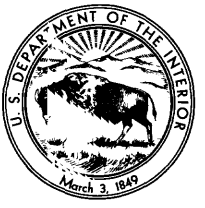
Quality of Surface Waters of the United States 1962

Parts 5 and 6. Hudson Bay and Upper Mississippi River Basins, and Missouri River Basin

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

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1943

Prepared in cooperation with the States of Iowa, Kansas, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming, and with other agencies



UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1964

UNITED STATES DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, *Secretary*

GEOLOGICAL SURVEY

Thomas B. Nolan, *Director*

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 Price $1.50 (paper cover)

PREFACE

This report was prepared by the Geological Survey in cooperation with the States of Iowa, Kansas, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming, and with other agencies by personnel of the Water Resources Division under the direction of L. B. Leopold, chief hydrologist, and S. K. Love, chief, Quality of Water Branch. The data were collected under the supervision of the following:

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[*Symbols after station name designate type of data: c, chemical; t, water temperature; s, sediment.*]

ILLUSTRATION

QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1962

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 State and 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 all uses. 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 content in streams may vary over wide ranges.

In 1941, the Geological Survey began publishing annual records of chemical quality, suspended sediment, and water temperature. The records prior to 1948 were published each year in a single volume for the entire country, and in two volumes ir 1948 and 1949. Beginning in 1950, the records were published in four volumes and beginning in 1959 in five volumes. The drainage basins covered in the five volumes are shown in Figure 1. The data given in this volume were collected during the water year October 1, 1961, to September 30, 1962. The records are arranged by drainage basins in downstream order according to the Geological Survey method of reporting streamflow. Stations on tributary streams are listed between stations on the main stem in the order in which those tributaries enter the main stem.

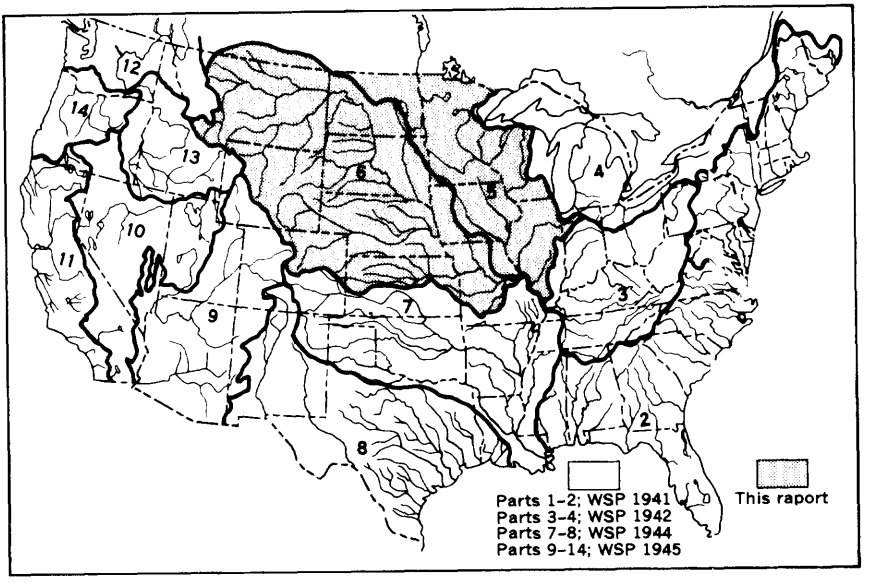

Figure 1. --Map of the conterminous United States showing basins covered by the five water-supply papers on quality of surface waters in 1962. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

A station number has been assigned as an added means of identification for each stream location where regular measurements of water quantity or quality have been made. The numbers have been assigned to conform with the standard downstream order of listing gaging stations. The numbering system consists of two digits followed by a hyphen and a six digit number. The notation to the left of the hyphen identifies the Part or hydrologic region used by the Geological Survey for reporting hydrologic data. The number to the right of the hyphen represents the position of the location in the standard downstream order listing measuring stations within each of the 14 parts. The assigned numbers are in numerical order but are not consecutive. They are so selected from the complete 6 digit number scale that intervening numbers will be available for future assignments to new locations. The identification number for each station in this report is printed to the left of the station name and contains only the essential digits. For example, the number is printed as 4-100 for a station whose complete identification number is 04-0100.00.

Descriptive statements are given for each sampling station where chemical analyses, temperature measurements, or sediment determinations have been made. These statements include the location of the station, drainage area, periods of records available, extremes of dissolved solids, hardness, specific conductance, temperature, sediment loads, and other pertinent data. Records of discharge of the streams at or near the sampling station are included in most tables of analyses.

During the water year ending September 30, 1962, the Geological Survey maintained 130 stations on 89 streams for the study of chemical and physical characteristics of surface water. Samples were collected daily and monthly at 89 of these locations for chemical-quality studies. Samples were also collected less frequently at many other points. Water temperatures were measured daily at 65 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, analyses made of the daily samples before compositing have not been reported. The specific conductance of almost all daily samples was determined, and as noted in the table headings this information is available for reference at the district offices listed under Division of Work, on page 30.

Quantities of suspended sediment are reported for 60 stations during the year ending September 30, 1962. 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. Particle-size distributions of sediments were determined at 30 of the stations.

COLLECTION AND EXAMINATION OF SAMPLES

Samples for analyses are usually collected at or near points on streams where gaging stations are maintained by Surface Water Branch of U. S. Geological Survey for measurement of water discharge. The concentration of solutes and sediments at different locations in the stream-cross section may vary widely with different rates of water discharge depending on the source of the material and the turbulence and mixing of the stream. In general, the distribution of sediment in a stream section is much more variable than the distribution of solutes. It is necessary to sample some streams at several verticals across the channel and especially for sediment, to uniformly traverse the depth of flow. These measurements require special sampling equipment to adequately integrate the vertical and lateral variability of the concentration in the section. These procedures yield a velocity-weighted mean con-

centration for the section in contrast to the average concentration that existed without regard to the variable velocities of the individual fluid elements.

The near uniformly dispersed ions of the solute load move in suspension with the velocity of the transporting water elements. Accordingly, the mean section concentration of solutes determined from samples is a precise measure of the total solute load. The mean section concentration obtained from suspended sediment samples is a less precise measure of the total sediment load, because sediment samplers did not traverse the bottom 0.3 foot of the sampling vertical where the concentration of suspended sediment is greatest and because a significant part of the coarser particles in many streams move in essentially continuous contact with the bed and are not represented in the suspended sediment sample. Hence, the computed sediment loads presented in this report are usually less than the total sediment loads. For most streams the difference between the computed and total sediment loads will be small, in the order of a few percent.

CHEMICAL QUALITY

The methods of collecting and compositing water samples for chemical analysis are described in a manual by Rainwater and Thatcher (1960, 301 p.). No single method of compositing samples is applicable to all problems related to the study of water quality. Although generally holding to the principle of 10 day periods or equivalent to three composite samples per month modifications are usually made on the basis of dissolved-solids content as indicated by measurements of conductivity of daily samples, supplemented by other information such as chloride content, river stage, weather conditions and other background information of the stream.

TEMPERATURE

Daily water temperatures were measured at most of the stations at the time samples were collected for chemical quality or sediment content. So far as practicable, the water temperatures were taken at about the same time each day for an individual station in order that the data would be relatively unaffected by diurnal variations in temperature. Most large, swiftly flowing streams probably have a small diurnal variation in water temperature, whereas sluggish or shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. The thermometers used for determining water temperature were accurate to plus or minus 0.5°F.

At stations where thermographs are located, the records consist of maximum and minimum temperatures for each day, and the monthly averages of maximum daily and minimum daily temperatures.

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. Depth-integrated samples were collected periodically at three or more verticals in the cross section to determine the cross-sectional distribution of the concentration of suspended sediment with respect to that at the daily sampling vertical. In streams where transverse distribution of sediment concentration ranges widely, samples were taken at two or more verticals to define more accurately the average concentration of the cross section. During periods of high or rapidly changing flow, samples were taken two or more times throughout the day at most sampling stations.

Sediment concentrations were determined by filtration-evaporation method. At many stations the daily mean concentration for some days was obtained by plotting the velocity-weighted instantaneous concentrations on the gage-height chart. The plotted concentrations, adjusted, if necessary for cross-sectional distribution were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated velocity-weighted concentration at any time, and for most periods daily mean concentrations were determined from the graph. The days were divided into shorter intervals when the concentration and water discharge were changing rapidly. During some periods of minor variation in concentration, the average concentration of the samples was used as the daily mean concentration. During extended periods of relatively uniform concentration and flow, samples for a number of days were composited to obtain average concentrations and average daily loads for each period.

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 in order to provide a complete record. For some streams, samples were collected weekly, monthly, or less frequently, and only rates of sediment discharge at the time of sampling are shown.

In addition to the records of quantities of suspended sediment transported, records of the particle sizes of sedimert are included. The particle sizes of the suspended sediment for many of the stations, and the particle sizes of the bed material for some of the stations were determined periodically.

The size of particles in stream sediments commonly range from colloidal clay (finer than 0.001 mm) to coarse sand or gravel (coarser than 1.0 mm). The common methods of particle-size analyses cannot accommodate such a wide range in particle size. Hence, it was necessary to separate most samples into two parts, one coarser than 0.062 mm and one finer than 0.062 mm. The separations were made by sieve or by a tube containing a settling medium of water. The coarse fractions were classified by sieve separation or by the visual accumulation tube (U.S. Interagency, 1957). The fine fractions were classified by the pipet method (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U.S. Interagency, 1943, p. 82-90).

EXPRESSION OF RESULTS

Quantities of water for analysis are most conveniently obtained in the laboratory by use of volumetric glassware. The analytical results thus obtained in this report are expressed in weights of solute in a given volume of water. To express the results in parts of solute per million (ppm) of water the data must be converted. For most waters this conversion is made by assuming that the liter of water sample weighs 1 kilogram; and thus milligrams per liter are equal to parts per million.

Equivalents per million are not reported, although the expression of analyses in equivalents per million is sometimes preferred. An equivalent per million (epm) is a unit chemical combining weight of a constituent in a million unit weights of water. Chemical equivalence in equivalents per million can be obtained by (a) dividing the concentration in parts per million by the combining weight of that ion, or (b) multiplying the concentration (in ppm) by the reciprocal of the combining weights. The following table lists the reciprocals of the combining weights of cations and anions generally reported in water analyses.

The conversion factors are computed from atomic weights based on carbon-12 (International Union of Pure and Applied Chemistry, 1961).

Conversion factors: Parts per million to equivalents per million

Ion	Multiply by	Ion	Multiply by
Aluminum (Al^{+3}).....	0.11119	Hydroxide (OH^{-1})...	0.05880
Arsenic (As^{+2})	.02669	Iodide (I^{-1}).....	.01788
Barium (Ba^{+2}).....	.01456	Iron (Fe^{+3}).....	.05372
Beryllium (Be^{+2})	.22192	Lead (Pb^{+2}).....	.01965
Bicarbonate (HCO_3^{-1})..	.01639	Lithium (Li^{+1}).....	.14411
Bromide (Br^{-1}).....	.01251	Magnesium (Mg^{+2})..	.08226
Cadmium (Cd^{+2}).....	.01779	Manganese (Mn^{+2}) ..	.03640
Calcium (Ca^{+2}).....	.04990	Nickel (Ni^{+2}).....	.03406
Carbonate (CO_3^{-2})	.03333	Nitrate (NO_3^{-1}).....	.01613
Chloride (Cl^{-1}).....	.02821	Phosphate (PO_4^{-3})..	.03159
Chromium (Cr^{+6}).....	.11539	Potassium (K^{+1})....	.02557
Cobalt (Co^{+2}).....	.03394	Sodium (Na^{+1}).....	.04350
Copper (Cu^{+2}).....	.03148	Strontium (Sr^{+2})....	.02282
Fluoride (F^{-1}).....	.05264	Sulfate (SO_4^{-2})	.02082
Hydrogen (H^{+1}).....	.99209	Zinc (Zn^{+2})	.03060

Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12.

The hardness of water is conventionally expressed in all water analyses in terms of an equivalent quantity of calcium carbonate. Such a procedure is required because hardness is caused by several different cations, present in variable proportions. It should be remembered that hardness is an expression in conventional terms of a property of water. The actual presence of calcium carbonate in the concentration given is not to be assumed. The hardness caused by calcium and magnesium (and other cations if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness. Hardness or alkalinity values expressed in parts per million as calcium carbonate may be converted to equivalents per million by dividing by 50.

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 calculated from the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. The calculated sum of the constituents may be given instead of or in addition to the residue. 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.

Specific conductance is given for most analyses and was determined by means of a conductance bridge and using a standard potassium chloride solution as reference. Specific conductance values are expressed in micromhos per centimeter at 25°C. Specific conductance in micromhos is 1 million times the reciprocal of specific resistance at 25°C. Specific resistance is the resistance in ohms of a column of water 1 centimeter long and 1 square centimeter in cross section.

The discharge of the streams is reported in cubic feet per second (see Streamflow, p. 24) and the temperature in degrees Fahrenheit. Color is expressed in units of the platirum-cobalt scale proposed by Hazen (1892, p. 427-428). A unit of color is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. 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 that 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, time-weighted, or discharge-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. A discharge-weighted average approximates the composition of water that would be found in a reservoir cortaining 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 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.

A program for computing these averages on an electronic digital computer was instituted in the 1962 water year. This program extended computations to include averages for pH values expressed in terms of hydrogen ion and averages for the concentration of individual constituents expressed in tons per day. Concentrations in tons per day are computed the same as daily sediment loads.

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 of material finer than indicates sizes in millimeters. The size classification used in this report is that recommended by the American Geophysical Union subcommittee on Terminology (Land and others, 1947, p. 937). Other data included as pertinent to the size analyses for many streams are the date of collection, the stream discharge, sediment concentration when sample was collected, 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 mineral matter. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rocks or soils with which the water has been in contact and the length of time of contact. Some streams are fed by both surface runoff and ground water from spring 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. Ground water is generally more highly mineralized than surface runoff because it remains in contact with the rocks and soils for much longer periods. The dissolved-solids content in a river is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or--in irrigated regions--by drainage from irrigated lands.

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 calculated as sodium), alkalinity as carbonate and bicarbonate, sulfate, chloride, fluoride, nitrate, boron, pH, dissolved solids and specific conductance. Aluminum, manganese, color, acidity, oxygen consumed, and other dissolved constituents and physical properties are reported for certain streams. Phenolic material and minor elements including strontium, chromium, nickel, copper, lead, zinc, cobalt, arsenic, cadmium, and others are occasionally determined for a few streams in connection with specific

problems in local areas and the results are reported when appropriate. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs. The constituents are arranged in the order that they appear on standard analytical statement cards which are used to process the chemical quality data in this report.

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.

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.

Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. It resembles iron in its chemical

behavior and in its occurrence in natural waters. However, manganese in rocks is less abundant than iron. As a result the concentration of manganese is much less than that of iron and is not regularly determined in many areas. 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. 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.

Calcium (Ca)

Calcium is dissolved from almost 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.

Strontium (Sr)

Strontium is a typical alkaline-earth element and is similar chemically to calcium. Strontium may be present in natural water in amounts up to a few parts per million much more frequently than the available data indicate. In most surface water the amount of strontium is small in proportion to calcium. However, in sea water the ratio of strontium to calcium is 1:30.

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.

In this report, the potassium values not shown are usually calculated in with the sodium and reported as sodium unless otherwise noted.

Lithium (Li)

Data concerning the quantity of lithium in water are scarce. It is usually found in small amounts in thermal springs and saline waters. Lithium also occurs in streams where some industries dump their waste water. The scarcity of lithium in rocks is responsible more than other factors for relatively small amounts present in water.

Bicarbonate, carbonate and hydroxide (HCO_3, CO_3, OH)

Bicarbonate, carbonate, or hydroxide is sometimes reported as alkalinity. The alkalinity of a water is defined as its capacity to consume a strong acid to pH 4.5. Since the major causes of alkalinity in most natural waters are carbonate and bicarbonate ions dissolved from carbonate rocks, the results are usually reported in terms of these constituents. Although alkalinity may suggest the presence of definite amounts of carbonate, bicarbonate or hydroxide, it may not be true due to other ions that contribute to alkalinity such as silicates, phosphates, borates, possibly fluoride, and certain organic anions which may occur in colored waters. The significance of alkalinity to the domestic, agricultural, and industrial user is usually dependent upon the nature of the cations (Ca, Mg, Na, K) associated with it. However, moderate amounts of alkalinity does not adversely affect most users.

Hydroxide may occur in water that has been softened by the lime process. Its presence in streams usually can be taken as an indication of contamination and does not represent the natural chemical character of the 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. Investigations have proved that fluoride concentrations of about 0.6 to 1.7 ppm reduced the incidence of dental caries and that concentrations greater than 1.7 ppm also protect the teeth from cavities but cause an undesirable black stain (Durfor and Becker, 1964). Public Health Service, 1962 (p. 8), states, "When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper control limit (0.6 to 1.7 ppm). Presence of fluoride in average concentration greater than two times the optimum values shall constitute grounds for rejection of the supply." Concentration higher than the stated limits may cause mottled enamel in teeth, endemic cumulative fluorosis, and skeletal effects.

Nitrate (NO_3)

Nitrate in water is considered a final oxidation product of nitrogenous material and may indicate contamination by sewage or

other organic matter. The quantities of nitrate present in surface waters are generally 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 methemoglobinemai ("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 ppm (as NO_3) may cause methemoglobinemia (Waring, 1949). In a report published by the National Research Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding. U. S. Public Health Service (1962) sets 45 ppm as the upper limit.

Phosphate (PO_4)

Phosphorus is an essential element in the growth of plants and animals, and some sources that contribute nitrate, such as organic wastes and leaching of soils, may be important as sources for phosphate in water and its occurrence may add to the apparent alkalinity. The addition of phosphates in water treatment constitutes a possible source, although the dosage is usually small. In some areas, phosphate fertilizers may yield some phosphate to water. A more important source is the increasing use of phosphates in detergents. Domestic and industrial sewage effluents may therefore contain considerable amounts of phosphate.

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. Water 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, but generally water containing more than about 2,000 ppm is considered to be unsuitable for long-term irrigation under average conditions.

Chromium (Cr)

Few if any waters contain chromium from natural sources. Natural waters can probably contain only traces of chromium as a cation unless the pH is very low. When chromium is present in water, it is usually the result of pollution by industrial wastes. Fairly high concentrations of chromate anions are possible in waters having normal pH levels. Concentrations of more than 0.05 ppm of chromium in the hexavalent form constitute grounds for rejection of a water for domestic use on the basis of the standards of the U.S. Public Health Service (1962).

Nickel and cobalt (Ni, Co)

Nickel and cobalt are very similar in chemical behavior and also closely related to iron. Both are present in igneous rocks in small amounts and are more prevalent in silicic rocks. Any nickel in water is likely to be in small amounts and could be in a colloidal state. Cobalt may be taken into solution more readily than nickel. It may be taken into solution in small amounts through bacteriological activity similar to that causing solution of manganese. However, few data on the occurrence of either nickel or cobalt in natural water are available.

Copper (Cu)

Copper is a fairly common trace constituent of natural water. Small amounts may be introduced into water by solution of copper and brass water pipes and other copper-bearing equipment in contact with the water, or from copper salts added to control algae in open reservoirs. Copper salts such as the sulfate and chloride are highly soluble in waters with a low pH but in water of normal alkalinity these salts hydrolyze and the copper may be precipitated. In the normal pH range of natural water containing carbon dioxide, the copper might be precipitated as carbonate. The oxidized portions of sulfide-copper ore bodies contain other copper compounds. The presence of copper in mine water is common.

Copper imparts a disagreeable metallic taste to water. As little as 1.5 ppm can usually be detected, and 5 ppm can render the water unpalatable. Copper is not considered to be a cumulative systemic poison like lead and mercury; most copper ingested is excreted by the body and very little is retained. The pathological effects of copper are controversial, but it is generally believed very unlikely that humans could unknowingly ingest toxic quantities from palatable drinking water. The U. S. Public Health Service (1962) recommends that copper should not exceed 1.0 ppm in drinking and culinary water.

Lead (Pb)

Lead is only a minor element in most natural waters, but industrial or mine and smelter effluents may contain relatively large amounts of lead. Many of the commonly used lead salts are water soluble.

