.0				278	.38	9.76	220	22	5	.2	456	7.8	30
Apr. 8-12.....	116			30	12	4.8		106	44	1.0				180	.24	56.4	124	37	8	.2	275	7.5	43
Apr. 13-18.....	114			--	--	5.5		149	60	1.0				238	.32	73.3	174	52	6	.2	359	8.0	55
Apr. 19-30.....	66.1			--	--	7.6		223	86	1.0				333	.45	59.4	257	74	6	.2	500	7.9	65
May 1-14.....	29.7			--	--	8.5		300	85	1.5				396	.54	31.8	318	72	5	.2	600	8.1	85
May 15-31.....	19.2			--	--	10		356	75	4.0				428	.58	22.2	353	61	6	.2	659	8.1	43
June 1-5.....	82.4			--	--	7.6		315	89	.0				329	.36	93.4	334	76	5	.2	619	7.7	65
June 6-July 13.....	102			--	--	8.3		274	65	.0				368	.30	101.4	274	49	6	.2	512	7.8	90
July 14-Aug. 5.....	4.51			--	--	9.9		325	57	2.5				357	.49	4.35	308	41	7	.2	570	8.0	43
Aug. 6-12.....	.39			--	--	14		349	50	6.0				350	.48	.37	316	30	9	.3	588	8.1	40
Aug. 17-23.....	.34			--	--	12		340	46	6.0				350	.48	.32	308	29	8	.3	579	8.1	42
Weighted average.....	b 51.9			--	--	8.0		251	68	0.6				343	0.47	48.1	260	54	6	0.2	496	--	--

a Represents 99.9 percent of runoff for water year October 1954 to September 1955.

b Average for periods of sampling only.

RED RIVER OF THE NORTH BASIN--Continued

MIDDLE RIVER AT ARGYLE, MINN.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement between 5 p.m. and 9 p.m. Many days of no flow/

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

RED RIVER OF THE NORTH BASIN--Continued
TAMARAC RIVER NEAR STRANDQUIST, MINN.

LOCATION.--At gaging station at highway bridge, 1.2 miles south of Florian and 9 miles southwest of Strandquist, Marshall County.
RECORDS AVAILABLE.--Chemical analyses: April 1954 to September 1955.
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, November 1954 to September 1955

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 (micro-mhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
Nov. 8, 1954.....	0.5	14	0.02	89	38	22		429	13	7.0	0.2	3.8	0.25	385	0.52	330	0	13	0.5	660	7.7	24	2
Nov. 24.....	.7	12	.01	63	37	17		391	15	5.5		2	1.8	350	.48	310	0	10		604	7.8	23	2
Dec. 16.....	.6	21	.00	82	38	36		495	19	5.5	3	4.6	.10	484	.63	360	0	18	.8	768	7.5	12	.9
Jan. 17, 1955.....	.1	25	.08	111	39	27		572	13	8.0	3	3	.03	515	.70	436	0	12	.6	853	7.6	21	1
Apr. 5.....	10	12	.07	50	22	5.5		253	13	1.5	.1	5.4	.06	263	.36	216	9	5	.2	426	7.6	28	3
Apr. 6.....	10	--	--	--	--	--		235	--	--	--	--	--	--	--	209	16	--	--	405	7.6	30	--
Apr. 14.....	33	--	--	--	--	4.1		175	54	1.0	--	--	--	253	.34	192	48	4	.1	391	7.5	50	.4
May 9.....	8.0	--	--	--	--	6.2		332	68	1.0	--	--	--	401	.55	331	59	4	.1	614	7.8	46	1
June 8.....	364	--	--	--	--	6.2		250	55	1.5	--	--	--	355	.48	251	46	5	.2	471	7.6	140	15
Aug. 10.....	.1	--	--	--	--	18		351	29	5.5	--	--	--	362	.49	287	0	12	.5	574	7.8	46	1
Sept. 27.....	.3	--	--	--	--	34		438	12	8.5	--	--	--	392	.53	309	0	20	.8	662	8.1	30	--

RED RIVER OF THE NORTH BASIN--Continued

TAMARAC RIVER NEAR STEPHEN, MINN.

LOCATION.--At gaging station, 4½ miles northwest of Stephen, Marshall County, and 8 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1955 (discontinued).

Water temperatures: October 1953 to September 1955 (discontinued).

EXTREMES, 1954-55.--Dissolved solids: Maximum, 415 ppm May 13-28; minimum, 214 ppm Apr. 3-15.

Hardness: Maximum, 343 ppm July 14-31; minimum, 149 ppm Apr. 3-15.

Specific conductance: Maximum daily, 688 micromhos Aug. 12; minimum daily, 302 micromhos Apr. 12.

Water temperatures: Maximum, 91°F Aug. 2.

EXTREMES, 1953-55.--Dissolved solids: Maximum, 451 ppm June 26 to July 21, 1954; minimum, 214 ppm Apr. 3-15, 1955.

Hardness: Maximum, 359 ppm June 26 to July 21, 1954; minimum, 149 ppm Apr. 3-15, 1955.

Specific conductance: Maximum daily, 688 micromhos Aug. 12, 1955; minimum daily, 302 micromhos Apr. 12, 1955.

Water temperatures: Maximum, 91°F Aug. 2, 1955.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. No flow during October to March and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, April to August 1955

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 sulfate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million		Tons per acre-foot	Tons per day							Calcium, mg/l	Non-carbonate, mg/l
														Residue at 180°C	Sum										
Apr. 3-15, 1955.	128					6.9		147	38	3.0				214	0.29	74.0	149	38	8	0.2	320	7.7	40		
Apr. 16-22	43.6					3.8		193	46	4.5				253	.34	29.8	200	42	6	.2	410	7.6	45		
Apr. 23-May 12.	34.3					6.9		273	63	3.0				345	.47	32.0	260	56	5	.2	536	7.8	45		
May 13-28	11.3					10		357	59	5.5				415	.56	12.7	320	47	6	.2	640	8.1	50		
May 29-June 6 ..	64.7					11		354	55	4.0				399	.54	69.7	328	39	7	.3	613	7.9	50		
June 7-13	313					6.7		262	54	.0				347	.47	293	256	41	5	.2	478	7.7	85		
June 14-July 13.	39.0					4.6		335	57	.0				409	.56	43.1	324	49	3	.1	590	7.8	85		
July 14-31	3.08					13		386	45	6.0				402	.55	3.34	343	26	8	.3	626	7.9	48		
Aug. 1-12 .....	.58					17		386	45	7.5				391	.53	.61	337	20	10	.4	635	7.8	43	
Weighted average a	18.8					6.7		256	51	1.8				328	0.45	16.6	251	41	5	0.2	479	--	--		

a Represents 100 percent of runoff for water year October 1954 to September 1955.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN--Continued

TAMARAC RIVER NEAR STEPHEN, MINN.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement between 5 p.m. and 8 p.m. Many days of no flow/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	67	85	73	85	
2							--	73	69	74	91	
3							--	a 70	70	80	--	
4							--	a 50	a 69	82	a 85	
5							--	62	71	83	a 88	
6							--	59	67	a 77	a 82	
7							--	44	68	81	82	
8							--	55	a 64	72	--	
9							--	59	a 60	73	77	
10							--	57	a 59	72	80	
11								60	62	60	77	81
12								48	a 66	63	77	80
13								a 52	70	a 65	80	--
14								a 54	a 67	70	a 73	--
15								a 50	a 68	--	80	--
16								a 46	56	a 75	--	--
17								a 42	a 61	75	82	--
18								44	75	a 71	82	--
19								56	74	77	83	--
20								48	76	73	82	--
21								46	75	a 72	87	--
22								50	68	a 71	a 83	--
23								56	80	72	a 73	--
24								50	63	76	75	--
25								a 54	--	79	83	--
26								56	59	79	72	--
27								a 62	55	76	74	--
28								58	a 55	80	a 73	--
29								69	67	82	83	--
30								--	69	78	a 83	--
31								--	73	--	a 87	--
Average							--	64	71	80	--	

a Reading obtained between 2 p.m. and 4 p.m.

RED RIVER OF THE NORTH BASIN--Continued
RED RIVER OF THE NORTH AT DRAYTON, N. DAK.

LOCATION.--At gaging station at interstate highway bridge, 1½ miles northeast of Drayton, Pembina County. Prior to Nov. 30, 1954, at site 1½ miles upstream.
DRAINAGE AREA.--34,800 square miles, approximately (includes 3,940 square miles in closed Devils Lake basin).
RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1955 (discontinued).
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium, magnesium	Non-carbon- ate						
Oct. 19, 1954.....	618	3.8	0.00	52	29	49	258	54	62	0.1	1.4	0.25	397	0.54	397	250	38	30	685	7.6	14	7	
Nov. 22.....	831	5.2	.00	61	29	73	274	72	91	1	1.7	.31	480	.87	272	272	47	37	831	7.6	9	4	
Dec. 17.....	733	7.4	.01	65	31	52	317	72	47	2	2.2	.13	445	.81	290	30	28	1.3	741	7.4	11	1	
Jan. 19, 1955.....	732	11	.01	62	32	37	332	59	21	2	3.5	.11	405	.55	287	15	22	.9	655	7.4	16	1	
Feb. 17.....	656	12	.00	62	29	32	312	52	21	2	4.7	.02	379	.52	273	17	21	.9	630	7.4	7	.7	
Mar. 29.....	750	12	.02	54	31	23	300	43	13	1	5.0	.10	345	.47	263	17	16	.6	564	7.5	6	1	
Apr. 6.....	7,000	9.5	.20	45	16	71	152	70	91	1	8.2	.11	414	.56	179	54	46	2.3	690	7.4	46	170	
Apr. 9.....	16,200	13	.39	45	16	26	155	60	26	1	11	.15	323	.44	179	52	24	.8	499	7.3	30	85	
Apr. 14.....	14,000	11	.14	45	18	25	149	69	28	1	9.5	.07	330	.45	188	66	22	.8	489	7.3	30	65	
Apr. 19.....	5,260	--	--	--	--	63	189	103	84	--	--	--	--	471	.64	243	88	36	1.8	770	7.5	35	70
Apr. 26.....	4,380	--	--	--	--	40	229	106	43	--	--	--	--	432	.59	272	84	24	1.1	689	7.8	22	60
May 12.....	2,340	--	--	--	--	39	276	101	36	--	--	--	--	446	.61	297	71	22	1.0	707	7.6	18	35
July 17.....	2,750	--	--	--	--	37	208	91	28	--	--	--	--	373	.51	225	54	26	1.1	582	7.5	43	140
Aug. 16.....	2,390	--	--	--	--	29	224	65	20	--	--	--	--	333	.45	217	33	22	.8	528	7.9	30	95
Sept. 9.....	934	--	--	--	--	43	272	74	32	--	--	--	--	377	.51	252	29	27	1.2	629	7.9	15	--
Sept. 28.....	959	--	--	--	--	43	248	39	51	--	--	--	--	347	.47	222	19	30	1.3	610	7.7	5	--

RED RIVER OF THE NORTH BASIN--Continued
SOUTH BRANCH TWO RIVERS AT PELAN, MINN.

LOCATION --At gaging station at bridge on State Highway 11 and a quarter of a mile west of Pelan, Roseau County.

DRAINAGE AREA 841 square miles

RECORDS AVAILABLE --Chemical analyses: September 1953 to September 1955 (discontinued).

REMARKS --Little or no flow during December to March, August, and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, October 1954 to July 1955

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids residue at 180°C		Hardness as CaCO ₃		Per- cent so- lution	So- lution ad- sorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium, mg- ne- sium	Non- carbon- ate						
Oct. 15, 1954.....	0.04	12	0.02	97	51	9.4	277	233	1.5	0.3	1.3	0.25	0.25	611	0.83	453	226	4	0.2	823	7.5	45	3
Nov. 30, 1954.....	3	9.2	.02	111	56	12	322	282	1.5	1.5	1.7	.25	.25	671	.31	508	242	5	.2	907	7.6	39	3
Apr. 4, 1955.....	3.5	4.9	.06	35	15	6.7	100	50	1.0	1.0	6.9	.06	.06	202	.27	132	45	9	.2	299	7.1	65	2
Apr. 6, 1955.....	40	4.9	.06	35	15	6.7	126	50	1.0	1.0	6.9	.06	.06	202	.27	148	45	9	.2	311	7.1	45	2
Apr. 27.....	59	59	..	..	..	8.3	219	116	1.0	1.0	..	..	..	378	.51	284	104	6	.2	541	7.7	80	1
May 25.....	8.1	..	..	..	..	6.9	344	97	1.5	1.5	..	..	..	456	.62	370	88	4	.2	674	7.8	80	1
June 8.....	815	..	..	..	..	6.2	230	62	1.0	1.0	..	..	..	334	.45	241	52	5	.2	455	7.5	140	3
June 15.....	180	..	..	..	..	7.6	302	96	1.5	1.5	..	..	..	439	.60	333	85	5	.2	610	7.6	120	3
July 7.....	7.2	..	..	..	..	5.5	282	68	1.0	1.0	..	..	..	355	.48	276	61	4	.1	528	7.5	50	1

RED RIVER OF THE NORTH BASIN--Continued

SOUTH BRANCH TWO RIVERS AT LAKE BRONSON, MINN.

LOCATION --At gaging station at bridge on U.S. Highway 59 at Lake Bronson, Kittson County, and 2 miles downstream from dam at outlet of Lake Bronson.

DRAINAGE AREA --444 square miles.

RECORDS AVAILABLE --Chemical analyses: April 1954 to September 1955 (discontinued).

EXTREMES, 1954-55 --Dissolved solids: Maximum, 494 ppm Dec. 27 to Jan. 7; minimum, 203 ppm Apr. 14-15.

HARDNESS: Maximum, 401 ppm Dec. 27 to Jan. 7; minimum, 146 ppm Apr. 14-15.

Specific conductance: Maximum daily, 757 microhos Dec. 31; minimum daily, 307 microhos Apr. 14.

Water temperatures: Maximum, 81 F July 21; minimum, freezing point on many days during November to April.

EXTREMES, April 1954 to September 1955 --Dissolved solids: Maximum, 494 ppm Dec. 27, 1954, to Jan. 7, 1955; minimum, 203 ppm Apr. 14-15, 1955.

HARDNESS: Maximum, 401 ppm Dec. 27, 1954, to Jan. 7, 1955; minimum, 146 ppm Apr. 14-15, 1955.

Specific conductance: Maximum daily, 757 microhos Dec. 31, 1954; minimum daily, 299 microhos Apr. 17, 1954.

Water temperatures: Maximum, 81 F July 21, 1955; 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1386.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 chloride	Sodium adsorption ratio	Specific conductance (microhm-cm at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1954	4.73	15	0.00	73	38	--	--	320	--	1.0	--	0.3	0.06	390	0.52	340	371	78	--	569	7.7	--
Oct. 11-Nov. 21	4.63	13	0.01	77	34	6.9	12	320	78	1.5	0.5	0.5	0.05	396	0.54	332	332	70	4	614	7.8	46
Nov. 22-Dec. 26	3.14	19	0.03	82	35	--	--	329	95	2.0	1.1	1.6	0.07	435	0.59	348	348	78	7	637	7.8	37
Dec. 27-Jan. 7, 1955	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 8-31	2.77	22	0.05	92	42	9.7	7.1	376	106	1.0	1.0	1.9	0.09	494	0.67	401	401	93	5	719	7.8	45
Feb. 1-28	2.46	22	0.04	83	39	7.4	3.8	350	82	1.0	0.3	1.0	0.09	457	0.62	364	364	80	4	659	7.9	41
Mar. 1-22	3.30	22	0.04	84	39	7.4	4.1	350	93	1.0	0.3	1.1	0.11	475	0.65	371	371	84	4	677	7.8	40
Mar. 23-Apr. 9	74.7	--	--	--	--	--	--	338	106	1.0	--	--	--	462	0.63	369	369	92	5	681	8.0	43
Apr. 6-9	75	16	0.07	81	37	9.0	6.4	328	95	0.7	1.1	5.1	0.07	441	0.60	354	354	85	5	656	7.8	45
Apr. 10-11	514	--	--	--	--	--	--	220	75	1.0	--	--	--	323	0.44	246	246	66	5	478	8.2	47
Apr. 12-13	432	--	--	--	--	4.6	4.6	156	61	5	--	--	--	242	0.33	182	182	54	5	372	8.3	55
Apr. 14-15	244	--	--	--	--	4.1	4.1	116	57	5	--	--	--	203	0.26	146	146	51	6	310	8.1	55
Apr. 16-May 1	282	--	--	--	--	6.0	6.0	163	76	1.0	--	--	--	273	0.37	201	201	67	6	406	7.9	80
May 2-31	67.3	--	--	--	--	7.1	7.1	215	98	0.5	--	--	--	358	0.48	263	263	87	6	514	8.0	85
June 1-30	370	--	--	--	--	7.4	7.4	254	75	0	--	--	--	354	0.49	270	270	62	6	503	7.7	90
July 1-31	24.9	--	--	--	--	7.8	7.8	301	82	0	--	--	--	400	0.54	315	315	68	5	580	7.7	75
Aug. 1-31	4.53	--	--	--	--	12	12	302	84	0.5	--	--	--	379	0.52	309	309	61	8	573	7.9	50
Sept. 1-30	5.06	--	--	--	--	11	11	306	72	1.0	--	--	--	360	0.49	304	304	53	7	563	7.8	50
Weighted average c.	63.0	--	--	--	--	7.1	7.1	234	79	0.4	--	--	--	341	0.46	259	259	67	6	482	--	--

a Not included in weighted average.

b Includes equivalent of 4 ppm of carbonate (CO₃).

c Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1954 to September 1955.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN--Continued

SOUTH BRANCH TWO RIVERS AT LAKE BRONSON, MISS.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /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	48	32	32	--	33	33	34	56	60	a 76	77	64
2	--	32	32	--	32	32	33	57	62	72	77	64
3	--	33	32	32	33	34	34	63	63	74	77	65
4	--	33	32	32	34	32	33	51	64	73	73	64
5	--	35	32	32	34	32	34	51	64	74	71	60
6	--	36	32	31	32	32	32	53	64	79	a 75	62
7	--	35	32	32	34	32	35	48	64	73	78	58
8	--	34	32	33	33	36	38	50	64	73	68	56
9	--	a 39	32	33	32	34	38	52	62	66	a 75	59
10	--	48	32	32	32	32	40	51	60	67	68	49
11	--	a 35	32	33	32	32	40	52	58	68	68	49
12	--	35	32	32	32	32	41	55	59	73	70	52
13	--	38	31	32	33	32	40	58	61	73	70	55
14	--	32	32	33	33	32	43	60	63	70	71	57
15	44	32	32	33	34	32	44	62	66	69	69	58
16	42	32	32	31	--	32	44	52	69	73	67	58
17	41	38	32	32	34	32	44	53	a 72	74	70	60
18	40	36	32	33	33	32	45	59	70	75	73	64
19	41	35	33	32	32	33	45	58	70	78	73	57
20	43	--	32	33	--	33	46	62	68	79	71	55
21	45	--	32	34	33	33	45	63	69	81	70	53
22	47	--	32	32	32	33	43	65	68	78	67	53
23	47	--	32	32	32	33	45	61	68	73	68	51
24	46	34	32	32	31	33	46	55	a 74	--	69	49
25	43	a 33	32	31	34	32	46	a 58	70	72	67	46
26	42	--	31	32	32	34	49	57	72	72	68	--
27	38	32	--	32	32	33	50	55	73	70	69	--
28	42	32	32	32	33	34	49	54	73	69	--	--
29	a 40	32	32	32	--	35	50	57	74	71	65	--
30	35	32	33	32	--	33	55	58	74	75	63	--
31	37	--	31	34	--	33	--	60	--	76	60	--
Aver- age	--	35	32	32	33	33	42	56	67	73	70	57

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

RED RIVER OF THE NORTH BASIN--Continued

TWO RIVERS BELOW HALLOCK, MINN.

LOCATION --At gaging station at highway bridge, 4 miles west of Hallock, Kittson County, and 5 miles upstream from North Branch Two Rivers. DRAINAGE AREA --644 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1954 to September 1955 (discontinued).

Water temperatures: April 1954 to September 1955 (discontinued).

EXTRIMES, 1954-55.--Dissolved solids: Maximum, 727 ppm Feb. 13 to Mar. 13; minimum, 183 ppm Apr. 4-10.

Hardness: Maximum, 506 ppm Jan. 13 to Feb. 12; minimum, 128 ppm Apr. 2; minimum daily, 207 microhms Apr. 5.

Water temperatures: Maximum, 78°F July 21; minimum, freezing point Dec. 1-10, Apr. 5-6.

EXTRIMES, April 1954 to September 1955.--Dissolved solids: Maximum, 727 ppm Feb. 13 to Mar. 13, 1955; minimum, 183 ppm Apr. 4-10, 1955.

Hardness: Maximum, 506 ppm Jan. 13 to Feb. 12, 1955; minimum, 128 ppm Apr. 4-10, 1955.

Specific conductance: Maximum daily, 1,110 microhms Feb. 2 to Mar. 2, 1955; minimum point Dec. 1-10, 1954, Apr. 5-6, 1955.

Water temperatures: Maximum, 78°F July 21, 1955; minimum, freezing point Dec. 1-10, 1954, Apr. 5-6, 1955.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 (microhms at 25° C)	pH	Color	
														Parts per million	Tons per acre-ft	Tons per million	Calcium, mg./l.						Non-carbonate, mg./l.
Oct. 1-19, 1954.....	1.11	10	0.02	67	31	30	273	66	47	0.6	0.2	0.09	400	0.54	1.20	295	71	18	0.8	657	7.9	46	
Oct. 20-Nov. 23.....	2.38	7.2	.01	76	38	39	311	84	62	.1	1.4	1.4	.09	492	.67	347	92	20	.9	786	7.7	45	
Nov. 24-Dec. 27.....	1.78	5.3	.01	85	44	32	377	87	42	.1	2.1	2.1	.09	505	.69	392	83	15	.7	810	7.8	38	
Dec. 28-Jan. 12.....																							
1955.....																							
Jan. 13-Feb. 12.....	.41	11	.01	106	49	35	440	110	46	.1	5.0	5.0	.11	609	.83	.67	488	107	14	.7	936	7.8	33
	.14	18	.04	111	56	41	460	113	63	.2	11	11	.13	713	.97	.27	506	129	15	.8	1,060	8.0	31
Feb. 13-Mar. 13.....	.32	23	.04	108	54	45	450	106	71	.2	11	12	.12	727	.99	.63	491	122	16	.9	1,070	7.8	33
Mar. 14-30.....	.47	23	.05	97	46	35	400	96	52	.2	9.4	9.4	.13	613	.83	.78	431	103	15	.7	924	7.8	30
Mar. 31-Apr. 1.....	1.30	--	--	--	--	24	310	80	38	--	--	--	--	467	.64	1.64	338	84	14	.6	733	8.1	33
Apr. 2.....	20	--	--	--	--	21	374	92	27	--	--	--	--	514	.70	27.8	394	87	11	.5	786	8.1	27
Apr. 3.....	150	--	--	--	--	10	312	96	3.3	--	--	--	--	432	.59	175	338	82	6	.2	651	8.0	30
Apr. 4-10.....	506	--	--	--	--	8.7	117	33	6.0	--	--	10	--	183	.25	250	128	32	13	.3	288	7.6	42
Apr. 11-30.....	477	--	--	--	--	8.1	175	74	3.5	--	--	--	--	280	.38	361	208	64	8	.2	429	7.9	50
May 1-13.....	125	--	--	--	--	19	226	103	16	--	--	--	--	366	.50	124	274	89	13	.5	549	8.0	70
May 14-31.....	66.4	--	--	--	--	11	288	110	8.0	--	--	--	--	432	.59	77.4	322	102	7	.3	641	8.0	60
June 1-17.....	618	--	--	--	--		252	81	.0	--	--	--	--	364	.50	607	276	69	5	.2	525	7.5	80
June 18-July 6.....	109	--	--	--	--	9.9	306	75	9.0	--	--	--	--	417	.57	123	320	69	6	.2	608	7.7	75
July 7-9.....	188	--	--	--	--	6.4	139	32	4.5	--	--	--	--	197	.27	100	140	26	9	.2	301	7.6	55

RED RIVER OF THE NORTH BASIN--Continued

TWO RIVERS BELOW HALLOCK, MINN.--Continued

Chemical analyses, in parts per million, water year October 1954 to September 1955.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Bo-ron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH	Col-or
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
July 10-13, 1955...	73.6	--	--	--	--	13	13	246	58	12	--	--	--	325	0.44	64.6	250	48	10	0.4	507	7.7	55
July 18-27.....	33.7	--	--	--	--	15	15	311	77	13	--	--	--	417	.57	37.9	320	65	9	.4	619	7.9	65
July 28-Aug. 26...	1.21	--	--	--	--	23	23	344	83	31	--	--	--	483	.66	9.40	363	81	12	.5	734	7.9	41
Aug. 27-Sept. 17...	1.62	--	--	--	--	27	27	354	83	39	--	--	--	498	.68	2.18	372	92	14	.6	775	7.9	40
Sept. 18-30.....	18.1	--	--	--	--	27	27	238	67	59	--	--	--	413	.56	20.2	268	93	17	.7	674	7.7	35
Weighted average.....	84.5	--	--	--	--	8.7	8.7	216	74	5.1	--	--	--	323	0.44	73.7	242	65	7	0.2	481	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

RED RIVER OF THE NORTH BASIN--Continued

TWO RIVERS BELOW HALLOCK, MINN.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (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	47	35	32	33	33	33	33	--	64	70	71	57
2	44	37	33	33	33	33	33	61	--	71	71	60
3	46	34	33	33	33	33	33	65	63	71	77	62
4	42	33	33	33	33	33	34	58	64	72	73	59
5	40	34	--	33	33	33	32	52	63	71	73	56
6	38	34	33	33	33	33	32	54	60	70	69	57
7	--	35	33	33	33	33	33	52	62	71	66	56
8	--	34	33	34	33	33	35	52	62	72	66	55
9	--	34	33	34	33	33	34	50	61	67	66	56
10	--	35	32	34	33	33	41	49	61	67	66	48
11	48	36	33	34	33	33	41	52	59	68	64	46
12	--	34	--	33	33	33	45	55	59	71	67	45
13	47	36	33	33	33	33	44	57	60	71	67	50
14	--	35	33	33	33	33	44	61	62	72	67	53
15	43	36	33	33	33	33	48	56	63	71	67	55
16	41	33	34	33	33	33	46	56	66	71	65	57
17	39	34	34	33	33	33	48	53	65	72	64	58
18	38	35	33	33	33	33	45	58	65	75	62	56
19	38	35	33	33	33	33	45	62	64	75	64	57
20	40	--	33	33	33	33	45	63	65	77	62	54
21	41	--	33	33	33	33	46	64	67	78	70	55
22	38	--	--	--	33	33	43	--	67	77	65	51
23	44	--	34	33	33	33	43	62	67	74	64	51
24	46	--	33	33	33	33	46	57	67	72	66	49
25	40	--	34	33	33	33	47	57	67	71	65	--
26	41	--	33	33	33	33	49	57	68	70	65	--
27	40	--	33	33	33	33	51	56	70	70	67	--
28	37	33	33	33	33	33	58	57	66	69	65	--
29	38	33	33	33	--	33	53	58	71	70	65	--
30	37	33	33	33	--	33	55	58	69	74	61	--
31	38	--	33	33	--	33	--	60	--	74	62	--
Average	41	--	33	33	33	33	43	57	64	72	67	54

RED RIVER OF THE NORTH BASIN--Continued

NORTH BRANCH TWO RIVERS NEAR LANCASTER, MINN.

LOCATION --At gaging station at highway bridge, half a mile upstream from State ditch 85 and 7 miles northeast of Lancaster, Kittson County.
 DRAINAGE AREA --32 square miles, approximately.
 RECORDS AVAILABLE --Chemical analyses: October 1953 to September 1955 (discontinued).
 REMARKS --Little or no flow November to March. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

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 (micro- mhos at 25°C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium, mag- nesium	Non- carbon- ate						
Oct. 28, 1954.....	0.12	5.5	0.02	84	40	11		384	68	7.0	0.3	1.4	0.19	430	0.58	373	58	6	0.3	690	7.7	44	3
Apr. 7, 1955.....	43	--	--	--	--	5.1	86	24	24	1.0	--	--	--	136	.18	86	15	11	.2	203	6.8	90	2
Apr. 22, 9:30 a.m.....	528	14	--	46	18	12	190	56	56	1.0	1	1.5	.08	267	.36	190	34	12	.4	382	7.2	90	1
Apr. 22, 5:00 p.m.....	146	--	--	--	--	6.0	158	58	58	.5	--	--	--	254	.35	176	48	7	.2	358	7.3	90	1
May 24.....	1.2	--	--	--	--	6.0	308	48	48	.5	--	--	--	375	.51	290	37	4	.2	551	7.6	90	1
June 15.....	7.9	--	--	--	--	7.1	314	34	34	1.0	--	--	--	356	.48	279	22	5	.2	521	7.9	95	.6
July 6.....	4.1	--	--	--	--	6.4	296	27	27	1.0	--	--	--	333	.45	258	15	5	.2	498	7.4	85	10
Sept. 23.....	1.0	--	--	--	--	8.7	288	36	36	1.0	--	--	--	316	.43	256	20	7	.2	494	7.4	45	--

RED RIVER OF THE NORTH BASIN--Continued
STATE DITCH 85 NEAR LANCASTER, MINN.

LOCATION.--At gaging station at highway bridge, 1 mile upstream from North Branch Two Rivers and 7 miles northeast of Lancaster, Kittson County.
DRAINAGE AREA.--95 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1955 (discontinued).
REMARKS.--Little or no flow November to March. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Per- cent so- dium	So- dium adsorp- tion ratio	Specific con- ductance (micro- mhos at 25°C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium	Non- carbon- ate						
Oct. 28, 1954.....	0.5	3.3	0.00	134	58		3.5	380	245	2.5	0.6	0.3	0.07	708	0.96	572	252	1	0.1	1,010	7.7	30	5
Apr. 7, 1955.....	23						3.5	86	34	1.0				149	.20	100	29	7	.2	233	6.9	50	2
Apr. 22.....	195						6.4	134	81	1.0		1.4		264	.36	183	73	7	.2	380	7.1	80	.9
May 24.....	10						7.6	314	171	.0				548	.75	419	162	4	.2	770	7.7	75	1
June 15.....	65						7.1	285	90	.5				422	.57	312	78	5	.2	585	7.7	110	.7
July 6.....	4.6						9.4	341	146	1.5				535	.73	413	133	5	.2	757	7.6	85	2
Aug. 1.....	1.6					12	162	358	162	1.5				571	.78	439	145	5	.2	796	7.9	90	3
Sept. 23.....	11.8					14	240	458		.0				880	1.20	644	447	4	.2	1,120	7.4	42	--

RED RIVER OF THE NORTH BASIN--Continued

NORTH BRANCH TWO RIVERS AT LANCASTER, MINN.

LOCATION.--At gaging station at bridge on U. S. Highway 59 at Lancaster, Kittson County, and 7½ miles downstream from State ditch 85.

DRAINAGE AREA.--209 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1953 to September 1955 (discontinued).

Water temperatures: April to July 1954, April to September 1955 (discontinued).

EXTREMES, 1954-55.--Dissolved solids: Minimum, 184 ppm Apr. 6-11.

Hardness: Minimum, 50 ppm June 25-27.

Specific conductance: Minimum daily, 256 micromhos Apr. 8.

EXTREMES, April 1954 to September 1955.--Dissolved solids: Maximum (April to September 1954), 539 ppm July 9-31, 1954; minimum, 184 ppm Apr. 6-11, 1955.

Hardness: Maximum (April to September 1954), 391 ppm July 9-31, 1954; minimum, 50 ppm June 25-27, 1955.

SPECIFIC CONDUCTANCE: Maximum daily (April to September 1954), 841 micromhos July 12, 1954; minimum daily, 256 micromhos Apr. 8, 1955.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH or	Col- or	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 14, 1954.....	2.4	9.3	0.02	80	38	22		355	70	26	0.4	1.8	0.25	449	0.61	2.91	356	65	12	0.5	719	7.7	28
Nov. 23.....	2.9	7.9	.01	97	43	23		422	81	26	.3	1.0	.22	514	.70	4.02	418	108	12	1.5	814	8.0	26
Jan. 28, 1955.....	1.1	18	.04	130	60	66		566	113	92	.1	6.1	.13	803	1.09	2.38	572	108	20	1.2	1,280	7.4	22
Mar. 4.....	.2	21	.84	114	62	73		586	82	93	.2	4.1	.10	754	1.03	.41	539	58	23	1.4	1,250	7.4	42
Apr. 6, 3:20 p.m.	116	5.6	.13	32	13	8.3		138	27	4.0	.1	7.7	.04	184	.25	57.6	135	22	12	.3	298	7.1	60
Apr. 6, 5:30 p.m. a	116					7.1		172	32	3.0		11		236	.32	73.9	172	31	8	.2	364	7.6	48
Apr. 7-11.....	285					7.6		129	34	2.5				184	.25	147	128	22	11	.3	281	7.7	55
Apr. 12-16.....	235					9.0		157	54	3.0				232	.32	147	169	40	10	.3	358	8.0	90
Apr. 17.....	140					8.1		338	16	3.0				310	.42	117	280	3	6	.2	520	8.1	29
Apr. 18-20.....	329					9.2		182	56	4.0				262	.36	233	193	44	9	.3	396	8.0	90
Apr. 21-22.....	507					9.7		b 280	25	28				354	.48	485	274	44	7	.3	540	8.3	50
Apr. 23-26.....	417					6.2		b 269	61	1.0				263	.36	296	190	51	7	.2	398	8.2	90
Apr. 27-May 1.....	230					12		b 272	35	14		28		352	.48	219	276	53	8	.3	547	8.3	38
May 2-3.....	138					11		c 358	51	10		47		356	.48	133	264	60	8	.3	549	8.2	55
May 4-7.....	86.3					7.8		c 368	29	1.0				376	.51	89.6	333	15	5	.2	607	8.3	42
May 8-9.....	95.5					10		c 290	59	5.0				337	.45	59.5	275	39	9	.3	595	9.4	40
May 10-17.....	47.3					14		324	77	7.0				413	.56	52.7	324	58	9	.3	626	8.2	60
May 18.....	50					39		324	83	9.0		.5		258	.35	34.8	102	17	45	1.6	387	8.1	25
May 18-29.....	43.1					9.9		323	68	2.0				394	.52	44.7	317	52	6	.2	599	7.6	50
May 30-June 4.....	169					9.2		297	61	.0				355	.48	162	287	43	7	.2	542	7.9	90

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN--Continued

NORTH BRANCH TWO RIVERS AT LANCASTER, MINN.--Continued

Temperature (°F) of water, April to September 1955
 (Once-daily measurement between 7 p.m. and 8 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	62	60	72	83	60
2							--	58	62	73	81	--
3							--	60	64	73	79	57
4							--	57	65	75	79	56
5							--	57	64	76	76	55
6							33	58	63	75	76	53
7							35	57	65	72	77	59
8							37	55	64	71	77	53
9							52	55	63	74	74	51
10							52	57	61	76	75	51
11							56	58	61	77	73	50
12							51	60	59	75	71	--
13							51	62	62	74	72	--
14							53	58	65	75	74	--
15							51	59	65	78	75	--
16							50	62	65	78	73	--
17							52	62	67	81	75	--
18							49	59	69	80	73	--
19							57	64	69	84	72	--
20							50	64	70	83	73	--
21							48	66	71	85	--	--
22							51	64	65	80	--	--
23							51	63	70	78	70	--
24							53	62	72	79	70	--
25							52	63	69	78	--	--
26							53	61	67	77	65	--
27							55	58	68	75	64	--
28							56	57	67	73	--	--
29							57	59	70	76	--	--
30							56	59	71	79	--	--
31							--	58	--	80	62	--
Average							50	60	66	77	74	--

RED RIVER OF THE NORTH BASIN--Continued

ROSEAU RIVER AT INTERNATIONAL BOUNDARY NEAR CARIBOU, MINN.

LOCATION.--At gaging station, 400 feet upstream from last international boundary crossing and 3 miles northwest of Caribou, Kittson County. DRAINAGE AREA.--1,590 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: April to September 1955.
 REMARKS.--Records of elevation for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955																							
Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Per- cent so- lids	So- lids ad- sorp- tion ratio	Specific conduct- ance (micro- mhos at 25° C)	pH	Color	Tur- bid- ity
														Parts per mil- lion	Tons per acre- foot	Calcium, mag- nesium	Non- carbon- ate						
Oct. 28, 1954.....	15	8.3	0.02	51	25	12	2.6	263	33	5.5	0.3	0.8	0.14	292	0.40	228	12	10	0.3	458	7.9	35	5
Apr. 7, 1955.....	299					11		220	47	5.0				291	.40	212	32	10	.3	457	7.1	40	3
May 24.....	290					6.2		235	39	1.0				296	.40	221	28	6	.2	426	8.0	70	5
June 4.....	880					8.3		239	45	1.5				301	.41	227	31	7	.2	433	7.5	110	7
July 8.....	225					9.2		253	36	1.5				297	.40	227	20	8	.3	430	7.6	85	3
Aug. 2.....	58					8.7		260	28	1.5				294	.40	225	12	8	.3	426	7.9	70	3
Aug. 31.....	433					10		262	25	1.5				292	.40	220	5	9	.3	428	8.2	55	3
Sept. 23.....	44					14		225	49	1.0				261	.35	206	21	13	.4	422	7.5	35	--

RED RIVER OF THE NORTH BASIN--Continued
SOURIS RIVER NEAR VERENDRYE, N. DAK.

LOCATION.--At gaging station, 2.7 miles north of Verendrye, McHenry County, and 7½ miles southwest of (19 miles upstream from) mouth of Wintering River.
DRAINAGE AREA.--12,200 square miles approximately.
RECORDS AVAILABLE.--Chemical analyses October 1949 to August 1951, August 1952 to September 1955.
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1386.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Per-cent so-lid-ity	So-dium ad-just-ment ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium near-nessium	Non-carbonate				
Oct. 5, 1954.....	138			51	27	98		339		147	20				553	0.75		236	847	46	2.8	847	7.4
Nov. 4.....	76			51	27	113		392		184	23				--	--		288	0	45	2.9	975	7.6
Dec. 7.....	76			--	--	113		386		198	30				--	--		313	0	43	2.8	1,020	7.5
Dec. 29.....	73			--	--	116		410		206	28				--	--		334	0	43	2.8	1,070	7.7
Jan. 27, 1955.....	72			--	--	104		398		199	25				--	--		334	8	40	2.5	1,030	7.5
Feb. 23.....	56			64	41	102		382		192	24				670	.91		327	6	40	2.5	1,020	7.6
Mar. 18.....	180			51	30	88		286		187	15				578	.79		251	16	43	2.4	858	7.1
Apr. 2.....	1,010			27	14	36		138		87	6.0				279	.38		126	13	37	1.4	431	7.4
Apr. 7.....	880			28	13	34		143		74	5.5				289	.37		125	8	37	1.3	412	7.0
Apr. 21.....	1,620			52	33	71		298		163	10				531	.72		267	23	36	1.9	789	7.5
May 2.....	1,590			--	--	62		262		143	9.5				--	--		230	15	36	1.8	702	7.6
May 12.....	1,550			--	--	49		216		118	7.0				--	--		188	11	34	1.6	580	7.7
May 24.....	1,680			--	--	42		190		98	5.5				--	--		166	10	34	1.4	513	7.7
June 18.....	598			43	30	67		266		145	10				475	.65		232	14	38	1.9	727	7.6
July 1.....	376			--	--	71		300		152	12				500	.68		246	0	37	2.0	772	7.5
July 21.....	351			--	--	72		284		152	11				498	.68		229	0	36	2.1	755	7.6
Aug. 26.....	158	8.6	0.27	48	31	70	12	320		142	11		1.1	0.12	511	.69		249	0	37	1.9	774	8.0
Sept. 22.....	252			40	41	66		320		147	12				519	.71		269	7	33	1.7	788	7.9

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR WESTHOPE, N. DAK.

LOCATION.--At gaging station, 1,200 feet upstream from second crossing of international boundary, 1 mile downstream from Fish and Wildlife Service dam 357, 7 miles northeast of Westhope, Bottineau County, and 11 miles downstream from Boundary Creek.

DRAINAGE AREA.--17,600 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1955.

Water temperatures: October 1954 to September 1955.

EXTREMES, August 1954 to September 1955.--Dissolved solids: Maximum, 1,080 ppm Jan. 25; minimum, 249 ppm Apr. 5-15.

Hardness: Maximum, 550 ppm Jan. 25; minimum, 121 ppm Apr. 5-15.

Specific conductance: Minimum daily, 355 micromhos Apr. 12.

Water temperatures: 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, July 1951 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids				Hardness as CaCO ₃	Per cent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium							
																	Residue at 180°C						Sum	
July 4, 1951 a...	b 592	7.1	0.2	37	24	66		c 274	92	8.0	0.2	2.4	0.11	400	--	0.54	192	0	43	--	723	8.7	--	
June 30, 1954 a...	51, 140	--	--	43	31	69	--	300	134	11	--	--	--	479	--	--	233	0	37	2.0	721	7.5	--	
Aug. 12-Sept. 8 a...	262	12	.01	35	35	83	11	350	115	12	3	6.7	.16	489	--	.68	353	0	43	2.4	759	8.0	43	
Sept. 10-26 a...	24.4	13	.02	22	31	84	11	300	104	14	4	10	.15	464	--	.63	32.4	184	0	48	2.7	700	7.4	42
Oct. 1-5 a...	247	5.7	.01	26	32	85	11	316	105	14	4	10	.15	470	--	.64	313	201	0	46	2.6	723	8.1	41
Oct. 6-Nov. 2 a...	458		.01	43	36	89	11	372	125	17	3	3.5	.16	535	--	.73	662	255	0	42	2.4	822	8.1	39
Nov. 3-30 a...	192	10	.12	53	42	102	11	410	171	19	3	3.5	.19	633	--	.86	328	306	0	41	2.5	957	7.8	41
Dec. 1-7 a...	218	10	.01	60	48	113	12	460	188	22	4	3.0	.16	709	--	.96	417	348	0	40	2.6	1,060	8.0	42
Dec. 8-24 a...	67.9	9.8	.02	65	56	122	14	510	215	25	4	2.2	.16	780	--	1.06	143	392	0	39	2.7	1,170	8.1	42
Dec. 25 a...	63.0	11	.04	46	43	94	10	380	165	19	--	1.4	.11	594	--	.81	101	290	0	40	2.4	912	8.2	--
Dec. 26-Jan. 8, 1955	64.4		.02	62	63	149	15	598	265	31	3	2.3	.21	935	--	1.27	163	463	0	40	3.0	1,360	8.1	33
Jan. 9-15 a...	68.0	10	.01	72	74	183	16	619	293	34	4	1.5	.23	1,020	969	1.39	187	484	0	41	3.2	1,460	8.2	35
Jan. 25 a...	70.0	11	.02	88	80	188	17	692	300	36	6	5.1	.23	1,060	1,050	1.47	204	556	0	39	3.1	1,590	7.9	37
Feb. 26 a...	68.0	21	.02	104	67	150	15	658	263	34	4	7.4	.09	1,020	986	1.39	187	533	0	37	2.8	1,500	7.8	37
Mar. 9 a...	68.0	21	.03	98	64	139	15	622	260	34	2	8.7	.20	981	--	1.33	180	508	0	36	2.7	1,420	7.4	23
Apr. 5-15 a...	2,046	7.6	.04	24	15	38	9.2	135	65	6.5	2	3.5	.09	249	--	.34	1,380	121	10	31	1.1	377	7.4	43
Apr. 16-23 a...	2,798	4.1	.05	29	19	34	10	169	96	7.0	2	1.5	.14	286	--	.39	2,160	150	11	31	1.2	451	7.5	46
Apr. 24-30 a...	2,394	7.8	.08	30	25	49	11	217	125	9.5	0	1.1	.10	393	--	.63	2,530	199	21	33	1.5	605	8.2	45
May 1-8 a...	1,991	9.1	.07	50	27	57	11	d 261	146	10	0	1.2	.11	455	--	.62	2,450	236	22	33	1.6	695	8.3	45
May 9-June 2 a...	2,028	7.7	.03	52	37	69	13	d 324	160	11	3	2.2	.18	540	--	.73	2,960	281	15	34	1.8	811	7.9	43

a Not included in weighted average.

b Discharge at time of sampling.

c Includes equivalent of 16 ppm of carbonate (CO₃).

d Includes equivalent of 6 ppm of carbonate (CO₃).

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR WESTHOPE, N. DAK.--Continued

Chemical analyses, in parts per million, July 1951 to September 1955--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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
																							Residue at 180°C	Sum
June 3-11, 1955	1,632	3.3	0.03	45	31	58	11	296	120	9.0	0.2	2.9	0.11	452	0.61	1,990	238	0	33	1.6	697	7.8	47
June 12.....	1,570	9.2	—	73	30	63	15	438	60	13	—	1.3	.14	560	—	2,370	304	0	30	1.6	940	7.4	75
June 13-30.....	1,386	4.3	.08	42	30	58	9.7	282	115	7.5	.2	2.2	.12	442	—	1,660	228	0	34	1.7	676	7.8	47
July 1-17.....	837	6.8	.02	40	29	66	9.6	281	123	9.0	.3	3.0	.15	447	—	1,010	219	0	38	1.9	665	7.9	43
July 18-Aug. 1.....	358	9.4	.01	40	30	65	11	288	133	9.0	.4	2.2	.16	454	—	439	223	0	37	1.9	682	7.9	40
Aug. 2-31.....	280	9.0	.01	37	34	68	12	284	139	11	.4	4.4	.15	477	—	361	231	0	38	2.0	707	8.0	32
Sept. 1-18.....	171	6.1	.08	39	33	76	12	306	138	9.5	.4	6.8	.13	504	—	233	234	0	40	2.2	769	8.0	—
Sept. 19-30.....	48.3	2.6	.07	35	34	80	12	302	136	11	.4	1.5	.14	491	—	64.0	226	0	42	2.3	752	7.9	—
Weighted average e.....	778	6.9	f 0.04	42	30	60	11	276	126	10	f 0.2	2.5	0.14	448	—	941	229	3	35	1.7	682	—	—
Weighted average g.....	635	7.1	0.04	43	31	62	11	283	129	11	0.2	2.6	0.14	459	—	787	231	0	35	1.8	697	—	—

e. Represents 97 percent of runoff for water year October 1954 to September 1955.

e Represents 97 percent of runoff for water year October 1954 to September 1955.

f Includes estimates where data are missing.

g Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1954 to September 1955.

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR WESTHOPE, N. DAK.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (Once-daily measurement between 5 p.m. and 9 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	--	32					--	a 70	a 70	--	--
2	50	--	33					--	70	a 71	--	a 73
3	44	31	32					--	a 65	a 75	--	--
4	49	34	35					--	60	a 75	--	78
5	41	38	a 31					--	a 60	a 75	--	--
6	50	a 39	31					--	57	77	--	58
7	50	37	31					--	a 54	78	7 ¹	--
8	51	38	--					--	a 54	a 75	--	--
9	49	38	32					--	a 54	a 75	a 73	--
10	51	38	--					--	65	75	--	50
11	49	40	--					--	a 70	75	--	--
12	48	38	a 31					--	a 70	75	--	59
13	46	38	--					--	73	75	71	--
14	--	38	31					--	a 73	75	--	58
15	--	38	--					a 63	73	75	a 79	--
16	--	38	--					63	a 74	75	--	a 59
17	--	34	--					64	74	--	78	--
18	--	36	--					a 64	74	--	--	--
19	--	36	--					a 64	73	--	a 73	--
20	--	39	--					a 64	72 ²	a 78	--	69
21	--	--	--					64	73	77	71	--
22	--	39	a 31					a 65	74	79	--	67
23	--	38	--					57	a 70	79	a 71	--
24	--	35	--					50	a 71	87	--	--
25	--	--	--					a 50	76	85	a 73	63
26	--	38	--					a 50	75	a 89	--	a 50
27	--	a 34	--					50	75	a 90	71	--
28	--	34	a 31					50	78	--	--	a 58
29	--	32	--					a 60	71	--	75	--
30	--	34	--					a 65	71	--	--	a 45
31	--	--	--					70	--	--	a 70	--
Average	--	37	b 32	b 32				--	67	--	--	--

a Reading obtained between 7 a.m. and 2 p.m.

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

RED RIVER OF THE NORTH BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS AND LAKES IN THE RED RIVER OF THE NORTH BASIN

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Pool elevation (ft)	Silica (SiO ₂) (Fe)	Cal- cium nesium (Ca) (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃) (B)	Dissolved solids		Hardness as CaCO ₃ Calcium, Non- nesium bonate	Per- cent ad- car- dium	So- dium sorp- tion ratio	Specific conduct- ance (micro- mhos at 25° C)	pH	Col- or	Tur- bid- ity			
												Parts per million	Tons per acre- foot										
																					Resi- due at 180° C	Sum	
LAKE TRAVERSE NEAR WHEATON, MINN.																							
Oct. 16, 1954 a...	975.5	4.3	0.02	84	70	64	15	191	0	451	15	0.4	0.2	0.31	851	1.16	496	339	21	1.2	1,150	7.7	
Sept. 20, 1955...	974.8	33	.06	113	76	76	14	271	0	515	15	.4	3.0	.35	1,070	979	596	374	21	1.4	1,330	7.8	
OSWELL RESERVOIR NEAR FERGUS FALLS, MINN.																							
Oct. 15, 1954 a...	1,085.6	12	0.00	38	30	8.5	4.5	241	7	23	3.8	0.3	0.3	0.06	251	0.34	217	8	8	0.3	422	8.3	
ROCK LAKE NEAR ROCK LAKE N. DAK.																							
July 15, 1954 b...		11	0.01	24	25	25	12	242	0	72	4.5				352	0.48	218	20	19	0.7	527	7.5	
July 15 c...				36	17	25		197	0	45	9.0	0.1	5.4	0.13	272		37	159	0	24	.9	430	7.5
Oct. 7 c...				43	19	30		241	0	49	12				328		45	187	0	24	1.0	494	7.6
Apr. 14, 1955 c...				37	16	23		190	0	45	11				273		37	158	2	23	.8	424	7.3
June 25 c...				49	25	30		270	0	67	12				373		51	227	6	21	.9	575	7.7
SWEETWATER LAKE NEAR DEVILS LAKE, N. DAK.																							
July 15, 1954 c...		32	0.02	84	37	53	29	236	0	283	20	0.2	9.8	0.19	699	0.95	362	188	22	1.2	942	7.3	
July 16 b...				49	18	27		274	0	27	8.0				312		.42	197	0	22	.8	491	7.6
Oct. 7 c...				47	30	45		300	0	100	3.5				473		.64	241	0	28	1.3	695	7.6
Apr. 15, 1955 c...				45	19	25		197	0	82	12				329		.45	192	30	21	.8	491	7.2
June 25 c...				80	40	59		228	0	295	22				729		.99	362	175	24	1.4	967	7.8
LAC AUX MORTES NEAR CHURCHES FERRY, N. DAK.																							
July 16, 1954 b...				48	19	15		218	0	52	5.0				280	0.38	200	21	14	0.5	444	7.5	
July 16 c...		12	0.02	46	16	11	8.8	186	0	48	3.5	0.2	1.7	0.07	255		.35	179	26	11	.4	400	7.4
Oct. 8 c...				56	26	22		272	0	67	7.5				358		.49	246	23	16	.6	558	7.6
Apr. 15, 1955 c...				43	20	20		172	0	82	8.5				300		.41	189	48	18	.6	460	7.3
June 25 c...				56	30	27		248	0	120	12				418		.57	262	59	17	.7	630	8.1
LAKE IRVINE NEAR CHURCHES FERRY, N. DAK.																							
June 27, 1954 c...		17	0.41	42	17	20	12	180	0	65	10	0.1	0.4	0.09	278	0.38	176	38	19	0.7	424	7.3	
July 16 c...		15	.07	43	18	18	12	190	0	64	8.5	.1	2.3	.11	290		.39	183	27	16	.6	446	7.6
Oct. 8 c...		--	--	56	23	25	--	258	0	68	11	--	--	--	361		.49	234	22	18	.7	587	7.8
Apr. 15, 1955 c...		--	--	58	27	26	--	257	0	95	14	--	--	--	393		.53	254	43	17	.7	607	7.6
June 25 c...		--	--	57	27	30	--	250	0	103	12	--	--	--	407		.55	251	46	20	.8	626	8.1

DEVILS LAKE NEAR DEVILS LAKE, N. DAK.

July 16, 1954.....	1,412.80	11	0.04	120	398	2,250	236	666	81	4,780	1,060	1.0	0.5	1.7	9,340	9,270	12.7	1,940	1,260	68	22	11,200	8.7
Oct. 7.....	1,413.95	--	--	95	383	2,120	--	--	683	60	4,350	996	--	--	8,690	11.8	1,810	1,150	70	22	10,400	8.6	
June 26, 1955....	1,416.68	--	--	80	321	1,730	--	--	554	79	3,730	795	--	--	7,170	9.75	1,520	935	67	19	8,920	8.8	
Sept. 23.....	1,416.1	.08	100	316	1,760	188	--	--	648	53	3,750	815	--	--	7,410	10.1	1,550	930	68	19	9,180	8.6	

WESTERN STUMP LAKE NEAR LAKOTA, N. DAK.

June 25, 1955....	d1.394	38	--	182	2,780	12,000	880	790	62	10,500	2,450	--	3.1	6.9	19,600	52,600	26.7	4,350	--	68	30	21,000	--
Sept. 24.....	--	--	--	--	--	--	--	--	--	29,700	6,220	--	--	--	53,000	11,900	72.1	11,100	11,100	67	48	46,300	8.3

EASTERN STUMP LAKE NEAR LAKOTA, N. DAK.

June 25, 1955....	--	--	--	--	27,200	29,000	--	--	--	67,000	10,900	--	--	--	121,000	165	25,800	--	69	74	79,300	--
Sept. 24.....	--	--	--	201	7,560	29,000	1,750	1,340	95	75,000	13,500	--	--	--	139,000	189	31,600	30,400	64	71	84,600	8.2

BALDWIN CREEK NEAR DAZEY, N. DAK.

Aug. 18, 1955....	e 3.25	23	0.06	43	38	69	8.6	326	0	134	18	0.2	2.3	0.29	506	0.69	265	0	35	1.8	787	7.8
Sept. 21.....	d 5	17	.06	46	41	95	11	331	0	180	31	.4	1.8	.30	610	.83	284	13	41	2.4	931	8.0

LAKE ASHTABULA NEAR VALLEY CITY, N. DAK.

Oct. 13, 1954 a...	1,266.0	11	0.03	52	27	68	12	317	0	117	14	0.2	0.7	0.18	464	0.63	238	0	37	1.9	726	8.1
Sept. 21, 1955 a...	1,263.3	12	.03	47	23	73	10	326	0	98	12	.2	2.3	.22	443	.60	210	0	42	2.2	694	7.8

THIEF RIVER NEAR GATZKE, MINN.

Apr. 6, 1955....	e 5.0	7.4	10.12	42	20	6.9	6.9	131	0	75	1.5	0.2	18	0.07	267	0.38	166	79	7	0.2	395	7.1
Apr. 8.....	e 30	--	--	--	--	6.4	6.4	112	0	69	1.0	0.1	18	--	244	.33	168	74	8	.2	347	7.2
Apr. 11.....	e 8.5	--	--	--	--	7.8	7.8	100	0	84	1.0	0.1	10	--	242	.33	162	80	9	.3	346	7.0
Apr. 19.....	e 88	--	--	--	--	5.1	5.1	180	0	119	1.0	0.1	10	--	344	.47	262	114	4	.1	508	7.6
May 11.....	e 43	--	--	--	--	6.7	6.7	194	0	131	1.5	0.1	--	--	377	.51	283	124	5	.2	548	7.6
Aug. 10.....	e 1.8	--	--	--	--	5.3	5.3	174	0	134	1.0	0.1	--	--	375	.51	272	129	4	.1	531	7.3

HOMME RESERVOIR NEAR PARK RIVER, N. DAK.

Oct. 14, 1954 a...	1,075.9	19	0.00	60	21	35	7.8	209	4	121	11	0.3	1.1	0.09	394	0.54	235	58	24	1.0	554	8.3
Sept. 24, 1955 a...	1,071	34	.03	72	25	42	7.8	237	0	167	15	0.3	2.8	.15	493	.67	282	88	24	1.1	711	7.9

WILLOW CREEK NEAR UPRAW, N. DAK.

Aug. 16, 1955....	e 20.6	26	0.35	55	46	24	11	344	0	101	6.0	0.3	0.8	0.13	457	0.62	327	45	13	0.6	689	7.8
Sept. 23.....	d 1	2.1	.16	60	58	41	12	404	0	128	10	.6	5.2	.17	546	.75	386	55	18	.9	843	8.1

a Average analysis of samples taken at several different depths at a single location.

b Inlet.

c Outlet.

d Estimated.

e Discharge (cfs).

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 1955.

Sediment records: November 1952 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 76°F Aug. 29; minimum, freezing point on many days during December to April.

Sediment concentrations: Maximum daily, 10,200 ppm July 4; minimum daily, not determined.

Sediment loads: Maximum daily, 10,700 tons July 4; minimum daily, less than 0.05 ton Jan. 24-31.

EXTREMES, 1952-55.--Water temperatures: Maximum, 76°F Aug. 29, 1955; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 10,200 ppm July 4, 1955; minimum daily, not determined.

Sediment loads: Maximum daily, 23,000 tons July 26, 1953; minimum daily, less than 0.05 ton Jan. 24-31, 1955.

REMARKS.--Flow affected by ice Dec. 26-30, Jan. 21 to Feb. 2, Feb. 11-14. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Temperature (°F) of water, water year October 1954 to September 1955

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

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

PAINT CREEK BASIN--Continued

PAINT CREEK AT WATERVILLE, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December						
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment					
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day				
1.....	8.0	70	1.3	9.2	--	e 1.2	8.0	--	e 0.2				
2.....	8.0			8.0	--		8.0	--					
3.....	8.0			8.0	--		8.0	--					
4.....	6.8			8.6	53		8.0	12					
5.....	6.4			8.6	--		7.4	--					
6.....	6.4	105	3.7	8.6	--	e 1.1	6.8	--	e .5				
7.....	6.4			8.6	--		6.8	--					
8.....	6.8			8.6	53		6.8	12					
9.....	6.8			8.0	--		7.4	--					
10.....	13			8.0	53		6.8	--					
11.....	12	175	sa 21	8.0	--	e 2.3	6.8	12					
12.....	8.6			8.6	--		6.8	--					
13.....	11			8.6	101		6.8	12					
14.....	176			2,580	sa 2,750		6.8	--					
15.....	18			430	21		8.6	101					
16.....	13	210	7.4	8.6	--	e 1.0	6.8	29	e .5				
17.....	12	110	3.6	8.6	101		6.8	--					
18.....	10	80	2.2	9.2	--		6.8	29					
19.....	9.8	80	2.1	8.6	--		6.8	--					
20.....	9.8	66	1.7	8.6	40		6.8	--					
21.....	9.8			8.6	--	6.4	29						
22.....	9.8			8.6	40	6.8	--						
23.....	9.2			9.2	--	6.8	--						
24.....	9.2			9.8	40	7.4	--						
25.....	8.6			9.2	--	6.8	--						
26.....	9.2	47	e 1.2	8.6	--	e .4	6.6	--					
27.....	9.2			9.2	45		6.2	--					
28.....	9.2			9.2	--		6.2	29					
29.....	9.2			8.6	--		6.4	--					
30.....	9.2			8.0	13		6.6	29					
31.....	9.2			--	--		6.8	--					
Total.	458.6	--	2,843.5	259.2	--	38.0	215.0	--	11.0				
Day	January			February			March						
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day				
1.....	6.8	31	0.6	5.0	--	e 0.1	15	94	s 5.2				
2.....	6.8			5.0	4		32	96	s 14				
3.....	6.8			5.0	--		235	1,180	s 1,860				
4.....	6.4			5.0	--		56	224	s 51				
5.....	7.4			5.7	4		13	63	2.2				
6.....	6.8	28	e .5	5.7	--	e .4	6.8	56	1.0				
7.....	6.4			5.4	--		6.1	41	.7				
8.....	6.4			5.4	--		61	455	s 227				
9.....	6.4			5.4	26		127	1,190	s 801				
10.....	6.4			5.0	--		66	752	s 188				
11.....	6.4	28		4.8	--	e .4	29	438	s 43				
12.....	6.4			4.7	--		18	120	5.8				
13.....	6.4			4.6	--		13	95	3.3				
14.....	6.4			4	--		14	105	4.0				
15.....	6.1			5.0	26		19	190	9.7				
16.....	6.1	4	e .1	5.0	--	s 384	8.0	190	5.1				
17.....	6.1			5.0	26								
18.....	5.7			5.0	--								
19.....	5.7			5.7	40								
20.....	5.7			150	540								
21.....	5.5	4	(t)	16	52	s 2.6	8.0	423	s 89				
22.....	5.1			8.8	25								
23.....	4.7			8.0	17								
24.....	4.4			6.8									
25.....	4.2			6.1									
26.....	4.2	4		6.1	77	1.2	6.8	32	.6				
27.....	4.2			6.1			6.4						
28.....	4.4			5.7			6.4						
29.....	4.6			4	--		30						
30.....	4.8			--	--		35	1,020	96				
31.....	5.0			--	--		18	498	s 28				
Total.	178.7	--	7.9	310.8	--	396.9	893.7	--	3,445.4				

e Estimated.

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from partly estimated concentration graph.

PAINT CREEK BASIN--Continued

PAINT CREEK AT WATERVILLE, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	Mean discharge (cfs)	April Suspended sediment		Mean discharge (cfs)	May Suspended sediment		Mean discharge (cfs)	June Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	12	150	4.9	13			12	270	8.7
2.....	10	105	2.8	13	52	1.8	73	5,030	s 1,780
3.....	9.2	90	2.2	14	111	s 5.0	96	4,730	sa 2,740
4.....	9.8	110	2.9	21	596	sa 46	14	430	16
5.....	13	113	4.0	11	210	6.2	89	5,070	s 2,680
6.....	9.8	117	3.1	10	155	4.2	20	1,230	66
7.....	9.2	70	1.7	11	226	6.7	15	740	30
8.....	8.0			9.8	145	3.8	14	400	15
9.....	8.0			11	137	4.1	13	250	8.8
10.....	7.4			12	153	5.0	13	220	7.7
11.....	6.8			9.8	123	3.3	13	200	7.0
12.....	7.4			9.2	114	2.8	13	190	6.7
13.....	8.0	62	1.4	9.2			13	190	6.7
14.....	10			8.6			13	170	6.0
15.....	9.8			7.4			13	180	6.3
16.....	8.6			8.0			13	175	6.1
17.....	8.0			7.4			12	140	4.5
18.....	10	100	2.7	7.4	77	1.6	10	130	3.5
19.....	14	150	5.7	7.4			41	2,480	s 849
20.....	10	153	4.1	7.4			14	1,140	43
21.....	9.2	115	2.9	6.8			9.8	260	6.9
22.....	8.6	80	1.9	6.4			9.8	165	4.4
23.....	11	58	s 2.3	8.0	89	s 2.8	9.8	163	4.3
24.....	52	1,160	163	39	2,490	s 337	9.8	155	4.1
25.....	32	270	23	11	900	27	8.6	115	2.7
26.....	24	220	14	9.8	400	11	7.4	135	2.7
27.....	19	205	11	9.8	360	9.5	6.8		
28.....	17	103	4.7	26	1,930	s 253	6.8		
29.....	15	118	4.8	18	1,180	s 61	6.8	86	1.6
30.....	13	116	4.1	15	400	16	6.8		
31.....	--	--	--	14	275	10	--	--	--
Total.	389.8	--	279.8	371.4	--	834.0	596.4	--	8,322.5
Day	Mean discharge (cfs)	July		Mean discharge (cfs)	August		Mean discharge (cfs)	September	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	6.8	127	2.3	8.6	155	3.6	6.1		
2.....	17	144	6.6	8.0	105	2.3	6.1		
3.....	36	1,240	sa 1,990	8.0	90	1.9	6.1		
4.....	212	10,200	sa 10,700	7.4	75	1.5	6.1		
5.....	15	1,050	s 40	13	790	s 113	6.1		
6.....	9.8	300	7.9	9.2	240	6.0	6.1		
7.....	12	720	sa 31	9.2	145	3.6	6.1		
8.....	119	5,700	s 3,080	8.6			6.1	58	0.9
9.....	14	830	31	8.6	118	2.7	6.1		
10.....	10	320	8.6	8.0			5.7		
11.....	24	530	s 50	6.8			5.7		
12.....	15	850	34	7.4			5.7		
13.....	9.8	310	8.2	7.4			6.1		
14.....	9.8	228	6.0	6.8	65	1.2	6.1		
15.....	10			6.8			6.1		
16.....	10	156	4.2	6.8			6.1		
17.....	10			6.8			5.7		
18.....	9.8			6.4			5.7		
19.....	9.2			6.1			5.7		
20.....	9.2			6.1			6.1		
21.....	8.6	91	2.2	6.1			6.8		
22.....	8.0			6.1			6.8		
23.....	18	164	8.0	6.1			7.4	57	1.0
24.....	8.6	115	2.7	6.4	62	1.1	6.4		
25.....	8.0			6.8			6.1		
26.....	8.0			6.8			6.1		
27.....	8.0	100	2.1	6.4			6.8		
28.....	7.4			6.4			6.1		
29.....	7.4			6.4			6.8		
30.....	35	879	s 265	6.1			6.1		
31.....	20	1,220	s 100	6.1			--	--	--
Total.	705.4	--	16,407.4	225.7	--	163.8	185.0	--	28.5
Total discharge for year (cfs-days).....									4,789.7
Total load for year (tons).....									32,778.7

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

PAINT CREEK BASIN--Continued
PAINT CREEK AT WATERVILLE, IOWA--Continued

Particle-size analyses of suspended sediment, May to June 1955
(Methods of analysis: B, bottom withdrawal 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
May 24, 1955.....	8:10 a.m.	116	61	4,430	4,920	52	92	100								SPWCM
June 5.....	2:05 p.m.	49		4,800	6,520	56	92	100								SPWCM

WISCONSIN RIVER BASIN

BLACK EARTH CREEK AT BLACK EARTH, WIS.

LOCATION.--At gaging station, 0.7 mile east of Black Earth, Dane County, and 2.1 miles upstream from Vermont Creek.

DRAINAGE AREA.--45.9 square miles.

RECORDS AVAILABLE.--Water temperatures: February 1954 to September 1955.

Sediment records: February 1954 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 78°F July 7, 1955; minimum, freezing point on several days during December 1954, January and February 1955.

Sediment concentrations: Maximum daily, 1,580 ppm July 3, 1954; minimum daily, 4 ppm Mar. 6, Dec. 11-12, 1954, Jan. 6, Feb. 14, 1955.

Sediment loads: Maximum daily, 3,960 tons July 3, 1954; minimum daily, 0.2 ton Mar. 6, 1954, Feb. 14, 1955.

REMARKS.--Flow affected by ice Mar. 3-4, 1954 and Jan. 26-27, Feb. 10-14, Mar. 6-7, 1955.

Records of discharge for period February to September 1954 given in WSP 1338 and for water year October 1954 to September 1955 given in WSP 1388.

Temperature (°F) of water, February to September 1954
/Once-daily measurement at varying hours/

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

WISCONSIN RIVER BASIN--Continued

BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement at approximately 8 a. m./

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

Suspended sediment, February to September 1954

Day	January			February			March		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....				--	--	--	23	15	0.9
2.....				--	--	--	23	23	1.4
3.....				--	--	--	19	27	1.4
4.....				--	--	--	21	38	2.2
5.....				--	--	--	22	13	.8
6.....				--	--	--	22	4	.2
7.....				--	--	--	22	11	.6
8.....				--	--	--	22	11	.6
9.....				--	--	--	22	9	.5
10.....				--	--	--	21	9	.5
11.....				--	--	--	21	14	.8
12.....				--	--	--	21	13	.7
13.....				--	--	--	21	8	.4
14.....				--	--	--	21	8	.4
15.....				--	--	--	21	13	.7
16.....				--	--	--	21	9	.5
17.....				--	--	--	22	13	.8
18.....				24	14	0.9	21	22	1.2
19.....				24	11	.7	24	26	1.7
20.....				26	13	.9	23	16	1.0
21.....				28	13	1.0	23	17	1.0
22.....				24	14	.9	23	15	.9
23.....				24	11	.7	23	17	1.0
24.....				24	15	1.0	23	28	1.7
25.....				24	11	.7	28	36	2.7
26.....				24	6	.4	27	22	1.6
27.....				24	8	.5	25	17	1.1
28.....				24	9	.6	26	28	2.0
29.....				--	--	--	24	11	.7
30.....				--	--	--	24	5	.3
31.....				--	--	--	24	7	.4
Total.				270	--	8.3	703	--	30.7

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

WISCONSIN RIVER BASIN--Continued

BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Suspended sediment, February to September 1954--Continued

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.....	24	7	0.4	31	47	3.9	86	338	s 89
2.....	24	17	1.1	40	120	sa 15	41	47	5.2
3.....	23	15	.9	40	114	s 13	87	128	s 34
4.....	23	7	.4	31	31	2.6	65	72	13
5.....	23	17	1.0	28	37	2.8	43	66	7.7
6.....	32	24	2.1	26	35	2.4	37	75	b 7
7.....	38	30	3.1	26	41	2.9	35	78	7.4
8.....	31	18	1.5	26	41	2.9	33	69	6.1
9.....	28	16	1.2	26	31	2.2	31	78	6.5
10.....	28	15	1.1	24	32	2.1	30	74	6.0
11.....	27	28	2.0	24	26	1.7	28	54	4.1
12.....	26	18	1.3	23	31	1.9	28	71	5.4
13.....	26	22	1.5	23	22	1.4	27	87	6.3
14.....	25	20	1.4	23	51	3.2	26	62	4.4
15.....	28	18	1.4	23	55	b 3	26	55	b 4
16.....	28	7	.5	22	53	3.1	26	55	3.9
17.....	26	10	.7	22	34	2.0	26	46	3.2
18.....	24	12	.8	22	34	2.0	26	41	2.9
19.....	24	10	.6	23	25	1.6	26	47	3.3
20.....	24	13	.8	22	23	1.4	28	55	4.2
21.....	28	12	.9	22	25	1.5	84	383	s 288
22.....	26	8	.6	22	22	1.3	260	724	s 930
23.....	25	13	.9	21	19	1.1	48	138	18
24.....	26	12	.8	21	15	.8	38	84	8.6
25.....	43	110	sa 16	21	15	.8	34	90	8.3
26.....	33	120	11	21	10	.6	48	--	e 60
27.....	34	57	5.2	24	10	.6	37	217	22
28.....	30	27	2.2	44	279	s 40	32	84	7.2
29.....	28	22	1.7	27	28	2.0	32	87	7.5
30.....	28	25	1.9	24	16	1.0	32	74	6.4
31.....	--	--	--	84	363	s 208	--	--	--
Total.	833	--	65.0	856	--	328.8	1,400	--	1,559.6
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	31	68	5.7	28	34	2.6	25	87	2.5
2.....	33	64	5.7	26	30	2.3	25	26	1.8
3.....	665	1,580	s 3,960	30	23	1.9	24	37	2.4
4.....	134	524	s 223	29	24	1.9	24	34	2.2
5.....	56	200	30	28	25	b 2	24	38	2.5
6.....	77	--	e 140	28	27	2.0	24	30	b 2
7.....	160	900	sa 550	28	25	1.9	24	25	1.6
8.....	54	172	25	28	23	1.7	24	25	1.6
9.....	44	128	15	28	25	1.9	24	25	1.6
10.....	43	125	14	28	30	b 2	24	25	1.6
11.....	41	120	b 13	28	30	2.3	24	30	1.9
12.....	39	116	12	28	23	1.7	24	22	1.4
13.....	38	109	11	28	20	b 2	27	32	2.3
14.....	36	84	8.2	34	21	1.9	30	38	3.1
15.....	35	82	7.7	30	17	1.4	28	32	2.4
16.....	35	82	7.7	28	11	.8	28	42	3.2
17.....	33	85	7.6	28	13	1.0	29	49	3.8
18.....	32	77	6.6	30	48	3.9	32	40	3.4
19.....	32	57	4.9	28	50	b 4	30	42	3.4
20.....	32	47	4.1	28	48	3.6	28	37	2.8
21.....	34	63	5.8	27	42	3.1	28	32	2.4
22.....	31	53	4.4	27	72	5.2	28	30	2.3
23.....	31	52	4.4	27	65	4.7	27	42	3.1
24.....	31	40	3.3	27	49	3.6	27	35	2.6
25.....	31	40	b 3	28	56	4.2	27	23	1.7
26.....	30	37	3.0	30	59	4.8	27	36	2.6
27.....	30	35	b 3	27	52	3.8	27	35	2.6
28.....	30	27	2.2	27	50	b 4	28	43	3.2
29.....	32	27	2.3	26	50	3.5	31	51	4.3
30.....	30	26	2.1	26	43	3.0	108	310	s 117
31.....	34	30	2.8	25	40	2.7	--	--	--
Total.	1,994	--	5,087.5	871	--	85.4	880	--	189.3
Total discharge for period (cfs-days)									7,807
Total load for period (tons)									7,354.6

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

b Computed from estimated concentration graph.

WISCONSIN RIVER BASIN--Continued

BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	42	94	11	28	30	a 2	29	17	1.3
2.....	38	64	6.6	28	32	2.4	28	13	1.0
3.....	231	647	s 486	28	48	3.6	28	10	.8
4.....	55	135	s 22	28	43	3.2	28	14	1.0
5.....	39	61	6.4	28	37	2.8	27	15	1.1
6.....	38	53	5.4	28	41	3.1	26	14	a 1
7.....	35	64	6.0	27	41	3.0	26	13	.9
8.....	35	87	6.3	27	49	3.6	26	16	1.1
9.....	35	53	5.0	27	34	2.5	26	12	.8
10.....	97	250	s 76	27	35	a 3	26	7	.5
11.....	71	161	s 33	27	45	3.3	25	4	.3
12.....	43	79	9.2	27	40	2.9	25	4	.3
13.....	38	64	6.6	27	24	1.7	25	8	.5
14.....	38	60	6.2	27	23	1.7	25	13	.9
15.....	38	68	7.0	27	30	2.2	25	23	1.6
16.....	37	60	6.0	27	26	1.9	25	20	1.4
17.....	34	50	4.6	27	30	a 2	26	22	1.5
18.....	33	55	4.9	27	34	2.5	26	18	1.3
19.....	32	55	a 5	27	36	2.6	27	17	1.2
20.....	32	54	4.7	27	31	2.2	27	25	1.8
21.....	32	55	a 5	27	12	.9	27	26	1.9
22.....	31	52	4.4	27	17	1.2	28	20	1.5
23.....	30	54	4.4	29	16	1.2	28	27	2.0
24.....	30	46	3.7	32	18	a 2	27	24	1.7
25.....	30	45	a 4	31	21	1.8	27*	23	1.6
26.....	30	37	3.0	29	30	2.3	27	25	1.8
27.....	30	35	a 3	30	28	2.3	28	20	1.5
28.....	29	43	3.4	30	22	1.8	28	12	.9
29.....	29	44	3.4	29	21	1.6	27	10	.7
30.....	28	41	3.1	29	17	1.3	27	12	.9
31.....	28	36	2.7	--	--	--	26	7	.5
Total.	1,368	--	758.0	839	--	68.6	825	--	35.3
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	26	7	0.5	23	10	0.6	37	35	sb 6
2.....	26	12	.8	23	11	.7	55	50	sb 8
3.....	25	17	1.1	23	10	a .6	127	--	e 140
4.....	26	10	.7	23	12	.7	71	120	sb 30
5.....	32	12	1.0	23	22	1.4	36	18	1.7
6.....	32	4	.3	23	17	1.0	25	16	1.1
7.....	30	8	.6	22	16	1.0	28	13	1.0
8.....	28	13	1.0	22	16	1.0	41	35	sb 5
9.....	28	10	.8	22	13	.8	79	71	s 20
10.....	27	8	.6	22	14	.8	56	56	8.8
11.....	26	18	1.3	22	15	.9	43	42	4.9
12.....	26	20	1.4	22	10	.6	36	29	2.8
13.....	26	18	1.3	22	6	.4	32	17	1.5
14.....	25	17	1.1	22	4	.2	38	26	2.7
15.....	25	20	1.4	22	7	.4	37	34	3.4
16.....	25	20	a 1	22	13	.8	31	26	2.2
17.....	25	18	1.2	22	8	.5	29	23	1.8
18.....	24	13	.8	22	13	.8	28	24	1.8
19.....	24	13	.8	24	12	.8	28	20	1.5
20.....	24	13	.8	403	410	s 526	28	18	1.4
21.....	24	16	1.0	66	65	12	30	16	1.3
22.....	24	16	1.0	34	27	2.5	29	22	1.7
23.....	24	24	1.6	30	18	1.4	29	14	1.1
24.....	24	18	1.2	28	17	1.3	30	12	1.0
25.....	24	8	.5	28	12	.9	29	12	.9
26.....	24	12	.8	32	15	1.3	28	8	.6
27.....	24	13	.8	34	20	1.8	28	8	.6
28.....	25	10	.7	29	10	.8	28	7	.5
29.....	25	10	.7	--	--	--	30	9	.7
30.....	24	8	.5	--	--	--	32	11	1.0
31.....	24	8	.5	--	--	--	32	15	1.3
Total.	796	--	.27.8	1,110	--	562.0	1,210	--	256.3

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

WISCONSIN RIVER BASIN--Continued

BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	32	12	1.0	38	15	1.5	28	58	4.4
2.....	31	10	.8	37	19	1.9	32	64	5.5
3.....	30	10	.8	37	17	1.7	32	68	5.9
4.....	29	7	.5	35	16	1.5	29	65	5.1
5.....	45	43	5.2	34	12	1.1	28	77	5.8
6.....	34	7	.6	33	15	1.3	29	80	6.3
7.....	32	15	1.3	35	17	1.6	31	77	6.4
8.....	29	20	1.6	32	7	.6	32	74	6.4
9.....	28	17	1.3	37	6	.6	36	70	6.8
10.....	28	14	1.0	37	8	.8	35	65	a 6
11.....	28	17	1.3	32	18	1.6	37	69	6.9
12.....	28	13	1.0	32	43	3.7	39	75	7.9
13.....	38	10	1.0	31	45	3.8	33	57	5.1
14.....	39	10	1.0	30	43	3.5	31	48	4.0
15.....	34	12	1.1	30	47	3.8	30	55	4.4
16.....	32	18	1.6	29	50	3.9	30	67	5.4
17.....	30	27	2.2	29	44	3.4	29	75	5.9
18.....	34	25	sb 4	28	45	3.4	29	74	5.8
19.....	38	55	5.6	28	54	4.1	28	68	5.1
20.....	32	25	2.2	27	48	3.5	28	77	5.8
21.....	30	25	2.0	27	69	5.0	28	77	5.8
22.....	28	31	2.3	28	60	4.5	28	75	5.7
23.....	28	30	2.3	26	65	4.6	28	65	4.9
24.....	160	918	s 446	30	67	5.4	28	72	5.4
25.....	89	174	s 48	29	56	4.4	31	76	6.4
26.....	52	32	4.5	28	60	4.5	29	70	a 5
27.....	46	34	4.2	35	63	6.0	28	65	4.9
28.....	43	34	3.9	33	63	5.6	28	51	3.8
29.....	40	16	1.7	33	80	7.1	28	60	4.5
30.....	38	13	1.3	30	66	5.3	32	72	6.2
31.....	--	--	--	29	55	4.3	--	--	--
Total.	1,205	--	551.3	979	--	104.0	914	--	167.5
Day	July			August			September		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	30	55	4.4	72	216	s 47	23	20	1.2
2.....	30	74	6.0	34	43	3.9	23	25	1.6
3.....	29	70	5.5	29	40	3.1	23	14	.9
4.....	28	64	4.8	27	37	2.7	23	12	.7
5.....	30	60	4.9	27	35	a 3	23	7	.4
6.....	32	85	7.3	32	33	2.8	22	8	.5
7.....	29	53	4.1	29	40	3.1	22	17	1.0
8.....	29	58	4.5	28	39	2.9	22	12	.7
9.....	32	72	6.2	28	36	2.7	22	17	1.0
10.....	30	72	5.8	26	31	2.2	21	23	1.3
11.....	29	48	3.8	26	38	2.7	21	25	1.4
12.....	28	48	3.6	26	48	3.4	21	21	1.2
13.....	28	34	2.6	25	39	2.6	20	13	.7
14.....	26	37	2.6	25	46	3.1	24	23	1.5
15.....	28	54	4.1	25	67	4.5	21	43	2.4
16.....	28	42	3.2	25	53	3.6	21	63	3.6
17.....	28	37	2.8	25	47	3.2	21	35	2.0
18.....	28	35	2.6	25	35	2.4	20	26	1.4
19.....	28	49	3.7	25	45	3.0	20	26	1.4
20.....	28	54	4.1	25	37	2.5	22	15	.9
21.....	28	48	3.6	26	42	2.9	22	14	.8
22.....	30	52	4.2	28	38	2.9	22	18	1.1
23.....	48	47	6.1	25	33	2.2	22	13	.8
24.....	37	31	3.1	24	34	2.2	22	19	1.1
25.....	31	34	2.8	24	26	1.7	21	21	1.2
26.....	30	32	2.6	25	48	3.2	22	12	.7
27.....	28	46	3.6	24	32	2.1	22	10	.6
28.....	28	51	3.8	24	30	a 2	22	8	.5
29.....	28	42	3.2	24	26	1.7	22	6	.4
30.....	33	44	s 4.7	23	23	1.4	22	6	.4
31.....	51	107	s 16	23	25	1.6	--	--	--
Total.	950	--	140.3	854	--	128.3	654	--	33.4
Total discharge for year (cfs-days)									11,704
Total load for year (tons)									2,832.8

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

WISCONSIN RIVER BASIN--Continued
BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Particle-size analyses of suspended sediment, May to September 1954
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

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
May 28, 1954.....	7:00 a. m.	54		1,080	938	73	84	95	98	99	100	--	--			BSWCM
May 28.....	8:45 a. m.	66		1,407	672	84	92	96	98	99	100	--	--			BSWCM
May 31.....	7:00 p. m.	221		1,490	1,030	42	59	77	89	98	100	--	--			BSWCM
June 21.....	7:30 p. m.	124		802	1,530	44	59	63	81	92	96	97	99			BSWCM
June 22.....	4:55 a. m.	576		1,040	796	81	87	91	93	97	99	100	--			BSWCM
June 22 a.....	6:50 a. m.	510		950	--	85	90	96	97	99	99	100	--			BSWCM
July 3.....	8:20 a. m.	640		2,670	1,800	55	74	87	96	99	100	--	--			BSWCM
July 3.....	8:20 a. m.	640		2,670	1,720	40	59	80	97	99	99	100	--			BSNM
July 3.....	11:40 a. m.	1,640		2,640	1,190	59	70	82	92	95	97	97	98			BSWCM
July 3.....	11:40 a. m.	1,640		2,640	1,180	61	74	80	92	96	96	96	98			BSNM
July 3.....	7:45 p. m.	738		1,350	2,090	75	91	95	97	98	98	99	--			BSWCM
July 7.....	6:20 a. m.	242		1,420	1,220	71	83	91	96	98	98	100	--			BSWCM
July 7.....	8:45 a. m.	175		1,020	638	65	70	88	92	99	99	99	--			BSWCM
Sept. 30.....	7:25 a. m.	176		719	1,140	36	48	60	77	91	98	99	99			BSWCM

a Average of individual analyses of samples from 3 verticals.