Traces of lead in water usually are the result of solution of lead pipe through which the water has passed. Amounts of lead of the order of 0.05 ppm are significant, as this concentration is the upper limit for drinking water in the standards adopted by the U. S. Public Health Service (1962). Higher concentrations may be added to water through industrial and mine-waste disposal. Lead in the form of sulfate is reported to be soluble in water to the extent of 31 ppm (Seidell, 1940, p. 1409) at 25°C. In natural water this concentration would not be approached, however, since a pH of less than 4.5 would probably be required to prevert formation of lead hydroxide and carbonate. It is reported (Pleissner, 1907) that at 18°C water free of carbon dioxide will dissolve the equivalent of 1.4 ppm of lead and the solubility is increased nearly four fold by the presence of 2.8 ppm of carbon dioxide in the solution. Presence of other ions may increase the solubility of lead.

Zinc (Zn)

Zinc is abundant in rocks and ores but is only a minor constituent in natural water because the free metal and its oxides are only sparingly soluble. In most alkaline surface waters it is present only in trace quantities, but more may be present in acid water. Chlorides and sulfates of zinc are highly soluble. Zinc is used in many commercial products, and industrial wastes may contain large amounts.

Zinc in water does not cause serious effects or health, but produces undesirable esthetic effects. The U. S. Public Health Service (1962, p. 55) recommends that the zinc content not exceed 5 ppm in drinking and culinary water.

Barium (Ba)

Barium may replace potassium in some of the igneous rock minerals, especially feldspar and barium sulfate (barite) is a common barium mineral of secondary origin. Only traces of barium are present in surface water and sea water. Because natural water contains sulfate, barium will dissolve only in trace amounts. Barium sometimes occurs in brines from oil-well wastes.

The U. S. Public Health Service (1962) states that water containing concentrations of barium in excess of 1 ppm is not suitable for drinking and culinary use because of the serious toxic effects of barium on heart, blood vessels, and nerves.

Bromide (Br)

Bromine is a very minor element in the earth's crust and is normally present in surface waters in only minute quantities. Measurable amounts may be found in some streams that receive industrial wastes, and some natural brines may contain rather high concentrations. It resembles chloride in that it tends to be concentrated in sea water.

Iodide (I)

Iodide is considerably less abundant both in rocks and water than bromine. Measurable amounts may be found in some streams that receive industrial wastes, and some natural brines may contain rather high concentrations. It occurs in sea water to the extent of less than 1 ppm. Rankama and Sahama (1950, p. 767) report iodide present in rainwater to the extent of 0.001 to 0.003 ppm and in river water in about the same amount. Few waters will contain over 2.0 ppm.

PROPERTIES AND CHARACTERISTICS OF WATER

Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is commonly 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.

Generally, bicarbonate and carbonate determine the proportions of "carbonate" hardness of water. Carbonate hardness is the amount of hardness chemically equivalent to the amount of bicarbonate and carbonate in solution. Carbonate hardness is approximately equal to the amount of hardness that is removed from water by boiling.

Noncarbonate hardness is the difference between the hardness calculated from the total amount of calcium and magnesium in solution and the carbonate hardness. If the carbonate hardness (expressed as calcium carbonate) equal the amount of calcium and magnesium hardness (also expressed as calcium carbonate) there is no noncarbonate hardness. Noncarbonate hardness is about equal to the amount of hardness remaining after water is boiled. The scale formed at high temperatures by the evaporation of water containing noncarbonate hardness commonly is tough, heat resistant, and difficult to remove.

Although many people talk about soft water and hard water, there has been no firm line of demarcation. Water that seems hard to an easterner may seem soft to a westerner. In this report hardness of water is classified as follows:

Hardness range (calcium carbonate in ppm)	Hardness description
0-60	Soft
61-120	Moderately hard
121-180	Hard
more than 180	Very hard

For public use, water with hardness above 200 parts per million generally requires softening treatment (Durfor and Becker, 1964).

Acidity (H^{+1})

The use of the terms acidity and alkalinity is widespread in the literature of water analysis and is a cause of confusion to those who are more accustomed to seeing a pH of 7.0 used as a neutral point. Acidity of a natural water represents the content of free carbon dioxide and other uncombined gases, organic acids and salts of strong acids and weak bases that hydrolyze to give hydrogen ions. Sulfates of iron and aluminum in mine and industrial

wastes are common sources of acidity. The presence of acidity is reported in those waters which have a pH below 4.5.

Sodium-adsorption-ratio (SAR)

The term "sodium-adsorption-ratio (SAR)" was introduced by the U. S. Salinity Laboratory Staff (1954). It is a ratio expressing the relative activity of sodium ions in exchange reaction with soil and is an index of the sodium or alkali hazard to the soil. Sodium-adsorption-ratio is expressed by the equation:

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

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

Waters are divided into four classes with respect to sodium or alkali hazard: low, medium, high, and very high, depending upon the SAR 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 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.

Specific conductance (micromhos per centimeter at 25°C)

Specific conductance is a convenient, rapid determination used to estimate the amount of dissolved solids in water. It is a measure of the ability of water to transmit a small electrical current (see p. 8). The more dissolved solids in water than can transmit electricity the greater the specific conductance of the water. Commonly, the amount of dissolved solids (in parts per million) is about 65 percent of the specific conductance (in micromhos). This relation is not constant from stream to stream or from well to well and it may even vary in the same source with changes in the composition of the water (Durfor and Becker, 1964).

Specific conductance of most waters in the eastern United States is less than 1,000 micromhos, but in the arid western parts of the country, a specific conductance of more than 1,000 micromhos is common.

Hydrogen-ion concentration (pH)

Hydrogen-ion concentration is expressed in terms of pH units (see p. 8). The values of pH often are used as a measure of the solvent power of water or as an indicator of the chemical behavior certain solutions may have toward rock minerals.

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 of 7.0 indicates that the water is neither acid nor alkaline. pH readings progressively lower than 7.0 denote increasing acidity and those progressively higher than 7.0 denote increasing alkalinity. 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 or organic matter usually have pH values less than 4.5.

The investigator who utilizes pH data in his interpretations of water analyses should be careful to place pH values in their proper perspective.

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 15 units generally passes unnoticed (U.S. Public Health Service, 1962). Some swamp waters have natural color in excess of 300 units.

The extent to which a water is colored by material in solution is commonly reported as a part of a water analysis because a significant color in water may indicate the presence of organic material that may have some bearing on the dissolved solids content. Color in water is expressed in terms of units between 0 and 500 or more based on the above standard (see p. 8).

Oxygen consumed

Oxygen consumed is a measure of the amount of oxygen required to oxidize unstable materials in water and may be correlated with natural-water color or with some carbonaceous organic pollution from sewage or industrial wastes.

Tolerances for oxygen consumed in feed water for low-and high-pressure boilers are 15 and 3 ppm, respectively (Northeast Water Works Association, 1940). Wash water containing more than 8 ppm has been reported to import a bad odor to textiles; concentrations for water used in beverages and brewing range from 0.5 to 5.0 ppm (California State Water Pollution Control Board, 1952, 1954).

Organics

Phenols.--Phenolic material in water resources is invariably the result of pollution. Phenols are widely used as disinfectants and in the synthesis of many organic compounds. Waste products from oil refineries, coke areas, and chemical plants may contain high concentrations. Fortunately, phenols decompose in the presence of oxygen and organic material, and their persistence downstream from point of entry is relatively short lived. The rate of decomposition is dependent on the environment.

Very low concentrations impart such a disagreeable taste to water that it is highly improbable that harmful amounts could be consumed unknowingly. Reported thresholds of detection of taste and odor range from 0.001 to 0.01 ppm.

Detergents (ABS).--The chief surfactant in commercial detergents is anionic alkylbenzenesulfonate (ABS). ABS and other anionic surfactants resist chemical oxidation and biological breakdown. Their persistence in water over long periods of time contributes to pollution of both ground water and surface water. Some of the effects produced from detergent pollution are unpleasant taste, odor, and foaming (Wyman, Robertson, and Page, 1962). Although the physiological implications of ABS to human beings is unknown, prolonged ingestion of this material by rats is believed to be nontoxic (Paynter, 1960). The U.S. Public Health Service (1962) recommends that ABS should not exceed 0.5 ppm in drinking and culinary waters.

Temperature

Temperature is an important factor in property determining the quality of water. This is very evident for such a direct use

as an industrial coolant. Temperature is also important, but perhaps not so evident, for its indirect influence upon aquatic biota, concentrations of dissolved gases, and distribution of chemical solutes in lakes and reservoirs as a consequence of thermal stratification and variation.

Surface water temperatures tend to change seasonally and daily with air temperatures, except for the outflow of large springs. Superimposed upon the annual temperature cycle is a daily fluctuation of temperature which is greater in warm seasons than in cold and greater in sunny periods than with a cloud cover. Natural warming is due mainly to absorption of a solar radiation by the water and secondarily to transfer of heat from the air or from the bottom. Condensation of water vapor at the water surface is reported to furnish measurable quantities of heat. Heat loss takes place largely through radiation, with further losses through evaporation and conduction to the air and bottom. Thus the temperature of a small stream generally reaches a maximum in mid-to late afternoon due to solar heating and reaches a minimum from early to mid-morning after nocturnal radiation.

Temperature variations which commonly occur during summer in lakes and reservoirs of temperate regions results in a separation of the water volume into a circulating upper portion and a non-circulating lower portion. Separating the two is a stratum of water of variable vertical thickness in which the temperature decreases rapidly with increasing depth. This physical division of the water mass into a circulating and a stagnant portion is the result of density differences in the water column associated with the temperature distribution. Knowledge of the stratification in a body of water may result in increased utility by locating strata of more suitable characteristics. For example, the elevation of an intake pipe may be changed to obtain water of lower temperature, higher pH, less dissolved iron, or other desirable properties.

Temperature is a major factor in determining the effect of pollution on aquatic organisms. The resistance of fish to certain toxin substances has been shown to vary widely with temperature. The quantity of dissolved oxygen which the water can contain is also temperature dependent. Oxygen is more soluble in cold water than in warm water, hence the reduction of oxygen concentrations by pollution is especially serious during periods of high temperature when oxygen levels are already low. Increased temperatures also accelerate biological activity including that of the oxygen-utilizing bacteria which decompose organic wastes. These pollutional effects may be especially serious when low flow conditions coincide with high temperatures. Summary temperature data of water are essential for planning multiple uses of water resources.

Turbidity

Turbidity is the optical property of a suspension with reference to the extent to which the penetration of light is inhibited by the presence of insoluble material. Turbidity is a function on both the concentration and particle size of the suspended material. Although it is reported in terms of parts per million of silica, it is only partly synonymous with the weight of sediment per unit volume of water.

Turbid water is abrasive in pipes, pumps, and turbine blades. In process water, turbidities much more than 1 ppm are not tolerated by several industries, but others permit up to 50 ppm higher (Rainwater, Thatcher, 1960, p. 289). Although turbidity does not directly measure the safety of drinking water, it is related to the consumers acceptance of the water. A level of 5 units of turbidity becomes objectionable to a considerable number of people (U. S. Public Health, 1962).

SEDIMENT

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended sediment is that part of it which remains in suspension in water owing to the upward components of turbulent currents or by colloidal suspension. Much fluvial sediment results from the natural process of erosion, which in turn is part of the geologic cycle of rock transformation. This natural process may be accelerated by agricultural practices. Sediment is also contributed by a number of industrial and construction 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, character of the solid mantle, plant cover, topography, and land use. The mode and rate of sediment erosion, transport, and deposition is determined largely by the size distribution of the particles or more precisely by the fall velocities of the particles in water. Sediment particles in the sandsize (larger than 0.062 mm) range do not appear to be affected by flocculation or dispersion resulting from the mineral constituents in solution. In contrast, 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.

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 State reports on the surface-water supply of the United States. The discharge reported for a composite sample is usually the average of daily mean discharges for the composite period. 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.

State reports containing more complete records of stream discharge may be obtained by writing to the responsible District Engineer, Surface Water Branch, U. S. Geological Survey. For the area covered in this volume, the States, drainage basins, and locations of the district engineers are listed below.

State	Drainage basin	Surface Water Branch district office
Colorado	Missouri River	Denver Federal Center Denver, Colo. 80225
Iowa	Hudson Bay and upper Mississippi River Missouri River	508 Hydraulic Laboratory University of Iowa Iowa City, Iowa 52241
Kansas	Missouri River	P. O. Box 856 Room 403 Federal Bldg. Topeka, Kans. 66601

State	Drainage basin	Surface Water Branch district office
Minnesota	Hudson Bay and upper Mississippi River Missouri River basin	1610 Post Office Building St. Paul, Minn. 55101
Missouri	Missouri River	P.O. Box 138 900 Pine Street Rolla, Mo. 65401
Montana	Hudson Bay and upper Mississippi River Missouri River	P.O. Box 1696 409 Federal Building Helena, Mont. 59601
Nebraska	Missouri River	Room 125 Nebraska Hall 901 North 17th Street Lincoln, Nebr. 68508
North Dakota	Hudson Bay and upper Mississippi River Missouri River	P.O. Box 750 202½ North Third Street Bismark, N. Dak. 58502
South Dakota		P.O. Box 216 Room 207 Federal Building Pierre, S. Dak. 57501
Wisconsin	Hudson Bay and upper Mississippi River	5001 University Avenue Madison, Wis. 53705
Wyoming	Missouri River	P.O. Box 2087 Blue Cross Building Cheyenne, Wyo. 82002

PUBLICATIONS

Reports giving records of chemical quality and temperatures of surface waters and suspended-sediment loads of streams in the area covered by this volume for the water years 1941-62, are listed below:

Numbers of water-supply papers containing records for Parts 5 and 6, 1941-62

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1947	1102	1953	1291	a 1959	1643
1942	950	1948	1132	1954	1351	a 1960	1743
1943	970	1949	1162	1955	1401	a 1961	1883
1944	1022	1950	1187	1956	1451	1962	1943
1945	1030	1951	1198	1957	1521		
1946	1050	1952	1251	1958	1572		

a To be published.

Geological Survey reports containing chemical quality, temperature, and sediment data obtained before 1941 are listed below. Publications dealing largely with the quality of ground-water supplies and only incidentally covering the chemical composition of surface waters are not included. Publications that are out of print are preceded by an asterisk.

PROFESSIONAL PAPER

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

BULLETINS

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

WATER-SUPPLY PAPERS

*108. Quality of water in the Susquehanna River drainage basin, with an introductory chapter on physiographic features, 1904.
*161. Quality of water in the upper Ohio River basin and at Erie, Pa., 1906.
*193. The quality of surface waters in Minnesota, 1907.
*236. The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian, 1909.

*237. The quality of the surface waters of California, 1910.
*239. The quality of the surface waters of Illinois, 1910.
*273. Quality of the water supplies of Kansas, with a preliminary report on stream pollution by mine waters in southeastern Kansas, 1911.
*274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, 1911.
*339. Quality of the surface waters of Washington, 1914.
*363. Quality of the surface waters of Oregon, 1914.
*418. Mineral springs of Alaska, with a chapter on the chemical character of some surface waters of Alaska, 1917.
*596-B. Quality of water of Colorado River in 1925-26, 1928.
*596-D. Quality of water of Pecos River in Texas, 1928.
*596-E. Quality of the surface waters of New Jersey, 1928.
*636-A. Quality of water of the Colorado River in 1926-28, 1930.
*636-B. Suspended matter in the Colorado River in 1925-28, 1930.
*638-D. Quality of water of the Colorado River in 1928-30, 1932.
*839. Quality of water of the Rio Grande basin above Fort Quitman, Tex., 1938.
*889-E. Chemical character of surface water of Georgia, 1944.
*998. Suspended sediment in the Colorado River, 1925-41, 1947.
1048. Discharge and sediment loads in the Boise River drainage basin, Idaho, 1939-40, 1948.
1110-C. Quality of water of Conchas Reservoir, New Mexico, 1939-49, 1952.

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

COOPERATION

The chemical quality of water and sediment investigations in the Missouri River and Red River of the North basins in Colorado, Kansas, Montana, Nebraska, North Dakota, and Wyoming were begun in 1945. Most of the investigations were made as part of the program of the United States Department of the 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 of the Interior Department for some of

State	Cooperating agency	Drainage basin	District office
Iowa	Iowa Geological Survey, H. G. Hershey, director and State Geologist.[a]	Hudson Bay and upper Mississippi River basins Missouri River basin	Room 125, Nebraska Hall 901 North 17th Street Lincoln, Nebr. 68508 (Chemical-quality data) 508 Hydraulic Laboratory Iowa City, Iowa 52241 (Sediment data)
Kansas	Kansas Water Resources Board, Robert L. Smith, executive secretary. Kansas State Board of Health Division of Sanitation, Dwight F. Metzler, director.	Missouri River basin	Room 125, Nebraska Hall 901 North 17th Street Lincoln, Nebr. 68508
Minnesota	Minnesota Department of Conservation Division of Waters, S. A. Frellsen, director. Minnesota Iron Range Resources and Rehabilitation Commission, A. M. Yoannes, commissioner[b]	Hudson Bay and upper Mississippi River basins	
Montana	Montana Fish and Game Department, W. J. Everin, director.	Missouri River basin	1214 Big Horn Avenue Worland, Wyo. 82401

a Financial assistance from Soil Conservation Service, Department of Agriculture.
b Discontinued June 1962.

State	Cooperating agency	Drainage basin	District office
Nebraska	Nebraska Mid-State Reclamation District, J. R. McKinney, secretary.	Missouri River basin	Room 125, Nebraska Hall 901 North 17th Street Lincoln, Nebr. 68508
South Dakota	South Dakota Water Resources Commission, J. W. Grimes, chief engineer.		
Wisconsin	Wisconsin Conservation Department, L. P. Voigt, director, through the Committee on Water Pollution, George P. Steinmetz, chairman, Thedore F. Wisniewski, director.	Hudson Bay and upper Mississippi River basin	2822 E. Main Street Columbus, Ohio 43209 (Sediment data)
Wyoming	Wyoming Natural Resources Board, E. J. Van Camp, chief of Water Development. Office of State Engineer, Earl Lloyd, State Engineer.	Missouri River basin	1214 Big Horn Avenue Worland, Wyo. 82401

the investigations in South Dakota; by the Soil Conservation Service of the Department of Agriculture for some of the investigations in Colorado and Nebraska; and by the Corps of Engineers of the Department of the Army for some investigations in North Dakota and South Dakota.

State and local agencies that cooperated in quality-of-water investigations in the drainage basins in this volume and the locations of the quality-of-water district office responsible for collecting the data are listed in the table on page 28.

DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, L. B. Leopold, chief hydrologist, and S. K. Love, chief, Quality of Water Branch.

Most of the investigations were made under the direction of D. M. Culbertson, district engineer, Lincoln, Nebr., and by T. F. Hanly, district engineer, Worland, Wyo. Sediment investigations were made under the direction of the following: In Iowa, V. R. Bennion, district engineer, Iowa City, Iowa; in Colorado, R. H. Langford, district chemist, Salt Lake City, Utah; and in Wisconsin, G. W. Whetstone, district chemist, Columbus, Ohio. Any additional information on file can be obtained by writing or visiting the responsible Survey district office.

LITERATURE CITED

American Society for Testing Materials, 1954, Manual on industrial water: Am. Soc. for Testing Mat., Philadelphia, Pa., p. 356.

Baker, M. N., 1949, The quest for pure water: Am. Water Works Assoc., New York, N. Y.

Brandt, H. J., 1948, Intensified injurious effects on fish, especially the increased toxic effect produced by a combination of sewage poisons: Chem. abs. 42, p. 9015.

Busch, Werner, 1927, The applicability of electrometric titration to the determination of the solubility of slightly soluble oxides; Zeitsche. Anorg. Chem., v. 161, p. 161-179.

Durfor, C. N. and Becker, E., 1964, Public water supplies of the 100 largest cities in the United States; 1962: U. S. Geol. Survey, Water-Supply Paper 1812.

California State Water Pollution Control Board, 1952, Water-quality criteria: California State Water Pollution Control Board, pub. 3., p. 291-292, 377-378.

1954, Water-quality criteria: California State Water Pollution Control Board, pub. 3, Addendum no. 1., p. 291-292.

Eriksson, E., 1952, Composition of atmospheric precipitation II; sulfur, chloride, iodine compounds, bibliography: Tellus, v. 4, p. 280-303.

Faucett, R. L. and Miller, H. C., 1946, Methemoglobinemia occurring in infants fed milk diluted with well waters of high nitrate content: Jour. Pediatrics, v. 29, p. 593.

Hazen, Allen, 1892, A new color standard for natural waters: Am. Chem. Jour., v. 12, p. 427-428.

International Union of Pure and Applied Chemistry, 1961, Table of Atomic weights based on carbon-12: Chem. and Eng. News, v. 39, no. 42, Nov. 20, 1961, p. 43.

Kilmer, V. J. and Alexander, L. T., 1949, Methods of making mechanical analyses of soils: Soil Sci., v. 68, p. 15-24.

Lackey, J. B., and Sawyer, C. N., 1946, Plankton productivity of certain southeastern Wisconsin lakes as related to fertilization: Sewage Works Jour., v. 17, p. 573.

Lane, E. W., and others, 1947, Report of the Subcommittee on Terminology: Am. Geophys. Union Trans., v. 28, p. 937.

Magistad, O. C., and Christiansen, J. E., 1944, Saline Soils, their nature and management: U. S. Dept., Agriculture Circ. 707, p. 8-9.

Maxcy, K. F., 1950, Report on the relation of nitrate concentrations in well waters to the occurrence of methemoglobinemia: Natl. Research Council, Bull. Sanitary Eng. and Environment, App. D., p. 271.

Moore, E. W., 1950, The desalting of saline waters, a review of the present status: Natl. Research Council Comm. on Sanitary Eng. and Environment, Rept. to Subcomm. on Water Supply.

National Research Council, 1954, Sodium restricted diets: Natl. Research Council, pub. 325.

Northeastern Water Works Association, 1940, Progress report, Committee on quality Tolerances of Water for Industrial Uses: Northeast Water Works Assoc. Jour., v. 54.

Paynter, O. E., 1960, The chronic toxicity of dodecylbenzene sodium sulfonate: U. S. Public Health Conference on Physiological Aspects of Water Quality Proc., Washington, D.C., Sept. 8-9, 1960, p. 175-179.

Pleissner, M., 1907, Arb. Kais. Gesundheitsamt, v. 26, p. 384-443.

Rainwater, F. H., and Thatcher, L. L., 1960, Methods for collection and analysis of water samples: U. S. Geol. Survey Water-Supply Paper 1454, 301 p.

Rankama, K., and Sahama, T. G., 1950, Geochemistry: Chicago Univ. Press, Chicago, Ill., p. 767.

Riffenburg, H. B., 1925, Chemical character of ground waters of the northern Great Plains: U. S. Geol. Survey Water-Supply Paper 560-B, p. 31-52.

Seidell, Atherton, 1940, Solubilities of inorganic and metal organic compounds, 3d ed., v. 1, D. van Nostrand, New York.

U. S. Interagency Report 6, 1952, A study of methods used in measurements and analysis of sediment loads in streams, the design of improved types of suspended samplers, p. 86-90; U.S. Engineer Office, St. Paul, Minn.

U.S. Interagency Report 6, 1952, A study of methods used in measurement and analysis of sediment loads in streams, a study of new methods of size analysis of suspended sampler, p. 82-90; U.S. Engineer Office, St. Paul, Minn.

U.S. Interagency Report 8, 1948, A study of methods used in measurement and analysis of sediment loads of streams, measurement of the sediment discharge of streams, p. 70-76; U.S. Engineer Office, St. Paul, Minn.

U.S. Interagency Report 11, 1957, A study of methods used in measurement and analysis of sediment loads in streams, the development and calibration of the visual-accumulation tube, p. 1-109.

U.S. Public Health Service, 1962, Drinking water standards: U.S. Dept. Health, Education, and Welfare, Public Health Service: Pub. no. 956.

U.S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U.S. Dept. Agriculture, Agriculture Handb. 60, p. 1-160.

Waring, F. H., 1949, Significance of nitrates in water supplies: Am. Water Works Assoc. Jour., v. 41, no. 2., p. 147-150.

Wayman, C. H., 1962, Limitations of the methylene blue method for ABS determinations: U.S. Geol. Survey, Prof. paper 450-B, art. 49, p. B117-B120.

Wayman, C.H., Robertson, J. B., and Page, H. G., 1962, Foaming characteristics of synthetic-detergent solutions: U.S. Geol. Survey, Prof. paper 450D, art. 178, p. D198.

CHEMICAL ANALYSES, WATER TEMPERATURES, AND SEDIMENT

PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN

RED RIVER OF THE NORTH BASIN

5-540. RED RIVER OF THE NORTH AT FARGO, N. DAK.

LOCATION.--At gaging station at city waterplant in Fargo, Cass County, 25 miles upstream from mouth of Sheyenne River.
DRAINAGE AREA.--6,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1962.
Water temperatures: October 1955 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 540 ppm Aug. 28; minimum, 175 ppm Apr. 6-16.
Hardness: Maximum, 344 ppm Jan. 24-31; minimum, 118 ppm Apr. 6-17.
Specific conductance: Maximum daily, 759 micromhos Sept. 12; minimum daily, 223 micromhos Apr. 11.
Water temperatures: Maximum, 77°F Aug. 6-8; minimum, 34°F on many days during December to February.
EXTREMES, 1955-62.--Dissolved solids (1955-58, 1959-62): Maximum, 650 ppm May 6-9, 1958; minimum, 174 ppm Dec. 1-2, 1955.
Hardness: Maximum, 420 ppm May 6-9, 1958; minimum, 118 ppm Apr. 6-17, 1962.
Specific conductance: Maximum daily, 960 micromhos May 6, 1958; minimum daily, 223 micromhos Apr. 11, 1962.
Water temperatures: Maximum, 82°F on several days during July 1957 and 1960; minimum, 33°F on many days in 1956 and 1959.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	102	3.0	0.05	38	31	13	4.5	252	0	38	4.7	0.2	0.9	0.00	276	0.38	76.0	224	17	0.4	471	7.5	5
Nov. 1-30.....	104	--	.06	--	--	11	--	248	0	37	--	--	--	--	272	.37	76.4	224	21	.3	468	7.6	--
Dec. 1-31.....	72.0	--	.07	--	--	16	--	309	0	49	--	--	--	--	339	.46	65.9	278	25	.4	573	7.6	--
Jan. 1-22, 1962.	70.1	--	.09	--	--	16	--	358	0	49	--	--	--	--	368	.50	69.7	314	20	.4	622	7.6	--
Jan. 23.....	84	10	.07	60	46	18	5.3	378	0	51	7.5	.2	1.9	.00	400	.54	90.7	338	28	.4	666	7.7	--
Jan. 24-31.....	91.5	--	.09	--	--	17	--	379	0	55	--	--	--	--	403	.55	99.6	344	33	.4	682	7.3	--
Feb. 1-28.....	85.4	--	.07	--	--	15	--	364	0	45	--	--	--	--	394	.54	90.8	322	24	.4	641	7.5	--
Mar. 1-26.....	173	--	.09	--	--	13	--	306	0	28	--	--	--	--	317	.43	148	268	17	.3	528	7.8	--
Mar. 27.....	329	18	.06	44	36	11	5.1	300	0	25	4.4	.3	1.3	.05	296	.40	263	256	10	.3	502	7.6	--
Mar. 28-Apr. 5..	438	--	.09	--	--	9.3	--	250	0	24	--	--	--	--	266	.36	315	220	15	.3	445	7.4	--
Apr. 6-16.....	2,692	--	--	--	--	7.2	--	116	0	30	--	--	--	--	175	.24	1,270	118	23	.3	280	7.1	--
Apr. 17.....	4,900	--	--	--	--	7.4	--	103	0	37	--	--	--	--	184	.25	2,430	118	34	.3	284	7.2	--
Apr. 18-22.....	5,636	--	--	--	--	9.3	--	126	0	57	--	--	--	--	228	.31	3,470	150	47	.3	350	7.4	--
Apr. 23-30.....	1,671	--	--	--	--	14	--	161	0	91	--	--	--	--	302	.41	1,360	208	76	.4	465	7.3	--
May 1-17.....	1,151	--	.11	--	--	24	--	214	0	156	--	--	--	--	452	.61	1,400	304	129	.6	658	7.4	--

RED RIVER OF THE NORTH BASIN--Continued

5-540. RED RIVER OF THE NORTH AT FARGO, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
May 18-23, 1962.	3,913	--	0.09	--	--	18	--	178	0	126	--	--	--	--	365	0.50	3,860	242	96	0.5	545	7.3	--
May 24-28.....	7,670	--	--	--	--	8.2	--	130	0	61	--	--	--	--	223	.30	4,620	152	45	.3	346	7.0	--
May 29.....	8,340	16	.15	35	14	7.4	4.9	128	0	59	0.0	0.2	1.5	0.13	236	.32	5,310	146	41	.3	334	7.8	7
May 30-June 10..	4,326	--	.12	--	--	16	--	182	0	98	--	--	--	--	325	.44	3,800	162	13	.5	493	7.9	--
June 11-18.....	8,612	--	--	--	--	8.4	--	143	0	58	--	--	--	--	223	.30	5,190	160	43	.3	351	7.9	--
June 19-30.....	3,918	--	.08	--	--	17	--	218	0	99	--	--	--	--	352	.48	3,720	250	71	.5	536	8.1	--
July 1-16.....	5,685	--	.10	--	--	13	--	190	0	78	--	--	--	--	302	.41	4,640	211	55	.4	458	7.3	--
July 17.....	5,230	23	.04	55	31	22	7.9	240	0	109	.0	.3	1.8	.10	410	.56	5,790	266	69	.6	584	7.8	25
July 18-31.....	5,733	--	.12	--	--	16	--	198	0	95	--	--	--	--	330	.45	5,110	228	66	.5	501	7.2	--
Aug. 1-27.....	2,924	--	--	--	--	23	--	242	0	139	--	--	--	--	434	.59	3,430	300	102	.6	646	7.6	--
Aug. 28.....	1,160	23	.14	67	41	28	8.4	276	0	172	5.0	.2	2.0	.12	540	.73	1,690	337	111	.7	717	7.7	--
Aug. 29-Sept. 30	868	--	.05	--	--	26	--	270	0	150	--	--	--	--	472	.64	1,110	328	107	.6	703	7.6	--
Weighted average.....	1,756	--	0.10	--	--	15	--	190	0	91	--	--	--	--	319	0.43	1,510	217	61	0.4	485	7.4	--
Time-weighted average.....	--	--	0.08	--	--	16	--	256	0	74	--	--	--	--	344	--	--	258	49	0.4	546	7.5	--
Tons per day..	--	--	0.47	--	--	71.0	--	900	0	429	--	--	--	--	--	--	--	--	--	--	--	--	--

RED RIVER OF THE NORTH BASIN--Continued

5-540. RED RIVER OF THE NORTH AT FARGO, N. DAK.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

5-560. SHEYENNE RIVER NEAR WARWICK, N. DAK.

LOCATION.--At gaging station at highway bridge, 3.3 miles south of Warwick, Benson County.
DRAINAGE AREA.--2,070 square miles, approximately, of which about 1,310 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1962.
Water temperatures: January 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 595 ppm June 1-15; minimum, 200 ppm Apr. 1-10.
Hardness: Maximum, 287 ppm May 25-31; minimum, 98 ppm Apr. 1-10.
Specific conductance: Maximum daily, 1,060 micromhos Mar. 27; minimum daily, 280 micromhos Apr. 8.
Water temperatures: Maximum, 79°F July 9, 10; minimum, 33°F on several days during January and February.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 1,230 ppm Mar. 21-23, 1955; minimum, 150 ppm Apr. 5-9, 1960.
Hardness: Maximum, 572 ppm Mar. 20, 1959; minimum, 71 ppm Apr. 5-9, 1960.
Specific conductance: Maximum daily, 1,940 micromhos Feb. 1, 1955; minimum daily, 208 micromhos Apr. 7, 1960.
Water temperatures: Maximum (1951-55, 1956-62), 86°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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	1.6	--	--	--	--	14	--	236	0	--	--	--	--	--	277	0.38	1.20	207	13	0.4	446	7.7	--
Nov. 1-30.....	2.4	--	--	--	--	18	--	244	0	--	--	--	--	--	283	.38	1.83	214	14	.5	472	7.3	--
Dec. 1-31.....	2.1	21	0.04	58	18	25	3.3	267	0	48	5.2	0.1	2.4	0.04	323	.44	1.83	219	0	.7	524	7.3	4
Jan. 1-31, 1962.	1.6	--	--	--	--	33	--	283	0	--	--	--	--	--	347	.47	1.50	230	0	.9	566	7.3	--
Feb. 1-28.....	1.3	--	--	--	--	36	--	312	0	--	--	--	--	--	405	.55	1.42	249	0	1.0	619	7.4	--
Mar. 1-26.....	1.4	--	--	--	--	39	--	320	0	--	--	--	--	--	400	.54	1.51	260	0	1.1	638	7.4	--
Mar. 27-29.....	39.3	--	--	--	--	47	--	349	0	--	--	--	--	--	453	.62	48.1	280	0	1.2	702	7.8	--
Mar. 30-31.....	281	14	--	33	14	24	9.6	159	0	57	3.5	.1	5.0	.12	256	.35	194	142	12	.9	400	7.5	--
Apr. 1-10.....	279	--	--	--	--	21	--	113	0	--	--	--	--	--	200	.27	151	98	5	.9	314	7.3	--
Apr. 11.....	116	16	--	33	14	32	8.9	161	0	66	6.5	.4	8.8	.07	296	.40	92.7	140	8	1.2	436	7.7	--
Apr. 12-30.....	41.7	--	--	--	--	54	--	212	0	--	--	--	--	--	354	.48	39.9	160	0	1.9	555	7.5	--
May 1-15.....	14.8	--	--	--	--	67	--	305	0	--	--	--	--	--	447	.61	17.9	227	0	1.9	692	7.8	--
May 16-24.....	84.8	--	--	--	--	55	--	320	0	--	--	--	--	--	462	.63	106	260	0	1.5	698	7.8	--
May 25-31.....	122	--	--	--	--	78	--	354	0	--	--	--	--	--	560	.76	184	287	0	2.0	828	7.9	--
June 1-15.....	58.9	19	.11	63	29	95	8.2	385	0	139	17	.3	2.1	.28	595	.81	94.6	278	0	2.5	877	7.8	45
June 16-24.....	154	--	--	--	--	77	--	335	0	--	--	--	--	--	484	.66	201	222	0	2.3	720	8.2	--
June 25-July 31.	26.2	--	--	--	--	76	--	339	4	--	--	--	--	--	468	.64	33.1	220	0	2.2	710	8.3	--

Aug. 1-25, 1962.	17.0	--	--	--	--	87	--	380	0	--	--	--	--	--	--	466	.63	21.4	218	0	2.5	730	7.7	--
Aug. 26-Sept. 12	8.8	--	--	--	--	96	--	399	0	--	--	--	--	--	--	493	.67	11.7	217	0	2.9	770	8.0	--
Sept. 13-30.....	5.7	22	.12	50	23	53	2.6	322	0	57	6.4	.2	1.4	.12	397	.54	6.11	218	0	1.6	606	7.9	--
Weighted average.....	28.6	--	--	--	--	55	--	260	0	--	--	--	--	--	389	0.53	30	192	2	1.7	592	7.6	--
Time-weighted average.....	--	--	--	--	--	50	--	299	0	--	--	--	--	--	393	--	--	222	2	1.4	614	7.5	--
Tons per day..	--	--	--	--	--	4.3	--	20	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

RED RIVER OF THE NORTH BASIN--Continued

5-564. BIG COULEE NEAR CHURCHS FERRY, N. DAK.

LOCATION.--At gaging station at bridge on U.S. Highway 281, 1 mile downstream from Little Coulee and 6 miles south of Churchs Ferry, Ramsey County.
DRAINAGE AREA.--2,500 square miles, approximately, of which about 690 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1962.
REMARKS.--No flow during most of 1962 water year.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Apr. 4, 1962..	1.8	16		0.07		40	11	20	19	125	0	84	12	0.1	2.8	0.10	289	144	41	0.7	419	7.2	80
Apr. 13.....	24	16		.08		31	8.6	14	13	100	0	61	8.4	.1	5.9	.05	229	113	31	.6	331	7.1	80
May 24.....	2.8	35		.04		130	34	106	20	328	0	405	35	.3	.3	.25	993	463	194	2.1	1,320	7.6	50
May 28.....	1.3	38		.11	0.28	150	54	134	23	337	0	530	49	.3	.4	.22	1,210	596	320	2.4	1,560	7.5	45

5-587. SHEYENNE RIVER AT LISBON, N. DAK.

LOCATION.--At gaging station, 150 feet downstream from dam at State fish hatchery at north edge of city of Lisbon, Ransom County, and 3 miles upstream from Timber Coulee.
DRAINAGE AREA.--8,190 square miles, approximately, of which about 5,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1956 to September 1962.
Water temperatures: August 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 832 ppm Jan. 14-29; minimum, 204 ppm Mar. 31.
Hardness: Maximum, 404 ppm Jan. 14-29; minimum, 118 ppm Mar. 31.
Specific conductance: Maximum daily, 1,450 micromhos Jan. 30; minimum daily, 314 micromhos Mar. 30.
Water temperatures: Maximum, 78°F Aug. 5; minimum, freezing point on many days during November to April.
EXTREMES, 1956-62.--Dissolved solids (1956-58, 1959-62): Maximum, 860 ppm Dec. 14-18, 1959; minimum, 185 ppm Apr. 3-5, 1960.
Hardness: Maximum, 409 ppm Dec. 14-18, 1959; minimum, 102 ppm Apr. 3-5, 1960.
Specific conductance: Maximum daily, 1,450 micromhos Jan. 30, 1962; minimum daily, 243 micromhos Apr. 2, 1960.
Water temperatures: Maximum, 90°F Aug. 23, 1959; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	21.1	--	--	--	--	67	--	246	0	128	--	--	--	--	460	0.63	26.2	222	20	2.0	740	7.1	--
Nov. 1-30.....	18.5	7.8	0.07	61	32	78	12	301	0	159	39	0.3	0.7	0.16	562	.76	28.1	283	36	2.0	882	7.5	6
Dec. 1-31.....	13.0	--	--	--	--	108	--	381	0	209	--	--	--	--	729	.99	25.6	369	57	2.4	1,130	7.1	--
Jan. 1-12, 1962.	15.3	--	--	--	--	130	--	415	0	225	--	--	--	--	813	1.11	33.6	391	51	2.9	1,260	7.4	--
Jan. 13.....	14	8.5	.33	79	45	123	14	420	0	210	66	.4	.3	.33	774	1.05	29.3	383	39	2.7	1,190	8.0	7
Jan. 14-29.....	11.5	--	--	--	--	132	--	436	0	225	--	--	--	--	832	1.13	25.8	404	46	2.9	1,290	7.3	--
Jan. 30-Feb. 19.	13.9	--	--	--	--	124	--	431	0	206	--	--	--	--	800	1.09	30.0	390	37	2.7	1,250	7.8	--
Feb. 20-Mar. 14.	15.1	--	--	--	--	91	--	366	0	172	--	--	--	--	637	.87	26.0	322	22	2.2	1,000	7.4	--
Mar. 15-25.....	102	--	--	--	--	77	--	328	0	138	--	--	--	--	541	.74	149	274	5	2.0	851	7.5	--
Mar. 26-27.....	600	--	--	--	--	34	--	172	0	73	--	--	--	--	312	.42	505	152	11	1.2	480	7.1	--
Mar. 28-30.....	1,310	--	--	--	--	18	--	136	0	40	--	--	--	--	213	.29	753	124	12	.7	344	7.0	--
Mar. 31.....	1,200	10	.26	33	8.6	17	10	129	0	41	8.4	.2	6.8	.05	204	.28	661	118	12	.7	322	7.4	--
Apr. 1-10.....	481	--	--	--	--	23	--	135	0	55	--	--	--	--	239	.33	310	134	23	.9	386	7.3	--
Apr. 11-30.....	464	--	--	--	--	56	--	248	0	101	--	--	--	--	408	.55	511	211	8	1.7	645	7.5	--
May 1-18.....	87.2	--	--	--	--	68	--	280	0	136	--	--	--	--	483	.66	114	254	24	1.9	768	7.8	--
May 19-25.....	230	--	--	--	--	67	--	248	0	161	--	--	--	--	509	.69	385	262	59	1.8	794	7.7	--
May 26.....	512	14	--	59	27	64	9.8	249	0	153	22	.4	1.2	.13	496	.67	686	256	52	1.7	757	8.0	--
May 27-31.....	497	--	--	--	--	55	--	244	0	124	--	--	--	--	435	.59	584	230	30	1.6	676	8.0	--
June 1-30.....	277	--	--	--	--	52	--	248	0	110	--	--	--	--	406	.55	304	280	77	1.4	649	8.1	--
July 1-6.....	554	--	--	--	--	43	--	200	0	103	--	--	--	--	371	.50	555	200	36	1.3	583	7.3	--

RED RIVER OF THE NORTH BASIN--Continued

5-587. SHEYENNE RIVER AT LISBON, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
July 7, 1962....	2,020	17	--	51	11	23	7.5	178	0	64	9.2	0.3	3.0	0.08	290	0.39	1,580	174	28	0.8	450	7.7	--
July 8-18.....	795	--	--	--	--	29	--	184	0	78	--	--	--	--	317	.43	680	182	31	.9	488	7.3	--
July 19-22.....	1,123	--	--	--	--	32	--	186	0	84	--	--	--	--	339	.46	1,030	193	40	1.0	523	7.3	--
July 23-31.....	198	--	--	--	--	42	--	218	0	115	--	--	--	--	422	.57	226	235	56	1.2	637	7.7	--
Aug. 1-14.....	129	--	--	--	--	65	--	276	0	172	--	--	--	--	568	.77	198	312	86	1.6	854	7.8	--
Aug. 15-Sept. 14	53.7	--	--	--	--	73	--	261	0	200	--	--	--	--	586	.80	85.0	307	93	1.8	884	7.6	--
Sept. 15.....	43	16	0.30	79	34	83	11	288	0	198	48	.3	.8	.21	676	.92	78.5	336	100	2.0	952	7.5	--
Sept. 16-30.....	35.2	--	--	--	--	80	--	292	0	198	--	--	--	--	627	.85	59.6	337	98	1.9	953	7.5	--
Weighted average.....	174	--	--	--	--	45	--	217	0	101	--	--	--	--	384	0.52	180	215	37	1.3	601	7.4	--
Time-weighted average.....	--	--	--	--	--	76	--	295	0	155	--	--	--	--	552	--	--	288	46	1.9	860	7.4	--
Tons per day..	--	--	--	--	--	21.0	--	102	0	48.0	--	--	--	--	--	--	--	--	--	--	--	--	--

RED RIVER OF THE NORTH BASIN--Continued

5-587. SHEYENNE RIVER AT LISBON, N. DAK.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

5-825. RED RIVER OF THE NORTH AT GRAND FORKS, N. DAK.