Particle-size analyses of suspended sediment, October 1954 to April 1955
(Methods of analysis: B, bottom withdrawal 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. 3, 1954	8:40 a. m.	374		1,280	800	46	56	66	77	87	94	96	99			BSWCM
	Oct. 3	440		661	1,180	70	78	84	90	95	98	99	100			BSWCM
	Oct. 10	88		378	566	55	67	78	85	92	94	96	97			BSWCM
	Apr. 24, 1955	218		1,640	1,180	46	57	71	84	97	100	--	--			BSWCM
	Apr. 24	151		722	1,240	66	81	89	96	99	100	--	--			BSWCM

ROCK RIVER BASIN

ROCK RIVER AT AFTON, WIS.

LOCATION.--Temperature recorder at gaging station on right bank 20 feet downstream from highway bridge in Afton, Rock County, and 0.8 mile upstream from Bass Creek.

DRAINAGE AREA.--3,300 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: September 1954 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum 89° July 27-30, Aug. 4; minimum, freezing point on many days during December to February.

REMARKS.--Records of discharge for September 1954 given in WSP 1338 and for water year October 1954 to September 1955 given in WSP 1388.

Temperature (°F) of water, September 1954 to September 1955

Recorder with temperature attachment, continuous ethyl alcohol-actuated thermometer

Day	September		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	max	min
1.....	--	--	67	65	51	50	35	33	33	32	32	32	37	36	42	40	62	60	71	67	80	76	87	82	76	66
2.....	--	--	65	65	50	49	33	33	33	32	32	32	37	37	44	41	63	62	69	67	83	78	88	83	74	65
3.....	--	--	69	65	48	48	33	33	33	33	32	32	37	36	45	43	65	63	72	68	85	79	87	84	75	66
4.....	--	--	68	64	48	44	33	33	33	33	32	32	37	37	45	43	67	65	73	69	87	81	89	83	75	66
5.....	--	--	65	63	44	43	33	33	33	33	32	32	37	37	43	41	66	65	76	71	86	83	87	85	75	69
6.....	--	--	63	61	45	43	33	33	33	33	32	32	37	36	43	42	65	63	73	72	86	82	86	85	76	67
7.....	--	--	61	59	45	43	33	33	33	33	32	32	36	35	44	43	64	62	73	71	86	81	85	83	73	65
8.....	--	--	59	58	46	44	33	33	33	33	32	32	35	34	45	43	62	60	71	68	87	83	83	79	72	65
9.....	69	67	59	58	46	45	33	33	33	34	33	32	38	35	47	45	61	58	68	65	86	79	80	77	74	67
10.....	68	64	59	59	47	45	34	33	37	34	33	32	39	37	49	47	58	57	65	65	85	78	81	76	70	66
11.....	68	62	61	59	47	46	34	33	38	37	33	32	40	39	49	49	59	57	65	62	84	77	81	77	69	61
12.....	65	62	61	61	47	46	34	34	39	38	32	32	40	39	51	49	62	59	62	60	83	79	81	77	70	60
13.....	65	63	61	61	48	47	34	34	39	39	33	32	40	39	51	50	65	61	60	59	83	79	80	77	67	62
14.....	67	63	61	61	48	47	34	34	39	39	32	32	39	38	51	51	68	63	62	59	84	78	81	76	72	61
15.....	66	64	61	59	47	46	34	34	39	34	32	32	38	38	52	51	70	65	65	62	85	77	81	77	71	65
16.....	67	63	59	57	48	47	34	34	38	34	32	32	38	37	53	52	71	66	69	65	82	75	83	77	72	65
17.....	68	63	57	56	48	46	34	34	34	34	32	32	38	37	55	53	70	65	69	67	84	72	84	78	72	64
18.....	71	65	56	55	48	48	35	34	32	32	33	32	37	36	55	54	71	65	69	68	84	78	85	80	73	65
19.....	71	65	55	54	48	48	35	34	32	32	33	32	39	37	54	53	72	67	68	67	86	76	87	79	71	66
20.....	70	64	55	54	48	45	34	34	33	32	35	32	39	39	53	53	73	69	71	67	87	77	85	79	72	64
21.....	69	63	55	55	45	45	34	33	33	32	36	32	39	38	55	53	74	69	73	70	87	76	86	79	66	62
22.....	66	60	55	55	45	44	33	33	33	32	33	32	38	36	55	54	72	70	73	71	87	78	86	79	69	61
23.....	65	61	55	55	44	41	34	33	32	32	33	32	36	35	55	55	77	70	72	71	83	80	83	74	69	63
24.....	64	61	56	55	41	40	35	34	32	32	36	32	37	35	55	52	74	71	69	68	85	79	76	74	65	59
25.....	65	61	56	56	40	39	35	34	37	32	37	36	36	36	53	51	68	70	69	63	87	80	73	63	57	57
26.....	66	62	56	56	39	38	35	35	37	32	37	36	36	35	55	53	69	66	71	69	87	79	79	73	60	58
27.....	67	60	56	56	38	38	35	35	37	33	36	36	36	35	57	54	71	67	77	69	89	83	80	73	63	57
28.....	64	61	56	55	38	37	35	33	35	33	36	36	37	35	57	57	69	67	79	74	89	83	82	75	65	57
29.....	66	61	55	54	37	36	33	32	33	32	33	32	39	37	59	56	67	63	77	75	89	81	79	65	63	58
30.....	68	64	54	51	36	35	33	32	32	32	32	32	40	38	60	58	69	63	79	71	89	81	77	71	61	57
31.....	--	--	51	50	--	--	33	33	32	32	--	--	41	39	--	--	71	65	--	--	86	83	76	67	--	--
Average.....	--	--	59	58	45	44	34	33	35	33	33	33	38	37	51	50	68	64	70	68	85	79	83	77	70	63

ROCK RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR BLANCHARDVILLE, WIS.

LOCATION.--At gaging station 0.6 mile upstream from highway bridge, 7 miles southwest of Blanchardville, Lafayette County, and about 9 miles upstream from mouth.

DRAINAGE AREA.--29.1 square miles.

RECORDS AVAILABLE.--Water temperatures: August 1954 to September 1955.

Sediment records: August 1954 to September 1955.

EXTREMES, 1954.--Water temperatures: Maximum, 89°F July 27, 1955; minimum, freezing point on many days during November 1954 to March 1955.

Sediment concentrations: Maximum daily, 1,190 ppm Mar. 3, 1955; minimum daily, 1 ppm Sept. 28-29, Oct. 7, Dec. 18-19, 1954.

Sediment loads: Maximum daily, 1,020 tons Mar. 1, 1955; minimum daily, less than 0.05 ton on many days during August to December 1954 and February 1955.

REMARKS.--Flow affected by ice Jan. 28 to Feb. 25, Mar. 6-9, 22-29, 1955. Records of discharge for period July to September 1954 given in WSP 1338 and for water year October 1954 to September 1955 given in WSP 1388.

Temperature (°F) of water, August to September 1954
/Once-daily measurement at approximately 7:30 a.m./

Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.	Day	Aug.	Sept.
1	--	63	7	--	70	13	--	61	19	68	66	25	74	58
2	--	68	8	--	69	14	--	60	20	68	57	26	68	58
3	--	65	9	--	62	15	--	60	21	68	56	27	66	58
4	--	65	10	--	60	16	--	58	22	68	52	28	69	60
5	--	70	11	--	57	17	--	63	23	74	49	29	74	62
6	--	69	12	--	60	18	--	67	24	73	55	30	87	66
												31	64	--
Average.....														61

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement at varying hours/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	38	33	--	32	35	57	52	65	75	84	67
2	58	--	32	36	32	35	56	73	62	74	84	68
3	67	40	34	35	32	40	49	68	75	85	86	70
4	65	38	36	35	33	35	44	64	77	85	82	72
5	59	36	35	34	34	35	46	70	72	81	85	74
6	51	38	32	38	32	33	50	66	68	84	--	74
7	47	40	34	34	33	32	50	63	70	84	78	69
8	50	42	34	33	33	34	68	59	66	84	76	67
9	52	45	34	34	33	41	60	50	60	--	76	73
10	60	45	34	33	33	49	67	50	59	79	81	68
11	--	49	34	34	32	36	54	67	58	79	77	65
12	61	48	34	33	32	46	56	64	57	80	77	64
13	64	49	34	33	32	40	56	63	62	82	76	60
14	67	44	34	34	33	42	56	70	70	83	77	68
15	47	40	34	34	34	43	54	70	--	79	78	68
16	47	46	36	33	34	41	54	70	75	75	81	74
17	46	50	34	33	35	38	63	73	75	80	82	76
18	43	49	35	33	36	43	57	70	77	81	83	78
19	46	48	35	33	36	39	53	74	71	85	83	74
20	42	49	34	33	35	43	56	74	80	83	84	69
21	45	49	35	33	32	38	63	72	75	86	85	69
22	45	40	34	32	33	32	61	70	76	85	83	70
23	49	34	36	32	34	36	58	78	75	78	83	65
24	52	37	36	32	32	37	49	67	74	79	73	61
25	54	37	37	32	33	33	52	65	76	80	75	62
26	48	36	38	33	33	33	54	65	69	86	79	64
27	54	39	33	32	33	--	62	70	72	89	78	65
28	47	39	34	32	33	--	55	64	78	86	82	67
29	43	34	34	32	--	--	55	62	74	86	75	65
30	40	32	34	32	--	--	55	67	80	87	69	60
31	42	--	33	32	--	--	--	68	--	87	69	--
Average	52	42	34	33	33	38	56	66	71	82	79	68

ROCK RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR BLANCHARDVILLE, WIS.--Continued

Suspended sediment, August 1954 to September 1955

Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				--	--	--	8.2	5	0.1
2.....				--	--	--	8.2	4	.1
3.....				--	--	--	8.0	3	.1
4.....				--	--	--	8.2	2	(t)
5.....				--	--	--	8.0	2	(t)
6.....				--	--	--	8.0	2	(t)
7.....				--	--	--	8.0	--	e.1
8.....				--	--	--	8.0	--	e.1
9.....				--	--	--	8.8	--	e.1
10.....				--	--	--	9.4	--	e.1
11.....				--	--	--	8.5	--	e.1
12.....				--	--	--	8.2	--	e.1
13.....				--	--	--	8.8	--	e.2
14.....				--	--	--	10	--	e.2
15.....				--	--	--	9.1	--	e.2
16.....				--	--	--	8.8	11	.3
17.....				--	--	--	9.1	15	.4
18.....				11	27	0.8	8.5	17	.4
19.....				9.8	17	.4	8.2	10	.2
20.....				9.1	12	.3	8.2	13	.3
21.....				8.8	3	.1	8.2	14	.3
22.....				8.8	4	.1	8.2	12	.3
23.....				8.5	2	(t)	8.0	17	.4
24.....				9.4	3	.1	8.2	15	.3
25.....				12	2	.1	8.0	10	.2
26.....				11	4	.1	8.0	2	(t)
27.....				9.8	3	.1	8.0	2	(t)
28.....				9.8	13	.3	8.5	1	(t)
29.....				9.1	8	.2	11	1	(t)
30.....				8.5	8	.2	38	390	s72
31.....				8.5	7	.2	--	--	--
Total.				134.1	--	3.0	284.3	--	76.8
October				November			December		
1.....	11	62	1.8	10	18	0.5	9.1	2	(t)
2.....	43	416	s94	9.8	25	.7	9.1	4	0.1
3.....	20	91	s5.2	9.8	25	.7	9.1	13	.3
4.....	12	28	.9	9.8	17	.4	9.1	16	.4
5.....	11	11	.3	9.4	6	.2	8.5	13	.3
6.....	11	2	.1	9.4	2	.1	8.2	8	.2
7.....	11	1	(t)	9.1	4	.1	8.2	8	.2
8.....	13	2	.1	9.1	2	(t)	8.5	7	.2
9.....	14	14	.5	8.8	2	(t)	8.8	4	.1
10.....	90	493	s191	8.8	7	.2	8.2	5	.1
11.....	26	124	s9.5	8.8	30	.7	7.9	5	.1
12.....	19	15	.8	8.5	42	1.0	8.5	7	.2
13.....	16	7	.3	8.5	40	.9	7.6	4	.1
14.....	16	2	.1	8.5	22	.5	8.2	4	.1
15.....	15	4	.2	8.5	17	.4	8.8	2	(t)
16.....	14	22	.8	9.1	29	.7	8.2	6	.1
17.....	13	35	1.2	9.1	22	.5	9.1	3	.1
18.....	12	33	1.1	9.1	21	.5	8.8	1	(t)
19.....	11	17	.5	8.8	28	.7	8.2	1	(t)
20.....	11	10	.3	8.8	32	.8	8.2	2	(t)
21.....	11	7	.2	8.8	28	.7	8.5	3	.1
22.....	10	6	.2	8.8	22	.5	9.1	2	(t)
23.....	10	12	.3	9.8	16	.4	9.1	2	(t)
24.....	9.4	18	.4	11	6	.2	8.8	2	(t)
25.....	9.4	18	.4	9.8	6	.2	8.8	5	.1
26.....	9.8	13	.3	9.4	17	.4	11	6	.2
27.....	9.8	22	.6	9.4	94	2.4	12	6	.2
28.....	9.4	14	.4	9.4	36	.9	10	4	.1
29.....	9.4	13	.3	9.1	8	.2	10	2	.1
30.....	9.4	11	.3	8.5	4	.1	10	2	.1
31.....	9.1	15	.4	--	--	--	10	3	--
Total.	495.7	--	312.5	275.7	--	15.7	277.6	--	3.9

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

ROCK RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR BLANCHARDVILLE, WIS.--Continued

Suspended sediment, August 1954 to September 1955--Continued

Day	January			February			March		
	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.....	10	4	0.1	7	13	0.2	183	771	s1,020
2.....	9.8	6	.2	7	4	.1	73	--	e150
3.....	9.8	15	.4	7	15	.3	134	1,190	s989
4.....	10	32	.9	8	7	.2	28	244	s26
5.....	20	30	1.6	8	2	(t)	16	4	.2
6.....	14	12	.4	8	2	(t)	11	12	.4
7.....	12	5	.2	8	3	.1	12	6	.2
8.....	12	2	.1	8	8	.2	15	--	e9
9.....	11	6	.2	8	9	.2	20	--	e9
10.....	10	4	.1	8	14	.3	20	67	3.6
11.....	9.4	3	.1	7	9	.2	17	20	.9
12.....	8.8	8	.2	7	8	.2	14	7	.3
13.....	8.2	5	.1	7	9	.2	13	7	.2
14.....	8.2	7	.2	7	9	.2	22	--	e16
15.....	7.9	6	.1	8	7	.2	18	140	a7
16.....	7.9	4	.1	8	7	.2	14	31	1.2
17.....	8.2	8	.2	9	6	.1	12	8	.2
18.....	8.2	9	.2	10	8	.2	12	12	.4
19.....	8.2	6	.1	13	15	s1.2	12	9	.3
20.....	8.2	6	.1	600	170	s460	12	10	.3
21.....	8.8	3	.1	40	40	4.3	14	11	.4
22.....	8.5	8	.2	15	28	1.1	8	19	.4
23.....	8.2	12	.3	12	24	.8	7	19	.4
24.....	8.5	7	.2	10	13	.4	6	14	.2
25.....	8.5	8	.2	9	12	.3	6	9	.1
26.....	7.9	10	.2	25	--	e20	6	20	.3
27.....	7.9	12	.2	24	--	e7	7	--	
28.....	7	8	.2	14	8	.3	10	--	
29.....	7	8	.2	--	--	--	11	--	e.2
30.....	7	7	.1	--	--	--	13	--	
31.....	7	40	.8	--	--	--	13	--	
Total.	268.1	--	8.3	902	--	498.6	759	--	2,237.0
Day	April			May			June		
	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.....	12	7	0.2	17	16	0.7	10	43	1.2
2.....	12	15	.5	16	11	.5	18	50	2.4
3.....	12	19	.6	16	8	.3	12	35	1.1
4.....	14	30	a1	15	8	.3	11	22	.7
5.....	23	56	s3.8	14	9	.3	12	34	1.1
6.....	17	14	.6	14	9	.3	14	44	1.7
7.....	15	10	.4	14	7	.3	13	27	.9
8.....	14	13	.5	13	5	.2	11	23	.7
9.....	14	8	.3	17	25	1.1	11	32	1.0
10.....	13	10	.4	16	33	1.4	11	32	1.0
11.....	12	20	.6	14	35	1.3	16	25	1.1
12.....	13	16	.6	13	32	1.1	15	17	.7
13.....	18	18	.9	13	38	1.3	12	17	.6
14.....	18	17	.8	12	39	1.3	12	17	.6
15.....	15	10	.4	12	40	1.3	11	17	.5
16.....	14	7	.3	12	38	1.2	10	15	.4
17.....	13	16	.6	11	40	1.2	10	31	.8
18.....	14	55	s2.7	11	37	1.1	9.8	31	.8
19.....	17	44	s2.1	11	31	.9	9.8	23	.6
20.....	15	9	.4	11	24	.7	9.8	26	.7
21.....	13	8	.3	11	23	.7	9.4	27	.7
22.....	13	15	.5	11	18	.5	9.1	29	.7
23.....	13	17	.6	11	18	.5	9.1	28	.7
24.....	50	260	sa40	16	30	1.3	9.1	24	.6
25.....	34	26	2.4	12	59	1.9	8.8	27	.6
26.....	28	26	2.0	12	39	1.3	8.5	31	.7
27.....	24	16	1.0	12	26	.8	8.2	29	.6
28.....	22	17	1.0	12	29	.9	8.2	37	.8
29.....	19	21	1.1	12	33	1.1	8.2	31	.7
30.....	18	18	.9	11	35	1.0	12	17	.6
31.....	--	--	--	10	42	1.1	--	--	--
Total.	529	--	67.5	402	--	27.9	329.0	--	25.3

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from partly estimated concentration graph.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

ROCK RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR BLANCHARDVILLE, WIS.--Continued

Suspended sediment, August 1954 to September 1955--Continued

[illegible]

ROCK RIVER BASIN--Continued
YELLOWSTONE RIVER NEAR BLANCHARDVILLE, WIS.--Continued

Particle-size analyses of suspended sediment, October 1954 to March 1955
(Methods of analysis: B, bottom withdrawal 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 tem- per- ature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Oct. 2, 1954,	10:45 a. m.	135		1,420	1,590	41	52	68	84	95	98	99	99			BSWCM
Oct. 10	3:30 p. m.	250		1,370	1,400	34	43	55	73	90	98	99	99			BSWCM
Mar. 1, 1955	7:00 p. m.	732		2,410	2,260	31	37	49	64	91	99	100	--			BSWCM
Mar. 3,	5:00 p. m.	597		3,990	2,880	23	30	37	53	85	98	99	100			BSWCM
Mar. 3,	5:00 p. m.	597		3,990	3,050	11	16	25	41	81	96	99	100			BSNM

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

ROCK RIVER BASIN--Continued

MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.

LOCATION.--At gaging station at bridge on State Highway 92, 0.9 mile upstream from West Branch Sugar River, and 2.5 miles southeast of Mount Vernon, Dane County.

DRAINAGE AREA.--16.1 square miles.

RECORDS AVAILABLE.--Water temperatures: January 1954 to September 1955.

Sediment records: January 1954 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 75°F July 14; minimum, freezing point on several days during January to March.

Sediment concentrations: Maximum daily, 950 ppm Apr. 24; minimum daily, 1 ppm Sept. 20.

Sediment loads: Maximum daily, 330 tons Apr. 24; minimum daily, less than 0.05 ton Sept. 20.

EXTREMES, January 1954 to September 1955.--Water temperatures: Maximum, 75°F July 14, 1955; minimum, freezing point Feb. 7, 1954, and on several days during January to March 1955.

Sediment concentrations: Maximum daily, 2,010 ppm Apr. 7, 1954; minimum daily, 1 ppm Sept. 20, 1955.

Sediment loads: Maximum daily, 498 tons Apr. 7, 1954; minimum daily, less than 0.05 ton Sept. 20, 1955.

REMARKS.--Flow affected by ice Feb. 5, 8-12, Mar. 4, 1954, and Jan. 26 to Feb. 14, Feb. 16-19, Mar. 5-7, 1955. Records of discharge for period January to September 1954 given in WSP 1338 and for water year October 1954 to September 1955 given in WS 1388.

Temperature (°F) of water, January to September 1954

/Once-daily measurement at varying hours/

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

ROCK RIVER BASIN--Continued
MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.--Continued
Temperature (°F) of water, water year October 1954 to September 1955
(Once-daily measurement at varying hours/

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

Suspended sediment, January to September 1954

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	25	0.9	14	30	1.1
2.....	--	--	--	14	27	1.0	14	32	1.2
3.....	--	--	--	14	23	.9	13	34	1.2
4.....	--	--	--	14	23	.9	13	38	1.3
5.....	--	--	--	14	26	1.0	13	30	1.0
6.....	--	--	--	14	17	.6	13	33	1.2
7.....	--	--	--	14	15	.6	13	30	1.0
8.....	--	--	--	13	28	1.0	13	25	.9
9.....	--	--	--	13	45	1.6	13	26	.9
10.....	--	--	--	13	38	1.3	13	25	.9
11.....	--	--	--	13	24	.8	13	26	.9
12.....	--	--	--	13	31	1.1	13	26	.9
13.....	--	--	--	13	20	.7	13	28	1.0
14.....	--	--	--	16	--	e3	13	24	.8
15.....	--	--	--	19	65	3.3	13	23	.8
16.....	--	--	--	14	30	1.1	13	31	1.1
17.....	--	--	--	14	22	.8	13	32	1.1
18.....	--	--	--	14	25	.9	13	35	1.2
19.....	--	--	--	14	28	1.0	14	38	1.4
20.....	--	--	--	15	40	1.6	13	33	1.2
21.....	--	--	--	15	31	1.2	13	28	1.0
22.....	--	--	--	14	23	.9	13	26	.9
23.....	--	--	--	14	29	1.1	13	32	1.1
24.....	--	--	--	14	28	1.0	14	31	1.2
25.....	--	--	--	14	28	1.0	20	140	a8
26.....	14	10	0.4	14	32	1.2	14	54	2.0
27.....	14	29	1.1	14	30	1.1	14	33	1.2
28.....	13	29	1.0	14	28	1.0	14	33	1.2
29.....	13	20	.7	--	--	--	13	28	1.0
30.....	13	20	.7	--	--	--	13	24	.8
31.....	13	25	.9	--	--	--	13	22	.8
Total.	80	--	4.8	395	--	32.6	417	--	40.3

e Estimated.

a Computed from partly estimated concentration graph.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

ROCK RIVER BASIN--Continued

MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.--Continued

Suspended sediment, January to September 1954--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.....	13	20	b 0.7	23	65	a 4	45	223	s 34
2.....	13	20	b .7	30	140	sa 13	20	44	2.4
3.....	13	23	.8	23	52	3.2	60	180	sa 35
4.....	13	26	.9	18	21	1.0	33	72	s 7.6
5.....	14	35	1.3	17	17	.8	20	32	1.7
6.....	22	--	e 7	16	20	.9	18	33	1.6
7.....	51	2,010	s 498	16	20	.9	18	35	1.7
8.....	24	488	s 39	16	23	1.0	18	39	1.9
9.....	18	198	9.6	15	17	.7	17	33	1.5
10.....	17	75	3.4	15	18	.7	18	26	1.3
11.....	15	66	2.7	15	19	.8	18	28	1.4
12.....	15	50	2.0	15	15	.6	17	27	1.2
13.....	14	45	1.7	14	19	.7	17	19	.9
14.....	14	45	1.7	14	15	.6	17	19	.9
15.....	19	85	a 4	14	15	.6	17	24	1.1
16.....	19	74	3.8	14	14	.5	17	25	1.1
17.....	15	46	1.9	14	10	.4	17	29	1.3
18.....	15	37	1.5	15	12	.5	17	21	1.0
19.....	14	28	1.0	15	13	.5	17	18	.8
20.....	15	60	2.4	15	9	.4	19	--	e 13
21.....	19	61	3.1	15	20	.8	51	450	sa 110
22.....	16	24	1.0	15	30	1.2	103	550	sa 220
23.....	15	34	1.4	15	36	1.4	23	75	b 5
24.....	17	45	2.1	15	31	1.2	20	46	2.5
25.....	50	368	s 58	15	22	.9	19	41	2.1
26.....	22	76	4.5	16	15	.6	20	46	2.5
27.....	31	--	e 12	17	13	b .6	18	30	1.4
28.....	21	31	1.8	34	329	s 42	17	28	1.3
29.....	19	54	2.8	19	41	2.1	17	33	1.5
30.....	18	36	1.7	17	35	1.6	17	31	1.4
31.....	--	--	--	19	37	1.9	--	--	--
Total.	581	--	672.5	531	--	86.1	745	--	459.1
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	16	25	1.1	18	27	1.3	17	36	1.6
2.....	22	82	s 6.4	18	18	.9	16	27	1.2
3.....	41	416	s 60	17	10	.4	16	24	1.0
4.....	22	104	6.2	16	17	.7	16	27	1.2
5.....	20	36	1.9	16	21	.9	16	31	1.3
6.....	42	--	e 60	16	20	.9	16	30	b 1
7.....	90	550	sa 180	15	23	.9	15	25	b 1
8.....	24	103	6.7	15	16	.6	15	25	b 1
9.....	22	60	3.6	15	12	.5	16	21	.9
10.....	21	40	2.3	15	10	.4	16	26	1.1
11.....	20	27	1.4	14	6	.2	15	39	1.6
12.....	20	29	1.6	14	6	.2	15	32	1.3
13.....	19	13	.7	14	7	.3	16	28	1.2
14.....	19	20	1.0	15	8	.3	17	24	1.1
15.....	19	20	1.0	14	21	.8	16	21	.9
16.....	18	23	1.1	14	8	.3	16	29	1.2
17.....	18	28	1.4	14	8	.3	17	30	1.4
18.....	18	27	1.3	16	14	b .6	16	40	1.7
19.....	17	25	1.1	16	18	.8	15	42	1.7
20.....	17	16	.7	15	17	.7	14	37	1.4
21.....	16	16	.7	15	15	.6	14	35	1.3
22.....	16	17	.7	15	27	1.1	14	32	1.2
23.....	16	12	.5	15	40	1.6	14	32	1.2
24.....	16	10	.4	15	26	1.0	14	34	1.3
25.....	16	13	.6	24	--	e 9	14	35	1.3
26.....	16	14	.6	20	42	2.3	14	31	1.2
27.....	15	24	1.0	18	34	1.6	14	30	1.1
28.....	18	--	e 5	18	39	1.9	14	24	.9
29.....	45	--	e 45	18	38	1.8	16	25	b 1
30.....	21	--	e 9	17	31	1.4	28	199	s 18
31.....	28	--	e 13	17	35	1.6	--	--	--
Total.	728	--	416.0	499	--	35.9	472	--	53.3

Total discharge for period (cfs-days).....

4,448

Total load for period (tons).....

1,800.6

e Estimated.

a Computed from partly estimated concentration graph.

s Computed by subdividing day.

b Computed from estimated concentration graph.

ROCK RIVER BASIN--Continued

MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	16	90	3.9	16	25	1.1	15	9	0.4
2.....	21	270	s16	16	20	.9	15	13	.5
3.....	45	441	s68	16	21	.9	15	15	.6
4.....	18	90	4.4	16	39	1.7	15	13	.5
5.....	16	57	2.5	16	46	2.0	15	16	.6
6.....	15	51	2.1	16	45	1.9	14	14	.5
7.....	15	52	2.1	15	47	1.9	14	13	.5
8.....	15	49	2.0	15	44	1.8	15	10	.4
9.....	15	43	1.7	15	33	1.3	14	13	.5
10.....	97	449	s161	15	30	1.2	14	12	.4
11.....	46	198	s31	15	33	1.3	14	15	.6
12.....	22	86	5.1	15	45	1.8	14	14	a.5
13.....	19	110	5.6	15	37	1.5	14	13	.5
14.....	22	99	5.9	15	36	1.4	14	17	.6
15.....	20	55	3.0	15	38	1.5	14	11	.4
16.....	18	49	2.4	15	40	1.6	14	11	.4
17.....	18	56	2.7	15	31	1.2	14	11	a.4
18.....	17	68	3.1	15	10	.4	14	10	a.4
19.....	16	64	2.8	15	7	.3	14	9	.3
20.....	16	58	2.5	14	5	.2	14	8	.3
21.....	16	62	2.7	15	5	.2	14	5	.2
22.....	16	66	2.8	15	4	.2	14	3	.1
23.....	15	58	2.3	15	15	.6	15	4	.2
24.....	15	52	2.1	17	20	.9	15	8	.3
25.....	15	46	1.9	16	47	2.0	15	9	.4
26.....	16	47	2.0	16	50	2.2	16	7	.3
27.....	16	57	2.5	16	40	1.7	17	8	.4
28.....	16	53	2.3	16	12	.5	16	16	.7
29.....	16	35	1.5	16	9	.4	16	16	.7
30.....	16	34	1.5	15	9	.4	15	13	.5
31.....	16	27	1.2	--	--	--	15	13	.5
Total.	660	--	350.6	462	--	35.0	454	--	13.6
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	15	21	0.8	13	13	0.4	32	--	e 30
2.....	15	13	.5	13	15	.5	41	--	e 30
3.....	15	10	.4	13	15	.5	77	--	e160
4.....	15	6	.2	13	18	.6	44	--	e 40
5.....	26	25	1.8	13	23	.8	18	57	2.8
6.....	21	19	1.1	13	20	.7	16	53	2.3
7.....	18	12	.6	13	25	.9	18	54	2.6
8.....	17	10	.4	13	17	.6	26	--	e19
9.....	17	11	.5	13	20	.7	39	--	e 40
10.....	16	10	.4	13	22	.8	29	150	b12
11.....	15	10	.4	13	20	.7	23	62	3.8
12.....	15	11	.4	12	52	s1.8	20	57	3.1
13.....	15	8	.3	12	25	.8	18	43	2.1
14.....	15	12	.5	12	10	.3	19	48	2.5
15.....	15	17	.7	12	6	.2	21	56	3.2
16.....	15	18	.7	12	9	.3	17	42	1.9
17.....	15	15	.6	12	7	.2	16	41	1.8
18.....	15	16	.6	13	10	.4	16	42	1.8
19.....	15	15	.6	15	12	.5	16	36	1.6
20.....	15	17	.7	139	390	sb170	16	33	1.4
21.....	15	14	.6	47	142	s19	19	31	1.6
22.....	14	13	.5	22	62	3.7	22	40	a2
23.....	14	15	.6	19	35	a2	18	48	2.3
24.....	14	15	.6	18	35	1.7	17	35	1.6
25.....	14	20	.8	17	38	1.7	16	23	1.0
26.....	14	25	.9	22	--	e4	15	31	1.2
27.....	14	27	1.0	22	45	2.7	15	15	.6
28.....	14	21	.8	18	27	1.3	15	12	.5
29.....	14	10	.4	--	--	--	16	14	.6
30.....	14	11	.4	--	--	--	18	13	.6
31.....	13	22	.8	--	--	--	17	19	.9
Total.	479	--	19.6	567	--	217.8	710	--	374.8

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

ROCK RIVER BASIN--Continued

MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued								
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)
1.....	16	24	1.0	20	13	0.7	15	23
2.....	16	18	.8	20	14	.8	19	38
3.....	16	17	.7	20	12	.6	17	29
4.....	16	18	a .8	19	15	.8	16	30
5.....	24	48	3.1	19	10	.5	16	27
6.....	18	20	1.0	18	7	.3	17	28
7.....	16	15	.6	18	8	.4	23	96
8.....	16	17	.7	17	8	.4	21	78
9.....	16	20	.9	21	26	1.5	20	49
10.....	15	17	.7	21	27	1.5	18	56
11.....	15	17	.7	18	34	1.6	23	95
12.....	17	15	.7	18	22	1.1	22	71
13.....	23	25	b 2	17	18	.8	18	69
14.....	22	19	1.1	17	20	.9	17	108
15.....	19	13	a .7	16	20	.9	17	108
16.....	17	9	a .4	16	18	.8	16	100
17.....	16	5	.2	15	17	.7	16	99
18.....	24	--	e 25	15	16	.6	15	80
19.....	29	500	sb 50	15	13	.5	23	303
20.....	20	71	3.8	15	12	.5	17	62
21.....	18	29	1.4	15	11	.4	16	73
22.....	17	25	a 1	16	17	.7	16	75
23.....	17	25	a 1	16	17	.7	16	70
24.....	118	950	s 330	17	22	1.0	15	68
25.....	44	265	s 35	16	17	.7	15	67
26.....	26	96	6.7	16	20	.9	15	61
27.....	23	29	1.8	20	55	b 3	15	74
28.....	22	21	1.2	16	21	.9	15	68
29.....	22	24	1.4	16	19	.8	15	62
30.....	21	16	.9	16	22	1.0	103	561
31.....	--	--	--	15	23	.9	--	--
Total..	699	--	475.3	534	--	26.9	607	--
Day	July			August			September	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)
1.....	30	129	s 12	22	110	sb 8	14	8
2.....	21	95	5.4	16	30	a 1	14	11
3.....	20	99	5.3	15	25	a 1	14	9
4.....	19	90	4.6	15	25	a 1	14	9
5.....	18	59	2.9	15	22	.9	14	9
6.....	18	62	3.0	16	16	.7	14	13
7.....	18	47	2.3	16	16	.7	14	14
8.....	18	45	2.2	15	23	.9	14	15
9.....	18	49	2.4	15	20	.8	14	15
10.....	17	33	1.5	15	21	.8	14	5
11.....	17	27	1.2	15	19	.8	14	11
12.....	16	25	1.1	15	17	.7	14	52
13.....	16	25	1.1	15	17	.7	14	44
14.....	16	27	1.2	14	20	.8	14	17
15.....	16	30	1.3	14	27	1.0	14	10
16.....	16	35	1.5	14	44	1.7	14	7
17.....	16	45	1.9	14	42	1.6	14	8
18.....	15	43	1.7	14	33	1.2	13	9
19.....	15	39	1.6	14	32	1.2	14	2
20.....	15	37	1.5	14	29	1.1	14	1
21.....	15	30	1.2	14	24	.9	14	2
22.....	18	--	e 4	14	22	.8	14	7
23.....	20	55	b 3	14	13	.5	14	5
24.....	16	28	1.2	14	12	.4	14	4
25.....	16	25	1.1	14	15	.6	14	3
26.....	15	47	1.9	14	25	.9	14	11
27.....	15	49	2.0	14	30	1.1	14	8
28.....	15	60	2.4	14	20	.8	14	21
29.....	14	65	2.4	15	21	.8	14	6
30.....	14	50	1.9	15	15	.6	14	5
31.....	18	--	e 7	15	4	.2	--	--
Total..	531	--	83.8	460	--	34.2	419	--

Total discharge for year (cfs-days)..... 6,582

Total load for year (tons)..... 1,942.4

e Estimated.

a Computed from estimated concentration graph.

s Computed by subdividing day.

b Computed from partly estimated concentration graph.

t Less than 0.05 ton.

ROCK RIVER BASIN--Continued

MOUNT VERNON CREEK NEAR MOUNT VERNON, WIS.--Continued

Particle-size analyses of suspended sediment, April 1954 to June 1955

(Methods of analysis: B, bottom withdrawal 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. 7, 1954.....	2:50 p. m.	59		5,370	1,920	26	34	47	69	93	99	100	--		BSWCM	
Apr. 7.....	2:50 p. m.	59		5,370	1,840	17	23	37	66	90	99	100	--		BSNM	
Apr. 7.....	3:30 p. m.	114		6,080	3,790	35	51	69	87	98	100	--	--		BSWCM	
Apr. 7.....	5:30 p. m.	114		6,080	3,770	16	24	40	66	99	99	99	100		BSNM	
Apr. 7.....	6:45 p. m.	128		5,650	3,820	54	65	81	93	97	99	99	100		BSWCM	
Apr. 25.....	8:15 a. m.	76		543	324	37	44	61	76	86	95	97	98		BSWCM	
June 1.....	10:00 a. m.	84		507	810	41	50	62	78	94	99	99	100		BSWCM	
June 22.....	8:00 a. m.	122		787	580	84	90	96	98	100	--	--	--		BWCM	
June 22.....	8:30 a. m.	116		815	1,550	75	83	88	92	94	95	97	98		BSWCM	
June 22.....	10:40 a. m.	72		833	1,590	56	69	78	87	95	98	99	99		BSWCM	
July 3.....	10:15 a. m.	74		829	738	50	65	80	92	98	99	99	--		BSWCM	
July 3.....	4:15 p. m.	54		604	1,040	56	73	84	94	98	99	99	100		BSWCM	
July 7.....	8:15 p. m.	98		770	678	72	90	94	96	97	98	99	100		BSWCM	
Sept. 30.....	9:00 a. m.	41		560	828	30	39	51	60	81	90	94	98		BSWCM	
Oct. 3.....	12:15 p. m.	66		759	1,350	56	70	81	87	94	97	98	100		BSWCM	
Oct. 10.....	8:45 a. m.	66		806	1,100	40	51	61	74	89	95	97	98		BSWCM	
Apr. 24, 1955.....	8:30 a. m.			1,470	1,740	56	68	81	92	99	100	--	--		BSWCM	
Apr. 24.....	6:00 p. m.	108		819	1,320	43	55	66	81	95	99	99	100		BSWCM	
June 30.....	9:00 a. m.	172		1,160	1,540	43	67	73	82	89	98	99	100		BSWCM	

IOWA RIVER BASIN

IOWA RIVER AT IOWA CITY, IOWA

LOCATION.--At Benton Street Bridge at Iowa City, Johnson County, 0.5 mile downstream from gaging station, 0.4 mile (revised) 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 1954.

Water temperatures: January 1944 to September 1955.

Sediment records: October 1943 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 87°F Aug. 2, 3; minimum, freezing point on several days during December to February.

Sediment concentrations: Maximum daily, 4,320 ppm Apr. 24; minimum daily, not determined.

Sediment loads: Maximum daily, 48,400 tons Apr. 24; minimum daily, not determined.

EXTREMES, 1943-55.--Water temperatures (1944-55): 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, 1955; minimum daily, 2 tons

Jan. 28, Feb. 2-8, 10, 1951.

REMARKS.--Flow affected by ice Dec. 29 to Jan. 3, Jan. 20-30, Feb. 12, 13, Feb. 19 to Mar. 9. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 7 a.m. and 8 a.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	35	a 40	a 33	--	48	a 65	66	76	85	73
2	--	--	35	a 36	33	--	53	66	68	78	87	68
3	--	--	35	34	33	37	a 55	66	--	a 82	87	69
4	--	--	33	34	32	39	53	68	--	a 85	86	a 76
5	63	--	a 34	35	36	38	52	67	--	83	85	a 69
6	58	--	35	33	a 34	a 34	52	66	71	83	82	68
7	56	--	32	33	32	37	51	67	70	83	a 82	--
8	55	--	33	37	32	--	52	a 64	68	84	79	--
9	--	47	40	a 36	34	34	a 54	62	66	83	78	--
10	--	47	34	34	--	43	a 54	57	67	a 79	79	78
11	a 64	--	34	33	--	42	58	59	66	80	78	--
12	63	48	a 34	33	a 32	45	56	61	a 62	76	77	--
13	61	46	33	32	a 32	a 45	56	60	61	79	75	a 68
14	60	46	34	35	33	45	59	63	61	79	a 78	--
15	--	46	33	33	33	45	56	a 66	64	80	76	a 75
16	--	46	34	34	33	38	63	a 67	69	78	79	--
17	--	46	34	34	33	41	a 64	65	72	a 80	78	--
18	--	48	34	34	34	38	62	66	64	80	82	--
19	--	--	a 33	33	38	46	65	68	77	80	82	--
20	--	58	37	35	36	a 43	62	70	73	81	82	a 78
21	--	a 48	37	34	35	45	60	70	74	82	a 84	--
22	--	44	38	33	32	37	64	a 72	73	84	a 84	--
23	--	46	33	a 33	38	39	62	72	75	84	78	--
24	--	--	37	32	37	36	a 57	72	73	a 82	76	--
25	--	39	a 36	32	34	38	53	69	72	78	76	--
26	--	--	37	34	35	33	55	65	a 76	83	78	66
27	--	43	35	32	a 33	34	58	66	72	83	83	67
28	--	a 38	33	33	--	37	60	67	74	85	a 86	60
29	--	37	33	34	--	46	60	a 68	63	85	81	67
30	--	36	33	a 32	--	46	60	a 66	67	86	74	62
31	--	--	33	33	--	45	--	65	--	86	71	--
Average	--	--	35	34	34	40	57	66	69	82	80	--

a Reading obtained after 9 a.m.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	1,930	186	865	1,410	114	422	760	29	54
2.....	1,730	520	2,430	1,330			682		
3.....	1,530	318	1,310	1,250			676		
4.....	1,810	200	977	1,250			668		
5.....	2,020	162	884	1,210	83	268	668		
6.....	2,020	312	1,700	1,170			598		
7.....	2,290	300	1,850	1,170			554		
8.....	2,060	469	2,610	1,130			550		
9.....	1,890	352	1,800	1,090	62	166	675	50	78
10.....	2,560	715	sa 5,380	1,050			521		
11.....	2,920	770	6,070	1,020			530		
12.....	3,640	2,230	21,900	1,020			625		
13.....	3,370	1,280	11,600	980	56	132	453	52	80
14.....	2,830	538	4,110	980			453		
15.....	2,380	340	2,180	909			539		
16.....	2,380	509	3,270	945			702		
17.....	2,920	569	4,490	910	41	80	644		
18.....	3,190	963	8,290	890			668		
19.....	3,010	534	4,340	934			462		
20.....	2,650	382	2,730	878			437		
21.....	2,380	310	1,990	819	56	132	530	52	80
22.....	2,160	264	1,540	850			590		
23.....	2,020	236	1,290	934			674		
24.....	1,850	243	1,210	864			622		
25.....	1,730	208	972	820	41		672		
26.....	1,650	160	670	774			655		
27.....	1,570			726			730		
28.....	1,530			683			790		
29.....	1,570			776	--	--	500	--	--
30.....	1,530			647		--	410		
31.....	1,450			--		--	350		
Total.	68,570	--	99,808	29,409	--	5,402	18,388	--	2,324
January			February			March			
1.....	375	18	31	381	65	64	2,500	258	a 1,740
2.....	470			381			2,300	241	a 1,500
3.....	580			377			2,200	266	1,580
4.....	730			381			2,400	658	4,280
5.....	1,020	144	408	373	65	64	2,600	819	5,750
6.....	1,050			369			2,150	800	4,640
7.....	730			361			1,750	411	1,940
8.....	790			353			1,400	129	488
9.....	880	17	38	341	73	58	1,600	200	864
10.....	820			337			1,610	159	691
11.....	645			321			1,570	163	691
12.....	675			300			1,570	209	886
13.....	590	14	19	280			1,530	133	549
14.....	356			309			1,490	128	515
15.....	445			285			1,530	170	702
16.....	465			285	103	181	1,690	226	1,030
17.....	449	17	16	285			1,850	1,110	5,540
18.....	481			297			1,610	1,290	5,610
19.....	441			650		181	1,490	610	2,450
20.....	420			3,300	659	5,870	1,370	256	947
21.....	400	14	19	3,200	386	3,340	1,330	152	516
22.....	420			3,080	469	3,900	1,290		
23.....	330			2,950	356	2,840	1,250		
24.....	350			2,800	301	2,280	1,210		
25.....	370	17	16	3,050	325	2,680	1,210	66	179
26.....	370			3,180	322	2,760	1,130		
27.....	340			3,300	398	3,550	1,020		
28.....	315			2,800	299	2,260	945		
29.....	330	17	16	--	--	--	945	66	179
30.....	350			--	--	--	980		
31.....	369			--	--	--	1,020		
Total.	16,356	--	1,120	34,326	--	30,765	48,540	--	46,027

s Computed by subdividing day.

a Computed from estimated concentration graph.

IOWA RIVER BASIN--Continued

IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Suspended sediment, water year October 1964 to September 1965—Continued									
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.....	980			1,650	284	1,270	790		
2.....	945			1,650	237	1,060	790		
3.....	910			1,490	187	752	760		
4.....	945			1,530	203	839	702		
5.....	980			1,410	292	1,110	670		
6.....	945			1,250	180	608	665		
7.....	945	91	234	1,180	143	456	635	135	250
8.....	980			1,090	112	330	615		
9.....	945			1,130	132	403	615		
10.....	945			1,610	496	2,160	645		
11.....	945			1,570	297	1,260	675		
12.....	945			1,690	335	1,530	670		
13.....	980			1,610	347	1,510	640		
14.....	1,050	97	275	1,450	222	869	615		
15.....	1,210	118	386	1,250	160	540	605		
16.....	1,290	166	578	1,250	174	587	530	109	167
17.....	1,330	174	625	1,090	142	418	525		
18.....	1,290	175	610	1,020	132	364	485		
19.....	1,770	570	s 3,230	820			490		
20.....	2,060	1,120	6,230	880			508		
21.....	1,690	678	3,090	850			503		
22.....	1,490	579	2,330	850			556		
23.....	1,490	628	2,530	850			458		
24.....	3,910	4,320	s 48,400	820			518	80	99
25.....	3,820	3,420	35,300	874	128	285	384		
26.....	3,010	2,790	22,700	790			508		
27.....	2,380	1,400	9,000	820			316		
28.....	2,060	732	4,070	790			398		
29.....	1,890	515	2,630	790			514		
30.....	1,770	360	1,720	790			362		
31.....	--	--	--	790			--	--	--
Total..	45,900	--	146,746	35,634	--	19,771	17,147	--	5,190
July			August			September			
1.....	372			404	110	120	150		
2.....	394			170			100		
3.....	352			276			132		
4.....	242			256	60	43	159		
5.....	427	70	64	366			126	76	26
6.....	253			618			97		
7.....	330			529			108		
8.....	624	82	138	400	128	179	126	--	
9.....	1,170	242	764	525			118	--	
10.....	1,130	747	2,280	252			102	71	
11.....	832	519	1,170	356	138	99	98		e 26
12.....	1,330	644	2,310	164			95	--	
13.....	2,060	592	3,290	297			116	103	
14.....	1,930	789	4,110	144			182	--	
15.....	1,690	497	2,270	94			100	41	
16.....	1,450	282	1,100	272			102	--	
17.....	1,170	211	667	122	67	27	101	--	
18.....	980	196	519	117			100	--	
19.....	850	181	415	142			106	--	
20.....	730	170	335	158			121	48	e 16
21.....	665			110			121	--	
22.....	570			146			119	--	
23.....	575	153	230	98			182	--	
24.....	548			148			108	--	
25.....	421			128			126	--	
26.....	418			134	75	34	124		
27.....	431			106			138	64	36
28.....	394			200			136		
29.....	264	116	110	256			501		
30.....	311			302			242		
31.....	294			228			--	--	--
Total..	23,207	--	21,626	7,518	--	1,967	4,136	--	740
Total discharge for year (cfs-days).....									
Total load for year (tons).....									
e Estimated.									
s Computed by subdividing day.									

IOWA RIVER BASIN--Continued
IOWA RIVER AT IOWA CITY, IOWA--Continued

Particle-size analyses of suspended sediment, October 1954 to July 1955
(Methods of analysis: B, bottom withdrawal 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. 11, 1954.....	11:00 a.m.	2,290	64	726	2,840		55		86		99					SPWCM
Feb. 21, 1955....	3:55 p.m.	a 3,200	35	494	2,510		57		76		98					SPWCM
Apr. 20.....	1:40 p.m.	1,680	64	1,080	3,310		62		96		99					SPWCM
Apr. 25.....	1:35 p.m.	4,000	54	4,840	3,380		44		81		100					SPWCM
May 13.....	1:20 p.m.	1,650	62	327	1,170		70		92		100					SPWCM
July 12.....	9:00 a.m.	1,130	74	628	2,110		90		98		99					SPWCM
a Daily mean discharge.																

a Daily mean discharge.

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 edge 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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 4,590 ppm Apr. 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,180 tons Apr. 23; minimum daily, 0 tons on many days.

EXTREMES, 1952-55.--Sediment concentrations: Maximum daily, 4,970 ppm May 24, 1953; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 1,980 tons May 24, 1953; minimum daily, 0 tons on many days each year.

REMARKS.--Flow affected by ice Dec. 30 to Jan. 1, Jan. 8-30, Feb. 10-16, 21-27, Mar. 7, 22-28. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Suspended sediment, water year October 1954 to September 1955

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	0.02	--	--	0.01	--	--
2.....	0	--	0	.02	--	--	.01	94	(t)
3.....	0	--	0	.03	--	--	.01	--	--
4.....	0	--	0	.02	--	--	.01	--	--
5.....	3.5	592	s 13	.02	--	--	0	--	0
6.....	.12	30	(t)	.02	--	--	0	--	0
7.....	.01	20	(t)	.01	--	--	0	--	0
8.....	0	--	0	.01	--	--	0	--	0
9.....	0	--	0	.01	--	--	0	--	0
10.....	15	2,460	s 219	.01	--	--	0	--	0
11.....	1.0	80	.2	.01	--	--	0	--	0
12.....	.34	13	(t)	.01	--	--	0	--	0
13.....	.14	--	(t)	.01	--	--	0	--	0
14.....	1.2	879	s 4.2	.01	--	--	0	--	0
15.....	.32	200	a .2	.01	--	(t)	0	--	0
16.....	.18	--	--	.01	--	--	0	--	0
17.....	.11	--	--	.02	--	--	0	--	0
18.....	.07	--	--	.01	71	--	0	--	0
19.....	.05	--	--	.01	--	--	0	--	0
20.....	.05	--	--	.01	--	--	0	--	0
21.....	.05	--	--	.01	--	--	.01	--	--
22.....	.04	--	--	.03	--	--	.01	--	--
23.....	.04	--	--	.02	71	--	.01	90	(t)
24.....	.02	--	(t)	.02	--	--	.01	--	--
25.....	.02	--	--	.01	--	--	.01	--	--
26.....	.03	12	--	.01	--	--	.17	23	--
27.....	.04	6	--	.01	--	--	.65	321	s .8
28.....	.02	--	--	.01	--	--	.11	25	--
29.....	.02	--	--	.01	--	--	.03	--	--
30.....	.02	--	--	.01	--	--	.02	--	(t)
31.....	.02	--	--	--	--	--	.02	--	--
Total.	22.41	--	236.7	0.42	--	0.1	1.09	--	0.9

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from estimated concentration graph.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	January			February			March		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.03	--		0.08	--		0.98	--	
2.....	.06	--		.05	--		.84	--	e 0.1
3.....	.07	5	(t)	.05	--		.84	--	
4.....	.26	20		.11	--		.66	26	
5.....	9.8	746	s 36	.11	--		.48	--	
6.....	1.6	73	.3	.08	--		.24	--	
7.....	.76	--	e .1	.13	--		.15	--	
8.....	.35	13		.15	66		.43	--	(t)
9.....	.24	--		.10	--	(t)	.41	--	
10.....	.19	--		.08	--		.43	26	
11.....	.16	--	(t)	.07	--		.41	--	
12.....	.13	--		.06	--		.32	--	
13.....	.11	--		.08	--		.26	--	
14.....	.09	--		.12	--		1.2	639	s 12
15.....	.07	--		.15	--		1.4	1,500	s 6.7
16.....	.06	--		.20	66		.50	130	a .2
17.....	.05	--		.24	--		.41	43	
18.....	.05	--		4.5	90	sa 2.5	.41	--	
19.....	.05	--		80	361	s 103	.32	--	(t)
20.....	.05	--		37	301	sb 71	.43	--	
21.....	.05	29		2.0	41	.2	.60	43	.1
22.....	.05	--		1.4	31	.1	.28	--	(t)
23.....	.05	--		1.0	--	e .1	.56	53	.1
24.....	.05	--	(t)	.70	--	e .1	.60	40	.1
25.....	.05	--		.50	45	a .1	.45	--	
26.....	.05	--		10	760	s 30	.32	--	
27.....	.05	--		16	634	s 55	.45	--	
28.....	.05	--		1.2	58	.2	.57	32	(t)
29.....	.05	--		--	--	--	.60	--	
30.....	.07	--		--	--	--	.57	--	
31.....	.09	29		--	--	--	.48	--	
Total.	14.79	--	36.8	156.16	--	262.9	16.60	--	20.5
Day	April			May			June		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.38	5	(t)	0.69	--		0.10	62	
2.....	.45	--	(t)	.52	--		.10	--	
3.....	.43	--	e 0.1	.45	--		.10	--	
4.....	.44	52	b .1	.38	--		.08	62	
5.....	.55	--	e .1	.32	17	(t)	.07	--	
6.....	.34	--		.29	--		.08	62	(t)
7.....	.23	--		.29	--		.10	46	
8.....	.23	--	(t)	.29	--		.07	--	
9.....	.23	--		5.5	838	s 42	.06	--	
10.....	.20	--		3.8	374	s 6.7	.04	46	
11.....	.41	80	b .1	1.3	46	.2	.05	46	
12.....	.36	49	(t)	.98	42		.07	--	
13.....	.82	72	.2	.80	35		.07	--	
14.....	.69	47	a .1	.60	--	e .1	.08	89	
15.....	.48	29		.54	--		.05	--	
16.....	.36	--	(t)	.40	35		.04	--	
17.....	.27	--		.34	--		.02	--	
18.....	.26	--		.31	--		.02	89	(t)
19.....	6.3	4,060	s 477	.27	29		.02	--	
20.....	1.5	180	.7	.24	--		.03	--	
21.....	.84	70	a .2	.21	--	(t)	.01	--	
22.....	.63	52	a .1	.26	--		.01	--	
23.....	17	4,590	s 1,180	.24	29		.01	--	
24.....	13	1,350	s 81	.24	29		0	--	0
25.....	5.2	200	2.8	.21	--		0	--	0
26.....	3.0	70	.6	.27	--	e .1	0	--	0
27.....	1.9	50	.3	.40	--	e .1	0	--	0
28.....	1.5	45	.2	.19	--		0	--	0
29.....	1.0	27	.1	.20	--		.45	307	s .8
30.....	.84	--	e .1	.16	29	(t)	.07	50	(t)
31.....	--	--	--	.12	--		--	--	--
Total.	59.84	--	1,744.1	20.81	--	49.9	1.80	--	1.0

e Estimated.

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

IOWA RIVER BASIN--Continued

RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	0.01	--	(t)	0	--	0			
2.....	0	--	0	0	--	0			
3.....	0	--	0	0	--	0			
4.....	0	--	0	0	--	0			
5.....	0	--	0	.18	135	sa .4			
6.....	0	--	0	1.3	577	sb 8.8			
7.....	0	--	0	0	--	0			
8.....	0	--	0	0	--	0			
9.....	0	--	0	0	--	0			
10.....	.04	50	(t)	0	--	0			
11.....	.01	--	(t)	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.....	1.6	1,080	s 30	0	--	0			
24.....	.04	--	(t)	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.	1.70	--	30	1.48	--	9.2	0		0

Total discharge for year (cfs-days)..... 297.10

Total load for year (tons) 2,391.9

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

IOWA RIVER BASIN--Continued
RALSTON CREEK AT IOWA CITY, IOWA--Continued

Particle-size analyses of suspended sediment, October 1954 to April 1955
(Methods of analysis: B, bottom withdrawal 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. 10, 1954.....	2:50 p.m.	67	64	6,170	3,520	45	74	99	100	--	--	--	--	SPWCM	
Apr. 19, 1955....	1:30 p.m.	89	58	31,400	3,290	36	68	99	99	100	100	100	100	SPWCM	
Apr. 19.....	1:35 p.m.	64	58	27,900	4,230	39	72	99	100	100	--	--	--	SPWCM	
Apr. 23.....	8:05 p.m.	187	56	29,600	7,650	30	57	97	97	98	100	100	100	SPWCM	

DES MOINES RIVER BASIN

DES MOINES RIVER AT EUCLID AVENUE BRIDGE AT DES MOINES, IOWA

LOCATION.--At Euclid Avenue Bridge in Des Moines, Polk County, 2.1 miles upstream from gaging station, 4.9 miles upstream from Raccoon River, and 2.4 miles downstream from Beaver Creek.

DRAINAGE AREA.--6,180 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: November 1954 to June 1955 (discontinued).

Water temperatures: November 1954 to September 1955.

Sediment records: November 1954 to September 1955.

EXTREMES, November 1954 to September 1955.--Dissolved solids: Maximum, 584 ppm Feb. 4-18; minimum, 256 ppm Feb. 19-21.

Hardness: Maximum, 458 ppm Feb. 4-18; minimum, 186 ppm Feb. 19-21.

Specific conductance: Maximum daily, 957 micromhos Feb. 14; minimum daily, 381 micromhos Feb. 19.

Water temperatures: Maximum, 95°F July 28; minimum, freezing point on many days during December to March.

Sediment concentrations: Maximum daily, 3,840 ppm July 11; minimum daily, not determined.

Sediment loads: Maximum daily, 59,100 tons July 11; minimum daily, not determined.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Neb. No appreciable inflow between sampling site and gaging station except during periods of heavy local runoff. Flow affected by ice Jan. 19 to Feb. 4, Mar. 8-10, 25-27. Discharge records at gaging station at Des Moines for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, November 1954 to June 1955

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 dissolved	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, mg./nesum	Non-carbonate					
Nov. 3, 1954.....	2,220	--	--	--	--	11	--	374	--	10	--	18	--	488	2,930	396	89	6	0.2	722	7.9	--
Nov. 9-23.....	1,533	21	0.01	93	32	13	2.1	335	95	11	0.4	16	0.08	465	1,920	364	89	7	3	686	7.9	--
Dec. 6-Jan. 12, 1955	771	--	--	--	--	18	--	365	--	15	--	14	--	507	1,060	405	105	9	4	788	7.9	--
Jan. 13-Feb. 3.....	388	--	--	--	--	--	--	390	126	18	--	--	--	553	75	579	440	115	--	861	7.9	--
Feb. 4-18.....	311	18	0.00	115	42	27	3.4	414	134	23	4	11	11	584	79	490	458	119	11	916	7.9	4
Feb. 19-21.....	2,183	13	17	48	16	9.9	7.0	164	51	11	3	12	0.08	256	35	1,510	186	52	10	415	7.2	41
Feb. 22-Mar. 3.....	909	--	--	--	--	--	--	267	75	15	--	13	--	388	53	952	295	76	--	617	7.5	--
Mar. 4-13.....	1,643	--	--	--	--	--	--	225	63	12	--	11	--	332	45	1,470	247	62	--	527	7.5	--
Mar. 14-17.....	3,530	--	--	--	--	--	--	189	48	7.0	--	11	--	284	36	2,520	200	45	--	425	7.5	--
Mar. 18-23.....	1,992	--	--	--	--	--	--	225	64	9.0	--	16	--	328	45	1,760	252	67	--	518	7.7	--
Mar. 24-Apr. 2.....	1,432	--	--	--	--	--	--	289	92	12	--	15	--	439	58	1,660	326	89	--	657	7.8	--
Apr. 3-23.....	1,853	--	--	--	--	--	--	254	87	10	--	11	--	379	52	1,900	391	83	--	594	7.8	--
Apr. 24-25.....	3,220	--	--	--	--	--	--	204	65	7.0	--	8.6	--	300	41	2,610	228	61	--	470	7.9	--
Apr. 26-May 8.....	4,306	--	--	--	--	--	--	295	80	8.5	--	26	--	438	60	5,090	328	86	--	651	7.8	--
May 9-30.....	1,665	--	--	--	--	--	--	228	92	11	--	9.4	--	363	49	1,630	272	85	--	568	7.6	--
May 31-June 14.....	2,265	--	--	--	--	--	--	254	69	9.0	--	23	--	382	52	2,340	284	76	--	574	7.9	--
June 15-23.....	1,267	--	--	--	--	--	--	282	81	11	--	19	--	419	57	1,430	311	80	--	632	7.9	--
June 24-30.....	714	--	--	--	--	--	--	185	94	14	--	4.3	--	323	44	623	233	81	--	516	7.6	--

DES MOINES RIVER BASIN--Continued

DES MOINES RIVER AT EUCLID AVENUE BRIDGE AT DES MOINES, IOWA--Continued

Temperature (°F) of water, November 1954 to September 1955
 /Once-daily measurement between 10 a.m. and 6 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	--	41	--	32	54	a 61	72	82	93	74
2		--	--	39	--	32	54	68	b 73	83	90	75
3		39	--	38	--	32	55	68	77	83	90	77
4		--	--	32	32	32	53	68	79	80	89	b 75
5		--	--	32	32	32	52	68	77	83	85	b 72
6		--	--	32	32	32	49	68	b 72	80	87	74
7		--	--	33	32	32	50	66	70	82	84	b 70
8		--	--	32	32	32	53	65	70	b 78	81	72
9		46	--	32	32	36	56	60	68	a 75	80	80
10		49	--	32	32	36	56	60	68	77	83	70
11		48	--	32	32	38	57	63	68	a 80	82	b 69
12		48	--	32	32	40	57	62	b 63	a 83	83	64
13		50	32	32	32	40	56	64	64	a 83	b 81	69
14		56	32	32	32	40	54	67	74	a 82	79	b 74
15		47	32	32	32	38	59	64	74	a 79	b 80	78
16		48	32	32	32	37	62	68	74	78	82	77
17		48	32	32	32	36	62	69	76	82	85	81
18		47	32	--	32	37	65	70	76	85	b 83	b 75
19		45	32	32	32	40	69	70	79	b 84	89	74
20		42	32	32	32	a 37	64	71	78	69	85	--
21		43	32	32	32	34	64	b 75	78	89	b 80	73
22		--	32	32	32	32	64	b 77	77	92	84	74
23		--	34	32	32	34	b 54	76	--	87	b 80	70
24		--	34	32	32	32	51	71	72	b 81	82	b 62
25		--	38	32	32	32	53	69	76	85	b 80	b 60
26		--	38	32	32	32	58	67	74	b 87	85	61
27		--	32	32	32	32	59	68	b 76	93	b 85	67
28		--	32	32	32	36	60	66	74	95	a 80	67
29		--	32	32	--	42	61	63	b 72	90	78	70
30		--	32	--	--	44	62	a 60	82	--	75	63
31		--	32	--	--	48	--	70	--	--	b 70	--
Average		--	--	c 33	32	36	57	67	74	84	85	71

a Reading obtained before 10 a.m.

b Reading obtained after 6 p.m.

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

DES MOINES RIVER BASIN--Continued

DES MOINES RIVER AT EUCLID AVENUE BRIDGE AT DES MOINES, IOWA--Continued

Suspended sediment, November 1954 to September 1955

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.....				2,480	--		1,050		
2.....				2,320	--		1,020		
3.....				2,220	103	e 650	960	--	e 200
4.....				2,060	--		975		
5.....				2,000	--		990		
6.....				1,950	--	e 530	885		
7.....				1,910	--		814		
8.....				1,870	--		842		
9.....				1,820	103	506	870		
10.....				1,760	103	489	670	--	e 140
11.....				1,680	--		960		
12.....				1,660	85	383	828		
13.....				1,660	--		856		
14.....				1,590	--		670	47	105
15.....				1,550	318	1,340	960		
16.....				1,530	--		828		
17.....				1,490	--		1,000		
18.....				1,460	196	771	774	29	66
19.....				1,420	--		774		
20.....				1,390	--		856		
21.....				1,350	121	448	885		
22.....				1,330	--	e 300	960		
23.....				1,300	--		900	36	87
24.....				1,230	--		870		
25.....				1,200	--		856		
26.....				1,180	--		814		
27.....				1,200	--		870		
28.....				1,200	--		646		
29.....				1,120	--		410	33	53
30.....				1,080	--		390		
31.....				--	--		451		
Total.				48,010	--	16,793	25,634	--	3,378
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.....	598			355	--	e 25	658	11	20
2.....	722			345	--		748	28	57
3.....	856			330	--		945		
4.....	870			320	--		1,160	104	366
5.....	900	30	62	300	--		1,800		
6.....	735			290	--		1,760		
7.....	670			290	--		1,320	144	518
8.....	709			285	--		920		
9.....	696	12	22	280	--		1,100		
10.....	658			280	38	30	1,300	116	414
11.....	610			280	--		1,570		
12.....	634			280	--		2,080		
13.....	410			285	--		3,420		
14.....	440			290	--		3,320		
15.....	517	10	14	295	--		3,740	376	3,250
16.....	528			300	61	49	3,740		
17.....	484			320	70	a 60	3,320		
18.....	420			574	90	a 139	2,800		
19.....	405			2,240	249	1,510	2,220		
20.....	390			2,400	165	1,070	1,800	100	524
21.....	375			1,910	100	516	1,800		
22.....	375			1,390	58	218	1,850		
23.....	370	5	5.0	1,200	35	113	1,480	68	274
24.....	360			990	--		1,150		
25.....	355			828	--		1,050		
26.....	345			828	35	78	980	99	263
27.....	340			828	--		920		
28.....	335			670	--		1,070		
29.....	350			--	--	--	1,230	40	124
30.....	355	24	23	--	--	--	1,390		
31.....	360			--	--	--	1,570	113	452
Total.	16,172	--	749.0	18,983	--	4,500	54,211	--	31,056

e Estimated.

a Computed from estimated concentration graph.

DES MOINES RIVER BASIN--Continued

DES MOINES RIVER AT EUCLID AVENUE BRIDGE AT DES MOINES, IOWA--Continued

Suspended sediment, November 1954 to September 1955--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.....	2,360			4,710	430	5,470	1,300	311	1,090
2.....	2,600	257	1,750	4,270	360	4,150	1,180	264	841
3.....	2,600			3,950	305	3,250	1,050	257	729
4.....	2,500			3,640	520	5,110	1,160	316	990
5.....	2,600	1,120	7,860	3,110	351	2,950	2,200	856	5,080
6.....	2,340	475	3,000	2,800	240	1,810	2,700	682	4,970
7.....	2,140	170	982	2,600	309	2,170	3,000	643	5,210
8.....	2,040	129	711	2,360	341	2,170	3,220	612	5,320
9.....	1,970	150	691	2,500	222	1,500	3,320	578	5,160
10.....	1,870	109	550	2,700	628	4,580	3,110	490	4,110
11.....	1,780	105	505	2,420	280	1,830	3,000	433	3,510
12.....	1,760	101	480	2,160	206	1,200	2,800	377	2,850
13.....	1,760	106	504	2,020	197	1,070	2,480	320	2,140
14.....	1,820	128	629	1,870	179	904	2,080	286	1,610
15.....	1,800	117	569	1,760	189	898	1,760	235	1,120
16.....	1,660	111	498	1,620	160	700	1,530	247	1,020
17.....	1,590	110	472	1,490	128	515	1,390	196	736
18.....	1,440	90	350	1,400	116	438	1,260	201	684
19.....	1,570	115	487	1,370	100	370	1,130	228	696
20.....	1,660	400	1,790	1,280	97	335	1,160	311	974
21.....	1,400	200	756	1,200	108	350	1,180	289	921
22.....	1,300	101	355	1,160	98	307	1,050	250	709
23.....	1,320	90	321	1,080	100	292	945	217	554
24.....	2,800	2,530	s 21,300	1,570	1,050	s 5,600	885	173	413
25.....	3,640	1,360	13,400	1,400	170	643	814	152	334
26.....	4,600	930	11,600	1,180	330	1,050	748	113	228
27.....	6,150	1,110	18,400	1,250	342	1,150	670	97	175
28.....	6,610	910	16,200	1,570	881	3,730	634	100	171
29.....	5,920	695	11,100	2,000	1,130	6,100	658	102	181
30.....	5,260	512	7,270	1,640	662	2,930	586	90	142
31.....	--	--	--	1,400	373	1,410	--	--	--
Total.	78,860	--	127,780	65,480	--	64,982	49,000	--	52,688

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	610	127	209	270			91		
2.....	634	213	365	240	--	e 20	101	27	7.1
3.....	528	130	185	240			101		
4.....	506	94	128	220			91		
5.....	495	95	127	210			83		
6.....	709	246	471	220			83	18	3.8
7.....	900	522	1,270	190			79		
8.....	3,330	2,200	19,800	190	33	17	76		
9.....	3,320	1,100	9,860	190			74		
10.....	4,440	2,520	s 31,800	171			68		
11.....	5,700	3,840	59,100	161			64		
12.....	4,060	1,180	12,900	161			64		
13.....	3,640	600	5,900	141			66		
14.....	2,700	450	3,280	131			64		
15.....	1,950	346	1,820	131			63		
16.....	1,530	309	1,280	121			62	14	2.4
17.....	1,320	285	1,020	111			58		
18.....	1,130	284	775	91	37	11	57		
19.....	990	167	446	91			69		
20.....	870	150	352	91			68		
21.....	814	143	314	111			111		
22.....	683	99	183	111			91		
23.....	562	74	112	91			79		
24.....	517	53	74	87			69		
25.....	484	41	54	83			69	16	4.5
26.....	430			83			91		
27.....	380			83	40	9.3	151		
28.....	360			83			91		
29.....	330	35	33	87			200		
30.....	310			91			83		
31.....	280			87			--	--	--
Total.	44,512	--	152,023	4,368	--	408.4	2,517	--	116.9

Total discharge for period Nov. 1, 1954, to Sept. 30, 1955 (cfs-days)..... 407,747
 Total load for period Nov. 1, 1954, to Sept. 30, 1955 (tons)..... 454,474.3

e Estimated.

s Computed by subdividing day.

DES MOINES RIVER BASIN--Continued

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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 380 ppm July 10; minimum daily, no flow Aug. 21, Aug. 23 to Sept. 30.

Sediment loads: Maximum daily, 236 tons July 10; minimum daily, 0 tons Aug. 21, Aug. 23 to Sept. 30.

EXTREMES, 1952-55.--Sediment concentrations: Maximum daily, 668 ppm Mar. 17, 1954; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 236 tons July 10, 1955; minimum daily, 0 tons on many days each year.

REMARKS.--Flow affected by ice Dec. 28-31, Jan. 11-14, 16-31, Feb. 5-8, 10-26, Mar. 6, 7, 21, 22, 24-26. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Suspended sediment, water year October 1954 to September 1955

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	70	1.3	21	97		6.5	--	
2.....	121	138	a 45	20	--		6.8	--	
3.....	108	88	b 26	20	--	e 4.0	7.4	--	
4.....	52	80	11	18	--		6.8	43	
5.....	40			18	--		5.9	--	
6.....	32			17	51		5.7	--	
7.....	29			16	--		6.2	--	
8.....	40			16	--		6.8	43	
9.....	35	88	8.1	16	--		5.4	--	
10.....	34			16	--	e 2.1	5.2	--	
11.....	32			15	--		5.4	--	
12.....	29			14	51		4.9	--	
13.....	72	156	sa 66	15	51		5.4	41	
14.....	182	115	s 60	13	--		5.9	--	
15.....	109	92	27	13	--		5.2	--	
16.....	64	92	16	13	26		5.2	41	e 0.6
17.....	42	--		11	--		5.2	--	
18.....	32	93	e 10	10	--		4.7	--	
19.....	28	74	6.0	10	--		4.7	--	
20.....	27	73	5.3	9.6	26		4.9	--	
21.....	44	107	b 13	9.2	--		4.4	41	
22.....	48	95	12	8.7	--	e .7	4.9	--	
23.....	36	75	7.3	8.7	--		4.7	--	
24.....	31			7.7	--		4.4	--	
25.....	28			8.0	26		4.9	--	
26.....	31	61	4.9	8.0	28		4.4	--	
27.....	31			8.3	--		3.9	--	
28.....	29			7.4	--		3.4	--	
29.....	26			6.2	28		2.9	--	
30.....	24	77	5.0	6.5	--		3.2	--	
31.....	23			--	--		3.6	--	
Total.	1,465.8	--	417.8	380.3	--	50.1	158.9	--	18.6

e Estimated.

s Computed by subdividing day.

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 1954 to September 1955--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4.0	--		2.0	--		12		
2.....	3.4	--		1.8	--		20		
3.....	3.6	22		1.7	9		20	--	e 2.2
4.....	3.4	--		1.7	--		16		
5.....	3.6	--		1.9	23		12		
6.....	3.0	22		1.8	--		7.4		
7.....	3.2	--		1.6	--		6.0	--	e .5
8.....	3.6	--		1.6	--		7.1		
9.....	3.0	--		1.6	--		14	--	e 3.2
10.....	2.8	36		1.5	--	e 0.1	13	--	e 2.0
11.....	2.7	--		1.5	--		7.4		
12.....	2.6	36		1.5	--	*	5.7		
13.....	2.5	--		1.6	--		5.0	45	.8
14.....	2.4	36		1.7	--		7.1		
15.....	2.2	--		2.0	23		8.7		
16.....	2.2	--	e 0.2	2.5	--		6.8		
17.....	2.2	--		3.0	--		6.2		
18.....	2.1	--		15	23		5.7		
19.....	2.0	--		12	--	e 1.0	5.7		
20.....	2.1	--		9.0	--		5.0		
21.....	2.0	36		6.0			4.7		
22.....	1.8	--		5.0			4.5	33	.5
23.....	1.8	--		4.6			5.4		
24.....	1.8	--		4.1			4.8		
25.....	1.7	--		3.8	--	e .3	4.1		
26.....	1.6	--		4.6			4.0		
27.....	1.5	--		5.0			4.7		
28.....	1.5	--		3.6			6.2		
29.....	1.6	--		--	--		9.2		
30.....	1.7	--		--	--		13	52	1.5
31.....	1.8	--		--	--		12		
Total.	75.4	--	6.2	103.7	--	7.1	263.4	--	32.7
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.....	8.7	--		21	--		3.8	--	
2.....	8.3	--	e 1.0	19	154		4.0	52	e 0.5
3.....	8.0	--		17	--	e 7.2	4.4	--	
4.....	17	--	e 4.0	15	--		15	--	e 5.0
5.....	14	81	3.1	14	154		10	--	e 2.5
6.....	10	--	e 1.4	14	--		8.0	114	
7.....	8.3	43		10	56		6.8	114	
8.....	7.4	60		9.6	--	e 1.9	6.0	114	
9.....	6.5	--		11	56		5.4	--	
10.....	6.0	--	e 1.0	9.2	--		5.2	--	e 1.8
11.....	5.7	--		8.7	56		6.0	--	
12.....	5.4	80		8.3	67		5.2	--	
13.....	5.2	60		7.7	--		4.7	90	
14.....	5.0	39		7.4	--		4.4	90	
15.....	4.7	--		7.1	--		4.0	--	
16.....	4.7	39		6.8	--	e 1.3	3.8	--	e .8
17.....	4.2	--		6.5	--		3.6	--	
18.....	5.0	39	e .5	6.2	--		3.6	--	
19.....	4.7	--		6.0	67		3.4	--	
20.....	4.2	--		6.0	67		3.0	--	
21.....	4.0	--		5.7	60		2.8	90	
22.....	4.0	--	e 1.5	5.4	60	e .9	2.8	104	
23.....	57	228	sa 68	5.2	60		2.4	104	
24.....	141	243	93	5.0	46		2.4	--	
25.....	96	133	34	4.7	--		2.2	--	
26.....	65	108	a 19	5.0	--		2.0	--	
27.....	42	97	a 11	5.0	--	e .6	1.9	--	
28.....	31	--	e 5.9	4.4	46		1.9	104	
29.....	26	58	4.1	4.2	--		1.9	--	
30.....	23	111	6.9	4.0	--		1.8	--	
31.....	--	--	--	4.0	46		--	--	--
Total.	632.0	--	266.9	263.1	--	66.0	132.4	--	34.0

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

DES MOINES RIVER BASIN--Continued

EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	Mean discharge (cfs)	July		Mean discharge (cfs)	August		Mean discharge (cfs)	September	
		Suspended sediment			Suspended sediment			Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	2.2	150	0.9	1.7	94	sb 0.6			
2.....	1.7	112	.5	1.0	77	a .2			
3.....	1.6	82	.4	.9	--	e .1			
4.....	1.4			.7					
5.....	2.8			.6					
6.....	2.0	120	b 1.7	.6	--	e .1			
7.....	5.2			.4					
8.....	3.0			.4					
9.....	4.4	145	b 1.7	.4	69	.2			
10.....	211	380	sa 236	1.1					
11.....	139	160	60	.5	--	e .1			
12.....	74	87	17	.3					
13.....	38	--	e 10	.3			69		
14.....	24	--	e 5.6	.3	--	(t)			
15.....	17	--	e 4.5	.2					
16.....	12	119	3.9	.2					
17.....	8.0	--	e 2.0	.2	--	0			
18.....	6.8	--		.1					
19.....	5.7	134		.1					
20.....	5.0	--		.1	--	(t)			
21.....	4.2	122	0	--					
22.....	4.0	--	.1	--			0		
23.....	3.2	131	e 1.1	0	--	0			
24.....	2.6	--		0	--	0			
25.....	2.3	--		0	--	0			
26.....	2.0	--	e .6	0	--	0			
27.....	1.7	--		0	--	0			
28.....	1.6	143		0	--	0			
29.....	1.3	--		0	--	0			
30.....	1.1	--		0	--	0			
31.....	1.7	--		0	--	0			
Total.	590.5	--	361.2	10.2	--	2.2	0	0	
Total discharge for year (cfs-days).....									4,075.7
Total load for year (tons).....									1,262.8

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.

MARIAS RIVER BASIN

TETON RIVER NEAR DUTTON, MONT.

LOCATION.--At gaging station at Kerr Bridge, 1 mile downstream from Hunt Coulee and 10 miles northeast of Dutton, Teton County.
 RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1955.

Water temperatures: August 1954 to September 1955.

Sediment records: August 1954 to September 1955.

EXTREMES, August 1954 to September 1955.--Dissolved solids: Maximum, 5,190 ppm Sept. 7-8, 1954; minimum, 410 ppm Aug. 24 to Sept. 5, 1954.

Hardness: Maximum, 1,970 ppm Sept. 7-8, 1954; minimum, 254 ppm Mar. 28 to Apr. 8, 1955.

Specific conductance: Maximum daily, 6,090 micromhos Sept. 15, 1954; minimum daily, 617 micromhos Apr. 5, 1955.

Water temperatures: Maximum, 78 F July 15-16, 1955; minimum, freezing point on many days during December to April.

Sediment concentrations: Maximum daily, 5,410 ppm May 19, 1955; minimum daily, not determined.