LOCATION.--At gaging station, 500 feet downstream from dam at Riverside Park in Grand Forks, Grand Forks County, and 2 miles downstream from Red Lake River.
DRAINAGE AREA.--30,100 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: September 1956 to September 1962.
Water temperatures: October 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 540 ppm Jan. 21; minimum, 199 ppm Apr. 9-16.
Hardness: 367 ppm Jan. 1-20; minimum, 140 ppm Apr. 9-16.
Specific conductance: Maximum daily, 847 micromhos Jan. 4, 5, 7; minimum daily, 298 micromhos Apr. 9, 10.
Water temperatures: Maximum, 75°F on several days during June to August; minimum, 35°F on many days during December, January, March, and April.
EXTREMES, 1956-62.--Dissolved solids (1956-58, 1959-62): Maximum, 540 ppm Jan. 21, 1962; minimum, 199 ppm Apr. 9-16, 1962.
Hardness: Maximum, 468 ppm Dec. 29-31, 1958; minimum, 140 ppm Apr. 9-16, 1962.
Specific conductance: Maximum daily, 976 micromhos Dec. 29-31, 1958; minimum daily, 298 micromhos Apr. 9, 10, 1962.
Water temperatures: Maximum, 81°F Aug. 3, 4, 1959; minimum, 33°F on several days during February 1958, January and February 1959.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	576	--	--	--	--	22	--	233	0	68	--	--	--	--	335	0.46	521	234	43	0.6	540	7.3	
Nov. 1-30.....	383	7.1	0.04	63	33	28	7.3	307	0	75	17	0.2	3.0	0.02	403	.55	417	293	41	.7	656	7.5	6
Dec. 1-31.....	220	--	--	--	--	34	--	366	0	84	--	--	--	--	483	.66	287	350	50	.8	773	7.7	
Jan. 1-20, 1962.	205	--	--	--	--	39	--	390	0	90	--	--	--	--	519	.71	287	367	47	.9	832	7.5	
Jan. 21.....	175	14	.07	76	39	41	7.3	379	0	80	29	.3	2.7	.02	540	.73	255	351	40	1.0	802	7.7	
Jan. 22-31.....	189	--	--	--	--	41	--	382	0	81	--	--	--	--	509	.69	260	355	42	.9	817	7.5	
Feb. 1-28.....	217	--	--	--	--	35	--	376	0	77	--	--	--	--	491	.67	288	353	45	.8	790	7.4	
Mar. 1-24.....	264	--	--	--	--	32	--	362	0	68	--	--	--	--	478	.65	341	351	54	.7	746	7.3	
Mar. 25.....	355	19	.06	68	36	28	7.4	351	0	60	19	.3	4.1	.13	432	.59	414	319	31	.7	682	7.7	
Mar. 26-31.....	504	--	--	--	--	28	--	328	0	57	--	--	--	--	429	.58	584	304	34	.7	671	7.2	
Apr. 1-3.....	683	--	--	--	--	27	--	314	0	49	--	--	--	--	394	.54	727	286	29	.7	632	7.9	
Apr. 4-8.....	5,090	--	--	--	--	16	--	216	0	38	--	--	--	--	277	.38	3,810	202	25	.5	454	7.7	
Apr. 9-16.....	12,890	--	--	--	--	8.3	--	135	0	36	--	--	--	--	199	.27	6,930	140	29	.3	322	7.4	
Apr. 17-24.....	16,920	--	--	--	--	8.4	--	153	0	45	--	--	--	--	227	.31	10,370	162	37	.3	361	7.5	
Apr. 25-27.....	11,480	--	--	--	--	13	--	164	0	68	--	--	--	--	279	.38	8,650	187	53	.4	422	7.6	
Apr. 28-30.....	6,250	--	--	--	--	15	--	187	0	81	--	--	--	--	312	.42	5,260	216	63	.4	478	7.8	
May 1-18.....	4,107	--	--	--	--	18	--	232	0	111	--	--	--	--	387	.53	4,290	275	85	.5	597	7.7	
May 19-26.....	13,480	--	--	--	--	14	--	208	0	105	--	--	--	--	364	.50	13,250	260	89	.4	542	7.6	
May 27.....	23,800	19	.21	55	17	9.6	5.4	193	0	78	1.5	.2	.4	.04	324	.44	20,820	206	48	.3	457	7.8	
May 28-June 16..	21,090	--	--	--	--	10	--	196	0	81	--	--	--	--	317	.43	18,050	226	65	.3	464	7.5	

June 17, 1962...	25,500	18	.15	49	18	6.8	2.7	185	0	62	.0	.2	.6	.09	282	.38	19,420	197	45	.2	397	7.7
June 18-30.....	17,670	--	--	--	--	11	--	219	0	77	--	--	--	--	322	.44	15,360	238	58	.3	483	7.5
July 1-6.....	7,762	--	--	--	--	15	--	252	0	91	--	--	--	--	379	.52	7,940	279	72	.4	563	7.4
July 7-19.....	18,590	--	--	--	--	11	--	198	0	61	--	--	--	--	285	.39	14,300	205	43	.3	429	7.3
July 20-31.....	12,080	--	--	--	--	16	--	222	0	77	--	--	--	--	331	.45	10,800	238	56	.5	505	7.3
Aug. 1-18.....	6,748	--	--	--	--	19	--	243	0	96	--	--	--	--	378	.51	6,890	266	67	.5	569	7.5
Aug. 19.....	6,830	18	.11	53	26	19	6.9	220	0	94	5.0	.2	.5	.10	352	.48	6,490	241	61	.5	541	7.5
Aug. 20-Sept. 30	3,598	--	--	--	--	19	--	236	0	95	--	--	--	--	368	.50	3,580	262	68	.5	557	7.4
Weighted average.....	5,404	--	--	--	--	13	--	207	0	76	--	--	--	--	318	0.43	4,650	228	58	0.4	481	7.5
Time-weighted average.....	--	--	--	--	--	23	--	277	0	79	--	--	--	--	392	--	--	280	54	0.6	613	7.4
Tons per day..	--	--	--	--	--	192	--	3,020	0	1,110	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

RED RIVER OF THE NORTH BASIN--Continued

5-994. LITTLE PEMBINA RIVER NEAR WALHALLA, N. DAK.

LOCATION.--At gaging station at bridge, 3.5 miles above mouth and 6 miles southwest of Walhalla, Cavalier County.
DRAINAGE AREA.--182 square miles, of which 10 square miles is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April to June 1962 (discontinued).
Sediment records: April to June 1962 (discontinued).

Chemical analyses, in parts per million, April to June 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Apr. 16, 1961	7.0	20		0.02	0.00	88	17	57	8.0	211	0	223	20	0.4	1.2	0.03	556	289	116	1.5	805	7.2	13
Apr. 12, 1962	12	17		.06	.18	52	14	39	6.0	136	0	143	11	.2	3.4	.08	385	189	77	1.2	561	7.6	22
Apr. 18.....	1,750	18		.11	.02	41	6.2	13	4.4	142	0	41	.0	.2	.2	.04	211	128	12	.5	319	7.1	22
Apr. 25.....	127	25		--	--	43	9.4	30	6.0	124	0	99	8.4	.2	.3	.09	300	146	44	1.1	428	7.1	--
May 2.....	37.0	--		--	--	61	14	44	7.3	156	0	158	13	--	--	--	416	209	81	1.3	603	7.1	--
May 11.....	22	--		--	--	66	17	52	8.3	172	0	184	16	--	--	--	470	235	94	1.5	684	7.4	--
May 16.....	57	--		--	--	64	15	55	8.1	164	0	185	17	--	--	--	472	220	86	1.6	675	7.5	--
May 24.....	56	24		--	--	60	17	60	7.7	172	0	178	15	.3	.1	.16	476	220	79	1.8	688	7.6	--
May 27.....	29	26		.04	.00	68	18	65	8.8	192	0	214	17	.4	.1	.16	527	244	87	1.8	744	7.3	17
May 30.....	63	26		--	--	61	13	52	7.5	180	0	150	10	.5	.2	.15	436	205	57	1.6	627	7.5	--
June 6.....	28	24		--	--	67	20	65	8.3	200	0	197	17	.4	.1	.19	522	249	85	1.8	749	7.5	--
June 13.....	21	--		--	--	72	20	67	8.6	216	0	209	16	--	--	--	550	263	86	1.8	783	7.8	--
June 20.....	16	--		--	--	77	21	69	9.0	228	0	217	16	--	--	--	572	279	92	1.8	816	7.8	--
June 27.....	6.4	27		--	--	87	25	71	10	251	0	232	18	.4	.1	.20	626	318	112	1.7	885	7.8	--

RED RIVER OF THE NORTH BASIN--Continued

5-994. LITTLE PEMBINA RIVER NEAR WALHALLA, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge and particle size, April to June 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 12, 1962.....	1515		33	12	119	4	--	--	--	--	--	--	--	--	--	--	--	
Apr. 14.....	1405		32	15	130	5	--	--	--	--	--	--	--	--	--	--	--	
Apr. 16.....	1320		32	40	293	32	61	75	--	--	--	100	--	--	--	--	--	VPWC
Apr. 17.....	1400		35	780	4,160	8,760	49	58	73	86	94	99	100	--	--	--	--	VPWC
Apr. 18.....	0840		32	3,000	2,880	23,300	--	--	--	--	--	--	--	--	--	--	--	
Apr. 18.....	1800		36	1,700	7,510	34,500	40	50	60	70	78	87	92	97	100	--	--	VPWC
Apr. 19.....	0830		34	1,140	5,230	16,100	36	42	51	58	65	71	85	92	98	99	100	SVPWC
Apr. 25.....	0900		43	127	820	281	--	--	--	--	--	89	89	94	97	97	100	SV
May 2.....	0800		48	37	266	27	--	--	--	--	--	--	--	--	--	--	--	
May 11.....	1700		51	22	158	9	--	--	--	--	--	--	--	--	--	--	--	
May 16.....	0930		49	57	481	74	--	--	--	--	--	--	--	--	--	--	--	
May 24.....	1010		50	56	423	64	--	--	--	--	--	--	--	--	--	--	--	
May 27.....	1505		68	29	181	14	--	--	--	--	--	--	--	--	--	--	--	
May 30.....	0845		54	63	1,710	291	--	--	--	--	--	98	99	99	100	--	--	V
June 6.....	0830		59	28	159	12	--	--	--	--	--	--	--	--	--	--	--	
June 13.....	0800		--	21	117	7	--	--	--	--	--	--	--	--	--	--	--	
June 20.....	0900		58	16	74	3	--	--	--	--	--	--	--	--	--	--	--	
June 27.....	0830		68	6.4	46	.8	--	--	--	--	--	--	--	--	--	--	--	

5-996. PEMBINA RIVER AT WALHALLA, N. DAK.

LOCATION.--At bridge on State Highway 32, about 3.5 miles downstream from gaging station, 5 miles downstream from Little Pembina River, and 0.4 mile south of Walhalla, Pembina County.
DRAINAGE AREA.--3,290 square miles.
RECORDS AVAILABLE.--Chemical analyses: March to September 1962.
Water temperatures: April to September 1962.
Sediment records: April to September 1962.
EXTREMES, March to September 1962.--Dissolved solids: Maximum, 503 ppm Aug. 1-31; minimum, 232 ppm Apr. 18.
Hardness: Maximum, 352 ppm Mar. 28-31; minimum, 135 ppm Apr. 18.
Specific conductance: Maximum daily, 769 micromhos July 3; minimum daily, 325 micromhos Apr. 18.
Water temperatures (April to September 1962): Maximum, 73°F June 28.
Sediment concentrations (April to September 1962): Maximum daily, 6,590 ppm Apr. 20; minimum daily, 9 ppm Sept. 25.
Sediment loads (April to September 1962): Maximum daily, 65,400 tons Apr. 19; minimum daily, 1 ton Apr. 1-4, 6.
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 Pembina River near Walhalla were adjusted by the North Dakota Surface Water Branch from measurements made at the bridge to compensate for additional inflow and time lag.

Chemical analyses, in parts per million, March to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Mar. 28-31, 1962	9.0	21	0.01	99	26	21	4.2	342	0	101	7.3	0.3	0.0	0.06	464	0.63	11.3	352	72	0.5	706	7.8	2
Apr. 1-3.....	6.3	22	--	72	25	21	4.2	258	0	102	7.0	.4	2.4	.04	384	.52	6.53	284	72	.5	609	7.9	--
Apr. 4-5.....	5.5	15	.02	78	9.8	15	4.0	228	0	70	5.8	.2	.1	.05	312	.42	4.63	235	48	.4	500	7.4	4
Apr. 6-11.....	22.4	16	--	73	22	35	11	207	0	158	11	.3	1.7	.07	442	.60	26.7	273	103	.9	663	7.8	8
Apr. 12-16.....	71.8	17	--	50	15	33	5.9	151	0	118	8.2	.3	2.2	.07	334	.45	64.7	188	64	1.1	519	7.7	7
Apr. 17.....	600	24	--	61	9.7	18	5.2	188	0	69	.0	.3	6.8	.02	304	.41	492	192	38	.6	458	7.8	--
Apr. 18.....	3,470	19	.08	41	7.9	13	4.0	139	0	56	.0	.2	2.0	.03	232	.32	2,170	135	21	.5	325	7.2	27
Apr. 19-20.....	3,880	22	--	55	8.3	15	4.6	168	0	59	.0	.3	5.5	.05	256	.35	2,680	171	33	.5	452	7.4	--
Apr. 21-24.....	1,870	25	--	51	9.5	19	2.8	154	0	72	6.6	.3	3.4	.15	280	.38	1,410	166	40	.6	405	7.3	17
Apr. 25-27.....	721	25	.13	51	12	25	3.9	149	0	101	4.2	.4	2.5	.12	316	.43	615	177	55	.8	460	7.3	--
Apr. 28-May 10..	284	22	.04	55	16	32	6.3	157	0	136	7.2	.4	1.1	.12	366	.50	281	204	75	1.0	537	7.2	15
May 11-31.....	353	23	.08	66	19	44	7.0	184	0	168	10	.4	.3	.15	452	.61	431	242	91	1.2	651	7.2	17
June 1-11.....	323	22	.08	66	21	47	7.1	203	0	169	11	.4	.2	.18	468	.64	408	251	85	1.3	677	7.5	17
June 12-July 31.	109	27	.03	70	24	47	8.0	244	0	159	11	.4	.1	.16	493	.67	145	275	75	1.2	715	7.6	12
Aug. 1-31.....	78.6	29	.06	68	28	52	8.6	265	0	156	12	.3	.3	.18	503	.68	107	284	67	1.3	731	7.7	--

Sept. 1-16, 1962	98.2	25	.07	56	28	45	8.6	243	0	135	11	.3	0.2	0.16	444	.60	118	253	54	1.2	659	7.7	--
Sept. 17-30.....	74.0	21	.06	63	29	48	9.2	260	0	146	12	.3	.3	.16	477	.65	95.3	277	64	1.3	707	7.5	--
Weighted average.....	252	24	0.07	58	16	32	5.8	186	0	116	6.8	0.3	2.0	0.12	369	0.50	252	211	59	0.9	549	7.4	--
Tons per day..	--	16.0	0.05	40.0	11.0	22.0	4.0	127	0	79.0	4.6	0.2	1.4	0.08	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, April to September 1962

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

RED RIVER OF THE NORTH BASIN--Continued

5-996. PEMBINA RIVER AT WALHALLA, N. DAK.--Continued

Suspended sediment, April to September 1962

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	7.0	--	E 1	305	370	300	449	810	980
2..	6.0	--	E 1	270	300	220	371	500	500
3..	6.0	63	1	265	--	E 190	329	310	280
4..	5.0	65	B 1	260	--	E 150	301	230	190
5..	6.0	120	2	255	--	E 130	282	--	E 150
6..	2.5	110	1	250	--	E 110	261	--	E 140
7..	10	100	3	245	--	E 110	429	1540	1780
8..	15	97	4	238	--	E 100	327	540	480
9..	20	51	3	230	--	E 100	282	240	B 180
10..	16	43	2	225	--	E 95	267	200	B 140
11..	71	160	31	221	160	95	253	200	140
12..	63	160	27	223	170	100	228	190	B 120
13..	63	160	27	223	190	110	208	160	B 90
14..	113	150	46	419	3470	3930	200	140	76
15..	53	220	31	403	1510	1640	205	140	B 75
16..	67	250	B 45	340	500	460	214	150	B 85
17..	600	2420	3920	311	340	290	195	150	B 80
18..	3470	4390	41100	303	390	320	184	150	75
19..	4210	5750	65400	507	2920	4000	179	150	B 70
20..	3550	6590	63200	489	2170	2870	176	140	B 65
21..	2880	5080	39500	386	670	700	166	120	54
22..	1980	2510	13400	336	500	B 450	155	100	B 42
23..	1460	2140	8440	356	1100	B 1100	144	100	39
24..	1150	1790	5560	364	700	690	134	110	40
25..	914	1200	2960	307	290	240	125	100	34
26..	707	930	1780	290	230	180	114	90	28
27..	541	680	990	273	190	140	107	75	22
28..	442	560	670	251	180	B 120	102	60	17
29..	374	460	460	247	220	B 150	96	50	13
30..	332	420	380	528	3260	4650	89	40	10
31..	--	--	--	641	3180	5500	--	--	--
Total	23133.5	--	247986	9961	--	29240	6572	--	5995

	JULY			AUGUST			SEPTEMBER		
1..	84	46	10	57	16	2	107	64	18
2..	81	50	11	59	15	2	112	61	18
3..	73	50	10	58	23	4	114	65	20
4..	87	50	12	64	36	B 6	107	62	18
5..	84	40	9	72	50	10	107	60	17
6..	84	55	12	82	50	B 12	105	55	16
7..	90	220	53	75	36	7	102	63	17
8..	309	3560	2970	69	25	5	100	65	B 18
9..	129	650	230	66	19	3	102	52	14
10..	96	190	49	66	15	3	97	55	14
11..	83	55	12	73	23	5	94	49	12
12..	76	45	9	76	38	8	91	46	11
13..	69	42	8	72	44	9	86	40	9
14..	67	24	4	71	27	5	84	36	8
15..	66	20	4	76	33	7	82	43	10
16..	65	20	4	82	39	9	82	46	B 10
17..	63	15	3	76	36	B 7	81	35	8
18..	63	18	3	73	31	6	82	30	7
19..	60	22	4	74	34	7	81	28	B 6
20..	63	20	3	76	35	7	80	26	6
21..	62	22	4	77	36	B 7	78	30	6
22..	64	57	10	84	64	15	78	27	6
23..	64	40	7	89	120	29	76	27	6
24..	59	26	4	105	150	B 42	76	24	5
25..	57	21	3	96	110	29	72	9	2
26..	59	23	4	87	49	12	72	23	4
27..	59	25	4	96	49	13	68	21	4
28..	55	12	2	87	51	12	65	22	4
29..	57	13	2	94	49	12	64	22	4
30..	57	12	2	101	53	14	63	32	5
31..	56	13	2	105	59	17	--	--	--
Total	2441	--	3464	2438	--	326	2608	--	303

Total discharge for period April to September (cfs-days)..... 47153.5
Total load for period April to September (tons)..... 287314

E Estimated.
B Computed from estimated-concentration graph.

5-996. PEMBINA RIVER AT WALHALLA, N. DAK.--Continued

Periodic determinations of suspended-sediment discharge and particle size, April to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 17, 1962.....	0945		33	280	690	520	--	--	--	--	--	94	97	99	100	--	--	V
Apr. 17.....	1500		40	800	2,870	6,200	53	57	64	74	82	87	93	97	100	--	--	VPWC
Apr. 17.....	1800		38	1,200	5,050	16,400	39	49	58	66	74	85	92	97	100	--	--	VPWC
Apr. 18.....	1500		37	3,200	4,200	36,300	40	--	61	70	78	89	95	98	100	--	--	VPWC
Apr. 18.....	1545		34	3,260	4,360	38,400	42	52	62	73	81	86	92	94	97	98	99	SVPWC
Apr. 19.....	0800		33	4,280	4,340	50,200	44	58	70	79	85	90	94	96	100	--	--	VPWC
Apr. 19.....	1105		36	3,520	4,360	41,400	46	59	69	78	86	94	98	100	--	--	--	VPWC
Apr. 19.....	1930		38	3,830	6,200	64,100	34	42	51	57	64	68	74	77	89	96	100	SVPWC
Apr. 20.....	1930		42	4,150	8,980	101,000	29	--	38	45	56	60	64	70	90	92	100	SVPWC
Apr. 22.....	0830		42	2,070	2,510	14,000	59	64	--	81	--	81	86	91	100	--	--	VPWC
Apr. 24.....	1930		50	1,070	3,300	9,530	18	21	26	31	33	33	36	41	91	98	100	SVPWC
May 14.....	0830		50	541	1,940	2,830	38	47	55	61	65	68	70	71	92	94	100	SVPWC
May 19.....	1930		52	705	7,010	13,300	68	71	82	91	--	95	95	96	98	98	99	SVPWC
May 27.....	1245		62	269	160	120	--	--	--	--	--	93	95	98	100	--	--	V
May 30.....	1800		53	868	7,240	17,000	15	18	22	27	42	98	99	99	100	--	--	VPWC

Particle-size analyses of bed material, April to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Apr. 5. 1962.....	1630	4		6.6		0	1	3	14	19	23	27	34	50	50	100	SV
Apr. 9.....	1515	4		25		1	2	4	14	24	31	38	48	60	100	--	SV
Apr. 13.....	1145	8		116		1	2	6	19	29	35	42	54	72	100	--	SV
Apr. 17.....	0945	8		280		2	4	14	34	45	53	62	72	84	100	--	SV
Apr. 18.....	1500	6		3,200		4	8	23	46	59	70	81	89	97	100	--	SV
May 27.....	1245	7		269		0	1	7	42	55	67	77	85	89	91	100	SV
June 3.....	1510	7		322		0	1	6	23	32	40	52	64	79	79	100	SV

RED RIVER OF THE NORTH BASIN--Continued

5-1200. *SOURIS (MOUSE) RIVER NEAR VERENDRYE, N. DAK.*

LOCATION.--At gaging station, 2.7 miles north of Verendrye, McHenry County, and 7.5 miles southwest of (19 miles upstream from) mouth of Wintering River.
DRAINAGE AREA.--12,000 square miles, approximately, of which about 7,400 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1951, August 1952 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Nov. 1, 1961.	9.4	--		--		68	31	114	--	428	0	154	33	--	--	--	657	299	0	2.9	1,040	7.6	--
Nov. 16.....	24	--		--		56	28	182	--	489	0	124	104	--	--	--	752	256	0	4.4	1,280	7.4	--
Dec. 13.....	4.5	--		0.42		83	44	173	--	575	0	--	--	--	--	--	911	388	0	3.8	1,390	7.6	--
Jan. 11, 1962	3.0	22		1.3		95	54	189	19	622	22	201	71	0.5	28	0.30	1,050	460	0	3.8	1,540	8.4	18
Feb. 7.....	2.2	--		1.4		100	45	182	--	616	0	213	62	--	--	--	1,010	436	0	3.8	1,480	8.0	--
Feb. 21.....	.9	--		--		--	--	185	--	620	0	--	--	--	--	--	1,010	441	0	3.8	1,490	7.6	--
Mar. 5.....	1.6	--		--		--	--	224	--	664	0	--	--	--	--	--	1,050	448	0	4.6	1,550	8.0	--
Mar. 21.....	3.0	--		--		--	--	195	--	621	0	--	--	--	--	--	1,010	426	0	4.1	1,520	7.5	--
Mar. 27.....	560	6.6		.07		19	6.4	35	10	108	0	56	12	.0	.7	.10	223	74	0	.2	353	6.9	60
May 2.....	40	--		--		52	29	75	--	344	0	115	20	--	--	--	508	248	0	2.1	790	7.6	--
June 13.....	15	--		--		71	38	161	--	448	0	281	23	--	--	--	847	334	0	3.8	1,250	7.9	--
Aug. 6.....	3.1	--		--		68	30	128	--	419	0	175	32	--	--	--	679	294	0	3.2	1,040	7.6	--
Aug. 15.....	136	10		.32		34	12	38	8.1	165	0	78	4.6	.2	.5	.13	287	135	0	1.4	442	7.3	--
Sept. 9.....	6.4	--		.09		63	27	100	11	381	0	162	16	--	--	--	608	270	0	2.6	917	8.0	--

5-1240. SOURIS (MOUSE) 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, of which about 10,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1962.
Water temperatures: October 1954 to September 1955, October 1956 to September 1959, October 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 3,060 ppm Dec. 22-28; minimum, 363 ppm Apr. 1-7.
Hardness: Maximum, 1,330 ppm Dec. 22-28; minimum, 170 ppm Apr. 1-7.
Specific conductance: Maximum daily, 3,900 micromhos Dec. 28; minimum daily, 536 micromhos Apr. 5.
Water temperatures: Maximum, 79°F Aug. 1; minimum, freezing point on many days during November, December, and April.
EXTREMES, 1954-55, 1956-62.--Dissolved solids (1954-55, 1956-58, 1959-62): Maximum, 3,650 ppm Feb. 8-28, 1961; minimum, 162 ppm Apr. 13-18, 1957.
Hardness: Maximum, 1,570 ppm Feb. 8-28, 1961; minimum, 85 ppm Apr. 13-18, 1957.
Specific conductance: Maximum daily (1956-62), 4,750 micromhos Feb. 21, 1961; minimum daily, 232 micromhos Apr. 18, 1957.
Water temperatures: Maximum (1959-62), 82°F July 14, 1960; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	11.1	4.6	0.17	58	71	184	23	339	0	470	63	0.6	8.0	0.27	1,080	1.47	32.4	436	158	3.8	1,560	7.1	28
Nov. 1-30.....	3.4	--	--	--	--	211	--	450	0	549	--	--	--	--	1,350	1.84	12.4	585	216	3.8	1,870	7.4	--
Dec. 1-21.....	1.5	2.8	.06	125	141	325	39	785	0	783	108	.7	7.9	.48	2,040	2.77	8.26	893	249	4.7	2,710	7.9	45
Dec. 22-28.....	.1	--	--	--	--	461	--	1,230	0	1,100	--	--	--	--	3,060	4.16	.83	1,330	320	5.5	3,790	7.9	--
Apr. 1-7, 1962..	2.7	--	--	--	--	48	--	111	0	154	--	--	--	--	363	.49	2.65	170	79	1.6	570	7.0	--
Apr. 8.....	3.0	3.9	.04	29	27	53	9.6	128	0	168	18	.3	7.2	.11	400	.54	3.24	184	79	1.7	633	7.3	--
Apr. 9-19.....	1.9	--	--	--	--	73	--	164	0	219	--	--	--	--	514	.70	2.64	240	106	2.1	783	7.0	--
Apr. 20-30.....	1.4	--	--	--	--	117	--	249	0	318	--	--	--	--	764	1.04	2.89	337	133	2.8	1,120	7.1	--
May 1-12.....	4.9	--	--	--	--	156	--	304	0	483	--	--	--	--	1,080	1.47	14.3	480	231	3.1	1,480	7.5	--
May 13.....	6.6	2.6	.03	73	80	155	23	331	0	511	49	.5	6.5	.24	1,150	1.56	20.5	509	238	3.0	1,550	7.8	--
May 14-31.....	4.9	--	--	--	--	150	--	315	0	442	--	--	--	--	1,020	1.39	13.5	461	203	3.0	1,440	7.5	--
June 1-15.....	4.3	6.3	.10	57	65	133	20	310	0	372	42	.3	7.6	.28	914	1.24	10.6	410	156	2.9	1,290	7.5	37
June 16-30.....	5.3	--	--	--	--	109	--	261	0	312	--	--	--	--	763	1.04	10.9	338	124	2.6	1,100	7.3	--
July 1-31.....	6.5	--	--	--	--	108	--	218	0	296	--	--	--	--	699	.95	12.3	292	113	2.8	1,020	7.2	--
Aug. 1-18.....	11.2	--	--	--	--	120	--	224	0	310	--	--	--	--	753	1.02	22.8	298	114	3.0	1,080	7.0	--
Aug. 19.....	10	25	.08	39	50	122	17	233	0	319	34	.4	14	.25	812	1.10	21.9	305	114	3.0	1,100	7.5	--

RED RIVER OF THE NORTH BASIN--Continued

5-1240. SOURIS (MOUSE) RIVER NEAR WESTHOPE, N. DAK.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Aug. 20-31, 1962	9.2	--	--	--	--	127	--	236	0	301	--	--	--	--	778	1.06	19.3	308	114	3.1	1,120	7.4	--
Sept. 1-30.....	10.4	--	--	--	--	134	--	236	0	349	--	--	--	--	814	1.11	22.9	320	126	3.3	1,160	7.3	--
Weighted average.....	a 4.6	--	--	--	--	147	--	289	0	387	--	--	--	--	921	1.25	15	382	145	3.2	1,310	7.2	--
Tons per day..	--	--	--	--	--	2.4	--	5	0	6.4	--	--	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 272 days of actual flow, 6.1 cfs.

Temperature (°F) of water, water year October 1961 to September 1962

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

LAKE OF THE WOODS BASIN

5-1305. STURGEON RIVER NEAR CHISHOLM, MINN.

LOCATION.--At highway bridge, 1,000 feet downstream from gaging station, about 0.8 mile downstream from East Branch Sturgeon River, and about 11.8 miles north of Chisholm, St. Louis County.
DRAINAGE AREA.--187 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1958 to September 1959, July 1960 to September 1962 (discontinued).

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 3, 1961.	53.8	--		0.57	--	--	--	1.1	--	41	0	6.3	0.2	--	--	--	81	38	4	0.1	86	6.9	80
Oct. 31.....	74.5	8.6		.57	0.00	14	1.5	2.3	0.8	43	0	12	.0	0.2	0.9	0.06	92	41	6	.2	91	7.2	70
Nov. 28.....	36.1	10		.79	--	14	3.7	2.7	1.6	55	0	12	.0	.2	.9	.05	103	50	5	.2	110	6.9	70
Jan. 3, 1962.	19.2	--		--	--	15	4.8	4.0	--	67	0	10	.2	--	--	--	94	57	2	.2	129	6.8	30
Feb. 7.....	16.9	--		--	--	--	--	3.6	--	72	0	6.3	.2	--	--	--	97	58	0	.2	126	7.1	--
Mar. 14.....	14.5	--		--	--	--	--	2.7	--	78	0	5.8	.0	--	--	--	101	64	0	.1	137	7.2	--
Apr. 16.....	89.4	9.6		.56	--	9.9	3.7	2.2	2.1	41	0	9.5	.5	.1	1.7	.04	82	40	6	.2	96	6.7	45
May 24.....	770	5.2		.41	.00	7.0	2.3	1.8	.6	24	0	9.3	1.1	.1	.4	.04	86	27	7	.2	58	6.4	150
June 11.....	317	--		--	--	--	--	1.2	--	33	0	8.3	.0	--	--	--	102	33	6	.1	69	7.0	--
July 10.....	243	--		--	--	--	--	.3	--	34	0	6.5	.1	--	--	--	92	34	6	.0	65	6.9	--
Sept. 27.....	72	--		--	--	--	--	.6	--	42	0	6.3	.2	--	--	--	94	40	6	.0	78	6.8	--

MISSISSIPPI RIVER MAIN STEM

5-2885. MISSISSIPPI RIVER NEAR ANOKA, MINN.

LOCATION.--At hydroelectric plant of Northern States Power Co. at Coon Rapids, 1.5 miles upstream from gaging station and 5 miles downstream from Anoka, Anoka County.
DRAINAGE AREA.--19,100 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: August 1960 to September 1962.
Water temperatures: August 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 238 ppm Jan. 1-31; minimum, 124 ppm Apr. 11-19.
Hardness: Maximum, 195 ppm Jan. 1 to Feb. 28; minimum, 85 ppm Apr. 11-19.
Specific conductance: Maximum daily, 400 micromhos Feb. 9; minimum daily, 167 micromhos Apr. 15.
Water temperatures: Maximum, 77°F June 30, July 1, Aug. 8, 10; minimum, freezing point on several days during January.
EXTREMES, 1960-62.--Dissolved solids: Maximum, 238 ppm Jan. 1-31, 1961, Jan. 1-31, 1962; minimum, 124 ppm Apr. 11-19, 1962.
Hardness: Maximum, 205 ppm Jan. 1-31, 1961; minimum, 85 ppm Apr. 11-19, 1962.
Specific conductance: Maximum daily, 427 micromhos Dec. 25, 1960; minimum daily, 167 micromhos Apr. 15, 1962.
Water temperatures: Maximum, 82°F July 26, Aug. 8, 9, 1961; minimum, freezing point on many days during December 1960, March 1961, and January 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	2,368	6.4	0.04	41	16	8.3	1.9	200	0	14	3.0	0.1	0.7	0.05	205	0.28	1,310	168	4	0.3	353	7.2	15
Nov. 1-30.....	2,767	6.5	.08	40	18	8.8	2.5	204	0	17	4.2	.1	1.3	.01	219	.30	1,640	176	9	.3	359	7.2	20
Dec. 1-31.....	2,245	11	.07	44	19	7.0	2.3	220	0	16	3.8	.1	2.1	.06	231	.31	1,400	189	9	.2	384	7.4	20
Jan. 1-31, 1962.	2,195	15	.07	43	21	7.8	2.1	228	0	12	3.6	.1	3.1	.06	238	.32	1,410	195	8	.2	391	7.5	20
Feb. 1-28.....	2,136	16	.06	50	17	7.1	1.5	231	0	13	2.2	.2	2.7	.04	236	.32	1,360	195	6	.2	400	7.4	7
Mar. 1-31.....	3,371	15	.07	44	16	6.8	1.9	208	0	11	3.5	.2	2.3	.04	214	.29	1,950	176	5	.2	355	7.5	5
Apr. 1-10.....	13,580	13	.26	33	11	4.9	2.9	146	0	11	2.0	.1	4.7	.04	169	.23	6,200	129	9	.2	270	7.6	15
Apr. 11-19.....	20,560	9.1	--	22	7.3	2.7	3.3	92	0	11	.0	.1	3.7	.04	124	.17	6,680	85	10	.1	185	7.4	32
Apr. 20-May 3...	11,610	10	.30	34	11	4.2	2.7	148	0	13	.9	.1	1.4	.04	169	.23	5,300	131	10	.2	266	7.8	28
May 4-10.....	8,419	9.0	.06	40	13	4.6	2.4	179	0	13	1.4	.1	.6	.04	191	.26	4,340	153	6	.2	306	7.7	26
May 11-31.....	20,170	9.9	.17	35	11	3.9	2.0	149	0	13	.0	.2	.9	.01	180	.24	9,800	131	9	.1	264	7.5	45
June 1-3.....	30,570	12	.27	41	2.8	2.8	1.9	130	0	14	.0	.2	1.0	.05	170	.23	14,030	114	7	.1	226	7.4	--
June 4-12.....	21,670	12	.37	36	10	3.2	1.7	148	0	13	.0	.2	1.1	.05	186	.25	10,880	133	12	.1	255	7.2	60
June 13-26.....	12,840	11	.14	39	12	3.9	1.9	169	0	12	.0	.2	.8	.04	198	.27	6,860	146	7	.1	283	7.4	45
June 27-July 4..	8,956	11	.08	40	13	4.1	1.5	178	0	11	.0	.2	.5	.03	193	.26	4,670	152	6	.1	297	7.3	40
July 5-31.....	12,460	13	.12	42	13	3.9	1.5	182	0	11	.0	.2	1.1	.04	202	.27	6,800	158	9	.1	305	7.4	45
Aug. 1-21.....	9,169	11	.08	43	13	4.6	1.4	194	0	8.8	1.3	.2	.8	.03	202	.27	5,000	163	4	.2	312	8.0	25
Aug. 22-31.....	7,120	11	.13	42	13	4.6	1.4	189	0	8.8	.1	.2	.6	.03	198	.27	3,810	158	3	.2	308	7.8	25

Sept. 1-23, 1962	6,963	30	0.06	38	16	4.8	1.6	193	0	10	0.5	0.2	0.4	0.04	204	0.28	3,840	162	4	0.2	316	7.2	15
Sept. 24.....	7,010	11	.08	39	14	4.6	2.4	183	0	12	.0	.2	.4	.04	194	.26	3,670	156	6	.2	303	7.2	24
Sept. 25-30.....	6,422	11	.09	40	14	4.8	2.0	186	0	10	.6	.2	.4	.04	202	.27	3,500	158	6	.2	309	7.3	25
Weighted average.....	7,584	12	0.15	38	12	4.6	2.0	169	0	12	0.9	0.2	1.5	0.04	190	0.26	3,900	146	8	0.2	291	7.4	33
Time-weighted average.....	--	13	0.11	41	15	5.9	2.0	192	0	12	1.9	0.2	1.6	0.04	206	--	--	164	7	0.2	330	7.4	24
Tons per day..	--	251	3.10	778	255	94.0	41.0	3,460	0	245	18.0	3.0	30.0	0.73	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

MINNESOTA RIVER BASIN

5-3045. *CHIPPEWA RIVER NEAR MILAN, MINN.*

LOCATION.--At gaging station at bridge on State Highway 40, 2.0 miles upstream from small tributary and 5.5 miles east of Milan, Chippewa County.
DRAINAGE AREA.--1,870 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 31, 1961	25.3	13		0.08	--	107	39	19	4.6	356	0	162	11	0.3	0.0	0.11	555	426	134	0.4	808	7.6	3
Nov. 2.....	31	11		.02	0.01	91	43	18	4.2	338	0	156	9.7	.2	.1	.08	522	405	128	.4	780	7.9	10
Dec. 5.....	37.0	14		.02	--	48	43	16	3.4	214	0	144	7.4	.2	2.0	.07	404	298	123	.4	613	7.6	7
Jan. 11, 1962	7.4	30		.08	--	150	59	29	5.4	512	0	220	17	.4	4.1	.12	801	616	196	.5	1,140	8.0	3
Feb. 14.....	5.8	28		.12	--	148	61	39	6.2	509	0	231	32	.6	8.4	.28	836	620	203	.7	1,180	7.7	17
Mar. 14.....	7.8	28		.08	--	118	48	30	4.6	401	0	176	25	.4	8.8	.11	678	493	164	.6	974	7.8	--
Apr. 2.....	930	12		.11	.01	35	13	4.0	7.3	118	0	44	4.2	.2	13	.03	230	140	43	.1	316	6.9	45
Apr. 19.....	520	21		.12	--	66	22	8.7	6.1	225	0	100	.3	.2	2.0	.06	376	255	70	.2	538	7.8	39
June 28.....	309	24		.29	--	79	42	11	6.1	338	0	104	.1	.4	.3	.11	472	368	91	.2	686	7.9	--
July 24.....	1,600	27		.19	.04	60	25	6.3	5.2	248	0	57	.0	.1	2.6	.09	324	253	50	.2	483	7.6	--
Aug. 27.....	35.7	28		.17	--	71	40	9.6	6.2	321	0	89	1.8	.3	.3	.09	435	343	80	.2	655	7.3	27
Sept. 24.....	261	22		.22	--	80	40	11	5.7	336	0	106	3.1	.2	.2	.03	459	364	88	.3	675	8.0	--

MINNESOTA RIVER BASIN--Continued

5-3045. CHIPPEWA RIVER NEAR MILAN, MINN.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1961 to September 1962
(Metbods of analysis: B, bottom witbdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 3, 1960.....	0830		50	62	142	24											
Mar. 20, 1961.....	0830		33	71	14	2.7											
May 15.....	1520		59	240	156	101											
Apr. 2, 1962.....	1830		33	930	194	487											

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material										Method of analysis
						Percent finer than size indicated, in millimeters										
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 3, 1960.....	0830	1		62		6	7	8	37	81	93	98	100				SV
May 15, 1961.....	1520	11		240		5	9	29	49	57	62	73	84	97	100		SV

MINNESOTA RIVER BASIN--Continued

5-3110. MINNESOTA RIVER AT MONTEVIDEO, MINN.