Sediment loads: Maximum daily, 13,000 tons May 19, 1955; minimum daily, not determined.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo. Flow affected by ice Nov. 29 to Apr. 10. Records of discharge for August 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, August 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids				Hardness as CaCO ₃	Per cent ad- sorp- tion ratio	Specific conductance (micro-mhos at 25°C)	Car- bonate (CO ₃)				
													Parts per million		Tons per acre-foot	Tons per day								
													Residue at 180°C	Sum										
Aug. 24-Sept. 5, 1954 a.....	102	8.0	0.01	49	36	40	2.5	264	131	5.0	0.4	0.6	0.07	410	0.56	113	272	56	24	1.1	655	7.8	0	
Sept. 6 a.....	113	8.1	.01	100	188	130	4.7	284	1,010	11	--	8	22	1,710	1,590	2,33	522	1,020	787	22	1.8	2,040	8.0	0
Sept. 7-8 a.....	107	7.1	.02	110	412	815	8.3	284	3,230	53	8	9	54	4,780	4,780	7.06	1,500	1,970	1,740	47	8.0	5,520	7.7	0
Sept. 9-20 a.....	95.2	9.9	.00	100	290	558	6.5	294	2,270	37	6	3	45	3,880	3,420	5.28	997	1,440	1,200	46	6.4	4,120	7.8	0
Sept. 21-30 a.....	83.1	5.7	.00	72	101	164	3.3	288	685	14	5	5	15	1,260	1,190	1.71	283	586	360	37	2.9	1,660	8.2	0
Oct. 1, 1954.....	107	7.4	.02	67	63	89	2.6	276	350	8.0	--	6	08	754	1.03	218	424	191	31	1.9	1,090	8.3	4	
Oct. 2-15.....	103	6.5	.00	98	222	420	5.6	314	1,690	30	6	6	27	2,950	2,630	4.01	820	1,160	896	44	5.4	3,280	8.3	4
Oct. 16-17.....	96.5	6.2	.01	62	55	75	2.2	283	280	7.0	4	6	10	652	--	89	170	382	145	30	1.7	985	8.3	3
Oct. 18-20.....	93.3	4.7	.00	100	226	428	5.4	310	1,730	29	6	4	31	3,060	2,680	4.16	771	1,180	926	44	5.4	3,370	8.2	0
Oct. 21-22.....	100	4.5	.01	89	167	300	4.4	300	1,250	22	4	8	23	2,100	1,990	2.86	567	908	655	42	4.3	2,580	8.3	4
Oct. 23-Nov. 1.....	107	5.7	.00	81	106	180	3.4	312	735	15	5	1.0	14	1,400	1,280	1.90	404	638	382	38	3.1	1,750	8.1	0
Nov. 2-19.....	99.9	11	.00	71	75	115	2.9	305	455	9.5	5	1.1	11	939	--	128	253	486	236	2.3	1,290	8.2	0	
Nov. 20-27.....	99.1	8.2	.00	68	52	74	2.1	289	300	8.0	4	1.4	08	670	--	91	179	385	148	29	1.6	975	7.9	0
Nov. 28-30.....	88.0	10	.00	69	46	59	1.9	292	245	8.0	4	1.8	08	590	--	80	140	360	121	26	1.4	874	7.9	0
Dec. 1-7.....	80.0	10	.00	80	62	88	2.3	324	365	10	5	2.1	09	803	--	109	173	454	188	30	1.8	1,130	7.9	0
Dec. 8-Jan. 1, 1955.....	65.4	8.6	.00	72	42	50	1.8	312	205	6.5	4	2.7	07	544	--	74	96.1	352	96	23	1.2	823	7.9	0
Jan. 2-31.....	51.8	8.4	.00	67	47	41	1.7	326	173	5.0	4	2.9	06	520	--	71	72.7	339	92	20	0.9	800	8.2	0
Feb. 1-24.....	52.9	7.6	.00	68	44	43	2.1	320	170	5.0	4	3.1	06	507	--	69	72.4	350	88	21	1.0	783	8.1	0
Feb. 25-Mar. 9.....	46.9	10	.00	75	43	43	1.8	327	177	6.5	4	2.5	08	523	--	71	66.2	362	94	20	1.0	806	8.0	0
Mar. 10-19.....	47.5	12	.01	75	43	49	2.8	321	194	5.5	4	2.8	09	550	--	75	70.5	364	101	22	1.1	840	8.1	0

a. Not included in weighted average.

MARIAS RIVER BASIN--Continued

TETON RIVER NEAR DUTTON, MONT.--Continued

Chemical analyses, in parts per million, August 1954 to September 1955.--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)	Boiron (B)	Dissolved solids				Hardness as CaCO ₃	Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH	Carbonate (CO ₃)			
														Parts per million		Tons per acre-foot	Tons per day								
														Residue at 180°C	Sum										
Mar. 20-27, 1955	35.6	10	0.00	51	43	42	2.4	268	157	5.0	0.4	2.4	0.07	486	--	0.82	302	82	23	1.1	710	8.0	0		
Mar. 28-Apr. 8	120	8.8	.02	51	31	53	4.4	225	162	5.0	.4	2.0	.08	440	--	.60	254	69	31	1.4	682	7.9	0		
Apr. 9-14	284	13	.00	58	48	83	3.8	264	295	8.5	.4	2.8	.05	648	--	.88	497	342	126	34	2.0	961	7.9	0	
Apr. 15-29	178	9.1	.00	72	100	167	3.7	305	655	14	.5	1.4	.14	1,230	I, 180	1.67	591	592	33	3.0	1,660	8.2	5		
Apr. 30-May 3	160	8.5	.00	63	70	108	3.0	297	413	11	.4	.7	.12	837	--	1.14	446	202	34	2.2	1,190	8.2	0		
May 4-10	199	10	.00	70	78	126	3.5	368	435	12	.5	1.0	.11	921	--	1.25	495	192	35	2.5	1,320	8.2	0		
May 11-28	454	12	.00	65	60	97	3.2	313	343	9.5	.4	1.5	.12	752	--	1.02	422	408	154	2.1	1,110	8.0	0		
May 29-June 10	236	11	.06	70	76	117	3.0	285	478	12	.4	.7	.12	974	--	1.32	621	486	244	34	2.3	1,300	8.3	5	
June 11-24	215	10	.05	64	61	88	2.4	285	360	8.0	.4	.6	.10	763	--	1.04	443	411	177	3.2	1,080	8.2	0		
June 25-July 11	337	13	.04	53	46	58	2.6	294	199	4.0	.4	1.2	.10	532	--	.72	484	322	81	28	1.4	824	8.2	0	
July 12-13	722	14	.04	61	56	89	3.7	290	320	12	.6	1.7	.13	713	--	.97	390	382	144	33	2.0	1,050	8.1	0	
July 14-18	535	12	.04	68	87	159	3.3	296	575	13	.4	.9	.16	1,100	--	1.50	590	526	273	39	3.0	1,530	8.2	6	
July 19-30	409	13	.03	73	103	194	3.3	278	758	17	.4	.6	.16	1,350	--	1,900	606	378	41	3.4	1,810	8.2	0		
July 31-Aug. 4	254	11	.00	73	133	270	4.1	279	1,000	26	.4	2.8	.23	1,820	--	2,480	730	501	44	4.3	2,270	8.1	0		
Aug. 5-15	149	9.8	.01	88	195	435	5.4	290	1,640	40	.6	.9	.33	2,780	--	2,510	1,020	782	48	5.9	3,210	8.1	0		
Aug. 16-Sept. 6	92.8	10	.00	113	201	500	5.8	300	1,800	54	.6	.8	.37	3,130	--	2,830	426	784	49	6.5	3,550	8.1	0		
Sept. 7-16	79.5	12	.00	83	156	357	4.1	310	1,230	41	.6	.2	.33	2,250	--	2,040	306	483	54	5.3	2,760	8.2	0		
Sept. 17-20	61.0	8.1	.00	73	241	558	4.8	310	2,030	65	.6	.7	.40	3,370	--	3,140	458	555	1,180	913	51	3,770	8.2	8	
Sept. 21-25	69.8	10	.00	83	173	398	4.9	300	1,460	47	.6	.7	.32	2,490	--	2,330	339	469	920	859	48	5.7	2,960	8.3	9
Sept. 26-30	81.0	6.8	--	83	165	370	4.0	320	1,350	45	--	.3	.29	2,380	--	3.24	521	884	622	48	5.4	2,880	7.8	0	
Weighted average b	154	11	0.02	70	85	152	3.3	c 300	573	14	d 0.4	1.3	0.14	1,120	--	1.52	466	524	278	38	2.9	1,480	--	--	

b Represents 100 percent of runoff for water year October 1954 to September 1955.

c Includes carbonate as bicarbonate.

d Includes estimates where data are missing.

MARIAS RIVER BASIN--Continued

TETON RIVER NEAR DUTTON, MONT.--Continued

Temperature (°F) of water, August to September 1954
[Once-daily measurement between 7 a.m. and 10 a.m.]

Day	Aug.	Day	Sept.	Day	Sept.	Day	Sept.
22	--	1	58	11	58	21	49
23	--	2	58	12	60	22	52
24	63	3	60	13	59	23	54
25	a 62	4	55	14	55	24	58
26	--	5	58	15	a 55	25	54
27	58	6	58	16	a 53	26	53
28	a 72	7	58	17	a 49	27	--
29	--	8	59	18	--	28	a 46
30	--	9	55	19	51	29	40
31	66	10	57	20	50	30	40
Average.....							54

a Reading obtained between 11 a.m. and 4 p.m.

Temperature (°F) of water, water year October 1954 to September 1955
[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	42	a 40	a 35	--	a 32		36	52	a 60	a 63	a 7 ⁵	65
2	a 45	38	a 33	--			a 33	46	a 58	58	6 ⁵	--
3	a 40	36	a 34	--			33	42	a 57	59	6 ⁵	64
4	a 39	43	a 35	a 32			33	48	a 60	56	6 ⁵	61
5	39	a 47	33	a 32			32	47	--	a 60	6 ⁵	59
6	a 48	a 49	a 34	a 32			34	a 54	56	a 58	6 ⁵	57
7	a 55	a 42	a 32	a 32			36	53	55	a 63	6 ⁵	--
8	a 53	a 45	32	a 32			--	47	--	a 65	6 ⁵	58
9	a 49	39	a 33	a 32			37	49	--	a 63	6 ⁵	--
10	a 50	41	32	a 32			38	46	--	a 63	6 ⁵	57
11	a 47	a 40	a 33	a 32			a 42	50	--	a 63	--	58
12	a 48	45	a 32	32			35	a 58	a 62	a 68	6 ⁵	55
13	a 42	a 44	a 32	32			--	a 50	60	a 72	--	55
14	39	--	a 34	a 32			39	41	64	a 74	6 ⁵	53
15	a 48	--	32	32			36	36	64	78	6 ⁵	55
16	43	a 42	a 33	32			40	a 42	--	a 78	6 ⁵	--
17	a 54	40	33	32			44	a 50	a 70	75	6 ⁵	53
18	45	--	a 34	32			44	52	62	77	6 ⁵	--
19	50	a 45	32	32			40	a 57	--	73	6 ⁵	51
20	45	39	a 33	--			38	--	60	73	6 ⁵	49
21	a 52	40	a 32	--			a 44	a 56	63	70	6 ⁵	46
22	--	39	a 33	--			42	55	61	71	6 ⁵	46
23	a 43	a 40	a 33	--			a 48	--	a 75	72	6 ⁵	49
24	a 44	a 40	a 33	--			a 49	50	65	70	7 ⁵	48
25	--	45	a 32	--			43	59	64	a 74	72	--
26	35	a 42	a 33	--			--	--	a 70	64	6 ⁵	--
27	a 43	38	--	--			41	50	63	a 70	5 ⁵	--
28	a 40	a 39	--	--			--	48	64	64	6 ⁵	--
29	a 40	a 38	--	--			41	55	a 62	a 67	5 ⁵	50
30	a 42	33	--	--			44	a 56	58	a 70	5 ⁵	46
31	a 43	--	--	a 32			--	55	--	a 72	a 72	--
Average	45	41	33	--			39	50	--	68	6 ⁵	--

a Reading obtained between 1 p.m. and 8 p.m.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

MARIAS RIVER BASIN--Continued

TETON RIVER NEAR DUTTON, MONT.--Continued

Suspended sediment, August to September 1954

[illegible]

MARIAS RIVER BASIN--Continued

TETON RIVER NEAR DUTTON, MONT.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	107			106			80		
2.....	113			106			80		
3.....	110			101			80		
4.....	107			100			80		
5.....	107			100			80		
6.....	107			98			80		
7.....	107			98			80		
8.....	104			98			60		
9.....	102			98			60		
10.....	100			99			55		
11.....	96			100			55		
12.....	94			102			60		
13.....	96			103			65		
14.....	98			103			70		
15.....	96			102			70		
16.....	98	14	4	99	31	8	70	56	10
17.....	95			99			70		
18.....	94			96			70		
19.....	92			96			70		
20.....	94			98			70		
21.....	101			99			75		
22.....	99			98			75		
23.....	99			99			80		
24.....	102			99			80		
25.....	106			99			75		
26.....	109			99			70		
27.....	109			102			65		
28.....	109			94			60		
29.....	107			85			55		
30.....	109			85			55		
31.....	109			--		--	50		
Total.	3,176		124	2,961		240	2,145		310
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	50			65			45		
2.....	50			65			50		
3.....	45			70			50		
4.....	45			70			50		
5.....	45			65			45		
6.....	45			55			50		
7.....	50			55			50		
8.....	50			55			55		
9.....	50			55			55		
10.....	50			50			50		
11.....	55			45			50		
12.....	55			45			50		
13.....	55			50			50		
14.....	55			55			50		
15.....	55	25	4	55	25	3	45	37	4
16.....	55			50			45		
17.....	50			50			45		
18.....	50			50			45		
19.....	50			45			45		
20.....	50			45			35		
21.....	50			45			40		
22.....	50			45			40		
23.....	50			45			35		
24.....	50			40			30		
25.....	55			40			25		
26.....	55			40			30		
27.....	55			40			50		
28.....	55			40			85	--	e 10
29.....	55			--	--	--	105	--	e 20
30.....	60			--	--	--	115	170	53
31.....	60			--	--	--	115	325	101
Total.	1,605		124	1,430		84	1,630	--	292

e Estimated.

MARIAS RIVER BASIN--Continued

TETON RIVER NEAR DUTTON, MONT.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Suspended sediment, water year October 1964 to September 1965--Continued									
Day	Mean discharge (cfs)	April		Mean discharge (cfs)	May		Mean discharge (cfs)	June	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	120	530	172	140	100	38	237	190	122
2.....	120	900	232	146	80	32	217	175	103
3.....	120	710	230	204	211	a 140	209	165	93
4.....	120	360	117	311	890	747	200	140	76
5.....	120	470	152	250	506	342	204		
6.....	125	640	216	204	210	116	217		
7.....	130	1,430	502	181	165	81	234		
8.....	160	2,020	873	163	108	48	229		
9.....	260	2,530	1,780	150	98	40	234	177	105
10.....	345	1,640	1,530	135	110	40	224		
11.....	366	1,180	1,170	129	190	66	211		
12.....	284	1,080	828	124	70	23	200		
13.....	237	--	e 400	126	70	24	209	135	76
14.....	213	370	213	160	85	37	256	175	121
15.....	206	270	150	278	922	692	261	210	148
16.....	191	220	113	332	450	403	270	240	175
17.....	179	185	89	412	1,540	s 2,000	261	225	159
18.....	176	180	a 85	726	4,200	8,230	240	150	97
19.....	181	188	92	890	5,410	13,000	215	140	81
20.....	196	215	114	708	2,500	a 4,800	200	125	68
21.....	187	192	97	550	1,420	2,110	194	150	79
22.....	181	170	83	606	2,760	s 5,060	185	118	59
23.....	176	140	67	668	3,500	a 6,300	162	118	52
24.....	172	115	53	588	1,350	2,140	151	125	51
25.....	165	120	53	546	680	1,000	153	150	a 60
26.....	162	100	a 44	502	650	a 900	185	240	120
27.....	162	110	48	451	630	767	253	280	a 190
28.....	165	140	a 60	383	482	498	220	160	95
29.....	165	145	65	325	302	265	209	160	90
30.....	151	115	47	281	268	219	229	240	148
31.....	--	--	--	256	230	159	--	--	--
Total.	5,535	--	9,735	10,923	--	50,317	6,489	--	3,103

Total discharge for year (cfs-days)..... 56,132

Total load for year (tons)..... 102,587

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

MARIAS RIVER BASIN--Continued
TETON RIVER NEAR DUTTON, MONT.--Continued

Particle-size analyses of suspended sediment, April to August 1955
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; 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	0.006	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Apr. 1, 1955.....	10:30 a.m.	a 120	36	1,210	652	10	44		76		85	94		98	100	BWCM
Apr. 2.....	12:45 p.m.	a 120	33	1,360	733	17	58		89		94	98		100	--	BWCM
Apr. 7.....	6:30 p.m.	a 130	36	2,080	1,270	9	32		81		91	96		99	100	BWCM
Apr. 9.....	9:25 p.m.	a 260	41	1,760	1,300	28	64		88		93	98		100	--	BWCM
Apr. 12.....	1:30 p.m.	270	38	878	1,490	70	87		95		96	97		98	99	BWCM
May 4.....	10:50 a.m.	318	48	822	1,570	66	89		98		99	100		--	--	BWCM
May 18.....	11:45 a.m.	641	52	3,200	6,000	2	64		93		98	100		--	--	VPN
May 18.....	11:45 a.m.	641	52	3,200	6,000	51	74		93		98	100		--	--	VPWCM
May 19.....	4:15 p.m.	821	60	4,940	3,500	52	73		93		98	99		100	--	VPWCM
June 15.....	1:35 p.m.	264	71	201	888	68	88		98		99	100		--	--	BWCM
June 29.....	6:40 p.m.	211	62	184	496	63	88		98		100	--		--	--	BWCM
Aug. 2.....	11:10 a.m.	256	73	208	761	65	90		100		--	--		--	--	BWCM
Daily mean discharge.																

a Daily mean discharge.

MILK RIVER BASIN

WILLOW CREEK NEAR GLASGOW, MONT.

LOCATION.--At gaging station, about 6 miles south of Glasgow, Valley County, and about 8 miles upstream from mouth.

DRAINAGE AREA.--536 square miles.

RECORDS AVAILABLE.--Sediment records: October 1953 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 220,000 tons May 4; minimum daily, 0 tons on many days.

EXTREMES, 1953-55.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 390,000 tons Apr. 6, 1954; minimum daily, 0 tons on many days each year.

REMARKS.--Maximum observed sediment concentration during water year, 45,400 ppm Apr. 9.

Flow affected by ice Mar. 12-29. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1954 to September 1955

Month	Discharge (cfs-days)	Runoff (acre-feet)	Load (tons)	Suspended sediment				
				Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October.....	459.2	911	a 9,065	292	e 5,000	0	7,310	8,370
November.....	24.0	48	e 114	3.8	e 40	0	1,760	--
December.....	0	0	0	0	0	0	--	--
January.....	0	0	0	0	0	0	--	--
February.....	0	0	0	0	0	0	--	--
March.....	3,994	7,920	b 160,700	5,180	50,000	0	14,900	23,000
April.....	11,677.6	23,160	b 761,484	25,400	171,000	(t)	24,200	45,400
May.....	10,003.4	19,840	b 651,876	21,000	b 220,000	(t)	24,100	31,400
June.....	134.6	267	e 820	27.3	e 400	0	2,260	--
July.....	994.3	1,970	59,810	1,930	45,600	0	22,300	27,600
August.....	12.5	25	123	4.0	e 80	0	3,640	--
September.....	0	0	0	0	0	0	--	--
Water year.....	27,299.6	54,140	b1,643,992	4,500	b 220,000	0	22,300	45,400

e Estimated.

t Less than 0.50 ton.

a Monthly estimated.

b Partly estimated.

MILK RIVER BASIN--Continued

WILLOW CREEK NEAR GLASGOW, MONT.--Continued

Particle-size analyses of suspended sediment, March to May 1955

(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; 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. 30, 1955 . . .	10:05 a.m.	711	--	17,200	5,960		53		77		98	100			VFWCM
Apr. 8	4:40 p.m.	2,650	--	28,500	4,560		58		81		97	100			VFWCM
Apr. 9	8:15 a.m.	1,790	--	45,400	3,460		51		74		98	100			VFWCM
Apr. 13	9:25 a.m.	196	45	13,400	4,700		66		89		97	99	100		VFWCM
May 17	10:10 a.m.	2,950	--	18,000	3,020		70		85		97	100			VFWCM
May 17	12:15 p.m.	2,530	44	18,300	2,970		67		86		98	100			VFWCM
May 20	7:05 p.m.	180	66	7,140	5,100		74		96		99	100			VFWCM

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 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 472 ppm Dec. 30-31; minimum, 110 ppm June 15-27.

Hardness: Maximum, 259 ppm Dec. 30-31; minimum, 56 ppm June 15-27.

Specific conductance: Maximum daily, 142 microhmhos June 24.

Water temperatures: Maximum, 80°F July 24; minimum, freezing point on many days during December to April.

EXTREMES, 1950-55.--Dissolved solids: Maximum, 868 ppm Feb. 2, 1951; minimum, 96 ppm June 19, 1951.

Hardness: Maximum, 476 ppm Feb. 2, 1951; minimum, 52 ppm May 21-23, 1954.

Specific conductance: Maximum daily, 1,210 microhmhos Feb. 2, 1951; minimum daily, 129 microhmhos May 22, 1954.

Water temperatures: Maximum, 80°F July 24, 1955; 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 district office at Worland, Wyo. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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	Sulfate-to-sulfate ratio	Specific conductance (microhmhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1954.....	3,035	--	--	--	--	35	--	172	101	--	--	--	--	304	0.41	2,490	176	35	30	1.1	491	7.8	--
Nov. 1-30.....	3,091	--	--	--	--	34	--	170	95	--	--	--	--	298	.41	2,490	176	37	30	1.1	480	7.8	--
Dec. 1-29.....	2,604	18	0.00	47	16	35	3.4	177	104	9.0	0.5	1.8	0.25	322	.43	2,260	182	37	29	1.1	503	8.0	4
Dec. 30-31.....	1,750	--	--	--	--	53	--	224	178	--	--	--	--	472	.64	2,230	259	75	31	1.4	703	7.9	--
Jan. 1-29, 1955.....	2,074	--	--	--	--	35	--	182	115	--	--	--	--	338	.46	1,890	200	51	28	1.1	533	7.7	--
Jan. 24-Feb. 17.....	2,260	--	--	--	--	32	--	164	100	--	--	--	--	299	.41	1,820	174	40	29	1.1	481	7.7	--
Feb. 18.....	2,100	--	--	--	--	24	--	116	71	--	--	--	--	234	.32	1,330	128	33	29	.9	364	7.6	--
Feb. 19-28.....	1,805	15	.00	48	17	35	4.0	171	116	10	.6	2.2	.29	337	.46	1,640	191	51	28	1.1	529	7.8	3
Mar. 1-26.....	2,113	--	--	--	--	34	--	158	109	--	--	--	--	331	.45	1,890	178	48	29	1.1	499	7.9	--
Mar. 27.....	1,600	--	--	--	--	44	--	191	162	--	--	--	--	440	.60	1,900	238	81	29	1.2	638	7.9	--
Mar. 28-30.....	3,333	--	--	--	--	35	--	162	104	--	--	--	--	319	.43	2,870	174	41	30	1.2	494	7.8	--
Mar. 31-Apr. 6.....	3,611	--	--	--	--	27	--	137	75	--	--	--	--	247	.34	2,410	137	25	30	1.0	391	7.7	--
Apr. 7-30.....	4,138	--	--	--	--	36	--	166	104	--	--	--	--	313	.43	3,500	171	35	31	1.2	490	7.9	--
May 1-8.....	3,835	--	--	--	--	31	--	158	86	--	--	--	--	287	.39	2,970	155	25	30	1.1	442	8.0	--
May 9-16.....	5,978	--	--	--	--	20	--	116	52	--	--	--	--	204	.28	3,290	110	15	28	.8	308	7.8	--
May 17-22.....	8,743	--	--	--	--	15	--	105	42	--	--	--	--	170	.23	4,010	98	12	25	.7	285	7.8	--
May 23-26.....	13,850	--	--	--	--	12	--	83	32	--	--	--	--	136	.18	5,090	76	8	25	.6	204	7.8	--
May 27-June 9.....	11,680	--	--	--	--	16	--	98	40	--	--	--	--	165	.22	5,200	88	8	28	.7	248	7.6	--
June 10-13.....	19,080	--	--	--	--	9.7	--	77	21	--	--	--	--	117	.16	6,030	67	4	24	.5	178	7.7	--
June 14.....	23,100	--	--	--	--	12	--	119	32	--	--	--	--	176	.24	10,980	104	6	20	.5	257	7.7	--

June 15-27.....	26,230	16	.04	15	4.5	8.5	1.3	69	15	2.0	.1	1.1	.06	110	.15	7,790	56	0	24	.5	158	7.4	12
June 28-July 3....	16,330	--	--	--	--	11	--	82	23	--	--	--	--	123	.17	5,430	70	3	26	.6	193	7.7	--
July 4.....	11,700	--	--	--	--	14	--	86	30	14	--	--	--	157	.21	4,960	92	21	25	.6	237	7.5	--
July 5-22.....	10,370	--	--	--	--	15	--	90	32	--	--	--	--	145	.20	4,060	76	4	29	.7	227	7.8	--
July 23-29.....	9,220	--	--	--	--	17	--	104	39	--	--	--	--	171	.23	4,260	92	7	29	.8	268	7.7	--
July 30-Aug. 9....	5,660	--	--	--	--	23	--	126	59	--	--	--	--	204	.28	3,120	115	12	30	.9	326	7.8	--
Aug. 10-31.....	3,518	--	--	--	--	30	--	144	80	--	--	--	--	245	.33	2,330	138	26	32	1.1	399	7.8	--
Sept. 1-30.....	2,685	17	.01	40	17	37	4.2	171	102	8.0	.4	1.1	.24	311	.42	2,260	170	36	31	1.2	482	8.0	7
Weighted aver- ages.....	5,351	--	--	--	--	21	--	119	57	--	--	--	--	206	0.28	2,980	114	16	29	0.9	320	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (Once-daily measurement between 3 p.m. and 5 p.m.)

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

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.

LOCATION (revised).--At gaging station, at bridge on State Highway 320, 1.1 miles south-east of Riverton, Fremont County, and 1½ miles upstream from Popo Agie River.

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, August 1954 to September 1955.

Sediment records: October 1948 to December 1953, August 1954 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 72°F July 17; minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 8,500 ppm July 23; minimum daily, not determined.

Sediment loads: Maximum daily, 24,400 tons July 25; minimum daily, less than 0.50 ton May 18, 30.

EXTREMES, 1947-55.--Water temperatures: Maximum (1947-48, 1953, 1954-55), 73°F Aug. 31, 1948; minimum (1947-49, 1954-55), freezing point on many days during winter months.

Sediment concentrations (1948-55): Maximum daily, 8,500 ppm July 23, 1955; minimum daily, not determined.

Sediment loads (1948-55): Maximum daily, 36,800 tons June 14, 1953; minimum daily, less than 0.50 ton May 18, 30, 1955.

REMARKS.--Flow affected by ice Dec. 28 to Mar. 16. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 12 m. and 6 p.m. October to March and between 7 a.m. and 10 a.m. April to September/

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

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

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	435			393			300		
2.....	459			335			280		
3.....	443			365			290		
4.....	428			372			353		
5.....	428	22	25	379			385		
6.....	372			393			372		
7.....	359			400			372		
8.....	365			400			393		
9.....	379			393			311		
10.....	491	80	sa 200	393			300		
11.....	890			407			329		
12.....	870			435			323		
13.....	870			428			300		
14.....	861			435			300		
15.....	804	190	426	435			305	54	47
16.....	785			435	34	39	323		
17.....	804			467			300		
18.....	738			467			305		
19.....	609			459			335		
20.....	592			451			323		
21.....	592	60	101	443			311		
22.....	672			443			317		
23.....	645			451			305		
24.....	636			443			305		
25.....	421			451			329		
26.....	295			443			305		
27.....	329			443			300		
28.....	359	26	26	428			310		
29.....	372			393			340		
30.....	400			372			340		
31.....	407			--		--	340		
Total.	17,110	--	4,621	12,552		1,170	9,981	--	1,361
	January			February			March		
1.....	340			440	--		190		
2.....	340			380	--		190		
3.....	340			380	--		180		
4.....	340			380	19		180		
5.....	340			380	--		170		
6.....	340			380	--		160		
7.....	340	e 22		380	--		160		
8.....	340			320	51		160	35	15
9.....	340			310	--	e 50	160		
10.....	340			310	128		150		
11.....	340			310	--		150		
12.....	340			280	--		150		
13.....	430			290	--		150		
14.....	440			300	46		140		
15.....	440			310	--		140	80	30
16.....	440			310	--		130	24	8
17.....	440			280	--		122	21	7
18.....	430			240	--		92		
19.....	410			210	--		92		
20.....	420	30		190	--		77		
21.....	420		e 36	170	14		86	33	8
22.....	430			180	--		98		
23.....	450			190	24	e 10	92		
24.....	460			190	--		153		
25.....	450			190	11		138		
26.....	440			200	--		162		
27.....	440			200	--		156		
28.....	440			200	12		153	63	24
29.....	440			--	--		153		
30.....	440			--	--		118		
31.....	440			--	--		105		
Total.	12,380		948	7,900	--	960	4,357	--	495

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

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.....	112	--	e 26	386	48	50	253	70	48
2.....	125	--	e 28	386	34	35	128	40	14
3.....	235	61	38	302	36	29	48	38	5
4.....	231			173	28	13	44		
5.....	223			117	96	30	49		
6.....	353	180	sb 200	89	24	6	52	277	s 448
7.....	393	195	207	407	240	b 260	55		
8.....	372	120	121	558	280	sb 480	316		
9.....	212	43	25	694	433	811	799	508	s 1,180
10.....	215	31	22	161	75	s 48	817	344	s 822
11.....	219			110	91	s 39	754	228	464
12.....	347			165	80	sb 40	853	306	s 778
13.....	329			190	140	sb 120	1,160	1,300	s 5,050
14.....	251			71	--	e 24	1,270	1,380	s 5,250
15.....	251			95	--	e 34	1,190	830	s 2,810
16.....	243	12	4	190	90	sb 60	1,410	2,720	s 15,200
17.....	235			62	25	4	1,930	1,670	8,700
18.....	231			10	16	(t)	1,420	1,200	4,600
19.....	156			20	34	sb 3	1,160	731	s 2,490
20.....	138			365	200	sb 320	1,240	669	s 2,510
21.....	102	40	23	580	472	s 989	1,450	858	s 3,640
22.....	150			636	476	s 874	1,370	860	sb 3,300
23.....	96			550	224	s 374	1,350	1,020	s 4,270
24.....	135			157	72	s 46	1,370	1,100	4,070
25.....	128			114	40	12	1,430	1,050	s 4,480
26.....	171	97	101	83	14	3	1,200	687	2,230
27.....	210			42	20	2	898	516	s 1,320
28.....	386			37	16	2	677	300	sb 600
29.....	386			22	9	1	484	280	sb 380
30.....	386			22	6	(t)	220	104	62
31.....	--	--	--	101	31	s 12	--	--	--
Total.	6,971	--	1,237	6,895	--	4,702	25,397	--	74,741
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	43	19	2	39	24	3	26	35	3
2.....	50			58			24		
3.....	29			30			30		
4.....	50	--	e 18	26	29	6	33	18	3
5.....	200			29			35		
6.....	120			50			33		
7.....	43	24	8	86	29	6	28	40	17
8.....	54			89			29		
9.....	28			69			50		
10.....	27	12	1	80	32	8	55	9	1
11.....	29			104			69		
12.....	62			95			56		
13.....	32			73			35		
14.....	28			98			44		
15.....	23			131			43		
16.....	22	600	sb 150	73	25	2	32	50	37
17.....	28			50			35		
18.....	32			36			48		
19.....	24			31			80		
20.....	20			18			138		
21.....	18	8,500	sb 24,000	19	25	2	161	40	17
22.....	28			23			161		
23.....	819			23			200		
24.....	907			20			225		
25.....	1,150			35			302		
26.....	1,110	1,600	4,800	42	--	--	337	--	--
27.....	944	715	1,820	42			259		
28.....	505	302	413	48			316		
29.....	185	339	s 184	50			283		
30.....	76	371	76	35			283		
31.....	55	40	6	24			--		
Total.	6,741	--	70,898	1,626	--	120	3,450	--	395
Total discharge for year (cfs-days).....									115,360
Total load for year (tons).....									161,648

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

b Computed from partly estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

WIND RIVER AT RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, October 1953 to July 1955.
 (Methods of analysis: B, bottom withdrawal tube; P, pipette; S, sediment; W, 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
Oct. 7, 1953.....	9:15 a.m.	880	--	143	1,920	48			75		90	--	--		--	--	SPWCM
Oct. 12, 1954....	11:10 a.m.	870	57	222	1,660	38			60		65	69	81		97	100	VPWCM
June 9, 1955.....	11:10 p.m.	1,110	58	662	5,680	23			43		66	80	95		100	--	VPWCM
June 15.....	2:50 p.m.	992	64	401	1,150	28			44		64	70	89		96	99	BWCM
June 24.....	1:40 p.m.	1,190	70	510	1,320	14			33		51	63	85		96	100	BWCM
July 27.....	9:40 a.m.	1,000	68	724	3,800	14			44		78	82	94		100	--	VPN
July 27.....	9:40 a.m.	1,000	68	724	3,620	19			47		78	82	94		100	--	VPWCM

YELLOWSTONE RIVER BASIN--Continued

MUSKRAT CREEK NEAR SHOSHONI, WYO.

LOCATION(revised).--At gaging station, 2 miles upstream from mouth and 7 miles southwest of Shoshoni, Fremont County.

DRAINAGE AREA.--760 square miles, approximately

RECORDS AVAILABLE.--Sediment records; June 1950 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 46,000 ppm July 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 34,000 tons July 24; minimum daily, 0 tons on many days.

EXTREMES, 1950-55.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.

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

REMARKS.--Maximum observed sediment concentration during water year, 162,000 ppm July 23.

Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1954 to September 1955

Month	Discharge (cfs-days)	Runoff (acre-feet)	Load (tons)	Suspended sediment				
				Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October.....	0	0	0	0	0	0	--	--
November.....	0	0	0	0	0	0	--	--
December.....	0	0	0	0	0	0	--	--
January.....	0	0	0	0	0	0	--	--
February.....	0	0	0	0	0	0	--	--
March.....	0	0	0	0	0	0	--	--
April.....	53.8	107	a 4,016	134	e 1,200	0	27,600	44,800
May.....	0	0	0	0	0	0	--	--
June.....	44	87	a 8,300	277	b 5,700	0	67,400	66,300
July.....	230.3	457	b 53,750	1,730	b 34,000	0	83,400	162,000
August.....	0	0	0	0	0	0	--	--
September.....	0	0	0	0	0	0	--	--
Water year 1954-55..	328.1	651	b 66,066	181	b 34,000	0	71,900	162,000

e Estimated.

a Mostly estimated.

b Partly estimated.

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

Particle-size analyses of suspended sediment, April to July 1955

(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; 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
Apr. 14, 1955.....	2:50 p.m.	9.1	59	37,700	8,360		82		99		100					VPWCM
Apr. 18.....	4:00 p.m.	e 3.0	57	33,000	6,760		96		100		--					PWCM
July 23.....	2:05 a.m.	585	65	55,000	3,010		47		72		91	98	100			VPWCM
July 23.....	3:10 p.m.	16	85	44,600	3,320		81		95		100					VPWCM
July 24.....	5:35 a.m.	e 5.0	--	28,900	5,330		76		98		100					VPWCM

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.

LOCATION.--At gaging station, 1,400 feet upstream from Wyoming Canal siphon and 4 miles north of Pavillion, Fremont County.

DRAINAGE AREA.--143 square miles.

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

Water temperatures: October 1950 to September 1951.

Sediment records: October 1949 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 19,000 ppm May 25; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 380 tons May 25; minimum daily, 0 tons on many days.

EXTREMES, 1949-55.--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 Feb. 15 to Apr. 14. No flow during period October to December; record is omitted. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Suspended sediment, January to September 1955

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.....				0	--	0	0	--	0
2.....				0	--	0	.8	771	s 12
3.....				0	--	0	1.3	1,070	s 19
4.....				0	--	0	.8	217	s 4
5.....				0	--	0	0	--	0
6.....				0	--	0	0	--	0
7.....				0	--	0	0	--	0
8.....				0	--	0	.3	433	s 2
9.....				0	--	0	.3	--	e 1
10.....				0	--	0	1.8	3,600	sa 50
11.....				0	--	0	2.9	5,000	sa 90
12.....				0	--	0	3.6	7,030	s 163
13.....				0	--	0	.2	2,050	s 6
14.....				0	--	0	.1	--	e 2
15.....				.2	--	e 2	0	--	0
16.....				.5	838	s 6	0	--	0
17.....				.5	1,620	s 8	.7	--	e 15
18.....				0	--	0	1.1	2,790	s 32
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.....				--	--	--	5.6	--	e 70
30.....				--	--	--	6.9	--	e 100
31.....				--	--	--	5.8	3,840	s 80
Total.	0		0	1.2	--	16	32.2	--	646

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

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

Suspended sediment, January to September 1955--Continued

Suspended sediment, January to September 1955--Continued									
Day	Mean discharge (cfs)	April		Mean discharge (cfs)	May		Mean discharge (cfs)	June	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	7.9	5,600	sa 160	0	--	0	0	--	0
2.....	6.0	6,900	sa 180	0	--	0	1.6	3,200	s 18
3.....	1.8	--	e 40	0	--	0	1.1	2,200	sa 8
4.....	.8	--	e 15	0	--	0	0	--	0
5.....	2.0	2,190	s 22	0	--	0	0	--	0
6.....	.5	--	e 10	0	--	0	0	--	0
7.....	2.2	7,050	s 99	0	--	0	0	--	0
8.....	1.6	4,840	s 44	0	--	0	0	--	0
9.....	1.0	4,700	sa 18	0	--	0	0	--	0
10.....	.6	--	e 10	0	--	0	0	--	0
11.....	.6	--	e 10	0	--	0	0	--	0
12.....	.7	3,360	s 13	0	--	0	0	--	0
13.....	.7	--	e 15	0	--	0	0	--	0
14.....	.7	--	e 15	0	--	0	0	--	0
15.....	1.9	3,200	sa 17	0	--	0	0	--	0
16.....	1.6	5,020	s 37	0	--	0	0	--	0
17.....	1.5	--	e 20	0	--	0	0	--	0
18.....	1.5	3,480	s 20	0	--	0	0	--	0
19.....	.7	3,160	s 9	0	--	0	0	--	0
20.....	.2	1,510	s 4	0	--	0	0	--	0
21.....	.4	1,290	s 4	0	--	0	0	--	0
22.....	.9	--	e 6	0	--	0	0	--	0
23.....	.2	1,400	sa 2	0	--	0	0	--	0
24.....	0	--	0	.4	--	e 5	0	--	0
25.....	0	--	0	5.5	19,000	sa 380	0	--	0
26.....	0	--	0	3.5	8,800	83	0	--	0
27.....	0	--	0	1.6	4,110	s 27	0	--	0
28.....	0	--	0	.8	1,530	s 5	0	--	0
29.....	0	--	0	0	--	0	0	--	0
30.....	0	--	0	0	--	0	0	--	0
31.....	--	--	--	0	--	0	--	--	--
Total.	36.0	--	770	11.8	--	500	2.7	--	26
</									

Total discharge for year (cfs-days)..... 91.8

Total load for year (tons)..... 2,436

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

b Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, February to July 1955
(Methods of analysis: 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
Feb. 16, 1955.....	4:55 p.m.	3.7	32	7,330	3,990		29		--		97	99	100		--	--	VPN
Feb. 16.....	4:55 p.m.	3.7	32	7,330	3,570		52		88		97	99	100		--	--	VPN
Feb. 16.....	1:00 p.m.	8.0	40	40,100	2,600		14		26		44	53	64		80	98	VPN
Apr. 18.....	9:35 a.m.	1.7	46	3,430	3,640		11		70		80	90	97		100	--	VPN
Apr. 18.....	9:35 a.m.	1.7	46	3,430	3,950		51		72		80	90	97		100	--	VPN
May 26.....	8:55 a.m.	3.5	55	8,500	2,600		38		57		79	88	95		99	100	VPN
July 23.....	8:10 a.m.	4.1	--	16,400	5,230		61		87		93	96	98		100	--	VPN

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 1955.

Sediment records: October 1949 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 70°F Aug. 2; minimum, freezing point on many days during December to April.

Sediment concentrations: Maximum daily, 23,700 ppm July 24; minimum daily, not determined.

Sediment loads: Maximum daily, 31,400 tons July 24; minimum daily, not determined.

EXTREMES, 1949-55.--Water temperatures (1950-51, 1952-55): 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, not determined.

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. 10 to Feb. 1, Feb. 5-7, 10-14, 19-24, Mar. 1, 4. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955

(Once-daily measurement between 7 a.m. and 10 a.m.)

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

YELLOWSTONE RIVER BASIN

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YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	96	4,800	1,240	54	2,200	321	29	1,200	s 110
2.....	94	5,000	1,270	54	2,300	335	30	1,200	s 107
3.....	95	5,200	1,330	53	2,300	329	36	720	s 79
4.....	96	5,600	1,450	53	2,200	315	34	700	64
5.....	91	4,800	1,180	51	2,000	275	32	750	65
6.....	112	5,200	1,570	51	1,800	248	29	1,100	s 91
7.....	121	4,700	1,540	51	1,800	248	30	900	s 86
8.....	115	4,800	1,490	50	1,800	243	31	700	59
9.....	121	4,900	1,600	49	1,700	225	28	740	s 64
10.....	132	5,100	1,820	49	1,700	225	28	790	60
11.....	109	4,600	1,350	47	1,700	216	31	760	64
12.....	61	3,400	560	48	1,700	220	28	810	61
13.....	48	3,000	389	46	1,500	186	28	710	54
14.....	53	2,600	372	47	1,600	203	30	800	65
15.....	68	3,000	551	47	1,700	216	35	1,000	94
16.....	68	3,100	569	47	1,800	228	45	1,200	146
17.....	67	2,400	434	45	1,800	219	45	1,100	134
18.....	67	2,400	434	40	1,600	173	45	950	115
19.....	66	2,300	410	40	1,300	140	40	1,000	108
20.....	65	2,500	439	40	1,300	140	35	--	e 95
21.....	65	2,300	404	39	1,400	147	35	960	91
22.....	64	2,300	397	39	1,300	137	40	1,300	140
23.....	61	2,300	379	40	1,300	140	40	1,400	151
24.....	58	2,100	329	39	1,200	126	40	1,100	119
25.....	65	2,700	474	39	1,100	116	35	810	77
26.....	63	2,500	425	40	1,900	205	32	590	51
27.....	61	2,200	362	37	2,200	220	30	490	40
28.....	57	2,300	354	33	1,800	160	30	380	31
29.....	56	2,200	333	32	1,400	s 130	30	380	31
30.....	55	2,300	342	35	1,300	s 130	30	210	17
31.....	54	2,200	321	--	--	--	35	210	20
Total.	2,404	--	24,118	1,335	--	6,216	1,046	--	2,489
Day	January			February			March		
	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.....	40			42	2,000	227	52	2,000	281
2.....	40			43	2,600	302	52	2,700	379
3.....	40	260	28	44	2,000	238	51	2,400	330
4.....	40			45	2,100	255	60	2,200	297
5.....	38			44	2,100	249	47	1,900	241
6.....	35	1,000	94	43	2,900	337	50	1,800	243
7.....	30	940	76	41	1,600	177	48	1,400	181
8.....	28	760	57	41	1,500	166	50	2,000	270
9.....	25	--	e 50	34	1,600	147	52	2,700	s 404
10.....	25			36	1,600	156	53	4,300	s 675
11.....	26			36	1,400	136	53	3,800	s 632
12.....	28			36	1,400	136	58	4,000	s 756
13.....	28			36	1,600	156	65	4,500	790
14.....	28			36	1,400	136	55	4,800	s 821
15.....	28			36	1,400	136	47	3,000	381
16.....	27	140	10	36	1,300	126	49	3,400	s 512
17.....	25			35	1,100	104	47	3,700	s 528
18.....	23			32	1,400	121	48	4,600	s 699
19.....	25			32	850	73	41	2,900	321
20.....	30			35	500	47	40	2,000	216
21.....	30			35	1,400	132	41	1,800	199
22.....	35			38	1,500	154	46	4,100	s 583
23.....	35	170	17	45	1,500	182	41	3,500	s 408
24.....	38			54	1,500	219	40	2,200	238
25.....	40	350	38	55	1,600	238	37	2,000	200
26.....	40	450	49	55	2,000	297	40	2,000	216
27.....	40	800	86	54	1,900	277	41	2,100	232
28.....	40	1,300	140	54	2,200	321	42	2,300	261
29.....	40	1,900	205	--	--	--	49	4,400	s 669
30.....	40	1,500	162	--	--	--	51	4,000	s 712
31.....	40	2,200	238	--	--	--	50	6,900	s 949
Total.	1,027	--	1,506	1,153	--	5,245	1,486	--	13,624

e Estimated.

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	54	6,500	s 1,090	83	6,500	1,460	129	5,900	2,050
2.....	56	6,500	s 1,090	78	5,000	1,050	140	6,700	2,530
3.....	47	3,800	482	83	5,200	1,170	129	5,800	2,020
4.....	31	3,100	259	72	3,600	700	128	5,800	2,000
5.....	38	3,600	s 401	73	3,700	729	138	6,300	2,350
6.....	46	5,000	621	69	3,800	708	151	6,900	2,810
7.....	45	5,600	s 742	74	4,100	819	141	6,200	2,360
8.....	45	7,100	s 1,040	79	4,900	1,050	121	5,300	1,730
9.....	49	8,200	s 1,240	85	5,000	1,150	121	5,500	1,800
10.....	49	6,000	s 914	91	5,100	1,250	111	5,400	1,620
11.....	48	5,200	674	95	7,000	1,800	116	5,600	1,750
12.....	45	4,200	510	99	7,500	2,000	128	6,000	2,070
13.....	43	3,900	453	94	7,900	2,010	128	6,200	2,140
14.....	44	4,000	475	87	6,500	1,530	116	6,300	1,970
15.....	42	3,800	431	90	7,000	1,700	108	5,800	1,690
16.....	40	3,400	367	94	7,200	1,830	172	11,000	5,110
17.....	43	3,000	348	92	7,100	1,770	166	9,200	4,120
18.....	45	3,400	413	96	7,700	2,000	156	9,000	3,790
19.....	48	3,800	492	90	6,800	1,650	156	8,200	3,450
20.....	40	2,400	259	110	8,400	2,490	141	7,300	2,780
21.....	38	2,600	267	110	8,500	2,520	147	6,600	2,620
22.....	83	17,600	s 4,550	105	7,500	2,130	133	6,600	2,370
23.....	49	6,500	s 953	106	6,800	1,950	140	5,900	2,230
24.....	45	3,800	462	123	8,100	2,690	139	6,000	2,250
25.....	46	3,900	484	184	13,200	6,560	159	5,700	2,450
26.....	53	6,300	902	162	11,200	4,900	179	6,800	3,290
27.....	61	4,300	708	166	10,700	4,800	198	8,200	4,380
28.....	53	3,400	487	148	8,300	3,320	197	8,100	4,310
29.....	48	3,100	402	115	6,700	2,080	187	7,300	3,690
30.....	67	6,000	1,090	109	6,900	2,030	170	6,700	3,080
31.....	--	--	--	115	7,300	2,270	--	--	--
Total.	1,441	--	22,606	3,177	--	64,116	4,345	--	80,810
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.....	176	7,300	3,470	206	9,600	5,340	134	5,500	1,990
2.....	154	6,300	2,620	164	7,600	3,370	121	5,200	1,700
3.....	144	5,800	2,260	146	6,900	2,720	117	5,200	1,640
4.....	145	5,700	2,230	129	5,800	2,020	127	5,600	1,920
5.....	146	5,600	2,210	140	6,700	2,530	121	5,500	1,800
6.....	147	5,800	2,300	157	7,200	3,050	121	5,200	1,700
7.....	133	5,700	2,050	166	7,300	3,270	128	5,400	1,870
8.....	133	6,100	2,190	158	7,700	3,280	130	5,200	1,830
9.....	138	6,400	2,380	148	7,600	3,040	120	4,700	1,520
10.....	162	7,300	3,190	146	7,500	2,960	127	4,900	1,680
11.....	163	6,800	2,990	145	6,900	2,700	130	6,100	2,140
12.....	159	6,400	2,750	133	6,600	2,370	130	5,200	1,830
13.....	148	5,800	2,320	129	6,300	2,190	128	4,900	1,690
14.....	147	5,700	2,260	135	5,900	2,150	133	4,700	1,690
15.....	138	5,600	2,090	139	6,100	2,290	124	4,100	1,370
16.....	150	5,800	2,350	147	6,000	2,380	114	3,700	1,140
17.....	156	5,300	2,230	152	6,300	2,590	118	4,000	1,270
18.....	148	5,400	2,160	147	5,300	2,100	122	3,500	1,150
19.....	144	5,400	2,100	156	5,300	2,230	136	4,500	1,650
20.....	152	5,900	2,420	168	6,500	2,950	135	5,300	1,930
21.....	168	6,400	2,900	168	6,200	2,810	130	4,500	1,580
22.....	205	9,700	s 6,270	168	6,500	2,950	129	4,200	1,460
23.....	275	12,600	s 12,900	154	5,200	2,160	127	4,200	1,440
24.....	431	23,700	s 31,400	156	5,500	2,320	138	4,100	1,530
25.....	268	17,700	12,800	150	5,500	2,230	166	5,100	2,290
26.....	270	15,000	10,900	150	5,500	2,230	150	5,500	2,230
27.....	251	13,100	8,880	140	5,800	2,190	136	4,800	1,760
28.....	251	11,200	7,590	151	5,700	2,320	140	5,000	1,890
29.....	229	9,800	6,060	151	5,700	2,320	138	4,300	1,600
30.....	193	9,000	4,690	151	5,600	2,280	136	4,600	1,690
31.....	179	8,900	4,300	139	5,700	2,140	--	--	--
Total.	5,703	--	157,260	4,689	--	81,480	3,906	--	50,980
Total discharge for year (cfs-days).....									31,712
Total load for year (tons).....									510,450

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Particle-size analyses of suspended sediment, water year October 1954 to September 1955

(Methods of analysis: 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
Oct. 15, 1954.....	12:10 p.m.	69	51	2,810	2,480		14		20		33	51	77	85	92	99	VPWCM
Oct. 28.....	3:00 p.m.	57	44	2,570	1,850		15		18		27	36	63	75	90	93	VPWCM
Nov. 12.....	2:25 p.m.	49	45	1,780	1,800		22		32		44	54	73	87	95	100	VPWCM
Nov. 23.....	2:30 p.m.	40	45	1,120	1,400		31		44		53	64	83	91	95	100	VPWCM
Mar. 16, 1955.....	3:40 p.m.	54	43	4,010	4,340		3		44		79	92	97	99	99	100	VPN
Mar. 16.....	3:40 p.m.	54	43	4,010	4,210		30		46		79	92	97	99	99	100	VPWCM
Apr. 7.....	10:40 a.m.	40	39	3,400	1,940		45		62		90	93	96	97	98	100	VPWCM
Apr. 21.....	3:00 p.m.	39	59	2,640	3,060		35		52		75	90	97	99	99	100	VPWCM
Apr. 22.....	2:00 p.m.	96	52	25,700	8,160		39		64		90	96	98	99	100	100	VPWCM
Apr. 25.....	3:15 p.m.	48	62	3,120	2,200		6		43		69	86	95	99	99	100	VPN
Apr. 29.....	3:15 p.m.	48	62	3,120	2,270		24		44		69	86	95	99	100	--	VPWCM
May 20.....	11:50 a.m.	123	64	8,600	6,150		31		45		74	89	97	98	100	--	VPWCM
May 24.....	2:20 p.m.	123	61	8,330	5,230		28		43		72	89	96	98	99	100	VPWCM
June 3.....	10:50 a.m.	142	57	6,280	2,870		2		30		54	73	92	96	98	100	VPN
June 3.....	10:50 a.m.	142	57	6,280	2,890		30		31		54	73	92	96	98	100	VPWCM
June 16.....	2:40 p.m.	171	72	8,410	3,900		25		38		61	77	91	96	99	100	VPWCM
June 30.....	4:45 a.m.	179	61	6,440	2,590		20		28		62	71	89	96	97	100	VPWCM
July 8.....	2:10 p.m.	144	74	6,310	3,540		26		38		63	79	94	98	99	100	VPWCM
July 22.....	10:00 p.m.	356	69	25,200	3,550		41		68		88	95	98	99	100	--	VPWCM
July 24.....	12:10 a.m.	1,440	65	39,500	2,910		39		64		94	99	100	100	--	--	VPWCM
July 24.....	2:55 a.m.	910	65	30,400	2,430		38		58		88	98	99	100	--	--	VPWCM
July 27.....	4:05 p.m.	247	81	13,200	2,870		28		44		72	87	96	98	100	--	VPWCM
Aug. 4.....	11:25 a.m.	129	70	5,320	2,190		23		30		50	70	96	100	--	--	VPWCM
Aug. 28.....	12:00 m.	154	67	5,640	2,220		17		26		41	56	79	88	94	99	VPWCM
Sept. 21.....	3:15 p.m.	126	64	4,350	3,060		18		25		39	55	76	84	90	95	VPWCM

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.

LOCATION (revised).--At gaging station, 1½ miles 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 1955.

Sediment records: August 1948 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 70°F June 23; minimum, freezing point on many days during November to April.

Sediment concentrations: Maximum daily, 36,700 ppm July 24; minimum daily, not determined.

Sediment loads: Maximum daily, 93,500 tons July 24; minimum daily, not determined.

EXTREMES, 1948-55.--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.--Flow affected by ice Dec. 9 to Mar. 11, Mar. 21-28. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955

(Once-daily measurement between 8 a.m. and 10 a.m.)

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

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

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	187	4,200	1,890	79	1,500	320	41	1,160	s 139
2.....	158	3,800	1,620	79	1,340	286	44	1,280	s 160
3.....	153	4,200	1,740	77	1,500	312	44	1,490	s 217
4.....	155	3,600	1,510	75	1,420	288	44	1,360	162
5.....	153	3,750	1,550	73	1,510	298	44	1,180	140
6.....	187	4,200	1,890	73	1,360	288	43	1,230	143
7.....	190	4,700	2,410	71	1,350	259	41	1,220	s 159
8.....	187	4,150	2,100	71	1,320	253	44	1,150	137
9.....	206	4,500	2,500	69	1,320	246	45	750	91
10.....	221	4,700	2,800	69	1,350	252	50	1,070	144
11.....	184	4,200	2,090	69	1,320	246	50	1,200	162
12.....	114	3,000	923	69	1,300	242	50	680	92
13.....	75	1,980	401	67	1,200	217	50	670	90
14.....	71	1,620	311	67	1,290	233	50	980	128
15.....	94	2,400	609	65	1,410	247	50	1,080	146
16.....	84	2,500	635	65	1,320	232	55	1,450	215
17.....	84	2,550	647	63	1,300	221	60	1,250	202
18.....	91	2,120	521	58	1,240	194	60	1,650	267
19.....	91	1,940	477	58	1,050	164	60	1,950	316
20.....	86	2,160	502	58	1,050	164	60	2,550	413
21.....	86	2,240	520	56	900	136	50	800	108
22.....	84	2,250	510	56	1,030	156	55	850	126
23.....	84	1,950	442	56	1,000	151	60	800	130
24.....	84	1,740	395	53	860	123	60	450	73
25.....	88	2,240	532	53	990	142	60	520	84
26.....	86	1,880	437	55	1,340	199	55	650	97
27.....	86	1,600	372	51	1,200	165	50	125	17
28.....	84	1,650	374	47	950	121	45	--	e 16
29.....	64	1,580	358	45	980	119	45	133	16
30.....	81	1,640	359	45	1,160	s 154	45	839	102
31.....	79	1,580	337	--	--	--	45	--	e 100
Total.	3,677	--	31,762	1,892	--	6,408	1,555	--	4,392
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.....	50	--	e 75	55	--	--	65	774	136
2.....	55			60			65	2,500	439
3.....	55			60			65	3,300	579
4.....	55			60			65	3,400	597
5.....	55			65			60	4,750	770
6.....	50	423	60	65	1,090	167	65	5,800	1,020
7.....	50			60			65	5,400	948
8.....	45			55			65	3,200	562
9.....	40			50			65	3,700	649
10.....	35			55			65	4,700	825
11.....	35	285	31	50	--	--	70	4,000	756
12.....	40			55			73	4,000	788
13.....	40			60			85	6,800	1,560
14.....	40			55			60	5,400	1,170
15.....	40			55			75	4,700	952
16.....	40	908	132	55	--	--	75	3,800	770
17.....	40			55			73	4,800	946
18.....	35			50			75	5,000	1,010
19.....	35			50			71	2,500	479
20.....	40			50			60	3,000	486
21.....	45	--	--	55	324	e 44	55	3,400	505
22.....	45			55	--		60	4,050	656
23.....	50			60	286		60	3,300	535
24.....	50			55	--		60	3,700	599
25.....	55			70	510		55	3,200	475
26.....	55	--	--	70	--	e 170	60	--	e 850
27.....	55			70	--		60	5,100	826
28.....	55			65	1,290		65	5,200	913
29.....	55			--	--		73	5,400	1,080
30.....	55			--	--		75	5,400	1,090
31.....	55			--	--		73	5,200	1,020
Total.	1,450	--	2,118	1,620	--	3,950	2,078	--	23,771

e Estimated.

s Computed by subdividing day.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	71	6,400	1,230	141	5,700	2,170	231	5,350	3,340
2.....	77	7,800	1,620	133	4,350	1,560	254	5,900	4,050
3.....	69	--	e 900	167	5,100	2,300	254	5,800	3,980
4.....	56	3,000	454	141	4,150	1,580	254	5,500	3,770
5.....	61	2,700	445	150	4,300	1,740	254	5,350	3,670
6.....	65	4,800	842	144	3,250	1,260	261	5,750	4,050
7.....	71	5,100	978	136	3,900	1,430	241	5,300	3,450
8.....	77	6,700	1,390	133	3,650	1,310	209	4,300	2,430
9.....	81	8,100	1,770	125	3,600	1,220	206	4,200	2,340
10.....	84	8,100	1,840	136	4,650	1,710	190	4,300	2,210
11.....	75	6,500	1,320	144	5,000	1,940	184	4,650	2,310
12.....	65	4,400	772	170	5,400	2,480	212	5,100	2,920
13.....	67	4,600	832	167	5,500	2,480	209	4,900	2,770
14.....	65	5,000	878	164	5,150	2,280	202	5,100	2,780
15.....	63	4,300	731	161	5,200	2,260	212	4,700	2,690
16.....	58	3,200	501	167	5,400	2,430	264	7,050	5,030
17.....	58	3,400	532	176	5,050	2,400	275	8,300	6,160
18.....	56	3,100	469	212	5,800	3,320	275	8,750	6,500
19.....	56	4,300	650	212	5,500	3,150	272	7,900	5,800
20.....	55	3,100	460	228	7,050	4,340	173	7,450	3,480
21.....	50	3,000	405	241	7,200	4,690	209	7,300	4,120
22.....	89	14,300	s 4,090	244	6,500	4,280	170	6,750	3,100
23.....	70	8,250	s 1,820	234	6,100	3,850	194	7,330	s 4,020
24.....	67	4,500	814	258	6,300	4,390	341	10,200	9,390
25.....	111	6,760	2,030	351	11,900	11,300	332	8,600	7,710
26.....	147	6,800	2,700	318	10,600	9,100	325	8,300	7,280
27.....	164	5,700	2,520	307	9,350	7,750	351	9,750	9,240
28.....	130	3,900	1,370	272	7,600	5,580	336	9,600	8,710
29.....	106	3,400	973	238	6,200	3,980	321	9,400	8,150
30.....	111	4,250	1,270	228	5,800	3,570	307	8,900	7,380
31.....	--	--	--	231	5,550	3,460	--	--	--
Total.	2,375	--	36,606	6,129	--	105,310	7,518	--	142,830
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.....	307	8,600	7,130	332	12,200	10,900	231	5,000	3,120
2.....	261	8,000	5,640	293	10,800	8,540	231	4,150	2,590
3.....	228	6,750	4,160	261	9,450	6,660	234	3,800	2,400
4.....	224	6,750	4,080	275	7,900	5,870	241	4,000	2,600
5.....	234	7,050	4,450	244	8,850	5,830	231	3,700	2,310
6.....	238	7,000	4,500	278	9,300	6,980	215	3,850	2,230
7.....	238	6,350	4,080	293	10,200	8,070	202	5,000	2,730
8.....	231	5,900	3,680	286	9,300	7,180	212	4,200	2,400
9.....	241	6,000	3,900	275	9,000	6,680	202	4,300	2,350
10.....	278	6,350	4,770	251	8,550	5,790	206	4,700	2,610
11.....	286	6,100	4,710	244	7,550	4,970	202	4,500	2,450
12.....	278	5,700	4,280	231	8,600	5,360	212	4,350	2,490
13.....	241	5,750	3,740	234	7,750	4,900	206	4,700	2,610
14.....	244	5,300	3,490	238	8,700	5,590	209	4,500	2,540
15.....	244	4,800	3,160	247	7,750	5,170	202	4,650	2,540
16.....	258	5,050	3,520	261	7,600	5,360	202	3,900	2,130
17.....	275	5,050	3,750	264	7,200	5,130	202	3,700	2,020
18.....	268	4,800	3,470	261	8,050	5,670	212	3,500	2,000
19.....	261	4,700	3,310	254	6,750	4,630	231	3,850	2,400
20.....	268	4,850	3,510	251	7,300	4,950	234	4,350	2,750
21.....	289	5,500	4,290	251	7,600	5,150	224	4,300	2,600
22.....	336	7,040	s 6,760	258	8,200	5,710	224	4,100	2,480
23.....	541	16,300	s 25,800	258	7,850	5,470	212	3,800	2,180
24.....	910	36,700	93,500	254	6,600	4,530	238	4,200	2,700
25.....	476	21,200	27,200	251	7,000	4,740	296	5,800	4,640
26.....	500	19,000	25,600	244	6,300	4,150	286	5,100	3,940
27.....	448	15,700	19,000	224	5,600	3,390	278	4,400	3,300
28.....	424	15,500	17,700	244	6,750	4,450	264	4,250	3,030
29.....	377	12,400	12,600	244	6,300	4,150	241	4,300	2,800
30.....	336	12,200	11,100	234	5,850	3,700	231	3,800	2,370
31.....	340	12,100	11,100	221	5,500	3,280	--	--	--
Total.	10,080	--	337,980	7,956	--	172,950	6,811	--	79,310
Total discharge for year (cfs-days).....									53,141
Total load for year (tons).....									947,387

e Estimated.

s Computed by subdividing day.

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

Particle-size analyses of suspended sediment, water year October 1954 to September 1955
(Methods of analysis: 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
Oct. 12, 1954.....	2:15 p.m.	114	50	2,570	3,680		19		30		44	57	82	91	97	100	VPWCM
Oct. 28.....	12:10 p.m.	81	42	1,630	1,570		18		23		32	41	72	85	93	99	VPWCM
Nov. 12.....	1:20 p.m.	67	44	1,150	1,120		18		26		34	42	69	83	93	97	VPWCM
Nov. 23.....	1:25 a.m.	59	41	1,000	1,430		31		42		48	56	80	91	97	100	VPWCM
Mar. 14, 1955.....	11:40 a.m.	a 80	38	4,350	2,030		10		32		55	72	92	97	99	100	VPN
Mar. 14.....	11:40 a.m.	a 80	38	4,350	2,000		25		34		55	72	92	97	99	100	VPWCM
Mar. 16.....	2:20 p.m.	84	42	6,270	4,060		13		23		47	68	91	96	99	100	VPWCM
Apr. 7.....	10:50 a.m.	65	44	4,690	3,020		5		33		48	59	83	92	97	99	VPN
Apr. 7.....	10:50 a.m.	65	44	4,690	3,010		23		35		48	59	83	92	97	99	VPWCM
Apr. 21.....	12:10 p.m.	47	54	2,240	1,790		19		29		45	64	90	96	98	100	VPWCM
Apr. 28.....	1:30 p.m.	125	51	2,890	1,380		13		20		40	59	85	94	99	100	VPWCM
May 20.....	11:05 a.m.	224	57	7,280	2,740		28		39		68	86	95	98	100	--	VPWCM
May 24.....	11:55 a.m.	275	60	6,060	4,090		23		34		60	77	92	96	99	100	VPWCM
May 25.....	1:10 p.m.	392	51	13,900	5,370		26		40		70	87	95	97	99	100	VPN
June 3.....	9:30 a.m.	258	53	5,320	2,180		2		23		40	58	84	92	98	100	VPN
June 3.....	9:30 a.m.	258	53	5,320	2,140		15		24		40	58	84	92	98	100	VPWCM
June 16.....	12:30 p.m.	289	65	8,560	6,840		32		55		74	86	95	98	99	100	VPWCM
June 24.....	12:30 a.m.	329	61	11,600	3,560		29		45		72	86	96	98	99	100	VPWCM
June 30.....	10:40 a.m.	318	56	8,040	1,840		17		24		45	66	88	95	98	100	VPWCM
July 8.....	11:15 a.m.	261	62	5,660	2,670		17		25		43	61	88	96	99	100	VPWCM
July 22.....	11:30 p.m.	640	68	19,900	4,730		35		56		88	95	98	99	100	--	VPWCM
July 23.....	12:20 a.m.	690	68	28,000	3,120		44		67		91	96	98	99	100	--	VPWCM
July 27.....	2:45 p.m.	460	78	16,000	2,440		26		39		66	84	95	98	99	100	VPWCM
Aug. 11.....	2:15 p.m.	244	77	7,440	1,840		21		32		52	72	89	96	98	100	VPWCM
Sept. 8.....	11:45 a.m.	231	63	4,560	2,180		18		26		44	65	88	93	95	99	VPWCM
Sept. 21.....	1:15 p.m.	231	60	3,920	3,050		15		24		37	63	95	100	--	--	VPWCM
Daily mean discharge.																	

a Daily mean 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 February 1954, August 1954 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 43,000 ppm July 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 39,000 tons July 24; minimum daily, 0 tons on many days.

EXTREMES, 1947-55.--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.--No flow during period October to December; record is omitted. Records of discharge for water year October 1954 to September 1955 given in WSP 1387.

Day	Suspended sediment, January to September 1955								
	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....							0	--	0
2.....							0	--	0
3.....							0	--	0
4.....							0	--	0
5.....							0	--	0
6.....							0	--	0
7.....							0	--	0
8.....							0	--	0
9.....							0	--	0
10.....							0	--	0
11.....							.5	5,600	sa 12
12.....							3.0	8,850	s 104
13.....							2.0	10,000	s 40
14.....							1.0	5,700	s 16
15.....							.3	3,200	3
16.....							.5	2,700	sb 7
17.....							1.2	4,600	sb 30
18.....							.6	2,600	sb 17
19.....							3.0	2,900	sb 36
20.....							0	--	0
21.....							0	--	0
22.....							.5	1,800	sb 12
23.....							.4	750	sb 3
24.....							0	--	0
25.....							0	--	0
26.....							0	--	0
27.....							0	--	0
28.....							2.0	1,610	s 32
29.....							5.8	9,700	s 164
30.....							16	38,800	1,740
31.....							6.2	13,200	s 266
Total.	0		0	0		0	43.0	--	2,482

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

b Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BADWATER CREEK AT BONNEVILLE, WYO.--Continued

Suspended sediment, January to September 1955--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4.1	11,400	s 169	58	8,100	1,270	4.1	6,300	70
2.....	4.0	23,500	254	76	8,200	1,680	19	13,700	703
3.....	.5	2,000	sb 11	74	9,700	1,940	28	9,900	748
4.....	0	--	0	57	5,900	908	34	5,500	505
5.....	0	--	0	69	4,000	745	45	4,100	498
6.....	0	--	0	74	4,200	839	48	3,500	454
7.....	1.9	950	sb 17	100	6,500	1,760	41	2,600	288
8.....	9.3	3,080	s 64	115	7,500	2,330	32	2,000	173
9.....	13	22,100	s 715	128	7,800	2,700	25	2,200	148
10.....	19	29,400	1,510	111	5,000	1,500	14	2,500	94
11.....	23	28,000	1,740	88	4,500	1,070	8.7	2,300	54
12.....	20	15,300	826	69	4,300	801	4.1	1,620	18
13.....	21	14,400	816	54	4,000	583	1.8	580	3
14.....	35	17,800	1,680	69	4,500	838	.8	500	s 2
15.....	58	22,800	s 3,390	61	3,800	626	0	--	0
16.....	60	20,800	3,370	74	4,500	899	0	--	0
17.....	74	17,200	3,440	66	4,600	820	3.2	4,520	39
18.....	61	17,400	2,870	54	2,800	408	19	17,500	s 1,030
19.....	76	12,500	2,570	53	2,600	372	6.0	30,800	499
20.....	113	11,200	3,420	44	2,000	238	1.6	15,800	68
21.....	45	10,300	1,250	32	1,100	95	.5	4,500	sa 9
22.....	42	7,200	816	24	530	34	.6	3,700	sb 12
23.....	44	7,300	867	17	205	9	.4	1,900	sb 4
24.....	52	7,400	1,040	14	500	19	14	20,200	764
25.....	57	6,100	939	18	670	33	.7	16,000	a 30
26.....	58	5,800	908	14	1,240	47	0	--	0
27.....	74	10,200	2,040	13	1,720	60	0	--	0
28.....	87	12,200	2,870	17	2,100	96	0	--	0
29.....	54	6,600	962	14	2,800	106	0	--	0
30.....	45	4,500	547	10	2,800	76	0	--	0
31.....	--	--	--	6.2	2,100	35	--	--	--
Total.	1,150.8	--	39,101	1,673.2	--	22,937	351.5	--	6,213
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0						
2.....	0	--	0						
3.....	0	--	0						
4.....	0	--	0						
5.....	0	--	0						
6.....	0	--	0						
7.....	0	--	0						
8.....	0	--	0						
9.....	0	--	0						
10.....	0	--	0						
11.....	0	--	0						
12.....	0	--	0						
13.....	0	--	0						
14.....	0	--	0						
15.....	0	--	0						
16.....	0	--	0						
17.....	0	--	0						
18.....	0	--	0						
19.....	0	--	0						
20.....	0	--	0						
21.....	0	--	0						
22.....	0	--	0						
23.....	92	43,000	sa 16,000						
24.....	267	35,000	sa 39,000						
25.....	6.0	8,800	143						
26.....	0	--	0						
27.....	0	--	0						
28.....	0	--	0						
29.....	0	--	0						
30.....	0	--	0						
31.....	0	--	0						
Total.	365.0	--	55,143	0		0	0		0

Total discharge for year (cfs-days)..... 3,583.5

Total load for year (tons)..... 125,876

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

b Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, March to July 1955
(Methods of analysis: 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. 13, 1955.....	4:00 p.m.	a 2.0	--	12,600	4,260	63			93		99	100	--		--	VPWCM
Mar. 29.....	3:00 p.m.	5.8	--	16,000	3,050	54			94		99	100	--		--	VPWCM
Mar. 30.....	9:00 a.m.	19	--	44,000	3,750	50			67		88	94	98		100	VPWCM
Apr. 10.....	5:30 p.m.	18	--	30,000	5,800	60			87		98	99	100		--	VPWCM
Apr. 14.....	6:10 p.m.	31	--	17,400	5,980	58			84		98	99	100		--	VPWCM
Apr. 15.....	6:10 a.m.	50	--	33,600	5,450	43			66		92	98	100		--	VPWCM
Apr. 20.....	8:10 a.m.	144	--	8,190	4,680	39			54		90	98	100		--	VPWCM
Apr. 20.....	3:25 p.m.	100	47	16,100	3,710	4			50		91	97	100		--	VPN
Apr. 20.....	3:25 p.m.	100	47	16,100	3,300	31			51		91	97	100		--	VPWCM
Apr. 24.....	1:05 p.m.	53	--	8,800	6,210	33			54		93	99	100		--	VPWCM
Apr. 27.....	6:40 p.m.	81	--	11,800	3,670	34			53		93	100	--		--	VPWCM
May 1.....	6:35 p.m.	76	--	7,620	5,460	32			50		92	100	--		--	VPWCM
May 3.....	7:10 p.m.	81	--	7,880	5,130	36			56		94	100	--		--	VPWCM
May 7.....	11:20 p.m.	136	--	7,680	4,440	32			50		85	97	100		--	VPWCM
May 9.....	11:15 p.m.	142	--	7,580	4,940	32			49		93	100	--		--	VPWCM
May 13.....	1:20 a.m.	64	--	4,030	4,930	38			57		91	99	100		--	VPWCM
May 13.....	8:50 a.m.	50	--	4,480	4,780	30			40		77	96	100		--	VPWCM
May 17.....	1:45 p.m.	61	77	5,730	4,250	2			41		78	96	100		--	VPN
May 17.....	1:45 p.m.	61	77	5,730	4,250	26			42		78	96	100		--	VPWCM
May 27.....	9:30 a.m.	16	--	1,860	2,140	58			74		98	100	--		--	VPWCM
June 2.....	5:20 a.m.	23	--	14,600	4,740	67			86		96	99	100		--	VPWCM
June 17.....	2:45 a.m.	8.1	--	4,740	6,380	81			98		99	100	--		--	VPWCM
June 18.....	9:50 a.m.	29	--	27,000	4,410	70			97		98	100	--		--	VPWCM
June 19.....	8:50 a.m.	5.0	--	32,200	5,510	72			93		98	100	--		--	VPWCM
July 23.....	9:10 a.m.	740	--	72,800	5,220	47			71		89	98	100		--	VPWCM
July 24.....	8:00 a.m.	386	--	42,800	4,580	44			67		86	94	99		100	VPWCM

a. Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.

LOCATION (revised).--270 feet upstream from Wyoming Canal siphon, 1½ miles downstream from gaging station, 4½ 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, October 1954 to September 1955.

Sediment records: March 1949 to November 1953, October 1954 to September 1955.

EXTREMES, 1949-53, 1954-55.--Water temperatures: Maximum, 81°F Aug. 10; minimum, freezing point on several days during February to April and probably on many other days during winter months.

Sediment concentrations: Maximum daily, 64,600 ppm May 25; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 32,000 tons Aug. 7; minimum daily, 0 tons on many days.

EXTREMES, 1949-53, 1954-55.--Water temperatures (1954-55): Maximum, 81°F Aug. 10, 1955; minimum, freezing point on many days during winter months.

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

Sediment loads: Maximum daily, 140,000 tons (estimated) July 4, 1950; minimum daily, 0 tons on many days.

REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff. Flow affected by ice Nov. 28, 29, Dec. 2 to Apr. 14.

Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement between 4 p.m. and 8 p.m. Many days of no flow/

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

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

Suspended sediment, water year October 1954 to September 1955									
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	71	1		1,180				
2.....					--				
3.....					532				
4.....					--				
5.....					--				
6.....	48 27	7,400 17,000	sa 6,300 sb 2,400		--				
7.....					--				
8.....					--				
9.....					848				
10.....					--				
11.....				4	--	e 10	1		e 1
12.....					--				
13.....					--				
14.....					1,400				
15.....					--				
16.....					--				
17.....					--				
18.....					--				
19.....					--				
20.....					1,010				
21.....	3	499	4		--				
22.....					--				
23.....					--				
24.....					--				
25.....					--				
26.....					718				
27.....					--				
28.....					--				
29.....					--				
30.....					--				
31.....	Total.	162	--	8,792	--	300	31		31
					120				
					--				
					--				
					--				
January				February			March		
1.....						0	--	0	
2.....							0	0	
3.....							0	0	
4.....							0	0	
5.....							0	0	
6.....				0	--	0	0	0	
7.....							0	0	
8.....							0	0	
9.....							1	594	
10.....							1	538	
11.....							2	526	
12.....							3	240	
13.....							5	550	
14.....							4	750	
15.....							3	584	
16.....				1	428	1	5	564	
17.....							10	880	
18.....							10	920	
19.....							10	394	
20.....							5	448	
21.....				0	--	0	2	660	
22.....							2	670	
23.....							3	1,130	
24.....							5	390	
25.....							10	534	
26.....							12	288	
27.....							12	404	
28.....							12	282	
29.....							12	1,620	
30.....							12	1,590	
31.....	15	1,500	b 60						
Total.	0		0	2	--	2	156	--	333

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

YELLOWSTONE RIVER BASIN

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YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	17	4,450	204	4.2			6.8	9,410	s 220
2.....	15	5,350	217	3.8			4.2	11,000	s 204
3.....	12	1,200	39	3.0	7,120	63	2.2		
4.....	5	900	12	2.2			1.8		
5.....	10	3,000	81	2.2	8,700	52	1.4		
6.....	15	6,200	251	2.6			1.8		
7.....	17	7,900	363	3.0			2.2		
8.....	17	12,500	574	3.0			1.8	2,320	13
9.....	20	11,700	632	2.2			2.6		
10.....	20	10,600	572	1.4			2.2		
11.....	16	7,600	328	1.0			2.6		
12.....	15	7,500	304	.9			2.6		
13.....	18	13,200	642	1.0			3.0		
14.....	18	12,700	617	1.0	4,140	22	2.6	722	6
15.....	17	11,800	542	1.4			3.0		
16.....	12	10,100	s 452	2.2			3.4	4,820	s 57
17.....	12	8,900	s 324	3.0			3.0	5,700	sb 55
18.....	9.8	8,710	s 282	2.6			1.4	13,000	sb 95
19.....	7.4	10,800	216	2.2			.5	2,730	4
20.....	8.0	11,900	s 301	1.8			.3	2,260	2
21.....	7.4	11,000	220	2.2			.3	1,140	1
22.....	8.0	9,500	205	3.4	11,200	s 139	.2	425	(t)
23.....	6.2	10,500	176	2.2	4,250	25	1.0	3,700	sb 100
24.....	6.2	9,650	162	3.0	4,100	33	22	40,000	sb 3,200
25.....	5.6	9,000	136	64	64,600	s 17,600	34	12,000	sb 9,600
26.....	4.6	9,300	116	6.2	8,060	s 225	63	22,000	sb 12,000
27.....	3.4	9,800	90	5.0	5,000	68	4.0	2,200	24
28.....	2.2	7,650	45	5.6			3.4	13,300	s 197
29.....	4.2	8,210	93	5.6	2,940	40	.7	1,900	4
30.....	4.6	5,650	70	3.8			.5	483	1
31.....	--	--	--	3.8	4,760	s 65	--	--	--
Total.	333.6	--	8,268	149.5	--	19,131	178.5	--	25,912

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.5	386	1	0	--	0	0		0
2.....	.4	204	(t)	0	--	0	0		0
3.....	.3	--	(t)	0	--	0	0		0
4.....	.1	--	(t)	0	--	0	0		0
5.....	0	--	0	0	--	0	0		0
6.....	0	--	0	0	--	0	0		0
7.....	0	--	0	104	25,000	sb 32,000	0		0
8.....	0	--	0	9	16,000	sa 750	0		0
9.....	0	--	0	.5	1,000	a 1	0		0
10.....	0	--	0	.1	146	(t)	0		0
11.....	0	--	0	0	--	0	0		0
12.....	0	--	0	0	--	0	0		0
13.....	0	--	0	0	--	0	0		0
14.....	0	--	0	0	--	0	0		0
15.....	0	--	0	2.7	5,800	sb 96	0		0
16.....	0	--	0	.5	1,000	a 1	0		0
17.....	0	--	0	.4	138	(t)	0		0
18.....	0	--	0	.2	--	(t)	0		0
19.....	0	--	0	0	--	0	0		0
20.....	0	--	0	0	--	0	0		0
21.....	0	--	0	0	--	0	0		0
22.....	18	8,000	sa 6,600	0	--	0	0		0
23.....	32	54,500	s 8,440	0	--	0	0		0
24.....	31	24,800	s 4,340	0	--	0	0		0
25.....	0	--	0	0	--	0	2	723	4
26.....	0	--	0	0	--	0	0		0
27.....	0	--	0	0	--	0	0		0
28.....	0	--	0	0	--	0	0		0
29.....	0	--	0	0	--	0	0		0
30.....	0	--	0	0	--	0	0		0
31.....	0	--	0	0	--	0	--		--
Total.	82.3	--	19,381	117.4	--	32,848	24		48

Total discharge for year (cfs-days)..... 1,356.3

Total load for year (tons)..... 115,044

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Particle-size analyses of suspended sediment, October 1954 to July 1955

(Methods of analysis: 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
Oct. 10, 1954.....	11:35 a.m.	6.2	57	12,300	6,910		82		--			100	--	--		SPWCM
Oct. 10.....	6:25 p.m.	4.6	48	11,200	6,440		86		100			--	--	--		FWCM
Mar. 30, 1955.....	1:30 p.m.	12	37	3,500	2,860		28		38			95	100	73		VPWCM
Apr. 9.....	6:00 p.m.	a 20	37	21,800	5,650		31		50			80	95	100		VPWCM
Apr. 10.....	5:00 p.m.	a 20	37	18,500	5,600		36		59			89	98	100		VPWCM
Apr. 11.....	8:30 p.m.	a 16	35	10,200	3,210		43		64			87	97	100		VPWCM
Apr. 12.....	10:25 a.m.	a 15	34	15,300	4,190		22		36			87	98	100		VPWCM
Apr. 15.....	3:30 p.m.	14	--	17,800	5,530		32		52			91	99	100		VPWCM
Apr. 18.....	11:15 a.m.	12	47	13,300	3,670		5		48			91	98	100		VPN
Apr. 18.....	11:15 a.m.	12	47	13,300	3,560		32		52			91	98	100		VPWCM
Apr. 24.....	1:00 p.m.	6.2	58	14,000	3,560		34		52			89	99	100		VPWCM
Apr. 27.....	6:45 p.m.	2.6	37	50,200	3,820		24		45			93	99	100		VPWCM
May 25.....	9:30 a.m.	135	47	139,000	3,750		28		43			75	92	98	100	VPWCM
May 26.....	11:40 a.m.	5.6	--	7,270	5,200		66		92			99	100	--		VPWCM
June 16.....	9:10 a.m.	3.4	65	2,940	2,820		43		66			85	89	100		VPWCM
June 24.....	8:45 a.m.	39	62	91,800	3,400		46		77			95	99	100		VPWCM
July 23.....	8:45 a.m.	23	--	63,500	5,390		58		87			98	100	--		VPWCM

a Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.