LOCATION.--At gaging station at bridge on U.S. Highway 212 at Montevideo, Chippewa County, 500 feet downstream from Chippewa River.
DRAINAGE AREA.--6,180 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1961 to September 1962.
Water temperatures: November 1961 to September 1962.
EXTREMES, November 1961 to September 1962.--Dissolved solids: Maximum, 1,390 ppm Feb. 19-24; minimum, 210 ppm Mar. 28 to Apr. 10.
Hardness: Maximum, 984 ppm Feb. 19-24; minimum, 148 ppm Mar. 28 to Apr. 10.
Specific conductance: Maximum daily, 1,870 micromhos Feb. 24; minimum daily, 275 micromhos Apr. 3.
Water temperatures: Maximum, 76°F June 30, July 6, 7; minimum, freezing point on several days during January and February.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, November 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Nov. 2, 1961....	53	9.7	0.02	82	58	30	6.3	312	0	224	11	0.3	0.1	0.12	617	0.84	88.3	441	185	0.6	896	7.6	6
Nov. 3-29.....	59.6	8.1	--	117	69	47	8.7	348	0	352	14	.3	5.3	.28	861	1.17	139	576	291	.9	1,170	7.1	6
Nov. 30-Dec. 25.	57.7	11	.10	47	53	34	5.6	190	0	219	21	.3	1.8	.13	521	.71	81.2	336	180	.8	773	7.6	7
Dec. 26-Jan. 17, 1962.....	42.9	9.6	.05	118	69	47	8.2	362	0	331	23	.4	4.8	.25	861	1.17	99.7	578	281	.8	1,170	7.4	7
Jan. 18-31.....	40.0	7.4	.10	104	79	48	9.2	339	0	367	13	.3	4.9	.23	880	1.20	95.0	583	305	.9	1,180	7.3	8
Feb. 1-18.....	38.9	10	.19	112	77	49	9.1	358	0	361	15	.4	6.7	.28	894	1.22	93.9	596	302	.9	1,210	7.5	7
Feb. 19-24.....	37.8	43	.11	223	104	69	10	763	0	412	46	.5	15	.35	1,390	1.89	142	984	358	1.0	1,830	7.4	9
Feb. 25-Mar. 27.	105	23	.11	130	56	44	7.4	416	0	253	24	.4	12	.25	801	1.09	227	553	212	.8	1,140	7.5	7
Mar. 28-Apr. 10.	2,963	8.6	.13	38	13	5.2	7.0	108	0	60	2.0	.1	10	.05	210	.29	1,680	148	59	.2	332	7.2	27
Apr. 11-29.....	4,004	11	.19	51	27	13	8.3	158	0	122	5.2	.2	6.3	.10	332	.45	3,590	237	107	.4	511	7.0	27
Apr. 30.....	2,870	11	.19	55	28	14	7.2	168	0	134	3.4	.2	2.5	.09	356	.48	2,760	251	113	.4	539	7.2	--
May 1-9.....	2,362	5.7	.16	58	33	18	7.9	177	0	158	5.7	.3	1.6	.12	402	.55	2,560	282	137	.5	604	7.8	17
May 10-31.....	1,773	7.7	.22	79	43	25	8.5	220	0	223	7.0	.3	1.5	.17	544	.74	2,600	373	193	.6	785	7.6	17
June 1-30.....	2,399	5.5	.19	79	42	23	7.8	244	0	198	5.4	.3	.9	.16	500	.68	3,240	368	168	.5	760	7.7	19
July 1-31.....	3,743	21	.19	74	38	19	7.4	244	0	167	3.7	.2	2.0	.14	487	.66	4,920	342	142	.5	680	7.4	25
Aug. 1-31.....	2,988	21	.27	73	35	17	7.1	262	0	133	2.6	.3	1.8	.13	450	.61	3,630	326	111	.4	658	7.7	20
Sept. 1-30.....	1,056	20	.66	80	41	21	7.2	292	0	157	4.8	.4	2.0	.15	509	.69	1,450	370	131	.5	741	7.9	15
Weighted average.....	1,507	14	0.23	69	35	18	7.6	223	0	155	4.5	0.3	3.2	0.13	443	0.60	1,800	315	133	0.5	649	7.4	22
Time weighted average.....	--	14	0.21	88	49	30	7.7	284	0	224	11	0.3	4.4	0.18	611	--	--	422	189	0.6	866	7.4	15
Tons per day..	--	58.0	0.93	280	143	74.0	31.0	907	0	630	18.0	1.0	13.0	0.53	--	--	--	--	--	--	--	--	--

MINNESOTA RIVER BASIN--Continued

5-3110. MINNESOTA RIVER AT MONTEVIDEO, MINN.--Continued

Temperature (°F) of water, November 1961 to September 1962

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

MISSISSIPPI RIVER MAIN STEM

5-3310. MISSISSIPPI RIVER AT ST. PAUL, MINN.

LOCATION.--Temperature recorder at gaging station, 300 feet upstream from Robert Street Bridge in St. Paul, Ramsey County, and 6 miles downstream from Minnesota River.
DRAINAGE AREA.--36,800 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 77°F July 9-13; minimum, 34°F Jan. 29 to Feb. 2.
EXTREMES, 1956-62.--Water temperatures: Maximum, 85°F on several days during August 1958; minimum, freezing point on many days in 1956-60.

Temperature (°F) of water, water year October 1961 to September 1962
/Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph/

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

WISCONSIN RIVER BASIN

5-4037. DELL CREEK NEAR LAKE DELTON, WIS.

LOCATION.--At gaging station at Butterfield Bridge on Town Road, 6 miles southwest of Lake Delton, Sauk County, 7 miles east of Reedsburg, and 7 miles upstream frrom mouth.
DRAINAGE AREA.--44.9 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1957 to September 1962.
Sediment records: October 1957 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 67°F June 18; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 240 ppm Nov. 2; minimum daily, 1 ppm Oct. 7, Sept. 30.
Sediment loads: Maximum daily, 75 tons Nov. 2; minimum daily, 0.1 ton on several days during October, March, June, August, and September.
EXTREMES, 1957-62.--Water temperatures: Maximum, 69°F Aug. 22, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 512 ppm May 11, 1959; minimum daily, 1 ppm on many days during 1958-60, 1962.
Sediment loads: Maximum daily, 512 tons May 11, 1959; minimum daily, less than 0.05 ton May 1, 1958, Mar. 14, 1959, Feb. 21, 28, Mar. 1, 1960.
REMARKS.--Flow affected by ice Dec. 9 to Mar. 9.

Temperature (°F) of water, water year October 1961 to September 1962
(Once-daily measurement, usually between 0800 and 1000)

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

WISCONSIN RIVER BASIN--Continued

5-4037. DELL CREEK NEAR LAKE DELTON, WIS.--Continued

Suspended sediment, water year October 1961 to September 1962

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	144	33	13	32	12	1.0	35	7	0.7
2	77	31	6.4	114	S 240	A 75	36	8	.8
3	33	16	1.4	167	--	E 40	35	10	.9
4	30	12	1.0	90	25	6.1	35	12	1.1
5	28	9	.7	45	20	2.4	32	11	1.0
6	26	5	.4	40	13	1.4	32	14	1.2
7	25	1	.1	38	13	1.3	31	9	.8
8	25	2	.1	37	9	.9	28	13	1.0
9	25	9	.6	36	12	1.2	28	9	.7
10	25	10	.7	36	7	.7	29	11	.9
11	35	18	1.7	36	8	.8	29	7	.5
12	30	11	.9	36	14	1.4	28	12	.9
13	33	13	1.2	40	10	1.1	28	6	.4
14	28	10	.8	40	10	1.1	28	5	.4
15	27	8	.6	36	9	.9	28	4	.3
16	26	8	.6	80	56	12	28	10	.8
17	26	10	.7	68	32	5.9	29	10	.8
18	26	13	.9	40	13	1.4	30	11	.9
19	59	40	6.4	37	10	1.0	30	6	.5
20	42	15	1.7	36	10	1.0	30	6	.5
21	31	11	.9	36	10	1.0	30	7	.6
22	29	10	.8	41	12	1.3	30	5	.4
23	36	21	2.0	48	13	1.7	30	5	.4
24	32	16	1.4	44	12	1.4	29	3	.2
25	29	14	1.1	39	10	1.0	28	6	.4
26	28	11	.8	37	8	.8	28	4	.3
27	29	8	.6	35	8	.8	27	9	.6
28	30	12	1.0	32	10	.9	26	3	.2
29	62	43	7.2	32	8	.7	26	4	.3
30	73	25	4.9	34	8	.7	26	4	.3
31	38	15	1.5	--	--	--	26	13	.9
Total	1187	--	62.1	1462	--	166.9	915	--	19.7
	JANUARY			FEBRUARY			MARCH		
1	26	12	0.8	24	11	0.7	23	6	0.4
2	27	19	1.4	25	16	1.1	23	7	.4
3	28	10	.8	25	15	1.0	23	4	.2
4	28	15	1.1	26	13	.9	23	3	.2
5	28	16	1.2	26	14	1.0	24	3	.2
6	29	12	.9	25	11	.7	25	3	.2
7	29	8	.6	25	11	.7	25	2	.1
8	28	12	.9	24	9	.6	26	7	.5
9	28	11	.8	24	8	.5	27	5	.4
10	28	10	.8	23	10	.6	27	5	.4
11	27	8	.6	24	8	.5	29	5	.4
12	26	6	.4	24	9	.6	35	10	.9
13	26	7	.5	24	10	.6	33	8	.7
14	27	7	.5	24	10	.6	31	8	.7
15	28	9	.7	24	11	.7	30	6	.5
16	27	7	.5	25	9	.6	30	4	.3
17	27	10	.7	25	10	.7	31	5	.4
18	27	9	.6	25	8	.5	33	6	.5
19	26	7	.5	25	10	.7	34	3	.3
20	25	5	.3	25	14	.9	40	9	1.0
21	25	7	.5	25	10	.7	40	7	.8
22	25	7	.5	25	12	.8	44	12	1.4
23	25	12	.8	25	12	.8	47	13	1.6
24	25	10	.7	25	23	1.6	51	31	4.3
25	26	13	.9	25	8	.5	63	68	12
26	26	21	1.5	25	5	.3	87	95	22
27	26	13	.9	24	3	.2	113	62	19
28	25	15	1.0	23	5	.3	191	29	15
29	25	12	.8	--	--	--	266	30	22
30	24	11	.7	--	--	--	122	30	10
31	23	12	.7	--	--	--	72	28	5.4
Total	820	--	23.6	689	--	19.4	1668	--	122.2

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated-concentration graph.

WISCONSIN RIVER BASIN--Continued

5-4037. DELL CREEK NEAR LAKE DELTON, WIS.--Continued

Suspended sediment, water year October 1961 to September 1962--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	65	22	3.9	42	6	0.7	32	8	0.7
2	60	20	3.2	37	5	.5	31	6	.5
3	56	20	3.0	35	10	.9	31	7	.6
4	57	32	5.0	34	14	1.3	41	18	2.0
5	64	20	3.4	39	7	.7	38	17	1.7
6	60	20	3.2	42	12	1.4	33	13	1.2
7	76	35	7.2	37	7	.7	31	12	1.0
8	66	31	5.5	40	8	.9	30	13	1.0
9	61	24	4.0	36	8	.8	31	12	1.0
10	50	20	2.7	53	33	4.7	33	11	1.0
11	48	18	2.3	43	53	6.2	34	18	1.6
12	48	10	1.3	74	140	28	34	29	2.7
13	54	8	1.2	53	56	8.0	29	13	1.0
14	56	11	1.7	39	13	1.4	28	13	1.0
15	49	12	1.6	35	18	1.7	27	7	.5
16	46	6	.7	32	32	2.8	26	7	.5
17	44	5	.6	31	15	1.2	27	33	2.4
18	42	4	.4	32	12	1.0	88	80	19
19	40	4	.4	30	13	1.0	43	47	5.4
20	39	2	.2	29	13	1.0	30	6	.5
21	40	5	.5	30	13	1.0	29	15	1.2
22	40	3	.3	31	14	1.2	30	12	1.0
23	39	5	.5	35	26	2.4	28	17	1.3
24	37	2	.2	32	12	1.0	27	15	1.1
25	36	2	.2	29	8	.6	25	8	.5
26	35	3	.3	29	7	.5	25	6	.4
27	38	9	.9	29	8	.6	24	6	.4
28	63	40	6.8	29	18	1.4	24	2	.1
29	43	10	1.2	122	206	68	24	5	.3
30	46	11	1.4	56	56	S 10	25	14	.9
31	--	--	--	36	15	1.4	--	--	--
Total	1498	--	63.8	1251	--	153.0	958	--	52.5

Day	JULY			AUGUST			SEPTEMBER		
1	24	14	0.9	23	6	0.4	24	6	0.4
2	61	50	8.2	22	8	.5	22	3	.2
3	106	58	16	34	13	1.2	21	3	.2
4	36	18	1.7	31	17	1.4	22	4	.2
5	30	12	1.0	24	8	.5	22	6	.4
6	28	12	.9	22	8	.5	22	7	.4
7	27	15	1.1	22	7	.4	21	4	.2
8	26	8	.6	21	8	.4	21	5	.3
9	24	7	.4	21	7	.4	25	8	.5
10	24	8	.5	20	7	.4	26	8	.6
11	24	9	.6	20	4	.2	25	7	.5
12	24	10	.6	21	4	.2	23	2	.1
13	23	8	.5	21	5	.3	23	2	.1
14	24	10	.6	20	6	.3	22	3	.2
15	24	10	.6	20	4	.2	22	9	.5
16	24	10	.6	20	4	.2	25	13	.9
17	23	11	.7	20	3	.2	25	3	.2
18	23	12	.7	20	2	.1	23	3	.2
19	23	10	.6	20	4	.2	22	2	.1
20	30	17	1.4	20	4	.2	22	2	.1
21	26	12	.8	20	5	.3	23	2	.1
22	24	11	.7	19	6	.3	26	6	.4
23	23	12	.7	20	3	.2	24	3	.2
24	23	8	.5	28	12	.9	24	3	.2
25	22	7	.4	28	8	.6	24	3	.2
26	22	8	.5	22	6	.4	24	6	.4
27	22	7	.4	21	4	.2	27	4	.3
28	22	11	.6	21	4	.2	28	2	.2
29	23	6	.4	21	3	.2	24	2	.1
30	22	4	.2	25	8	.5	24	1	.1
31	22	3	.2	27	7	.5	--	--	--
Total	879	--	43.6	694	--	12.5	706	--	8.5

Total discharge for year (cfs-days)..... 12727
Total load for year (tons)..... 747.8

S Computed by subdividing day.

WISCONSIN RIVER BASIN--Continued

5-4065. BLACK EARTH CREEK AT BLACK EARTH, WIS.

LOCATION.--At gaging station, 0.7 mile east of Black Earth, Dane County, 2.1 miles upstream from Vermont Creek, and 150 feet south of U.S. Highway 14.
DRAINAGE AREA.--45.9 square miles.
RECORDS AVAILABLE.--Water temperatures: February 1954 to September 1962.
Sediment records: February 1954 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 74°F June 18; minimum, freezing point on several days during December to March.
Sediment concentrations: Maximum daily, 332 ppm Nov. 16; minimum daily, 1 ppm Oct. 8.
Sediment loads: Maximum daily, 136 tons Nov. 16; minimum daily, 0.1 ton Oct. 8, Sept. 23, 27-30.
EXTREMES, 1954-62.--Water temperatures: Maximum, 78°F July 7, 1955, June 10, 1956, July 20, 1957; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 2,010 ppm May 13, 1956; minimum daily, 1 ppm Dec. 31, 1955, Oct. 19-21, 1958; Oct. 8, 1961.
Sediment loads: Maximum daily, 3,960 tons July 3, 1954; minimum daily, less than 0.05 ton Oct. 19-21, 1958.
REMARKS.--Flow affected by ice Dec. 8-31, Jan. 1-3, 6-13, 17-20, 23-25, Feb. 6-9, 18, 19, 22, 26-28, Mar. 1, 2.

Temperature (°F) of water, water year October 1961 to September 1962

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

WISCONSIN RIVER BASIN--Continued

5-4065. BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	44	21	2.5	35	20	1.9	39	25	2.6
2	37	18	1.8	106	204 S	75	39	21	2.2
3	34	18	1.6	92	88	22	38	16	1.6
4	32	16	1.4	55	49	7.3	38	15	1.5
5	30	14	1.1	46	30	3.7	36	13	1.3
6	29	12	.9	45	24	2.9	36	88	8.6
7	28	5	.4	43	25	2.9	34	129	12
8	27	1	.1	40	26	2.8	33	28	2.5
9	27	7	.5	39	24	2.5	32	9	.8
10	27	5	.4	37	22	2.2	32	10	.9
11	32	3	.2	36	21	2.0	31	12	1.0
12	31	7	.6	35	18	1.7	31	15	1.2
13	40	12	1.3	36	18	1.7	31	17	1.4
14	34	7	.6	37	16	1.6	31	17	1.4
15	32	6	.5	34	13	1.2	32	32	2.8
16	29	10	.8	129	332 S	136	33	32	2.8
17	29	10	.8	80	110 B	25	33	24	2.1
18	28	9	.7	59	48	7.6	33	25	2.2
19	38	4	.4	51	28	3.8	32	36	3.1
20	38	4	.4	48	21	2.7	31	29	2.4
21	34	11	1.0	46	25	3.1	31	42	3.5
22	33	13	1.2	48	28	3.6	31	40	3.3
23	37	25	2.5	50	35	4.7	32	35	3.0
24	34	17	1.6	49	35	4.6	32	53	4.6
25	31	18	1.5	46	29	3.6	32	52	4.5
26	30	10	.8	44	25	3.0	31	24	2.0
27	28	13	1.0	43	24	2.8	30	15	1.2
28	28	20	1.5	41	18	2.0	30	14	1.1
29	37	24	2.4	40	14	1.5	30	15	1.2
30	54	22	3.2	40	16	1.7	29	18	1.4
31	40	17	1.8	--	--	--	28	15	1.1
Total	1032	--	35.5	1530	--	337.1	1011	--	81.3
	JANUARY			FEBRUARY			MARCH		
1	28	12	0.9	27	13	0.9	24	13	0.8
2	28	15	1.1	26	12	.8	24	10	.6
3	28	13	1.0	26	14	1.0	25	10	.7
4	29	13	1.0	27	16	1.2	26	13	.9
5	33	15	1.3	28	15	1.1	25	15	1.0
6	32	11	1.0	27	12	.9	25	16	1.1
7	31	9	.8	26	11	.8	25	14	.9
8	30	13	1.0	25	15	1.0	25	12	.8
9	29	15	1.2	25	10	.7	25	14	.9
10	28	14	1.0	25	9	.6	25	15	1.0
11	28	12	.9	25	17	1.1	27	14	1.0
12	28	9	.7	25	12	.8	34	18	1.6
13	28	13	1.0	25	6	.4	34	16	1.5
14	29	13	1.0	26	7	.5	33	13	1.2
15	29	19	1.5	25	7	.5	32	19	1.6
16	29	18	1.4	25	8	.5	32	22	1.9
17	28	71	5.4	25	6	.4	34	21	1.9
18	28	118	8.9	25	6	.4	37	32	3.2
19	27	119	8.7	25	8	.5	52	50 A	7
20	27	124	9.0	25	8	.5	74	58	12
21	28	125	9.4	25	11	.7	84	64	14
22	28	125	9.4	25	11	.7	98	76 S	23
23	28	121	9.1	25	8	.5	97	92	24
24	27	112	8.2	25	8	.5	112	110 S	39
25	27	40	2.9	25	12	.8	144	160 A	60
26	27	19	1.4	25	8	.5	125	140 A	45
27	27	22	1.6	25	8	.5	105	81	23
28	27	18	1.3	25	12	.8	101	69	19
29	27	10	.7	--	--	--	84	62	14
30	27	11	.8	--	--	--	71	38	7.2
31	27	12	.9	--	--	--	64	29	5.0
Total	877	--	94.5	713	--	19.6	1723	--	314.8

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.