LOCATION (revised).--At gaging station, 2½ 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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 82,000 ppm July 24; minimum daily, no flow on many days during January and February.

Sediment loads: Maximum daily, 140,000 tons July 24; minimum daily, 0 tons on many days during January and February.

EXTREMES, 1949-55.--Sediment concentrations: Maximum daily (1950-55), 119,000 ppm July 22, 1951; 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, 118,000 ppm July 23. Flow affected by ice Nov. 23, Nov. 28 to Jan. 3, Mar. 1-30, Apr. 4. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Suspended sediment, water year October 1954 to September 1955

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.....	6.2			3.8			1.0	--	
2.....	6.7			6.7			1.1	--	
3.....	6.2			5.7			1.2	--	
4.....	7.1			6.7			1.3	--	
5.....	6.2	3,000	53	6.2			1.5	--	
6.....	7.1			5.7			1.7	347	
7.....	6.2			7.6			1.8	--	
8.....	5.7			7.6			1.7	--	
9.....	7.6			7.6			1.6	--	
10.....	26	13,000	sa 1,200	9.6			1.6	674	
11.....	10	10,300	278	11			1.6	--	
12.....	11	4,260	127	8.3			1.7	--	
13.....	12	--	e 120	9.6			1.8	--	
14.....	8.9			8.9	3,280	72	1.8	369	
15.....	7.1			9.6			1.7	--	e 2
16.....	7.1			9.6			1.6	238	
17.....	6.2			9.6			1.5	--	
18.....	5.7			8.9			1.5	--	
19.....	4.8			8.9			1.4	--	
20.....	4.8			9.6			1.4	--	
21.....	4.8			8.3			1.4	450	
22.....	5.2	2,910	46	8.3			1.3	--	
23.....	5.2			9.0			1.3	--	
24.....	4.8			9.6			1.2	324	
25.....	6.2			9.6			1.0	--	
26.....	7.1			8.3			.9	--	
27.....	6.2			5.7			.7	--	
28.....	5.2			1.5		e 10	.4	--	
29.....	5.2			1.0		e 4	.1	--	
30.....	5.7			1.0		e 2	.1	194	(t)
31.....	4.8			--		--	.1	--	
Total	223.0	--	3,030	223.5		1,960	39.0	--	54

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Suspended sediment, Water year October 1994 to September 1995--Continued											
Day	Mean discharge (cfs)	January		Mean discharge (cfs)	February		Mean discharge (cfs)	March			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1.....	0.1		(t)				0.1	--	(t)		
2.....	.1						2.0	450	2		
3.....	.1						2.5	420	3		
4.....	0						2.5	465	3		
5.....	0						2.0	--	e 2		
6.....	0		0			1.0	--	e 1			
7.....	0		0			5.0	334	5			
8.....	0		0			12	--	e 30			
9.....	0		0			10	1,120				
10.....	0		0			10	--				
11.....	0		0			12	2,550		83		
12.....	0		0			12	--	e 80			
13.....	0		0			15	--	e 95			
14.....	0		0			13	2,250	79			
15.....	0		0			10	1,900	51			
16.....	0		0			13	2,600	91			
17.....	0		0			15	2,700	109			
18.....	0		0			15	2,900	117			
19.....	0		0			15	--	e 110			
20.....	0		0			5.0	--	e 6			
21.....	0		0			3.0	970				
22.....	0		0			5.0	301				
23.....	0		0			7	--				
24.....	0		0			10	--				
25.....	0		0			12	--	e 30			
26.....	0		0			12	--	e 90			
27.....	0		0			15	--				
28.....	0		0			12	3,300				
29.....	0		0			12	4,200				
30.....	0		0			20	5,500				
31.....	0		0			20	5,880	s 399			
Total.	0.3		(t)	0		0	300.1	--	2,064		
		April			May			June			
1.....	23	6,100	s 474	16	--	e 320	32	10,000	sb 1,100		
2.....	21	--	e 440	14	6,850	259	32	12,000	1,040		
3.....	17	--	e 200	19	10,000	a 500	20	10,400	562		
4.....	4	191	2	18	8,100	394	18	--			
5.....	10	--	e 130	14	--		18	--			
6.....	16	--	e 260	14	7,220	273	21	--			
7.....	18	5,980	s 542	15			23				
8.....	22	8,220	s 623	21	9,400	a 550	27	--			
9.....	24	--	e 650	18	--		29	--			
10.....	23	--	e 550	16	--		25	4,350	247		
11.....	15	8,000	324	13	--		23	--			
12.....	13	9,800	344	12	--		15	--			
13.....	18	11,600	564	12	--		17	--			
14.....	18	11,700	569	14	5,240	212	18	--			
15.....	18	11,900	578	15			18				
16.....	15	--		18	--		20	6,000	b 320		
17.....	17	--		18	--		24	12,000	sb 1,000		
18.....	16	--		18	--		26	11,000	sa 850		
19.....	12	--		15	--		26	--			
20.....	12	--		16	--		28	--			
21.....	12	10,100	355	18	9,000	a 440	28	5,060	355		
22.....	12			43	11,000	a 1,300	24				
23.....	13			45	11,800	1,430	26			5,310	373
24.....	12			36	7,200	700	34			18,900	s 2,170
25.....	13			72	33,700	s 11,800	26			14,000	a 1,000
26.....	16	10,200	441	60	40,900	s 7,720	72	38,000	sa 12,000		
27.....	9.6	7,440	193	40	12,200	1,320	25	14,200	958		
28.....	14	9,700	367	49	11,000	a 1,500	26	8,700	611		
29.....	17	11,300	519	40	8,200	886	31	10,200	854		
30.....	16	--	e 480	30	6,500	a 550	28	9,400	711		
31.....	--	--	--	26	5,300	372	--	--	--		
Total.	466.6	--	11,800	775	--	33,404	780	--	27,933		

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 1954 to September 1955--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.....	42	9,620	1,090	27			20		
2.....	38	--	e 900	27			20		
3.....	41	--	e 850	33			18		
4.....	38	--	e 750	32			15		
5.....	37	--	e 700	34	4,190	351	19		
6.....	34	7,010	644	33			15		
7.....	30			33			19		
8.....	31			114	28,000	sb 13,000	22		
9.....	28			33	9,750	869	18		
10.....	23			35	7,500	a 700	20	2,230	120
11.....	21	4,670	328	37	7,100	709	22		
12.....	24			28	4,900	a 380	24		
13.....	23			21	1,500	85	26		
14.....	28			20	--	e 80	24		
15.....	24			24			22		
16.....	16			24			21		
17.....	15			27	4,270	288	20		
18.....	14			26			14		
19.....	18	2,390	97	26			16		
20.....	14			23			6.2	--	e 26
21.....	11			31	--	e 400	5.2	1,550	22
22.....	19	12,100	s 687	31	--	e 400	12	4,500	a 150
23.....	85	40,900	s 10,700	34	4,900	450	19	2,600	133
24.....	361	82,000	sb 140,000	27			28	--	e 190
25.....	90	20,700	5,030	23			32	--	e 220
26.....	68	16,000	2,940	22			25	2,470	167
27.....	69	14,300	2,660	25	3,110	202	22	--	e 120
28.....	58	9,600	1,490	25			13	1,560	55
29.....	56	8,500	1,290	24			7.6	--	e 36
30.....	43	--	e 750	22			6.2	1,800	30
31.....	33	--	e 400	21			--	--	--
Total.	1,412	--	174,415	942	--	22,874	551.2	--	3,429

Total discharge for year (cfs-days)..... 5,712.7

Total load for year (tons)..... 280,963

e Estimated.

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 1954 to September 1955
(Methods of analysis: 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
Oct. 12, 1954.....	3:10 p.m.	11	50	4,260	2,950	1	37	41	56	72	94	98	100	--	VPN	
Oct. 12.....	3:10 p.m.	11	50	4,260	3,050			45	56	72	94	98	100	--	VPWCM	
Oct. 29.....	3:20 p.m.	15	47	3,470	2,620	9	12	17	27	57	93	98	99	100	VPWCM	
Nov. 12.....	12:15 p.m.	23	40	7,180	2,200	12	12	17	32	63	95	99	100	--	VPWCM	
Mar. 2, 1955.....	4:20 p.m.	15	33	2,930	6,700	18	18	43	86	99	100	--	--	--	VPWCM	
Mar. 17.....	4:25 p.m.	47	32	7,620	2,280	5	15	12	46	70	94	98	99	100	VPN	
Mar. 17.....	4:25 p.m.	47	32	7,620	1,670	15	15	18	46	70	94	98	99	100	VPWCM	
Apr. 7.....	1:15 p.m.	49	42	15,600	2,200	21	21	30	57	79	95	98	99	100	VPWCM	
Apr. 11.....	3:50 p.m.	14	36	2,690	12,300	46	46	66	76	85	97	100	--	--	VPWCM	
Apr. 18.....	1:40 p.m.	17	59	10,000	5,070	41	41	62	83	91	99	100	--	--	VPWCM	
Apr. 28.....	11:55 a.m.	14	50	9,380	2,950	35	35	54	77	91	99	100	--	--	VPWCM	
May 20.....	2:15 p.m.	17	78	4,760	2,420	6	6	30	60	85	99	100	--	--	VPN	
May 20.....	2:15 p.m.	17	78	4,760	2,380	18	18	27	60	85	99	100	--	--	VPWCM	
May 25.....	2:20 p.m.	58	53	13,800	3,190	22	22	34	70	85	97	100	--	--	VPWCM	
May 25.....	9:10 p.m.	132	50	86,400	3,250	36	36	56	84	93	99	100	--	--	VPWCM	
June 17.....	9:25 a.m.	23	62	10,800	3,850	43	43	59	74	86	97	99	100	--	VPWCM	
June 24.....	4:25 p.m.	54	73	22,600	5,600	39	39	59	80	91	98	100	--	--	VPWCM	
June 30.....	9:20 a.m.	35	54	9,000	2,620	19	19	29	62	81	96	99	100	--	VPWCM	
July 13.....	10:10 a.m.	24	69	5,040	1,300	6	6	13	33	59	92	99	100	--	VPN	
July 13.....	10:10 a.m.	24	69	5,040	1,270	10	10	14	33	59	92	99	100	--	VPWCM	
July 23.....	11:00 a.m.	73	76	23,400	3,160	19	19	31	79	93	99	100	--	--	VPWCM	
July 23.....	4:30 p.m.	88	79	116,000	4,500	45	45	73	89	95	99	100	--	--	VPWCM	
July 24.....	10:10 a.m.	129	67	47,400	3,080	37	37	60	89	95	99	99	100	--	VPWCM	
Aug. 11.....	3:20 p.m.	38	82	7,280	3,280	27	27	39	69	85	98	99	99	100	VPWCM	
Sept. 8.....	9:20 a.m.	22	59	2,650	1,800	12	12	16	25	44	80	91	98	100	VPWCM	
Sept. 23.....	2:25 p.m.	19	61	2,390	2,570	21	21	27	42	64	95	99	100	--	VPWCM	

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.

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

DRAINAGE AREA.--594 square miles (revised).

RECORDS AVAILABLE.--Sediment records: March 1951 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 97,300 ppm May 25; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 75,800 tons June 26; minimum daily, 0 tons on many days. EXTREMES, 1951-55.--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, 182,000 ppm June 16.

No flow during period October to December; record is omitted. No diversions above station. Bureau of Land Management has extensive spreader systems on some of the tributaries above station. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Suspended sediment, January to September 1955

Day	January			February			March		
	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
2.....							0	--	0
3.....							0	--	0
4.....							0	--	0
5.....							0	--	0
6.....							0	--	0
7.....							0	--	0
8.....							0	--	0
9.....							0	--	0
10.....							0	--	0
11.....							1	20,000	a 55
12.....							2	15,400	83
13.....							2	10,900	59
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.....							16	17,200	s 2,000
30.....							96	47,600	s 15,300
31.....							17	30,400	1,400
Total.	0		0	0		0	134	--	18,897

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

FIFTEENMILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, January to September 1955--Continued

Suspended sediment, January to September 1955--Continued											
Day	April			Mean dis- charge (cfs)	May		Mean dis- charge (cfs)	June			
	Mean dis- charge (cfs)	Suspended sediment			Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		
		Mean concen- tration (ppm)	Tons per day			Mean concen- tration (ppm)			Tons per day	Mean concen- tration (ppm)	Tons per day
1.....	7.8	19,700	415	0	--	0	20	14,200	s 4,490		
2.....	4.0	11,000	b 120	0	--	0	105	56,600	s 18,000		
3.....	5.2	7,500	105	.1	550	sb 11	153	66,200	s 33,500		
4.....	2.8	4,200	32	7.6	49,000	sb 1,200	40	36,200	s 4,560		
5.....	.6	1,500	2	.7	47,000	s 106	11	28,000	832		
6.....	1.8	4,550	s 66	0	--	0	11	19,800	588		
7.....	18	32,100	s 2,130	0	--	0	5.6	15,000	227		
8.....	142	50,100	s 23,100	0	--	0	2.8	13,800	104		
9.....	206	57,600	s 36,700	0	--	0	.6	11,400	18		
10.....	128	47,300	s 19,100	0	--	0	0	--	0		
11.....	49	30,800	s 4,530	0	--	0	0	--	0		
12.....	7.2	22,400	435	0	--	0	0	--	0		
13.....	2.0	17,300	93	0	--	0	0	--	0		
14.....	2.2	22,000	sa 180	0	--	0	0	--	0		
15.....	0	--	0	0	--	0	0	--	0		
16.....	0	--	0	0	--	0	144	29,500	s 53,300		
17.....	0	--	0	0	--	0	99	58,000	s 21,400		
18.....	0	--	0	0	--	0	12	52,200	s 1,880		
19.....	0	--	0	0	--	0	4.4	27,800	330		
20.....	0	--	0	0	--	0	.8	11,200	s 30		
21.....	0	--	0	0	--	0	0	--	0		
22.....	0	--	0	26	58,900	s 6,900	0	--	0		
23.....	0	--	0	26	71,900	s 5,440	0	--	0		
24.....	0	--	0	6.0	72,000	a 1,200	0	--	0		
25.....	0	--	0	179	97,300	s 58,000	152	43,600	s 33,100		
26.....	0	--	0	47	59,200	s 8,460	279	85,900	s 75,800		
27.....	0	--	0	52	71,700	s 11,300	96	41,800	s 14,500		
28.....	0	--	0	11	56,500	1,740	79	39,000	s 8,870		
29.....	0	--	0	2.4	42,100	282	19	34,800	s 1,850		
30.....	0	--	0	.8	24,000	b 50	9.6	21,500	557		
31.....	--	--	--	.1	8,750	s 5	--	--	--		
Total.	576.6	--	87,008	358.7	--	94,694	1,243.8	--	273,936		
Day	July			Mean dis- charge (cfs)	August		Mean dis- charge (cfs)	September			
	Mean dis- charge (cfs)	Suspended sediment			Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		
		Mean concen- tration (ppm)	Tons per day			Mean concen- tration (ppm)			Tons per day	Mean concen- tration (ppm)	Tons per day
1.....	5.2	15,000	b 220	5.2	17,000	239	0	--	0		
2.....	1.8	12,000	b 60	2.8	12,000	b 90	0	--	0		
3.....	.4	6,100	sb 10	1.8	12,000	b 60	0	--	0		
4.....	0	--	0	.4	7,000	sb 11	0	--	0		
5.....	0	--	0	0	--	0	0	--	0		
6.....	0	--	0	0	--	0	0	--	0		
7.....	0	--	0	0	--	0	0	--	0		
8.....	0	--	0	0	--	0	0	--	0		
9.....	0	--	0	0	--	0	0	--	0		
10.....	0	--	0	0	--	0	0	--	0		
11.....	0	--	0	0	--	0	0	--	0		
12.....	0	--	0	0	--	0	0	--	0		
13.....	0	--	0	0	--	0	0	--	0		
14.....	0	--	0	20	16,200	s 6,850	0	--	0		
15.....	0	--	0	197	63,900	s 52,500	0	--	0		
16.....	0	--	0	1.6	18,600	80	0	--	0		
17.....	0	--	0	0	--	0	0	--	0		
18.....	0	--	0	0	--	0	0	--	0		
19.....	0	--	0	15	33,500	s 2,110	0	--	0		
20.....	0	--	0	.2	8,000	s 9	9.6	27,900	s 1,220		
21.....	0	--	0	0	--	0	.5	11,900	s 19		
22.....	0	--	0	0	--	0	0	--	0		
23.....	23	16,000	s 3,390	0	--	0	0	--	0		
24.....	22	49,600	s 3,520	0	--	0	2.6	2,270	s 121		
25.....	113	55,000	s 22,200	0	--	0	142	56,400	22,400		
26.....	26	39,800	2,900	0	--	0	67	39,400	s 7,920		
27.....	6.6	23,500	419	0	--	0	12	30,700	995		
28.....	4.0	24,600	266	0	--	0	6.0	24,000	389		
29.....	243	61,000	s 55,900	0	--	0	2.4	16,400	106		
30.....	11	43,500	1,340	0	--	0	.3	5,800	sb 9		
31.....	5.2	33,000	480	0	--	0	--	--	--		
Total.	461.2	--	90,705	244.0	--	61,949	242.4	--	33,179		

Total discharge for year (cfs-days)..... 3,260.7
 Total load for year (tons)..... 660,388

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

Particle-size analyses of suspended sediment, March to July 1955
(Methods of analysis: 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. 11, 1955.....	4:10 p.m.	4.6	--	28,600	2,390		74		79		80	81	92		99	100	VPWCM
Mar. 29.....	7:50 p.m.	46	--	50,700	2,810		73		94		98	99	100		--	--	VPWCM
Mar. 30.....	11:45 a.m.	203	--	63,700	5,430		60		79		95	98	100		--	--	VPWCM
Apr. 6.....	1:15 p.m.	.6	--	1,850	1,320		91		--		97	--	--		--	--	SPWCM
Apr. 8.....	10:00 a.m.	149	35	54,900	5,000		52		73		94	98	100		--	--	VPWCM
Apr. 9.....	6:45 a.m.	356	--	67,600	2,250		13		49		83	93	99		100	100	VPN
Apr. 9.....	6:45 a.m.	356	--	67,600	2,240		36		58		83	93	99		100	100	VPWCM
Apr. 9.....	10:45 a.m.	328	--	66,800	4,140		40		56		84	93	98		100	100	VPWCM
Apr. 13.....	2:15 p.m.	1.8	--	17,200	3,990		--		99		100	--	--		--	--	SPWCM
May 22.....	8:15 a.m.	.8	53	75,100	7,260		87		93		99	100	--		--	--	VPWCM
May 22.....	8:30 a.m.	23	--	89,200	9,220		75		97		99	100	--		--	--	VPWCM
May 22.....	10:05 a.m.	72	--	92,000	5,170		62		85		97	99	100		--	--	VPWCM
May 22.....	10:30 a.m.	102	--	110,000	5,780		62		86		98	99	100		--	--	VPWCM
May 22.....	9:50 p.m.	16	--	69,800	3,050		74		90		100	--	--		--	--	VPWCM
May 24.....	11:05 a.m.	6	--	83,200	3,530		86		97		100	--	--		--	--	VPWCM
May 25.....	11:30 a.m.	249	--	95,700	4,520		48		62		91	98	100		--	--	VPWCM
June 2.....	11:05 a.m.	212	--	76,800	2,960		45		56		90	98	99		100	100	VPWCM
June 3.....	6:10 a.m.	408	--	99,700	3,800		36		47		82	95	99		100	100	VPWCM
June 16.....	10:35 p.m.	1,320	--	110,000	2,440		42		52		83	91	98		100	100	VPWCM
July 29.....	11:25 a.m.	572	66	85,600	2,500		51		72		87	96	99		100	100	VPWCM

YELLOWSTONE RIVER BASIN--Continued

GREYBULL RIVER AT MEETEETSE, WYO.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

Twice-daily measurements between 6 a.m. and 8 a.m. and between 4 p.m. and 6 p.m.

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

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

GREYBULL RIVER AT MEETEETSE, WYO.--Continued

Suspended sediment, August to September 1954

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....				--	--	--	206	55	31
2.....				--	--	--	214	55	s 32
3.....				--	--	--	226	190	s 101
4.....				--	--	--	200	168	91
5.....				--	--	--	192	196	102
6.....				--	--	--	173		
7.....				--	--	--	180		
8.....				--	--	--	151	38	16
9.....				--	--	--	138		
10.....				--	--	--	126		
11.....				--	--	--	134		
12.....				--	--	--	136	21	8
13.....				--	--	--	140		
14.....				--	--	--	136		
15.....				--	--	--	117		
16.....				--	--	--	112	8	2
17.....				--	--	--	112		
18.....				--	--	--	107		
19.....				--	--	--	106		
20.....				--	--	--	104		
21.....				--	--	--	102	8	2
22.....				--	--	--	98		
23.....				296	360	304	104		
24.....				302	265	232	107		
25.....				299	283	228	104		
26.....				313	430	363	101		
27.....				313	362	306	99		
28.....				316	407	347	101	9	3
29.....				313	260	220	107		
30.....				299	263	212	107		
31.....				262	238	s 183	--	--	--
Total.				2,713	--	2,395	4,020	--	498

Total discharge for period Aug. 23 to Sept. 30, 1954 (cfs-days)..... 6,733

Total load for period Aug. 23 to Sept. 30, 1954 (tons)..... 2,893

s Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

GREYBULL RIVER AT MEETEETSE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	109			101	--		62	--	
2.....	107			98	--		65	--	
3.....	102			93	2		67	13	
4.....	99	9	2	93	--		67	--	
5.....				94	--		70	--	
6.....	93			63	--		70	--	
7.....	94			58	--		70	--	
8.....	94	--		60	4		70	--	
9.....	99	--		61	--		70	--	
10.....	101	--		63	3		71	7	
11.....	98	--		63	--		74	--	
12.....	98	18		60	--		78	--	
13.....	99	8		50	--		78	--	
14.....	90	--		52	--		78	--	
15.....	93	--		50	--		74	--	
16.....	98	--		46	--	(t)	69	--	e 2
17.....	99	--		36	--		69	7	
18.....	96	--		40	3		77	--	
19.....	93	--	e 2	46	--		78	--	
20.....	93	3		48	--		78	--	
21.....	90	--		48	--		78	--	
22.....	92	--		55	--		78	--	
23.....	93	--		54	--		78	--	
24.....	94	--		40	--		80	11	
25.....	98	--		49	--		78	--	
26.....	101	--		44	--		76	--	
27.....	98	7		28	--		70	--	
28.....	107	--		30	--		63	--	
29.....	106	--		51	--		64	--	
30.....	107	--		56	--		66	--	
31.....	106	--		--	--	--	70	5	
Total.	3,040	--	62	1,730	--	14	2,236	--	62
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.....	72	--		56	--		66	8	
2.....	72	--		56	--		68	--	
3.....	68	--		56	--		66	--	
4.....	60	--		58	7		60	10	
5.....	50	7		60	--		50	--	
6.....	45	--		80	--		43	--	
7.....	45	34		62	--		45	--	
8.....	45	--		64	14		47	--	
9.....	45	--		66	--		48	--	
10.....	45	--		60	--		50	--	
11.....	44	--		66	14		50	21	
12.....	44	--		68	--		50	--	
13.....	44	--		68	--		50	--	
14.....	44	5		68	--		50	--	
15.....	44	--		68	--	e 2	50	--	e 2
16.....	44	--	e 2	68	--		50	--	
17.....	41	--		64	--		50	--	
18.....	38	--		60	15		50	11	
19.....	40	--		66	--		48	--	
20.....	45	--		66	--		46	--	
21.....	45	9		65	--		47	--	
22.....	45	--		65	--		47	--	
23.....	45	--		65	--		46	--	
24.....	45	--		64	--		43	--	
25.....	46	--		64	7		35	8	
26.....	50	--		63	--		38	--	
27.....	53	--		63	--		40	--	
28.....	58	7		63	--		41	--	
29.....	58	--		--	--	--	40	--	
30.....	58	--		--	--	--	38	--	
31.....	57	--		--	--	--	45	68	8
Total.	1,535	--	62	1,772	--	56	1,497	--	68

e Estimated.

t Less than 0.50 ton.

YELLOWSTONE RIVER BASIN--Continued

GREYBULL RIVER AT MEETRETSE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	Mean dis-charge (cfs)	April		Mean dis-charge (cfs)	May		Mean dis-charge (cfs)	June	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	48	--	e 15	131	118	s 46	275	315	s 253
2.....	49	165	22	131	40	14	218	198	117
3.....	49	--	e 15	102	20	6	195	288	152
4.....	48	--	e 8	99	120	32	190	130	67
5.....	48	--	e 8	116	70	22	188	40	20
6.....	50	70	9	172	282	131	195	25	13
7.....	53	39	6	215	372	s 233	272	135	s 105
8.....	54	190	28	260	523	367	504	599	s 877
9.....	56	270	41	198	560	310	430	273	s 350
10.....	58	220	a 34	176	165	78	373	151	152
11.....	58	170	27	167	110	50	398	161	173
12.....	60	382	62	178	210	101	552	620	s 978
13.....	66	392	70	192	360	187	621	905	s 1,690
14.....	76	412	85	210	265	150	649	891	1,560
15.....	95	395	101	233	170	107	582	1,590	2,500
16.....	81	106	s 24	198	90	48	656	1,560	s 3,260
17.....	83	120	27	160	85	37	576	616	s 870
18.....	80	73	16	163	243	s 114	480	315	s 436
19.....	76	34	7	221	349	208	546	337	497
20.....	60	25	4	403	813	885	670	850	1,540
21.....	63	20	3	510	1,050	s 1,680	691	929	1,730
22.....	61	14	2	455	457	s 613	712	705	1,360
23.....	60	10	2	257	126	s 98	649	866	1,520
24.....	61	20	3	215	80	46	698	1,800	s 4,010
25.....	106	106	30	221	80	48	480	884	s 1,360
26.....	104	40	11	192	211	109	564	796	1,210
27.....	97	34	9	183	75	37	522	569	802
28.....	76	20	4	149	35	14	498	307	s 438
29.....	93	28	7	147	25	10	408	196	216
30.....	106	34	10	205	74	41	353	78	74
31.....	--	--	--	361	395	385	--	--	--
Total.	2,075	--	690	6,620	--	6,207	14,145	--	28,330
Day	Mean dis-charge (cfs)	July		Mean dis-charge (cfs)	August		Mean dis-charge (cfs)	September	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	328	65	58	317	168	144	139	20	8
2.....	331	80	71	317	127	109	131	17	a 6
3.....	408	144	159	306	135	112	125	12	4
4.....	492	165	s 237	310	122	102	119	12	4
5.....	465	215	s 323	282	86	65	119	10	3
6.....	416	88	99	278	75	56	123	23	8
7.....	342	64	59	260	47	33	133	24	9
8.....	296	46	37	236	40	25	131	14	5
9.....	303	42	34	236	60	38	123		
10.....	349	90	85	233	44	28	116		
11.....	365	109	107	239	58	37	106		
12.....	275	138	102	242	72	47	93		
13.....	278	79	59	242	94	61	83		
14.....	320	190	164	245	108	71	76		
15.....	353	509	485	242	110	72	81		
16.....	353	350	334	210	44	25	83		
17.....	338	280	256	218	87	51	73		
18.....	300	178	144	200	35	19	83		
19.....	296	249	s 216	190	32	16	97	232	s 68
20.....	421	1,750	1,990	183	20	10	102	1,640	s 530
21.....	510	2,950	s 4,250	174	31	15	80	50	11
22.....	470	1,360	1,730	215	115	67	81	15	3
23.....	582	2,720	4,270	236	197	126	73		
24.....	804	16,800	s 45,800	210	90	51	83		
25.....	435	1,030	1,210	200	65	35	97		
26.....	416	523	s 822	195	59	31	95	13	3
27.....	365	250	246	181	42	21	85		
28.....	466	2,530	s 4,570	172	30	14	76		
29.....	296	523	418	163	30	13	76		
30.....	260	125	88	160	28	12	76		
31.....	283	100	71	145	18	7	--	--	--
Total.	11,896	--	68,494	7,037	--	1,513	2,958	--	707
Total discharge for year (cfs-days).....									
									56,541
Total load for year (tons).....									
									106,265

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued
GREYBULL RIVER AT MEETEETSE, WYO.--Continued

Particle-size analyses of suspended sediment, August 1954 to July 1955
(Methods of analysis: 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-tem- per- ature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Aug. 23, 1954.....	4:40 p.m.	306	--	428	947	21	31	37	58	67	82	90	97		100	--	BWCM
May 20, 1955.....	7:00 a.m.	421	46	1,100	851	14	21	28	38	54	66	79	91		96	100	BWCM
May 21.....	7:00 a.m.	642	46	1,750	1,230	--	17	27	38	55	67	79	94		99	100	BWCM
May 26.....	6:00 p.m.	188	55	512	380	--	54	73	85	90	94	95	96		100	--	BWCM
June 2.....	12:10 p.m.	218	50	132	488	--	72	74	87	89	91	93	96		98	99	BWCM
June 14.....	6:20 p.m.	927	--	1,400	1,650	--	9	--	22	--	56	80	91		99	100	VPWCM
June 22.....	8:35 p.m.	677	--	478	1,440	--	16	--	27	--	60	76	90		99	100	VPWCM
June 24.....	8:00 p.m.	804	56	10,800	3,590	--	32	--	44	--	92	98	100		--	--	VPWCM
July 21.....	1:40 p.m.	588	--	5,400	2,660	--	14	--	51	--	86	95	99		100	--	VPN
July 21.....	1:40 p.m.	588	--	5,400	2,510	--	31	--	56	--	86	95	99		100	--	VPWCM
July 24.....	12:10 p.m.	804	60	16,800	6,400	--	3	--	73	--	98	99	100		--	--	VPN
July 24.....	12:10 p.m.	804	60	16,800	6,360	--	42	--	75	--	98	99	100		--	--	VPWCM

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 1955.

Sediment records: March 1946 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 84°F July 31; minimum, freezing point on many days during December to March.

Sediment concentrations: Maximum daily, 24,200 ppm July 26; minimum daily, not determined.

Sediment loads: Maximum daily, 225,000 tons June 18; minimum daily, not determined.

EXTREMES, 1948-55.--Water temperatures (1950-55): Maximum, 85°F July 14, 30, 1953, July 12, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 33,000 ppm April 20, Sept. 21, 1948; minimum daily, not determined.

Sediment loads: Maximum daily, 97,000 tons June 25, 1946; minimum daily, not determined.

REMARKS.--Flow affected by ice Dec. 26 to Mar. 20, Mar. 23-24. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, June to August 1955

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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg- per meq- liter	Non-carbonate					
																							Residue at 180°C	Sum
June 2, 1955,...	3,730			67	16	61	3.0							483	0.66		234		36	1.7	700		
June 18,.....	a 6,360			88	22	54	3.4							584	.81		312		27	1.3	815		
June 26,.....	6,950			68	18	65	3.4							514	.70		244		36	1.8	749		
July 25,.....	a 3,340			88	30	134	5.1							840	1.14		344		45	3.1	1,190		
July 26,.....	1,790			217	44	141	8.0							1,420	1.93		724		29	2.3	1,770		
Aug. 11,.....	a 874			118	33	140	5.5							1,010	1.37		432		41	2.9	1,370		

a Daily mean discharge.

a Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	1,400	500	1,890	1,690	1,680	7,670	1,640	875	4,260
2.....	1,450	580	2,270	1,170	792	2,500	1,780	900	4,330
3.....	1,390	550	a 2,100	1,500	680	2,750	1,760	880	4,180
4.....	1,450	570	2,230	1,500	700	2,840	1,700	880	4,040
5.....	1,350	415	1,510	2,180	1,230	7,240	1,620	830	3,630
6.....	1,450	582	s 2,490	2,180	1,080	6,360	1,560	850	3,580
7.....	1,660	940	4,210	2,120	1,020	5,840	1,360	690	2,530
8.....	1,700	1,180	5,420	1,900	910	4,670	1,600	320	1,380
9.....	1,520	1,190	4,880	1,180	750	2,390	1,720	220	1,020
10.....	1,380	810	3,020	1,710	1,080	4,990	1,620	140	612
11.....	1,070	530	1,530	1,990	1,100	5,910	1,650	240	1,070
12.....	836	450	1,020	1,990	920	4,940	1,810	250	1,220
13.....	1,070	763	s 2,450	1,950	680	3,580	1,810	670	3,270
14.....	1,390	750	2,810	1,960	850	4,500	1,440	660	2,570
15.....	1,400	750	2,840	1,980	910	4,860	1,780	650	3,120
16.....	1,470	740	2,940	1,320	850	3,030	1,720	450	2,090
17.....	1,470	680	2,700	1,860	1,050	5,270	1,860	560	2,810
18.....	1,090	475	s 1,490	1,990	1,070	5,750	1,950	470	2,470
19.....	892	380	915	1,870	660	3,330	1,850	480	2,400
20.....	1,010	598	s 2,010	1,740	1,000	s 5,170	1,310	450	1,580
21.....	1,310	742	2,620	1,770	964	s 4,860	1,290	200	697
22.....	1,280	570	1,970	1,520	450	1,850	1,910	706	3,640
23.....	1,240	550	1,840	1,250	670	2,260	2,190	570	3,370
24.....	1,240	630	2,110	1,850	912	4,560	2,320	420	2,630
25.....	1,090	550	a 1,600	1,880	983	s 5,250	2,250	410	2,490
26.....	1,120	530	1,600	1,830	620	3,060	2,250	200	1,220
27.....	1,400	680	2,570	1,500	480	1,940	2,000	140	755
28.....	1,340	600	2,170	1,780	931	s 4,870	1,700	100	459
29.....	1,330	620	2,230	1,750	850	4,020	2,000	122	659
30.....	1,450	810	3,560	1,300	650	a 2,300	2,000	188	1,020
31.....	1,950	1,850	8,740	--	--	--	2,200	116	659
Total.	41,198	--	82,735	52,210	--	128,560	55,650	--	69,802
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	2,200	292	1,730	2,000	--	--	1,500	120	486
2.....	1,700	412	1,890	1,800	--	--	1,300	180	632
3.....	1,300	130	456	1,500	--	--	1,500	330	1,340
4.....	1,300	46	161	1,300	--	--	1,300	280	983
5.....	1,500	--	e 300	1,200	--	--	1,500	200	810
6.....	1,700	--	e 400	1,200	--	--	1,700	260	1,190
7.....	2,000	--	e 600	1,200	--	--	1,200	230	745
8.....	2,100	--	e 800	1,200	--	--	1,100	250	742
9.....	2,200	--	--	1,200	--	--	1,100	500	1,490
10.....	2,400	--	--	1,200	--	--	1,400	480	1,810
11.....	2,400	--	e 1,000	1,200	--	--	1,400	990	3,740
12.....	2,400	--	--	1,200	--	--	1,400	1,770	6,690
13.....	2,400	--	--	1,300	--	--	1,200	2,380	7,710
14.....	1,800	--	--	1,300	--	--	1,000	2,050	5,540
15.....	1,600	--	--	1,300	102	394	1,150	3,630	11,300
16.....	1,600	--	--	1,400	--	--	1,000	2,910	7,860
17.....	1,600	--	--	1,600	--	--	2,100	2,250	12,800
18.....	1,600	--	--	1,900	--	--	2,000	2,570	13,900
19.....	1,600	--	e 700	1,400	--	--	2,400	1,600	10,400
20.....	1,600	156	--	1,600	--	--	2,500	830	5,600
21.....	1,600	--	--	2,000	--	--	2,250	500	3,040
22.....	1,600	--	--	1,300	--	--	2,430	180	1,180
23.....	1,600	--	--	1,400	--	--	2,700	1,370	9,990
24.....	1,600	--	--	1,400	--	--	2,400	800	5,180
25.....	1,600	108	467	1,200	--	--	2,030	530	2,900
26.....	1,600	--	--	1,400	--	--	2,250	170	1,030
27.....	1,600	--	--	1,800	--	--	2,770	300	2,240
28.....	2,000	334	--	1,500	--	--	3,240	670	5,860
29.....	2,400	--	--	--	--	--	3,440	2,050	s 17,900
30.....	2,400	--	e 1,000	--	--	--	2,700	8,860	35,400
31.....	2,300	127	--	--	--	--	3,000	16,500	85,100
Total.	57,300	--	24,272	40,000	--	11,032	58,960	--	265,588

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	2,870	7,210	s 60,500	1,800	1,660	8,070	2,750	2,650	19,700
2.....	2,640	3,360	s 26,100	1,780	978	4,700	3,570	3,400	32,800
3.....	2,600	3,570	s 26,700	1,680	2,680	12,200	3,920	6,050	64,000
4.....	2,510	--	e 22,000	2,080	2,210	12,400	3,330	4,350	39,100
5.....	2,190	2,870	s 18,300	1,640	3,020	13,400	2,860	4,300	33,200
6.....	2,190	1,250	7,390	1,670	2,980	13,400	2,740	2,070	15,300
7.....	2,360	1,890	12,000	1,700	1,440	6,610	2,560	1,530	10,600
8.....	2,880	4,600	35,800	1,750	--	e 7,200	2,390	1,350	8,710
9.....	3,440	11,200	104,000	1,760	1,700	8,080	2,560	1,350	9,330
10.....	3,820	9,650	99,500	1,880	2,510	12,700	2,630	1,260	8,950
11.....	3,740	9,050	91,400	1,800	2,300	11,200	2,500	--	e 7,500
12.....	3,420	5,950	54,900	2,100	--	e 14,000	2,460	1,090	7,170
13.....	3,150	5,450	46,400	2,700	2,510	18,300	2,980	1,350	10,900
14.....	2,980	2,610	21,000	2,780	2,610	21,100	3,700	4,850	48,500
15.....	2,900	2,000	15,700	3,090	3,090	25,800	4,290	7,750	89,800
16.....	3,060	1,750	14,500	3,810	4,100	42,200	4,900	4,100	54,200
17.....	3,060	1,590	13,100	4,280	3,900	45,200	5,580	5,460	82,300
18.....	2,820	1,530	11,600	3,410	2,700	24,500	6,560	13,100	225,000
19.....	2,710	1,530	11,200	2,860	2,100	16,200	4,370	6,900	81,400
20.....	2,820	1,450	11,000	2,780	1,900	14,300	3,810	3,200	32,900
21.....	2,820	1,220	9,290	3,330	2,250	20,200	3,840	1,950	20,200
22.....	2,710	1,160	8,490	3,860	2,700	28,100	4,340	1,300	15,200
23.....	2,620	1,160	8,210	4,460	4,500	54,200	4,490	1,200	14,500
24.....	2,480	850	5,690	3,090	5,800	48,400	4,460	1,750	21,100
25.....	2,360	1,060	6,750	2,490	3,200	21,500	5,770	5,700	88,800
26.....	2,360	935	5,960	3,890	9,830	103,000	5,050	7,900	108,000
27.....	2,390	892	5,760	2,860	12,400	95,800	4,370	6,200	73,200
28.....	2,290	892	5,520	2,660	4,850	34,800	3,970	5,900	63,200
29.....	2,220	1,020	6,110	2,220	3,250	19,500	4,000	4,500	48,600
30.....	2,000	1,870	10,100	2,140	2,250	13,000	3,890	3,150	33,100
31.....	--	--	--	2,300	2,100	13,000	--	--	--
Total.	82,410	--	774,970	80,660	--	783,460	114,440	--	1,367,280
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	3,300	1,650	14,700	868	3,700	8,670	844		
2.....	2,860	1,300	10,000	850	1,200	2,750	862		
3.....	1,820	1,050	5,160	886	900	2,150	808		
4.....	1,640	900	3,990	754	650	1,320	802		
5.....	1,770	1,100	5,260	742	500	1,000	814		
6.....	1,770	1,050	5,020	712	350	673	850		
7.....	1,560	750	3,160	868	400	937	874		
8.....	1,270	700	2,400	910	500	1,230	898		
9.....	1,090	650	1,910	1,080	1,850	5,390	886		
10.....	958	550	1,420	1,010	850	2,320	892		
11.....	1,230	750	2,490	874	650	1,530	892	205	495
12.....	1,170	750	2,370	880	550	1,310	970		
13.....	1,060	500	1,430	886	350	837	984		
14.....	980			886	300	718	946		
15.....	900			880	800	1,900	970		
16.....	800	--	e 500	1,170	2,050	s 7,140	880		
17.....	720			880	17,100	40,600	916		
18.....	640			900	6,200	a 15,000	910		
19.....	580			946	1,450	3,700	922		
20.....	560	152	230	916	700	1,730	970		
21.....	580			802	900	1,950	1,020	236	650
22.....	580	--	e 240	832	700	1,570	970	336	864
23.....	580			808	400	873	1,020	385	1,080
24.....	670	350	633	808	300	654	1,080	231	674
25.....	3,340	15,900	s 162,000	796	250	537	1,270	446	1,510
26.....	2,330	24,200	152,000	800			2,000	2,856	15,400
27.....	1,720	19,200	89,200	820	--	e 440	1,660	6,106	27,300
28.....	1,400	7,550	28,500	840			1,380	4,056	15,100
29.....	1,270	5,800	19,900	860	174	404	1,420	1,456	5,560
30.....	1,170	6,110	19,300	874	191	451	1,300	756	2,630
31.....	1,000	3,950	10,700	862	180	419	--	--	--
Total.	41,318	--	545,493	27,000	--	109,083	31,010	--	80,648

Total discharge for year (cfs-days)..... 682,156

Total load for year (tons)..... 4,242,903

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, November 1954 to September 1955

(Methods of analysis: 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 per- centage of sample (° 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. 8, 1954.....	11:30 a.m.	2,000	43	914	937	19	27	41	58	86	100	VPWCM			
Nov. 19.....	11:10 a.m.	2,080	46	674	957	11	17	28	50	94	100	VPWCM			
Dec. 15.....	11:30 a.m.	2,350	34	668	972	9	14	30	45	93	100	VPWCM			
Mar. 18, 1955.....	1:05 p.m.	3,200	34	3,160	3,880	3	55	78	85	97	100	VPN			
Mar. 18.....	1:05 p.m.	3,200	34	3,160	3,680	39	59	78	85	97	100	VPWCM			
Mar. 31.....	12:00 m.	3,370	40	14,600	5,140	57	80	88	95	98	100	VPWCM			
Apr. 8.....	10:35 a.m.	3,260	45	4,710	2,590	3	62	80	87	98	100	VPN			
Apr. 8.....	10:35 a.m.	3,260	45	4,710	2,540	50	63	80	87	98	100	VPWCM			
Apr. 11.....	3:55 p.m.	3,780	35	8,920	6,290	1	87	94	97	99	100	VPN			
Apr. 11.....	3:55 p.m.	3,780	35	8,920	6,210	62	85	94	97	99	100	VPWCM			
May 2.....	12:45 p.m.	1,960	57	1,440	2,190	22	37	64	77	97	100	VPWCM			
May 9.....	3:40 p.m.	1,850	61	2,220	3,210	37	63	84	90	98	99	100	VPWCM		
May 17.....	4:20 p.m.	4,310	--	3,540	4,140	26	42	78	91	99	100	VPWCM			
May 23.....	1:25 p.m.	4,780	58	4,940	3,560	44	59	84	92	99	100	VPWCM			
May 23.....	7:20 p.m.	4,150	60	6,560	4,630	56	72	89	95	100	--	VPWCM			
May 26.....	1:25 p.m.	4,150	60	8,300	5,500	58	78	92	97	100	--	VPWCM			
June 2.....	3:40 p.m.	3,600	58	2,980	3,340	5	47	77	92	100	--	VPN			
June 2.....	3:40 p.m.	3,600	58	2,980	3,220	29	44	77	92	100	--	VPWCM			
June 4.....	10:00 a.m.	3,550	57	4,380	5,310	55	71	86	95	100	--	VPWCM			
June 13.....	11:10 a.m.	2,880	70	1,290	2,260	14	22	59	82	99	100	VPWCM			
June 18.....	9:40 a.m.	6,740	61	11,700	4,450	4	81	91	97	99	100	VPN			
June 18.....	9:40 a.m.	6,740	61	11,700	4,370	76	79	91	97	99	100	VPWCM			
June 26.....	8:10 p.m.	4,540	--	5,020	6,280	1	72	88	95	99	100	VPN			
June 26.....	8:10 p.m.	4,540	--	5,020	6,360	53	74	88	95	99	100	VPWCM			
July 20.....	2:50 p.m.	545	83	158	1,820	22	37	69	86	99	100	VPWCM			
July 25.....	9:10 a.m.	5,020	76	11,200	3,850	54	75	92	97	100	--	VPWCM			
July 25.....	12:40 p.m.	4,780	77	12,300	4,360	1	72	95	98	100	--	VPN			
July 25.....	12:40 p.m.	4,780	77	12,300	4,310	51	76	95	98	100	--	VPWCM			
July 26.....	11:00 a.m.	2,140	75	20,600	6,230	64	94	97	99	100	--	VPWCM			

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

Particle-size analyses of suspended sediment, November 1954 to September 1955--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; 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 26, 1955.....	7:40 p. m.	1,790	71	27,200	6,010		0		92		98	99	100				VPN
July 28.....	7:40 p. m.	1,790	71	27,200	5,930		67		95		98	99	100				VPWCM
July 29.....	6:20 p. m.	1,140	67	6,620	4,770		79		98		98	99	100				VPWCM
July 30.....	7:40 p. m.	1,480	76	5,340	4,040		80		93		96	98	100				VPWCM
Aug. 9.....	1:15 p. m.	910	75	2,200	6,610		57		88		97	98	100				VPWCM
Aug. 16.....	11:50 a. m.	1,630	74	2,680	3,350		2		43		88	93	100				VPN
Aug. 16.....	11:50 a. m.	1,630	74	2,680	3,200		27		52		88	93	100				VPWCM
Sep. 27.....	11:25 a. m.	1,660	55	7,390	4,930		71		93		96	98	100				VPWCM

YELLOWSTONE RIVER BASIN--Continued

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 1955.

Water temperatures: April 1949 to September 1951, August 1952 to September 1955.

Sediment records: July 1947 to September 1954.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 1,190 ppm July 28-31; minimum, 345 ppm Mar. 9-10.

Hardness: Maximum, 544 ppm July 28-31; minimum, 166 ppm Mar. 9-10.

Specific conductance: Maximum daily, 1,560 micromhos July 28; minimum daily, 503 micromhos Mar. 9.

Water temperatures: Maximum, 79°F Aug. 5; minimum, freezing point on several days during December and February and probably on many other days during winter months.

EXTREMES, 1949-55.--Dissolved solids (1951-55): Maximum, 1,190 ppm July 28-31, 1955; minimum, 304 ppm June 23, 1951.

Hardness (1951-55): Maximum, 544 ppm July 28-31, 1955; minimum, 151 ppm June 23, 1951.

Specific conductance (1951-55): Maximum daily, 1,560 micromhos July 28, 1955; minimum point on many days during winter months.

Water temperatures (1949-51, 1952-55): Maximum, 89°F Aug. 7, 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 district office at Worland, Wyo. 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 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate residue at 180°C					
Oct. 1-31, 1954.	2,650	--	--	--	--	122	--	235	418	--	--	--	--	843	1.15	6,030	374	181	42	2.7	1,180	7.9	--
Nov. 1-30.	2,822	--	--	--	--	119	--	238	405	--	--	--	--	823	1.12	6,270	379	184	41	2.7	1,160	7.8	--
Dec. 1-31.	2,868	12	0.00	94	35	109	4.2	250	385	16	0.5	2.1	0.16	793	1.08	6,140	377	172	38	2.4	1,110	7.9	3
Jan. 1-31, 1955.	2,350	--	--	--	--	102	--	256	375	--	--	--	--	784	1.07	4,970	381	171	37	2.3	1,110	7.9	--
Feb. 1-10.	2,500	--	--	--	--	74	--	192	262	--	--	--	--	568	.77	3,830	272	115	37	2.0	828	7.7	--
Feb. 11-31.	2,080	--	--	--	--	100	--	247	360	--	--	--	--	770	1.05	4,350	367	164	37	2.3	1,080	7.9	--
Feb. 12-23.	2,083	--	--	--	--	112	--	274	415	--	--	--	--	879	1.20	4,940	423	198	37	2.4	1,210	8.0	--
Feb. 24.	2,000	--	--	--	--	79	--	196	283	--	--	--	--	616	.84	3,330	300	139	36	2.0	897	7.8	--
Feb. 25-28.	2,075	11	.00	90	41	95	4.8	282	343	14	.4	3.2	.17	762	1.04	4,270	393	162	34	2.1	1,080	7.8	--
Mar. 1-8.	2,238	--	--	--	--	103	--	240	378	--	--	--	--	799	1.09	4,830	378	181	37	2.3	1,110	7.7	--
Mar. 9-10.	2,550	--	--	--	--	45	--	112	158	--	--	--	--	345	.47	2,380	166	74	37	1.5	523	7.9	--
Mar. 11-31.	3,186	--	--	--	--	99	--	217	368	--	--	--	--	756	1.03	6,500	349	171	38	2.3	1,060	8.0	--
Apr. 1-5.	5,170	--	--	--	--	31	--	210	323	--	--	--	--	682	.93	11,360	312	140	39	2.2	975	8.1	--
Apr. 6-30.	5,038	--	--	--	--	112	--	212	373	--	--	--	--	756	1.03	10,280	326	152	43	2.7	1,070	7.8	--
May 1-16.	3,396	--	--	--	--	94	--	203	340	--	--	--	--	695	.95	6,370	324	158	39	2.3	978	8.0	--
May 17-29.	5,830	--	--	--	--	67	--	187	243	--	--	--	--	516	.70	8,120	241	104	37	1.9	749	8.0	--
May 30-June 19.	5,251	18	.00	69	24	72	3.3	183	263	9.0	.2	3.1	.12	580	.79	8,220	270	120	36	1.9	828	7.8	7
June 20-21.	5,810	--	--	--	--	61	--	169	333	--	--	--	--	666	.91	10,450	353	214	27	1.4	913	7.8	--
June 22-July 4.	5,365	--	--	--	--	67	--	176	245	--	--	--	--	545	.74	7,890	266	112	36	1.8	789	7.4	--
July 5-14.	2,138	--	--	--	--	93	--	191	335	--	--	--	--	702	.95	4,050	318	161	39	2.3	993	7.9	--

July 15-27.....	1,375	--	--	--	--	130	--	192	455	--	--	--	--	872	1.19	3,240	359	202	44	3.0	1,210	7.8	--
July 28-31.....	2,030	--	--	--	--	145	--	260	635	--	--	--	--	1,190	1.62	6,520	544	331	36	2.7	1,540	7.6	--
Aug. 1-31.....	1,454	--	--	--	--	141	--	217	505	--	--	--	--	942	1.28	3,700	390	212	44	3.1	1,280	8.0	--
Sept. 1-30.....	1,659	19	.01	95	39	151	5.2	218	515	19	.6	2.2	.21	981	1.33	4,390	396	217	45	3.3	1,330	8.0	18
Weighted average a...	3,008	--	--	--	--	102	--	215	362	--	--	--	--	742	1.01	6,030	338	162	40	2.4	1,040	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /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	--	--	--	--	--	--	34	55	58	65	74	68
2	--	40	--	--	--	--	34	56	53	63	75	65
3	--	40	--	33	--	--	--	46	58	64	74	66
4	--	a 42	--	33	--	--	--	54	58	--	68	68
5	--	41	a 36	--	--	--	--	55	59	67	79	66
6	--	40	a 36	a 33	--	--	--	57	59	70	--	66
7	--	a 42	34	--	--	--	--	53	60	70	72	65
8	55	40	34	--	--	--	--	55	59	66	71	64
9	a 54	--	33	a 33	--	--	--	--	59	69	71	60
10	53	40	33	a 33	--	--	--	54	59	71	69	56
11	50	--	--	a 33	--	--	--	--	59	73	72	54
12	48	41	33	a 33	--	--	--	57	62	71	74	57
13	--	a 42	32	a 33	--	--	a 52	60	63	67	74	80
14	a 51	40	33	a 33	32	--	--	59	69	72	73	62
15	49	44	--	a 33	32	33	47	54	67	73	67	62
16	50	47	33	--	33	a 33	45	50	64	74	71	57
17	51	43	a 35	33	--	--	--	54	65	78	70	59
18	52	--	a 35	--	--	--	48	56	65	77	70	69
19	49	43	33	--	--	--	--	58	65	--	74	56
20	--	42	a 33	--	--	--	48	61	67	78	74	54
21	--	--	33	--	--	33	50	62	70	--	71	54
22	--	--	35	--	--	33	50	65	70	76	70	54
23	--	a 41	--	--	--	--	50	60	71	74	89	48
24	--	a 39	a 34	--	--	--	52	51	70	72	89	50
25	--	a 40	--	--	--	--	--	55	68	74	68	47
26	a 44	--	34	--	--	--	--	57	69	73	70	47
27	a 46	41	33	--	32	--	52	54	68	74	71	54
28	a 42	--	33	--	--	--	--	53	67	72	66	52
29	--	--	a 33	33	--	--	49	55	70	72	65	50
30	41	--	32	--	--	--	53	58	64	73	65	47
31	40	--	32	--	--	33	--	57	--	73	67	--
Average	--	--	--	--	--	--	--	56	64	71	71	58

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

YELLOWSTONE RIVER BASIN--Continued
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 1955.
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Per-cent so-dium ad-sorp-tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH		
															Parts per mil-lion	Tons per acre- foot	Tons per day	Calcium	Non-carbon- ate					
Oct. 7, 1954.....	a 100	--	--	--	--	35	--	282	0	165	4.5	--	--	--	--	--	465	0.63	328	97	19	725	7.9	
Nov. 4.....	116	--	--	63	44	32	--	288	0	132	3.5	--	--	--	--	--	465	0.63	338	94	17	718	8.1	
Dec. 6.....	a 135	--	--	--	--	27	--	268	6	132	3.5	--	--	--	--	--	--	--	315	85	16	7	662	8.3
Jan. 4, 1955.....	a 100	--	--	--	36	27	--	274	0	128	3.0	--	--	--	--	--	416	.57	307	82	16	7	667	7.6
Feb. 4.....	a 100	--	--	59	37	26	--	273	0	129	3.0	--	--	--	--	--	404	.95	299	75	16	7	647	7.9
Mar. 2.....	a 110	--	--	--	--	25	--	273	0	126	3.0	--	--	--	--	--	--	--	305	81	15	6	649	7.9
Apr. 12.....	770	--	--	--	--	30	--	202	0	165	3.5	--	--	--	--	--	--	--	270	104	19	8	640	7.5
May 3.....	715	--	--	37	19	17	--	132	0	77	1.0	--	--	--	--	--	256	.35	172	47	13	6	398	7.7
June 1.....	1,570	--	--	--	28	12	8.9	120	0	39	1.5	--	--	--	--	--	168	.23	119	21	14	4	275	7.9
July 6.....	432	8.7	0.01	39	23	16	1.6	178	4	72	1.5	0.0	0.5	0.08	---	---	282	.36	194	41	15	.5	439	8.3
Aug. 4.....	a 52	--	--	53	38	33	--	260	0	147	3.0	--	--	--	--	--	413	.56	287	74	19	8	860	8.2
Sept. 7.....	32	6.4	.10	54	50	42	3.2	285	0	180	5.0	.2	.5	.24	---	---	505	.69	340	106	21	1.0	785	8.2
Sept. 29.....	109	--	--	68	47	40	--	298	6	191	3.5	--	--	--	--	--	--	--	364	110	19	1.9	799	8.3
a. Daily mean discharge.																								

a Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.

LOCATION --At gaging station, 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1955.

Water temperatures: April 1949 to September 1955.

Sediment records: June 1948 to September 1951.

EXTRIMES, 1954-55.--Dissolved solids: Maximum, 1,090 ppm Sept. 5-30; minimum, 242 ppm July 2-5.

Hardness: Maximum, 494 ppm Jan. 1-31; minimum, 94 ppm May 4.

Specific conductance: Maximum daily, 1,790 micromhos Sept. 25; minimum daily, 353 micromhos Mar. 10.

Water temperatures: Maximum, 73° F July 21; minimum, freezing point on many days during November to April.

EXTRIMES, 1948-55.--Dissolved solids (1951-55): Maximum, 1,430 ppm July 26 to Aug. 4, 1954; minimum, 200 ppm June 23-27, 1953.

Hardness (1951-55): Maximum, 556 ppm Nov. 26 to Dec. 5, 1952; minimum, 94 ppm May 4, 1955.

Specific conductance (1951-55): Maximum daily, 2,280 micromhos July 24, 1953; minimum daily, 288 micromhos June 21, 1953.

Water temperatures: Maximum, 86° F July 20, 1954; minimum, freezing point on many days during winter month.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 in hardness	Specific conductance (micro-mhos at 25° C)	pH	Color		
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
Oct. 1-25, 1954.....	60.4	--	--	--	--	89	--	325	270	--	--	--	--	660	0.90	108	354	87	35	983	7.8	--	
Oct. 26-31.....	155	--	--	--	--	63	--	285	227	--	--	--	--	554	.75	232	328	94	29	1.5	844	8.1	--
Nov. 1-30.....	213	--	--	--	--	61	--	297	247	--	--	--	--	582	.79	335	353	109	26	1.4	872	8.1	--
Dec. 1-31.....	208	9.0	0.00	82	58	71	5.0	359	305	6.0	0.4	1.0	0.14	720	.98	404	445	151	25	1.5	1,040	8.2	6
Jan. 1-31, 1955.....	153	--	--	--	--	74	--	396	320	--	--	--	--	799	1.09	330	484	169	24	1.4	1,120	8.1	--
Feb. 1-28.....	105	--	--	--	--	75	--	366	300	--	--	--	--	710	.97	201	432	132	27	1.6	1,050	8.1	--
Mar. 1-8.....	124	13	.05	84	61	79	5.0	388	298	5.5	.4	1.3	.15	760	1.03	254	482	144	27	1.6	1,120	8.0	6
Mar. 9-11.....	749	--	--	--	--	44	--	137	87	--	--	--	--	258	.35	522	107	0	47	1.8	402	7.7	--
Mar. 12-14.....	381	--	--	--	--	45	--	171	129	--	--	--	--	340	.46	350	174	34	36	1.5	531	7.6	--
Mar. 15-22.....	246	--	--	--	--	64	--	233	223	--	--	--	--	513	.70	341	277	86	33	1.7	775	7.8	--
Mar. 23-29.....	178	--	--	--	--	82	--	335	295	--	--	--	--	696	.95	334	399	124	31	1.8	1,010	8.2	--
Mar. 30-Apr. 11.....	317	--	--	--	--	60	--	221	191	--	--	--	--	467	.64	400	246	65	34	1.7	711	7.8	--
Apr. 12-18.....	319	--	--	--	--	68	--	277	265	--	--	--	--	611	.83	526	347	120	29	1.6	905	8.0	--
Apr. 19-May 3.....	643	--	--	--	--	44	--	238	206	--	--	--	--	505	.69	877	306	111	23	1.1	751	7.9	--
May 4.....	2,400	--	--	--	--	101	--	193	154	--	--	--	--	412	.56	2,670	94	0	69	4.5	620	8.0	--
May 5-17.....	567	--	--	--	--	66	--	221	220	--	--	--	--	514	.70	787	264	83	35	1.8	774	8.0	--
May 18-27.....	986	--	--	--	--	40	--	207	179	--	--	--	--	451	.61	1,200	248	78	30	1.3	672	8.0	--
May 28-June 3.....	1,228	--	--	--	--	39	--	187	127	--	--	--	--	358	.49	1,190	220	67	23	.9	546	7.7	--
June 4-15.....	1,164	15	.00	40	20	25	3.1	164	96	2.0	.1	2.2	.06	297	.40	933	184	50	22	.8	463	7.8	9
June 16-20.....	965	--	--	--	--	47	--	188	135	--	--	--	--	359	.49	935	189	35	35	1.5	563	7.8	--

June 21-30.....	1,560	--	--	--	--	--	--	--	--	174	43	19	.6	421	7.8	--
July 1.....	1,820	--	--	--	--	19	37	--	--	172	143	172	160	573	7.9	--
July 2-5.....	1,638	--	--	--	--	--	18	--	--	142	82	--	--	388	7.9	--
July 6-7.....	1,677	--	--	--	--	--	37	--	--	166	133	--	--	545	8.0	--
July 8-21.....	202	--	--	--	--	--	52	--	--	217	172	--	--	691	7.9	--
July 22-Aug. 17...	86.4	--	--	--	--	--	76	--	--	267	233	--	--	841	8.0	--
Aug. 18-28.....	69.5	--	--	--	--	--	85	--	--	300	253	--	--	935	7.5	--
Aug. 29-Sept. 4...	27.9	--	--	--	--	--	126	--	--	386	340	--	--	1,200	7.9	--
Sept. 5-30.....	10.1	.00	81	68	189	8.2	47	--	--	483	475	9.0	.32	1,540	8.1	11
Weighted aver- age b.....	343	--	--	--	--	--	--	--	--	224	174	--	--	674	--	--

a. Includes equivalent of 5 ppm of carbonate (CO₃).

b. Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 7 a.m. and 10 a.m./

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

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.

Water temperatures: March 1949 to September 1955.

Sediment records: April 1946 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point probably on many days during winter months.

Sediment concentrations: Maximum daily, 101,000 ppm Aug. 8; minimum daily, no flow on many days during October and September.

Sediment loads: Maximum daily, 1,020,000 tons Aug. 8; minimum daily, 0 tons on many days during October and September.

EXTREMES, 1946-55.--Water temperatures: Maximum (1949-54), 90° F July 16, 1954; minimum (1949-55), freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 105,000 ppm July 19, 1954; 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.--No appreciable inflow between gaging station and sampling point except during periods of intense local rainfall. Flow affected by ice Nov. 29 to Mar. 12, Apr. 3-5. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, July to August 1955

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)	Boiron (B)	Dissolved solids			Hardness as CaCO ₃		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 19, 1955.....	32			308	68	164	9.0							2,020	2.75		1,050		25	2.2	2,270	
Aug. 4.....	a 16			408	95	536	17							3,770	5.13		1,410		45	6.2	4,180	

a Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

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

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0	--	0	52	--		3.0	--	e 3
2.....	0	--	0	52	--		3.5	486	5
3.....	0	--	0	57	--		4.0		
4.....	0	--	0	58	3,080		5.0		e 7
5.....	0	--	0	59	--		6.0		
6.....	0	--	0	62	--		7.5	462	9
7.....	0	--	0	66	--		10		
8.....	0	--	0	66	--		14		e 18
9.....	0	--	0	68	3,520		20		
10.....	0	--	0	68	--		30		
11.....	0	--	0	65	--		40		
12.....	0	--	0	64	--		35		
13.....	0	--	0	64	--		45		e 46
14.....	0	--	0	62	--	e 460	40		
15.....	0	--	0	62	--		35		
16.....	0	--	0	62	--		40		
17.....	0	--	0	65	--		45		
18.....	30	33,000	sa 3,000	65	--		50	--	
19.....	22	50,000	3,080	65	--		54	--	
20.....	16	40,400	1,810	68	--		58	404	
21.....	14	29,500	1,120	69	2,220		65	--	e 70
22.....	12			68	--		70	--	
23.....	12	--	e 1,100	66	--		65	462	
24.....	11			64	2,110		60	--	
25.....	11	35,000	1,080	65	--		50	--	
26.....	10	--	e 340	64	--		30		
27.....	9.5	--	e 100	59	--		25		
28.....	8.6	1,830	42	52	1,690	237	30	--	e 34
29.....	19	--	e 150	34	698	64	37		
30.....	41	--	e 500	10	--	e 15	35		
31.....	54	5,660	825	--	--	--	40		
Total.	270.1	--	15,347	1,801	--	12,736	1,052.0	--	1,224
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.....	38	334		75	--		70	406	77
2.....	35	--		70	--		78	408	86
3.....	32	338		65	--		75	--	e 80
4.....	28	--		61	378		60	--	e 65
5.....	25	--		55	--		45	--	e 55
6.....	28	--		60	--		55	630	94
7.....	31	--		65	--		68	550	101
8.....	33	--		70	--		150	540	219
9.....	35	--		60	--		480	2,200	2,670
10.....	37	--		41	204		1,500	12,000	48,600
11.....	39	604		45	--		1,550	6,550	27,400
12.....	25	--		50	--		2,000	10,400	56,200
13.....	30	--		60	252		1,780	8,980	43,200
14.....	35	--		70	--		1,410	8,530	32,500
15.....	32	--	e 38	80	--	e 55	968	4,630	12,100
16.....	31	436		85	--		554	3,860	5,770
17.....	31	--		90	--		567	3,680	s 6,330
18.....	30	490		70	--		482	3,960	5,150
19.....	32	--		60	--		478	3,700	4,760
20.....	31	--		65	--		250	1,660	1,120
21.....	30	--		70	--		150	970	393
22.....	31	--		67	--		121	1,680	s 1,050
23.....	32	450		63	462		109	1,300	383
24.....	32	--		60	--		100	350	94
25.....	33	435		66	--		90	--	e 80
26.....	36	--		60	--		150	--	e 140
27.....	40	--		55	--		300	346	280
28.....	45	--		60	--		1,000	1,040	2,810
29.....	50	--		--	--	--	2,000	12,100	65,300
30.....	60	--	e 55	--	--	--	2,580	20,900	146,000
31.....	66	--		--	--	--	2,990	45,800	s 446,000
Total.	1,093	--	1,246	1,798	--	1,540	22,178	--	909,107

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER AT ARVADA, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Suspended sediment, water year October 1957 to September 1958--Continued											
Day	April			Mean discharge (cfs)	May			Mean discharge (cfs)	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.....	1,680	57,100	269,000	182	4,070	2,000	496	7,390	9,900		
2.....	1,120	34,400	108,000	165	3,420	1,520	534	9,400	13,600		
3.....	300	--	e 5,000	188	3,800	1,930	587	13,200	20,900		
4.....	100	--	e 500	261	8,200	5,780	714	13,100	25,300		
5.....	200	--	e 1,500	287	8,290	6,420	629	12,900	21,900		
6.....	368	10,300	10,200	282	7,060	5,380	560	11,000	a 17,000		
7.....	368	8,200	8,150	253	6,580	4,490	528	10,600	15,100		
8.....	384	8,500	8,810	244	5,880	3,870	463	11,000	13,800		
9.....	676	13,700	s 27,400	293	8,640	6,840	432	10,100	11,800		
10.....	1,320	37,200	137,000	396	11,300	12,100	396	7,620	8,150		
11.....	1,790	59,900	300,000	470	13,900	17,600	396	6,770	7,240		
12.....	1,300	55,700	203,000	456	13,700	16,900	408	6,300	a 6,900		
13.....	790	38,100	84,300	450	12,100	14,700	374	6,270	6,330		
14.....	580	27,300	42,800	508	13,200	18,100	555	16,800	s 32,400		
15.....	522	18,400	25,900	608	13,400	22,000	622	18,000	30,200		
16.....	489	16,000	21,100	798	19,000	40,900	541	20,300	29,700		
17.....	426	12,500	14,400	1,020	24,400	67,200	1,470	52,900	s 230,000		
18.....	335	--	e 11,000	923	21,000	52,300	3,150	67,800	s 693,000		
19.....	314	10,200	8,650	706	14,700	28,000	1,370	57,000	a 220,000		
20.....	293	9,000	7,120	601	11,500	18,700	977	34,200	93,600		
21.....	265	7,000	5,010	560	10,400	15,700	690	20,300	37,800		
22.....	269	6,400	4,650	567	10,400	15,900	508	16,500	22,600		
23.....	236	4,950	3,150	560	9,850	14,900	414	11,300	12,600		
24.....	208	4,100	2,300	587	9,740	15,400	384	7,300	7,570		
25.....	204	4,070	2,240	554	8,960	13,400	396	6,600	7,060		
26.....	185	3,960	1,980	528	8,060	11,500	758	23,100	s 64,500		
27.....	192	3,740	1,940	629	12,000	20,400	1,550	49,100	213,000		
28.....	182	4,070	2,000	650	12,000	21,100	824	38,600	89,100		
29.....	192	4,070	2,110	601	10,400	16,900	682	31,200	57,500		
30.....	215	5,030	2,920	534	8,730	12,600	502	21,700	29,400		
31.....	--	--	--	541	6,380	9,320	--	--	--		
Total.	15,503	--	1,322,130	15,402	--	513,850	21,910	--	2,047,950		
Day	July			Mean discharge (cfs)	August			Mean discharge (cfs)	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.....	368	19,400	19,300	31	19,000	a 1,600	6.9	--	--	e 40	
2.....	282	11,400	8,680	24	15,800	1,020	3.9	--	--	e 8	
3.....	233	7,000	4,400	20	14,000	a 750	1.0	--	--	e 1	
4.....	185	4,750	2,370	16	10,500	454	.2	--	--	--	
5.....	165	3,200	a 1,400	13	3,200	a 110	.2	--	--	--	
6.....	150	2,400	972	9	1,000	a 24	.1	--	--	(t)	
7.....	137	--	e 800	223	4,300	sa 46,000	.1	--	--	--	
8.....	125	--	e 650	3,480	101,000	1,020,000	.1	--	--	--	
9.....	112	1,740	526	1,190	48,000	160,000	.1	--	--	--	
10.....	98	--	e 340	274	30,500	22,600	0	--	--	0	
11.....	86	950	221	126	15,500	5,270	0	--	--	0	
12.....	514	44,400	s 90,400	83	9,000	2,020	0	--	--	0	
13.....	186	31,300	s 17,800	56	--	e 500	0	--	--	0	
14.....	92	11,100	2,760	40	--	e 150	0	--	--	0	
15.....	76	7,700	1,580	30	548	44	0	--	--	0	
16.....	182	19,900	s 11,500	25	--	e 26	0	--	--	0	
17.....	96	11,900	3,080	21	--	e 15	0	--	--	0	
18.....	50	9,000	a 1,200	17	186	9	0	--	--	0	
19.....	32	13,600	1,180	14	--	--	0	--	--	0	
20.....	24	17,000	a 1,100	13	--	e 6	0	--	--	0	
21.....	17	9,700	a 440	9.2	--	--	0	--	--	0	
22.....	13	5,200	a 180	6.9	174	3	0	--	--	0	
23.....	12	2,900	a 95	6.0	164	3	0	--	--	0	
24.....	11	1,100	a 32	16	2,400	sa 150	0	--	--	0	
25.....	83	19,600	s 19,100	20	--	e 300	0	--	--	0	
26.....	253	74,300	52,600	14	--	e 50	3.7	7,800	sa 150		
27.....	157	58,600	25,800	8.7	600	a 14	20	11,000	a 600		
28.....	174	57,000	a 28,000	79	28,000	sa 10,000	79	11,600	b 2,470		
29.....	612	51,600	s 118,000	58	34,000	5,500	94	15,500	3,930		
30.....	87	31,000	a 7,300	26	--	e 2,000	78	14,000	a 2,900		
31.....	40	23,600	2,550	15	--	e 200	--	--	--		
Total.	4,652	--	424,356	5,963.8	--	1,278,830	287.3	--	--	10,100	

Total discharge for year (cfs-days)..... 91,910.2

Total load for year (tons)..... 6,538,416

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
POWDER RIVER AT ARVADA, WYO.--Continued

Particle-size analyses of suspended sediment, November 1954 to September 1955

(Methods of analysis: 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. 4, 1954.....	11:50 a.m.	58	38	3,080	5,300		82		98		98	98	100		--	VPWCM
Nov. 24.....	1:40 p.m.	64	--	2,110	2,060		78		100		--	--	--		--	PWCM
Mar. 9, 1955.....	6:20 p.m.	e 470	--	3,320	2,440		41		68		83	86	94		--	VPWCM
Mar. 10.....	11:40 p.m.	e 1,400	--	5,140	4,030		57		79		94	96	100		--	VPWCM
Mar. 11.....	10:50 a.m.	1,400	33	4,280	2,490		6		72		81	90	98		100	VPN
Mar. 11.....	10:50 a.m.	1,400	33	4,280	2,400		55		70		81	90	98		100	VPWCM
Mar. 30.....	10:30 a.m.	2,910	35	16,500	3,130		5		60		76	91	98		100	VPN
Mar. 30.....	10:30 a.m.	2,910	35	18,500	3,070		41		61		76	91	98		100	VPWCM
Apr. 12.....	1:50 p.m.	1,220	47	52,800	3,430		8		61		92	98	100		--	VPN
Apr. 12.....	1:50 p.m.	1,220	47	52,800	3,500		45		61		92	98	100		--	VPWCM
Apr. 25.....	2:55 p.m.	204	--	4,230	3,400		40		54		81	95	100		--	VPWCM
May 10.....	1:35 p.m.	463	--	13,900	3,030		29		45		90	98	100		--	VPWCM
May 18.....	3:00 p.m.	869	66	18,400	3,290		32		51		91	98	99		100	VPWCM
June 1.....	1:05 p.m.	502	56	8,670	2,830		5		36		84	98	100		--	VPN
June 1.....	1:05 p.m.	502	56	8,670	2,720		22		34		84	98	100		--	VPWCM
June 16.....	1:40 p.m.	502	75	24,000	5,160		63		79		93	98	100		--	VPWCM
June 17.....	1:05 p.m.	1,830	61	66,100	4,250		42		63		88	96	100		--	VPWCM
June 21.....	12:15 p.m.	650	77	19,100	3,060		58		74		94	98	99		100	VPWCM
June 29.....	1:45 p.m.	674	77	32,400	4,950		61		82		94	99	100		--	VPWCM
July 6.....	1:10 p.m.	155	82	2,740	3,500		52		74		88	96	100		--	VPWCM
July 12.....	11:50 a.m.	986	71	81,800	3,270		45		76		95	99	100		--	VPWCM
July 19.....	1:45 p.m.	32	82	14,100	5,610		67		100		--	--	--		--	PWCM
July 27.....	5:45 p.m.	142	81	54,900	5,180		76		97		99	100	--		--	VPWCM
Aug. 6.....	9:10 p.m.	2,740	76	81,200	2,340		43		65		94	99	100		--	VPWCM
Aug. 9.....	9:05 a.m.	731	67	49,400	5,200		53		85		94	99	100		--	VPWCM
Sept. 29.....	1:15 p.m.	96	--	17,400	4,080		84		100		--	--	--		--	PWCM
e Estimated.																

e Estimated.

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 1955.

Water temperatures: February 1951 to May 1954, October 1954 to September 1955.

Sediment records: March 1950 to September 1953.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 3,660 ppm Sept. 30; minimum, 284 ppm Mar. 10-12.

Hardness: Maximum, 1,630 ppm Aug. 11-13; minimum, 102 ppm Mar. 7-8.

Specific conductance: Maximum daily, 4,010 micromhos Sept. 30; minimum freezing point on many days during November to March.

Water temperatures: Maximum, 76°F July 21; minimum, freezing point on many days during November to March.

EXTREMES, 1951-55.--Dissolved solids: Maximum, 3,660 ppm Sept. 30, 1955; minimum, 278 ppm Mar. 29, 1952.

Hardness: Maximum, 1,630 ppm Aug. 11-13, 1955; minimum, 62 ppm Oct. 22-24, 1953.

Specific conductance: Maximum daily, 4,010 micromhos Sept. 30, 1955; minimum daily, 407 micromhos Feb. 14, 1952.

Water temperatures: Maximum (1951-53, 1954-55), 85°F on several days during July 1952, 1953; 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 district office at Worland, Wyo. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bi-car- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids				Hardness as CaCO ₃		So- dium ad- sor- ption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million		Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.					
														Residue at 180°C	Sum									
Oct. 1-25, 1954.....	8.26	--	--	--	--	331	--	304	1,040	38	--	--	--	1,960	--	2.53	41.5	644	395	52	5.7	2,360	7.9	--
Oct. 26-Nov. 14.....	30.5	--	--	--	--	304	--	289	1,080	43	--	--	--	1,920	--	2.61	158	738	501	47	4.9	2,390	8.1	--
Nov. 15-30.....	82.8	--	--	--	--	238	--	256	945	70	--	--	--	1,740	--	2.37	389	740	530	40	3.8	2,160	7.8	--
Dec. 1-15.....	76.0	13	0.00	235	96	333	8.8	406	1,220	84	0.6	3.9	0.22	2,330	2,200	3.17	478	982	649	42	4.6	2,790	8.1	11
Dec. 16-31.....	95.0	--	--	--	--	258	--	396	1,080	60	--	--	--	2,070	--	2.62	531	940	615	37	3.7	2,470	8.0	--
Jan. 1-31, 1955.....	82.9	--	--	--	--	261	--	435	1,080	73	--	--	--	2,120	--	2.88	360	974	617	36	3.6	2,530	8.0	--
Feb. 1-26.....	76.6	--	--	--	--	208	--	376	860	61	--	--	--	1,710	--	2.33	354	802	494	35	3.2	2,120	8.0	--
Mar. 1-23.....	84.2	15	.00	178	79	192	6.7	355	780	64	.5	5.1	.17	1,610	1,500	2.19	366	768	477	35	3.0	2,010	7.8	7
Mar. 24-29.....	105	--	--	--	--	71	--	136	141	8.0	--	--	--	352	--	.48	100	102	0	57	3.1	527	7.3	--
Mar. 30-Apr. 8.....	150	--	--	--	--	94	--	164	303	22	--	--	--	618	--	.84	250	258	124	43	2.5	900	7.2	--
Mar. 10-13.....	1,957	--	--	--	--	46	--	113	113	6.5	--	--	--	284	--	.39	818	110	17	46	1.9	435	7.4	--
Mar. 13-14.....	1,900	--	--	--	--	62	--	159	200	12	--	--	--	461	--	.63	2,360	206	76	38	1.9	673	7.7	--
Mar. 15-23.....	817	--	--	--	--	130	--	152	590	33	--	--	--	1,080	--	1.47	2,380	490	365	36	2.6	1,400	7.6	--
Mar. 24-29.....	212	--	--	--	--	205	--	232	870	49	--	--	--	1,590	--	2.16	910	698	508	38	3.4	1,990	7.9	--
Mar. 30-Apr. 8.....	2,322	--	--	--	--	116	--	194	540	29	--	--	--	1,020	--	1.39	6,400	496	337	33	2.3	1,360	7.6	--
Apr. 9-30.....	1,105	--	--	--	--	157	--	177	685	28	--	--	--	1,220	--	1.66	3,640	538	393	38	2.9	1,590	7.7	--
May 1-2.....	450	--	--	--	--	175	--	229	720	38	--	--	--	1,290	--	1.75	1,570	588	400	38	3.1	1,700	8.1	--
May 3-4.....	1,246	--	--	--	--	164	--	209	428	16	--	--	--	798	--	1.09	2,680	240	69	56	4.6	1,160	7.9	--
May 5-16.....	580	--	--	--	--	172	--	211	650	38	--	--	--	1,180	--	1.60	1,780	498	325	41	3.3	1,580	8.0	--
May 17-22.....	1,593	--	--	--	--	117	--	171	438	20	--	--	--	794	--	1.08	3,420	326	186	41	2.8	1,120	7.9	--

May 23-June 1..	866	--	--	--	82	--	170	340	19	--	--	--	689	--	.94	1,610	330	191	34	2.0	975	7.7	--
June 2-10.....	681	--	--	--	110	--	172	448	25	--	--	--	861	--	1.17	1,580	390	249	37	2.4	1,180	7.7	--
June 11-18.....	486	17	.00	43	144	6.2	188	558	37	.5	3.7	1.17	1,090	1,020	1.48	1,430	476	322	39	2.9	1,450	7.8	20
June 19-20.....	3,100	--	--	--	125	--	203	605	21	--	--	--	1,150	--	1.56	9,630	552	386	33	2.3	1,460	7.6	--
June 21-24.....	1,538	--	--	--	165	--	214	805	43	--	--	--	1,480	--	2.03	6,190	699	524	33	2.7	1,850	7.4	--
June 25-26.....	782	--	--	--	156	--	188	620	29	--	--	--	1,160	--	1.58	2,450	492	338	40	3.1	1,520	7.8	--
June 27-28.....	1,608	--	--	--	126	--	192	520	19	--	--	--	983	--	1.34	4,270	445	288	38	2.6	1,320	7.8	--
June 29.....	3,050	--	--	--	80	--	212	400	16	--	--	--	812	--	1.10	6,690	418	244	28	1.7	1,100	7.4	--
June 30-July 11.	937	--	--	--	136	--	180	645	29	--	--	--	1,190	--	1.62	3,010	550	402	35	2.5	1,530	7.3	--
July 12.....	612	--	--	--	135	--	222	410	17	--	--	--	848	--	1.15	1,400	334	152	46	3.2	1,180	7.5	--
July 13-16.....	324	--	--	--	178	--	213	670	31	--	--	--	1,230	--	1.67	1,080	498	323	42	3.5	1,620	7.4	--
July 17-25.....	179	--	--	--	236	--	226	1,030	50	--	--	--	1,840	--	2.50	689	782	597	39	3.7	2,250	7.3	--
July 26.....	255	--	--	--	204	--	226	845	33	--	--	--	1,500	--	2.04	1,030	626	441	40	3.5	1,870	8.1	--
July 27.....	412	--	--	--	153	--	264	485	16	--	--	--	951	--	1.29	1,060	386	170	45	3.4	1,320	8.1	--
July 28.....	588	--	--	--	86	--	248	225	6.2	--	--	--	550	--	.75	673	240	37	42	2.4	810	8.1	--
July 29-30.....	577	--	--	--	143	--	208	470	11	--	--	--	881	--	1.20	1,370	338	167	45	3.4	1,210	7.6	--
July 31.....	465	--	--	--	122	--	198	313	5.9	--	--	--	640	--	.87	804	222	60	53	3.6	935	7.7	--
Aug. 1-10.....	288	--	--	--	224	--	215	1,250	41	--	--	--	2,140	--	2.31	1,660	985	809	32	3.1	2,460	7.1	--
Aug. 11-13.....	672	--	--	--	157	--	205	1,760	26	--	--	--	2,900	--	3.94	5,260	1,630	1,460	17	1.7	2,940	6.8	--
Aug. 14-31.....	92.7	--	--	--	166	--	204	1,090	25	--	--	--	1,910	--	2.60	478	950	783	27	2.3	2,180	7.1	--
Sept. 1-29.....	8.41	12	.01	73	320	11	258	1,210	40	.6	.4	.23	2,090	1,990	2.84	47.5	800	588	46	4.9	2,550	8.2	23
Sept. 30.....	5.50	--	--	--	504	--	192	2,210	82	--	--	--	3,660	--	4.98	54.4	1,420	1,260	43	5.8	4,010	7.1	--
Weighted aver- age a.....	427	--	--	--	141	--	197	619	29	--	--	--	1,150	--	1.56	1,330	522	360	37	2.7	1,480	--	--

a. Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 1 p.m. and 6 p.m. October to May and between 6 a.m. and 11 a.m. June to September/

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

a Reading obtained between 6 a.m. and 10 a.m.

b Reading obtained between 11 a.m. and 12 m.

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 1955.

Water temperatures: January 1951 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 1,020 ppm Mar. 3-7; minimum, 272 ppm June 12-19.

Hardness: Maximum, 485 ppm Mar. 3-7; minimum, 140 ppm June 12-19.

Specific conductance: Maximum daily, 1,400 microhms Mar. 3; minimum daily, 361 microhms June 25.

Water temperatures: Maximum, 80°F July 17, 18, 31; minimum, freezing point on many days during December to March.

EXTREMES, 1951-55.--Dissolved solids: Maximum, 1,370 ppm Jan. 2-3, 1954; minimum, 206 ppm June 27 to July 1, 1954.

Hardness: Maximum, 649 ppm Jan. 2-3, 1954; minimum, 109 ppm June 27 to July 21, 1954.

Specific conductance: Maximum daily, 2,780 microhms Jan. 14, 1951; minimum daily, 277 microhms June 29, 1954.

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 district office at Worland, Wyo. No appreciable inflow between gaging station and sampling station. Discharge records for gaging station near Sidney for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH or
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium				
Oct. 1-31, 1954....	6,015	--	--	--	--	92	--	211	283	--	--	--	--	614	0.84	9,970	294	111	41	2.4	883	7.8
Nov. 1-30.....	6,508	--	--	--	--	88	--	221	280	--	--	--	--	616	.84	10,860	289	118	39	2.5	893	7.8
Dec. 1-31.....	3,782	13	0.00	76	31	89	4.5	237	303	15	0.5	2.0	--	694	.89	10,160	318	124	37	2.2	946	8.1
Jan. 1-4, 1955....	3,373	--	--	--	--	97	--	264	328	--	--	--	--	733	1.00	6,660	368	140	37	2.2	1,040	8.2
Jan. 5-12.....	3,850	--	--	--	--	112	--	289	365	--	--	--	--	819	1.11	8,510	396	161	38	2.4	1,150	8.0
Jan. 13-31.....	4,087	--	--	--	--	89	--	262	313	--	--	--	--	698	.95	7,700	348	133	36	2.1	1,010	8.0
Feb. 1-26.....	4,618	--	--	--	--	76	--	228	325	--	--	--	--	608	.88	7,190	304	119	36	1.9	892	8.1
Mar. 1-4.....	3,230	--	--	--	--	94	--	256	316	--	--	--	--	686	.98	6,170	347	138	37	2.2	1,020	8.0
Mar. 5-7.....	3,494	--	--	--	--	132	--	324	448	--	--	--	--	1,020	1.39	8,900	495	196	37	2.6	1,380	7.8
Mar. 8-16.....	4,568	12	.10	62	21	70	5.5	184	223	13	.8	3.9	.16	514	.70	8,960	242	91	38	2.0	771	7.6
Mar. 17-Apr. 11....	9,383	--	--	--	--	76	--	195	277	--	--	--	--	589	.80	14,920	287	135	36	1.9	868	7.7
Apr. 12-May 4.....	10,590	--	--	--	--	94	--	197	310	--	--	--	--	680	.90	20,530	299	127	41	2.4	941	7.8
May 5-13.....	13,040	--	--	--	--	84	--	262	263	--	--	--	--	573	.78	15,860	235	60	47	2.7	851	7.9
May 14-23.....	13,820	--	--	--	--	80	--	189	199	--	--	--	--	573	.80	18,750	213	83	38	1.8	673	8.0
May 24-June 11....	19,346	--	--	--	--	44	--	145	141	--	--	--	--	358	.49	18,480	198	57	38	1.4	536	7.7
June 12-19.....	27,400	21	.00	38	11	29	2.5	133	84	5.0	.2	2.7	.09	272	.37	20,120	140	31	31	1.1	408	7.7
June 20-27.....	34,290	--	--	--	--	31	--	120	114	--	--	--	--	299	.41	27,630	156	58	30	1.1	447	7.7
June 28-July 4.....	31,040	--	--	--	--	37	--	134	116	--	--	--	--	315	.43	26,400	155	45	34	1.3	477	7.8
July 5-28.....	12,310	--	--	--	--	44	--	134	129	--	--	--	--	328	.45	10,900	152	42	38	1.5	510	7.9
July 29-Aug. 9.....	8,331	--	--	--	--	67	--	166	218	--	--	--	--	478	.65	10,750	218	80	40	2.0	711	7.7

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sulfate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Per- cent ad- sor- p- tion ratio	So- l- id con- duct- ance (micro- mhos at 25° C)	Col- or or pH		
														Parts per mil- lion	Tons per acre- foot	Tons per acre- foot	Calcium, magnesium	Non- carbon- ate					
Aug. 10-13, 1955.....	4,633	--	--	--	--	113	--	221	485	--	--	--	--	921	1.25	11,520	432	251	36	2.4	1,240	7.8	--
Aug. 14-31.....	3,684	--	--	--	--	87	--	163	288	--	--	--	--	597	.81	5,940	260	110	42	2.3	868	7.9	--
Sept. 1-30.....	3,024	11	0.01	64	32	108	4.9	212	328	13	0.5	0.8	0.26	685	.93	5,590	290	116	44	2.8	953	8.1	6
Weighted average a.....	8,986	--	--	--	--	66	--	177	215	--	--	--	--	491	0.67	11,910	233	68	38	1.9	722	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement between 1 p.m. and 8 p.m./

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

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

MISSOURI RIVER MAIN STEM
MISSOURI RIVER NEAR WILLISTON, N. DAK.

LOCATION.--At gaging station at Lewis and Clark Highway bridge, 5 miles southwest of Williston, Williams County, and 25 miles downstream from Yellow-SUCE River.

Drainage Area.--164,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

EXTREMES, 1951-55.--Dissolved solids: Maximum, 604 ppm June 3.

Hardness: Maximum, 308 ppm Mar. 9; minimum, 160 ppm June 3.

Specific conductance: Maximum, 459 microhms June 18, 28.

Water temperature: Maximum, 76°F July 20; minimum, 33°F May 28 to July 11, 1954.

EXTREMES 1950-55.--Dissolved solids: Maximum, 604 ppm June 3; minimum, 160 ppm June 3.

Hardness: Maximum, 308 ppm Mar. 9; minimum, 160 ppm June 3.

Specific conductance: Maximum, 459 microhms June 18, 28.

Water temperature: Maximum, 76°F July 20; minimum, 33°F May 28 to July 11, 1954.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 adsorption	Specific conductance (microhms at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per million gallons	Calcium, magnesium	Non-carbonate					
Oct. 1-28, 1954.....	34,200	--	--	--	--	60	--	197	194	--	--	--	--	483	0.83	42,750	238	76	35	1.7	701	8.0	--
Oct. 29-Nov. 12.....	26,640	--	--	--	--	82	--	200	204	--	--	--	--	485	.66	34,890	244	80	36	1.7	724	8.0	--
Nov. 13-Dec. 6.....	13,190	13	0.00	--	65	72	4.0	217	230	11	0.6	0.8	--	542	.74	19,300	270	92	36	1.9	805	8.0	5
Dec. 7-26.....	11,770	--	--	--	--	75	--	224	235	--	--	--	--	559	.76	17,780	278	94	37	1.9	824	8.1	--
Dec. 27-Jan. 23, 1955.....	9,106	--	--	--	--	77	--	240	255	--	--	--	--	592	.81	14,560	302	105	36	1.9	872	8.1	--
Jan. 24-Feb. 7.....	11,030	--	--	--	--	89	--	222	238	--	--	--	--	540	.73	16,080	279	97	35	1.8	808	7.8	--
Feb. 8-11.....	10,660	--	--	--	--	64	--	204	220	--	--	--	--	502	.68	14,450	257	90	35	1.7	754	7.9	--
Feb. 12-13.....	9,770	--	--	--	--	76	--	236	238	--	--	--	--	600	.82	15,830	301	107	35	1.9	860	7.6	--
Feb. 14-Mar. 6.....	9,223	11	.00	65	27	67	4.7	215	226	12	.6	2.1	.17	537	.73	13,370	272	96	34	1.8	793	8.0	4
Mar. 7-8.....	9,820	--	--	--	--	57	--	185	189	--	--	--	--	450	.61	11,930	232	80	35	1.6	681	7.7	--
Mar. 9.....	10,000	--	--	--	--	76	--	242	263	--	--	--	--	604	.82	16,310	308	110	35	1.9	895	7.5	--
Mar. 10-12.....	11,630	--	--	--	--	50	--	188	168	--	--	--	--	398	.54	12,500	208	54	33	1.5	622	7.5	--
Apr. 3-6.....	56,880	--	--	--	--	55	--	167	182	--	--	--	--	420	.57	64,500	213	76	36	1.6	650	7.9	--
Apr. 7-13.....	32,600	--	--	--	--	60	--	166	184	--	--	--	--	428	.58	37,670	200	64	39	1.8	651	7.6	--
Apr. 14-30.....	29,050	--	--	--	--	72	--	178	225	--	--	--	--	493	.67	38,670	225	79	41	2.1	750	7.9	--
May 1-24.....	27,740	--	--	--	--	70	--	191	198	--	--	--	--	492	.67	36,850	217	60	41	2.1	741	7.7	--
May 25-June 2.....	35,880	--	--	--	--	52	--	185	160	--	--	--	--	391	.53	37,880	189	54	37	1.6	601	7.7	--
June 3.....	30,900	--	--	--	--	34	--	150	99	--	--	--	--	302	.41	29,200	160	37	32	1.2	470	7.8	--
June 4-16.....	34,060	18	.00	44	18	48	3.4	157	145	6.0	.4	1.3	.13	374	.51	34,410	184	54	36	1.5	569	7.7	7
June 17.....	41,900	--	--	--	--	57	--	170	166	--	--	--	--	415	.56	46,950	196	57	39	1.8	634	7.8	--

June 18-30.....	50,030	--	--	37	140	124	--	--	--	324	.44	43,770	167	52	32	1.2	488	7.6
July 1-25.....	41,470	--	--	49	187	154	--	--	--	389	.53	43,560	195	56	32	1.5	584	7.9
July 26-28.....	36,800	--	--	51	173	170	--	--	--	393	.53	39,050	200	58	33	1.6	583	7.7
July 29-Aug. 31....	33,000	--	--	56	191	193	--	--	--	443	.60	39,470	228	71	24	1.6	692	7.8
Sept. 1-30.....	29,610	.00	55	25	60	4.4	9.0	6	1.5	.13	.63	37,260	238	76	33	1.7	693	7.8
Weighted aver-																		
age a.....	25,880	--	--	58	186	188	--	--	--	449	0.61	31,370	223	70	36	1.7	678	--
age b.....	25,340	--	--	58	185	187	--	--	--	448	0.61	30,850	223	71	36	1.7	677	--

a Represents 96 percent of runoff for water year October 1954 to September 1955.

b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

MISSOURI RIVER MAIN STEM--Continued

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

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 4 p.m. and 8 p.m./

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

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

b Reading obtained between 11 a.m. and 2 p.m.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER BELOW GARRISON DAM, N. DAK.

LOCATION.--Temperature recorder at gaging station, 4.3 miles north of Stanton, Mercer County, 5 miles upstream from Knife River, and 9 miles downstream from Garrison Dam.
 DRAINAGE AREA.--181,400 square miles, approximately.
 RECORDS AVAILABLE.--Water temperatures: June 1952 to September 1955.
 EXTREMES, 1954-55.--Water temperatures: Maximum, 72° F on several days in August; minimum, 72° F on several days in August; freezing point Jan. 25, Feb. 4.
 EXTREMES, 1952, 1954-55.--Water temperatures: Maximum, 76° F July 27, 28, 1954; minimum (1954-55), freezing point Jan. 25, Feb. 4, 1955.
 REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955

/Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph, October, November, April to September/

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

GRAND RIVER BASIN

GRAND RIVER NEAR SHADEHILL, S. DAK.

LOCATION.--At irrigation outlet of Shadehill Reservoir, 1 mile upstream from gaging station, 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 1953 to September 1955.

Water temperatures: August 1954 to September 1955.

EXTREMES, 1934-35.--Dissolved solids: Maximum, 847 ppm Apr. 4-7; minimum, 760 ppm Oct. 1-31.

Hardness: Maximum, 167 ppm Apr. 4-7; minimum, 144 ppm Aug. 1-31.

Specific conductance: Maximum daily, 1,290 micromhos Apr. 4, 5; minimum daily, 1,120 micromhos Oct. 8-9, 11-16, 18-19, 21.

Water temperatures: Maximum, 78 F Aug. 3.

EXTREMES, August 1954 to September 1955.--Dissolved solids: Maximum, 847 ppm Apr. 4-7, 1955; minimum, 725 ppm Aug. 13 to Sept. 13, 1954.

Hardness: Maximum, 167 ppm Apr. 4-7, 1955; minimum, 144 ppm Aug. 1-31, 1955.

Specific conductance: Maximum daily, 1,290 micromhos Apr. 4, 5, 1955; minimum daily, 1,090 micromhos Aug. 13, 16, 18-20, 24-28, 31, Sept. 12, 1954.

Water temperatures: Maximum, 78 F Aug. 3, 1955.

REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Flow is regulated by an ungated spillway and by regulated irrigation outlet. No water released from reservoir during November, December, and most of January. Discharge records for gaging station at Shadehill for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180° C)	Hardness as CaCO ₃		Percent sodium	Specific conductance (micro-mhos at 25° C)
															Calcium	Non-carbonate		
Oct. 1-31, 1954.....	5.95	5.7		34	16	206	7.2	331	0	320	5.0		0.31	760	152	152	74	1,140
Jan. 21-Feb. 13, 1955	5.42	5.0		33	19	221	7.4	340	10	343	4.5		.33	816	111	111	0	1,240
Feb. 14-28.....	5.60	4.4		33	19	222	7.5	348	8	345	4.5		.32	825	112	112	0	1,250
Mar. 1-29.....	5.07	6.0		33	20	222	7.4	348	8	348	5.5		.32	828	113	113	0	1,250
Mar. 30-Apr. 3.....	6.24	3.5		34	18	214	7.5	337	9	335	5.0		.30	814	111	113	0	1,220
Apr. 4-7.....	5.58	5.0		35	19	228	7.6	350	9	358	4.5		.32	847	115	12.8	0	1,270
Apr. 8-30.....	5.57	6.9		33	18	214	7.3	335	8	330	4.0		.32	804	109	12.1	0	1,210
May 1-31.....	3.86	4.4		30	20	218	7.6	320	16	338	5.5		.32	803	109	8.37	0	1,210
June 1-30.....	18.3	7.3		34	16	217	7.2	326	13	335	5.0		.33	807	110	39.9	0	1,220
July 1-31.....	15.6	4.7		29	18	224	7.2	332	10	347	5.0		.30	811	110	34.2	0	1,230
Aug. 1-31.....	12.5	3.7		30	17	231	8.2	342	11	325	4.0		.32	837	114	28.2	0	1,260
Sept. 1-30.....	11.3	3.2		30	17	226	7.8	333	9	340	3.5		.31	814	111	24.8	0	1,250
Weighted average a.	3.34	5.1		32	17	221	7.5	354	--	337	4.6		0.32	812	113	20.3	0	1,230

a Represents 100 percent of runoff at sampling station and 97 percent of runoff at gaging station, 1 mile downstream from dam, for water year October 1954 to September 1955.

b Includes carbonate as bicarbonate.

GRAND RIVER BASIN--Continued

GRAND RIVER NEAR SHADEHILL, S. DAK.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (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			--	35	38	45	--	--	66	75	71
2	--			--	36	38	42	51	60	67	75	71
3	--			--	a 37	39	--	51	--	--	78	71
4	56			--	a 37	--	43	52	60	--	75	--
5	54			--	37	--	41	48	--	68	76	--
6	53			--	--	--	--	53	61	68	75	70
7	53			--	38	38	--	--	61	68	--	69
8	a 53			--	a 38	38	42	53	59	68	73	68
9	54			--	36	40	a 46	--	59	--	74	68
10	--			--	37	39	--	54	59	--	74	66
11	52			--	35	39	45	54	58	69	74	--
12	50			--	37	41	45	56	--	70	74	67
13	51			--	--	--	a 46	55	60	70	74	66
14	51			--	37	a 40	40	--	59	71	--	66
15	53			--	37	39	--	--	60	72	74	65
16	53			--	38	41	47	56	61	72	74	66
17	--			--	37	41	--	56	62	--	73	--
18	52			--	37	41	45	58	--	72	73	--
19	52			--	37	--	46	59	--	72	74	65
20	50			--	--	--	47	59	56	72	73	--
21	50			--	36	41	45	59	54	73	--	62
22	50			--	37	41	46	--	62	73	73	65
23	--			--	37	40	47	60	60	--	73	a 63
24	--			--	37	--	47	58	63	--	73	--
25	49			--	36	40	--	56	64	--	73	--
26	49			--	--	40	49	--	--	73	74	60
27	48			37	--	--	--	56	65	73	73	59
28	47			36	a 37	42	49	58	65	73	--	59
29	--			a 37	--	41	52	--	67	73	73	59
30	--			--	--	42	50	--	66	73	73	a 59
31	--			a 37	--	42	--	--	--	--	73	--
Average	--			--	--	--	--	--	--	--	74	--

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

GRAND RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN GRAND RIVER BASIN IN SOUTH DAKOTA
Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids		Hardness as CaCO ₃		Per- cent so- dium	So- dium ad- sorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	
															Tons per acre foot	Calcium, mag- nesium	Non-carbon- ate					
																		Parts per million				Sum at 180°C
NORTH FORK GRAND RIVER NEAR WHITE BUTTE																						
May 5, 1954.....	a 13			51	30	260	7.4	322	8	500	4.0			0.55	1,050	1.43	252	0	68	7.2	1,520	8.4
Oct. 12.....	2			40	26	218	11	297	0	415	5.0			.52	898	1.22	206	0	68	6.6	1,320	8.0
Aug. 9, 1955.....	5.8	7.2	0.01	33	22	291	8.9	348	12	510	5.0	0.8	1.3	.69	1,070	1.46	172	0	78	9.6	1,570	8.4
SOUTH FORK GRAND RIVER NEAR CASH																						
May 5, 1954.....	15			18	10	488	5.7	655	34	503	10			0.37	1,430	1.94	86	0	92	23	2,120	8.7
Oct. 12.....	8.4			12	7.8	632	10	889	33	605	12			.52	1,770	2.41	62	0	95	35	2,580	8.6
Aug. 9, 1955.....	9.8	10	0.09	14	12	399	6.8	586	18	415	7.0	0.8	1.1	.39	1,170	1.59	84	0	90	19	1,750	8.3
a. Daily mean discharge.																						

a Daily mean discharge.

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.

Sediment records: March 1950 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 16,000 ppm May 17; minimum daily, no flow Oct. 1-12.

Sediment loads: Maximum daily, 43,000 tons May 18; minimum daily, 0 tons Oct. 1-12.

EXTREMES, 1950-55.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days during 1950, 1952-55.

Sediment loads: Maximum daily, 56,000 tons (estimated) May 30, 1953; minimum daily, 0 tons on many days during 1950, 1952-55.

REMARKS.--Flow affected by ice Nov. 26-28, Dec. 3 to Apr. 6. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Suspended sediment, water year October 1954 to September 1955

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	0.1			1.5		
2.....	0	--	0	.1			1.5		
3.....	0	--	0	.1			2.4		
4.....	0	--	0	.2			5.0		
5.....	0	--	0	.3			5.5		
6.....	0	--	0	.2			4.5		
7.....	0	--	0	.2			5.0		
8.....	0	--	0	.2			4.5		
9.....	0	--	0	.3			4.0		
10.....	0	--	0	.3			4.5		
11.....	0	--	0	.4			4.6		
12.....	0	--	0	.4			4.3		
13.....	1.3			.5			4.6		
14.....	3.7			.5			4.5		
15.....	1.5	--	e 1	.6	15	(t)	4.7		
16.....	1.5			.5			5.0	245	4
17.....	1.8			.6			5.5		
18.....	1.8			.6			5.0		
19.....	1.8			.5			5.5		
20.....	1.3			.4			6.0		
21.....	1.2	21	(t)	.6			7.0		
22.....	1.1			.5			8.0		
23.....	.8			.6			9.0		
24.....	.4			.7			11		
25.....	.4			.5			13		
26.....	.3			.4			11		
27.....	.2	8	(t)	.6			9.0		
28.....	.2			1.0			7.0		
29.....	.3			1.5			8.0		
30.....	.3			1.6			7.5		
31.....	.1			--		--	8.0		
Total.	20.0	--	6	15.0		1	186.6		124

e Estimated.

t Less than 0.50 ton.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	8.5			4.5			10		
2.....	10			4.3			11		
3.....	9.5			4.0			14		
4.....	9.0			3.5			12		
5.....	9.0			4.0			9	211	7
6.....	7.0			4.2			11		
7.....	5.0			4.5			15		
8.....	3.0			5.0			20		a 48
9.....	2.0			4.5			100	1,400	378
10.....	2.5			3.5			400	2,000	2,160
11.....	2.7			4.0			450	2,800	3,400
12.....	3.0			4.5			440	4,100	4,870
13.....	2.5			5.0	81	1	250	2,500	1,690
14.....	3.0			5.5			200	1,700	918
15.....	3.5			6.2			160	3,500	1,510
16.....	3.2	134	2	6.5			100	2,600	702
17.....	3.0			7.0			80	1,600	a 340
18.....	2.8			6.0			60		
19.....	2.7			5.0			45		
20.....	2.5			5.5			35		
21.....	2.4			6.0			30		
22.....	2.3			5.5			35		
23.....	2.4			5.0			40	1,050	121
24.....	2.7			4.5			35		
25.....	3.0			6.0			30		
26.....	3.2			6.0	235	4	40		
27.....	3.5			7.0			50		
28.....	3.8			9.0			70		
29.....	4.0			--	--	--	150	2,400	972
30.....	4.2			--	--	--	230	3,700	2,300
31.....	4.4			--	--	--	210	3,500	a 2,000
Total.	130.3		62	146.2	--	40	3,342	--	22,668
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.....	330	4,400	a 3,900	0.7			3.4	159	2
2.....	200	3,100	a 1,700	.5			7.8	240	sa 7
3.....	150	2,200	a 900	1.2	90	(t)	90	1,230	s 533
4.....	110	1,800	a 550	1.2			240	5,700	sa 3,900
5.....	60	1,400	a 220	93	13,000	sa 4,400	48	2,800	a 360
6.....	40	1,100	119	40	10,700	s 1,270	22	1,500	89
7.....	38	800	a 80	16	3,800	a 160	14	700	a 26
8.....	44	750	89	8.2	750	a 17	9.5	380	a 10
9.....	70	2,100	sa 480	5.1	400	6	7.2	230	4
10.....	205	4,100	sa 2,400	4.0	280	3	5.1	135	2
11.....	448	6,860	8,300	1.3			4.3	100	a 1
12.....	397	7,600	a 8,100	1.1			4.0	100	a 1
13.....	222	4,400	sa 2,800	1.0	96	(t)	10	130	4
14.....	119	3,180	1,020	.9			6.9	120	a 2
15.....	78	2,050	432	.6			8.5	155	4
16.....	48	1,100	a 140	4.1	450	s 29	6.0	90	2
17.....	35	700	a 65	651	16,000	sa 32,000	4.0	90	1
18.....	26	500	a 36	1,060	14,000	sb 43,000	19	2,000	sa 180
19.....	18	370	18	1,260	11,000	sb 36,000	118	6,500	sa 2,400
20.....	13	--	e 12	157	2,000	sa 900	140	9,300	s 3,890
21.....	8.8			58	1,000	a 160	47	4,500	571
22.....	6.6	198	5	35	340	a 32	27	1,000	73
23.....	5.1			26	198	14	15	200	a 8
24.....	5.4			20	190	a 10	12	195	6
25.....	2.0	--	e 2	14	176	7	24	360	a 24
26.....	1.8			13	152	5	16	340	a 15
27.....	1.0			9.9	150	4	9.1	300	a 7
28.....	1.0			7.9			7.2	220	a 4
29.....	.9	104	(t)	6.3	--	e 3	4.8	170	2
30.....	.9			5.7			12	240	a 8
31.....	--	--	--	5.1	205	3	--	--	--
Total.	2,684.5	--	31,377	3,507.8	--	118,031	941.8	--	12,136

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.

CHEYENNE RIVER BASIN--Continued

BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	July			August			September		
	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.....	6.9			0.3			1.1		
2.....	4.0			.4			.9		
3.....	2.4			.5			.7		
4.....	1.5			.5	6	(t)	1.0		
5.....	1.2			1.2			.8		
6.....	1.1			1.5			.6		
7.....	.8			26	2,570	s 505	.7		
8.....	.8			74	2,900	sa 1,200	.7		
9.....	.9			4.6	110	1	.4		
10.....	1.0	233	1	1.3	70	(t)	1.0	13	(t)
11.....	1.3			35	650	sa 120	1.5		
12.....	1.6			25	353	s 31	2.6		
13.....	1.1			219	11,100	s 7,910	3.4		
14.....	.9			38	3,000	sa 500	3.1		
15.....	1.0			14	270	10	2.6		
16.....	1.0			20	452	s 66	2.9		
17.....	.9			30	1,050	s 98	2.6		
18.....	.6			13	280	a 10	1.5		
19.....	.6			7.9			1.1		
20.....	.5			4.8			3.6	70	a 1
21.....	.7			6.6	48	1	2.6	65	a 1
22.....	1.1			4.6			59	1,960	s 1,050
23.....	1.0			2.2			116	13,000	s 4,550
24.....	.5	12	(t)	1.3			29	7,200	sa 650
25.....	.8			1.3			16	1,200	a 50
26.....	1.3			1.0			169	7,100	s 4,630
27.....	.9			.8	28	(t)	167	8,680	s 4,270
28.....	2.0			.8			52	4,250	s 637
29.....	2.0			.7			23	1,400	a 85
30.....	1.5			.5			13	130	5
31.....	1.0			.5			--	--	--
Total.	42.9	--	17	537.3	--	10,454	679.4	--	15,930

Total discharge for year (cfs-days)..... 12,233.8
 Total load for year (tons)..... 210,846

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued
BEAVER CREEK NEAR NEWCASTLE, WYO.--Continued

Particle-size analyses of suspended sediment, March to September 1955
(Methods of analysis: 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	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, 1955.....	a 400	34	2,160	2,480	--	74		92		98	--	--		--		SPWCM
Mar. 11.....	a 450	34	2,870	3,750	--	72		93		99	--	--		--		SPWCM
Mar. 12.....	a 440	34	4,300	4,880	--	77		98		98	--	--		--		SPWCM
Mar. 13.....	a 250	--	3,150	2,040	--	75		94		100	--	--		--		SPWCM
Mar. 15.....	a 160	--	3,590	4,270	--	2		94		100	--	--		--		VPN
Mar. 15.....	a 160	--	3,590	4,350	--	72		94		100	--	--		--		VPWCM
Mar. 29.....	a 150	36	1,960	1,100	56	61		63		63	65	68		71		BWCM
Mar. 30.....	a 230	36	3,790	4,280	67	87		88		99	100	--		--		VPWCM
Apr. 8.....	44	--	783	1,910	--	87		100		--	--	--		--		PWCM
Apr. 11.....	417	42	7,150	4,760	--	69		94		99	100	--		--		VPWCM
Apr. 14.....	114	52	3,140	4,730	--	78		97		100	--	--		--		SPWCM
May 6.....	42	--	11,000	7,770	--	82		100		--	--	--		--		PWCM
May 16.....	581	50	6,540	6,880	--	2		98		98	100	--		--		VPN
May 18.....	581	50	6,540	7,050	--	84		96		99	100	--		--		VPWCM
May 19.....	849	60	7,620	3,190	--	85		99		100	--	--		--		SPWCM
June 3.....	142	67	1,560	1,790	58	63	75	93		97	98	99		99		BWCM
June 6.....	22	62	1,460	2,360	--	99		100		--	--	--		--		PWCM
June 21.....	40	--	2,870	3,270	--	0		99		--	--	--		--		PN
June 21.....	40	--	2,870	3,250	--	87		100		--	--	--		--		PWCM
June 22.....	27	69	760	452	50	84		90		92	93	96		96		BWCM
Aug. 12.....	36	62	532	1,270	56	75		93		96	97	100		--		BWCM
Aug. 13.....	276	73	25,500	1,920	--	85		100		--	--	--		--		PWCM
Sept. 27.....	138	--	7,070	2,500	--	84		99		--	--	--		--		PWCM

a Daily mean discharge.

a Daily mean discharge.

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 1955.

Sediment records: April 1946 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 84°F July 17; minimum, 33°F Mar. 18.

Sediment concentrations: Maximum daily, 36,400 ppm June 4; minimum daily, not determined.

Sediment loads: Maximum daily, 254,000 tons Aug. 9; minimum daily, less than 0.50 ton Aug. 2, 3.

EXTREMES, 1946-55.--Water temperatures (1947-49, 1951-55): 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, not determined.

Sediment loads: Maximum daily, 612,000 tons June 28, 1952; minimum daily, 0.1 or less on several days during some years.

REMARKS.--Maximum observed sediment concentration during water year, 50,100 ppm Aug. 8.

Records of discharge for water year October 1954 to September 1955 given in WF¹ 1389.

Temperature (°F) of water, water year October 1954 to September 1955

/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	--	--	--	--	a 54	--	37	54	60	60	a 74	--
2	a 66	--	a 54	--	--	a 54	40	58	a 56	62	--	--
3	--	a 60	--	--	a 51	55	44	50	56	66	a 76	a 79
4	--	--	a 53	--	--	--	34	46	58	77	a 71	a 73
5	a 62	--	--	--	a 50	a 35	--	50	58	66	a 78	--
6	a 60	a 59	--	--	--	a 36	39	54	55	68	a 80	a 70
7	a 66	--	--	--	a 56	a 36	46	a 68	56	a 74	--	--
8	a 65	a 58	--	a 47	--	a 37	a 59	a 64	59	a 74	--	70
9	a 64	--	--	--	--	--	46	54	52	a 76	77	--
10	--	a 56	a 52	--	a 45	a 38	44	--	54	a 81	66	--
11	a 58	--	--	--	--	39	50	60	54	a 73	66	a 67
12	a 58	a 56	a 52	--	a 52	a 43	--	59	56	a 76	68	a 70
13	a 58	--	--	--	--	38	38	64	56	a 73	62	a 70
14	a 56	a 56	a 52	a 44	a 54	35	44	a 70	59	a 76	68	--
15	a 62	--	--	--	--	34	48	a 72	64	a 74	65	--
16	a 64	--	--	--	a 56	--	46	68	65	a 74	68	a 70
17	--	--	49	--	--	--	49	52	63	a 84	66	--
18	a 64	a 56	--	a 44	a 49	33	48	54	a 73	a 78	68	--
19	--	--	a 56	--	--	--	52	52	68	--	71	--
20	a 60	a 56	--	a 44	--	a 36	44	58	70	a 76	68	--
21	a 65	--	--	--	--	a 39	45	60	65	a 76	65	57
22	a 65	--	--	a 48	--	a 44	51	62	64	a 78	64	55
23	--	--	--	--	--	a 48	51	--	65	a 70	70	48
24	--	--	--	--	a 50	--	45	58	64	a 78	65	48
25	--	--	a 54	--	--	--	52	59	61	a 77	a 81	43
26	--	a 53	--	a 48	a 52	a 40	52	54	63	a 79	68	56
27	--	--	--	--	--	--	50	51	75	a 76	68	48
28	--	a 60	--	a 49	a 55	--	44	50	62	--	--	50
29	--	--	--	--	--	39	48	48	66	a 83	a 68	48
30	--	--	--	a 54	--	--	57	55	65	64	--	48
31	--	--	a 51	--	--	40	--	61	--	a 78	--	--
Average	--	--	--	--	--	--	46	57	61	74	70	--

a Reading obtained between 2 p.m. and 8 p.m.

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1954 to September 1955

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.....	16			22			20		
2.....	16			22			20		
3.....	15			19			19		
4.....	16			19			19		
5.....	18			18			21		
6.....	17			18			23		
7.....	17			17			23		
8.....	17			17			22		
9.....	19			17			21		
10.....	19			17			22		
11.....	18			17			22		
12.....	19			17			22		
13.....	21			17			21		
14.....	19			17			21		
15.....	20			17			21		
16.....	22	25	1	21	18	1	21	23	1
17.....	22			24			21		
18.....	23			23			21		
19.....	23			23			22		
20.....	23			23			21		
21.....	23			23			21		
22.....	23			22			21		
23.....	23			22			22		
24.....	22			22			23		
25.....	23			23			23		
26.....	24			23			22		
27.....	24			23			21		
28.....	24			23			21		
29.....	23			23			21		
30.....	22			24			22		
31.....	22			--			22		
Total.	633		31	613		30	662		31
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	23			21			23	23	1
2.....	22			22			26	43	3
3.....	21			23			23	60	4
4.....	22			23			26	60	a 4
5.....	22			23			79	448	s 120
6.....	21			23			63	164	28
7.....	20			23			121	233	s 85
8.....	20			23			198	1,180	s 786
9.....	19			23			303	1,400	s 1,250
10.....	19			21			692	5,730	s 11,400
11.....	19			21			999	10,100	27,200
12.....	19			20			948	9,270	23,700
13.....	19			21			913	8,180	20,200
14.....	19			23			685	6,460	s 12,600
15.....	19			24	13	1	405	2,100	2,300
16.....	19	19	1	23			243	1,200	787
17.....	19			24			287	1,600	1,150
18.....	19			24			156	800	337
19.....	19			24			106	362	104
20.....	19			24			68	279	51
21.....	19			24			54	238	35
22.....	20			24			43	180	21
23.....	20			24			46	444	55
24.....	20			26			43	163	19
25.....	21			26			44	140	17
26.....	22			24			71		34
27.....	22			24			108	246	72
28.....	22			24			121	380	124
29.....	23			--		--	89	275	s 72
30.....	23			--		--	210	900	510
31.....	23			--		--	849	8,740	s 23,600
Total.	634		31	649		28	8,022	--	126,869

s Computed by subdividing day.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

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

Suspended sediment, water year October 1954 to September 1955--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.....	1,250	20,100	67,800	83	217	49	104	1,210	340
2.....	1,180	16,500	52,600	74	190	38	94	870	221
3.....	830	10,600	23,800	62	223	37	154	2,200	s 2,670
4.....	540	7,600	11,100	59	158	25	1,650	36,400	168,000
5.....	326	4,820	4,240	56	130	20	1,080	25,400	74,100
6.....	229	3,450	2,130	52	82	12	521	13,000	18,300
7.....	137	1,900	703	77	548	s 128	322	8,000	6,960
8.....	126	1,180	401	57	300	46	192	4,300	2,230
9.....	204	2,360	s 1,670	44	95	11	147	2,550	1,010
10.....	570	7,290	s 11,800	41	44	5	135	1,510	550
11.....	1,020	10,800	s 32,500	38	35	4	127	950	326
12.....	2,530	28,900	197,000	32	11	1	109	620	182
13.....	1,970	19,900	106,000	28	10	1	115	648	201
14.....	1,540	12,300	51,100	27	15	1	109	400	118
15.....	2,360	16,400	s 110,000	25	12	1	98	380	101
16.....	2,620	21,500	152,000	31	734	s 120	181	6,860	3,350
17.....	1,860	14,000	70,300	88	1,410	s 348	130	9,500	3,330
18.....	1,520	9,700	39,800	1,970	21,400	s 115,000	370	14,400	s 17,400
19.....	1,480	9,300	37,200	1,810	17,500	85,500	946	28,000	71,500
20.....	1,210	7,500	24,500	1,690	13,300	s 92,600	658	20,000	35,500
21.....	865	5,300	12,400	589	6,400	10,200	676	17,000	31,000
22.....	611	3,600	5,940	281	4,800	3,640	424	9,000	10,300
23.....	452	2,220	2,710	221	3,700	2,210	413	9,180	s 12,000
24.....	323	1,850	1,610	147	2,500	992	325	15,200	13,300
25.....	253	1,300	888	248	8,500	5,690	172	7,780	s 3,870
26.....	180	980	476	350	12,700	s 13,200	135	3,000	1,090
27.....	141	750	286	470	17,900	22,700	122	2,700	889
28.....	122	520	171	553	14,300	21,400	120	4,100	1,330
29.....	116	436	137	295	8,000	s 6,920	329	13,200	s 26,100
30.....	100	293	79	162	3,300	1,440	831	32,500	s 76,700
31.....	--	--	--	125	1,400	472	--	--	--
Total.	26,685	--	1,021,341	9,785	--	352,809	10,789	--	582,968
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.....	365	19,200	18,900	8	31	1	34	96	9
2.....	222	10,500	6,290	8	21	(t)	30	84	7
3.....	162	5,460	2,390	7	20	(t)	26	48	3
4.....	126	2,700	919	34	4,020	s 558	22	35	2
5.....	87	1,200	282	15	334	14	20	30	a 2
6.....	66	614	110	11	100	3	18	21	1
7.....	49	465	62	10	140	4	16	20	1
8.....	40	318	34	2,600	19,600	s 217,000	16	21	1
9.....	30	131	11	4,280	22,100	254,000	16	130	6
10.....	22	--	--	1,660	16,400	s 76,200	16	110	a 5
11.....	19	--	--	733	11,500	22,800	16	30	1
12.....	18	--	--	1,190	12,300	s 45,000	16	20	1
13.....	15	--	--	1,470	6,400	25,400	15	47	2
14.....	10	--	--	551	3,400	5,060	12	80	3
15.....	10	--	--	376	5,700	5,790	11	122	4
16.....	8	--	--	201	2,500	1,380	12	65	2
17.....	8	--	--	142	900	345	12	50	2
18.....	8	--	--	366	5,400	s 9,480	13	45	2
19.....	8	20	1	358	18,700	18,100	20	194	s 19
20.....	9	--	--	210	8,640	4,900	158	2,550	s 2,330
21.....	10	--	--	151	4,260	1,740	1,640	13,200	58,400
22.....	9	--	--	126	3,950	1,340	1,240	17,400	s 55,500
23.....	10	--	--	103	3,200	880	572	14,300	s 23,200
24.....	10	--	--	90	2,200	535	395	10,400	11,100
25.....	10	--	--	77	1,320	275	218	5,280	3,110
26.....	8	--	--	60	670	109	137	2,410	891
27.....	10	--	--	49	297	38	190	2,630	1,350
28.....	9	150	4	47	218	28	298	7,480	6,020
29.....	28	1,260	s 167	46	225	28	177	4,900	2,340
30.....	26	542	s 49	54	609	s 94	92	2,300	571
31.....	10	74	2	43	191	22	--	--	--
Total.	1,422	--	29,238	15,056	--	691,096	5,456	--	164,885
Total discharge for year (cfs-days).....									80,406
Total load for year (tons).....									2 969,357

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, March to September 1955

(Methods of analysis: 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. 12, 1955.....	11:55 a. m.	869	--	8,180	2,600	56		68		75	84	98		VPWCM
Apr. 1.....	12:30 p. m.	1,280	42	16,100	5,970	60		80		89	94	100	--	VPWCM
Apr. 12.....	6:00 p. m.	2,710	--	29,200	5,270	48		71		87	93	99	100	VPWCM
Apr. 14.....	1:15 p. m.	1,430	52	12,000	3,600	4		75		92	96	99	100	VPN
Apr. 14.....	1:15 p. m.	1,430	52	12,000	3,260	62		82		92	96	99	100	VPWCM
May 23.....	10:30 a. m.	212	--	3,920	6,430	88		99		--	--	--	--	PWCM
May 27.....	5:30 p. m.	475	--	17,800	3,480	81		98		98	99	99	100	VPWCM
May 28.....	6:00 a. m.	491	50	19,100	3,400	90		--		97	98	100	100	VPWCM
May 28.....	7:00 p. m.	614	--	11,600	3,490	86		--		95	97	98	100	VPWCM
June 1.....	11:10 a. m.	104	64	1,350	3,990	86		--		99	100	--	--	VPWCM
June 20.....	3:40 p. m.	649	76	18,800	3,390	74		87		90	90	92	96	VPWCM
June 29.....	8:00 p. m.	1,020	72	29,800	5,680	55		82		98	99	100	100	VPWCM
Aug. 8.....	6:15 p. m.	4,460	--	25,200	4,600	6		71		92	97	99	100	VPN
Aug. 8.....	6:15 p. m.	4,460	--	25,200	4,830	53		73		92	97	99	100	VPWCM
Aug. 9.....	8:00 a. m.	4,370	--	19,000	3,220	53		68		84	93	98	100	VPWCM
Aug. 10.....	5:15 p. m.	1,140	74	14,400	4,500	65		85		95	98	100	--	VPWCM
Aug. 17.....	5:15 p. m.	157	82	652	1,470	81		--		97	98	99	100	BWM
Aug. 23.....	6:00 a. m.	105	--	3,200	4,440	94		99		--	--	--	--	PWCM
Sept. 28.....	3:50 p. m.	290	62	6,830	5,550	3		84		98	99	100	--	VPN
Sept. 28.....	3:50 p. m.	290	62	6,830	5,940	86		97		98	99	100	--	VPWCM

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, $4\frac{1}{2}$ miles upstream from Fall River, and $6\frac{1}{2}$ miles southeast of Hot Springs, Fall River County.

DRAINAGE AREA.--9,100 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: October 1951 to September 1953, October 1954 to September 1955.

REMARKS.--Maximum observed sediment concentration during water year, 30 ppm July 19.

Discharge records for gaging station below Angostura Dam for water year October 1954 to September 1955 given in WSP 1389.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1954 to September 1955

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October.....	62.4	124	e 6.2	0.2			--	--
November.....	49.5	98	e 3.0	.1			--	--
December.....	92.5	183	e 6.2	.2			--	--
January.....	49.4	98	e 3.1	.1			--	--
February.....	55.1	109	e 2.8	.1			--	--
March.....	67.8	134	e 3.1	.1			--	--
April.....	3,461.7	6,870	74.5	2.5			8	13
May.....	6,360	12,610	120.9	3.9			7	11
June.....	8,165	16,200	132.0	4.4			6	12
July.....	2,405.7	4,770	102.7	3.3			16	30
August.....	1,738.1	3,450	24.8	.8			5	6
September.....	1,609.5	3,190	42.0	1.4			10	16
Water year 1954-55..	24,116.7	47,840	521.3	1.4			8	30

e Estimated.

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER BELOW MOORCROFT, WYO.

LOCATION.--At gaging station, 100 feet upstream from Trail Creek, three-quarters of a mile downstream from Donkey Creek, and 2.8 miles northwest of Moorcroft, Crook County.

DRAINAGE AREA.--1,670 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1955.

Water temperatures: November 1950 to September 1951.

Recent records: May 1950 to September 1951.

REMARKS.--No flow during October, November, and January and practically no flow during February and September. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, December 1954 to August 1955

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 in hardness	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color
														Parts per million		Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.					
														Residue at 180° C	Sum									
Dec. 13, 1954.....	0.1			126	67	361		570	845	13				1,740	2.37		590	123	57	6.5	2,340	7.5		
Mar. 8, 1955.....	23			38	15	54		100	182	3.5				394	.54		155	73	42	1.9	560	6.7		
Mar. 16.....	a 50	4.0	0.20	19	7.4	21		62	69	1.5	0.4	3.8	0.05	171	.27		75	27	35	1.0	268	6.8		
Mar. 21.....	10			27	11	37		96	114	1.0				263	.36		114	35	41	1.5	410	7.0		
Mar. 29.....	132			17	6.9	22		66	57	1.0				162	.22		66	12	42	1.2	245	6.8		
Mar. 30.....	990			23	8.1	16		70	65	1.0				175	.24		91	34	28	.7	269	6.7		
Apr. 1.....	391			--	--	15		64	56	.5				--	--		75	23	29	.8	235	6.8		
Apr. 27.....	3.6			--	--	133		242	453	5.5				--	--		382	184	43	3.0	1,240	7.8		
May 4.....	4.0			73	52	171		304	500	5.5				1,000	1.36		397	148	48	3.7	1,400	7.8		
June 16.....	27			58	38	152		245	420	3.5				822	1.12		299	98	51	3.8	1,190	7.8		
June 30.....	115			--	--	19		84	80	.5				--	--		112	43	27	.8	328	7.2		
July 6.....	6.1			57	26	91		81	275	4.5				596	.81		248	73	42	2.5	866	7.4		
Aug. 4.....	.2			95	39	159		300	490	11				981	1.33		399	153	45	3.5	1,360	7.5		
Aug. 8.....	148			49	11	17		108	125	1.5				285	.39		166	77	17	.6	431	7.1		
Aug. 29.....	4.0			--	--	111		236	324	4.0				--	--		286	92	45	2.9	1,010	7.6		

Daily mean discharge.

a Daily mean discharge.

CHEYENNE RIVER BASIN--Continued
BELLE FOURCHE RIVER NEAR STURGIS, S. DAK.

LOCATION --At gaging station at bridge on State Highway 24, half a mile upstream from Bear Butte Creek and 20 miles northeast of Sturgis, Meade County.
DRAINAGE AREA --5,870 square miles, approximately.
RECORDS AVAILABLE --Chemical analyses: August 1954 to September 1955.

Water temperatures: August 1954 to September 1955 --Dissolved solids: Maximum, 5,170 ppm May 22; minimum, 1,140 ppm June 11-18.
EXTREMES: August 1954 to September 1955 --Dissolved solids: Maximum, 5,170 ppm May 22; minimum, 1,140 ppm June 11-18.

Hardness: Maximum, 1,800 ppm May 22; minimum, 645 ppm June 11-18.
Specific conductance: Maximum daily, 5,440 micromhos May 22; minimum daily, 1,280 micromhos June 12.

Water temperatures: Maximum, 84°F Aug. 29, 1954; minimum, freezing point on several days during December to March.

REMARKS --Daily samples for chemical analysis compiled by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, August 1954 to September 1955

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-sulfate ratio	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million		Tons per acre-foot	Tons per day							Calcium	Non-carbonate magnesium
														Residue at 180°C	Sum										
Aug. 9-Sept. 5, 1954 a.....	234	9.0	0.01	241	89	120	14	172	1,030	16	0.6	4.4	0.28	1,730	1,610	2.35	1,090	966	825	21	1.7	1,970	8.1	6	
Sept. 6-30 a.....	215	10	.02	251	96	126	14	183	1,100	17	.6	5.6	.35	1,850	1,710	2.52	1,070	1,020	870	21	1.7	2,080	7.5	5	
Oct. 1-22.....	94.0	8.7	.00	268	114	138	15	229	1,200	18	.6	6.5	.39	2,060	1,880	2.80	523	1,140	952	20	1.8	2,280	7.7	---	
Nov. 1-16.....	63.4	9.7	.00	268	133	183	16	262	1,310	27	.7	20	.46	2,320	2,120	3.16	397	1,210	995	24	2.3	2,530	7.7	---	
Nov. 17-19.....	84.7	7.6	.00	298	211	448	18	296	2,110	75	.7	94	.51	3,760	3,410	5.11	860	1,610	1,370	37	4.9	3,960	7.8	---	
Nov. 20-Dec. 1.....	67.4	8.7	.00	268	129	178	16	269	1,300	26	.7	13	.41	2,270	2,070	3.09	413	1,200	979	24	2.2	2,500	7.8	---	
Dec. 2-11.....	54.5	11	.00	312	147	194	17	367	1,390	28	.7	9.3	.47	2,540	2,290	3.45	374	1,380	1,080	23	2.3	2,760	7.5	---	
Dec. 12-21.....	54.0	13	.00	285	136	183	15	348	1,340	28	.7	16	.38	2,360	2,190	3.21	344	1,270	985	24	2.2	2,570	7.5	---	
Dec. 22-Jan. 18, 1955.....	42.0	12	.00	327	174	266	15	363	1,730	41	.8	26	.50	3,050	2,770	4.15	346	1,530	1,230	27	3.0	3,200	7.7	---	
Jan. 19-Feb. 12.....	25.2	11	.01	312	171	215	15	370	1,540	32	.7	15	.47	2,760	2,490	3.78	189	1,480	1,180	24	2.4	2,970	7.8	---	
Feb. 13-Mar. 1.....	29.1	9.9	.01	305	191	300	15	348	1,580	46	.7	36	.54	3,200	2,860	4.35	251	1,550	1,270	29	3.3	3,370	7.7	---	
Mar. 2-8.....	27.9	12	.01	278	154	247	14	300	1,520	39	.6	27	.44	2,690	2,440	3.66	203	1,330	1,080	29	3.0	2,940	7.5	---	
Mar. 9-19.....	145	8.2	.01	173	104	209	12	182	1,080	32	.6	31	.25	1,880	1,740	2.56	736	858	709	34	3.1	2,230	7.4	---	
Mar. 20-23.....	113	9.4	.01	228	133	218	15	233	1,310	39	.6	24	.32	2,300	2,090	3.13	702	1,120	929	29	2.8	2,600	7.5	---	
Mar. 24-26.....	107	8.9	.01	305	185	315	18	312	1,810	52	.7	28	.42	3,180	2,880	4.32	919	1,530	1,270	31	3.5	3,410	7.7	---	
Mar. 27-28.....	125	9.3	.00	338	231	442	19	348	2,280	78	.7	42	.55	4,040	3,610	5.49	1,360	1,790	1,510	35	4.5	4,190	7.7	---	
Mar. 29-Apr. 6.....	121	7.8	.01	213	126	212	17	250	1,820	35	.6	11	.30	2,170	1,980	2.95	709	1,050	845	30	2.8	2,450	7.6	---	
Apr. 7-9.....	194	9.7	.00	223	154	373	26	238	1,650	64	.6	28	.24	2,880	2,650	3.92	1,510	1,190	995	40	4.7	3,270	7.6	---	
Apr. 10-13.....	383	11	.02	188	90	179	23	213	1,010	25	.6	.3	.29	1,770	1,630	2.41	1,830	840	665	31	2.7	2,090	7.6	---	
Apr. 14-21.....	171	7.3	.02	150	79	121	16	191	755	18	.6	7.7	.24	1,380	1,250	1.89	462	700	543	27	2.0	1,680	7.6	---	

a Not included in weighted average.

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER NEAR STURGIS, S. DAK.--Continued

Chemical analyses, in parts per million, August 1954 to September 1955--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		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million		Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.						
														Residue at 180°C	Sum										
Apr. 25-May 6, 1955.....	88.2	7.9	0.00	153	70	89	14	190	670	17	0.6	6.9	0.33	1,220	1,120	1.66	291	670	514	22	1.5	1,500	7.6	--	--
May 7-13.....	66.7	8.9	0.00	168	87	109	15	175	820	21	6	7.8	24	1,450	1,320	1.97	261	775	631	23	1.7	1,720	7.7	--	--
May 14-21.....	75.4	8.7	0.00	208	98	131	17	183	975	23	7	4.4	28	1,740	1,560	2.37	354	920	770	23	1.9	1,980	7.6	--	--
May 22.....	90.0	6.3	0.01	265	277	768	24	208	2,900	132	1.2	193	50	5,170	4,670	7.03	1,260	1,800	1,630	48	7.9	5,440	7.8	--	--
May 23-24.....	130	7.6	0.00	243	150	297	19	200	1,540	60	8	43	35	2,760	2,460	3.75	969	1,230	1,070	34	3.7	3,050	8.1	--	--
May 25-June 10.....	164	9.7	0.03	220	97	146	19	213	1,040	21	7	1.9	24	1,840	1,660	2.50	815	947	772	25	2.1	2,110	7.5	--	--
June 11-18.....	200	12	0.03	158	61	71	17	183	640	12	6	5	20	1,140	1,060	1.55	616	645	495	19	1.2	1,430	7.6	--	--
June 19-24.....	164	8.3	0.03	198	80	104	18	180	850	15	7	1.0	25	1,500	1,360	2.04	664	824	676	21	1.6	1,790	7.6	--	--
June 25-July 23.....	214	9.9	0.03	223	86	122	19	180	980	17	7	1.3	30	1,700	1,550	2.31	982	911	763	22	1.8	1,960	7.5	--	--
July 24-29.....	352	9.7	0.03	188	71	102	19	172	800	16	6	2.3	21	1,410	1,290	1.92	1,340	762	621	22	1.6	1,700	7.6	--	--
July 30-Aug. 29.....	175	9.3	0.00	228	90	129	15	174	1,030	17	6	5.4	35	1,750	1,610	2.38	837	938	795	23	1.8	1,990	7.4	--	--
Aug. 30-Sept. 25.....	214	9.6	0.07	225	87	126	16	189	980	14	7	4.2	32	1,710	1,560	2.33	988	920	765	23	1.8	1,960	7.3	--	--
Sept. 26.....	177	9.0	--	155	66	120	9.9	270	640	17	--	6.2	31	1,270	1,170	1.73	607	656	435	28	2.0	1,570	7.8	--	--
Sept. 27-30.....	146	12	0.00	220	98	136	12	206	1,010	17	6	8.0	32	1,780	1,610	2.42	702	950	781	23	1.9	2,030	7.3	--	--
Weighted average b.....	120	9.6	0.02	225	102	154	17	212	1,080	22	0.7	9.1	0.32	1,890	1,830	2.57	612	981	807	25	2.1	2,150	--	--	--

b Includes estimated data for missing period. Represents 100 percent of runoff for water year October 1954 to September 1955.

CHEYENNE RIVER BASIN--Continued

BELLE FOURCHE RIVER NEAR STURGIS, S. DAK.--Continued

Temperature (°F) of water, August to September 1954
 /Once-daily measurement between 6 a.m. and 10 a.m./

Day	August	Day	August	Day	September	Day	September
2	--	17	65	1	70	16	62
3	--	18	64	2	65	17	60
4	--	19	65	3	64	18	59
5	--	20	64	4	62	19	58
6	--	21	65	5	--	20	55
7	--	22	66	6	63	21	48
8	--	23	64	7	60	22	48
9	a 83	24	66	8	60	23	53
10	68	25	68	9	60	24	54
11	66	26	a 70	10	60	25	54
12	68	27	66	11	61	26	56
13	67	28	64	12	a 74	27	58
14	70	29	a 84	13	65	28	57
15	a 82	30	62	14	60	29	49
16	70	31	70	15	61	30	48

Aver-

age

59

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

Temperature (°F) of water, water year October 1954 to September 1955
 /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	50	--	33	34	35	34	36	60	60	62	73	60
2	48	--	32	--	35	33	42	60	60	64	73	62
3	--	--	32	--	33	33	44	54	60	65	73	68
4	48	--	33	34	34	34	35	48	56	68	68	64
5	43	a 47	35	37	34	33	b 33	52	59	60	68	63
6	44	40	34	34	34	32	40	55	55	68	70	63
7	47	b 44	34	b 34	35	34	37	50	58	66	68	59
8	51	44	35	--	35	34	40	48	58	60	70	63
9	52	a 48	35	34	33	34	44	50	51	65	69	60
10	53	b 46	33	33	34	35	40	52	52	64	65	59
11	50	39	33	34	33	35	48	55	54	67	65	54
12	45	41	a 34	32	32	35	42	55	55	70	70	55
13	45	44	a 37	33	34	b 36	43	60	58	70	70	58
14	40	36	34	33	34	b 36	45	59	60	70	70	58
15	38	38	33	33	34	33	45	59	60	70	68	66
16	43	40	--	35	35	32	44	57	65	75	70	59
17	46	45	35	34	b 35	34	b 50	54	65	67	a 70	60
18	47	40	35	34	b 34	34	48	58	62	67	71	59
19	44	41	34	34	b 33	34	52	59	60	68	74	67
20	45	40	34	34	b 33	34	40	61	60	70	71	60
21	42	--	34	32	34	33	45	65	65	77	70	55
22	44	41	35	32	34	b 35	50	b 68	65	78	69	40
23	--	42	34	32	33	32	--	58	65	70	70	50
24	--	35	35	33	32	33	48	57	65	b 70	70	50
25	--	37	35	34	32	b 32	50	58	63	74	70	54
26	--	40	a 38	34	32	32	50	53	63	73	72	48
27	--	38	35	36	a 33	34	50	52	65	73	71	50
28	--	b 38	33	34	33	34	45	50	65	73	70	51
29	--	35	34	34	--	34	48	50	67	72	65	50
30	--	34	35	34	--	35	58	55	65	74	61	50
31	--	--	35	34	--	36	--	60	--	b 80	60	--
Aver-	--	41	34	34	34	34	45	56	61	69	69	57

a Reading obtained between 2 p.m. and 4 p.m.

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

MISSOURI RIVER MAIN STEM--Continued

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 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES 1954-55 --Dissolved solids: Maximum, 639 ppm Feb. 24 to Mar. 8; minimum, 398 ppm Sept. 1-30.

Hardness: Maximum, 316 ppm Feb. 24 to Mar. 8; minimum, 183 ppm Sept. 1-30.

Specific conductance: Maximum daily, 959 microhos Feb. 28; minimum daily, 582 microhos Sept. 9.

Water temperatures: Maximum, 79°F July 30, Aug. 3-6; minimum, freezing point on many days during December to March.

EXTREMES 1951-55 --Dissolved solids: Maximum, 704 ppm May 1-3, 1953; minimum, 264 ppm June 18-26, 1952.

Hardness: Maximum, 338 ppm Jan. 1 to Feb. 2, 1954; minimum, 134 July 9, 1951.

Specific conductance: Maximum daily, 1,040 microhos Jan. 23, 1954; minimum daily, 394 microhos 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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 adsorption	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Magnesium					
Oct. 1-26, 1954.	34,150	--	--	--	--	64	--	191	195	--	--	--	--	457	0.62	42,140	231	74	38	1.8	697	8.0	--
Oct. 27-29	25,530	--	--	--	--	62	--	194	198	--	--	--	--	491	.64	32,540	238	79	36	1.7	708	7.9	--
Oct. 30-Nov. 30	14,230	--	--	--	--	65	--	203	208	--	--	--	--	491	.67	18,860	247	81	36	1.8	735	8.0	--
Dec. 1-31	7,475	--	0.00	63	28	69	4.3	221	219	10	0.6	0.9	0.15	528	.72	10,660	262	81	36	1.9	790	8.0	--
Jan. 1-22, 1955.	7,027	--	--	--	--	73	--	235	237	--	--	--	--	551	.75	10,450	264	91	36	1.9	833	8.1	--
Jan. 23-Feb. 3	7,000	--	--	--	--	77	--	241	253	--	--	--	--	582	.79	11,000	293	95	36	2.0	864	8.1	--
Feb. 4-23	7,549	--	--	--	--	79	--	244	257	--	--	--	--	595	.81	12,130	298	98	37	2.0	880	8.1	--
Feb. 24-Mar. 8	7,905	--	--	--	--	86	--	254	276	--	--	--	--	639	.87	13,640	316	108	37	2.1	933	8.0	--
Mar. 9-22	11,200	13	.01	58	25	73	5.2	187	233	11	.5	1.5	.20	534	.73	16,150	248	95	38	2.0	764	7.9	8
Mar. 23-31	7,437	--	--	--	--	79	--	221	233	--	--	--	--	551	.75	11,060	254	73	40	2.2	818	7.9	--
Apr. 1-3	9,773	--	--	--	--	81	--	209	282	--	--	--	--	595	.81	15,700	275	104	39	2.1	862	8.1	--
Apr. 4-8	14,680	--	--	--	--	72	--	207	217	--	--	--	--	524	.71	20,770	246	76	39	2.0	769	8.1	--
Apr. 9-24	11,530	--	--	--	--	81	--	229	280	--	--	--	--	593	.81	18,460	282	94	38	2.1	873	8.0	--
Apr. 25-May 5	31,790	--	--	--	--	75	--	224	233	--	--	--	--	562	.76	33,020	272	88	38	2.0	846	8.0	--
May 7-30	40,100	--	--	--	--	69	--	180	222	--	--	--	--	479	.65	51,860	232	76	39	2.0	730	8.0	--
May 31-June 6	36,470	--	--	--	--	71	--	176	208	--	--	--	--	485	.66	47,760	214	68	42	2.1	734	7.7	--
June 7-30	23,160	--	0.00	53	21	77	5.7	184	215	9.5	.4	1.3	.15	510	.69	31,890	218	67	43	2.3	764	8.0	6
July 1-31	31,340	--	--	--	--	72	--	186	220	--	--	--	--	477	.65	40,360	209	56	41	2.2	729	7.8	--
Aug. 1-31	24,600	--	--	--	--	99	--	169	178	--	--	--	--	422	.57	28,030	190	51	40	1.9	648	7.8	--
Sept. 1-30	30,800	15	.01	47	16	56	4.7	166	168	7.0	.5	1.1	.14	398	.54	33,190	183	47	39	1.8	603	8.1	17
Weighted average	20,140	--	--	--	--	68	--	192	209	--	--	--	--	481	0.65	26,160	226	69	39	2.0	723	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER MAIN STEM--Continued

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

Temperature (°F) of water, water year October 1954 to September 1955
 /Once-daily measurement at 7 a.m./

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

a Reading obtained between 10 a.m. and 11 a.m.

b Reading obtained between 4 p.m. and 5 p.m.

WHITE RIVER BASIN

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. DRAINAGE AREA.--1,570 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: February 1951 to September 1954, August to September 1955.

Sediment records: December 1950 to September 1954.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Selenium (Se)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Car-bonate (CO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ton per mil-lion (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Per-cent ad-sorp-tion ratio	So-dium micro-mhos at 25° C	pH	
																Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 7, 1954...	68	--	--	--	37	4.5	19	--	174	0	14	2.0	--	--	--	--	220	0.30	111	0	26	303	8.1
Nov. 2.....	70	--	--	--	--	--	20	--	180	0	17	2.5	--	--	--	--	--	--	117	0	26	319	7.8
Dec. 16.....	98	--	--	--	43	6.2	28	--	210	0	21	2.5	--	--	--	--	265	.36	133	0	31	374	7.9
Jan. 4, 1955...	112	--	--	--	41	6.2	29	--	210	0	19	.5	--	--	--	--	264	.36	128	0	33	376	7.5
Feb. 4.....	95	--	--	--	39	6.4	27	--	201	0	15	.5	--	--	--	--	255	.35	124	0	32	363	7.8
Mar. 7.....	252	--	--	--	39	5.7	24	--	182	0	28	1.0	--	--	--	--	254	.35	121	0	29	362	7.6
Apr. 7.....	193	--	--	--	44	6.1	25	--	190	0	40	2.5	--	--	--	--	272	.37	135	0	27	386	7.7
May 4.....	99	--	--	--	--	--	26	--	206	0	29	1.0	--	--	--	--	--	--	134	0	28	383	8.0
June 7.....	165	--	--	--	41	5.2	25	--	186	0	29	.5	--	--	--	--	262	.36	124	0	30	365	8.0
July 8.....	98	--	--	--	--	--	30	--	205	0	26	.5	--	--	--	--	--	--	125	0	33	386	8.0
Aug. 9.....	67	--	--	--	63	6.1	25	--	160	0	121	2.5	--	--	--	--	354	.48	182	59	22	493	7.4
Aug. 10-31....	a 60.7	68	0.00	0.04	41	4.3	27	9.5	179	10	23	1.0	0.4	0.7	0.12	282	.38	46.2	120	0	31	351	8.6
Sept. 1-30....	a 71.8	69	.00	.03	39	6.0	23	9.0	186	0	22	1.0	.4	1.8	0.10	268	.36	52.0	122	0	27	326	8.1

a Mean daily discharge

WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, August to September 1955
 /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											--	65
2											--	65
3											--	65
4											--	a 84
5											--	62
6											--	62
7											--	58
8											--	--
9											--	67
10											a 78	55
11											a 79	a 67
12											a 76	64
13											a 78	a 73
14											a 86	66
15											a 81	67
16											--	a 83
17											a 85	71
18											a 94	72
19											73	58
20											71	65
21											74	55
22											70	55
23											70	45
24											a 86	a 53
25											75	47
26											a 90	a 55
27											a 73	a 60
28											76	a 65
29											68	a 63
30											63	a 63
31											62	--
Average											--	63

a Reading obtained between 2 p.m. and 7 p.m.

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 7, 1954.....	72	118	23
Nov. 2.....	72	400	78
Nov. 9.....	91	409	101
Dec. 7.....	a 95	608	156
Dec. 16.....	a 95	223	57
Jan. 4, 1955.....	a 100	281	76
Feb. 4.....	a 90	96	23
Mar. 16.....	529	2,350	3,360
Mar. 30.....	397	1,310	1,400
Apr. 7.....	112	2,730	826
Apr. 19.....	197	2,260	1,200
May 4.....	100	220	59
May 9.....	88	1,840	437
May 27.....	350	4,860	4,590
June 1.....	193	7,220	3,760
June 7.....	178	2,640	1,270
June 14.....	130	1,040	365
July 8.....	99	428	115
Aug. 10.....	64	720	124
Aug. 17.....	60	294	48
Sept. 6.....	48	126	16
Sept. 14.....	60	860	139

a Daily mean discharge.

WHITE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, April to August 1955

(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed; 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
Apr. 7, 1955.....	2:45 p.m.	112	56	2,730	3,100		12		24		93	99	100				VPWCM
June 7.....	3:45 p.m.	178	73	2,640	360		12		40		54	70	96		100		VFN
June 7.....	3:45 p.m.	178	73	2,640	280		28		--		54	74	96		100		VPWCM
Aug. 10.....	12:35 p.m.	64	77	720	1,710		32		46		74	86	94				BWM

Particle-size analyses of bed material, October 1954 to August 1955

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

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										
						0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000		8.000
Oct. 7, 1954.....	4	72				0	1	14		74	92	95	98	99	100	SV
Apr. 7, 1955.....	4	112				0	2	31		73	80	81	84	90	98	SV
May 4.....	3	120				--	0	47		96	99	99	100	--	--	SV
June 7.....	4	178				0	1	33		90	98	98	99	99	100	SV
July 8.....	4	99				0	2	30		86	96	98	99	100	--	SV
Aug. 10.....	4	64				0	1	25		87	98	98	99	99	--	SV

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 July 1955 (discontinued).

Sediment records: February to December 1951, October 1952 to September 1955 (discontinued). EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 2,560 ppm June 27; minimum daily, not determined.

Sediment loads: Maximum daily, 1,160 tons May 17; minimum daily, 1 ton or less on many days.

EXTREMES, 1951, 1952-55.--Water temperatures: Maximum (1951, 1952-54), 94°F June 21, 1954: 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, 0.50 ton Aug. 15, 1953.

REMARKS.--Flow affected by ice Nov. 29 to Mar. 6, Mar. 20-22, 25-29. Flow regulated by Box Butte Reservoir; major part of release from reservoir diverted 12 miles upstream for irrigation. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, October 1954 to July 1955
(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	64	33	31	--	32	--	55	78	62	80		
2	69	39	33	--	--	32	--	66	60	81		
3	65	42	33	--	--	--	--	58	63	83		
4	48	47	38	--	32	32	35	59	--	76		
5	58	49	35	--	--	--	--	65	--	--		
6	48	55	35	32	32	32	44	60	--	--		
7	63	--	34	--	--	--	47	74	70	--		
8	70	49	33	--	32	32	64	54	60	--		
9	64	49	--	--	--	--	65	64	50	--		
10	63	52	--	--	--	32	56	74	--	--		
11	55	--	--	--	--	--	50	69	--	--		
12	53	54	--	--	32	32	46	76	--	--		
13	48	46	34	--	--	--	63	70	--	--		
14	42	--	--	--	32	34	64	73	68	--		
15	53	53	35	--	--	39	61	59	74	--		
16	58	--	--	--	32	48	52	--	85	--		
17	62	42	32	32	--	--	65	--	--	--		
18	58	43	--	--	32	49	64	--	--	--		
19	58	49	34	--	--	--	52	78	--	--		
20	--	47	--	--	--	38	58	83	46	--		
21	54	46	36	--	--	--	66	80	--	--		
22	58	49	--	--	--	38	64	67	--	--		
23	54	40	36	--	--	--	--	73	--	--		
24	40	35	--	--	32	--	70	63	63	--		
25	--	36	--	--	--	--	65	66	--	--		
26	34	38	--	--	32	--	72	49	--	--		
27	44	35	--	--	--	--	54	62	--	--		
28	38	32	--	--	32	40	59	--	81	--		
29	43	32	--	32	--	--	59	76	--	--		
30	38	--	--	--	--	45	70	74	84	--		
31	--	--	--	32	--	--	--	74	--	--		
Average	54	44	--	a 32	a 32	--	58	68	--	--		

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

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	38	128	13	22			23		
2.....	34	120	11	22			25		
3.....	30	89	7	22			24		
4.....	25	78	5	22			25		
5.....	25	84	6	19			27	53	3
6.....	17			19			25		
7.....	15			19			23		
8.....	14			19			21		
9.....	15			20			21	--	
10.....	17			22			26		
11.....	15	53	2	22			28	--	
12.....	13			22			26	30	
13.....	16			22			28	22	
14.....	18			23			27	--	
15.....	19			23			24	23	
16.....	27			27	75	4	23	--	
17.....	24			27			15	78	
18.....	22			27			36	--	
19.....	22			27			29	57	
20.....	22	72	5	23			26	--	a 2
21.....	22			22			25	42	
22.....	22			22			25	--	
23.....	23			20			25	30	
24.....	25			20			25	--	
25.....	34			22			25	23	
26.....	31			20			25	--	
27.....	28			23			22	29	
28.....	28	112	8	17			20	--	
29.....	27			18			20	31	
30.....	25			20			25	--	
31.....	22			--		--	27	6	
Total..	715	--	163	653		120	766	--	70
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.....	29	--		33	11		35	28	3
2.....	30	--		30	--		45	612	74
3.....	28	--		26	--		50	--	
4.....	26	12		24	34		50	233	
5.....	25	--		25	--		45	--	
6.....	26	15		21	8		55	190	a 53
7.....	24	--		21	--		62	--	
8.....	24	22		22	51		56	409	
9.....	20	--		20	--		52	--	
10.....	22	8		15	32		40	712	
11.....	22	7		21	--		34	--	
12.....	22	--		23	34		34	291	
13.....	22	--		24	--		34	--	
14.....	23	8		25	32		34	145	
15.....	25	--		28	32	a 2	31	444	a 24
16.....	26	7	a 1	25	46		33	251	
17.....	26	28		19	--		33	--	
18.....	28	8		18	22		34	230	
19.....	30	--		15	--		33	--	
20.....	30	10		15	55		30	--	e 20
21.....	30	--		20	--		30	--	e 20
22.....	26	8		24	36		35	--	e 32
23.....	26	--		23	--		38	--	e 40
24.....	29	8		24	30		27	32	2
25.....	33	--		26	--		25	--	e 2
26.....	33	8		29	25		30	--	e 15
27.....	36	--		31	--		35	--	e 26
28.....	35	6		32	32		40	852	92
29.....	34	7		--	--		45	--	e 95
30.....	34	--		--	--	--	36	123	12
31.....	34	9		--	--	--	36	--	e 12
Total..	859	--	31	659	--	56	1,197	--	1,085

e Estimated.

a Computed from samples obtained about three times a week.

NIOBRARA RIVER BASIN

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NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	April			May			June		
	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.....	40			16			30		
2.....	44			15			23		
3.....	44	191	22	16			25		
4.....	40			20			22		
5.....	46			18			22		
6.....	67	411	s 90	16			22		
7.....	62	185	31	16			19		
8.....	52	104	15	17	54	2	18		
9.....	44			16			23	76	4
10.....	38			16			23		
11.....	38			16			19		
12.....	46			16			17		
13.....	40			15			14		
14.....	34			15			14		
15.....	20			17			15		
16.....	22	70	6	28	71	5	16		
17.....	30			183	1,750	s 1,160	63	1,550	s 358
18.....	30			42	640	73	30	750	61
19.....	25			36	215	21	20	170	9
20.....	25			31	145	12	47	1,830	s 474
21.....	27			28	90	7	24	1,360	s 104
22.....	25			17	50	2	50	2,180	s 333
23.....	19			23	336	21	28	690	52
24.....	17			23	225	s 18	38	193	20
25.....	16			33	245	22	31	111	9
26.....	15	29	1	189	1,340	s 776	33	116	10
27.....	15			116	1,330	s 474	131	2,560	s 993
28.....	15			60	255	41	56	677	s 111
29.....	17			42	150	17	36	180	17
30.....	17			36	95	9	24	180	12
31.....	--	--	--	31	80	7	--	--	--
Total.	970	--	338	1,163	--	2,695	934	--	2,627

July				August				September			
1.....	25	118	8	15			15				
2.....	16			14			13				
3.....	16			15			14				
4.....	14			17			15				
5.....	14			23			16				
6.....	17	60	2	19	40	2	15		39	1	
7.....	15			17			16				
8.....	14			16			15				
9.....	13			14			14				
10.....	12			13			14				
11.....	11			14			13				
12.....	12			15			12				
13.....	9.9			12			9.9				
14.....	8.7			11			8.7				
15.....	9.3			9.9			8.2				
16.....	9.3	8.2	40	2	8.2		75	3			
17.....	9.9	9.9			8.2						
18.....	9.9	12			8.7						
19.....	9.9	12			8.7						
20.....	8.7	12			17						
21.....	8.7	12	12	12		196	16				
22.....	8.7	12	12	11							
23.....	15	12	12	12							
24.....	25	12	16								
25.....	17	12	34								
26.....	14	69	3	12							
27.....	18			13						34	
28.....	18			15						30	
29.....	20			23						30	
30.....	19			19						30	
31.....	13			22						27	
Total.	431.0	--	76	443.0	--	62	485.6	--	--	130	

Total discharge for year (cfs-days)..... 9,275.6

Total load for year (tons)..... 7,453

s Computed by subdividing day.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.--Continued

Particle-size analyses of bed material, October 1954 to July 1955

(Methods of analysis: 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	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										
						0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	
Oct. 5, 1954.....	3	25					0	1	22	85	93	95	97	100	SV	
May 9, 1955.....	3	16					0	2	30	88	96	97	88	100	SV	
June 1.....	3	30					0	1	28	91	97	97	100	--	SV	
July 7.....	3	14					0	1	26	83	91	94	97	100	SV	

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 1953 to September 1955 (discontinued).

Sediment records: October 1947 to December 1950, July 1953 to September 1955 (discontinued).

EXTREMES, 1954-55.--Water temperatures: Maximum, 94°F July 29, 30; minimum, freezing point on many days during October to March.

Sediment concentrations: Maximum daily, 2,800 ppm Mar. 20; minimum daily, not determined.

Sediment loads: Maximum daily, 1,800 tons Mar. 10; minimum daily, not determined.

EXTREMES, 1947-50, 1953-55.--Water temperatures (1953-55): Maximum, 94°F July 12, 1954, July 29, 30, 1955; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 5,360 ppm Mar. 15, 1958; minimum daily, not determined.

Sediment loads: Maximum daily, 22,900 tons June 17, 1948; minimum daily, 2 tons Feb. 3, 1950.

REMARKS.--Flow affected by ice Nov. 30 to Dec. 13, Dec. 28 to Mar. 6, Mar. 24-27.

Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement between 1 p.m. and 8 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	a32	a32	a35	34	33	59	76	60	84	88	a79
2	62	38	36	--	a34	--	50	a75	--	84	85	80
3	66	41	a32	a33	32	34	47	58	--	85	86	83
4	47	38	a32	--	a32	32	43	a55	64	--	84	a65
5	57	a47	a32	a32	a32	32	a34	a65	63	81	78	a62
6	a45	a46	34	32	32	a32	55	a60	68	82	82	a61
7	58	50	32	a32	a32	38	58	a58	77	87	88	a62
8	72	49	33	--	a32	a41	61	a54	a60	a83	84	a64
9	62	a43	a32	34	32	a36	68	65	--	85	82	67
10	64	a42	a32	32	32	a41	a61	a56	--	86	82	57
11	a51	a40	a32	a32	a32	a37	46	71	58	86	83	67
12	a48	a41	33	32	32	a43	44	73	60	a77	85	75
13	47	--	a32	a32	36	45	63	a73	a60	87	76	a62
14	a42	a37	a32	a33	a32	38	64	a67	a63	88	75	a80
15	a47	a39	35	a32	32	a36	67	72	74	84	85	a68
16	60	44	32	a33	a36	47	65	64	71	76	84	79
17	62	a42	a32	a32	a36	a40	a56	70	a67	77	87	a65
18	60	a42	36	34	--	a37	68	60	72	78	81	a66
19	a48	51	a32	32	--	a43	47	a57	72	86	83	a61
20	a48	a41	a35	a33	--	a33	59	78	74	88	75	60
21	a47	44	a36	a32	a32	a32	a58	a81	a72	88	--	a55
22	a47	a43	a34	32	--	a32	a66	81	--	82	83	a50
23	a48	a38	a37	a32	32	a32	55	72	--	67	84	a49
24	a44	a32	a37	34	--	--	63	a63	64	79	83	a52
25	a36	41	a36	36	36	a32	65	67	71	a81	97	a47
26	32	42	a34	36	--	a32	a56	48	--	76	81	a45
27	a32	a37	a32	33	36	34	50	a60	76	87	83	a50
28	a41	a33	a32	a34	--	a32	57	a53	a72	92	83	a60
29	43	a32	a33	a34	--	a42	63	--	84	94	73	a51
30	41	32	a33	a36	--	a44	78	--	75	94	a71	a52
31	40	--	33	a36	--	46	--	--	--	90	a75	--
Average	50	41	33	*33	--	37	58	65	--	84	83	62

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

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	111	680	200	118	320	100	107	510	160
2.....	105	690	200	105			107		
3.....	96	640	170	111			104		
4.....	94	510	130	135			124		
5.....	88	520	120	125	490	150	137		
6.....	88	270	64	118			139		
7.....	85	320	73	128			130		
8.....	82	500	110	125			120		
9.....	85	740	170	91	710	190	108	430	100
10.....	88	540	130	118			94		
11.....	88	510	120	114			86		
12.....	82	800	180	88			88		
13.....	88	630	150	108	660	210	86		
14.....	96	370	96	96			82		
15.....	96	230	60	94			85		
16.....	99	260	69	105	350	97	72	430	100
17.....	105	250	71	118			72		
18.....	96	440	110	118			70		
19.....	94	680	170	121			72		
20.....	88	760	180	118	490	130	77		
21.....	94	400	100	114			91		
22.....	99	440	120	114			94		
23.....	96	580	150	99			94		
24.....	102	630	170	91	--	--	99	--	--
25.....	114	730	220	96			96		
26.....	128	800	280	102			94		
27.....	138	970	360	99			96		
28.....	138	580	220	96	--	--	88	--	--
29.....	138	510	190	94			88		
30.....	131	250	88	96			86		
31.....	118	260	83	--			88		
Total.	3,150	--	4,554	3,255	--	4,385	2,974	--	3,700
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.....	94	380	94	95	480	99	130	160	56
2.....	102			95			150	550	220
3.....	99			85			165	850	380
4.....	95			70			230	1,000	620
5.....	95	380	94	65	1,400	460	300	2,100	1,700
6.....	95			70			350	1,200	1,100
7.....	88			80			410	1,200	1,300
8.....	87			85			317	1,700	1,500
9.....	87	380	94	85	1,400	460	317	2,000	1,700
10.....	88			70			312	2,100	1,800
11.....	88			50	1,400	460	284	1,400	1,100
12.....	84			70			258	940	650
13.....	54			100			243	780	510
14.....	80			120			228	400	250
15.....	106	380	94	134			188	680	350
16.....	104			140	1,400	460	180	920	450
17.....	102			125			180	320	160
18.....	96			110			188	580	290
19.....	95	380	94	25			188	1,000	510
20.....	96			90			219	2,800	1,700
21.....	96			90	1,400	460	215	2,100	1,200
22.....	96			80			219	2,600	1,500
23.....	95			110			233	600	380
24.....	94			125			210	--	e 240
25.....	92	380	94	130			170	1,700	780
26.....	90			120	1,400	460	160	--	e 700
27.....	87			125			170	1,400	640
28.....	85			130			176	440	210
29.....	80	380	94	--			193	1,100	570
30.....	92			--			176	780	370
31.....	93			--			188	520	240
Total.	2,835	--	2,914	2,674	--	4,052	6,927	--	23,176

e Estimated.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

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.....	176	320	150	102	140	39	142	500	190
2.....	168	170	77	105	200	57	142	--	e 190
3.....	168	300	140	102	73	20	142	--	e 190
4.....	142	400	150	99	140	37	138	460	170
5.....	157	490	210	99	230	61	131	330	120
6.....	142	430	160	96	40	10	121	230	75
7.....	153	520	210	91	340	83	121	34	11
8.....	142	490	190	91	30	7	121	14	5
9.....	157	530	220	88	350	83	131	--	e 7
10.....	145	840	330	91	270	66	161	--	e 13
11.....	157	630	270	85	59	14	149	29	12
12.....	161	180	78	85	140	32	135	29	11
13.....	138	460	170	85	43	10	128	35	12
14.....	128	590	200	80	65	14	121	43	14
15.....	138	580	220	82	41	9	111	150	45
16.....	131	480	170	91	76	19	105	99	28
17.....	128	400	140	145	740	s 370	121	230	75
18.....	128	300	100	128	910	310	128	520	180
19.....	121	99	32	125	760	260	125	230	78
20.....	111	230	69	128	170	59	108	110	32
21.....	111	400	120	121	91	30	142	440	170
22.....	111	230	69	118	210	67	121	390	a 130
23.....	108	58	17	128	170	59	128	320	a 110
24.....	102	44	12	128	350	120	114	290	89
25.....	102	180	50	184	1,100	550	125	130	44
26.....	99	280	75	238	1,900	1,200	114	60	a 18
27.....	96	170	44	197	780	400	138	1,300	s 560
28.....	99	34	9	157	330	140	149	1,800	720
29.....	99	29	8	149	--	e 100	118	480	150
30.....	99	28	7	145	--	--	102	250	69
31.....	--	--	--	145	--	--	--	--	--
Total.	3,917	--	3,697	3,708	--	4,426	3,832	--	3,518
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	96	190	49	91	73	18	60	--	--
2.....	91	160	39	85	110	25	56	--	--
3.....	91	41	10	85	210	48	54	--	--
4.....	91	--	e 10	85	130	30	58	--	--
5.....	77	33	7	88	26	6	60	--	--
6.....	77	76	16	97	230	60	65	--	--
7.....	99	210	56	95	84	22	68	--	--
8.....	96	84	22	90	110	27	72	--	--
9.....	91	33	8	85	300	69	65	--	--
10.....	77	24	5	88	240	57	63	36	6
11.....	68	24	4	121	330	110	68	--	--
12.....	68	26	5	121	460	150	70	--	--
13.....	70	140	26	91	130	32	68	--	--
14.....	65	99	17	75	35	7	65	--	--
15.....	70	91	17	72	33	6	68	--	--
16.....	72	84	16	70	--	--	65	--	--
17.....	72	84	16	68	--	--	65	--	--
18.....	70	140	26	68	83	15	63	--	--
19.....	65	140	25	65	--	--	65	--	--
20.....	60	68	11	63	--	--	82	--	--
21.....	63	28	5	60	--	--	87	--	--
22.....	68	17	3	60	--	--	84	--	--
23.....	96	270	s 99	58	--	--	60	--	--
24.....	121	200	65	58	--	--	75	--	--
25.....	105	35	10	56	--	--	82	77	17
26.....	102	170	47	58	43	7	86	--	--
27.....	102	84	23	60	--	--	86	--	--
28.....	102	--	e 20	68	--	--	88	--	--
29.....	94	110	28	68	--	--	78	--	--
30.....	91	84	21	68	--	--	78	--	--
31.....	94	24	6	65	--	--	--	--	--
Total.	2,604	--	712	2,382	--	819	2,124	--	301
Total discharge for year (cfs-days).....									40,382
Total load for year (tons).....									56,254

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

NIOBRARA RIVER BASIN--Continued

NIOBRARA RIVER NEAR GORDON, NEBR.--Continued

Particle-size analyses of suspended sediment, April to July 1955

(Methods of analysis: 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, in degrees Fahrenheit (°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. 4, 1955.....	2:35 p. m.	135	43	636	1,690		4		8		19	45	100		BWCM
Apr. 18.....	1:40 p. m.	131	68	381	2,530		5		7		25	38	100		BWCM
May 19.....	12:10 p. m.	125	57	738	939		32		36		46	67	95	100	BWCM
June 1.....	2:50 p. m.	142	60	500	1,400		4		5		14	36	88	100	BWCM
July 7.....	1:15 p. m.	96	87	168	354		14		22		48	70	98	100	VPWCM

Particle-size analyses of bed material, October 1954 to August 1955

(Methods of analysis: 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	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									
						0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
Oct. 5, 1954.....	4	88						0	1	36	96	99	100	SV	
Apr. 18, 1955.....	4	131						0	1	38	96	99	100	SV	
May 9.....	4	91						0	2	37	94	98	100	SV	
June 1.....	4	141						0	2	37	96	100	V	V	
July 7.....	4	96						0	4	38	94	98	100	SV	
Aug. 4.....	4	83						0	5	45	96	98	100	SV	

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

Particle-size analyses of suspended sediment, water year October 1954 to September 1955
(Methods of analysis: 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
NIOBRARA RIVER NEAR CODY																	
July 14, 1955.....	9:50 a.m.	212	73	566							14	26	65		99	100	V
July 28.....	8:50 a.m.	286	72	774							16	31	67		98	100	V
Aug. 10.....	8:10 a.m.	234	--	502							14	29	71		99	100	V
Aug. 23.....	3:35 p.m.	208	79	444							12	24	62		99	100	V
Sept. 8.....	1:55 p.m.	208	70	529							15	29	63		95	100	V
Sept. 21.....	10:15 a.m.	254	59	993							21	39	76		98	100	V
NIOBRARA RIVER NEAR NORDEN																	
July 15, 1955.....	9:00 a.m.	707	--	382							23	40	86		100		V
July 28.....	1:30 p.m.	633	85	382							39	55	90		100		V
Aug. 10.....	1:20 p.m.	781	80	306							26	46	93		100		V
Aug. 24.....	10:20 a.m.	656	--	380							18	34	84		100		V
Sept. 7.....	5:05 p.m.	668	70	472							14	26	76		100		V
Sept. 20.....	5:30 p.m.	1,050	64	1,040	3,250	9	13	25	38	64	77	93		100		VPWCM	

NIOBRARA RIVER BASIN--Continued

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

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955

Periodic determinations of suspended-sediment discharge, water year October 1955 to September 1956			
Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
NIOBRARA RIVER NEAR CODY			
July 14, 1955.....	212	566	324
July 28.....	286	774	598
Aug. 10.....	234	502	317
Aug. 23.....	208	444	249
Sept. 8.....	208	529	297
Sept. 21.....	254	993	681
NIOBRARA RIVER NEAR NORDEN			
July 15, 1955.....	707	382	729
July 28.....	833	382	859
Aug. 10.....	781	306	645
Aug. 24.....	656	380	673
Sept. 7.....	668	472	851
Sept. 20.....	1,050	1,040	2,950

JAMES RIVER BASIN

JAMES RIVER AT LA MOURE, N. DAK.

LOCATION. --Temperature recorder at gaging station, downstream from bridge on State Highway 13, half a mile west of La Moure, La Moure County, and 12 miles upstream from Cottonwood Creek.

DRAINAGE. 740 square miles, approximately, of which about 2,800 square miles is probably noncontributing.

RECORDS AVAILABLE. June 1953 to September 1955.

WATER TEMPERATURES. Maximum, 88°F Aug. 3; minimum, freezing point on many days during December to April.

EXTREMES, 1954-55. --Water temperatures: Maximum, 88°F Aug. 3, 1954; minimum, freezing point on many days during winter months.

EXTREMES, 1953-54. --Water temperatures: Maximum, 88°F Aug. 3, 1953; minimum, freezing point on many days during winter months.

REMARKS. --Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Temperatures (°F) of water, water year October 1954 to September 1955

/Recorder with temperature attachment, continuous ethyl alcohol-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
1.....	55	53	41	38	38	37	33	33	33	33	65	59	72	86
2.....	54	52	40	38	37	37	33	33	33	33	66	75	83	85
3.....	58	54	40	38	37	36	33	33	33	33	66	75	83	85
4.....	56	51	42	39	36	35	33	33	33	33	66	74	80	87
5.....	51	50	42	41	35	35	33	33	33	33	66	74	70	69
6.....	50	48	43	42	35	35	33	33	33	33	66	73	75	84
7.....	50	47	43	41	35	35	33	33	33	33	66	73	75	84
8.....	52	50	44	43	35	35	33	33	33	33	66	73	72	86
9.....	55	51	44	43	35	35	33	33	33	33	66	73	71	70
10.....	55	54	45	43	35	35	33	33	33	33	66	73	71	70
11.....	56	54	45	44	35	35	33	33	33	33	66	73	71	70
12.....	56	54	44	44	35	35	33	33	33	33	66	73	71	70
13.....	54	52	44	43	35	34	33	33	33	33	66	73	71	70
14.....	52	48	43	42	35	34	33	33	33	33	66	73	71	70
15.....	46	47	42	41	35	35	33	33	33	33	66	73	71	70
16.....	48	47	42	41	35	34	33	33	33	33	66	73	71	70
17.....	48	46	42	41	34	34	33	33	33	33	66	73	71	70
18.....	49	47	42	42	34	34	33	33	33	33	66	73	71	70
19.....	48	47	42	41	34	34	33	33	33	33	66	73	71	70
20.....	48	47	42	42	34	34	33	33	33	33	66	73	71	70
21.....	49	47	42	41	34	34	33	33	33	33	66	73	71	70
22.....	50	48	43	41	34	34	33	33	33	33	66	73	71	70
23.....	51	49	42	41	34	34	33	33	33	33	66	73	71	70
24.....	51	50	41	40	34	34	33	33	33	33	66	73	71	70
25.....	50	47	40	40	34	34	33	33	33	33	66	73	71	70
26.....	47	46	40	38	34	34	33	33	33	33	66	73	71	70
27.....	46	45	38	38	34	33	33	33	33	33	66	73	71	70
28.....	45	45	38	37	34	33	33	33	33	33	66	73	71	70
29.....	45	43	38	38	33	32	33	33	33	33	66	73	71	70
30.....	43	42	38	38	33	33	33	33	33	33	66	73	71	70
31.....	42	41	--	--	33	33	33	33	33	33	66	73	71	70
Average.....	50	48	42	41	35	34	33	33	33	33	66	73	71	70

JAMES RIVER BASIN--Continued

JAMES RIVER NEAR COLUMBIA, S. DAK.

LOCATION --At bridge on county road, 3.5 miles north of Columbia, Brown County, approximately 5 miles upstream from gaging station, and 0.1 mile downstream from Columbia Reservoir. Prior to October 1954, at gaging station at Columbia.

DATE AVAILABLE --7,050 square miles, approximately

RECORDS AVAILABLE --Chemical analyses October 1951 to September 1952, November 1954 to September 1955.

REMARKS --No flow January, February, and September. Discharge records for gaging station at Columbia for water year October 1954 to September 1955 given in WSP 1385.

Chemical analyses, in parts per million, August 1954 to August 1955

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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, nesium	Non-carbonate						
																			Residue at 180°C					Sum
Aug. 30, 1954 a.	2.4			47	42	146		364	218	67				764	1.04		292	0	51	3.7	1,160	7.4		
Nov. 4,	50			66	50	141		397	259	68				848	1.15		369	43	44	3.2	1,280	7.5		
Mar. 10, 1955 ..	17			114	89	244		652	493	114				1,490	2.03		652	117	44	4.2	2,100	7.5		
Mar. 15,	32			67	44	117		340	241	61				773	1.05		349	70	41	2.7	1,160	7.2		
Mar. 21,	5	26	0.04	123	107	269		791	515	124	0.6	0.8	0.66	1,650	2.24		747	98	43	4.3	2,300	7.5	49	
Apr. 6,	49			39	36	95		270	165	43				553	.75		247	26	46	2.6	874	8.0		
Apr. 13,	106			56	46	128		359	225	55				734	1.00		330	36	46	3.1	1,130	7.3		
Apr. 21,	98			--	--	125		344	220	55	--	--	--	--	--		322	40	46	3.0	1,120	7.2		
June 3,	12			55	42	121		332	238	51				735	1.00		311	39	44	3.0	1,110	8.0		
June 22,	24			--	--	126		323	248	56	--	--	--	--	--		313	48	46	3.1	1,120	7.8		
Aug. 4,	1.5			55	42	133		359	253	61				768	1.04		310	16	45	3.3	1,160	7.7		

a. Collected at former sampling site 5 miles downstream.

JAMES RIVER BASIN--Continued
JAMES RIVER NEAR SCOTLAND, S. DAK.

LOCATION.--Temperature recorder at gaging station, 50 feet upstream from highway bridge, 500 feet upstream from Dawson Creek, and 5 miles northeast of Scotland, Bon Homme County.
DRAINAGE AREA.--21,550 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: January 1953 to September 1955.
EXTREMES, 1954-55.--Water temperatures: Maximum, 89°F on several days in July; minimum, freezing point Mar. 20-25.
EXTREMES, 1953-55.--Water temperatures: Maximum, 89°F on several days in July 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

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.....	61	59	41	37	33	33	33	33	33	33	34	33	45	41	72	68	74	68	88	81	--	--	74	68
2.....	58	57	37	35	33	33	33	33	33	33	34	33	48	44	74	71	79	73	88	76	--	--	73	69
3.....	59	57	37	34	33	33	33	33	33	33	34	34	49	48	73	72	77	73	86	83	--	--	77	72
4.....	58	57	38	37	33	33	33	33	33	33	34	34	51	48	72	69	76	71	88	81	--	--	87	75
5.....	57	54	39	37	33	33	33	33	33	33	35	34	50	48	71	67	74	73	89	82	87	84	73	69
6.....	54	52	42	39	33	33	33	33	33	33	35	35	49	46	72	68	73	70	89	84	86	83	73	68
7.....	54	51	44	41	33	33	33	33	33	33	35	34	50	47	71	67	75	68	88	84	85	78	70	66
8.....	57	50	45	43	33	33	33	33	33	33	34	33	53	53	67	64	73	68	88	83	81	79	71	66
9.....	58	56	45	44	33	33	33	33	33	33	33	33	56	51	67	63	70	67	88	80	82	77	73	70
10.....	59	57	48	45	33	33	33	33	33	33	33	33	58	54	67	63	69	67	86	79	81	77	71	63
11.....	59	57	48	47	33	33	33	33	33	33	33	34	58	56	69	65	68	64	89	82	80	77	63	57
12.....	58	54	48	46	33	33	33	33	33	33	34	34	59	57	70	65	64	63	88	85	79	75	64	59
13.....	56	51	48	47	33	33	33	33	33	33	34	34	58	56	71	67	69	64	88	82	79	75	69	63
14.....	51	49	47	44	33	33	33	33	33	33	34	34	59	55	71	68	72	67	88	82	80	75	70	65
15.....	49	46	44	42	33	33	33	33	33	33	34	34	60	57	71	67	75	70	88	82	82	78	72	67
16.....	--	--	45	43	33	33	33	33	33	33	34	33	62	59	73	68	75	73	87	81	84	78	76	71
17.....	--	--	47	45	33	33	33	33	33	33	34	34	62	60	71	69	75	72	86	81	83	78	76	73
18.....	47	46	47	45	33	33	33	33	33	33	34	33	65	59	74	68	78	73	88	82	83	79	75	73
19.....	47	46	45	43	33	33	33	33	33	33	35	35	66	62	77	71	84	80	84	83	79	74	71	64
20.....	47	46	44	42	33	33	33	33	33	33	35	32	66	63	78	71	84	78	89	84	87	80	72	61
21.....	47	45	42	42	33	33	33	33	33	33	32	32	64	61	79	73	85	79	88	84	84	80	66	62
22.....	46	47	42	40	33	33	33	33	33	33	32	32	64	62	80	73	84	79	88	86	83	78	63	62
23.....	50	46	42	41	33	33	33	33	33	33	32	32	64	61	78	69	80	76	86	85	83	78	62	59
24.....	51	50	41	39	33	33	33	33	33	34	32	32	62	61	73	66	80	79	83	81	85	76	61	58
25.....	51	50	39	37	33	33	33	33	33	34	33	33	63	60	71	68	83	79	86	80	89	81	58	55
26.....	50	46	37	36	33	33	33	33	33	34	33	33	65	62	70	68	81	76	88	85	86	81	55	54
27.....	46	44	37	36	33	33	33	33	33	34	33	33	67	64	69	66	79	76	89	87	85	83	58	53
28.....	45	43	37	35	33	33	33	33	33	34	33	33	68	65	68	64	80	75	89	84	85	82	61	55
29.....	44	41	35	34	33	33	33	33	--	--	34	33	67	64	66	61	84	77	86	80	84	76	61	58
30.....	42	41	34	33	33	33	33	33	--	--	39	34	68	64	70	64	85	80	83	80	73	61	57	--
31.....	41	40	--	--	33	33	33	33	--	--	41	39	--	--	72	66	--	--	89	86	76	70	--	--
Average.....	52	50	42	40	33	33	33	33	33	33	34	33	59	56	72	67	77	72	88	83	83	79	70	66

Temperature (°F) of water, water year October 1954 to September 1955
Recorder with temperature attachment, continuous ethyl alcohol-actuated thermometer/7

JAMES RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN JAMES RIVER BASIN IN NORTH DAKOTA

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Dis-charge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Per- cent so- dium adsorp- tion ratio	So- dium con- duc- tance (micro- mhos at 25° C)	pH	
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium	Non- mag- nesium				
PIPESTEM CREEK NEAR BUCHANAN																							
Aug. 11, 1955.....	0.2	11	0.13	31	36	134	13	382	11	145	28	0.3	0.2	0.33	634	0.66		224	0	55	3.9	976	8.4
Sept. 30.....	.1	5.2	.06	47	52	156	11	392	0	295	42	.3	2.5	.35	831	1.13		332	11	50	3.7	1,250	8.1

PIPESTEM CREEK NEAR BUCHANAN

MISSOURI RIVER BASIN ABOVE SIOUX CITY, IOWA

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

LITTLE SIOUX RIVER BASIN

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA

LOCATION.--At gaging station at bridge on U. S. Highway 20, 0.2 mile upstream from Bacon Creek, 0.5 mile west of Correctionville, Woodbury County, and 0.8 mile downstream from Pierson Creek.

DETAILED DATA--2,450 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: November 1954 to June 1955 (discontinued).

Water temperatures: May 1951 to September 1955.

EXTREMES: May 1950 to September 1955.

Hardness: Maximum 486 ppm. Minimum, 136 ppm Mar. 9-14.

Specific conductance: 1 ppm maximum daily, 100 ppm Mar. 9-14.

Water temperatures: Maximum daily, 73.1° minimum daily, 28.7° ppm Mar. 10.

Sediment concentrations: Maximum daily, 7.310 ppm July 10; minimum daily, not determined.

EXTREMES: 1950-55.--Water temperatures (1951-55): Maximum daily, 73.1° minimum daily, 28.7°.

Sediment loads: Maximum daily, 52,700 tons July 10, 1950; minimum daily, not determined.

Sediment concentrations: Maximum daily, 257,000 tons June 19, 1954; minimum daily, not determined.

REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Flow affected by ice Feb. 4 to Mar. 10, Mar. 22-25. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, November 1954 to June 1955

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 adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per million	Calcium, magnesium	Non-carbonate					
Nov. 4, 1954.....	400	--	--	--	--	15	--	a 170	--	9.5	--	12	--	368	0.50	248	109	12	531	8.3	--	--	--
Nov. 5-30.....	337	18	0.00	100	34	14	2.4	324	127	9.5	0.5	10	0.07	502	68	391	117	7	739	7.7	--	--	--
Dec. 1-Jan. 3, 1955.....	207	--	--	--	--	16	--	359	--	11	--	--	--	536	73	300	419	125	8	791	8.0	--	--
Jan. 4-31.....	129	--	--	--	--	20	--	384	--	14	--	9.0	--	587	80	204	456	141	9	866	7.9	--	--
Feb. 1-16.....	78.5	22	.00	124	43	24	3.6	409	169	16	.3	9.6	.09	629	86	133	486	151	10	946	7.7	3	--
Feb. 17-Mar. 2.....	63.9	--	--	--	--	--	--	362	157	16	--	9.5	--	571	78	98.5	439	142	--	871	7.8	--	--
Mar. 3-8.....	358	--	--	--	--	--	--	260	95	13	--	8.2	--	401	55	388	295	82	--	625	7.6	--	--
Mar. 9-14.....	2,100	13	.53	36	10	4.5	9.6	146	23	4.5	.2	7.9	.04	196	27	110	136	16	6	310	7.2	42	--
Mar. 15-20.....	1,170	--	--	--	--	--	--	188	68	6.5	--	14	--	301	41	951	222	68	--	465	7.5	--	--
Mar. 21-30.....	468	--	--	--	--	--	--	280	101	9.0	--	12	--	421	57	555	322	92	--	649	7.7	--	--
Mar. 31-Apr. 6.....	1,270	--	--	--	--	270	--	228	79	7.0	--	16	--	349	47	1,200	260	73	--	540	7.6	--	--
Apr. 7-May 3.....	820	--	--	--	--	--	--	b 266	109	9.0	--	10	--	437	59	968	335	100	--	655	8.3	--	--
May 4-31.....	425	--	--	--	--	425	--	280	119	9.0	--	9.0	--	451	61	518	346	108	--	689	7.9	--	--
June 1-22.....	245	--	--	--	--	--	--	236	108	11	--	1.5	--	384	52	254	286	92	--	600	7.9	--	--
June 23-30.....	153	--	--	--	--	--	--	243	125	11	--	1.7	--	414	56	171	287	86	--	635	7.9	--	--

a. Includes equivalent of 8 ppm of carbonate (CO₃).

b. Includes equivalent of 5 ppm of carbonate (CO₃).

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Temperature (°F) of water, water year October 1954 to September 1955

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

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

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	310	85	71	486			246		
2.....	382	171	176	442			250		
3.....	400	137	148	414			178		
4.....	388	108	113	400			210		
5.....	376			376			238		
6.....	376	86	88	388	55	61	224	30	18
7.....	376			428			208		
8.....	388			428			226		
9.....	400	99	107	414			220		
10.....	556	516	s 847	388			214		
11.....	596	595	957	388			218	40	
12.....	580	375	587	365			238	--	
13.....	612	425	702	385			238	--	
14.....	660	300	535	354			234	40	
15.....	710	290	556	343			230	--	
16.....	710	250	479	343	32	30	214	40	e 23
17.....	761	290	596	343			200	--	
18.....	727	1,200	2,380	332			195	40	
19.....	877	194	355	321			200	--	
20.....	828	174	295	321			202	--	
21.....	596			310			198	37	
22.....	564			310			204	--	
23.....	548	136	206	300			197	37	
24.....	532			300			198	--	
25.....	516			289			206	37	
26.....	516	111	156	278	19	15	193	--	e 19
27.....	532			278			185	--	
28.....	516			278			146	37	
29.....	501			264			181	--	
30.....	501	61	83	250			184	--	
31.....	501			--	--	--	189	37	
Total.	16,436	--	10,933	10,496	--	1,091	6,474	--	619
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	184	38		93	81		60	103	17
2.....	189	--		92	--		108	121	sa 41
3.....	185	--		91	81		490	58	77
4.....	178	38		88	--		450	--	e 35
5.....	175	--	e 18	86	81		300	26	21
6.....	166	38		84	--	e 19	228	--	e 15
7.....	164	--		82	--		180	--	e 12
8.....	162	28		79	94		500	511	sb 1,500
9.....	164	--		77	--		1,500	1,290	a 5,220
10.....	162	--		75	--		2,500	2,150	14,500
11.....	151	28		73	--		2,650	2,310	16,500
12.....	148	--		71	94		2,100	1,780	10,100
13.....	146	28	e 11	69	--		1,720	1,620	7,520
14.....	136	--		87	--	e 17	2,110	2,490	14,200
15.....	136	28		65	94		1,850	1,850	sb 9,850
16.....	132	--		84	--		1,340	1,070	3,870
17.....	126	--		63	123		1,150	780	2,420
18.....	122	13		62	--		994	480	1,290
19.....	127	--		61	123		884	385	919
20.....	122	13		61	--		830	280	627
21.....	110	--		60	--		550	165	245
22.....	106	13		60	123		480	220	285
23.....	103	--		60	--	e 19	400	228	246
24.....	100	--		60	118		340	210	193
25.....	99	13	e 4	60	--		300	187	151
26.....	99	--		60	118		332	150	134
27.....	100	--		60	--		428	152	176
28.....	99	--		60	--		516	182	254
29.....	96	13		--	--	--	596	340	547
30.....	95	--		--	--	--	934	844	s 2,330
31.....	95	--		--	--	--	1,380	1,940	7,230
Total.	4,177	--	292	1,983	--	520	28,200	--	100,505

e Estimated.

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

Suspended sediment, water year October 1954 to September 1955--Continued

Day	Mean discharge (cfs)	April		Mean discharge (cfs)	May		Mean discharge (cfs)	June	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	1,340	1,450	5,250	1,220	925	3,050	240		
2.....	1,260	1,060	3,610	1,260	953	3,240	228	214	132
3.....	1,110	890	2,670	1,070	870	2,510	218		
4.....	1,410	4,540	s 18,700	956	650	1,680	242	452	295
5.....	1,260	1,950	6,630	866	500	1,170	268	437	316
6.....	1,110	995	2,980	778	460	966	268	352	255
7.....	1,030	570	1,590	710	447	857	289	376	293
8.....	994	490	1,320	644	410	713	278	340	255
9.....	920	478	1,180	612	340	562	264	288	205
10.....	812	481	1,050	580	299	468	264	280	185
11.....	744	425	854	548	299	442	268	237	171
12.....	694	412	772	532	263	378	278	206	155
13.....	644	350	609	486	263	345	262	171	121
14.....	612	320	529	456	208	246	246	165	110
15.....	564	310	472	414	208	233	228	160	98
16.....	532	279	401	376			216	162	94
17.....	501	250	338	354	133	123	208	183	103
18.....	456	235	289	332			208	178	100
19.....	442	210	251	310			202	185	101
20.....	414	193	216	289			240	245	159
21.....	400	162	175	278	131	95	254	256	176
22.....	388	148	155	260			220	232	138
23.....	414	210	235	252			216	220	128
24.....	612	450	744	236			198	210	112
25.....	778	550	1,160	228			173	208	97
26.....	1,150	1,220	3,790	220			153	195	81
27.....	1,340	1,470	5,320	218	162	101	136	175	64
28.....	1,420	1,340	5,140	220			124	150	50
29.....	1,380	1,280	4,770	244			114	167	51
30.....	1,340	1,220	4,410	246			108	209	61
31.....	--	--	--	246			--	--	--
Total.	26,071	--	75,610	15,441	--	18,550	6,611	--	4,370
Day	Mean discharge (cfs)	July		Mean discharge (cfs)	August		Mean discharge (cfs)	September	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	112	209	63	66			20		
2.....	112	194	59	63			20		
3.....	99	178	48	57	173	27	19		
4.....	97	144	38	53			18		
5.....	1,270	5,300	s 26,300	46			17		
6.....	557	2,670	s 4,640	89	525	s 141	22	129	6
7.....	184	520	258	63	178	30	18		
8.....	153	300	124	45	130	16	16		
9.....	182	388	sb 206	48	144	sb 21	14		
10.....	1,660	7,310	sb 52,700	149	215	86	12		
11.....	310	650	544	80	118	25	11		
12.....	193	440	229	59			11		
13.....	157	315	134	48			11		
14.....	192	372	193	41	110	14	12		
15.....	246	450	299	38			12		
16.....	148	310	124	37			9.6		
17.....	130	245	86	37			6.8		
18.....	118	245	78	37			7.5		
19.....	108	220	64	35	148	14	14		
20.....	148	1,630	s 821	32			14		
21.....	118	190	61	30			17		
22.....	116	231	sb 88	29			17		
23.....	203	529	290	26			19		
24.....	133	190	68	25			15		
25.....	115	175	54	24			14	118	6
26.....	93			24			17		
27.....	92			24	135	8	20		
28.....	89			22			22		
29.....	78	179	40	20			35	133	13
30.....	69			21			38	147	15
31.....	68			21			--	--	--
Total.	7,350	--	87,809	1,391	--	680	498.9	--	176
Total discharge for year (cfs-days).....									125,128.9
Total load for year (tons).....									301,155

s Computed by subdividing day.

b Computed from partly estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

Particle-size analyses of suspended sediment, April to July 1955

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

[illegible]

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

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 1955.

Sediment records: May 1950 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point Jan. 30, Feb. 2, and probably on many other days during winter months.

Sediment concentrations: Maximum daily, 10,900 ppm July 10; minimum daily, not determined.

Sediment loads: Maximum daily, 67,100 tons July 10; minimum daily, not determined.

EXTREMES, 1950-55.--Water temperatures: Maximum (1951-54), 83°F June 24, 1952; minimum (1951-55), 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 Dec. 6 to Mar. 10, Mar. 22-28. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

[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	a 55	--	--	a 34		--	44	62	68	70	78	--
2	a 58	a 38	--	--	a 32	--	48	66	72	72	--	64
3	58	--	--	--		--	50	66	69	--	--	--
4	58	--	--	a 34		--	48	64	68	--	--	--
5	--	--	--	--		--	46	62	68	--	78	--
6	a 54	--	--	--		--	46	64	64	72	--	--
7	a 52	--	a 34	--		--	44	62	68	74	--	--
8	--	a 54	--	--		--	48	58	64	78	--	--
9	--	--	--	--		--	49	58	58	78	71	--
10	--	--	--	--		39	52	58	58	76	70	62
11	58	49	--	--		a 40	54	58	--	74	68	--
12	--	--	--	--		34	56	58	58	78	--	--
13	56	--	--	a 33		34	52	60	58	--	--	66
14	--	--	--	--		36	50	60	62	72	--	--
15	50	--	--	--		--	54	63	64	76	70	--
16	--	--	--	--		38	54	64	64	--	--	--
17	--	46	--	--		--	54	66	68	--	--	--
18	a 40	--	--	--		42	58	65	68	--	--	--
19	46	--	--	--		--	60	66	68	76	74	--
20	46	--	--	--		--	58	64	72	76	--	--
21	48	44	34	--		--	--	69	--	--	--	64
22	--	--	--	--		--	58	71	70	78	70	66
23	--	--	--	--		--	54	70	--	--	--	--
24	a 58	--	--	--		--	52	62	69	--	--	--
25	--	--	--	--		--	58	66	68	74	75	--
26	--	--	--	--		--	56	66	--	--	--	52
27	46	--	--	--		--	56	62	70	--	--	--
28	--	--	--	--		--	56	62	68	80	--	--
29	--	a 38	--	--		a 48	56	58	68	--	72	--
30	--	--	--	a 32		a 49	56	--	75	--	--	52
31	--	--	--	--		--	--	62	--	82	--	--
Average	--	--	--	--		--	53	63	66	--	--	--

a Reading obtained between 1 p.m. and 6 p.m.

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955

Suspended sediment, water year October 1904 to September 1905									
Day	Mean discharge (cfs)	October		Mean discharge (cfs)	November		Mean discharge (cfs)	December	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	308	394	328	545	215	a 316	272		
2.....	836	7,990	sb 24,000	530	170	243	291		
3.....	509	1,750	2,410	472	140	a 178	262	--	e 100
4.....	426	750	863	292	72	a 57	227		
5.....	426	--	e 540	470	195	a 247	243		
6.....	412	377	419	399	160	a 172	246	--	
7.....	412	306	340	483	276	sa 395	248	114	
8.....	426	--	e 350	500	820	1,110	249	--	
9.....	440	--	e 370	440	525	a 624	250	--	
10.....	1,060	10,800	s 38,200	426	510	a 587	250	--	
11.....	684	3,500	6,460	412	495	551	250	--	
12.....	560	1,450	a 2,190	426	490	a 564	250	--	
13.....	575	1,070	1,660	399	445	a 479	252	--	
14.....	605	1,000	a 1,630	386	--	--	252	--	e 90
15.....	665	930	1,670	386	--	--	252	--	
16.....	715	880	a 1,700	373	--	e 350	253	--	
17.....	768	800	a 1,660	373	339	--	253	--	
18.....	802	820	1,780	360	--	--	254	--	
19.....	768	630	1,310	347	--	--	254	--	
20.....	732	535	1,060	347	--	--	255	--	
21.....	680	470	863	347	157	e 150	255	166	
22.....	635	430	a 737	347	--	--	250	--	
23.....	605	415	a 678	318	--	--	243	--	
24.....	590	405	645	306	--	--	236	--	
25.....	560	390	a 590	318	--	--	228	--	
26.....	575	425	a 660	313	--	--	218	--	e 80
27.....	560	430	650	301	--	e 180	210	--	
28.....	560	405	a 612	296	--	--	209	--	
29.....	545	370	a 544	294	225	--	209	--	
30.....	560	330	a 499	294	--	--	208	--	
31.....	560	290	a 438	--	--	--	208	--	
Total.	18,559	--	95,856	11,500	--	9,253	7,537	--	2,750
January									
1.....	208	124		112			100	--	e 60
2.....	208	--		111	15		295	--	e 250
3.....	208	--		110	--		1,180	--	e 2,000
4.....	207	124		108	--		1,010	--	e 1,500
5.....	207	--	e 70	107	--		700	--	e 900
6.....	205	--		105	--		500	--	e 500
7.....	205	--		103	--	e 5	450	--	e 300
8.....	199	--		102	--		600	594	sa 1,550
9.....	191	--		101	--		1,170	2,420	a 7,640
10.....	187	--	e 25	99	--		2,100	6,780	38,400
11.....	182	--		97	--		3,170	5,340	45,700
12.....	176	--		95	--		2,580	4,500	31,300
13.....	170	25		94	--		2,040	2,850	15,700
14.....	166	--		93	41		2,000	2,710	14,600
15.....	160	--		92	--		2,360	3,550	a 22,600
16.....	153	--		92	--		1,700	1,860	8,630
17.....	146	--		91	--		1,420	1,670	a 6,400
18.....	142	--		90	--		1,140	1,500	4,620
19.....	138	--	e 10	88	--		960	--	e 2,200
20.....	133	--		87	--		855	--	e 1,500
21.....	132	--		86	--	e 9	680	--	e 900
22.....	131	--		86	--		600	--	e 600
23.....	129	--		85	--		510	--	e 400
24.....	125	--		84	--		455	--	e 300
25.....	122	--		83	41		390	--	e 240
26.....	120	--		82	--		340	--	e 220
27.....	119	--		82	--		340	--	e 220
28.....	117	--		82	--		450	--	e 300
29.....	115	--	e 8	--	--		590	400	637
30.....	114	25		--	--		732	1,350	2,670
31.....	113	--		--	--		1,150	2,100	a 6,520
Total.	4,928	--	793	2,647	--	200	32,567	--	219,357

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

LITTLE SIOUX RIVER BASIN--Continued

LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

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.....	1,420	2,550	9,780	1,500	1,450	5,370	301	490	398
2.....	1,340	1,750	6,330	1,460	1,300	5,120	282	442	337
3.....	1,260	1,430	4,860	1,380	1,240	4,620	260	350	246
4.....	1,100	1,470	4,370	1,140	1,130	3,480	255	330	227
5.....	1,380	4,730	17,600	995	910	2,440	289	490	382
6.....	1,030	2,300	6,400	890	762	1,830	296	407	325
7.....	925	1,130	2,820	768	649	1,350	289	371	289
8.....	890	750	1,800	732	550	1,090	289	400	312
9.....	890	885	1,650	680	428	786	282	345	263
10.....	820	665	1,470	635	400	686	277	279	209
11.....	768	625	1,300	605	360	588	279	265	a 200
12.....	698	585	1,100	575	358	556	286	253	195
13.....	665	551	989	545	369	543	291	259	203
14.....	635	472	809	500	340	459	279	281	212
15.....	605	470	768	455	329	404	258	307	214
16.....	560	495	748	426	300	345	243	307	201
17.....	545	430	633	399	293	316	236	298	190
18.....	515	385	535	373	295	297	234	321	203
19.....	485	381	499	347			216	351	224
20.....	455	418	514	331			216	348	203
21.....	426	--	e 500	311			258	350	a 244
22.....	412	--	e 500	294			260	480	337
23.....	412	1,280	1,400	284			225	430	a 261
24.....	530	870	1,240	270	334	257	234	350	221
25.....	650	612	1,070	260			214	296	171
26.....	960	1,150	2,980	255			193	300	a 156
27.....	1,380	4,400	16,400	250			178	314	151
28.....	1,620	6,920	30,300	246			172	325	151
29.....	1,620	2,250	9,840	258	129	90	153	442	183
30.....	1,580	1,750	7,470	286	--	e 125	144	352	137
31.....	--	--	--	301	167	136	--	--	--
Total.	26,576	--	136,675	17,751	--	33,701	7,409	--	7,045
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	204	3,060	1,690	87	117		36	--	
2.....	148	1,020	408	87	--		34	151	
3.....	140	800	a 302	80	--	e 30	34	--	e 14
4.....	126	720	a 245	77	--		34	--	
5.....	153	724	sa 392	75	159		36	--	
6.....	1,370	8,180	30,300	77	--	e 45	39	--	e 20
7.....	426	2,800	3,220	89	--	e 90	35	--	e 16
8.....	206	1,000	556	88	--	e 50	32	--	e 15
9.....	182	500	246	77	150	31	29	--	e 14
10.....	1,680	10,900	s 67,100	136	1,400	sb 555	31	888	
11.....	1,450	5,910	s 29,200	99	520	139	30	--	e 60
12.....	360	1,700	1,650	71	290	a 56	29	--	
13.....	232	650	a 407	54	--	e 30	28	820	
14.....	214	428	247	51	--	e 25	26	--	e 35
15.....	229	384	237	51	160	22	27	--	e 20
16.....	236	405	a 258	51	--		24	--	
17.....	160	280	a 121	53	--		24	--	e 15
18.....	148	210	a 84	51	--		24	--	
19.....	158	181	77	46	146		28	--	
20.....	167	188	85	44	--		30	--	e 25
21.....	183	--	e 600	44	--		40	343	37
22.....	128	178	62	43	130		30	217	18
23.....	128	165	a 57	43	--		29	--	
24.....	169	372	a 170	41	--	e 18	30	--	
25.....	136	170	62	41	150		31	--	
26.....	120	--	e 50	42	--		32	116	e 10
27.....	108	--	e 40	39	--		35	--	
28.....	99	132		38	--		33	--	
29.....	99	--		43	184		32	--	
30.....	97	--	e 35	40	--		34	113	
31.....	87	147		38	--		--	--	--
Total.	9,343	--	138,006	1,896	--	1,481	936	--	650

Total discharge for year (cfs-days)..... 141,649

Total load for year (tons)..... 645,767

e Estimated.

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 NEAR KENNEBEC, IOWA--Continued

Particle-size analyses of suspended sediment, April to July 1955

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

Date of collection	Time	Discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Apr. 5, 1955.....	5:15 p. m.	1,260	46	7,360	3,190	48	82	97	98	99					SPWCM
May 5.....	9:00 a. m.	995	62	7,950	3,290	25	51	88	95	99					SPWCM
July 6.....	11:30 a. m.	1,660	76	8,500	2,610	48	82	98	99	100					SPWCM

PLATTE RIVER BASIN

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.

LOCATION.--At bridge on U. S. Highway 26 at Guernsey, Platte County, 0.9 mile downstream from gaging station and 2 miles downstream from Guernsey Dam. Prior to Nov. 4, 1954, sampling site was at gaging station.

DRAINAGE AREA.--16,200 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: October 1951, April to September 1952, March to September 1953, May 1954 to September 1955.

Sediment records: April 1947 to June 1953.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 928 ppm Feb. 1-28; minimum, 226 ppm June 27.

Hardness: Maximum, 440 ppm Mar. 1-31; minimum, 132 ppm June 27.

Specific conductance: Maximum daily, 1,340 micromhos Mar. 7-9; minimum daily, 354 micromhos June 27.

Water temperatures: Maximum, 90°F Aug. 20; minimum, freezing point on several days in February.

EXTREMES, 1951-55.--Dissolved solids: Maximum (1954-55), 928 ppm Feb. 1-28, 1955; minimum, 226 ppm June 27, 1955.

Hardness: Maximum (1954-55), 440 ppm Mar. 1-31, 1955; minimum, 132 ppm June 27, 1955.

Specific conductance: Maximum daily (1954-55), 1,340 micromhos Mar. 7-9, 1955; minimum daily, 354 micromhos June 27, 1955.

Water temperatures: Maximum, 90°F Aug. 20, 1955; minimum, freezing point on several days in February.

REMARKS.--Records of specific conductance of daily samples available in district office at Worland, Wyo. No appreciable inflow between gaging station and sampling station except during periods of heavy local precipitation. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Particulate matter	Sedimentation ratio	Specific conductance (micro-mhos at 25°C)	pH	Col- or
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium					
Oct. 1-12, 1954...	14.8	--	--	--	--	79	--	210	280	--	--	--	--	640	0.87	25.6	316	144	35	1.9	922	7.7	--
Oct. 13-27...	14.0	--	--	--	--	82	--	214	283	--	--	--	--	654	.89	24.7	320	145	36	2.0	937	7.9	--
Oct. 28-Nov. 4...	19.9	--	--	--	--	82	--	216	288	--	--	--	--	652	.89	35.0	320	143	36	2.0	947	8.1	--
Nov. 5-29...	20.9	12	0.00	79	32	87	6.3	211	310	27	0.4	1.9	0.13	682	.93	38.5	327	154	36	2.1	978	7.7	4
Nov. 30-Dec. 2...	56.0	--	--	--	--	90	--	216	305	--	--	--	--	683	.93	103	333	156	37	2.1	986	8.2	--
Dec. 3-6...	760	--	--	--	--	104	--	216	360	--	--	--	--	764	1.04	1,570	357	180	39	2.4	1,090	8.2	--
Dec. 7-31...	279	--	--	--	--	114	--	227	383	--	--	--	--	838	1.13	624	384	198	39	2.5	1,160	8.1	--
Jan. 1-31, 1955...	13.0	--	--	--	--	112	--	269	385	--	--	--	--	881	1.20	30.9	418	197	37	2.4	1,210	8.0	--
Feb. 1-28...	11.6	--	--	--	--	117	--	273	413	--	--	--	--	928	1.26	29.1	438	214	37	2.4	1,260	8.0	--
Mar. 1-31...	16.6	12	.11	105	43	121	6.4	268	420	39	.4	4.1	.17	924	1.26	41.4	440	220	37	2.5	1,280	8.0	4
Apr. 1-17...	626	--	--	--	--	112	--	229	388	--	--	--	--	838	1.14	1,420	389	201	38	2.5	1,180	7.9	--
Apr. 18-30...	976	--	--	--	--	96	--	169	340	--	--	--	--	692	.94	1,620	309	170	40	2.4	1,000	7.8	--
May 1-15...	445	--	--	--	--	68	--	141	253	--	--	--	--	514	.70	618	239	123	38	1.6	764	8.0	--
May 16-June 2...	202	--	--	--	--	52	--	134	190	--	--	--	--	425	.58	232	203	93	36	1.6	643	7.7	--
June 3-26...	480	13	.04	54	16	49	4.3	146	170	14	.3	1.2	.08	404	.55	524	201	81	34	1.5	618	7.6	8
June 27...	28.0	--	--	--	--	20	--	142	59	--	--	--	--	226	.31	17.1	132	16	24	.8	354	8.0	--
June 28-July 13...	952	--	--	--	--	55	--	167	188	--	--	--	--	468	.64	1,200	223	86	35	1.6	680	7.6	--
July 14-16...	3,250	--	--	--	--	66	--	194	228	--	--	--	--	558	.76	4,900	266	107	35	1.8	803	7.8	--
July 17-19...	4,057	--	--	--	--	50	--	182	185	--	--	--	--	494	.87	5,410	252	103	30	1.4	698	7.7	--
July 20-Aug. 21...	3,748	--	--	--	--	45	--	171	175	--	--	--	--	431	.59	3,910	227	87	30	1.3	633	7.8	--
Aug. 22-Sept. 12...	3,358	--	--	--	--	45	--	178	168	--	--	--	--	431	.59	3,910	227	86	30	1.3	647	7.5	--
Sept. 13-30...	1,617	19	.01	64	22	54	4.8	189	188	16	.4	2.0	.10	483	.66	2,110	250	95	31	1.5	700	8.2	9
Weighted average a...	883	--	--	--	--	55	--	177	200	--	--	--	--	480	0.85	1,140	246	101	33	1.5	706	--	--

a. Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1954 to September 1955

/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	--	--	40	35	38	35	a 49	48	72	79	b 70	--
2	--	--	a 42	38	36	50	48	50	a 66	b 80	b 70	--
3	--	--	a 40	40	34	a 39	a 40	a 55	64	--	--	--
4	b 56	43	45	40	36	a 42	33	b 55	68	--	b 70	83
5	--	50	45	--	a 36	36	34	58	b 60	80	b 69	--
6	--	48	40	--	a 34	a 41	--	67	a 70	a 78	--	b 83
7	--	46	38	--	37	a 38	a 39	68	a 57	85	--	b 81
8	--	--	40	--	36	47	b 50	56	a 74	82	a 82	--
9	--	49	38	--	34	48	a 54	54	a 54	a 79	83	--
10	--	48	37	a 35	a 34	45	50	a 65	65	a 83	a 81	82
11	--	41	38	35	35	48	--	70	85	78	b 60	80
12	--	50	37	34	35	48	50	70	62	80	--	b 80
13	--	48	38	34	40	a 46	52	65	a 69	80	a 82	78
14	--	50	--	b 36	38	39	44	56	--	b 78	80	75
15	--	49	38	36	38	38	50	62	a 70	--	84	b 82
16	--	50	40	38	b 37	50	b 46	b 62	65	--	b 80	b 80
17	--	50	38	--	b 39	50	48	62	70	--	a 82	81
18	--	50	38	a 34	34	47	50	b 62	74	b 82	80	79
19	a 54	50	40	33	31	45	42	b 68	76	--	82	b 80
20	--	45	52	33	31	48	--	73	78	--	b 90	78
21	--	45	38	33	32	47	50	68	a 75	a 83	--	b 70
22	--	50	40	33	32	46	51	63	--	a 81	a 87	72
23	--	48	42	35	a 32	38	50	72	a 73	80	87	70
24	--	47	38	34	34	35	48	64	--	b 80	a 84	68
25	--	50	40	34	35	b 33	50	56	--	b 82	--	a 65
26	--	45	38	33	34	34	50	62	73	--	b 85	b 66
27	--	45	33	36	--	45	b 47	--	--	87	a 86	--
28	--	40	40	36	--	48	58	70	b 75	a 86	87	b 70
29	--	38	39	38	--	a 45	--	70	82	a 85	86	b 75
30	--	40	a 36	38	--	a 48	--	--	b 70	a 85	--	--
31	--	--	34	40	--	50	--	70	--	85	87	--
Average	--	47	39	36	35	44	47	63	69	--	--	--

a Reading obtained between 11 a.m. and 1 p.m.

b Reading obtained between 5 p.m. and 7 p.m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

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 1955.

Sediment records: October 1952 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 7,720 ppm June 27; minimum daily, not determined.

Sediment loads: Maximum daily, 19,400 tons June 27; minimum daily, not determined.

EXTREMES, 1952-55.--Water temperatures: Minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 7,720 ppm June 27, 1955; minimum daily, not determined.

Sediment loads: Maximum daily, 19,400 tons June 27, 1955; minimum daily, not determined.

REMARKS.--Flow affected by ice Dec. 17, 28-31, Jan. 6 to Mar. 1, Mar. 22, 23, 26, 27.
Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

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

a Reading obtained between 12 m. and 3 p.m.

PLATTE RIVER BASIN

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PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	4.0			37			42		
2.....	3.7			36			56		
3.....	3.2			36			52		
4.....	2.9			40			56		
5.....	4.2			32			62		
6.....	5.0			32			62		
7.....	6.5			34			56		
8.....	8.5			32			52		
9.....	10			32			48		
10.....	22			37			52		
11.....	16			38			52		
12.....	9.0			42			48		
13.....	8.5			44			50		
14.....	13			43			48		
15.....	16			43			48		
16.....	16	102	5	43	48	5	46	60	8
17.....	22			43			44		
18.....	22			42			50		
19.....	23			42			50		
20.....	22			42			50		
21.....	18			42			50		
22.....	19			42			50		
23.....	21			40			52		
24.....	22			38			54		
25.....	28			40			52		
26.....	34			42			52		
27.....	36			42			50		
28.....	36			42			40		
29.....	37			40			43		
30.....	37			42			45		
31.....	38			--		--	46		
Total.	563.5		155	1,180		150	1,558		248
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	48			52			66		
2.....	50			48			82		
3.....	52			42			70		
4.....	52			40			64		
5.....	52			42			52		
6.....	46			42			48		
7.....	40			46			56		
8.....	40			46			62		
9.....	42			40			60		
10.....	42			30			60		
11.....	44			32			60		
12.....	46			34			60		
13.....	48			38			60		
14.....	48			38			58		
15.....	40			40	24	3	58	36	5
16.....	42	32	4	44			56		
17.....	44			46			56		
18.....	44			40			56		
19.....	40			34			58		
20.....	36			34			48		
21.....	38			38			44		
22.....	40			40			46		
23.....	40			44			48		
24.....	44			48			50		
25.....	44			52			37		
26.....	48			50			42		
27.....	46			54			50	44	6
28.....	40			58			70	30	7
29.....	46			--		--	86	23	5
30.....	52			--		--	106	41	12
31.....	52			--		--	117	25	8
Total.	1,382		124	1,192		84	1,686	--	168

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

LARAMIE RIVER NEAR UVA, WYO.--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	106	27	8	44			12	80	3
2.....	110	--	e 20	44			177	1,630	s 1,480
3.....	98	--	e 18	43			86	410	95
4.....	88	--	e 15	42			74	144	29
5.....	76	66	14	37			86	112	26
6.....	76	101	21	36			86	122	28
7.....	74	94	19	34	51	5	76	108	22
8.....	70	98	19	36			62	92	15
9.....	68	76	14	36			60	92	15
10.....	66	91	16	34			58	105	17
11.....	66	89	16	37			54	109	16
12.....	80	96	21	36			46		
13.....	121	94	31	27			46		
14.....	139	90	34	10			43	--	e 12
15.....	113	94	29	15			56		
16.....	96	74	19	16			94		
17.....	96	81	21	16			84		
18.....	100	81	22	16			92	--	e 22
19.....	100	74	20	16	44	1	88		
20.....	86	87	20	11			84		
21.....	76	86	18	7.0			76	73	15
22.....	72	75	15	6.5			68	78	14
23.....	68	75	a 14	6.0			66	64	11
24.....	64	74	13	4.7			136	889	s 461
25.....	62	68	11	5.5			84	305	69
26.....	54			89	487	s 147	282	3,270	s 4,460
27.....	48			58	154	24	1,040	7,720	s 19,400
28.....	48	74	10	24	58	4	500	2,970	s 4,580
29.....	46			18	60	3	186	973	s 510
30.....	44			17	76	3	141	464	177
31.....	--	--	--	15	86	3	--	--	--
Total.	2,411	--	518	836.7	--	261	4,043	--	31,621
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.....	119	322	103	4.2			3.7		
2.....	102	275	76	3.4			4.0		
3.....	94	232	59	3.2	156	1	4.7		
4.....	84	214	49	2.7			4.7		
5.....	80	215	46	3.2			8.0		
6.....	66	150	27	9.5	159	4	6.5		
7.....	60	150	24	12	205	7	6.0		
8.....	36	156	15	94	1,510	s 540	6.0		
9.....	32	137	12	38	480	49	6.0		
10.....	30	126	10	28	292	22	7.5		
11.....	24	130	8	17	251	12	8.5		
12.....	37	180	18	13	225	8	11		
13.....	17	153	7	12	200	6	9.0		
14.....	15	182	7	18	187	9	8.0		
15.....	16	132	6	22	300	18	8.5		
16.....	16	128	6	27	220	16	10		
17.....	17	140	a 6	24	180	12	10		
18.....	26	148	10	23	174	11	10		
19.....	30	163	13	24	150	10	6.0		
20.....	26	199	14	17			5.0		
21.....	26	177	12	16			2.7		
22.....	28	129	10	17			2.9		
23.....	24	98	6	17			3.2		
24.....	24	113	7	16	154	6	3.7		
25.....	21	122	7	14			4.5		
26.....	22	140	a 8	14			5.5		
27.....	22	148	9	12			4.0		
28.....	18	154	7	12			3.2		
29.....	27	160	12	8.5			2.9		
30.....	32	135	12	4.0	137	2	3.4		
31.....	17	138	6	4.2			--		--
Total.	1,188	--	612	529.9	--	789	179.1		30

Total discharge for year (cfs-days)..... 16,949.2

Total load for year (tons)..... 34,760

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, May to July 1955
(Methods of analysis: 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 per- ature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
May 26, 1955.....	12:00 m.	139	52	878	760	56	70	79	81	83	87	--	--	--	BWCM	
June 2.....	1:30 p.m.	360	--	3,840	2,620	22	22	--	86	86	96	98	98	100	VPN	
June 2.....	1:30 p.m.	360	--	3,840	2,480	--	60	--	86	--	96	98	99	100	VPWCM	
June 2.....	1:45 p.m.	360	--	3,840	3,700	--	77	--	83	--	95	100	--	--	VPWCM	
June 27.....	9:00 a.m.	1,270	60	4,120	2,630	--	68	--	82	--	91	97	99	100	VPWCM	
June 28.....	9:00 a.m.	560	87	4,120	2,630	--	--	--	82	--	91	97	99	100	VPWCM	
June 28.....	10:40 p.m.	232	87	1,660	2,860	--	75	--	92	--	99	100	--	--	VPWCM	
June 28.....	7:20 p.m.	149	30	149	839	28	34	41	49	58	77	96	100	--	BWCM	
July 18.....	1:49 p.m.	30	77	--	--	--	--	--	--	--	--	--	--	--	BWCM	

Particle-size analyses of bed material, June to July 1955
(Methods of analysis: 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	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										
						0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.000	
June 2, 1955.....	3	360			0	1	8	61	88	94	98	100	94			
July 13, 1955.....	3	33			1	3	5	43	55	70	74	79	94			

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.

LOCATION.--At gaging station at bridge on county road 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 June 1955 (discontinued).

Sediment records: April 1952 to June 1955 (discontinued).

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point Nov. 30, Dec. 9, Jan. 20, Feb. 24 and probably on several other days during November to February.

Sediment concentrations: Maximum daily, 1,300 ppm May 15; minimum daily, not determined.

Sediment loads: Maximum daily, 1,200 tons June 13; minimum daily, not determined.

EXTREMES, 1952-55.--Water temperatures: Maximum (1952-54), 67° F July 31, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 3,900 ppm June 10, 1952; minimum daily, not determined.

Sediment loads: Maximum daily, 22,000 tons June 10, 1952; minimum daily, 1 ton Apr. 16, 1952, Sept. 20, 22, 1954, and probably on several other days during 1953-55.

REMARKS.--Flow affected by ice Dec. 22, 23, Dec. 25 to Feb. 14, Feb. 17, 19-27, Mar. 1, 2, 4-9, 11, 13, 14, 18, 22, 26, 27. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, October 1954 to June 1955

/Once-daily measurement between 5 p.m. and 9 p.m./

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

a Reading obtained between 6 a.m. and 1 p.m.

PLATTE RIVER BASIN

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PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Suspended sediment, October 1954 to June 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	81			65	--		41	--	
2.....	76			60	50		55	21	
3.....	74			87	--		54	--	
4.....	75			58	21		55	13	
5.....	81			56	8		48	--	
6.....	75			61	--		50	--	
7.....	74			58	9		49	11	
8.....	68			56	--		39	--	
9.....	68			54	14		37	10	
10.....	68			49	--		48	--	
11.....	72			51	12		47	12	
12.....	71			55	--		42	--	
13.....	74			60	16		43	9	
14.....	70			52	--		41	--	
15.....	66			50	15		41	15	
16.....	71	13	2.4	56	--	a 2.0	37	--	a 1.5
17.....	68			49	7		28	--	
18.....	70			46	--		40	16	
19.....	68			49	18		46	--	
20.....	67			47	--		42	14	
21.....	65			43	10		41	--	
22.....	63			52	--		42	14	
23.....	65			51	11		42	--	
24.....	66			49	--		41	11	
25.....	71			48	9		40	--	
26.....	67			47	--		39	17	
27.....	57			39	11		38	--	
28.....	64			31	--		35	--	
29.....	62			29	--		30	--	
30.....	62			38	10		32	--	
31.....	60			--	--		32	13	
Total.	2,139		74.4	1,526	--	60.0	1,295	--	46.5
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.....	37	--		30	13		28	--	
2.....	37	23		29	13		29	--	
3.....	38	--		28	--		28	--	
4.....	35	--		27	--		28	--	
5.....	33	--		28	29		28	--	
6.....	33	13		30	--		29	--	
7.....	33	--		31	--		29	--	
8.....	34	--		31	--		30	--	
9.....	32	27		29	15		31	--	
10.....	31	--		26	--		31	--	
11.....	31	--		27	--		31	--	
12.....	32	12		28	21		31	--	
13.....	33	--		29	--		31	--	
14.....	33	--		30	--		31	--	
15.....	33	17		28	12	a 1.4	31	--	
16.....	32	--	a 1.9	28	--		31	39	3.2
17.....	31	--		30	--		30	--	
18.....	30	--		29	--		30	--	
19.....	31	--		26	--		31	--	
20.....	31	14		23	23		30	--	
21.....	31	--		26	--		28	--	
22.....	30	--		26	--		29	--	
23.....	29	16		26	--		31	--	
24.....	30	--		27	19		28	--	
25.....	31	--		30	--		27	--	
26.....	32	28		27	--		31	--	
27.....	33	43		28	16		32	--	
28.....	33	--		28	--		34	--	
29.....	34	24		--	--		33	--	
30.....	34	--		--	--		36	--	
31.....	32	--		--	--		33	--	
Total.	1,009	--	58.9	785	--	39.2	940	--	99.2

a Computed on basis of infrequent samples.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

CLEAR CREEK BELOW IDAHO SPRINGS, COLO.--Continued

Suspended sediment, October 1954 to June 1955--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.....	31	20	1.7	104	87	24	303	320	260
2.....	36	28	2.7	130	160	56	351	320	300
3.....	32	45	3.9	116	73	23	306	180	150
4.....	26	52	3.7	87	66	16	262	120	85
5.....	29	15	1.2	96	56	15	265	110	79
6.....	32	16	1.4	114	84	26	285	120	92
7.....	31	28	2.3	152	200	82	340	130	120
8.....	32	34	2.9	200	300	160	480	560	730
9.....	33	22	2.0	165	180	80	420	580	660
10.....	34	32	2.9	165	200	89	380	290	300
11.....	39	51	5.4	175	180	85	358	290	s 330
12.....	34	18	1.7	188	200	100	485	680	890
13.....	34	32	2.9	202	430	230	535	720	s 1,200
14.....	37	27	2.7	240	750	s 530	590	670	1,100
15.....	42	22	2.5	297	1,300	1,000	490	320	420
16.....	47	27	3.4	294	830	660	480	260	340
17.....	56	40	6.0	230	560	350	520	230	320
18.....	59	42	6.7	220	310	180	500	180	240
19.....	61	48	7.9	198	250	130	575	260	400
20.....	45	76	9.2	188	220	110	625	280	470
21.....	52	42	5.9	238	290	190	660	410	730
22.....	60	32	5.2	265	350	250	710	380	730
23.....	62	44	7.4	270	290	210	746	420	850
24.....	53	26	3.7	327	370	330	704	390	740
25.....	61	30	4.9	365	380	370	640	230	400
26.....	84	120	27	327	300	260	620	270	450
27.....	100	150	40	279	270	200	600	230	370
28.....	69	150	28	238	200	130	590	230	370
29.....	71	38	7.3	230	160	99	595	160	260
30.....	84	54	12	245	200	130	560	120	180
31.....	--	--	--	258	180	130	--	--	--
Total.	1,466	--	214.5	6,603	--	6,245	14,975	--	13,566

Total discharge for period Oct. 1, 1954, to June 30, 1955 (cfs-days).....

30,738

Total load for period Oct. 1, 1954, to June 30, 1955 (tons).....

20,403.7

s Computed by subdividing day.

PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, May to June 1955

Methods of analysis: 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
May 12, 1955.....	1:40 p. m.	180	56	156	340	4	6	9	13	19	50	76	98	100	VBWCM
May 13, 1955.....	10:10 p. m.	324	49	2,260	1,270	4	5	9	14	23	50	78	98	100	VBWCM
May 14, 1955.....	3:10 p. m.	270	48	224	1	2	3	6	9	25	44	90	90	100	VBWCM
May 15, 1955.....	4:15 p. m.	464	56	270	280	3	5	7	11	16	33	56	87	98	VBWCM
June 13, 1955.....	9:05 p. m.	842	52	550	160	3	4	5	8	13	29	45	72	100	VBWCM

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.

LOCATION.--At gaging station, 2.3 miles upstream from mouth and $4\frac{1}{2}$ miles southeast of Blackhawk, Gilpin County.

DRAINAGE AREA.--55.8 square miles.

RECORDS AVAILABLE.--Water temperatures: April 1952 to June 1955 (discontinued).

Sediment records: April 1952 to June 1955 (discontinued).

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point on many days during November to March.

Sediment concentrations: Maximum daily, 1,040 ppm May 21; minimum daily, not determined.

Sediment loads: Maximum daily, 56 tons May 21; minimum daily, less than 0.050 ton on many days.

EXTREMES, 1952-55.--Water temperatures: Maximum (1952-54), 78°F July 9, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 28,000 ppm June 11, 1952; minimum daily, 0 ppm

Aug. 25-31, Sept. 11-22, 1954.

Sediment loads: Maximum daily, 10,000 tons June 7, 1952; minimum daily, 0 tons Aug. 25

Aug. 25-31, Sept. 11-22, 1954.

REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, October 1954 to June 1955
/Once-daily measurement between 1 p.m. and 8 p.m./

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

a Reading obtained between 7 a.m. and 12 m.

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Suspended sediment, October 1954 to June 1955

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			1.2	40		1.2	--	
2.....	1.1	12	(t)	1.2	92		1.4	--	
3.....	1.1			1.3	5		1.5	8	
4.....	1.2	--	e 1.3	1.3	39		1.6	--	
5.....	1.2	610	2.0	1.2	--		1.7	--	
6.....	1.1	10		1.3	--		1.7	--	
7.....	1.0	--		1.3	5		1.7	12	
8.....	1.0	--		1.6	--		1.6	--	
9.....	1.0	--		1.3	11		1.5	--	
10.....	1.0	--		1.1	25		1.3	--	
11.....	1.0	4		1.1	--		1.2	7	
12.....	1.0	--		1.2	--		1.1	--	
13.....	1.2	--		1.7	12		1.1	--	
14.....	1.2	--		1.6	--		1.1	--	
15.....	1.1	--		1.4	--		1.1	--	
16.....	1.2	7		1.4	44	e 0.1	1.1	--	(t)
17.....	1.2	--		1.2	--		1.0	--	
18.....	1.2	4		1.1	--		1.0	--	
19.....	1.2	4	e .1	1.2	48		1.0	--	
20.....	1.2	12		1.3	--		1.0	--	
21.....	1.2	--		1.3	--		1.0	--	
22.....	1.2	--		1.4	15		1.0	--	
23.....	1.2	--		1.4	22		1.0	--	
24.....	1.2	14		1.3	--		1.1	13	
25.....	1.4	46		1.4	3		1.1	--	
26.....	1.4	10		1.2	--		.9	13	
27.....	1.2	30		1.1	--		.6	--	
28.....	1.2	--		1.0	--		.3	--	
29.....	1.3	14		.9	3		.4	--	
30.....	1.3	--		1.1	--		.5	--	
31.....	1.2	34		--	--		.6	--	
Total.	36.2	--	6.0	38.1	--	3.0	34.4	--	0.9
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.....	0.7	13		0.6	4		1.3	27	0.1
2.....	.6	--		.5	--		1.3	33	.1
3.....	.5	--		.5	--		1.3	--	e .1
4.....	.5	--		.4	--		1.4	--	e .2
5.....	.4	--		.5	--		1.0	70	.2
6.....	.4	--		.6	6		1.2	38	.1
7.....	.4	--		.5	--		1.3	92	.3
8.....	.4	--		.7	7		1.3	130	.5
9.....	.4	15		.6	--		1.3	180	.6
10.....	.4	--		.4	--		1.5	74	.3
11.....	.5	--		.5	2		1.6	--	e 1.5
12.....	.5	--		.6	--		1.7	120	.6
13.....	.5	--		.7	--		1.8	--	e 2.4
14.....	.5	--		.8	29		1.8	96	.5
15.....	.5	--		.8	--	(t)	1.7	86	.4
16.....	.3	26	(t)	.8	--		1.7	110	.5
17.....	.3	--		.8	27		1.6	38	.2
18.....	.3	--		.4	--		1.7	72	s .4
19.....	.3	--		.3	--		1.4	42	.2
20.....	.3	--		.2	--		1.3	83	.3
21.....	.3	--		.3	94		1.2	40	.1
22.....	.3	--		.5	--		1.4	10	(t)
23.....	.3	7		.7	--		1.6	23	.1
24.....	.3	--		.9	39		1.4	18	.1
25.....	.3	--		1.2	--		1.2	32	.1
26.....	.3	--		1.2	21		1.1	52	.2
27.....	.3	--		1.2	--		1.5	35	.1
28.....	.5	5		1.2	--		2.3	72	.4
29.....	.6	--		--	--	--	2.5	170	s 3.4
30.....	.7	9		--	--	--	3.4	700	s 12
31.....	.6	--		--	--	--	2.8	140	1.1
Total.	13.3	--	0.3	18.4	--	1.3	49.6	--	27.1

e Estimated.

s Computed by subdividing day.

t Less than 0.050 ton.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Suspended sediment, October 1954 to June 1955--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	3.1	540	4.5	8.6	310	s 8.4	21	320	18
2.....	3.4	520	4.8	9.5	320	8.2	21	290	16
3.....	4.0	380	4.1	8.1	180	3.9	20	360	19
4.....	3.5	220	2.1	6.7	150	2.7	21	280	16
5.....	3.2	190	1.6	7.6	310	6.4	20	310	17
6.....	3.1	80	.7	9.5	290	s 8.4	21	580	33
7.....	3.4	220	2.0	10	260	s 7.9	18	320	16
8.....	2.8	290	2.2	10	210	5.7	21	350	20
9.....	2.8	280	2.1	10	250	6.8	21	430	24
10.....	4.3	350	4.1	12	250	8.1	19	200	10
11.....	4.3	130	1.5	12	170	5.5	19	300	15
12.....	3.4	150	1.4	10	170	4.6	19	260	13
13.....	3.4	590	5.4	12	140	4.5	20	190	10
14.....	3.4	67	.6	12	200	s 7.3	22	530	s 36
15.....	5.7	190	2.9	13	230	8.1	22	310	18
16.....	7.6	450	9.2	14	130	4.9	21	210	12
17.....	9.1	580	14	14	360	14	23	250	16
18.....	10	380	10	15	490	20	19	110	5.6
19.....	8.1	240	5.2	15	480	19	18	100	4.9
20.....	9.5	330	8.5	14	670	s 31	17	98	4.5
21.....	6.2	290	4.9	17	1,040	s 56	16	200	8.6
22.....	7.6	180	3.7	20	740	40	16	140	6.0
23.....	6.7	240	4.3	20	730	39	15	140	5.7
24.....	4.7	150	1.9	22	720	43	15	92	3.7
25.....	7.1	530	s 12	23	510	32	15	98	4.0
26.....	8.6	560	13	24	510	33	14	67	2.5
27.....	7.6	340	s 7.9	24	500	32	12	100	3.2
28.....	5.7	75	1.2	23	490	30	12	110	3.6
29.....	5.7	65	1.3	23	300	19	11	45	1.3
30.....	7.1	280	5.4	21	340	19	10	58	1.6
31.....	--	--	--	20	320	17	--	--	--
Total.	165.1	--	142.5	460.0	--	545.4	539	--	364.2

Total discharge for period Oct. 1, 1954, to June 30, 1955 (cfs-days)..... 1,354.1

Total load for period Oct. 1, 1954, to June 30, 1955 (tons)..... 1,080.7

s Computed by subdividing day.

PLATTE RIVER BASIN--Continued
NORTH CLEAR CREEK NEAR BLACKHAWK, COLO.--Continued

Particle-size analyses of suspended sediment, March to June 1955

(Methods of analysis: 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. 13, 1955.....	1:40 p.m.	a 1.8	34	760	1,570	43	60	72	80	90	95	--	--	--	SBWCM	
Mar. 30.....	1:30 p.m.	8.1	34	2,300	2,200	32	46	58	68	78	88	--	--	--	SPWCM	
May 12.....	11:15 a.m.	10.0	58	145	330	6	9	10	13	18	28	33	44	74	100	VBWCM
May 12.....	12:30 p.m.	9.5	62	162	360	9	10	12	15	18	27	30	40	59	100	VBWCM
May 21.....	9:30 p.m.	25	50	2,310	1,590	10	14	20	27	37	62	72	83	97	100	VBWCM
June 11.....	3:00 p.m.	19	60	710	620	22	35	47	57	64	70	76	85	99	100	VBWCM
June 14.....	7:55 p.m.	27	48	1,010	990	28	38	48	57	66	75	80	89	100	100	VBWCM
June 21.....	9:20 p.m.	16.5	55	600	730	47	59	74	86	89	91	--	--	--	--	SBWCM
a Daily mean discharge.																

a Daily mean discharge.

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT HENDERSON, COLO.

LOCATION.--At gaging station at bridge on State Highway 22 (formerly State Highway 128) and 0.2 mile northwest of Henderson, Adams County.
DRAINAGE AREA.--4,740 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: July to September 1955.

Water temperatures: July to September 1955.

REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Phosphorus PO ₄	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
																Tons per million	Parts per million	Tons per foot	Calcium, mg./nestum	Non-carbonate				
Oct. 29, 1954.....	23.0	--	--	--	--	94	26	126	--	333	198	117	0.8	0.3	--	752	1.02	46.7	340	67	42	3.0	1,250	7.5
July 21-31, 1955..	203	16	0.1	0.02	0.00	59	13	90	8.2	164	128	79	7	25	7.2	500	.68	273	208	66	48	2.8	840	8.0
Aug. 1-4.....	255	15	.2	.02	.05	53	13	91	154	154	126	70	9	21	5.8	483	.66	334	185	59	52	2.9	771	7.9
Aug. 5-8.....	510	18	.1	.03	.00	48	11	44	44	146	76	38	7	4.7	3.8	325	.44	711	165	45	36	1.5	515	7.8
Aug. 9-20.....	428	14	.1	.00	.00	51	14	71	71	154	103	64	7	12	3.0	424	.58	490	184	58	46	2.3	685	7.2
Aug. 21-26.....	282	15	.1	.03	.00	48	14	68	68	142	100	58	7	17	4.6	413	.56	314	178	62	46	2.2	666	7.1
Aug. 27-30.....	947	13	.2	.03	.00	42	7.8	44	44	130	74	28	7	6.7	8	297	.40	760	137	30	41	1.6	474	7.3
Aug. 31-Sept. 9..	353	15	.2	.03	.00	53	13	87	87	178	114	64	9	15	4.2	460	.63	438	186	40	51	2.8	747	7.0
Sept. 10-16.....	209	16	.1	.02	.20	60	16	110	110	229	130	82	9	9.7	3.8	534	.73	301	216	28	53	3.3	895	7.1
Sept. 19.....	390	--	--	--	--	43	7.8	--	--	126	75	44	--	--	1.0	320	.44	337	140	37	--	--	532	7.0
Sept. 20-24.....	223	17	.0	.03	.00	65	15	104	104	182	149	82	8	34	7.0	560	.76	337	224	75	50	3.0	890	7.8
Sept. 25.....	517	--	--	--	--	38	6.8	--	--	102	73	34	--	--	1.5	280	.38	391	123	39	--	--	459	7.9
Sept. 26-30.....	235	17	.1	.03	.00	59	15	90	90	170	130	76	4	26	6.6	512	.70	325	208	69	48	2.7	818	8.2

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT HENDERSON, COLO.--Continued

Temperature (°F) of water, July to September 1955
 [Once-daily measurement between 6 a.m. and 7 a.m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1										--	72	66
2										--	71	66
3										--	72	64
4										--	70	64
5										--	70	--
6										--	66	65
7										--	71	63
8										--	66	63
9										--	66	63
10										--	67	60
11										--	68	60
12										--	68	60
13										--	67	62
14										--	68	63
15										--	68	63
16										--	70	62
17										--	58	62
18										--	68	64
19										--	68	59
20										--	68	62
21										a 80	68	58
22										a 80	68	58
23										65	68	58
24										72	68	59
25										70	68	52
26										70	68	55
27										69	70	55
28										68	64	56
29										70	68	56
30										72	64	57
31										75	64	--
Average										--	67	61

a Reading obtained at 2 p.m.

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT FORT LUPTON, COLO.

LOCATION.--At gaging station at bridge on State Highway 52 at Fort Lupton, Weld County.
DRAINAGE AREA.--5,070 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1955 (discontinued).
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, August 1954 to September 1955

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 adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, and nesium						
																							Residue at 180° C	Sum
Aug. 8, 1954.....	172			71	17	83	--	232	149	70	0.8	0.1	--	542	0.74		248	58	41	2.3	872	7.4	
Sept. 22.....	48			93	27	145	--	319	220	126	1.0	.1	--	802	1.09		342	80	47	3.4	1,300	7.5	
Oct. 28.....	21			108	32	145	--	394	244	122	.8	.2	0.29	860	1.16		400	77	42	3.2	1,440	7.6	
Nov. 24.....	43			80	48	147	10	544	126	112	1.1	.2	--	827	1.12		397	0	43	3.2	1,440	7.4	
Feb. 17, 1955..	82			--	--	137	--	334	280	91	--	--	--	--	--	--	396	122	42	3.0	1,300	7.5	
Mar. 28.....	70			--	--	131	--	312	293	90	--	--	--	--	--	--	405	149	41	2.8	1,320	7.4	
Apr. 28.....	57			--	--	139	--	243	210	125	--	--	--	--	--	--	318	36	45	3.4	1,300	7.4	
Apr. 30.....	59			80	26	145	--	305	210	127	1.2	1.4	.31	780	1.06		308	58	48	3.6	1,280	7.2	
May 11.....	72			73	24	126	--	303	164	108	1.1	.2	--	862	.93		280	32	46	3.3	1,150	7.3	
May 27.....	604			44	12	53	--	126	95	43	1.0	9.1	--	347	.47		158	55	42	1.8	566	7.0	
June 8.....	138			62	21	102	--	235	140	81	.9	6.9	--	580	.79		242	49	48	2.9	958	7.2	
June 28.....	260		0.54	44	12	70	4.4	163	106	56	.7	3.3	.19	393	.53		181	27	48	2.4	648	7.2	
July 20.....	46			80	20	133	--	265	185	114	1.4	6.6	--	718	.98		282	65	49	3.5	1,150	7.1	
Aug. 25.....	149			--	--	96	--	220	158	82	--	--	--	--	--	--	233	53	45	2.7	908	7.3	
Sept. 21.....	238			57	26	94	--	237	168	70	.9	12	--	555	.75		248	54	43	2.6	920	7.2	

PLATTE RIVER BASIN--Continued

ST. VRAIN CREEK AT MOUTH, NEAR PLATTEVILLE, COLO.

LOCATION --At gaging station at bridge on county road, 1.3 miles upstream from mouth and 4 miles northwest of Platteville, Weld County.
 DRAINAGE AREA, 1,000 square miles, approximately.
 RECORDS AVAILABLE --Chemical analyses: February to September 1955.
 REMARKS --Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, August 1954 to September 1955

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 (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium	Non-carbonate					
Aug. 8, 1954.....	75	--	--	132	107	180	--	319	825	24	1.4	5.4	0.39	--	2.18	--	770	508	34	2.8	1,930	7.7	--
Sept. 22.....	30	--	--	--	--	180	--	330	790	33	--	--	.38	--	--	--	742	471	34	2.9	1,900	8.0	--
Feb. 14, 1955 ..	a 54	--	--	111	81	135	--	341	555	21	.7	17	.29	--	1.65	--	610	330	32	2.4	1,560	7.4	--
Mar. 19.....	53	--	--	92	102	151	--	359	620	26	1.2	9.3	.23	--	1.78	--	648	354	33	2.6	1,660	7.6	--
Mar. 28.....	64	--	--	--	--	146	--	354	600	25	--	--	.25	--	--	--	625	335	33	2.5	1,630	7.7	--
Apr. 28.....	17	--	--	--	--	166	--	318	655	37	--	--	.29	--	--	--	632	371	36	2.9	1,720	7.6	--
Apr. 30.....	17	--	--	99	93	178	--	276	700	41	1.2	2.2	.33	--	1.90	--	628	402	38	3.1	1,790	7.9	--
May 11.....	a 23	--	--	105	84	162	--	302	645	36	1.1	5.0	.29	--	1.73	--	606	358	36	2.9	1,680	7.7	--
May 27.....	65	--	--	109	76	130	--	278	585	20	1.1	7.3	.26	--	1.62	--	584	356	32	2.3	1,500	7.6	--
June 8.....	68	--	--	93	57	107	--	265	430	23	.9	7.1	.23	--	1.23	--	468	251	33	2.1	1,250	7.7	--
June 28.....	60	12	0.00	100	77	127	4.4	289	545	23	1.2	7.6	.30	--	1.140	1.55	566	329	33	2.3	1,460	7.6	--
July 20.....	44	--	--	--	--	154	--	331	640	31	--	--	.29	--	--	--	630	359	34	2.7	1,670	7.6	--
Aug. 25.....	50	--	--	--	--	143	--	320	575	26	--	--	.29	--	--	--	572	310	34	2.6	1,550	7.9	--
Sept. 19.....	60	13	.05	129	82	155	5.6	329	638	26	1.4	6.9	.37	--	1,220	--	660	390	34	2.6	1,670	7.9	--

a Daily mean discharge.

PLATTE RIVER BASIN--Continued

BIG THOMPSON RIVER AT MOUTH, NEAR LA SALLE, COLO.

LOCATION.--At highway bridge 0.7 mile downstream from gaging station, 0.9 mile upstream from mouth, and about 3.5 miles west of La Salle, Weld County.
 DRAINAGE AREA.--818 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1955.

REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, August 1954 to September 1955

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		So- dium ad- sorp- tion ratio	Specific conduct- ance micro- mhos at 25°C	pH	Color
														Parts per million	Tons per acre- foot	Tons per day	Calcium, Non- mag- nesium	Carbon- ate					
																			Residue at 180°C					Sum
Aug. 6, 1954.....	39	--	--	204	143	220	--	350	1,200	25	--	8.9	0.47	2,180	--	2.96	1,100	813	30	2.9	2,480	7.8	--
Sept. 22.....	15	--	--	--	--	213	--	359	1,150	24	--	--	.48	--	--	--	1,070	776	30	2.8	2,430	7.9	--
Oct. 27.....	48	--	--	235	91	184	--	362	990	23	--	8.7	.41	1,880	--	2.56	962	665	29	2.6	2,200	7.4	--
Nov. 22.....	42	--	--	--	--	208	21	469	1,090	27	--	--	.14	--	--	--	1,060	675	29	2.8	2,460	7.7	--
Dec. 27.....	36	11	0.00	221	174	243	--	444	1,340	28	1.4	8.6	.55	2,550	--	3.47	1,270	906	29	3.0	2,820	7.3	--
Feb. 17, 1955.....	43	--	--	--	--	222	--	406	1,290	26	--	--	.47	--	--	--	1,180	847	28	2.8	2,640	7.7	--
Mar. 30.....	38	--	--	210	157	229	--	352	1,330	26	--	6.1	.51	2,350	--	3.20	1,170	881	29	2.9	2,640	7.5	--
Apr. 25.....	6.8	--	--	235	185	268	--	351	1,510	39	--	4.7	.64	2,730	--	3.71	1,350	1,060	30	3.2	2,980	7.8	--
Apr. 30.....	6.8	--	--	415	41	251	--	346	1,360	35	--	6.0	.54	2,510	--	3.41	1,210	926	31	3.1	2,770	7.5	--
May 11.....	8.4	--	--	--	--	230	--	376	1,300	34	--	--	.49	--	--	--	1,190	882	29	2.9	2,690	7.6	--
May 26.....	8.4	--	--	200	149	224	--	351	1,270	30	--	8.6	.36	2,250	--	3.06	1,110	822	29	2.9	2,560	7.7	--
June 17.....	41	--	--	--	--	172	--	304	950	28	--	--	.52	--	--	--	901	652	29	2.5	2,110	7.6	--
June 28.....	2.8	7.4	10	198	146	186	7.2	322	1,170	29	1.0	2.9	.34	2,120	1,910	2.88	1,100	836	27	2.4	2,390	7.9	--
July 20.....	15	--	--	188	123	192	--	337	1,040	41	--	4.1	.32	1,970	--	2.68	974	698	29	2.7	2,260	7.5	--
Aug. 2.....	146	--	--	72	40	58	--	147	343	8.0	--	3.4	.11	644	--	.88	345	224	26	1.4	885	7.5	--
Sept. 19.....	15	12	.06	188	117	180	4.7	326	1,000	21	1.0	7.1	.41	1,860	1,690	2.53	950	683	29	2.5	2,180	8.0	--

PLATTE RIVER BASIN--Continued
CACHE LA POUDRE RIVER NEAR GREELEY, COLO.

LOCATION.--At gaging station at highway bridge, 3 miles east of courthouse in Greeley, Weld County, and 3 miles upstream from mouth.
DRAINAGE AREA.--1,840 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1955.

REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390

Chemical analyses, in parts per million, August 1954 to September 1955

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 sorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.					
																							Residue at 180° C	Sum
Aug. 8, 1954....	13			172	79	131	--	330	685	27	0.8	9.1	0.31	1,410	1.92		753	482	27	2.1	1,730	7.6	
Sept. 22.....	8.5			198	92	154	--	393	810	35	.9	9.1	.41	1,650	2.24		873	551	28	2.3	1,970	7.9	
Oct. 27.....	25			200	95	142	--	528	700	31	.4	.2	.36	1,490	2.03		888	455	26	2.1	2,000	7.7	
Nov. 23.....	81			--	--	132	15	--	841	400	24	--	--	--	--		840	150	25	2.0	1,890	7.5	
Dec. 27.....	61			185	99	151	--	382	807	30	.9	.2	.35	1,630	2.22		868	555	27	2.2	1,940	7.3	
Feb. 14, 1955..	55			173	96	138	--	349	750	28	.8	.13	.36	1,540	2.09		825	539	27	2.1	1,860	7.5	
Mar. 29.....	54			--	--	139	--	329	810	29	--	--	--	--	--		844	574	26	2.1	1,890	7.4	
Apr. 25.....	10			--	--	136	--	335	790	32	--	--	--	--	--		832	557	26	2.1	1,870	7.3	
Apr. 30.....	7.4			189	83	141	--	360	760	31	.7	9.1	.33	1,530	2.08		814	519	28	2.1	1,870	7.5	
May 11.....	5.6			--	--	139	--	341	745	30	--	--	--	--	--		808	528	27	2.1	1,850	7.5	
May 26.....	30			112	59	88	--	221	490	16	.6	5.9	.20	995	1.35		524	343	27	1.7	1,270	7.6	
June 17.....	72			125	69	99	--	256	555	21	.6	11	.33	1,110	1.51		596	386	26	1.8	1,410	7.5	
June 28.....	10	11	0.00	180	80	137	6.3	339	735	29	.8	8.2	.33	1,480	2.01		778	500	27	2.1	1,810	7.7	
July 19.....	25			175	88	133	--	327	770	30	.8	10	.32	1,510	2.05		800	532	26	2.0	1,820	7.6	
Aug. 24.....	13			--	--	147	--	386	765	35	--	--	--	--	--		830	513	27	2.2	1,930	7.6	
Sept. 19.....	10			--	--	127	--	326	675	25	--	--	--	--	--		726	459	27	2.1	1,720	7.7	

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER NEAR KERSEY, COLO.

LOCATION.--At gaging station at bridge on State Highway 37, 1.9 miles north of railroad in Kersey, Weld County, and 2½ miles downstream from Cache La Poudre River.

DRAINAGE AREA.--9,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1953, August 1954 to September 1955.

Water temperatures: December 1950 to September 1953.

REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, August 1954 to September 1955

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids				Hardness as CaCO ₃	Per cent sodium	So- dium ad- sor- p-tion ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million		Tons per acre-foot	Tons per day							
														Residue at 180°C	Sum									
AUG. 8, 1954....	118			165	73	144		318	670	37				1,400	1.90		711	450	31	2.3	1,750	7.6		
Sept. 22.....	79			186	71	156		332	745	39				1,490	2.03		756	484	31	2.5	1,830	7.9		
Oct. 27.....	198			191	75	154		399	713	39				1,490	2.03		783	456	30	2.4	1,880	7.5		
Nov. 22.....	307			164	89	148		467	628	24				1,450	1.97		774	375	29	2.3	1,840	7.4		
Dec. 28.....	268			--	--	146		327	610	53				--	--		647	379	32	2.5	1,690	7.5		
Feb. 15, 1955...	292			145	73	142		338	600	49				1,320	1.80		663	386	32	2.4	1,700	7.3		
Mar. 29.....	309			--	--	146		326	618	51				--	--		663	396	32	2.5	1,700	7.7		
Apr. 25.....	93			163	82	150		315	700	41				1,490	2.03		744	486	30	2.4	1,820	7.6		
May 11.....	49			159	74	146		295	695	38				1,400	1.90		700	458	31	2.4	1,720	7.6		
May 26.....	99			133	66	124		274	595	34				1,210	1.65		604	379	30	2.2	1,550	7.6		
June 17.....	485			100	49	92		222	593	28				880	1.20		452	270	31	1.9	1,390	7.7		
June 28.....	82	15	0.00	142	77	137	6.1	304	650	37	1.0	8.2	0.27	1,320	1.80		672	423	30	2.3	1,670	8.0		
July 19.....	124			163	66	141	a	324	590	37				1,450	1.94		726	459	29	2.3	1,730	8.6		
Aug. 16.....	197			125	55	110		345	528	28				1,080	1.47		538	337	30	2.1	1,370	7.8		
Sept. 19.....	97			--	--	148		318	690	36				--	--		706	445	31	2.4	1,770	7.8		

a Includes equivalent of 23 ppm of carbonate (CO₃).

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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 107,000 ppm Aug. 19; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 98,700 tons Aug. 28; minimum daily, 0 tons on many days.

EXTREMES, 1950-55.--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 tons on many days each year.

REMARKS.--Maximum observed sediment concentration during water year, 188,000 ppm Aug. 28.

No flow during period October to March; record is omitted. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Suspended sediment, April to September 1955

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	46	--	e 5,800
15.....				0		0	176	50,700	s 42,900
16.....				0		0	15	80,300	s 3,020
17.....				0		0	128	24,800	s 8,310
18.....				0		0	23	9,270	s 836
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.....				17		e 800	0	--	0
27.....				0		0	0	--	0
28.....				0		0	44	15,300	s 2,020
29.....				0		0	.5	1,330	s 12
30.....				0		0	0	--	0
31.....				0		0	--	--	--
Total.	0		0	17		800	432.5	--	62,898

e Estimated.

s Computed by subdividing day.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Suspended sediment, April to September 1955--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	0	--	0
2.....	0		0	0	--	0	0	--	0
3.....	0		0	0	--	0	0	--	0
4.....	0		0	0	--	0	0	--	0
5.....	0		0	0	--	0	0	--	0
6.....	0		0	.9	--	e 70	0	--	0
7.....	0		0	.8	--	e 40	0	--	0
8.....	0		0	0	--	0	0	--	0
9.....	50	9,800	sa 4,500	0	--	0	0	--	0
10.....	0		0	6.6	--	e 500	0	--	0
11.....	0		0	0	--	0	0	--	0
12.....	0		0	0	--	0	0	--	0
13.....	0		0	0	--	0	0	--	0
14.....	0		0	0	--	0	0	--	0
15.....	0		0	0	--	0	0	--	0
16.....	0		0	0	--	0	0	--	0
17.....	0		0	0	--	0	0	--	0
18.....	0		0	61	48,100	s 19,300	0	--	0
19.....	0		0	21	107,000	6,520	7.8	12,800	s 325
20.....	0		0	95	91,200	s 30,400	50	23,200	s 3,500
21.....	0		0	6.0	72,100	s 1,280	9.9	7,810	s 301
22.....	0		0	.7	--	e 30	1.9	3,570	s 35
23.....	0		0	0	--	0	0	--	0
24.....	0		0	0	--	0	0	--	0
25.....	0		0	0	--	0	0	--	0
26.....	.5		e 22	0	--	0	54	37,700	5,700
27.....	0		0	1.1	--	e 28	9.3	36,700	s 997
28.....	0		0	273	52,400	s 98,700	.1	4,870	s 6
29.....	0		0	96	106,000	29,500	0	--	0
30.....	0		0	24	57,500	s 4,330	0	--	0
31.....	0		0	1.4	8,620	s 78	--	--	--
Total.	50.5		4,522	587.5	--	190,774	133.0	--	10,864

Total discharge for year (cfs-days) 1,220.5
 Total load for year (tons) 289,858

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

PLATTE RIVER BASIN--Continued
BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Particle-size analyses of suspended sediment, May to September 1955

(Methods of analysis: 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	
May 26, 1955.....	11:00 a.m.	33	61	7,730	5,730	77	88	93	95	97	99	100	--	--	--	--	SPWCM
May 26, 1955.....	12:20 p.m.	604	--	86,200	3,960	56	66	77	85	91	95	--	--	--	100	--	SPWCM
June 15.....	5:30 a.m.	117	55	36,400	3,420	58	69	80	88	92	97	--	--	--	--	--	SPWCM
June 17.....	12:07 p.m.	72	80	16,200	5,560	59	69	75	78	79	85	85	88	95	95	100	VPWCM
July 9.....	8:00 a.m.	18	60	6,440	4,240	70	83	89	91	95	98	--	--	--	--	--	SPWCM
Aug. 7.....	9:00 a.m.	6.1	70	20,400	4,200	78	90	98	100	--	--	--	--	--	--	--	PWCM
Aug. 18.....	1:50 p.m.	151	--	161,000	5,430	62	76	87	94	96	98	--	--	--	--	--	SPWCM
Aug. 18.....	1:50 p.m.	151	--	161,000	5,450	0	2	11	94	96	98	--	--	--	--	--	SPNM
Aug. 18.....	6:02 p.m.	138	76	84,000	5,820	66	79	89	95	97	99	--	--	--	--	--	SPWCM
Aug. 18.....	6:02 p.m.	138	76	84,000	5,800	1	4	20	97	99	99	--	--	--	--	--	SPNM
Aug. 19.....	4:25 a.m.	32	60	106,000	4,270	73	84	95	98	98	99	--	--	--	--	--	SPWCM
Aug. 28.....	3:40 p.m.	1,960	--	167,000	3,710	48	57	65	75	83	88	--	--	--	--	--	SPWCM
Aug. 28.....	5:20 p.m.	1,060	--	124,000	3,410	57	66	76	85	90	95	--	98	100	100	--	SPWCM
Aug. 28.....	5:20 p.m.	1,060	--	124,000	3,410	3	4	32	86	91	95	--	98	100	100	--	SPNM
Aug. 28.....	9:45 p.m.	406	70	109,000	4,450	64	74	84	92	96	98	--	--	--	--	--	SPWCM
Aug. 29.....	12:17 p.m.	51	75	110,000	5,770	68	82	94	99	100	--	--	--	--	--	--	PWCM
Aug. 29.....	4:45 p.m.	72	70	105,000	5,330	70	84	94	98	98	99	--	--	--	--	--	SPWCM
Sept. 19.....	1:40 a.m.	31	55	17,800	5,350	41	49	60	73	82	86	87	88	97	100	100	VPWCM
Sept. 20.....	1:42 p.m.	144	67	34,600	4,950	80	71	80	87	93	98	--	--	--	--	--	SPWCM
Sept. 20.....	10:02 p.m.	55	53	15,500	5,130	68	83	92	95	97	98	--	--	--	--	--	SPWCM
Sept. 26.....	2:18 p.m.	49	65	43,300	6,440	64	76	85	88	88	90	91	93	98	98	100	VPWCM

PLATTE RIVER BASIN--Continued
 BIJOU CREEK NEAR WIGGINS, COLO.--Continued

Particle-size analyses of bed material, August to September 1955

(Methods of analysis: 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	Number of sampling points	Discharge (cfs)	Water temperature (° F)	Bed material												Methods of analysis	
				Concentration of sample analyzed (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
Aug. 28, 1955.....	4	685				11	14	17	21	30	37	38	51	83	96	100	VPWCM SV
Sept. 7	4	0									7	12	35	74	92	97	

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT BALZAC, COLO.

LOCATION.--At gaging station at highway bridge at Balzac siding and 2½ miles northeast of Union, Morgan County.
DRAINAGE AREA.--17,700 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1951, August 1954 to September 1955.
REMARKS.--Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, August 1954 to September 1955

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 adsorption at 25°C	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Aug. 15, 1954...	121	--	--	206	58	163	11	--	--	--	--	--	--	1,500	2.04	--	752	--	32	2.6	1,880	7.9
Sept. 23	13	--	--	194	62	168	--	278	788	56	--	--	--	1,480	2.01	--	737	509	33	2.7	1,890	7.8
Oct. 28	166	--	--	--	--	--	--	321	720	53	--	--	--	1,460	1.99	--	741	478	32	2.6	1,860	7.6
Nov. 23	28	--	--	178	68	197	--	312	720	32	--	--	--	1,450	1.97	--	722	466	32	2.5	1,830	7.8
Dec. 30	8.3	--	--	183	61	192	--	302	693	53	--	--	--	1,410	1.92	--	709	461	32	2.5	1,790	7.6
Feb. 15, 1955...	9.5	--	--	--	--	149	--	264	708	52	--	--	--	--	--	--	686	470	32	2.5	1,770	7.9
Mar. 29	7.2	--	--	173	56	148	--	254	686	53	--	--	--	1,340	1.82	--	682	454	32	2.5	1,730	7.9
Apr. 26	133	--	--	179	78	164	--	302	790	56	--	--	--	1,550	2.11	--	768	520	31	2.6	1,920	7.8
May 11	151	--	--	163	71	162	--	274	715	53	--	--	--	1,430	1.94	--	698	473	34	2.7	1,820	7.8
June 15	1,810	20	0.32	84	24	57	10	160	268	20	0.5	0.5	0.09	587	.80	--	308	177	28	1.4	848	7.5
June 28	137	18	.00	193	61	157	9.5	299	745	55	.8	3.0	.25	1,470	2.00	--	732	487	31	2.5	1,840	8.0
July 19	130	--	--	180	63	166	--	284	780	57	--	--	--	1,440	1.96	--	708	492	33	2.7	1,870	7.8
Aug. 25	99	--	--	--	--	174	--	267	800	58	--	--	--	--	--	--	730	511	33	2.8	1,920	7.8
Sept. 20	251	--	--	--	--	139	--	242	615	46	--	--	--	--	--	--	586	388	34	2.5	1,810	7.7

PLATTE RIVER BASIN--Continued

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 1955.

Water temperatures: October 1945 to September 1955.

EXTREMES, 1954-55.--Dissolved solids: Maximum, 1,860 ppm Apr. 13; minimum, 751 ppm May 17-18.

Hardness: Maximum, 846 ppm Feb. 20; minimum, 352 ppm May 17-18.

Specific conductance: Maximum daily, 2,350 micromhos Apr. 13; minimum daily, 1,010 micromhos May 17.

Water temperatures: Maximum, 89°F Aug. 4; minimum, freezing point Feb. 20, 22, 23, 26, Mar. 25.

EXTREMES, 1945-55.--Dissolved solids: Maximum, 1,860 ppm Apr. 13, 1955; minimum, 446 ppm Aug. 19, 1953.

Hardness: Maximum, 846 ppm Feb. 20, 1955; minimum, 173 ppm Mar. 1-12, 1947.

Specific conductance: Maximum daily, 2,350 micromhos Apr. 13, 1955; minimum daily, 617 micromhos Aug. 19, 1953.

Water temperatures: Maximum (1946-49, 1950-55), 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October, 1954 to September 1955																								
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			Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million		Tons per acre-foot	Tons per day	Calcium	Non-magnesium					
														Residue at 180°C	Sum									
Oct. 1-29, 1954.	34.1	--	--	--	--	152	--	--	--	--	--	--	--	1,360	--	1.85	125	692	--	32	2.5	1,760	--	--
Oct. 30-Nov. 10.	75.4	--	--	--	--	174	--	--	--	--	--	--	--	1,470	--	2.00	299	762	--	33	2.7	1,960	--	--
Nov. 11-27.....	46.5	--	--	--	--	145	--	--	--	--	--	--	--	1,360	--	1.85	171	738	--	30	2.3	1,830	--	--
Nov. 28-Dec. 13.	101	36	0.00	229	48	178	19	409	725	69	0.5	4.3	0.23	1,550	1,510	2.11	423	769	434	33	2.8	1,970	7.5	5
Dec. 14-Jan. 12, 1955.....	98.2	--	--	--	--	171	--	--	--	--	--	--	--	1,510	--	2.05	400	710	--	34	2.8	1,900	--	--
Jan. 13-31.....	111	--	--	--	--	173	--	--	--	--	--	--	--	1,510	--	2.05	453	704	--	35	2.8	1,900	--	--
Feb. 1-19.....	215	--	--	--	--	179	--	--	--	--	--	--	--	1,530	--	2.08	888	718	--	35	2.9	1,940	--	--
Feb. 20.....	182	--	--	--	--	199	--	--	--	--	--	--	--	1,770	--	2.41	870	846	--	34	3.0	2,220	--	--
Feb. 21-Mar. 9.	283	--	--	--	--	176	--	--	--	--	--	--	--	1,490	--	2.03	1,140	703	--	35	2.9	1,900	--	--
Mar. 10-26.....	199	31	.00	176	57	173	14	282	720	64	.7	3.0	.28	1,440	1,380	1.96	774	672	441	35	2.9	1,840	8.0	5
Mar. 27-Apr. 10	135	--	--	--	--	169	--	--	--	--	--	--	--	1,450	--	1.97	529	669	--	35	2.8	1,830	--	--
Apr. 11-12.....	93.5	--	--	--	--	163	--	--	--	--	--	--	--	1,340	--	1.82	338	600	--	37	2.9	1,720	--	--
Apr. 13.....	161	--	--	--	--	279	--	--	--	--	--	--	--	1,860	--	2.53	809	694	--	47	4.6	2,350	--	--
Apr. 14-23.....	82.6	--	--	--	--	174	--	--	--	--	--	--	--	1,460	--	1.99	326	666	--	36	2.9	1,850	--	--
Apr. 24-May 16.	36.8	--	--	--	--	154	--	--	--	--	--	--	--	1,310	--	1.78	130	616	--	35	2.7	1,710	--	--
May 17-18.....	272	--	--	--	--	92	--	--	--	--	--	--	--	751	--	1.02	552	352	--	36	2.1	1,070	--	--
May 19-31.....	142	--	--	--	--	170	--	--	--	--	--	--	--	1,360	--	1.85	521	634	--	37	2.9	1,790	--	--
June 1-16.....	148	33	.03	155	50	149	15	273	585	55	.7	3.5	.23	1,230	1,180	1.67	492	591	367	35	2.7	1,630	7.8	7
June 17-18.....	363	--	--	--	--	127	--	--	--	--	--	--	--	1,010	--	1.37	990	444	--	38	2.6	1,360	--	--

Chemical analyses, in parts per million, water year October 1954 to September 1955

[illegible]

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (Once-daily measurement between 12 m. and 4 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	66	a 46	43	38	40	41	a 53	a 72	a 74	a 70	a 81	a 80
2	b 58	50	b 36	38	38	43	59	64	a 71	b 75	87	74
3	a 69	51	b 38	34	33	41	a 46	a 60	a 70	a 76	a 78	82
4	a 56	a 50	43	34	33	43	45	b 54	59	--	89	a 72
5	b 54	a 52	a 46	33	33	41	b 38	b 54	b 65	80	84	a 77
6	52	a 56	45	34	34	40	a 52	74	a 70	82	78	78
7	52	a 56	44	33	34	42	b 51	b 56	a 72	b 71	83	a 80
8	71	a 53	b 39	35	36	51	a 60	a 56	60	82	b 69	83
9	75	a 53	a 39	34	39	48	63	69	50	b 72	87	71
10	68	57	46	34	33	b 48	b 49	68	a 57	81	81	a 70
11	70	56	40	33	a 37	a 49	a 44	75	a 63	80	86	60
12	68	59	39	33	b 33	50	a 42	a 71	64	82	a 76	80
13	62	b 55	a 38	34	35	a 54	a 55	73	63	b 73	83	80
14	b 48	56	35	35	b 33	49	a 58	70	b 62	--	85	80
15	62	57	35	a 33	b 33	44	b 52	76	a 71	a 78	82	a 79
16	b 49	59	36	33	b 35	46	66	a 65	b 70	a 72	b 79	81
17	a 68	b 53	34	33	a 42	45	62	b 58	66	a 76	a 60	a 76
18	81	55	39	33	b 35	b 42	a 64	55	b 66	a 74	79	75
19	86	a 56	43	33	34	52	55	65	b 68	b 77	a 75	76
20	64	b 51	41	33	32	37	a 57	a 76	b 71	83	b 60	a 76
21	b 58	b 50	40	33	33	39	a 60	b 69	b 73	84	82	73
22	64	b 49	40	33	32	48	66	a 73	b 73	83	b 77	56
23	b 59	a 50	41	33	a 32	49	a 56	71	b 72	b 70	a 78	60
24	b 54	48	38	34	33	37	a 61	b 89	b 65	82	b 76	52
25	b 52	53	b 37	34	a 33	b 32	63	68	b 69	a 82	83	b 50
26	49	48	39	35	32	33	a 65	52	a 73	82	84	63
27	59	b 44	36	34	34	37	a 53	a 62	70	88	81	a 68
28	a 51	41	34	35	33	49	--	63	b 65	a 88	73	73
29	55	42	35	35	--	a 55	61	b 62	b 66	a 84	b 70	a 68
30	46	41	36	38	--	a 57	a 68	72	79	a 68	78	68
31	45	--	33	36	--	41	--	71	--	82	82	--
Average	59	52	39	34	34	45	56	66	67	78	80	72

a Reading obtained between 5 p.m. and 8 p.m.

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

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.

LOCATION --At gaging stations just downstream from bridges on county highway, half a mile and 2 1/2 miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte River.

DRAINAGE AREA --56 900 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: November 1950 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES 1954-55.--Dissolved solids: Maximum, 508 ppm Mar. 25-27; minimum, 347 ppm June 27 to July 1.

Hardness: Maximum, 241 ppm Mar. 25-27; minimum, 168 ppm June 27 to July 1.

Specific conductance: Maximum daily, 852 microhos May 12 (Chan. 1); minimum daily, 415 microhos June 28 (Chan. 1).

Water temperatures: Maximum, 78°F July 31 (Chan. 1); minimum, freezing point on many days during November to March.

EXTREMES 1951-55.--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 microhos Feb. 19, 1953 (Chan. 1); minimum daily, 345 microhos Nov. 26, 1952 (Chan. 1).

Water temperatures: 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, Neb. Records of specific conductance of daily samples, taken at each of the two major channels, available in district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
Oct. 1-31, 1954.....	132	--	--	--	--	54	--	210	119	--	--	--	--	427	0.58	152	199	27	37	1.7	626	7.8	--
Nov. 1-30.....	135	44	0.00	55	15	49	6.8	222	112	12	0.5	1.8	0.12	415	.56	151	198	16	34	1.5	607	7.8	3
Dec. 1-28.....	161	--	--	--	--	49	--	223	107	--	--	--	--	412	.56	179	198	15	35	1.5	597	8.0	--
Dec. 29-Jan. 19, 1955.....	232	--	--	--	--	51	--	226	114	--	--	--	--	434	.59	272	205	20	35	1.6	616	8.1	--
Jan. 20-26.....	433	--	--	--	--	58	--	222	129	--	--	--	--	436	.59	510	206	24	38	1.8	647	7.9	--
Jan. 27-Feb. 4.....	268	--	--	--	--	47	--	211	107	--	--	--	--	390	.53	282	199	16	35	1.5	576	8.1	--
Feb. 5-10.....	401	--	--	--	--	53	--	215	121	--	--	--	--	421	.57	456	199	23	37	1.6	619	7.8	--
Feb. 11-13.....	384	--	--	--	--	59	--	232	136	--	--	--	--	456	.62	473	215	25	37	1.8	677	8.0	--
Feb. 14-19.....	313	36	00	52	14	45	9.1	202	102	14	.4	2.2	.09	386	.52	326	186	20	33	1.4	558	8.0	5
Feb. 20-23.....	365	--	--	--	--	64	--	234	150	--	--	--	--	481	.65	474	226	34	38	1.9	709	7.9	--
Feb. 24-Mar. 16.....	262	--	--	--	--	43	--	205	101	--	--	--	--	388	.53	274	187	19	33	1.4	556	7.9	--
Mar. 17-24.....	167	--	--	--	--	47	--	219	115	--	--	--	--	418	.57	188	208	28	33	1.4	613	7.9	--
Mar. 25-27.....	297	--	--	--	--	62	--	245	153	--	--	--	--	508	.69	407	241	40	36	1.7	734	8.0	--
Mar. 28-Apr. 25.....	198	--	--	--	--	44	--	206	111	--	--	--	--	386	.52	206	194	25	33	1.4	574	8.0	--
Apr. 26-May 11.....	147	--	--	--	--	51	--	219	124	--	--	--	--	431	.59	171	206	26	35	1.6	632	8.0	--
May 12-25.....	329	--	--	--	--	61	--	221	137	--	--	--	--	446	.61	396	198	17	40	1.9	669	7.9	--

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1954 to September 1955--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sorption	Boilum adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
May 26-June 26, 1955.....	168	42	0.00	54	15	49	10	219	112	14	0.5	1.6	0.11	412	0.56	187	196	16	34	611	8.0	7
June 27-July 1.....	308	--	--	--	--	39	--	197	86	--	--	--	--	347	.47	289	168	6	34	515	8.0	--
July 2-9.....	175	--	--	--	--	55	--	218	128	--	--	--	--	437	.59	206	200	21	37	642	8.1	--
July 10-31*.....	1,230	--	--	--	--	73	--	242	142	--	--	--	--	473	.64	1,570	199	1	44	711	8.2	--
Aug. 1-22.....	1,056	--	--	--	--	75	--	248	133	--	--	--	--	467	.64	1,330	193	0	46	702	7.8	--
Aug. 23-Sept. 15.....	1,105	--	--	--	--	69	--	234	135	--	--	--	--	459	.62	1,300	193	1	44	679	8.1	--
Sept. 16-30.....	169	44	.01	52	15	59	11	239	119	16	.5	1.7	.17	436	.59	199	191	0	39	633	7.8	4
Weighted average a.....	313	--	--	--	--	61	--	230	126	--	--	--	--	442	0.60	374	197	8	40	655	--	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

CHANNEL 1

Temperature (°F) of water, water year October 1954 to September 1955
 /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	51	35	32	32	32	32	40	57	67	66	76	60
2	55	32	32	33	32	32	45	59	62	73	75	61
3	58	33	33	32	32	32	48	55	64	74	76	60
4	55	33	35	33	a 32	a 34	36	53	60	73	75	65
5	--	35	36	32	a 32	32	36	55	59	73	76	61
6	48	39	33	a 32	a 32	32	36	58	63	77	77	60
7	48	42	32	32	a 32	32	38	51	57	71	71	56
8	57	40	33	32	32	33	44	54	57	69	69	61
9	59	39	32	--	32	33	44	52	50	69	71	65
10	59	49	32	32	a 32	34	47	53	51	74	72	60
11	58	43	32	32	32	34	47	53	52	75	70	57
12	50	42	32	32	a 32	35	48	57	52	71	69	54
13	56	41	32	32	32	40	50	55	56	71	67	62
14	45	36	33	32	32	39	45	55	60	71	70	62
15	34	37	32	32	32	34	49	58	58	75	70	68
16	42	40	33	32	32	32	48	59	64	73	70	67
17	48	44	32	32	32	33	51	59	a 74	73	70	65
18	45	39	33	32	32	32	56	59	62	72	70	65
19	45	35	33	32	32	34	56	59	66	73	70	66
20	45	35	32	a 33	--	32	41	64	66	72	72	65
21	43	39	32	32	a 32	32	46	66	67	72	70	55
22	43	34	32	a 32	32	32	50	63	69	75	70	61
23	46	48	33	32	32	32	57	59	66	76	70	51
24	50	33	32	a 32	a 32	32	49	58	61	72	70	52
25	50	34	32	a 32	32	a 32	50	58	61	73	70	47
26	38	33	35	32	--	32	50	a 69	67	75	60	48
27	36	34	32	32	32	32	55	55	71	76	72	49
28	36	33	32	32	32	32	44	52	68	76	70	53
29	33	32	32	a 32	--	32	50	55	70	75	60	52
30	34	33	32	32	--	42	55	57	68	77	60	52
31	34	--	32	--	--	41	--	64	--	78	50	--
Average	47	37	33	32	32	34	47	57	62	73	70	59

a Reading obtained between 12 m. and 2 p.m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

CHANNEL 4

Temperature (°F) of water, water year October 1954 to September 1955
 /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	53	41	33	33	37	35	42	58	62	67	74	60
2	54	34	35	34	35	37	46	60	63	72	73	63
3	58	37	37	35	33	37	49	58	65	72	74	61
4	58	39	40	36	a 35	40	41	56	61	71	73	65
5	50	40	41	35	a 34	32	40	55	58	71	75	62
6	49	43	38	a 34	32	33	40	58	61	74	76	61
7	50	45	35	32	a 35	37	40	55	58	71	70	57
8	53	45	37	33	35	39	45	55	60	70	67	62
9	59	43	33	32	40	40	46	52	52	70	71	62
10	60	50	34	32	--	36	48	54	52	74	71	62
11	59	48	34	--	32	37	46	55	54	75	69	58
12	54	45	32	32	a 32	39	50	57	58	71	67	56
13	56	45	32	32	32	44	46	57	58	70	67	65
14	48	46	36	32	33	43	46	57	59	68	70	64
15	42	42	32	32	35	39	50	60	60	72	69	60
16	45	44	37	32	36	34	51	60	62	70	68	67
17	49	47	33	33	36	38	52	--	a 70	70	68	66
18	49	43	36	33	38	35	55	--	62	69	70	66
19	49	41	36	32	34	38	56	58	65	70	69	66
20	48	40	35	a 34	--	34	44	62	66	71	70	68
21	47	43	34	32	32	32	48	62	68	70	70	61
22	46	40	36	a 32	32	32	52	62	69	73	69	62
23	49	44	37	32	32	35	57	62	67	74	70	58
24	52	37	35	a 33	a 32	35	50	58	63	71	70	55
25	52	40	36	a 35	33	a 32	52	60	60	71	71	50
26	42	39	38	33	32	32	54	63	66	74	70	50
27	42	39	36	32	32	32	57	57	68	75	72	52
28	42	38	32	32	34	34	48	55	68	74	72	51
29	40	34	32	a 36	--	40	52	55	71	74	70	56
30	42	37	32	34	--	45	56	58	70	75	62	55
31	40	--	32	35	--	45	--	64	--	76	60	--
Average	50	42	35	33	34	37	49	58	63	72	70	60

a Reading obtained between 12 m. and 2 p.m.

PLATTE RIVER BASIN--Continued
SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.

LOCATION --At gaging station at Marshall Flume in sec. 28, T. 13 N., R. 29 W., near Maxwell, Lincoln County.
RECORDS AVAILABLE --Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES 1954-55 --Dissolved solids: Maximum, 578 ppm Apr. 26 to May 11; minimum, 421 ppm Nov. 1-30.

Hardness: Maximum, 249 ppm Mar. 25-27; minimum, 181 ppm Aug. 23 to Sept. 30.

Specific conductance: Maximum daily, 906 micromhos May 6, 8; minimum daily, 541 micromhos June 28.

Water temperatures: Maximum, 83°F July 31; minimum, 33°F on many days during November to March.

EXTREMES 1951-55 --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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in reports of State Engineer.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium carbonate	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./ml.	Non-carbonate					
Oct. 1-31, 1954.....	1,136	--	--	--	--	66	--	218	135	--	--	--	--	438	0.60	1,340	190	11	43	2.1	660	7.9	--
Nov. 1-30.....	930	31	0.00	49	15	63	10	211	130	18	0.5	1.3	0.12	421	.57	1,060	186	13	41	2.0	639	8.0	5
Dec. 1-28.....	996	--	--	--	--	65	--	216	134	--	--	--	--	422	.57	1,130	190	13	43	2.1	655	8.0	--
Dec. 29-Jan. 19, 1955.....	961	--	--	--	--	71	--	226	158	--	--	--	--	482	.66	1,250	209	24	43	2.1	720	7.9	--
Jan. 20-26.....	898	--	--	--	--	80	--	236	181	--	--	--	--	519	.71	1,260	224	30	44	2.3	785	8.1	--
Jan. 27-Feb. 4.....	1,054	--	--	--	--	72	--	225	168	--	--	--	--	487	.66	1,390	217	32	42	2.1	742	8.0	--
Feb. 5-10.....	908	--	--	--	--	76	--	232	181	--	--	--	--	509	.69	1,250	226	36	42	2.2	778	8.0	--
Feb. 11-13.....	889	--	--	--	--	81	--	238	192	--	--	--	--	537	.73	1,290	237	42	43	2.3	815	8.1	--
Feb. 14-19.....	1,095	30	.02	55	19	67	11	218	157	20	.5	2.0	.12	472	.64	1,400	215	36	39	2.0	706	7.9	3
Feb. 20-23.....	728	--	--	--	--	86	--	243	207	--	--	--	--	560	.76	1,100	245	46	43	2.4	850	7.9	--
Feb. 24-Mar. 16.....	1,118	--	--	--	--	62	--	214	151	--	--	--	--	465	.63	1,400	214	39	39	1.8	689	8.0	--
Mar. 17-24.....	1,037	--	--	--	--	68	--	212	171	--	--	--	--	496	.67	1,390	220	46	40	2.0	727	8.0	--
Mar. 25-27.....	742	--	--	--	--	73	--	222	199	--	--	--	--	552	.75	1,110	249	67	39	2.0	803	8.0	--
Mar. 28-Apr. 25.....	996	--	--	--	--	67	--	204	184	--	--	--	--	500	.68	1,340	228	61	39	1.9	747	8.0	--
Apr. 26-May 11.....	1,401	--	--	--	--	84	--	205	235	--	--	--	--	578	.79	2,190	243	75	43	2.3	853	7.9	--
May 12-25.....	1,774	--	--	--	--	77	--	215	193	--	--	--	--	517	.70	2,480	220	44	43	2.3	784	7.8	--
May 26-June 26.....	1,391	27	.03	52	19	71	11	210	193	20	.5	1.5	.12	457	.64	1,540	202	30	42	2.2	716	7.9	6
June 27-July 1.....	1,508	--	--	--	--	61	--	194	145	--	--	--	--	432	.59	1,760	187	28	41	1.9	666	7.8	--
July 2-9.....	1,464	--	--	--	--	79	--	215	190	--	--	--	--	513	.70	2,030	210	34	45	2.4	775	8.0	--
July 10-31.....	2,044	--	--	--	--	82	--	219	188	--	--	--	--	507	.69	2,800	204	24	47	2.5	776	8.0	--

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color	pH
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Aug. 1-22, 1955...	2,064	--	--	--	--	80	--	231	153	--	--	--	484	0.66	2,700	191	2	2.5	732	7.9
Aug. 23-Sept. 15...	1,799	--	--	--	--	78	--	226	150	--	--	--	480	.63	2,230	181	0	2.5	715	7.9
Sept. 16-30.....	1,448	34	0.01	47	15	76	12	202	150	18	0.5	1.9	464	.63	1,810	181	15	2.5	692	8.0
Weighted average.....	1,286	--	--	--	--	73	--	217	164	--	--	--	479	0.65	1,660	203	25	2.2	725	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

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

a Reading obtained at 8:30 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 gauging station, and 1 mile upstream from Dismal River.

DRAINAGE AREA --1,760 sq miles, approximately 149 miles contribute directly to surface runoff.

RECORDS AVAILABLE --Water temperatures, October 1949 to September 1953.

Sediment records: March 1950 to September 1952, October 1953 to September 1954.

EXTREMES, 1954-55 --Water temperatures: Maximum, 92°F July 31; minimum, freezing point on many days during November to March.

EXTREMES, 1949-55 --Water temperatures: Maximum, 92°F July 31, 1955; minimum, freezing point on many days during winter months.

REMARKS --Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

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
1.....	54	48	40	34	33	32	37	32	32	32	32	81	65	77
2.....	62	52	39	32	37	32	40	33	32	32	77	85	90	70
3.....	66	54	46	32	40	32	37	33	33	43	71	83	88	72
4.....	60	48	47	35	40	36	38	32	32	35	69	82	70	58
5.....	..	46	48	38	40	36	35	32	..	33	69	82	66	71
6.....	..	..	54	42	38	33	35	32	32	30	55	85	66	71
7.....	..	..	54	44	34	32	35	32	31	32	71	85	81	71
8.....	..	..	52	43	37	32	32	32	32	36	55	90	82	69
9.....	..	..	53	43	..	32	34	32	32	56	50	84	71	59
10.....	67	..	56	46	..	..	32	32	32	48	51	86	83	62
11.....	64	55	53	46	..	..	32	31	..	59	45	83	69	55
12.....	59	50	52	43	33	32	31	..	..	46	76	87	87	66
13.....	55	50	52	44	33	32	32	31	32	54	61	85	80	54
14.....	50	43	46	38	37	32	32	31	..	75	59	84	66	80
15.....	50	38	47	38	36	32	32	..	..	64	70	86	70	82
16.....	58	42	50	41	34	32	33	..	..	76	64	86	71	74
17.....	58	48	48	43	33	32	32	..	..	62	77	86	81	62
18.....	56	46	46	39	36	32	32	..	..	74	64	83	80	77
19.....	56	48	46	37	40	33	32	..	..	68	65	86	70	65
20.....	55	46	44	38	40	32	32	..	..	82	63	80	75	64
21.....	56	47	47	41	40	32	31	..	..	86	67	82	70	61
22.....	55	44	48	38	41	34	32	32	32	83	69	85	70	57
23.....	58	46	45	38	40	34	32	32	32	79	64	86	73	64
24.....	54	50	41	34	39	32	31	33	32	69	62	84	72	51
25.....	51	43	40	33	41	34	32	31	32	72	57	82	83	51
26.....	43	39	42	36	38	32	32	32	32	67	60	84	67	52
27.....	48	36	43	35	38	32	32	32	32	55	57	82	82	50
28.....	46	39	39	32	33	32	32	30	31	65	76	86	78	51
29.....	44	34	36	32	33	32	32	31	32	85	80	82	72	56
30.....	42	38	36	32	33	32	32	..	..	69	50	74	64	57
31.....	46	36	..	..	32	32	34	..	..	71	56	91	76	53
Average.....	54	45	46	38	37	33	34	32	..	75	58	85	70	68

PLATTE RIVER BASIN--Continued

MIDDLE LOUP AT DUNNING, NEBR. (Total-load section)--Continued

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Oct. 1, 1954.....	395	1,050	1,120
Oct. 13.....	377	1,040	1,060
Oct. 26.....	461	1,890	2,350
Nov. 15.....	380	1,320	1,280
Dec. 22.....	417	1,840	2,070
Mar. 9, 1955.....	553	809	1,210
Mar. 28.....	563	3,370	5,120
Apr. 13.....	436	1,400	1,850
Apr. 27.....	398	1,070	1,150
May 11.....	315	612	521
May 25.....	410	878	972
June 7.....	384	1,160	1,200
June 21.....	432	792	924
July 13.....	332	601	718
July 27.....	357	654	630
Aug. 9.....	345	580	540
Aug. 23.....	345	592	552
Sept. 7.....	360	684	865
Sept. 20.....	329	723	642

PLATTE RIVER BASIN--Continued

MIDDLE LOUP RIVER AT DUNNING, NEBR. (Total-load section)--Continued

Particle-size analyses of suspended sediment, water year October 1954 to September 1955

(Methods of analysis: 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
Oct. 13, 1954.....	10:00 a.m.	377	50	1,040							7	27	66	89	98	100	V
Oct. 28.....	9:40 a.m.	461	40	1,800							5	24	72	92	97	100	V
Nov. 15.....	2:10 p.m.	360	49	1,320							7	19	65	93	99	100	V
Dec. 22.....	11:50 a.m.	417	37	1,940							4	23	61	88	100	--	V
Mar. 9, 1955.....	2:15 p.m.	553	51	509							26	67	87	92	99	100	V
Mar. 28.....	6:15 p.m.	563	35	3,370	4,840	2	3	5	7	10	16	38	70	90	97	100	VPWCM
Apr. 13.....	4:10 p.m.	438	61	1,400							6	27	68	91	100	--	V
Apr. 27.....	2:30 p.m.	398	66	1,070							6	26	64	86	100	--	V
May 11.....	4:50 p.m.	315	70	612							10	23	60	85	99	100	V
May 25.....	9:20 a.m.	410	61	878							12	32	73	92	100	--	V
June 7.....	2:00 p.m.	384	72	1,160							8	18	58	88	97	100	V
June 21.....	2:40 p.m.	432	80	792							17	31	64	88	98	100	V
July 13.....	8:45 a.m.	332	69	801							12	24	57	84	94	100	V
July 27.....	3:00 p.m.	387	86	654							16	37	69	92	100	--	V
Aug. 9.....	12:50 p.m.	345	81	580							9	24	57	79	91	100	V
Aug. 23.....	10:05 a.m.	345	71	592							13	27	61	84	97	100	V
Sept. 7.....	9:00 a.m.	360	57	684							9	25	70	92	100	--	V
Sept. 20.....	11:55 a.m.	329	65	723							8	23	63	90	97	100	V

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)

MIDDLE LOUP RIVER 7½ MILES NORTHWEST OF MILBURN, NEBR.

Oct. 13, 1954.....	808	708	1,540
Oct. 26.....	1,010	1,220	3,330
Nov. 16.....	808	935	2,030
Dec. 21.....	850	954	2,190
Mar. 9, 1955 a.....	882	2,580	6,140
Mar. 29 a.....	806	1,400	3,050
Apr. 14.....	910	688	1,690
Apr. 27.....	850	840	1,930
May 12.....	730	440	867
May 24.....	828	558	1,270
June 8.....	806	687	1,500
June 22.....	839	617	1,400

MIDDLE LOUP RIVER AT ARCADIA, NEBR.

Oct. 11, 1954.....	873	734	1,730
Oct. 26.....	1,100	1,770	5,260
Nov. 16.....	847	902	2,060
Dec. 20.....	882	1,870	4,450
Mar. 10, 1955.....	b 1,560	1,780	7,410
Mar. 28.....	587	2,200	3,490
Apr. 13.....	1,240	1,820	6,090
Apr. 26.....	734	694	1,380
May 10.....	554	532	796
May 24.....	830	604	1,350
June 7.....	891	663	1,590
June 21.....	901	882	2,150
July 12.....	446	264	318
July 26.....	338	162	148
Aug. 9.....	412	248	276
Aug. 22.....	401	206	223
Sept. 6.....	434	255	299
Sept. 20.....	477	246	317

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.

July 26, 1955.....	348	168	158
Aug. 8.....	409	356	393
Aug. 25.....	348	147	138
Sept. 6.....	367	146	145
Sept. 19.....	528	287	409

NORTH LOUP RIVER AT BURWELL, NEBR.

Oct. 11, 1954.....	432	262	305
Oct. 25.....	458	462	571
Nov. 16.....	582	510	801
Dec. 21.....	502	1,020	1,380
Mar. 10, 1955.....	2,300	4,580	28,400
Mar. 29.....	872	974	2,290
Apr. 12.....	608	548	900
Apr. 25.....	548	443	653
May 9.....	249	170	114
May 23.....	407	278	305

a Measurement at county bridge 7½ miles upstream from established sampling section.

b Daily mean discharge.

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955 --Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)

NORTH LOUP RIVER AT BURWELL, NEBR.--Continued

June 6, 1955.....	511	402	555
June 20.....	872	422	994
July 12.....	222	118	71
July 27.....	232	104	65
Aug. 8.....	213	145	83
Aug. 22.....	171	79	36
Sept. 6.....	171	70	32
Sept. 19.....	407	251	276

CALAMUS RIVER NEAR BURWELL, NEBR.

Oct. 25, 1954.....	344	262	243
Nov. 16.....	316	240	205
Dec. 21.....	306	281	232
Mar. 10, 1955.....	390	350	369
Mar. 29.....	340	310	285
Apr. 12.....	351	222	210
Apr. 25.....	330	226	201
May 9.....	236	232	146
May 23.....	267	184	133
June 6.....	299	223	180
June 20.....	330	192	171
Aug. 11.....	239	160	103

NORTH LOUP RIVER AT ORD, NEBR.

Oct. 11, 1954.....	830	288	645
Oct. 25.....	800	277	598
Nov. 15.....	870	400	940
Dec. 20.....	930	666	1,670
Mar. 11, 1955.....	1,780	1,980	9,520
Mar. 30.....	1,520	966	4,050
Apr. 12.....	970	567	1,480
Apr. 25.....	940	272	690
May 9.....	468	154	195
May 23.....	723	240	469
June 6.....	800	301	650
June 20.....	1,410	543	2,070
July 29.....	386	82	85

NORTH LOUP RIVER NEAR ST. PAUL, NEBR.

July 26, 1955.....	340	166	152
Aug. 8.....	297	166	133
Aug. 25.....	204	84	46
Sept. 6.....	228	93	57

PLATTE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1954 to September 1955

(Methods of analysis: B, bottom water; C, chemically dispersed; D, decanted; E, pipette; F, sieve; G, in sediment 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
MIDDLE LOUP RIVER 7½ MILES NORTHWEST OF MILBURN, NEBR.																	
Oct. 13, 1954.....	12:00 m.	806	54	706							8	32	65	98	100		V
Oct. 26.....	12:55 p.m.	1,010	43	1,220							13	48	92	99	100		V
Nov. 16.....	9:20 a.m.	806	43	935							14	51	93	100	--		V
Dec. 21.....	2:25 p.m.	850	39	954							12	40	91	100	--		V
Apr. 14, 1955...	11:40 a.m.	910	58	688							21	52	90	100	--		V
Apr. 27.....	9:55 a.m.	850	56	840							16	44	79	88	99	100	V
May 12.....	9:35 a.m.	730	--	440							25	54	94	100	--		V
May 24.....	3:25 p.m.	828	71	568							20	45	84	99	100		V
June 8.....	11:25 p.m.	906	60	687							20	51	89	99	100		V
June 22.....	11:15 a.m.	839	75	617							23	42	77	96	100		V
MIDDLE LOUP RIVER AT ARCADIA, NEBR.																	
Oct. 11, 1954.....	1:20 p.m.	873	--	734							15	41	84	98	100		V
Oct. 26.....	4:35 p.m.	1,100	--	1,770							15	45	89	99	100		V
Nov. 16.....	4:15 p.m.	847	52	902							20	63	96	100	--		V
Dec. 20.....	12:20 p.m.	882	33	1,870							11	55	96	100	--		V
Mar. 10, 1955...	9:05 p.m.	a 1,560	32	1,760							12	39	88	99	100		V
Apr. 13.....	11:15 a.m.	1,240	52	1,820							17	51	84	97	100		V
Apr. 26.....	11:40 a.m.	734	62	694							23	59	93	98	100		V
May 10.....	11:35 a.m.	554	60	532							17	42	81	98	100		V
June 7.....	10:50 a.m.	891	64	663							21	56	95	100	--		V
June 21.....	11:20 a.m.	901	76	882	2,000	16	17	18	20	25	38	64	95	100	--		VPWCM
July 12.....	3:30 p.m.	446	81	264							15	41	96	100	--		V
July 26.....	2:35 p.m.	338	89	162							41	61	96	100	--		V
Aug. 9.....	8:40 a.m.	412	73	248							22	44	90	100	--		V
Sept. 6.....	5:00 p.m.	434	71	255							31	49	90	100	--		V
Sept. 20.....	9:15 a.m.	477	64	246							34	55	93	100	--		V

a Daily mean discharge.

MIDDLE LOUP RIVER AT ST. PAUL, NEBR.

Aug. 8, 1955.....	8:55 a.m.	409	74	356					58	88	93	100	V
Aug. 25	9:35 a.m.	348	78	147					66	74	96	100	V
Sept. 6	10:40 a.m.	367	68	146					48	56	93	100	V
Sept. 19	12:10 p.m.	528	72	287					55	86	91	100	V

NORTH LOUP RIVER AT BURWELL, NEBR.

Oct. 25, 1954....	12:20 p.m.	458	51	462					13	42	82	100	V
Nov. 16	12:20 p.m.	582	48	510					14	40	83	99	V
Mar. 10, 1955...	5:45 p.m.	2,300	34	4,580					18	52	82	96	V
Mar. 28	3:35 p.m.	608	53	548					26	55	87	99	V
Apr. 12	12:50 p.m.								19	46	88	100	V
Apr. 25	1:20 p.m.	546	64	443					20	43	86	100	V
May 9	1:05 p.m.	249	66	170					22	44	89	100	V
May 23	11:40 a.m.	407	64	278					27	46	86	100	V
June 6	12:25 p.m.	511	69	402					24	47	89	100	V
June 20	5:05 p.m.	872	83	422					44	75	97	100	V
July 12	12:50 p.m.	222	82	118					37	54	93	100	V
July 27	8:25 a.m.	252	78	104					52	66	97	100	V
Aug. 22	3:05 p.m.	171	64	79					42	55	96	100	V
Sept. 6	2:40 p.m.	171	74	70					50	67	97	100	V

CALAMUS RIVER NEAR BURWELL, NEBR.

Oct. 25, 1954....	11:40 a.m.	344	51	262					13	39	95	100	V
Nov. 16	2:10 p.m.	316	53	240					18	47	95	100	V
Dec. 31	10:00 a.m.	306	35	281					11	26	88	100	V
Mar. 10, 1955...	12:50 p.m.	390	--	350					25	47	90	100	V
Mar. 29	5:30 p.m.	340	54	310					31	56	95	100	V
Apr. 12	11:30 a.m.	351	52	222					28	59	96	100	V
Apr. 25	11:34 a.m.	330	59	226					30	56	96	100	V
May 9	11:35 a.m.	236	60	232					31	57	96	100	V
May 23	10:58 a.m.	267	82	184					51	74	99	100	V
June 6	11:45 a.m.	269	65	223					38	66	97	100	V
June 20	12:30 p.m.	330	78	192					40	69	98	100	V
Aug. 11	9:05 a.m.	239	--	160					33	60	95	100	V

NORTH LOUP RIVER AT ORD, NEBR.

Oct. 11, 1954....	4:30 p.m.	830	68	288					60	75	95	100	V
Oct. 25	2:00 p.m.	800	54	277					30	60	96	100	V
Nov. 15	11:15 a.m.	870	43	400					19	45	86	100	V

PLATTE RIVER BASIN--Continued
MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Particle-size analyses of suspended sediment, water year October 1954 to September 1955--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; 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 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
NORTH LOUP RIVER AT ORD, NEBR.--Continued																
Dec. 20, 1954.....	3:40 p.m.	930	36	666							23	55	92	99	100	V
Mar. 11, 1955....	8:40 a.m.	1,780	34	1,980							28	62	94	99	100	V
Mar. 30.....	11:55 a.m.	1,520	50	986							31	60	90	100	--	V
Apr. 25.....	4:55 p.m.	940	65	272							47	68	94	100	--	V
May 9.....	2:40 p.m.	468	62	154							43	65	97	100	--	V
May 23.....	4:42 p.m.	723	70	240							50	70	97	100	--	V
June 6.....	3:58 p.m.	800	70	301							34	61	92	100	--	V
June 20.....	5:20 p.m.	1,410	--	543							45	72	92	99	100	V
July 23.....	8:10 a.m.	386	--	82							64	80	100	--	--	V
NORTH LOUP RIVER NEAR ST. PAUL, NEBR.																
July 26, 1955....	11:10 a.m.	340	80	166							75	80	95	100		V
Aug. 8.....	10:55 a.m.	287	77	166							88	95	99	100		V
Aug. 25.....	8:40 a.m.	204	75	84							92	98	100	--		V
Sept. 6.....	11:30 a.m.	228	68	93							87	91	99	100		V

PLATTE RIVER BASIN--Continued
 MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1954 to September 1955
 (Methods of analysis: E, 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	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											
						0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.000	
MIDDLE LOUP RIVER 7½ MILES NORTHWEST OF MILBURN, NEBR.																	
Apr. 14, 1955.....	5	910					0	1	25	67	85	91	96	99		SV	
June 8.....	5	806					0	2	37	73	91	96	99	100		SV	
June 22.....	5	839					0	3	37	70	87	93	98	100		SV	
MIDDLE LOUP RIVER AT ARCADIA, NEBR.																	
May 10, 1955.....	5	354					0	1	35	94	100					SV	
June 7.....	5	891					0	1	48	94	100					SV	
June 21.....	5	901					0	1	38	94	100					SV	
July 26.....	5	338					0	2	39	89	97	99	100			SV	
NORTH LOUP RIVER AT BURNELL, NEBR.																	
Mar. 26, 1955.....	3	872					--	0	13	53	76	86	95	100		SV	
June 20.....	3	872					0	1	31	73	89	95	98	100		SV	
Aug. 22.....	3	171					0	1	28	70	88	97	99	100		SV	
Sept. 19.....	5	407					0	1	27	77	92	96	98	100		SV	
NORTH LOUP RIVER AT ORD, NEBR.																	
Oct. 11, 1954.....	5	830					--	0	11	47	75	85	95	99	100	SV	
Mar. 30, 1955.....	5	1,520					0	1	36	81	94	97	99	100	--	SV	
May 23.....	5	723					0	1	29	71	87	93	97	100	--	SV	
June 20.....	5	1,410					0	4	27	67	88	94	98	100	--	SV	
July 29.....	5	386					--	0	11	51	79	88	95	99	100	SV	

MISSOURI RIVER MAIN STEM--Continued
MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION --At gaging station at Waubensie Highway Bridge at Nebraska City, Otoe County.

DRAINAGE AREA --414,400 square miles, approximately.

WATERS AVAILABLE --Chemical analyses: January 1951 to September 1955.

Water temperatures: May 1951 to September 1955.

EXTREMES 1954-55 --Dissolved solids: Maximum, 532 ppm Jan. 15 to Feb. 9; minimum, 195 ppm Mar. 11-16.

Hardness: Maximum, 262 ppm Jan. 15 to Feb. 9; minimum, 195 ppm Mar. 11-16.

Specific conductance: Maximum daily, 841 microhos Jan. 23; minimum daily, 495 microhos Mar. 12.

Water temperatures: Maximum, 83°F on several days during July and August; minimum, freezing point on many days during December to March.

EXTREMES 1951-55 --Dissolved solids: Maximum, 600 ppm Jan. 1-10, 1952; minimum, 273 ppm June 23-25, 1954.

Hardness: Maximum, 344 ppm Jan. 1-10, 1952; minimum, 159 ppm June 23-25, 1954.

Specific conductance: Maximum daily, 936 microhos Jan. 6, 1953; minimum daily, 361 microhos Mar. 29, 1951.

Water temperatures: Maximum, 85°F July 25, 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 district office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October 1954 to September 1955

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		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million		Tons per acre-foot	Tons per day	Calcium	Non-magnesium					Percent sodium
														Residue at 180°C	Sum									
Oct. 1-31, 1954	36,080	--	--	--	--	55	--	182	165	--	--	--	--	426	0.56	41,500	215	66	36	1.6	657	7.8	--	
Nov. 1-30	18,860	--	--	--	--	59	--	208	161	--	--	--	--	463	.63	23,600	236	65	35	1.7	701	7.8	--	
Dec. 1-31	16,400	17	0.00	63	19	56	5.2	210	158	25	0.5	2.8	0.09	457	.62	20,240	236	64	33	1.6	702	7.9	5	
Jan. 1-14, 1955	14,730	--	--	--	--	57	--	212	160	--	--	--	--	469	.64	18,650	241	67	34	1.6	703	7.7	--	
Jan. 15-Feb. 9	11,570	--	--	--	--	64	--	232	174	--	--	--	--	516	.70	16,120	262	72	35	1.7	769	7.8	--	
Feb. 10-28	14,980	--	--	--	--	60	--	206	163	--	--	--	--	474	.64	19,180	239	70	35	1.7	715	7.8	--	
Mar. 1-10	25,060	--	--	--	--	46	--	191	130	--	--	--	--	396	.54	26,790	214	57	32	1.4	622	7.6	--	
Mar. 11-16	46,100	15	01	51	17	32	6.2	180	108	13	.4	4.0	.07	341	.46	44,290	195	47	26	1.0	529	7.5	--	
Mar. 17-22	29,170	--	--	--	--	34	--	179	107	--	--	--	--	345	.47	27,170	200	53	27	1.0	535	7.7	--	
Mar. 23-Apr. 10	28,740	--	--	--	--	51	--	202	157	--	--	--	--	447	.61	34,690	238	72	32	1.4	674	7.8	--	
Apr. 11-May 11	31,610	--	--	--	--	61	--	212	199	--	--	--	--	498	.68	42,500	261	87	34	1.6	762	7.8	--	
May 12-26	33,100	--	--	--	--	70	--	205	220	--	--	--	--	520	.71	46,470	260	92	37	1.9	799	7.8	--	
May 30-June 25	33,860	16	00	63	21	67	6.1	199	202	18	.5	.5	.13	396	.69	48,990	243	80	37	1.9	767	7.5	6	
June 26-July 12	35,430	--	--	--	--	61	--	191	185	--	--	--	--	471	.64	45,060	227	70	37	1.8	716	7.6	--	
July 13-19	34,670	--	--	--	--	60	--	186	181	--	--	--	--	456	.62	43,120	220	67	37	1.8	701	7.5	--	
July 20-31	32,210	--	--	--	--	72	--	190	210	--	--	--	--	511	.69	44,440	230	74	40	2.1	778	7.6	--	
Aug. 1-7	15,510	--	--	--	--	76	--	203	215	--	--	--	--	532	.72	22,260	242	76	41	2.2	806	7.8	--	
Aug. 8-31	34,060	--	--	--	--	81	--	195	230	--	--	--	--	528	.72	48,560	236	76	43	2.3	798	7.4	--	
Sept. 1-30	35,660	10	.00	59	19	78	6.3	198	218	15	.5	.4	.15	504	.69	48,530	227	65	42	2.3	764	7.9	13	
Weighted average a	27,450	--	--	--	--	63	--	199	186	--	--	--	--	476	0.65	35,290	235	72	37	1.8	725	--	--	

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement between 7 a.m. and 8 a.m./

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

a Reading obtained at 1 p.m.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

NISHNABOTNA RIVER BASIN

MULE CREEK NEAR MALVERN, IOWA

LOCATION.--At gaging station at highway bridge, 1.6 miles upstream from mouth and 4.4 miles south of Malvern, Mills County.

DRAINAGE AREA.--10.6 square miles.

RECORDS AVAILABLE.--Sediment records: July 1954 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 6,000 ppm Mar. 2; minimum daily, not determined.

Sediment loads: Maximum daily, 2,000 tons Mar. 2; minimum daily, less than 0.05 ton on many days.

EXTREMES, July 1954 to September 1955.--Sediment concentrations: Maximum daily, 11,000 ppm Aug. 23, 1954; minimum daily, not determined.

Sediment loads: Maximum daily, 22,000 tons Aug. 21, 1954; minimum daily, less than 0.05 ton on many days.

REMARKS.--Flow affected by ice Dec. 3-15, 17-21, 23, 24, Dec. 26 to Jan. 12, Jan. 14 to Mar. 3, Mar. 6-30. Records of discharge for period July 1954 to September 1955 given in WSP 1440.

Suspended sediment, July to September 1954

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.....	0.87	--		1.4	--		2.2	--	
2.....	.87	--		.87	--		2.0	--	
3.....	.87	243		.71	e 0.5		1.9	--	
4.....	.87	--		.71	180		1.9	115	
5.....	.87	--		1.0	198		1.9	--	e 0.8
6.....	.71	--	e 0.7	1.9	170	a .9	1.9	--	
7.....	.71	--		6.4	2,000	sb 45	1.9	--	
8.....	.71	199		2.4	1,000	a 6.4	1.9	197	
9.....	.71	--		1.7	300	a 1.4	2.2	--	
10.....	.71	496		1.4	--		2.0	--	
11.....	.71	--		1.5	123		2.0	--	e .3
12.....	.71	--		1.5	--	e .5	1.9	50	
13.....	.71	--		1.2	--		2.0	--	
14.....	.55	91		1.5	128		2.0	75	
15.....	.55	--		1.2	139		1.9	--	e .4
16.....	.55	--		3.5	2,100	sb 32	2.4	--	
17.....	.71	--	e .2	1.4	560	2.1	2.2	--	
18.....	.87	--		1.5	250	1.0	2.0	44	
19.....	.55	--		1.4	--	e .3	2.2	--	e .3
20.....	.55	--		1.2	--		2.4	--	
21.....	.71	86		255	10,000	sb 22,000	2.2	--	
22.....	.87	--		15	2,800	sa 190	1.9	66	
23.....	.87	--		158	11,000	sb 9,400	1.9	--	
24.....	.71	50		11	2,100	sb 95	1.9	--	
25.....	.71	--		4.0	--	e 6.0	1.9	70	e .3
26.....	.71	--		3.1	--	e 2.8	1.7	--	
27.....	.71	53	e .1	13	--	e 100	1.9	--	
28.....	.71	--		2.8	600	a 4.6	2.4	49	
29.....	.55	--		2.6	420	a 3.0	2.0	66	
30.....	.55	78		2.6	376	2.6	6.5	--	e 50
31.....	.55	--		2.2	--	e 1.5	--	--	
Total.	22.01	--	10.8	503.69	--	31,900.4	65.1	--	63.6

Total discharge for period July 1 to Sept. 30, 1954 (cfs-days)..... 590.80

Total load for period July 1 to Sept. 30, 1954 (tons)..... 31,974.8

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

NISHNABOTNA RIVER BASIN--Continued

MULE CREEK NEAR MALVERN, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	2.2	--		2.6	--		1.3	11	
2.....	2.2	63	e 0.4	2.6	--	e 0.3	1.2	--	(t)
3.....	2.0	--		2.3	51		1.3	--	
4.....	2.6	80		2.0	--		1.5	--	
5.....	6.4	3,400	sa 110	1.7	--		1.4	--	
6.....	2.2	700	b 4.2	1.9	26		1.3	--	
7.....	2.0	--		2.0	--		1.3	--	
8.....	2.2	--		2.0	26		1.3	--	
9.....	2.0	448	e 2.4	2.0	--	e .1	1.3	--	e 0.2
10.....	2.0	--		2.2	--		1.3	49	
11.....	2.2	--		2.4	--		1.3	--	
12.....	2.2	46		2.2	--		1.3	--	
13.....	2.2	--		2.2	--		1.2	--	
14.....	2.2	--		2.0	--		1.2	--	
15.....	2.4	--	e .2	2.0	26		1.2	--	
16.....	2.4	--		2.0	--		1.2	--	
17.....	2.4	22		2.0	--		1.2	13	
18.....	2.4	--		1.7	--		1.4	--	
19.....	2.4	33		1.5	--	e .2	1.5	--	e .1
20.....	2.8	--		1.5	--		1.4	--	
21.....	2.2	--		1.7	--		1.3	--	
22.....	2.0	--		1.7	33		1.2	--	
23.....	2.0	--		1.9	--		1.3	55	
24.....	2.0	49	e .3	2.0	--	(t)	1.5	--	
25.....	2.0	--		2.4	--		1.2	--	
26.....	2.8	--		2.4	--		1.2	--	
27.....	2.4	--		2.4	--		1.2	--	e .2
28.....	2.4	--		2.6	--	(t)	1.1	--	
29.....	2.4	--		2.4	--		1.0	--	
30.....	2.6	22	e .1	1.7	--		1.0	--	
31.....	2.6	--		--	--		1.0	48	
Total.	74.8	--	130.0	62.0	--	3.6	39.1	--	4.3
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.....	1.1	--		0.80	61		80	3,100	sa 1,900
2.....	1.2	--		.80	--		45	6,000	sa 2,000
3.....	1.2	--		.80	--		8.0	2,200	sa 55
4.....	1.2	--		.80	--		5.0	35	4.7
5.....	1.2	--		.80	59		4.4	41	4.9
6.....	1.2	--		.80	--	e 0.1	4.0	40	4.3
7.....	1.2	17	e 0.1	.80	--		3.5	50	4.7
8.....	1.2	--		.80	--		4.5	1,11	14
9.....	1.2	--		.80	--		3.5	7	6.8
10.....	1.1	--		.80	--		2.5	58	3.9
11.....	1.1	--		.80	--		3.1	48	4.1
12.....	1.1	--		1.0	59	e .2	2.6	43	3.0
13.....	1.0	17		1.5	--		1.8	--	
14.....	.90	--		2.0	--		2.0	--	
15.....	.90	--		3.0	--	e .4	1.8	167	
16.....	.90	--		2.0	--		1.6	--	e .8
17.....	.90	--		1.5	--		1.5	--	
18.....	.90	--		9.0	--	e 9.0	1.6	--	
19.....	.90	--		25	272		1.6	160	
20.....	.80	11		15	110	4.5	2.0	--	
21.....	.80	--		8.0	--		4.5	--	
22.....	.80	--		6.0	--		3.0	--	
23.....	.80	--		5.5	--	e 2.0	2.1	152	
24.....	.80	--	(t)	4.5	--		2.5	--	
25.....	.80	--		10	--	e 6.5	3.6	300	
26.....	.80	--		20	218	12	3.0	--	e 2.2
27.....	.80	--		10	130	b 3.6	3.5	--	
28.....	.80	--		5.0	90	b 1.2	4.0	--	
29.....	.80	11		--	--		3.2	--	
30.....	.80	--		--	--		3.0	--	
31.....	.80	--		--	--		2.8	--	
Total.	30.00	--	1.6	137.80	--	65.9	215.2	--	4,036.0

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.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

NISHNABOTNA RIVER BASIN--Continued

MULE CREEK NEAR MALVERN, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

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.....	2.8	--		1.2	--		0.55	48	
2.....	2.8	132	e 1.1	1.2	163		.55	145	e 0.2
3.....	2.8	--		1.2	83		.87	--	
4.....	3.4	--		1.0	158		1.0	145	
5.....	2.6	65		1.0	--	e 0.2	1.7	--	
6.....	2.4	--		.55	158		1.0	145	e .5
7.....	2.4	61	e .4	.87	--		.87	--	
8.....	2.6	--		.71	59		.87	61	
9.....	2.6	61		6.6	4,900	sa 650	.87	--	
10.....	2.6	--		1.5	500	b 2.0	.87	61	
11.....	2.6	125	e .9	1.4	192	.7	1.0	--	
12.....	2.8	125		1.4	--		1.0	61	
13.....	2.8	125		1.2	94		1.0	--	e .1
14.....	2.4	--		1.2	--		.71	53	
15.....	2.2	71	e .4	1.0	94		.71	--	
16.....	1.7	--		1.0	--	e .2	.71	53	
17.....	1.7	--		1.0	65		.71	--	
18.....	1.7	71		1.0	--		.87	53	
19.....	1.5	--	e .3	.87	65		.71	--	
20.....	1.5	71		.87	--		.71	--	
21.....	1.5	--		1.0	300	sa 1.5	.71	104	e .2
22.....	1.7	46		.87	--		.71	--	
23.....	1.9	2,580	13	1.2	55	e .1	.71	100	
24.....	2.2	550	b 3.2	1.0	--		2.4	330	
25.....	1.5	80	.3	1.2	590	1.9	1.7	220	1.0
26.....	1.5	40	b .2	1.9	520	2.7	.87	--	
27.....	1.5	55	a .2	1.0	200	b .5	.71	--	
28.....	2.2	280	b 1.5	1.7	790	3.6	1.2	110	e .3
29.....	1.4	30	.1	1.2	600	2.0	1.4	135	
30.....	1.2	--	e .1	.55	572	.9	.55	89	
31.....	--	--	--	.71	--	e .3	--	--	--
Total.	64.5	--	31.6	39.10	--	669.8	28.24	--	8.8
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.42	255		0.10	--		0.33	--	
2.....	.42	--	e 0.2	.08	48		.27	--	(t)
3.....	.33	--		.10	--		.27	50	
4.....	.33	255		.10	--		.27	--	
5.....	.33	--		.13	--	(t)	.21	50	
6.....	.27	--		.13	48		.21	--	
7.....	.21	161		.13	--		.21	--	
8.....	.21	--		.13	48		.21	--	
9.....	.13	60		.13	--		.21	--	
10.....	.10	--		.55	--	e 1.0	.17	48	
11.....	.10	--		.21	--		.17	--	
12.....	.10	85		.21	--		.17	48	(t)
13.....	.10	--		.17	94		.17	--	
14.....	.10	145		.17	--		.17	--	
15.....	.10	--	(t)	.17	--		.17	--	
16.....	.10	40		.17	94		.17	--	
17.....	.10	--		.13	--		.17	48	
18.....	.10	86		.13	--		.17	--	
19.....	.10	--		.13	94		.17	--	
20.....	.10	55		.13	--		4.5	--	e 200
21.....	.10	--		.13	--		13	--	e 650
22.....	.10	--		.17	--		.27	--	
23.....	.10	59		.13	37		.27	--	e .3
24.....	.10	--		.13	--		.71	--	
25.....	.10	36		.13	--		.33	--	
26.....	.10	--	(t)	.13	--	(t)	1.5	90	b .4
27.....	.10	--		.13	--		1.0	160	b .4
28.....	.10	28		.13	37		2.3	440	sb 30
29.....	.10	--		.21	--		18	--	e 900
30.....	.10	35		.17	--		.71	260	b 1.0
31.....	.10	--		.21	--		--	--	--
Total.	4.95	--	2.1	4.87	--	1.6	46.48	--	1,783.5
Total discharge for year (cfs-days).....									746.94
Total load for year (tons).....									6,738.8

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.

NISHNABOTNA RIVER BASIN--Continued
MULE CREEK NEAR MALVERN, IOWA--Continued

Particle-size analyses of suspended sediment, March to May 1955

(Methods of analysis: B, bottom withdrawal 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. 1, 1955.....	6:15 p.m.	322	34	9,840	5,680	28	48	98	99	100	98	99	100	99	100	SPWCM
May 9,.....	5:00 p.m.	50	70	37,500	7,010	31	59	97	98	99	97	98	99	100	100	SPWCM

NISHNABOTNA RIVER BASIN--Continued

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 Nishnabotna River.

DRAINAGE AREA.--26.1 square miles.

RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1953.

Sediment records: July 1952 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 10,700 ppm Apr. 23; minimum daily, no flow on many days during July to September.

Sediment loads: Maximum daily, 5,790 tons Apr. 23; minimum daily, 0 tons on many days during July to September.

EXTREMES, 1952-55.--Sediment concentrations: Maximum daily, 10,700 ppm Apr. 23, 1955; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 6,290 tons June 4, 1953; minimum daily, 0 tons on many days.

REMARKS.--Flow affected by ice Dec. 1 to Jan. 13, Jan. 21-26, 30, Feb. 3-5, Feb. 13 to Mar. 11, Mar. 21-28. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	1.3	--		3.7	82	0.8	0.7	50	
2.....	1.8	58	e 0.3	1.1	--		.7	--	
3.....	.9	--		1.2	--		.7	--	
4.....	1.1	89		1.3	--		.7	--	
5.....	9.4	667	sa 21	1.2	--		.6	--	
6.....	2.5	195	a 1.3	1.3	63		.5	--	
7.....	1.4	--	e .5	1.2	--		.4	--	e 0.1
8.....	2.7	121	.9	1.2	--		.4	--	
9.....	2.3	143	.9	1.2	--		.4	--	
10.....	1.8	--		1.2	--	e .2	.4	--	
11.....	1.5	108	e .4	1.3	63		.4	63	
12.....	1.4	--		1.2	--		.4	--	
13.....	8.0	820		1.2	47		.4	--	
14.....	14	1,380	sb 79	1.2	--		.4	--	
15.....	3.8	270	2.8	1.2	--		.4	--	
16.....	2.5	304	2.1	1.2	--		.4	--	
17.....	2.7	--	e 1.6	1.2	--		.4	--	
18.....	1.8	--		1.0	47		.4	27	
19.....	1.8	--		1.0	--		.4	--	
20.....	1.6	--		.9	42		.5	--	
21.....	1.6	105		1.0	--		.5	--	(t)
22.....	1.8	--		1.0	--		.5	--	
23.....	1.8	94		.9	--		.5	--	
24.....	1.4	--	e .5	.7	--	e .1	.6	27	
25.....	1.5	--		.7	--		.6	--	
26.....	2.3	78		.7	--		.7	--	
27.....	2.0	--		1.2	36		.5	--	
28.....	1.6	--		1.3	--		.4	--	
29.....	1.5	--		.8	--		.4	--	
30.....	1.4	102		.8	24		.3	--	
31.....	1.3	--		--	--		.3	--	
Total.	82.5	--	178.5	36.1	--	5.3	14.9	--	1.8

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.

NISHNABOTNA RIVER BASIN--Continued

DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

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.....	0.4	29		0.3	--		30	440	sb 80
2.....	.4	--		.3	3		200	792	sb 590
3.....	.5	--		.3	--		155	625	262
4.....	.7	--		.3	--		45	406	49
5.....	.6	--		.3	--		20	275	15
6.....	.5	--		.3	--		10	--	e 7.0
7.....	.4	--		.3	--		5.0	--	e 2.6
8.....	.4	116	e 0.1	.3	--		16	591	sb 45
9.....	.3	--		.3	--		40	655	71
10.....	.3	--		.3	--	(t)	14	706	26
11.....	.3	--		.3	--		10	536	14
12.....	.3	100		.3	--		8.7	416	9.8
13.....	.3	--		.3	--		6.1	336	a 5.4
14.....	.3	--		.3	--		5.7	286	4.3
15.....	.3	206		.3	--		4.7	235	3.0
16.....	.3			.3	--		4.1	166	1.8
17.....	.3			.3	--		3.6	93	
18.....	.3			20	100	sb 11	3.6	--	
19.....	.3			50	185	25	3.6	166	
20.....	.3			15	120	a 4.9	2.3	--	
21.....	.3			8.2	73	1.6	2.0	--	
22.....	.3			6.8			3.0	--	
23.....	.3			6.0			4.0	78	.8
24.....	.3	--	(t)	5.4	--	e .9	2.0	80	
25.....	.3			5.0			1.8	--	
26.....	.3			10	77	2.1	1.7	--	
27.....	.3			9.0	--	e 1.6	2.1	--	
28.....	.3			7.0	--	e 1.0	3.5	80	
29.....	.3			--	--	--	7.0	320	6.0
30.....	.3			--	--	--	6.1	325	5.4
31.....	.3			--	--	--	4.1	190	2.1
Total.	10.8	--	1.8	147.5	--	51.0	624.7	--	1,208.8
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.....	3.6	230	2.2	4.4	123	1.5	0.9		
2.....	3.1	240	2.0	3.8	178	1.8	.9	59	0.1
3.....	2.9	285	2.1	3.8	83	.9	7.0	688	sa 63
4.....	8.3	1,300	sb 36	3.6			14	1,870	sb 125
5.....	3.6	320	3.3	3.1			7.5	1,420	sb 42
6.....	3.1	205	a 1.7	3.6	48	.4	2.5	270	1.8
7.....	2.5	175	1.2	2.9			1.8	150	.7
8.....	2.5			2.5			1.4	115	.4
9.....	2.3			13	1,880	sb 105	4.5	688	sa 34
10.....	2.1			4.4	158	1.9	3.5	1,400	sb 18
11.....	2.3			3.4			2.0	390	2.1
12.....	2.3			3.1			1.6	120	.5
13.....	2.5	60	.3	2.9			1.5	110	
14.....	2.7			2.5			1.2	--	e .4
15.....	2.1			2.3			1.0	--	
16.....	1.8			2.3			.9	--	
17.....	1.5			2.1			.8	--	
18.....	1.5			2.1			.9	103	
19.....	36	8,830	s 2,040	2.1			.9	--	e .2
20.....	5.7	800	12	2.0			.8	--	
21.....	3.4	200	1.8	1.8			.8	--	
22.....	2.9	122	1.0	1.5			.6	93	
23.....	106	10,700	sb 5,790	1.4			.6	--	
24.....	39	2,700	284	1.4			.9	--	
25.....	18	745	36	1.4			.9	49	
26.....	12	540	17	2.1	61	.2	.6	--	e .1
27.....	8.7	350	8.2	1.6			.5	--	
28.....	7.4	285	5.7	1.4			.6	--	
29.....	5.3	188	2.7	1.3			.7	41	
30.....	5.0	140	1.9	1.2			.6	--	
31.....	--	--	--	.9			--	--	--
Total.	300.3	--	8,252.1	86.1	--	119.3	62.4	--	291.0

e Estimated.

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

NISHNABOTNA RIVER BASIN--Continued

DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--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	--		0		0	0		0
2.....	.3	82		0		0	0		0
3.....	.2	--		.1	(t)	0	0		0
4.....	.2	--		0		0	0		0
5.....	.3	--	(t)	.1	(t)	0	0		0
6.....	.6	24		0		0	0		0
7.....	.4	--		0		0	0		0
8.....	.3	28		0		0	0		0
9.....	1.6	195	0.8	0		0	0		0
10.....	21	4,460	sb 351	.1	(t)	0	0		0
11.....	1.6	600	2.6	.1	(t)		.1		(t)
12.....	.6	125	.2	0		0	0		0
13.....	.4	63		0		0	0		0
14.....	.3	--		0		0	.1		
15.....	.3	--	e .1	0		0	.1		
16.....	.3	79		0		0	.1		(t)
17.....	.3	--		0		0	.1		
18.....	.3	--		0		0	.1		
19.....	.3	--		0		0	0		0
20.....	.2	--		0		0	0		0
21.....	.2	--		0		0	0		0
22.....	.2	--		0		0	0		0
23.....	.1	101		0		0	0		0
24.....	.1	--	(t)	0		0	0		0
25.....	.1	--		0		0	0		0
26.....	.1	--		0		0	.1		(t)
27.....	.1	--		0		0	.1		(t)
28.....	.1	--		0		0	0		0
29.....	.1	--		.1	(t)		.1		(t)
30.....	.1	22		0		0	0		0
31.....	0	--	0	0		0	--		--
Total.	31.1	--	355.7	0.5		0.1	0.9		0.2

Total discharge for year (cfs-days)..... 1,396.8
 Total load for year (tons)..... 10,465.6

e Estimated.

s Computed by subdividing day.

t Less than 0.050 ton.

b Computed from partly estimated concentration graph.

NISHNABOTNA RIVER BASIN--Continued
DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Particle-size analyses of suspended sediment, October 1954 to July 1955
(Methods of analysis: B, bottom withdrawal 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, 1954.....	9:15 a.m.	14	53	1,270	4,780		89		98		100		--	--			SPWCM
Oct. 15, 1954.....	3:05 p.m.	a 155	33	1,652	2,670		35		60		97		98				SPWCM
Mar. 3, 1955.....	4:40 p.m.	a 16	38	1,080	3,890		49		77		99		--	--			SPWCM
Mar. 8.....	9:55 a.m.	145	46	35,500	3,060		38		72		98		99		100		SPWCM
Apr. 19.....	2:40 p.m.	54	56	22,800	5,660		36		66		98		99		100		SPWCM
Apr. 23.....																	
May 9.....	10:30 a.m.	24	52	3,550	2,770		62		89		99		--	--			SPWCM
July 10.....	9:55 a.m.	44	68	8,200	3,510		66		92		100		--	--			SPWCM
a Daily mean discharge.																	

a Daily mean discharge.

KANSAS RIVER BASIN

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 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES: 1954-55.--Dissolved solids: Maximum, 414 ppm Mar. 26; minimum, 204 ppm June 17-20.