WISCONSIN RIVER BASIN--Continued

5-4065. BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	61	23	3.8	37	14	1.4	33	13	1.2
2..	55	22	3.3	39	15	1.6	33	8	.7
3..	48	23	3.0	37	19	1.9	33	12	1.1
4..	48	18	2.3	35	19	1.8	33	16	1.4
5..	52	25	3.5	36	20	1.9	33	17	1.5
6..	50	21	2.8	37	17	1.7	33	21	1.9
7..	50	19	2.6	35	12	1.1	33	17	1.5
8..	51	18	2.5	36	16	1.6	33	25	2.2
9..	50	21	2.8	35	18	1.7	33	33	2.9
10..	46	20	2.5	39	26	2.7	33	31	2.8
11..	43	19	2.2	38	22	2.2	33	48	4.3
12..	44	11	1.3	49	32	4.2	32	53	4.6
13..	55	16	2.4	41	30	3.3	28	32	2.4
14..	54	16	2.3	38	21	2.2	28	23	1.7
15..	48	15	1.9	35	19	1.8	28	36	2.7
16..	46	20	2.5	34	23	2.1	28	53	4.0
17..	44	19	2.2	34	23	2.1	28	53	4.0
18..	43	12	1.4	34	18	1.6	28	37	2.8
19..	41	7	.8	32	14	1.2	28	28	2.1
20..	41	8	.9	32	14	1.2	28	29	2.2
21..	42	10	1.1	32	13	1.1	28	30	2.3
22..	42	10	1.1	33	8	.7	28	27	2.0
23..	41	16	1.8	34	8	.7	28	28	2.1
24..	41	12	1.3	34	7	.6	28	28	2.1
25..	37	13	1.3	33	8	.7	28	26	2.0
26..	37	22	2.2	33	12	1.1	27	18	1.3
27..	36	30	2.9	33	13	1.2	27	16	1.2
28..	39	20	2.1	32	21	1.8	28	11	.8
29..	39	9	.9	33	17	1.5	28	7	.5
30..	38	12	1.2	33	12	1.1	29	8	.6
31..	--	--	--	35	16	1.5	--	--	--
Total	1362	--	62.9	1098	--	51.3	898	--	62.9
	JULY			AUGUST			SEPTEMBER		
1..	29	17	1.3	28	7	0.5	32	3	0.2
2..	44	17	2.0	28	8	.6	31	2	.2
3..	39	10	1.0	30	9	.7	31	5	.4
4..	32	13	1.1	38	7	.7	32	6	.5
5..	31	10	.8	32	4	.3	32	5	.4
6..	30	8	.6	31	5	.4	31	5	.4
7..	30	10	.8	31	4	.3	32	7	.6
8..	29	9	.7	30	7	.6	32	7	.6
9..	29	11	.9	30	11	.9	33	8	.7
10..	28	37	2.8	30	15	1.2	33	12	1.1
11..	28	16	1.2	30	13	1.1	32	15	1.3
12..	28	10	.8	30	10	.8	31	8	.7
13..	29	10	.8	30	8	.6	31	6	.5
14..	29	8	.6	30	5	.4	30	8	.6
15..	30	7	.6	31	3	.2	30	8	.6
16..	29	6	.5	31	4	.3	30	12	1.0
17..	29	6	.5	30	4	.3	30	11	.9
18..	29	17	1.3	30	3	.2	29	10	.8
19..	29	12	.9	30	26	2.1	28	7	.5
20..	30	12	1.0	31	34	2.8	27	7	.5
21..	29	14	1.1	31	17	1.4	27	5	.4
22..	28	11	.8	31	5	.4	27	3	.2
23..	28	15	1.1	32	3	.2	27	2	.1
24..	29	14	1.1	44	6	.7	27	3	.2
25..	29	13	1.0	37	4	.4	27	5	.4
26..	30	16	1.3	34	5	.4	27	3	.2
27..	30	12	1.0	33	4	.4	27	2	.1
28..	31	10	.8	31	4	.3	27	2	.1
29..	31	18	1.5	32	4	.3	27	2	.1
30..	29	13	1.0	32	2	.2	27	2	.1
31..	28	10	.8	32	3	.2	--	--	--
Total	933	--	31.7	980	--	19.9	887	--	14.4

Total discharge for year (cfs-days)..... 13044
Total load for year (tons)..... 1125.9

WISCONSIN RIVER BASIN--Continued

5-4065. BLACK EARTH CREEK AT BLACK EARTH, WIS.--Continued

Particle-size analyses of suspended sediment, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 2, 1961.....	1305			185	428		57	67	74	84	94	99	100					SBWC
Nov. 16.....	1300			186	490		58	69	76	85	95	97	100					SBWC

TURKEY RIVER BASIN

5-4125. TURKEY RIVER AT GARBER, IOWA

LOCATION.--At gaging station at county highway bridge at Garber, Clayton County, 800 feet upstream from Wayman Creek, 2,000 feet downstream from Elk Creek, and 1 mile downstream from Volga River.
DRAINAGE AREA.--1,545 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1957 to September 1962 (discontinued).
Sediment records: October 1957 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 80°F June 17, Aug. 29; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 9,330 ppm May 6; minimum daily, 5 ppm Feb. 13.
Sediment loads: Maximum daily, 222,000 tons May 6; minimum daily, 6 tons Feb. 13.
EXTREMES, 1957-62.--Water temperatures: Maximum, 82°F Aug. 19, 1958; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 19,300 ppm May 20, 1959; minimum daily (1959-62), 5 ppm Feb. 13, 1962.
Sediment loads: Maximum daily, 294,000 tons June 26, 1959; minimum daily (1959-62), 3 tons Feb. 7, 1961.
REMARKS.--Maximum observed sediment concentration during water year, 18,200 ppm July 2. Flow affected by ice Dec. 8 to Mar. 19.

Temperature (°F) of water, water year October 1961 to September 1962

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

TURKEY RIVER BASIN--Continued

5-4125. TURKEY RIVER AT GARBER, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

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..	6460	2110	S 38300	2140	450	2600	1550	76	318
2..	2700	920	6710	6130	5260	S 107000	1520	72	295
3..	1930	280	1460	8450	2200	50200	1460	64	252
4..	1550	220	921	5500	1180	17500	1460	56	221
5..	1340	180	651	3480	600	5640	1400	57	215
6..	1160	150	470	2700	350	2550	1340	58	210
7..	1040	130	365	2300	240	1490	1250	68	230
8..	935	115	290	2070	170	950	1000	78	211
9..	860	90	209	1860	145	728	800	88	190
10..	810	73	160	1720	155	720	650	75	132
11..	1020	300	A 826	1620	135	590	580	70	110
12..	1250	545	S 2230	1520	115	472	700	63	119
13..	7650	5200	107000	1550	140	586	920	56	139
14..	4600	1450	18000	1520	120	492	1100	48	143
15..	2380	580	3730	1430	94	363	1100	39	116
16..	1790	310	1500	5630	3280	S 55700	1000	30	81
17..	1550	210	879	5500	1150	17100	970	21	55
18..	1400	160	605	3390	660	6040	930	31	78
19..	1490	170	684	2700	460	3350	900	41	100
20..	1400	130	491	2300	180	1120	860	35	81
21..	1280	110	380	2070	140	782	850	29	67
22..	1190	94	302	2540	245	1680	840	42	95
23..	1220	91	300	2780	305	2290	830	56	125
24..	1160	100	313	2620	285	2020	800	50	108
25..	1100	85	252	2380	155	996	780	45	95
26..	1020	70	193	2140	91	526	780	42	88
27..	962	57	148	1930	88	459	740	39	78
28..	935	55	139	1790	86	416	640	40	69
29..	2530	3390	54300	1680	83	376	660	42	75
30..	3750	3680	38900	1580	80	341	680	40	73
31..	3030	1000	8180	--	--	--	700	37	70
Total	61492	--	288888	85020	--	285077	29790	--	4239

	JANUARY			FEBRUARY			MARCH		
1..	660	38	68	510	18	25	430	7	8
2..	660	38	68	510	13	18	450	7	9
3..	680	32	59	520	8	11	500	7	9
4..	680	25	46	540	10	15	520	6	8
5..	700	28	53	600	13	21	500	6	8
6..	680	31	57	500	11	15	500	7	9
7..	640	32	55	450	9	11	520	8	11
8..	580	32	50	430	10	12	550	10	15
9..	520	25	35	430	10	12	580	11	17
10..	560	18	27	430	16	19	610	10	16
11..	600	14	23	430	22	26	660	35	62
12..	620	10	17	430	14	16	680	29	53
13..	640	10	17	430	5	6	700	26	49
14..	640	10	17	430	26	30	700	30	57
15..	620	26	44	420	21	24	660	27	48
16..	580	42	66	410	16	18	660	25	45
17..	560	8	12	400	18	19	660	23	41
18..	550	39	58	400	20	22	750	51	103
19..	540	34	50	390	23	24	1200	480	1560
20..	540	30	44	420	23	26	2000	630	3400
21..	540	30	44	450	23	28	1790	350	1690
22..	540	29	42	460	24	30	2540	770	5280
23..	540	26	38	460	26	32	3350	1030	9320
24..	520	23	32	460	16	20	4800	1870	24200
25..	520	21	29	450	15	18	7010	3280	62100
26..	520	19	27	450	14	17	9580	2900	75000
27..	520	20	28	420	10	11	11500	2820	87600
28..	520	21	29	410	7	8	18200	2800	138000
29..	520	24	34	--	--	--	23700	1670	107000
30..	520	27	38	--	--	--	20100	1350	73300
31..	510	22	30	--	--	--	13400	1540	55700
Total	18020	--	1237	12640	--	534	129800	--	644718

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

TURKEY RIVER BASIN--Continued

5-4125. TURKEY RIVER AT GARBER, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--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..	6350	1050	18000	1580	89	380	1340	250	904
2..	4700	640	8120	1520	92	378	1250	180	608
3..	3840	440	4560	1430	84	324	1280	175	605
4..	4200	610	6920	1370	68	252	1400	220	832
5..	6130	1320	21800	1660	1200 S	10100	1490	245	986
6..	7010	1230	23300	8830	9330	222000	1620	470	2060
7..	7480	1070	21600	4160	4820	54100	1550	240	1000
8..	4500	660	8020	3300	2300	20500	1400	185	699
9..	4600	550	6830	2540	800	5490	1340	165	597
10..	4500	400	4860	2220	750	4500	1310	160	566
11..	3570	390	3760	2700	1200	8750	2340	2410 S	19400
12..	3390	340	3110	5520	5060 S	78800	2300	2750	17100
13..	3390	260	2380	5200	2350	33000	1790	710	3430
14..	3300	230	2050	3300	940	8380	1400	265	1000
15..	3120	195	1640	2700	555	4050	1280	230	795
16..	2700	170	1240	2220	385	2310	1190	185	594
17..	2540	180	1230	2000	280	1510	1130	160	488
18..	2380	150	964	1790	200	967	1160	185	579
19..	2380	155	996	1680	205	930	1280	285	985
20..	2200	155	921	1580	190	811	1220	425	1400
21..	2070	165	922	1520	130	534	1250	250	844
22..	2220	145	869	1490	120	483	1130	160	488
23..	2220	145	869	1460	140	552	1220	825 S	3040
24..	1930	140	730	1430	105	405	1070	170	491
25..	1760	135	642	1340	96	347	990	140	374
26..	1580	145	619	1310	92	325	962	135	351
27..	1580	365 S	1750	1280	75	259	910	120	295
28..	2000	650 A	3510	1250	79	267	885	140	335
29..	1790	170	822	2930	5260 S	46100	860	125	290
30..	1680	120	544	1860	1050	5270	860	120	279
31..	--	--	--	1490	390	1570	--	--	--
Total	101110	--	153578	74660	--	513644	39207	--	61415

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..	835	105	237	1160	175	548	3500	1840 S	20000
2..	3100	7690 S	85900	1070	150	433	7240	1660	32400
3..	2540	3400	23300	1060	300 S	970	3810	1000	10300
4..	1720	850	3950	1100	460 A	1370	1760	620	2950
5..	1400	470	1780	935	145	366	1430	230	888
6..	1280	300	1040	910	110	270	1370	200	740
7..	1130	220	671	860	105	244	1310	175	619
8..	1100	285	846	835	89	201	1130	135	412
9..	1130	325	992	810	97	212	1130	135	412
10..	1070	300	867	760	78	160	1250	175	591
11..	1040	250	702	735	57	113	1220	190	626
12..	1190	1130 S	4420	735	70	139	1220	255	840
13..	1340	1200 A	4340	735	78	155	1310	900 A	3180
14..	1520	1200 A	4920	685	82	152	1070	220	636
15..	1930	1700 A	8860	685	55	102	962	115	299
16..	1620	720	3150	660	100	178	910	50	123
17..	1250	300	1010	612	85	140	910	39	96
18..	1100	210	624	635	130	223	935	50	126
19..	1240	795	5370	612	62	102	935	69	174
20..	7360	6790	142000	612	44	73	860	36	84
21..	5920	2400	38400	612	27	45	810	31	68
22..	2940	1800	14300	584	90	142	810	24	52
23..	3300	2230	19900	574	94	146	785	24	51
24..	2380	770	4950	735	340 A	675	785	22	47
25..	1860	460	2310	810	270	590	785	22	47
26..	1490	320	1290	710	145	278	760	25	51
27..	1310	240	849	635	125	214	735	23	46
28..	1790	1100 S	5700	588	110	175	735	16	32
29..	2000	890	4810	566	91	139	735	16	32
30..	1520	380	1560	588	140	222	735	18	36
31..	1310	230	814	785	150	318	--	--	--
Total	60715	--	388862	23393	--	9095	41937	--	75958

Total discharge for year (cfs-days)	677784
Total load for year (tons)	2427245

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

TURKEY RIVER BASIN--Continued

5-4125. TURKEY RIVER AT GARBER, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 1, 1961.....	0610		50	7,010	2,420	45,800	--	30	--	52	--	92	96	99	100	--		SPWC
Oct. 13.....	0735		58	9,450	7,070	180,000	--	42	--	68	--	97	99	100	--	--		SPWC
Nov. 16.....	0735		40	6,680	4,570	82,400	--	17	--	42	65	85	90	95	99	100		SPWC
Nov. 16.....	1430		40	6,350	2,740	47,000	--	23	--	38	49	75	84	93	99	100		SPWC
Mar. 26, 1962.....	1830		38	9,320	2,220	55,900	--	19	22	33	60	79	85	97	98	100		SPWC
Mar. 26.....	1830		38	9,320	2,220	55,900	--	14	18	30	53	79	85	97	98	100		SPN
Mar. 27.....	0630		36	10,900	2,670	78,600	--	24	--	40	64	89	94	97	100	--		SPWC
Mar. 28.....	0620		37	17,000	4,840	222,000	20	29	35	46	72	93	96	98	100	--		SPWC
Mar. 28.....	0620		37	17,000	4,840	222,000	17	21	25	44	70	93	96	98	100	--		SPN
May 8.....	1615		58	3,210	1,460	12,700	24	29	36	47	68	88	93	98	100	--		SPWC
May 8.....	1615		58	3,210	1,460	12,700	13	20	31	46	64	88	93	98	100	--		SPN
May 12.....	1730		58	6,900	5,040	93,900	--	38	--	58	80	96	98	100	--	--		SPWC
July 2.....	0730		66	6,240	18,200	307,000	--	28	--	53	77	96	99	100	--	--		SPWC
July 20.....	0545		66	9,200	9,180	228,000	--	35	--	58	82	94	96	99	100	--		SPWC
July 21.....	0745		68	7,720	2,840	59,200	--	32	--	48	64	87	93	97	100	--		SPWC

ROCK RIVER BASIN

5-4305. ROCK RIVER AT AFTON, WIS.

LOCATION.--Temperature recorder at gaging station in Afton, Rock County, 0.2 mile downstream from highway bridge, and 0.8 mile upstream from Bass Creek.
DRAINAGE AREA.--3,300 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: September 1954 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 82°F Aug. 29; minimum, freezing point on many days during December to March.
EXTREMES, 1954-62.--Water temperatures: Maximum, 89°F July 27-30, Aug. 4, 1955; minimum, freezing point on many days during winter months.

Temperature (°F) of water, water year October 1961 to September 1962
(Continuous ethyl alcohol-actuated thermograph)

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

IOWA RIVER BASIN

5-4495. IOWA RIVER NEAR ROWAN, IOWA

LOCATION.--At gaging station at county highway bridge, 3.8 miles northwest of Rowan, Wright County, and 9.4 miles downstream from confluence of East and West Branches.
DRAINAGE AREA.--429 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1957 to September 1962 (discontinued).
Sediment records: October 1957 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 80°F July 7; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 760 ppm July 2; minimum daily, 4 ppm Mar. 16-18.
Sediment loads: Maximum daily, 1,000 tons July 2; minimum daily, 0.2 ton Mar. 14-18.
EXTREMES, 1957-62.--Water temperatures: Maximum, 86°F Aug. 4, 1958, Aug. 21, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 760 ppm July 2, 1962; minimum daily (1959-62), 3 ppm Mar. 19, 1960.
Sediment loads: Maximum daily, 2,020 tons Mar. 26, 1961; minimum daily (1959-62), 0.1 ton Feb. 6, 10, 1961.
REMARKS.--Flow affected by ice Nov. 18, 19, Dec. 6 to Mar. 29.

Temperature (°F) of water, water year October 1961 to September 1962

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

IOWA RIVER BASIN--Continued

5-4495. IOWA RIVER NEAR ROWAN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedime	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	38	31	3.2	172	60	28	88	25	5.
2..	33	40	3.6	154	57	24	88	25	5.
3..	32	33	2.9	154	55	23	84	24	5.
4..	32	26	2.2	192	66	34	81	28	6.
5..	29	29	2.3	199	68	37	82	45	10
6..	28	31	2.3	172	66	31	70	40	7.
7..	27	30	2.2	148	45	18	60	34	5.
8..	28	32	2.4	138	38	14	54	36	5.
9..	28	29	2.2	126	38	13	46	40	5.
10..	32	45	3.9	119	37	12	41	45	5.
11..	101	50	14	113	37	11	50	54	7.
12..	199	44	24	105	36	10	60	60	9.
13..	235	41	26	101	57	16	68	54	9.
14..	276	40	30	89	54	13	70	50	9.
15..	276	35	26	83	52	12	72	47	9.
16..	206	45	25	90	40	9.7	70	30	5.
17..	154	44	18	88	28	6.7	70	28	5.
18..	138	35	13	70	30	5.7	68	26	4.
19..	118	43	14	68	35	6.4	66	24	4.
20..	102	49	13	78	30	6.3	64	25	4.
21..	93	44	11	91	27	6.6	62	23	3.
22..	86	46	11	88	26	6.2	60	20	3.
23..	82	51	11	90	26	6.3	60	19	3.
24..	81	48	10	109	34	10	58	17	2.
25..	72	45	8.7	116	40	13	56	15	2.
26..	71	44	8.4	118	30	9.6	54	12	1.
27..	64	43	7.4	114	21	6.5	54	15	2.
28..	61	40	6.6	101	24	6.5	52	17	2.
29..	68	52	9.5	94	28	7.1	50	20	2.
30..	80	55	12	93	26	6.5	50	22	3.
31..	154	64	27	--	--	--	50	22	3.
Total	3024	--	352.8	3473	--	409.1	1958	--	161.