Hardness: Maximum, 250 ppm Dec. 29 to Jan. 13; minimum, 129 ppm June 17-20.

Specific conductance: Maximum daily, 731 micromhos Jan. 11; minimum, 298 micromhos June 19.

Water temperatures: Maximum, 93°F Aug. 24; minimum, freezing point on many days during December to March.

EXTREMES: 1950-55.--Dissolved solids: Maximum (1951-55), 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 (1951-55), 830 micromhos Aug. 21, 1952; minimum daily, 267 micromhos Aug. 17, 1954.

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 district 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 1954 to September 1955 given in WSP 1390.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium	Non-magnesium					
Oct. 1-31, 1954.....	91.8	--	--	--	--	29	--	277	39	--	--	--	--	350	0.48	86.8	208	0	23	0.9	528	7.7	--
Nov. 1-30.....	97.4	--	--	--	--	28	--	297	38	--	--	--	--	367	.50	98.5	224	0	21	.8	543	8.2	--
Dec. 1-28.....	106	44	0.00	61	18	28	14	302	38	9.5	0.9	4.7	0.12	372	.51	106	227	0	20	.8	560	8.2	4
Dec. 29-Jan. 13, 1955.....	92.0	--	--	--	--	32	--	335	45	--	--	--	--	411	.56	102	250	0	22	.9	618	8.1	--
Jan. 14-Feb. 16.....	109	--	--	--	--	28	--	308	42	--	--	--	--	377	.51	111	239	0	20	.8	575	8.0	--
Feb. 17-19.....	199	--	--	--	--	22	--	291	33	--	--	--	--	291	.40	156	175	0	21	.7	445	7.9	--
Feb. 20-Mar. 1.....	176	--	--	--	--	30	--	301	43	--	--	--	--	380	.52	181	227	0	22	.9	565	8.1	--
Mar. 2-5.....	320	--	--	--	--	21	--	227	32	--	--	--	--	290	.39	251	175	0	21	.7	438	7.9	--
Mar. 6-25.....	234	43	.04	46	21	23	13	267	33	7.5	.9	4.1	.09	337	.46	213	202	0	19	.7	503	8.0	6
Mar. 26.....	163	--	--	--	--	29	--	328	42	--	--	--	--	414	.56	182	248	0	20	.8	597	8.3	--
Mar. 27-Apr. 19.....	173	--	--	--	--	26	--	275	36	--	--	--	--	347	.47	162	205	0	21	.8	512	8.2	--
Apr. 20-May 17.....	56.8	--	--	--	--	33	--	298	45	--	--	--	--	396	.54	60.7	220	0	25	1.0	582	8.0	--
May 18-21.....	112	--	--	--	--	27	--	222	44	--	--	--	--	294	.40	88.9	165	0	28	.9	482	8.1	--
May 22-25.....	108	--	--	--	--	28	--	274	37	--	--	--	--	349	.47	102	203	0	23	.9	640	7.6	--
May 26-29.....	312	--	--	--	--	26	--	208	28	--	--	--	--	263	.36	222	150	0	22	.7	406	7.7	--
May 30-June 16.....	111	43	.05	47	17	26	18	260	34	7.0	.8	4.0	11	327	.44	98.0	187	0	21	.8	503	7.5	16
June 17-20.....	1,867	--	--	--	--	10	--	176	8.0	--	--	--	--	204	.28	1,080	129	0	14	.4	319	7.6	--
June 21-27.....	303	--	--	--	--	24	--	263	36	--	--	--	--	347	.47	284	193	0	21	.7	503	7.9	--

June 28-July 27....	51.6	--	--	--	--	46	260	--	30	--	246	46	356	.48	49.6	190	0	25	.9	527	7.9	--
July 28-Aug. 10....	83.3	--	--	--	--	66	245	--	27	--	244	45	347	.47	78.0	176	0	30	1.2	532	7.6	--
Aug. 11-14.....	111	--	--	--	--	32	203	--	30	--	243	43	251	.35	76.1	148	0	23	.8	389	7.6	--
Aug. 15-16.....	8.50	--	--	--	--	47	245	--	30	--	246	47	328	.85	13.41	178	0	26	1.0	497	7.8	--
Aug. 23-25.....	13.0	--	--	--	--	53	287	--	36	--	287	53	371	.90	13.0	188	0	29	1.1	546	7.7	--
Sept. 7-8.....	5.50	--	--	--	--	65	246	--	36	--	246	65	348	.47	5.17	183	0	31	1.2	549	7.5	--
Sept. 12-14.....	9.33	--	--	--	--	57	244	--	36	--	244	57	334	.45	9.41	190	0	30	1.2	532	7.1	--
Sept. 19-21.....	37.0	--	--	--	--	43	243	--	36	--	243	43	331	.45	33.1	171	0	31	1.2	522	7.1	--
Sept. 22-26.....	98.2	27	.02	40	13	32	14	198	20	14	198	32	252	.34	86.6	153	0	20	1.7	385	8.0	18
Sept. 27-30.....	72.9	--	--	--	--	36	250	--	28	--	250	36	320	.44	63.0	182	0	25	.9	502	7.9	--
Weighted aver.~	136	--	--	--	--	33	250	--	24	--	250	33	325	0.44	119	193	0	21	0.7	488	--	--

a Includes equivalent of 7 ppm of carbonate (CO₃).

b Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK, AT CAMBRIDGE, NEBR.--Continued

Temperature (°F) of water, water year October 1954 to September 1955
 (Once-daily measurement between 10 a.m. and 1 p.m. Several days of no flow)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a 63	42	33	33	34	34	55	a 77	a 74	a 83	82	--
2	64	a 54	34	a 34	32	34	60	a 76	75	a 91	79	--
3	a 79	40	35	34	32	34	a 59	67	74	a 83	84	--
4	58	a 47	39	33	32	34	51	65	a 65	a 83	82	--
5	48	45	37	33	32	32	51	64	66	87	80	--
6	b 49	50	35	32	a 32	a 39	50	a 80	73	83	81	--
7	45	a 57	33	32	32	43	55	61	75	--	a 82	72
8	52	50	35	34	32	46	a 63	a 58	62	a 81	82	79
9	63	51	32	a 34	33	a 58	a 61	67	58	a 81	86	81
10	67	55	32	32	32	53	a 58	64	a 65	b 73	84	a 61
11	69	55	33	32	32	50	47	68	59	75	76	a 62
12	64	50	32	32	32	51	b 49	a 79	b 57	77	82	a 77
13	66	52	34	32	a 33	52	b 51	74	64	81	81	87
14	53	b 39	34	34	34	50	55	75	65	77	b 70	75
15	--	40	34	32	34	46	a 76	65	b 60	75	87	a 79
16	55	a 54	34	a 33	35	44	56	73	a 82	83	86	--
17	50	45	34	32	35	45	a 69	65	63	81	a 83	--
18	57	a 49	35	32	35	45	69	60	64	a 83	a 91	--
19	57	41	a 35	32	32	48	69	75	68	--	a 86	a 77
20	53	40	35	32	a 32	33	59	75	b 71	83	a 90	a 74
21	55	a 48	35	32	a 33	32	64	77	75	83	a 84	74
22	55	43	36	32	34	a 38	a 77	a 83	71	93	a 85	a 65
23	58	47	37	a 32	32	35	59	65	a 82	87	80	64
24	a 56	42	35	32	32	a 43	52	66	72	a 93	a 93	63
25	54	39	b 33	32	33	a 33	66	b 62	70	93	--	a 50
26	45	42	34	a 32	32	32	70	64	b 69	93	--	50
27	a 53	38	32	32	32	a 39	70	59	73	93	--	a 69
28	43	34	32	32	32	42	63	58	a 65	a 81	--	a 71
29	47	34	32	33	--	--	a 69	58	84	81	--	a 72
30	43	35	32	a 34	--	55	69	71	a 66	b 71	--	a 68
31	a 46	--	32	34	--	46	--	--	--	b 73	--	--
Average	56	45	34	33	33	43	61	68	70	81	83	69

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

b Reading obtained between 8 a.m. and 9 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, approximately, of which about 82 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April 1951 to September 1955.

Sediment records: April 1951 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 84°F July 30; minimum, freezing point Jan. 2, 17, Feb. 3, 19, 26.

Sediment concentrations: Maximum daily, 2,900 ppm June 17; minimum daily, not determined.

Sediment loads: Maximum daily, 1,000 tons June 17; minimum daily, not determined.

EXTREMES, 1951-55.--Water temperatures: Maximum, 86°F July 13, 1953; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 20,000 ppm July 12, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 22,700 tons May 20, 1951; minimum daily, not determined.

REMARKS.--Flow affected by ice Dec. 2, 12, 13, Dec. 28 to Jan. 1, Jan. 6-28, Feb. 3-8, 10-15, Feb. 19 to Mar. 1, Mar. 21, 22, 25-27. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 7 a. m. and 12 m./

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

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

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	17	--		22	53		25	91	
2.....	18	--		22	--		23	79	
3.....	18	168		22	47		24	33	
4.....	18	--	a 6	24	--		25	--	
5.....	18	109		24	48		26	32	
6.....	18	89		24	--		26	--	
7.....	23	200	b 12	24	66		25	36	
8.....	26	280	b 21	24	--		24	--	
9.....	24	244	16	23	65		24	60	
10.....	22	191	11	23	64		23	--	
11.....	22	140		23	130		22	49	
12.....	22	--		24	--		22	--	
13.....	21	106		24	45		22	120	
14.....	21	--		23	--		21	--	
15.....	20	80		24	35	a 4	22	44	
16.....	20	--		24	--		23	--	a 4
17.....	21	71		24	48		23	35	
18.....	21	76		24	--		25	--	
19.....	21	83		23	42		27	62	
20.....	21	--		24	--		28	--	
21.....	21	77	a 5	24	50		28	41	
22.....	21	--		24	--		26	--	
23.....	22	82		24	52		26	42	
24.....	22	--		24	--		26	--	
25.....	23	114		24	51		26	52	
26.....	25	--		24	--		26	--	
27.....	24	77		26	37		27	48	
28.....	23	--		26	--		23	--	
29.....	23	52		24	58		22	87	
30.....	22	--		24	--		23	--	
31.....	22	--		--	--		24	57	
Total.	662	--	201	713	--	120	757	--	124
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	25	--		28	90		36	443	43
2.....	25	56		30	--		43	534	62
3.....	27	62		29	88		38	312	32
4.....	27	81		27	--		35	212	20
5.....	28	--		25	50	a 5	33	196	17
6.....	25	79		24	--		28	152	11
7.....	26	--		24	69		28	140	11
8.....	27	110		28	--		30	167	14
9.....	27	--		31	152		32	210	18
10.....	26	140		25	--		33	215	19
11.....	25	--		28	129	a 10	33	198	18
12.....	25	82		25	--		31	180	15
13.....	24	--		26	126		30	159	12
14.....	25	128		26	--		28	135	10
15.....	26	--		32	281		27	118	9
16.....	26	140	a 7	34	--		25	103	7
17.....	28	63		38	314		25	93	6
18.....	26	93		36	--		24	88	6
19.....	25	--		26	269	a 24	25	87	6
20.....	25	92		25	--		24	87	6
21.....	25	--		30	271		22	260	b 15
22.....	26	129		29	--		24	220	b 14
23.....	27	--		27	164		28	110	8
24.....	28	94		26	--		28	110	8
25.....	27	--		29	162	a 11	23	140	9
26.....	28	83		30	130		22	150	b 9
27.....	29	--		30	96		26	130	9
28.....	28	130		32	--		28	146	11
29.....	28	--		--	--		31	160	13
30.....	27	86		--	--		30	150	12
31.....	27	--		--	--		28	141	11
Total.	818	--	217	800	--	356	897	--	461

a Computed from samples obtained about four times a week.

b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	26	139	10	21	367	21	20	295	16
2.....	25	146	10	21	375	21	18	286	14
3.....	25	152	10	21	371	21	16	232	11
4.....	24	124	8	20	304	16	18	229	11
5.....	24	102	7	20	292	16	20	229	12
6.....	23	99	6	19	297	15	20	202	11
7.....	23	113	7	19	250	13	19	199	10
8.....	24	120	8	18	219	11	19	188	10
9.....	24	123	8	19	197	10	20	130	7
10.....	24	107	7	19	210	11	24	187	12
11.....	25	108	7	19	214	11	31	343	29
12.....	36	309	30	19	231	12	26	228	16
13.....	39	267	28	19	238	12	23	210	13
14.....	32	206	18	18	207	10	22	206	12
15.....	27	184	13	17	227	10	35	1,670	s 219
16.....	24	199	13	17	318	15	33	490	44
17.....	24	189	12	30	2,880	s 689	53	2,900	sb 1,000
18.....	24	240	16	46	2,300	286	33	474	42
19.....	23	256	16	53	2,060	295	24	274	18
20.....	22	196	12	82	2,100	465	22	257	15
21.....	22	234	14	85	1,200	s 297	22	423	25
22.....	22	233	14	34	570	52	20	276	15
23.....	25	312	21	24	420	27	19	247	13
24.....	36	448	44	22	300	18	18	249	12
25.....	31	424	35	22	512	s 41	19	211	11
26.....	26	356	25	89	2,810	675	19	245	13
27.....	23	370	23	120	1,580	512	21	282	16
28.....	21	249	14	62	960	161	25	363	26
29.....	21	325	18	32	650	56	25	390	26
30.....	21	332	19	24	510	33	21	312	18
31.....	--	--	--	21	420	24	--	--	--
Total.	766	--	473	1,052	--	3,856	707	--	1,697
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	18	249	12	10	200	8	8.6	161	4
2.....	16	240	10	9.9	236	6	8.6	143	3
3.....	16	244	11	9.7	248	6	8.4	146	3
4.....	14	206	8	9.6	246	6	8.2	152	3
5.....	14	195	7	9.7	247	6	8.3	151	3
6.....	14	234	9	10	244	7	8.5	144	3
7.....	13	250	9	10	230	6	9.2	140	3
8.....	13	217	8	11	236	7	9.9	162	4
9.....	14	180	7	13	270	9	10	183	5
10.....	14	225	9	16	307	13	9.9	172	5
11.....	13	201	7	16	284	12	9.4	120	3
12.....	11	206	6	15	267	11	11	165	5
13.....	11	211	6	14	244	9	12	250	8
14.....	12	217	7	13	259	9	12	212	7
15.....	12	246	8	12	238	8	12	212	7
16.....	13	240	8	12	223	7	12	243	8
17.....	13	216	8	11	250	7	12	209	7
18.....	12	215	7	11	207	6	12	161	5
19.....	12	212	7	11	218	6	13	230	8
20.....	13	227	8	10	205	6	14	230	9
21.....	13	274	10	10	204	6	14	174	7
22.....	16	380	s 17	10	180	5	14	170	6
23.....	13	289	10	9.9	180	5	15	152	6
24.....	12	278	9	9.9	223	6	16	184	8
25.....	12	233	8	10	197	5	24	458	30
26.....	11	206	6	9.7	230	6	31	514	43
27.....	12	197	6	9.6	221	6	24	310	20
28.....	12	210	7	9.2	219	5	21	207	12
29.....	12	225	7	9.2	229	6	19	177	9
30.....	11	238	7	8.6	160	4	18	160	6
31.....	11	284	9	8.6	167	4	--	--	--
Total.	403	--	258	338.6	--	213	405.0	--	252
Total discharge for year (cfs-days).....									8,318.6
Total load for year (tons).....									8,230

s Computed by subdividing day.

b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT MAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, May to July 1955

(Methods of analysis: B, bottom withdrawal 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
May 17, 1955.....	10:49 p.m.	98	58	14,500	6,040	--	40	--	63	--	97	--				SPWCM
June 13.....	4:31 p.m.	58	61	4,030	6,130	24	34	43	57	80	99	100				SPWCM
June 15.....	5:58 p.m.	70	61	8,510	3,160	--	33	--	59	--	99	100				SPWCM
June 17.....	6:30 p.m.	116	65	7,710	5,170	--	38	--	59	--	98	100				SPWCM
July 11.....	2:40 p.m.	13	79	204	1,180	50	59	71	81	92	99	100				SBWCM
July 11.....	3:25 p.m.	13	79	197	1,170	51	62	73	82	92	99	100				SBWCM
July 12.....	2:15 p.m.	11	73	199	1,170	50	61	71	82	93	99	100				SBWCM

Particle-size analyses of bed material, July 1955

(Methods of analysis: 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	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											
						0.004	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	
July 11, 1955.....	4	13		8	13	24	53	69	74	76	82	84	88	94	96	100	SV
July 12.....	6	11					46	73	78	82	84	88	94	97	99	SV	

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, approximately, of which about 72 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: April 1951 to September 1955.

Sediment records: April 1951 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 78°F July 8, 14, 20; minimum, freezing point Jan. 14, 28, Feb. 9 and probably on several other days during winter months.

Sediment concentrations: Maximum daily, 9,180 ppm June 17; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,290 tons June 17; minimum daily, 0 tons on many days.

EXTREMES, 1951-55.--Water temperatures: Maximum, 89°F Aug. 1, 1953; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 22,700 ppm June 8, 1951; minimum daily, no flow on many days during 1951, 1953-55.

Sediment loads: Maximum daily, 58,000 tons Sept. 2, 1951; minimum daily, 0 tons on many days during 1951, 1953-55.

REMARKS.--Maximum observed sediment concentration during water year, 54,000 ppm June 15. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement between 7 a.m. and 11 a.m. Many days of no flow/

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

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

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR MAYWOOD, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

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	0.3	10	--	0.3	3	--
2.....	.1	--	--	.3	--	--	.3	--	--
3.....	.1	28	--	.3	--	--	.4	--	--
4.....	.1	--	--	.3	--	--	.4	--	--
5.....	.1	--	--	.4	--	--	.4	--	--
6.....	.1	30	--	.4	--	--	.4	2	--
7.....	.7	74	--	.4	--	--	.4	30	--
8.....	.3	33	--	.4	7	--	.4	--	--
9.....	.2	--	--	.3	--	--	.4	--	--
10.....	.2	40	--	.3	7	--	.4	--	--
11.....	.3	--	--	.3	--	--	.4	--	--
12.....	.2	--	--	.3	--	--	.4	11	--
13.....	.2	--	--	.4	--	--	.4	--	--
14.....	.2	--	--	.4	--	--	.4	--	--
15.....	.2	--	--	.4	9	--	.4	--	--
16.....	.2	--	(t)	.4	--	(t)	.5	--	(t)
17.....	.2	--	--	.4	--	--	.5	--	--
18.....	.2	20	--	.4	--	--	.6	4	--
19.....	.2	--	--	.4	--	--	.6	--	--
20.....	.2	--	--	.4	--	--	.6	--	--
21.....	.2	--	--	.4	--	--	.5	6	--
22.....	.2	--	--	.4	--	--	.5	--	--
23.....	.2	15	--	.4	12	--	.5	5	--
24.....	.3	10	--	.4	--	--	.5	--	--
25.....	.3	--	--	.4	--	--	.5	--	--
26.....	.3	--	--	.4	--	--	.4	--	--
27.....	.2	--	--	.4	--	--	.5	--	--
28.....	.3	--	--	.4	--	--	.6	4	--
29.....	.3	--	--	.4	--	--	.6	--	--
30.....	.3	--	--	.4	21	--	.6	--	--
31.....	.3	7	--	--	--	--	.5	--	--
Total.	6.9	--	0.5	11.2	--	0.3	14.3	--	0.3
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.....	0.6	--	--	0.5	3	--	3.6	108	1.0
2.....	.5	--	--	.4	--	--	4.5	160	a 2.0
3.....	.5	6	--	.5	--	--	1.4	95	a .1
4.....	.5	--	--	.5	--	--	1.0	53	--
5.....	.5	--	--	.4	--	--	.6	--	--
6.....	.5	--	--	--	--	--	--	--	--
7.....	.5	--	--	.4	14	--	.8	19	--
8.....	.5	--	--	.4	--	--	.8	--	--
9.....	.5	--	--	.5	--	--	.8	--	--
10.....	.5	33	--	.6	4	--	.8	--	--
11.....	.5	--	--	.6	--	--	.8	--	--
12.....	.6	--	--	.6	4	--	.7	20	--
13.....	.6	--	--	.5	--	--	.7	--	--
14.....	.7	6	--	.7	--	--	.7	--	--
15.....	.6	--	--	1.0	--	(t)	.6	--	--
16.....	.7	26	(t)	1.1	--	--	.6	--	--
17.....	.5	--	--	.9	43	--	.7	--	--
18.....	.4	--	--	.7	--	--	.7	13	(t)
19.....	.4	--	--	.7	--	--	.7	--	--
20.....	.5	--	--	.7	--	--	.7	--	--
21.....	.5	--	--	.9	--	--	.7	--	--
22.....	.5	7	--	.7	--	--	.8	--	--
23.....	.5	--	--	.7	3	--	.8	6	--
24.....	.4	--	--	.6	--	--	.7	9	--
25.....	.4	--	--	.7	--	--	.7	--	--
26.....	.4	--	--	--	--	--	--	--	--
27.....	.4	--	--	.8	8	--	.7	--	--
28.....	.5	4	--	.8	--	--	.7	--	--
29.....	.4	7	--	1.9	44	a 0.2	.8	17	--
30.....	.4	--	--	--	--	--	.7	--	--
31.....	.5	--	--	--	--	--	.7	15	--
Total.	15.7	--	0.5	19.3	--	0.7	30.0	--	4.2

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 1954 to September 1955--Continued

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.....	0.5	14		0.8	15		0.2	--	
2.....	.6	--		.8	--		.2	76	
3.....	.6	19		.6	17		.1	--	
4.....	.6	15		.6	--		.2	107	
5.....	.5	12		.6	27		.2	--	
6.....	.5	9	(t)	.6	--		.1	131	
7.....	.5	--		.5	31		.1	--	
8.....	.6	14		.5	--		.2	84	b 0.1
9.....	.5	--		.5	14	(t)	.3	66	
10.....	.6	10		.4	17		.6	183	
11.....	.6	--		.4	35		.4	--	
12.....	1.1	118	0.4	.5	--		.3	89	
13.....	.7	34	.1	.5	54		.2	--	
14.....	.6	--		.7	--		.3	77	
15.....	.6	--		.9	16		4.1	2,380	s 45
16.....	.6	--		1.0	16		1.1	600	1.8
17.....	.7	--		1.3	106	0.4	38	9,180	s 1,290
18.....	.7	--		28	2,590	s 753	2.9	1,960	s 20
19.....	.7	--		12	2,220	s 122	.9	500	1.2
20.....	.7	--		.8	550	1.2	.7	260	.5
21.....	.8	--		.5	268	.4	.5	300	.4
22.....	.6	34	.1	.4	130	.1	25	7,230	s 935
23.....	.7	--		.4	98	.1	.7	1,150	2.2
24.....	.7	--		.4	85	.1	.4	350	.4
25.....	.7	--		.6	438	s 1.3	.3	246	.2
26.....	.7	--		7.6	2,450	s 64	.2	168	.1
27.....	.7	--		1.9	1,450	7.4	.4	147	.2
28.....	.7	--		.4	498	.5	.3	99	.1
29.....	.7	--		.2	235	.1	.2	65	(t)
30.....	.8	--		.2	157	.1	.2	81	(t)
31.....	--	--	--	.2	114	.1	--	--	--
Total.	19.6	--	2.4	64.8	--	951.4	79.3	--	2,298.6
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.2	109		0		0	0	--	0
2.....	.2	--		0		0	0	--	0
3.....	.1	--		0		0	0	--	0
4.....	.1	--		0		0	0	--	0
5.....	.2	--		0		0	0	--	0
6.....	.2	--	(t)	0		0	0	--	0
7.....	.2	--		0		0	0	--	0
8.....	.1	100		0		0	0	--	0
9.....	.1	--		.1		e .2	0	--	0
10.....	.1	85		1.7		e 7.0	0	--	0
11.....	0	--	0	0		0	0	--	0
12.....	0	--	0	0		0	0	--	0
13.....	0	--	0	0		0	0	--	0
14.....	.1	43		0		0	0	--	0
15.....	.1	48		0		0	0	--	0
16.....	.1	53	(t)	0		0	0	--	0
17.....	.1	--		0		0	0	--	0
18.....	.1	30		0		0	0	--	0
19.....	0	--	0	0		0	0	--	0
20.....	.1	28		0		0	0	--	0
21.....	.1	--		0		0	0	--	0
22.....	.1	48		0		0	0	--	0
23.....	.1	--		0		0	0	--	0
24.....	.1	18	(t)	0		0	0	--	0
25.....	.1	--		0		0	.3	86	s .2
26.....	.1	31		0		0	.1	63	(t)
27.....	.1	--		0		0	0	--	0
28.....	.1	28		0		0	0	--	0
29.....	0	--	0	0		0	0	--	0
30.....	0	--	0	0		0	0	--	0
31.....	0	--	0	0		0	--	--	--
Total.	2.9	--	0.5	1.8		7.2	0.4	--	0.2

Total discharge for year (cfs-days)..... 266.2
 Total load for year (tons)..... 3,268.8

e Estimated.

s Computed by subdividing day..

t Less than 0.050 ton.

b Computed from samples obtained about four times a week.

KANSAS RIVER BASIN--Continued

BRUSHY CREEK NEAR WAYWOOD, NEBR.--Continued

Particle-size analyses of suspended sediment, May to June 1955

Methods of analysis: B, bottom withdrawal 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
May 26, 1955.....	5:37 a.m.	14	--	4,610	3,490	62	77	89	95	96	100	---				SPWCM
May 26.....	5:37 a.m.	14	--	4,610	3,510	10	23	79	94	98	100	---				SPNM
June 15.....	3:38 p.m.	2.6	62	54,000	3,920	--	22	--	36	--	95	---	100			SPWCM
June 15.....	4:46 p.m.	33	62	14,600	5,410	--	35	--	56	--	97	100				SPWCM
June 17.....	2:22 a.m.	142	--	20,800	2,830	--	39	--	62	--	99	100				SPWCM
June 22.....	5:30 a.m.	132	62	27,900	4,880	23	32	41	52	69	98	100				SPWCM
June 22.....	5:30 a.m.	132	62	27,900	4,900	5	11	34	50	69	98	100				SPNM
June 23.....	5:50 a.m.	.9	--	1,600	2,020	--	93	--	98	--	100	---				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, October 1953 to September 1955.

Sediment records: April 1951 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 82°F July 3; minimum, freezing point Feb. 10, 19, 26, and probably on several other days during winter months.

Sediment concentrations: Maximum daily, 8,580 ppm May 26; minimum daily, not determined.

Sediment loads: Maximum daily, 5,510 tons May 26; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1951-55.--Water temperatures: Maximum (1951-52, 1953-55), 86°F July 18, 1954; minimum (1951-52, 1955), freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 37,600 ppm June 8, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 131,000 tons May 31, 1951; minimum daily, less than 0.50 ton on many days each year.

REMARKS.--Flow affected by ice Dec. 28, 29, Jan. 7, 13-15, 22, 23, 25, Feb. 4-7, 10-12, 19, 20, 24, 26, Mar. 21, 22, 25-27. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

/Once-daily measurement between 2 p.m. and 9 p.m. October to March and between 6 a.m. and 1 p.m. April to September/

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

a Reading obtained between 6 a.m. and 1 p.m.

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

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	5.2	--		5.8	20		6.8	13	
2.....	5.7	92		5.7	--		6.8	--	
3.....	5.5	--		6.1	13		7.0	11	
4.....	5.5	52	a 0.8	6.2	--		7.1	--	
5.....	5.4	--		6.5	15		7.1	14	
6.....	5.7	26		6.5	--		7.0	--	
7.....	7.1	64		6.6	17		7.0	12	
8.....	7.1	79		6.8	--		7.0	--	
9.....	6.1	--		6.8	23		7.0	13	
10.....	6.1	56	a 1.1	7.1	21		7.0	--	
11.....	6.5	--		7.0	20		7.6	29	
12.....	6.1	48		7.0	--		6.6	--	
13.....	5.7	--		7.0	18		6.8	18	
14.....	5.4	27		6.8	--		7.2	--	
15.....	5.7	--		7.0	16	a 0.3	7.2	12	
16.....	5.9	23		7.0	--		7.1	--	a 0.3
17.....	5.9	--		7.0	16		7.1	15	
18.....	5.9	30	a .4	7.1	--		7.1	--	
19.....	5.9	24		7.1	13		7.1	10	
20.....	6.4	28		7.2	--		7.2	16	
21.....	6.1	--		7.2	11		7.2	12	
22.....	5.9	23		7.2	--		7.2	--	
23.....	5.9	--		7.1	12		7.2	--	
24.....	5.9	31		7.1	--		7.4	--	
25.....	6.5	100	b 1.8	7.2	11		7.4	--	
26.....	6.6	90	1.6	7.2	--		7.4	--	
27.....	5.9	--		7.0	21		7.6	12	
28.....	5.9	16		7.0	--		7.0	--	
29.....	5.8	--	a .3	7.0	10		6.8	23	
30.....	5.9	18		7.0	--		7.4	--	
31.....	5.5	--		--	--	--	7.4	--	
Total.	184.7	--	21.1	205.3	--	9.0	220.8	--	9.3
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.....	7.4	19		7.8	22		18	1,100	sb 60
2.....	7.4	14		7.8	--		22	1,600	sb 120
3.....	7.2	--		7.7	16		11	320	9.5
4.....	7.1	21		7.6	--		8.3	130	2.9
5.....	7.1	--		7.6	45		8.0	67	1.4
6.....	7.1	--		7.5	--		7.6	--	
7.....	7.0	93		7.5	--		7.7	--	
8.....	7.0	--		8.0	20	a 0.5	7.8	107	
9.....	7.2	13		8.3	--		7.8	--	
10.....	7.2	--		7.3	24		7.8	111	
11.....	7.4	15		7.5	17		7.6	72	
12.....	7.4	--		7.5	17		7.7	75	
13.....	7.5	18		8.0	--		7.7	--	
14.....	7.5	18		8.3	--		7.7	--	
15.....	7.5	--		9.9	175	4.7	7.7	49	
16.....	7.6	14	a 0.4	10	--	e 4.0	7.6	--	
17.....	7.6	--		12	127	4.1	7.7	49	
18.....	7.2	11		11	--	e 2.8	7.7	--	
19.....	7.4	--		7.0	61	1.2	7.7	41	a 1.5
20.....	7.4	15		7.5	--		7.7	--	
21.....	7.2	--		8.6	--		7.3	--	
22.....	7.0	15		8.5	128		7.8	80	
23.....	7.1	--		8.2	--		8.0	89	
24.....	7.6	--		7.8	25	a .7	7.7	--	
25.....	7.2	14		8.2	--		7.0	59	
26.....	7.2	--		7.8	29		7.4	--	
27.....	7.2	23		8.0	38	sb 9.0	7.5	62	
28.....	7.4	--		9.6	280		8.6	--	
29.....	7.4	20		--	--		8.5	77	
30.....	7.7	14		--	--		8.2	--	
31.....	7.7	--		--	--		8.3	58	
Total.	226.9	--	12.4	232.5	--	38.4	269.7	--	232.8

e Estimated.

s Computed by subdividing day.

a Computed from samples obtained 3 or 4 times a week.

b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	8.5	73	1.7	7.0	210	4.0	7.6	272	5.6
2.....	8.8	94	2.2	6.8	153	2.8	7.2	305	5.9
3.....	9.0	70	1.7	6.8	135	2.5	7.0	283	5.3
4.....	8.8	62	1.5	6.6	108	1.9	7.2	244	4.7
5.....	8.6	64	1.5	6.6	122	2.2	7.8	237	5.0
6.....	8.5	57	1.3	6.5	137	2.4	7.2	214	4.2
7.....	8.5	60	1.4	5.8	91	1.4	6.8	206	3.8
8.....	8.6	71	1.6	6.2	58	1.0	6.8	219	4.0
9.....	8.6	80	1.9	6.6	62	1.1	7.0	140	2.6
10.....	8.6	67	1.6	6.2	80	1.3	6.8	152	2.8
11.....	8.6	70	1.6	6.5	95	1.7	7.6	199	4.1
12.....	10	152	4.1	6.4	95	1.6	7.2	148	2.9
13.....	9.0	93	2.3	6.4	124	2.1	7.7	169	3.5
14.....	8.5	82	1.9	6.1	118	1.9	8.0	190	4.1
15.....	8.2	124	2.7	5.9	133	2.1	13	1,060	s 245
16.....	8.2	110	2.4	5.9	108	1.7	22	4,340	s 396
17.....	8.2	130	2.9	7.7	393	s 9.4	12	1,500	sb 60
18.....	8.0	172	3.7	10	1,040	s 35	9.8	1,740	s 48
19.....	7.8	141	3.0	7.8	275	5.8	7.7	730	15
20.....	7.6	59	1.2	7.2	200	3.9	6.6	370	6.6
21.....	7.4	72	1.4	6.8	238	4.4	6.6	320	5.7
22.....	7.8	123	2.6	6.6	229	4.1	7.8	852	s 29
23.....	8.2	184	4.1	6.5	170	3.0	6.4	320	5.5
24.....	8.3	111	2.5	6.6	170	3.0	7.0	270	5.1
25.....	7.7	88	1.8	7.0	550	sb 14	7.2	260	5.1
26.....	7.6	134	2.7	148	8,580	s 5,510	7.2	240	4.7
27.....	7.4	118	2.4	14	2,450	s 105	8.6	645	s 18
28.....	7.1	62	1.2	8.5	680	16	8.0	366	7.9
29.....	7.2	73	1.4	7.7	332	6.9	6.5	277	4.9
30.....	7.0	133	2.5	7.7	275	5.7	6.2	242	4.1
31.....	--	--	--	7.7	300	6.2	--	--	--
Total.	246.3	--	64.8	362.1	--	5,764.1	244.5	--	919.1
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	6.4	190	3.3	2.4	138	0.9	3.4	144	1.3
2.....	6.1	193	3.2	2.9	163	1.3	3.4	197	1.8
3.....	6.1	182	3.0	3.6	212	2.1	3.4	183	1.7
4.....	5.9	174	2.8	4.0	204	2.2	3.8	130	1.3
5.....	5.8	171	2.7	4.4	219	2.6	3.8	76	.8
6.....	5.8	192	3.0	4.4	238	2.8	3.8	85	.9
7.....	5.5	222	3.3	4.1	158	1.7	3.8	125	1.3
8.....	5.4	229	3.3	4.1	178	2.0	3.8	126	1.3
9.....	5.2	235	3.3	4.3	270	3.1	3.7	148	1.5
10.....	5.1	189	2.6	4.4	174	2.1	3.6	148	1.4
11.....	5.0	216	2.9	4.7	201	2.6	3.7	56	.6
12.....	4.8	212	2.7	4.3	148	1.7	4.0	76	.8
13.....	5.1	199	2.7	4.1	134	1.5	3.8	135	1.4
14.....	5.4	217	3.2	3.8	138	1.4	4.0	155	1.7
15.....	5.2	218	3.0	3.7	86	.9	3.8	109	1.1
16.....	5.1	214	2.9	3.8	122	1.3	3.4	133	1.2
17.....	4.8	197	2.6	3.7	151	1.5	3.4	168	1.5
18.....	4.8	185	2.4	3.8	152	1.6	3.6	83	.8
19.....	4.8	200	2.6	3.8	210	2.2	3.7	115	1.1
20.....	4.8	205	2.7	3.8	164	1.7	4.0	120	1.3
21.....	4.8	192	2.5	4.4	174	2.1	3.8	74	.8
22.....	6.6	360	sb 7.5	4.7	164	2.1	4.4	89	1.1
23.....	5.2	360	b 5.0	4.3	158	1.8	5.0	73	1.0
24.....	3.3	194	1.7	3.3	115	1.0	5.5	72	1.1
25.....	3.6	143	1.4	3.6	106	1.0	7.1	77	1.5
26.....	2.6	157	1.1	3.7	107	1.1	7.1	76	1.5
27.....	3.6	162	1.6	3.7	100	1.0	6.1	68	1.1
28.....	2.9	137	.9	3.8	61	.6	5.2	69	1.0
29.....	2.6	126	.9	3.5	102	1.0	5.0	86	1.2
30.....	2.7	111	.8	3.4	120	1.1	4.5	77	.9
31.....	3.4	206	s 2.0	3.4	167	1.5	--	--	--
Total.	148.4	--	83.8	119.9	--	51.5	127.6	--	36.0

Total discharge for year (cfs-days)..... 2,588.7

Total load for year (tons)..... 7,242.3

s Computed by subdividing day.

b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

FOX CREEK AT CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, March to June 1955

(Methods of analysis: B, bottom withdrawal 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
Mar. 1, 1955.....	6:30 p.m.		15	338	2,110	59	70	77	84	91	99	100	--		SPWCM
Mar. 2.....	3:10 p.m.		15	904	1,480	72	83	90	94	98	100	100	--		BWCM
May 18.....	7:00 p.m.		16	4,460	3,170	--	53	--	77	77	99	100	--		SPWCM
May 26.....	3:30 a.m.	588	588	16,900	4,830	27	36	45	59	78	97	99	100		SPWCM
May 26.....	3:30 a.m.	588	588	16,900	4,930	7	15	38	57	78	97	99	100		SPNM
May 28.....	4:27 p.m.		37	5,120	4,160	--	60	--	79	--	99	100	--		SPWCM
June 15.....	11:07 p.m.	132	132	15,400	5,190	20	30	43	59	80	98	100	--		SPWCM
June 15.....	11:07 p.m.	132	132	15,400	5,320	6	13	36	56	80	98	100	--		SPNM

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.

LOCATION.--At gaging station at county road bridge, 2½ miles upstream from mouth and 3½ miles east of Curtis, Frontier County.

DRAINAGE AREA.--20 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: April 1951 to September 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 9,800 ppm June 17; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 779 tons June 17; minimum daily, 0 tons on many days.

EXTREMES, 1951-55.--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, 61,400 ppm June 16.

No flow during periods October to December and July to September; record is omitted. Flow affected by ice Feb. 17, Feb. 27 to Mar. 3. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Suspended sediment, January to June 1955

Day	January			February			March		
	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	4.4	2,900	sa 80
2.....				0		0	2.0	1,800	sa 13
3.....				0		0	.1	700	sa .2
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.....				1.0		e 1.4	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.....				.3		e .4	0	--	0
28.....				3.0	1,800	sa 30	0	--	0
29.....				--		--	0	--	0
30.....				--		--	0	--	0
31.....				--		--	0	--	0
Total.	0		0	4.3		31.8	6.5	--	93.2

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

DRY CREEK NEAR CURTIS, NEBR.--Continued

Suspended sediment, January to June 1955--Continued

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.....				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	1.5	1,380	s 60
16.....				0	--	0	4.5	6,800	s 635
17.....				.1	900	sa .1	9.6	9,800	s 779
18.....				.7	3,700	sa 18	0	--	0
19.....				0	--	0	0	--	0
20.....				0	--	0	0	--	0
21.....				0	--	0	0	--	0
22.....				0	--	0	.8	3,000	sa 36
23.....				0	--	0	0	--	0
24.....				0	--	0	0	--	0
25.....				1.6	1,390	s 64	0	--	0
26.....				3.5	6,100	sa 85	0	--	0
27.....				0	--	0	6.7	7,240	s 297
28.....				0	--	0	0	--	0
29.....				0	--	0	0	--	0
30.....				0	--	0	0	--	0
31.....				0	--	0	--	--	--
Total.	0		0	5.9	--	167.1	23.1	--	1,807

Total discharge for year (cfs-days)..... 39.8

Total load for year (tons)..... 2,089.1

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued
 DRY CREEK NEAR CURTIS, NEBR.--Continued

Particle-size analyses of suspended sediment, March to June 1955
 (Methods of analysis: B, bottom withdrawal 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. 1, 1955.....	5:40 p.m.	20	--	12,700	9,220	--	35	--	61	--	98	100				SPWCM
May 18.....	6:32 p.m.	2.1	--	19,800	4,050	21	30	42	54	74	98	100				SPWCM
May 18.....	6:32 p.m.	2.1	--	19,800	4,020	7	16	34	51	74	98	100				SPNMC
May 25.....	11:59 p.m.	20	59	15,000	5,720	--	39	--	60	--	96	--				SPWCM
June 15.....	9:32 p.m.	25	--	27,100	4,340	--	46	--	68	--	98	100				SPWCM
June 15.....	10:28 p.m.	18	58	12,600	3,850	--	52	--	80	--	98	100				SPWCM
June 16.....	11:00 p.m.	6.0	--	58,500	5,810	--	26	--	42	--	98	100				SPWCM
June 22.....	3:20 a.m.	10	--	16,400	6,230	--	55	--	78	--	99	100				SPWCM
June 27.....	7:24 a.m.	68	--	25,800	4,760	--	30	--	50	--	98	100				SPWCM
June 27.....	8:17 a.m.	31	--	13,800	4,890	33	45	60	76	91	99	100				SPWCM
June 27.....	8:17 a.m.	31	--	13,800	4,950	4	11	51	72	91	99	100				SPNMC

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, 3½ miles southeast of Stockville, and 13½ miles upstream from Medicine Creek Dam.

RECORDS AVAILABLE.--Water temperatures: October 1952 to September 1955.

Sediment records: April 1951 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Minimum, freezing point on many days during December to February.

Sediment concentrations: Maximum daily, 13,200 ppm June 17; minimum daily, 64 ppm Sept. 7, 8.

Sediment loads: Maximum daily, 17,500 tons June 17; minimum daily, 3 tons on several days during August and September.

EXTREMES, 1951-55.--Water temperatures (1952-55): Minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, not determined; minimum daily, not determined.

Sediment loads: Maximum daily, 490,000 tons (estimated) June 22, 1951; minimum daily, 3 tons on several days during 1955.

REMARKS.--Flow affected by ice Nov. 2, 29, Dec. 1, 2, 9-17, 21, 24, Dec. 28 to Jan. 3, Jan. 6 to Mar. 1, Mar. 21, 22, 26, 27. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955
/Once-daily measurement between 2 p.m. and 9 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	36	32	a 32	34	59	75	--	85	--	--
2	62	40	--	33	--	a 34	a 53	74	80	89	85	--
3	--	--	--	--	33	41	53	72	78	80	86	--
4	56	--	--	--	--	--	51	73	a 64	85	88	--
5	--	--	45	--	--	42	53	71	76	80	85	--
6	--	52	40	31	--	--	53	75	72	87	--	72
7	--	--	36	--	32	45	60	a 69	80	92	84	76
8	70	52	--	32	32	--	61	57	a 57	85	78	--
9	--	--	38	--	--	--	a 50	70	64	83	93	66
10	a 61	52	--	--	--	--	--	75	--	--	81	--
11	a 61	--	--	32	--	--	63	71	61	80	81	--
12	--	--	67	--	--	--	64	79	67	77	79	--
13	61	--	33	--	31	--	50	74	67	75	79	a 70
14	--	41	--	--	31	52	--	74	68	65	--	--
15	--	--	35	31	34	--	71	73	64	85	--	--
16	--	51	--	--	32	49	69	77	72	90	80	--
17	--	--	36	33	33	--	65	64	64	86	84	--
18	57	47	--	32	--	--	--	62	70	83	86	78
19	--	--	a 40	31	--	--	58	69	77	81	--	a 73
20	--	a 46	35	--	--	34	64	75	77	80	--	--
21	--	--	--	31	33	--	69	a 74	70	86	--	--
22	--	46	--	--	--	46	65	79	a 61	82	85	--
23	--	--	41	--	--	--	--	72	77	80	a 82	--
24	55	41	--	32	32	--	58	72	73	--	--	--
25	--	--	--	--	--	--	64	a 62	72	84	--	--
26	45	42	--	--	--	34	68	62	72	a 78	--	--
27	a 46	--	45	--	a 32	33	65	63	73	86	--	--
28	--	41	a 32	--	--	51	67	62	80	80	--	71
29	--	--	34	--	--	58	68	72	--	82	--	a 61
30	--	39	--	32	--	58	72	74	81	86	a 68	--
31	45	--	--	31	--	--	--	a 65	--	87	--	--
Average	--	--	--	--	--	--	61	71	71	84	--	--

a Reading obtained between 9 a.m. and 1 p.m.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	35	122	a 12	48	--	--	53	380	--
2.....	36	--		48	200	--	53	--	--
3.....	37	--		47	206	--	54	227	--
4.....	37	120		47	--	--	54	--	--
5.....	37	--		49	--	--	57	219	--
6.....	39	122	a 55	51	179	--	57	215	--
7.....	47	--		53	--	--	57	205	--
8.....	51	514		53	142	--	57	--	--
9.....	53	--		53	--	--	55	258	--
10.....	50	381		53	136	--	54	--	--
11.....	50	344	a 22	53	--	--	52	--	--
12.....	47	--		53	137	--	53	399	--
13.....	44	232		53	--	--	53	329	--
14.....	42	--		51	156	--	55	--	--
15.....	42	236		51	145	a 22	54	378	--
16.....	42	--	a 22	52	132		53	--	a 45
17.....	43	--		53	--		53	467	
18.....	43	148		51	232		53	--	
19.....	45	--		51	--		54	350	
20.....	45	151		50	164		57	286	
21.....	47	--	a 22	51	--	--	57	356	--
22.....	47	140		51	138	--	58	--	--
23.....	47	--		51	--	--	59	246	--
24.....	47	129		51	164	--	57	--	--
25.....	51	--		51	--	--	58	--	--
26.....	53	216	a 22	51	167	--	59	--	--
27.....	52	154		52	--	--	60	261	--
28.....	52	190		53	167	--	43	91	--
29.....	50	--		53	--	--	45	576	--
30.....	50	--		53	190	--	50	--	--
31.....	48	--		--	--	--	55	--	--
Total.	1,409	--	820	1,537	--	660	1,689	--	1,395
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.....	85	131	a 30	68	509	a 50	120	7,100	b 2,300
2.....	78	121		66	--		134	6,440	2,330
3.....	70	460		53	201		103	2,960	823
4.....	64	--		52	--		85	1,730	397
5.....	65	--		58	160		75	1,430	290
6.....	40	580	a 30	64	--	a 50	69	1,210	225
7.....	50	--		56	118		63	960	163
8.....	65	99		66	216		64	1,000	b 170
9.....	70	--		71	777		67	1,220	221
10.....	60	140		42	--		69	1,290	240
11.....	62	145	a 30	55	--	a 50	70	1,300	246
12.....	54	--		53	192		69	1,280	238
13.....	45	103		63	--		69	1,060	197
14.....	57	--		72	--		67	940	170
15.....	47	131		73	--		65	800	140
16.....	53	--	a 30	86	721	a 65	63	720	122
17.....	57	169		100	--		61	710	117
18.....	49	111		90	--		60	700	113
19.....	46	85		50	473		60	690	112
20.....	51	--		60	--		60	680	110
21.....	51	112	a 30	77	361	a 65	57	700	b 110
22.....	50	--		70	378		55	840	125
23.....	55	105		65	--		60	830	134
24.....	62	176		50	340		61	680	112
25.....	56	--		65	--		61	520	86
26.....	64	141	a 30	70	--	a 65	55	350	52
27.....	63	--		60	327		55	1,280	190
28.....	62	--		70	--		67	1,320	239
29.....	67	--		--	--		64	1,020	176
30.....	64	232		--	--		65	900	158
31.....	65	341		--	--		65	830	146
Total.	1,827	--	930	1,625	--	2,192	2,158	--	10,252

a Computed from samples obtained about three times a week.

b Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Day	Mean dis-charge (cfs)	April		Mean dis-charge (cfs)	May		Mean dis-charge (cfs)	June	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	59	790	126	49	395	52	48	524	68
2.....	58	770	121	49	429	57	44	497	57
3.....	58	820	128	49	450	60	44	499	59
4.....	58	720	113	49	430	57	44	432	51
5.....	54	620	90	47	342	43	48	500	65
6.....	52	560	79	46	342	42	47	549	70
7.....	53	530	76	44	344	41	45	400	49
8.....	53	520	74	44	320	38	44	370	44
9.....	53	560	80	44	308	37	45	324	39
10.....	54	460	67	44	299	36	48	348	45
11.....	53	480	69	42	302	34	51	550	76
12.....	63	740	126	41	293	32	55	618	92
13.....	66	820	146	40	287	31	53	477	68
14.....	66	750	134	40	276	30	50	432	58
15.....	63	680	116	37	322	32	54	524	76
16.....	59	640	102	37	277	28	175	6,600	sb 4,300
17.....	58	590	92	43	365	42	492	17,200	17,500
18.....	58	560	88	72	2,000	389	102	7,000	1,930
19.....	57	820	126	126	4,210	1,430	66	3,100	552
20.....	53	750	107	100	2,320	626	57	940	145
21.....	53	580	83	113	2,930	894	50	630	85
22.....	53	500	72	109	2,640	777	171	9,530	s 6,050
23.....	55	520	77	67	1,130	204	90	4,950	s 1,310
24.....	58	570	89	57	795	122	58	1,040	163
25.....	61	680	112	68	4,240	s 856	52	660	93
26.....	59	630	100	233	8,820	s 7,040	49	570	75
27.....	53	600	86	293	8,300	s 7,680	56	1,130	s 198
28.....	51	520	72	132	4,200	1,500	58	1,370	215
29.....	49	430	57	86	1,880	437	51	680	94
30.....	49	400	53	65	900	158	48	620	80
31.....	--	--	--	55	630	94	--	--	--
Total.	1,689	--	2,861	2,321	--	22,899	2,295	--	33,709
Day	Mean dis-charge (cfs)	July		Mean dis-charge (cfs)	August		Mean dis-charge (cfs)	September	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	43	510	59	18	211	10	16	72	3
2.....	39	400	42	15	185	7	16	68	3
3.....	35	370	35	15	161	7	17	80	b 4
4.....	34	340	31	14	127	5	18	137	7
5.....	32	268	23	14	119	4	16	96	4
6.....	31	228	19	16	124	5	15	68	3
7.....	29	218	17	17	129	6	16	64	3
8.....	29	250	20	18	127	6	16	64	3
9.....	28	198	15	44	1,820	s 807	16	87	4
10.....	27	168	12	60	4,450	s 1,090	16	80	3
11.....	25	187	13	30	714	58	18	72	4
12.....	25	193	13	26	370	26	18	74	4
13.....	25	227	15	21	420	b 24	18	97	5
14.....	27	249	18	22	261	16	20	103	6
15.....	27	257	19	20	162	9	20	101	5
16.....	27	252	18	20	157	8	19	107	5
17.....	27	228	17	18	129	6	19	114	6
18.....	27	195	14	18	119	6	22	137	8
19.....	25	211	14	17	106	5	23	150	9
20.....	26	203	14	18	116	6	26	340	b 24
21.....	24	196	13	18	126	6	24	300	b 20
22.....	24	192	12	21	137	8	27	500	b 36
23.....	27	338	25	18	101	5	27	296	22
24.....	23	400	25	18	78	4	39	467	49
25.....	20	264	14	16	76	3	48	365	47
26.....	20	220	12	16	76	3	49	416	55
27.....	19	201	10	16	82	4	51	519	71
28.....	18	194	9	17	83	4	44	395	47
29.....	20	220	12	17	82	4	39	314	33
30.....	18	225	11	17	93	4	38	283	29
31.....	17	186	9	17	77	4	--	--	--
Total.	818	--	580	632	--	2,160	751	--	522
Total discharge for year (cfs-days).....									18,951
Total load for year (tons).....									78,980

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, March to August 1955
 (Methods of analysis: B, bottom withdrawal 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. 1, 1955.....	2:42 p.m.	a 120	34	1,800	2,670	17	23	28	36	51	92	--	--	--	SBWCM
Mar. 3.....	2:31 p.m.	98	--	2,640	4,900	18	21	25	31	46	82	--	--	--	SBWCM
May 26.....	11:10 p.m.	510	--	19,300	8,120	29	38	49	61	73	90	97	99	100	SPWCM
May 26.....	11:10 p.m.	510	--	19,300	8,410	2	3	13	58	70	90	97	99	100	SPNM
May 27.....	3:32 p.m.	178	60	6,150	3,110	--	40	--	58	--	95	100	--	--	SPWCM
June 18.....	3:08 p.m.	163	72	9,060	3,540	--	41	--	62	--	96	100	--	--	SPWCM
June 23.....	5:58 p.m.	67	75	2,750	5,020	--	59	--	86	--	99	100	--	--	SPWCM
Aug. 9.....	10:48 p.m.	249	71	13,800	5,280	--	29	--	48	--	95	99	100	--	SPWCM
Aug. 9.....	11:36 p.m.	266	71	13,600	4,330	23	34	46	59	78	98	--	100	--	SPWCM
Aug. 9.....	11:36 p.m.	266	71	13,600	4,280	8	17	37	56	79	98	--	100	--	SPNM
Aug. 17.....	12:40 p.m.	18	81	110	1,240	49	59	68	75	85	96	100	--	--	SBWCM
Aug. 17.....	5:15 p.m.	17	86	92	405	46	56	67	75	84	97	100	--	--	SBWCM
Aug. 17.....	5:40 p.m.	17	84	90	702	41	53	66	72	78	97	100	--	--	SBWCM
Aug. 18.....	9:10 a.m.	20	72	127	1,390	44	56	67	75	84	95	100	--	--	SBWCM
Aug. 18.....	2:25 p.m.	19	89	123	1,450	43	58	72	81	88	98	100	--	--	SPWCM
a Daily mean discharge.															

a Daily mean discharge.

Particle-size analyses of bed material, August 1955
 (Methods of analysis: 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	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
Aug. 17, 1955.....	6	18			7	13	33	67	93	94	97	98	100	SV
Aug. 18.....	6	19			8	18	36	70	89	94	97	98	100	SV

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, 2½ 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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 25,000 ppm June 17; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 16,000 tons June 17; minimum daily, 0 tons on many days.

EXTREMES, 1951-55.--Sediment concentrations: Maximum daily, 25,000 ppm June 17, 1955; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 20,000 tons May 16, 1954; minimum daily, 0 tons on many days each year.

REMARKS.--Maximum observed sediment concentration during water year, 116,000 ppm June 22.

No flow during period October to December; record is omitted. Flow affected by ice Feb. 15-23, Feb. 28 to Mar. 3. Records of discharge for water year October 1954 September 1955 given in WSP 1390.

Suspended sediment, January to September 1955

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	1.5	--	e 2
2.....				0		0	7.5	1,100	a 22
3.....				0		0	4.0	1,000	11
4.....				0		0	.2	--	e .3
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.....				2.0		e 5	0	--	0
16.....				2.7		e 5	0	--	0
17.....				2.3		e 5	0	--	0
18.....				.6		e 1	0	--	0
19.....				.3		e .2	0	--	0
20.....				.2		e .1	0	--	0
21.....				.1		e .1	0	--	0
22.....				.1		e .1	0	--	0
23.....				.1		e .1	0	--	0
24.....				0		0	0	--	0
25.....				0		0	0	--	0
26.....				0		0	0	--	0
27.....				0		0	0	--	0
28.....				.1	240	a .1	0	--	0
29.....				--		--	0	--	0
30.....				--		--	0	--	0
31.....				--		--	0	--	0
Total.	0		0	8.5		16.7	13.2	--	35.3

e Estimated.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Suspended sediment, January to September 1955--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	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	64	--	e 12,000
17.....				0	--	0	167	25,000	sa 16,000
18.....				0	--	0	1.2	3,720	s 14
19.....				0	--	0	0	--	0
20.....				0	--	0	.8	1,900	sa 8
21.....				0	--	0	0	--	0
22.....				0	--	0	30	16,300	s 3,970
23.....				0	--	0	.8	8,100	17
24.....				0	--	0	0	--	0
25.....				0	--	0	0	--	0
26.....				58	9,880	s 10,300	0	--	0
27.....				91	14,200	s 6,570	0	--	0
28.....				1.0	--	e 4	0	--	0
29.....				0	--	0	0	--	0
30.....				0	--	0	0	--	0
31.....				0	--	0	--	--	--
Total.	0		0	150.0	--	16,874	263.8	--	32,009
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				0	--	0			
2.....				0	--	0			
3.....				0	--	0			
4.....				0	--	0			
5.....				0	--	0			
6.....				0	--	0			
7.....				0	--	0			
8.....				0	--	0			
9.....				0	--	0			
10.....				32	13,700	s 2,600			
11.....				.5	3,200	sa 4			
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	32.5	--	2,604	0		0

Total discharge for year (cfs-days)..... 468.0
 Total load for year (tons)..... 51,539.0

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued
MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR.--Continued

Particle-size analyses of suspended sediment, March to August 1955
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	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. 2, 1955.....	4:45 p.m.	8.7.5		1,120	1,080	61	70	83	95	99	100	--	--			SBWCM
May 26	10:27 p.m.	179		19,500	3,270	33	44	55	69	91	99	100	--	--		SPWCM
May 26	10:27 p.m.	179		19,500	3,170	10	23	43	64	90	99	100	--	--		SPNM
May 27	3:34 a.m.	127		27,000	5,510	27	35	46	60	81	99	--	100			SPWCM
May 27	3:34 a.m.	127		27,000	5,610	7	13	38	56	80	99	--	100			SPNM
May 27	12:35 p.m.	8.0	58	9,640	3,660	--	83	--	99	--	100	--	--			SPWCM
June 17	8:55 p.m.	9.7		5,400	3,580	--	77	--	96	--	100	--	--			SPWCM
June 22	11:30 a.m.	156		31,800	10,000	21	29	41	52	71	97	--	100			SPWCM
June 22	11:30 a.m.	156		31,800	10,200	2	3	16	52	72	97	--	100			SPNM
Aug. 10	3:21 a.m.	111		29,200	4,920	--	31	--	50	--	98	100	--			SPWCM
Aug. 10	4:25 a.m.	212		45,300	4,100	--	30	--	52	--	97	--	100			SPWCM
Daily mean discharge.																

Daily mean discharge.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION.--At gaging station, 100 feet upstream from highway bridge, three-quarters of a mile north of Cambridge, Furnas County, 2½ miles upstream from mouth, and 7½ miles downstream from Harry Strunk Lake.

DRAINAGE AREA.--1,070 square miles, approximately, of which about 680 square miles contribute directly to surface runoff.

RECORDS AVAILABLE.--Water temperatures: March 1951 to September 1955.

Sediment records: November 1945 to December 1949, March 1951 to September 1955.

EXTREMES, 1954-55.--Water temperatures: Maximum, 85°F July 5, 30, 31, Aug. 26; minimum, freezing point on several days during December to February.

Sediment concentrations: Maximum daily, 3,800 ppm June 17; minimum daily, not determined. Sediment loads: Maximum daily, 2,600 tons June 17; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1945-49, 1951-55.--Water temperatures (1951-55): Maximum, 94°F June 20, 1952; minimum, freezing point on many days during winter months.

Sediment concentrations (1951-55): Maximum daily, 9,800 ppm Sept. 2, 1951; minimum daily, not determined.

Sediment loads: Maximum daily, 3,700,000 tons (estimated) June 22, 1947; minimum daily, less than 0.50 ton on many days.

REMARKS.--Since August 1949, flow partially regulated by Medicine Creek Dam. Flow affected by ice Nov. 2, 3, Nov. 29 to Dec. 4, Dec. 8 to Mar. 9, Mar. 21, 22, 25-28. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Temperature (°F) of water, water year October 1954 to September 1955

Once-daily measurement between 12 m. and 8 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	a55	--	33	--	--	--	63	74	--	83	--	78
2	a60	--	--	34	32	33	64	73	--	84	80	75
3	a64	a34	36	--	--	34	54	73	77	82	81	79
4	--	--	--	32	--	--	56	76	--	83	80	81
5	55	49	--	--	--	--	61	71	75	85	82	76
6	51	--	39	--	--	--	57	74	74	84	82	74
7	56	--	34	--	--	33	a47	71	81	84	83	a61
8	--	51	--	--	--	--	64	58	62	84	80	77
9	a58	--	--	--	--	43	--	69	64	84	79	a65
10	a61	a48	34	--	--	--	59	73	64	a74	83	70
11	a61	--	--	33	--	--	64	71	64	80	78	64
12	64	52	--	--	--	--	50	78	71	76	78	76
13	a57	--	--	32	--	--	67	74	70	75	83	80
14	--	--	--	--	--	53	67	71	71	82	82	79
15	55	49	33	--	35	49	77	69	66	81	79	76
16	65	--	34	33	32	46	72	69	81	83	82	80
17	64	45	--	--	--	40	a59	64	66	--	81	76
18	a47	--	--	32	--	50	73	63	72	79	84	77
19	--	48	--	--	--	48	a59	77	73	78	79	77
20	a47	--	--	--	--	a35	a52	76	76	77	81	76
21	a51	--	38	--	--	38	a54	80	74	82	80	77
22	--	--	a32	--	--	46	a58	79	72	81	81	--
23	60	45	--	--	--	a33	--	75	69	82	83	--
24	--	--	--	--	--	41	68	74	68	83	82	--
25	55	--	--	33	33	--	--	73	71	84	83	53
26	47	--	37	a32	--	--	72	69	69	84	85	56
27	a40	43	--	--	--	42	72	67	68	84	84	--
28	--	--	34	--	34	53	74	66	72	82	--	71
29	--	--	--	--	--	61	70	75	77	80	a77	--
30	--	36	--	--	--	62	73	77	77	85	78	--
31	43	--	--	33	--	--	--	81	--	85	80	--
Average	--	--	--	--	--	--	63	72	71	82	81	73

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

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955

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.....	16	50	2.2	5.4	--	--	6.3	20	--
2.....	14	50	1.9	5.0	--	--	6.0	--	--
3.....	14	58	2.2	6.0	24	--	6.0	78	--
4.....	14	50	a 1.9	5.4	--	--	6.5	--	--
5.....	12	38	1.2	3.8	18	--	6.4	--	--
6.....	6.4	22	.4	5.9	--	--	5.9	13	--
7.....	9.0	22	.5	5.9	--	--	6.4	9	--
8.....	6.4	26	a .4	5.9	15	--	6.0	--	--
9.....	5.9	30	.5	5.9	--	--	5.5	--	--
10.....	7.4	240	sa 5	5.9	14	--	5.0	21	--
11.....	7.2	123	2.4	5.9	--	--	5.0	--	--
12.....	6.4	21	--	5.9	17	--	5.0	--	--
13.....	5.9	49	--	5.9	--	--	5.5	--	--
14.....	5.9	--	--	5.4	--	--	6.5	--	--
15.....	5.9	24	--	5.4	14	--	7.0	18	--
16.....	5.9	18	--	5.9	--	b 0.3	7.0	22	b 0.5
17.....	5.9	23	--	5.4	16	--	7.0	--	--
18.....	5.9	32	--	5.4	--	--	7.0	--	--
19.....	5.9	--	--	5.4	15	--	6.5	--	--
20.....	5.9	30	--	5.9	--	--	6.0	--	--
21.....	5.9	30	b .4	5.9	--	--	5.5	80	--
22.....	5.4	--	--	5.9	--	--	5.2	14	--
23.....	5.4	30	--	6.4	23	--	5.5	--	--
24.....	5.4	--	--	5.9	--	--	5.5	--	--
25.....	6.4	22	--	5.9	--	--	6.0	--	--
26.....	5.9	26	--	6.4	--	--	6.0	35	--
27.....	5.4	30	--	7.7	15	--	6.5	--	--
28.....	1.8	--	--	5.9	--	--	6.2	32	--
29.....	2.5	40	--	5.5	--	--	5.0	--	--
30.....	4.7	--	--	5.5	50	--	5.0	--	--
31.....	5.0	41	--	--	--	--	5.5	--	--
Total.	219.7	--	26.6	172.6	--	9.0	184.4	--	15.5
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.....	6.0	--	--	5.0	--	--	6.5	--	--
2.....	5.5	9	--	4.9	6	--	7.0	16	--
3.....	5.5	--	--	5.0	--	--	7.5	17	--
4.....	5.3	14	--	5.0	--	--	7.0	--	--
5.....	5.5	--	--	5.0	--	--	5.0	--	--
6.....	5.5	--	--	5.0	--	--	5.0	--	--
7.....	5.0	--	--	5.0	--	--	6.0	12	--
8.....	4.0	--	--	5.0	--	--	12	--	--
9.....	3.5	--	--	4.9	5	--	10	138	--
10.....	3.0	--	--	4.0	--	--	9.0	--	--
11.....	3.0	18	--	3.5	12	--	8.2	--	--
12.....	3.0	--	--	4.0	--	--	8.2	--	--
13.....	3.3	11	--	4.0	--	--	7.2	--	--
14.....	3.5	--	--	5.0	--	--	7.7	23	--
15.....	4.0	--	--	6.0	9	e 0.1	17	203	s 22
16.....	4.0	8	e 0.1	6.9	19	--	61	768	s 137
17.....	4.0	--	--	7.0	--	--	84	675	153
18.....	4.0	5	--	6.5	--	--	85	527	121
19.....	4.0	--	--	5.0	--	--	83	446	100
20.....	4.0	--	--	5.0	--	--	79	355	76
21.....	4.0	--	--	5.5	--	--	70	424	80
22.....	4.0	--	--	5.5	--	--	68	395	73
23.....	4.0	--	--	5.5	--	--	68	286	53
24.....	4.0	--	--	5.0	--	--	57	215	s 35
25.....	4.0	8	--	5.4	9	--	15	77	3.1
26.....	3.4	7	--	5.5	--	--	7.0	68	1.3
27.....	4.0	--	--	6.0	--	--	7.0	87	1.6
28.....	4.0	--	--	6.5	12	--	8.0	73	1.6
29.....	4.5	--	--	--	--	--	9.0	72	1.7
30.....	4.5	--	--	--	--	--	7.2	42	.8
31.....	5.0	6	--	--	--	--	7.7	38	.8
Total.	131.0	--	3.1	146.6	--	2.8	839.2	--	873.1

e Estimated.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

b Computed from samples obtained about three times a week.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Suspended sediment, water year October 1954 to September 1955--Continued

Suspended sediment, water year October 1994 to September 1995--Continued									
Day	Mean discharge (cfs)	April		Mean discharge (cfs)	May		Mean discharge (cfs)	June	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	7.2			4.1	43	0.5	29	99	7.8
2.....	7.2			4.1	25	.3	29	97	7.6
3.....	7.2			4.7	45	.6	29	112	8.8
4.....	7.2			5.9	70	1.1	31	128	11
5.....	7.2			45	420	sa 55	30	193	11
6.....	7.2			56	298	45	29	151	12
7.....	7.2			56	262	40	28	150	11
8.....	7.2			57	235	36	30	120	9.7
9.....	7.2			56	239	36	30	170	8.1
10.....	7.2			36	128	12	31	178	9.0
11.....	7.2			35	146	14	30	118	9.6
12.....	10			39	260	sa 30	29	110	8.6
13.....	7.7			73	469	s 108	28	170	7.6
14.....	6.8			106	584	167	28	177	8.1
15.....	5.9			106	426	122	30	99	8.0
16.....	5.4	31	0.5	101	405	110	28	178	8.2
17.....	5.4			94	272	69	255	3,870	a 2,600
18.....	5.4			66	246	44	241	1,470	969
19.....	5.4			35	139	13	227	1,170	723
20.....	5.4			32	128	11	206	940	523
21.....	5.4			31	113	9.5	234	1,070	s 715
22.....	5.9			30	113	9.2	445	1,370	1,660
23.....	6.8			30	110	8.9	544	1,220	1,790
24.....	6.4			29	105	8.2	542	1,270	1,860
25.....	3.5			30	121	9.8	510	1,370	1,790
26.....	3.8			31	135	11	478	1,370	1,700
27.....	3.8			31	73	6.1	454	1,270	1,470
28.....	3.8			30	110	8.9	400	1,270	1,340
29.....	3.8			30	105	8.5	261	1,370	944
30.....	4.1			29	101	7.9	136	552	s 213
31.....	--	--	--	29	100	7.8	--	--	--
Total.	183.9		15.0	1,341.8	--	1,010.3	5,402	--	18,443.1
July				August			September		
1.....	52	234	33	275	1,090	809	166	445	199
2.....	48	213	28	330	1,120	998	142	377	147
3.....	45	197	24	289	920	718	140	371	148
4.....	45	188	23	302	1,100	897	138	370	134
5.....	48	199	26	286	1,030	795	116	274	92
6.....	65	260	46	282	1,000	761	111	279	81
7.....	63	267	45	274	860	636	93	223	56
8.....	95	520	133	272	870	639	78	179	40
9.....	95	442	113	245	750	a 500	77	179	39
10.....	97	338	89	88	312	s 82	76	179	38
11.....	148	776	310	36	122	a 21	76	179	34
12.....	154	665	276	154	360	a 150	74	175	31
13.....	258	1,490	1,040	153	466	192	50	119	16
14.....	211	1,100	627	138	500	186	46	111	14
15.....	187	750	338	186	595	299	57	170	a 26
16.....	131	580	205	136	550	202	69	179	29
17.....	142	620	238	141	496	189	60	127	21
18.....	200	840	454	162	533	233	62	135	23
19.....	211	880	501	156	453	191	50	176	14
20.....	269	1,030	748	208	647	363	30	63	5.1
21.....	275	1,010	750	211	634	361	24	51	3.3
22.....	268	990	716	210	608	345	10	27	.7
23.....	246	990	658	205	564	312	22	85	a 5
24.....	231	900	561	200	522	282	27	77	5.6
25.....	261	890	627	202	541	295	28	63	4.8
26.....	275	870	646	223	574	346	24	40	2.6
27.....	293	930	736	223	526	317	11	14	.4
28.....	304	940	771	220	547	325	8.6	14	.3
29.....	306	870	554	218	607	357	8.2	10	.2
30.....	295	858	683	218	683	390	8.6	10	.2
31.....	313	1,180	927	192	511	265	--	--	--
Total.	5,611	--	12,996	6,435	--	12,456	1,882.4	--	1,210.2
Total discharge for year (cfs-days).....									22,549.8
Total load for year (tons).....									47,080.7

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

KANSAS RIVER BASIN--Continued

MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of suspended sediment, March to June 1955

(Methods of analysis: 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 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
Mar. 15, 1955.....	7:25 p.m.	42	--	696	1,260	21	24	29	38	54	81	98	100	--	--	VBWCM
Mar. 16.....	3:58 p.m.	78	--	1,020	1,830	15	19	24	31	49	86	98	100	--	--	VBWCM
Mar. 17.....	9:40 a.m.	85	37	575	3,160	13	16	19	25	40	84	95	100	--	--	VBWCM
Mar. 17.....	10:30 a.m.	84	37	801	2,980	13	16	20	25	41	85	96	100	--	--	VBWCM
Mar. 17.....	2:50 p.m.	85	45	641	3,250	10	12	17	22	38	85	95	100	--	--	VBWCM
May 13.....	5:50 p.m.	100	--	707	2,850	14	18	22	30	51	87	--	--	--	--	SBWCM
May 13.....	10:10 p.m.	105	--	768	1,520	13	16	20	26	45	80	--	--	--	--	SBWCM
May 14.....	10:50 a.m.	105	61	564	1,880	10	14	17	22	37	81	95	99	100	--	VBWCM
June 17.....	10:45 a.m.	310	83	4,210	2,830	35	43	49	54	62	88	97	99	100	--	SPWCM
June 18.....	3:55 p.m.	234	72	1,150	4,780	12	15	19	23	37	83	97	100	--	--	VBWCM
June 18.....	4:30 p.m.	234	72	1,190	4,030	8	10	13	20	33	80	95	97	100	--	VBWCM
June 18.....	5:05 p.m.	234	72	1,240	4,580	11	15	18	22	34	81	97	100	--	--	VPWCM
June 19.....	10:30 a.m.	232	87	1,120	4,220	11	14	16	20	32	80	97	100	--	100	VPWCM
June 20.....	3:25 p.m.	264	66	1,350	5,700	10	12	15	18	30	75	90	94	99	94	VPWCM
June 21.....	5:50 p.m.	292	66	1,370	6,050	10	12	15	18	28	79	94	98	100	100	VPWCM
June 22.....	10:00 a.m.	392	66	1,180	2,030	11	14	17	21	33	71	93	98	100	100	VBWCM
June 22.....	11:10 a.m.	403	67	1,180	1,750	11	15	18	21	35	72	94	99	100	100	VBWCM
June 22.....	3:35 p.m.	489	73	1,520	4,270	13	16	20	24	40	79	96	99	100	100	VPWCM
June 23.....	11:00 a.m.	523	67	1,020	4,710	13	17	20	25	40	79	94	99	100	100	VPWCM
June 23.....	2:55 p.m.	565	68	1,240	5,110	13	16	20	25	40	80	94	99	100	100	VPWCM
June 30.....	12:25 p.m.	141	71	508	1,840	16	19	23	28	47	83	97	99	100	100	SBWCM

KANSAS RIVER BASIN--Continued
MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Particle-size analyses of bed material. May to June 1955
(Methods of analysis: 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	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
May 13, 1955.....	10	105			4	12	25	59	84	92	98	100	--	SV	
May 14.....	8	105			1	6	24	65	83	95	99	100	--	SV	
June 18.....	4	234			1	5	25	74	89	95	98	99	100	SV	
June 23.....	4	559			2	5	14	60	88	94	98	99	100	SV	

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN KANSAS RIVER BASIN IN NEERASKA

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955

Periodic determinations of suspended-sediment discharge, water year October 1954 to September 1955			
Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
LITTLE BLUE RIVER NEAR DEWESE			
Aug. 17, 1955.....	32	89	7.7
Aug. 30	27	88	6.4
Sept. 19	43	270	31
LITTLE BLUE RIVER NEAR ENDICOTT			
July 20, 1955	109	218	64
Aug. 9.....	199	4,280	2,300
Aug. 30	38	56	5.7
Sept. 19	78	156	33

KANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN KANSAS RIVER BASIN IN NEBRASKA--Continued

Particle-size analyses of suspended sediment, water year October 1954 to September 1955

(Methods of analysis: 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
LITTLE BLUE RIVER NEAR ENDICOTT																
July 20, 1955,	11:40 a. m.	109	83	218	7,810	87	83	94	96	97	97	98	99		100	V
Aug. 9,	11:40 a. m.	199	76	4,280							98	99	99		100	VPWCM

Particle-size analyses of bed material, water year October 1954 to September 1955

(Methods of analysis: 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	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											
						0.031	0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.000	32.000	
LITTLE BLUE RIVER NEAR DEWESE																	
Aug. 17, 1955.....	5	32					0	6	31	49	61	78	94	99	100	SV	
Aug. 30	5	27					0	3	24	46	61	78	95	100	SV		
Sept. 19	5	43					0	3	22	40	53	72	93	100	SV		
LITTLE BLUE RIVER NEAR ENDICOTT																	
July 20, 1955	3	109					0	3	20	45	73	84	97	100	SV		
Aug. 9	3	199					0	3	8	41	74	88	96	100	SV		
Aug. 30	6	38					0	5	36	69	84	96	100	SV			
Sept. 19	5	78					0	5	35	75	88	97	100	SV			

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 1955.

EXTREMES, 1954-55.--Sediment concentrations: Maximum daily, 2,320 ppm July 9; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 202 tons July 9; minimum daily, 0 tons on many days.

EXTREMES, 1952-55.--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 tons on many days each year.

REMARKS.--Backwater from Chariton River Oct. 5, 6, Apr. 13, 14. Flow affected by ice Feb. 20 to Mar. 8, Mar. 23-27. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Suspended sediment, water year October 1954 to September 1955

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0						
2.....	0	--	0						
3.....	0	--	0						
4.....	0	--	0						
5.....	31	548	sa 89						
6.....	1.5	101	.4						
7.....	.9	100	b .2						
8.....	.2	100	b .1						
9.....	0	--	0						
10.....	8.8	267	sa 14						
11.....	7.2	212	sb 6.2						
12.....	1.5	80	.3						
13.....	.6	81	b .1						
14.....	1.5	196	.8						
15.....	.5	100	b .1						
16.....	.2	90	(t)						
17.....	.1	85	(t)						
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.	54.0	--	111.3	0		0	0		0

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 1954 to September 1955--Continued

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.....	0	--	0	0	--	0	6.0	122	2.0
2.....	0	--	0	0	--	0	4.5	--	e 1.2
3.....	0	--	0	0	--	0	3.6	--	--
4.....	0	--	0	0	--	0	3.0	--	e .5
5.....	1.2	286	sa 1.8	0	--	0	1.8	--	--
6.....	2.8	340	2.6	0	--	0	1.1	--	--
7.....	1.0	110	b .3	0	--	0	1.0	--	e .1
8.....	.4	--	.1	0	--	0	1.5	--	--
9.....	.2	--	--	0	--	0	2.5	--	e .5
10.....	.2	--	(t)	0	--	0	2.1	--	e .3
11.....	.1	--	--	0	--	0	1.9	45	.2
12.....	.1	--	--	0	--	0	1.3	--	--
13.....	0	--	0	0	--	0	1.0	--	e .1
14.....	0	--	0	0	--	0	1.9	--	--
15.....	0	--	0	0	--	0	3.3	--	e .8
16.....	0	--	0	0	--	0	1.9	--	e .3
17.....	0	--	0	0	--	0	1.2	--	--
18.....	0	--	0	.8	74	sb .6	1.2	--	e .2
19.....	0	--	0	64	225	sa 63	1.1	--	--
20.....	0	--	0	17	150	b 6.9	1.3	105	b .4
21.....	0	--	0	12	--	e 4.5	3.5	280	b 2.6
22.....	0	--	0	8.4	--	--	2.8	225	1.7
23.....	0	--	0	6.0	--	e 1.6	2.1	--	e .8
24.....	0	--	0	8.0	--	--	1.6	--	--
25.....	0	--	0	12	--	e 5.0	1.2	--	--
26.....	0	--	0	30	--	e 16	1.0	--	e .4
27.....	0	--	0	20	--	e 10	1.2	--	--
28.....	0	--	0	9.6	--	e 3.1	1.9	--	--
29.....	0	--	0	--	--	--	2.6	--	--
30.....	0	--	0	--	--	--	2.3	--	e 1.0
31.....	0	--	0	--	--	--	1.5	--	--
Total.	6.0	--	4.9	187.8	--	113.9	64.9	--	18.5
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.....	1.3	--	--	0.4	--	--	0.1	62	(t)
2.....	1.1	--	e 0.1	.4	--	(t)	1.1	351	sb 8.1
3.....	1.0	--	--	.2	61	--	1.5	914	sa 5.7
4.....	.9	21	--	1.2	--	e 0.4	.2	290	b .2
5.....	.8	--	--	.5	--	e .1	.2	110	b .1
6.....	.7	--	--	.3	--	--	.1	--	--
7.....	.5	--	(t)	.3	26	(t)	.1	--	--
8.....	.5	--	--	.2	--	--	.2	--	--
9.....	.5	--	--	.4	35	--	.1	--	--
10.....	.5	--	--	3.2	195	b 1.7	.1	--	(t)
11.....	1.2	--	e .1	1.4	130	.5	.1	--	--
12.....	1.7	20	.1	2.6	170	sa 1.6	.1	--	--
13.....	16	987	sa 89	23	380	sa 30	0	--	0
14.....	5.4	183	2.4	3.9	110	b 1.2	0	--	0
15.....	3.3	120	1.1	2.3	--	e .6	0	--	0
16.....	2.6	--	e .7	1.3	--	e .3	0	--	0
17.....	1.6	--	--	.9	--	--	0	--	0
18.....	1.5	--	e .4	.6	--	e .1	0	--	0
19.....	1.3	--	--	.4	--	--	0	--	0
20.....	1.0	--	--	.4	--	--	0	--	0
21.....	.6	--	e .2	.2	--	--	0	--	0
22.....	.5	--	--	.2	--	--	0	--	0
23.....	1.3	--	e .9	.2	--	(t)	0	--	0
24.....	3.2	--	e 1.8	.2	--	--	0	--	0
25.....	2.3	--	e .7	.2	--	--	.1	--	(t)
26.....	1.3	--	e .3	.3	60	--	0	--	0
27.....	.9	--	--	.3	85	b .1	0	--	0
28.....	.6	--	--	4.5	1,250	sb 36	0	--	0
29.....	.4	--	e .1	1.0	145	b .4	1.0	800	sb 5.2
30.....	.4	--	--	.4	90	b .1	.7	250	b .5
31.....	--	--	--	.2	70	(t)	--	--	--
Total.	54.9	--	99.9	51.6	--	73.7	5.7	--	19.9

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.

MISSOURI RIVER BASIN BELOW SIOUX CITY, IOWA

CHARITON RIVER BASIN--Continued

HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, water year October 1954 to September 1955--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.....	0.1	--	(t)						
2.....	0	--	0						
3.....	0	--	0						
4.....	0	--	0						
5.....	.1	--	(t)						
6.....	0	--	0						
7.....	0	--	0						
8.....	0	--	0						
9.....	23	2,320	sa 202						
10.....	2.8	150	b 1.1						
11.....	.5	120	b .2						
12.....	.3	110	b .1						
13.....	5.6	550	b 8.3						
14.....	2.1	320	b 1.8						
15.....	2.2	400	b 2.4						
16.....	1.1	110	.3						
17.....	.2	--	(t)						
18.....	.1	--	(t)						
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.	38.1	--	216.3	0		0	0		0

Total discharge for year (cfs-days)..... 463.0

Total load for year (tons)..... 658.4

s Computed by subdividing day.

t Less than 0.050 ton.

a Computed from partly estimated concentration graph.

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