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	22	3.0	28	8	0.6	13	15	0.
2..	50	23	3.1	28	8	.6	13	10	.
3..	52	24	3.4	28	8	.6	13	10	.
4..	54	26	3.8	27	8	.6	13	10	.
5..	52	24	3.4	27	9	.7	13	10	.
6..	50	22	3.0	27	13	.9	13	11	.
7..	48	19	2.5	26	7	.5	13	13	.
8..	47	20	2.5	26	31	2.2	14	13	.
9..	47	20	2.5	25	32	2.2	15	10	.
10..	47	19	2.4	25	34	2.3	15	7	.
11..	47	18	2.3	24	32	2.1	16	7	.
12..	47	18	2.3	24	30	1.9	16	6	.
13..	46	16	2.0	24	30	1.9	17	6	.
14..	46	16	2.0	23	30	1.9	17	5	.
15..	44	15	1.8	23	31	1.9	18	5	.
16..	42	15	1.7	22	32	1.9	18	4	.
17..	40	15	1.6	21	32	1.8	19	4	.
18..	39	15	1.6	21	33	1.9	20	4	.
19..	37	14	1.4	20	32	1.7	21	30	1.
20..	35	13	1.2	18	30	1.5	21	59	3.
21..	34	13	1.2	18	30	1.5	20	60	3.
22..	33	10	.9	17	29	1.3	20	62	3.
23..	32	9	.8	16	30	1.3	20	64	3.
24..	31	8	.7	15	34	1.4	20	63	3.
25..	30	7	.6	14	38	1.4	34	100	9.
26..	29	8	.6	14	30	1.1	150	135	55
27..	29	10	.8	14	25	.9	450	180	219
28..	28	11	.8	13	20	.7	1000	200	540
29..	28	14	1.1	--	--	--	2800	115	869
30..	28	17	1.3	--	--	--	3490	42	396
31..	28	10	.8	--	--	--	3090	44	367
Total	1250	--	57.1	608	--	39.3	11412	--	2479.

IOWA RIVER BASIN--Continued

5-4495. IOWA RIVER NEAR ROWAN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--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	2850	40	308	256	35	24	838	110	249
2	2430	40	262	264	56	40	605	80	131
3	2250	48	292	248	51	34	400	54	58
4	2160	58	338	223	54	33	309	120	100
5	2250	56	340	207	64	36	291	140	110
6	2340	40	253	192	52	27	273	145	107
7	2250	40	243	177	45	22	256	135	93
8	2080	35	197	177	42	20	239	120	77
9	1850	40	200	177	43	21	215	115	67
10	1480	33	132	156	41	17	192	105	54
11	1070	34	98	163	45	20	177	105	50
12	1100	70	208	163	47	21	163	93	41
13	1240	62	208	170	25	11	144	97	38
14	1200	31	100	163	36	16	134	63	23
15	1150	33	102	150	48	19	125	63	21
16	1070	29	84	136	40	15	116	43	13
17	890	27	65	134	22	8.0	111	43	13
18	770	40	83	130	25	8.8	106	45	13
19	665	43	77	128	32	11	111	47	14
20	580	41	64	138	45	17	110	49	15
21	518	41	57	132	56	20	98	46	12
22	492	41	54	144	74	29	90	45	11
23	422	40	46	468	410	518	86	40	9.3
24	357	50	48	492	230	306	80	42	9.1
25	318	54	46	347	115	108	74	45	9.0
26	291	55	43	239	125	81	68	41	7.5
27	273	60	44	200	130	70	64	39	6.7
28	256	41	28	184	99	49	59	32	5.1
29	239	40	26	522	265	373	60	37	6.0
30	231	35	22	872	340	800	64	35	6.0
31	--	--	--	890	175	420	--	--	--
Total	35072	--	4068	8042	--	3194.8	5658	--	1368.7

	JULY			AUGUST			SEPTEMBER		
1	62	35	5.9	480	115	149	2430	98	643
2	346	760	S 1000	367	125	124	3090	25	209
3	755	460	938	291	125	98	2630	18	128
4	695	280	525	256	125	86	2250	18	109
5	1030	290	806	223	135	81	1920	21	109
6	1380	64	238	200	120	65	1650	18	80
7	1480	42	168	223	150	90	1380	21	78
8	1240	40	134	256	240	166	1150	67	208
9	995	44	118	215	210	122	960	80	207
10	855	46	106	177	175	84	872	81	191
11	680	68	125	156	175	74	785	98	208
12	518	50	70	150	140	57	680	86	158
13	357	32	31	144	150	58	568	80	123
14	309	38	32	130	165	58	468	74	94
15	400	56	60	116	140	44	400	94	102
16	480	70	91	108	160	47	357	95	92
17	468	86	109	99	150	40	328	98	87
18	378	91	93	92	160	40	300	100	81
19	367	96	95	86	120	28	273	105	77
20	755	130	265	82	115	25	239	100	65
21	1200	135	437	76	115	24	223	100	60
22	1480	190	759	70	110	21	215	88	51
23	1380	150	559	71	100	19	207	83	46
24	1110	155	465	86	140	32	192	83	43
25	855	125	289	94	110	28	192	76	39
26	620	130	218	95	140	36	177	75	36
27	444	125	150	87	100	23	170	69	32
28	635	130	223	78	97	20	156	73	31
29	802	115	249	78	110	23	150	64	26
30	755	110	224	180	150	73	156	67	28
31	635	100	171	1150	250	776	--	--	--
Total	23466	--	8753.9	5916	--	2611	24568	--	3441

Total discharge for year (cfs-days)	124447
Total load for year (tons)	26937.0

S Computed by subdividing day.

IOWA RIVER BASIN--Continued

5-4545. 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 upstream from Ralston Creek, and 4.1 miles downstream from Clear Creek.
DRAINAGE AREA.--3,271 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: September 1906 to September 1907, January 1944 to September 1954.
Water temperatures: January 1944 to September 1962.
Sediment records: October 1943 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 86°F July 3, 5-7; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, not determined; minimum daily, 4 ppm Jan. 6.
Sediment loads: Maximum daily, 60,000 tons (estimated) July 14; minimum daily, 7 tons Jan. 26.
EXTREMES, 1943-62.--Water temperatures (1944-62): Maximum, 90°F July 19, 1957, Aug. 24, 25, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 7,800 ppm June 13, 1953; minimum daily, 3 ppm Jan. 29, 31, Feb. 6, 8, 1958.
Sediment loads: Maximum daily, 177,000 tons May 23, 1944; minimum daily, 2 tons on several days during 1951 and 1958.
REMARKS.--Flow affected by ice Jan. 10-25, Feb. 5-11, Feb. 16 to Mar. 1. Diurnal fluctuation at low stages caused by powerplants upstream from station. Flow regulated by Coralville Reservoir upstream from Iowa City beginning Sept. 17, 1958 (total capacity, 492,000 acre-ft).

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	60	--	62	62	62	60	62	60	60	62	64	64	62	60	62	64	60	60	60	60	58	58	58	58	54	54	54	58	58	54	54	59
November	54	54	54	52	52	52	52	48	48	48	46	46	46	44	44	42	60	40	40	40	42	--	42	42	44	44	42	--	--	40	40	46
December	41	34	36	--	36	34	32	32	32	32	32	32	34	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33
January	--	34	36	--	36	34	32	32	32	32	32	32	34	32	32	32	32	32	32	32	32	32	32	34	34	32	32	32	32	32	32	33
February	32	34	34	34	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34	34	32	--	32	--	--	--	32
March	32	32	32	32	32	32	32	32	32	32	--	32	32	34	--	34	34	--	34	34	34	34	36	36	38	38	36	--	38	36	42	34
April	42	42	42	44	44	46	46	46	48	50	48	50	50	52	--	52	54	54	54	54	56	--	56	56	56	60	60	60	62	60	--	52
May	62	64	66	66	66	66	60	66	66	68	68	68	70	66	70	70	72	72	72	74	74	74	74	62	72	72	72	66	70	72	74	69
June	70	68	66	70	72	--	68	70	--	76	78	78	78	78	78	--	--	80	80	80	80	80	82	82	82	84	84	84	--	--	--	--
July	84	84	86	--	86	86	86	84	84	82	82	74	72	--	--	72	--	72	76	78	78	76	76	79	78	78	--	79	--	72	--	--
August	--	--	78	78	78	78	78	76	76	76	76	76	74	76	--	--	76	74	76	78	--	78	78	--	--	80	80	80	--	80	--	--
September	--	--	--	--	--	--	--	--	--	--	--	--	--	74	--	--	--	--	--	--	65	--	--	--	--	--	--	--	--	--	--	--

IOWA RIVER BASIN--Continued

5-4545. IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	850	165	379	1340	24	87	4780	48	619
2..	1340	140	507	2640	1420	S 11600	4870	47	618
3..	2850	100	770	2560	950	6570	4780	42	542
4..	3000	145	1170	1600	125	540	4780	42	542
5..	3000	36	292	1720	41	190	4690	42	532
6..	2850	37	285	1600	61	264	4600	32	397
7..	2160	42	245	2400	60	389	4600	33	410
8..	2160	40	233	3160	98	836	4510	40	487
9..	2160	28	163	3320	--	800	4420	11	131
10..	1880	34	173	3400	--	700	4420	--	130
11..	1300	35	123	3400	--	600	4330	--	130
12..	1300	39	137	3400	--	500	2320	--	100
13..	1960	35	185	3320	--	400	1600	13	56
14..	2240	32	194	3320	44	394	1430	--	60
15..	2160	31	181	3400	--	500	1300	25	88
16..	2160	32	187	4780	730	9420	1150	--	70
17..	2160	33	192	2560	460	3180	1080	19	55
18..	2160	53	309	1680	440	2000	1080	--	55
19..	2320	46	288	1520	415	1700	1080	--	55
20..	2400	130	842	2400	750	4860	1300	--	60
21..	2400	230	1490	4060	1100	12100	1680	--	70
22..	2400	100	648	4290	750	8690	1920	--	80
23..	2320	73	457	1680	440	2000	1920	--	80
24..	1840	27	134	2780	350	2630	1880	--	80
25..	1600	22	95	4870	310	4080	1880	--	70
26..	1560	28	118	4870	--	3000	1880	--	60
27..	1300	22	77	4780	--	2000	1760	--	50
28..	1160	25	78	4780	--	1000	1600	--	40
29..	1200	35	113	4780	35	452	1480	9	36
30..	1250	28	94	4690	32	405	1340	--	34
31..	1200	22	71	--	--	--	925	--	30
Total	60640	--	10230	95100	--	81887	81385	--	5767
	JANUARY			FEBRUARY			MARCH		
1..	1340	--	40	850	10	23	1000	7	19
2..	1340	--	40	843	14	32	992	11	29
3..	1380	--	46	829	13	29	970	14	37
4..	1380	--	50	815	13	29	970	11	29
5..	1380	14	52	910	8	20	948	--	30
6..	1380	4	15	1100	28	83	940	--	30
7..	1380	13	48	1500	14	57	932	--	30
8..	1380	17	63	1700	16	73	1000	--	40
9..	1380	10	37	1400	13	49	1300	--	50
10..	1400	8	30	1350	11	40	1430	--	60
11..	1600	8	35	1300	12	42	1480	--	80
12..	1850	7	35	1430	12	46	1960	--	100
13..	2000	12	65	1880	32	162	2640	--	140
14..	2000	9	49	2400	38	246	3080	--	170
15..	1950	11	58	2320	67	420	3320	--	200
16..	1950	17	90	2200	38	226	3160	--	200
17..	1900	14	72	2150	43	250	2920	--	200
18..	1900	11	56	2100	56	318	3000	--	200
19..	1800	5	24	2000	54	292	6180	45	S 8610
20..	1800	12	58	1600	11	48	8660	700	16400
21..	1800	9	44	1400	15	57	5790	630	9850
22..	1800	7	34	1200	12	39	6290	840	14300
23..	1750	8	38	1100	11	33	8440	515	11700
24..	1750	9	43	1000	11	30	10200	305	8400
25..	1300	6	21	1000	16	43	9820	245	6500
26..	455	6	7	1000	14	38	9700	220	5760
27..	581	8	13	1000	14	38	9580	200	5170
28..	622	8	13	1000	14	38	9820	180	4770
29..	702	6	11	--	--	--	9700	175	4580
30..	843	7	16	--	--	--	9820	250	6630
31..	865	8	19	--	--	--	9940	190	5100
Total	44958	--	1222	39377	--	2801	145982	--	109414

S Computed by subdividing day.

IOWA RIVER BASIN--Continued

5-4545. IOWA RIVER AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

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..	9220	70	1740	5140	81	1120	3480	260	2440
2..	4820	22	286	5140	56	777	4960	260	3480
3..	1560	26	110	5050	50	682	5230	460	6500
4..	1430	23	89	5050	115	1570	5320	240	3450
5..	1640	21	93	5050	94	1280	5140	170	2360
6..	2560	57	394	4960	68	911	5140	150	2080
7..	6690	60	1080	5050	48	654	5050	105	1430
8..	9940	63	1690	5050	44	600	5050	120	1640
9..	9820	115	3050	4960	93	1250	5050	100	1360
10..	9940	22	590	4960	100	1340	4960	69	924
11..	9820	72	1910	5230	460	6500	4960	180	2410
12..	9820	80	2120	5320	1200	17200	4870	150	1970
13..	9820	84	2230	5050	480	6540	4780	115	1480
14..	9820	38	1010	4960	110	1470	4780	135	1740
15..	9700	40	1050	4960	50	670	4690	140	1770
16..	9700	43	1130	4870	115	1510	4600	120	1490
17..	9700	42	1100	4780	42	542	4510	80	974
18..	9700	40	1050	4690	99	1250	4330	66	772
19..	9220	47	1170	4690	105	1330	3560	51	490
20..	8220	28	621	4600	120	1490	1960	42	222
21..	7230	38	742	4510	145	1770	1340	31	112
22..	6690	40	723	4330	130	1520	1340	61	221
23..	6590	43	765	4240	100	1140	1380	58	216
24..	6590	28	498	3720	120	1210	1340	73	264
25..	6490	25	438	3080	140	1160	1300	82	288
26..	6490	60	1050	3240	140	1220	1300	82	288
27..	6490	41	718	3160	100	853	1300	32	288
28..	6390	36	621	3160	140	1270	1160	41	128
29..	6290	31	526	8110	2560	S 58100	752	45	91
30..	5790	49	766	2920	800	S 7330	520	50	70
31..	--	--	--	1800	220	1070	--	--	--
Total	218180	--	29360	141830	--	125329	104152	--	40948

Day	JULY			AUGUST			SEPTEMBER		
1..	520	58	81	6490	50	876	1040	--	180
2..	550	79	117	6090	50	822	1040	--	160
3..	528	--	80	5500	49	728	1040	--	150
4..	511	--	60	5140	79	1100	1040	--	150
5..	641	29	52	5050	64	873	1040	--	150
6..	1120	--	80	4960	70	937	1160	--	170
7..	1340	--	100	4960	80	1070	1520	--	200
8..	1380	--	140	4870	90	1180	2000	--	400
9..	1340	--	180	4870	96	1260	2080	--	340
10..	1340	--	180	4780	76	981	2080	--	300
11..	1340	--	180	4690	80	1010	2080	--	280
12..	1520	49	201	4690	84	1060	2080	--	280
13..	1800	48	233	4600	--	1000	2080	--	280
14..	7470	--	60000	4510	--	850	2080	50	281
15..	3080	--	8000	3880	--	750	2080	--	280
16..	2320	155	971	2920	--	550	2080	--	280
17..	5050	--	1700	2080	--	500	2000	--	260
18..	5140	--	1400	2080	--	460	1800	--	240
19..	5230	--	1100	2080	--	400	1560	--	200
20..	5500	--	800	2080	--	400	1340	--	150
21..	5410	--	700	2080	--	400	1040	45	126
22..	5790	750	11700	2080	70	393	1040	--	130
23..	6090	200	3290	1840	--	360	1000	--	130
24..	6590	--	1800	1430	--	300	1040	--	130
25..	6590	47	836	1250	--	240	1040	--	130
26..	6590	56	979	1120	--	200	1040	--	120
27..	6590	53	943	1080	60	175	836	--	100
28..	7010	51	965	1080	66	192	676	--	90
29..	6690	50	903	1080	77	225	676	--	80
30..	6590	50	890	1080	--	220	676	--	80
31..	6590	50	890	1040	--	200	--	--	--
Total	118270	--	99551	101480	--	19712	42284	--	5847

Total discharge for year (cfs-days)	1193638
Total load for year (tons)	532068

S Computed by subdividing day.

IOWA RIVER BASIN--Continued

5-4545. IOWA RIVER AT IOWA CITY, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 29, 1962.....	0930		70	10,300	3,500	97,300	55	67	80	88	94	99	100					SPWC
May 29.....	0930		70	10,300	3,500	97,300	3	13	57	87	94	99	100					SPN

IOWA RIVER BASIN--Continued

5-4550. RALSTON CREEK AT IOWA CITY, IOWA

LOCATION.--At gaging station at bridge on Rochester Avenue (revised), near east edge of Iowa City, Johnson County, and 2.2 miles upstream from mouth.
DRAINAGE AREA.--3.01 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1960 to September 1962.
Sediment records: April 1952 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 72°F Aug. 23; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 4,930 ppm May 29; minimum daily, 8 ppm Feb. 2, Aug. 8, 19.
Sediment loads: Maximum daily, 3,080 tons July 14; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1952-62.--Water temperatures (1960-62): Maximum, 76°F June 30, July 1, 1961; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 8,240 ppm Jan. 12, 1960; minimum daily, no flow on many days in 1953-59.
Sediment loads: Maximum daily, 3,080 tons June 4, 1960, July 14, 1962; minimum daily, 0 tons on many days in 1953-59.
REMARKS.--Maximum observed sediment concentration during water year, 31,300 ppm May 29. Flow affected by ice Dec. 8 to Mar. 11.

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	50	46	48	48	52	52	54	56	60	60	60	52	60	50	48	50	52	52	48	44	46	50	50	44	42	40	42	44	52	54	48	50
November	50	56	44	40	38	38	38	36	38	38	40	48	46	44	44	40	38	36	36	38	38	40	42	38	40	42	38	32	32	40	--	40
December	40	38	40	52	34	38	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34
January	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February	32	32	32	38	32	32	32	32	32	32	32	32	32	32	37	34	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	32
March	32	32	32	32	32	32	32	32	32	38	39	36	34	32	32	32	32	38	38	38	32	34	32	34	44	34	34	38	34	32	32	34
April	32	32	32	36	38	34	34	42	48	34	40	42	32	34	32	32	40	40	36	36	46	52	50	50	50	52	62	58	56	58	--	42
May	52	50	50	48	52	58	52	56	50	50	50	50	52	60	62	62	68	68	68	64	62	62	60	60	60	60	58	58	62	62	62	58
June	54	56	54	60	60	60	62	62	64	64	64	60	60	60	60	64	68	70	70	62	64	64	68	68	68	64	64	70	70	70	--	63
July	70	68	70	68	70	70	70	68	68	68	70	70	68	68	62	68	60	60	64	62	64	68	64	68	62	60	60	64	62	64	60	66
August	60	62	62	64	64	64	68	68	64	64	64	64	64	60	60	60	62	62	64	70	70	70	72	70	68	62	64	64	64	66	64	65
September	54	54	52	60	56	54	56	60	60	56	54	60	64	62	66	62	62	62	60	58	58	60	60	58	54	52	50	50	48	54	--	58

IOWA RIVER BASIN--Continued

5-4550. RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

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..	3.8	73	0.7	3.9	285	S 4.0	3.4	42	0.4
2..	2.8	68	.5	62	2930	S 612	3.2	42	.4
3..	2.3	56	.3	17	520	S 31	3.1	42	.4
4..	1.8	58	.3	8.0	135	2.9	2.8	42	.3
5..	1.6	51	.2	5.8	99	1.6	2.3	43	.3
6..	1.3	49	.2	5.0	110	1.5	1.9	43	.2
7..	1.1	43	.1	4.2	66	.7	1.5	41	.2
8..	1.2	46	.1	3.6	64	.4	1.4	39	.1
9..	1.2	50	.2	3.2	52	.4	1.6	32	.1
10..	1.9	190	S 5.9	2.8	69	.5	1.6	25	.1
11..	7.6	535	S 22	2.6	40	.3	1.6	24	.1
12..	2.0	51	.3	2.3	54	.3	1.7	20	.1
13..	2.0	69	.4	2.4	67	.4	1.9	16	.1
14..	1.5	32	.1	2.2	32	.2	1.8	17	.1
15..	1.4	31	.1	21	1240	S 510	1.7	11	.1
16..	1.3	55	.2	86	375	S 151	1.4	19	.1
17..	1.3	30	.1	12	145	6.3	1.9	19	.1
18..	1.2	45	.1	8.4	120	2.7	1.6	22	.1
19..	1.2	31	.1	7.1	60	1.2	1.4	19	.1
20..	1.0	74	.2	5.8	72	1.1	1.3	26	.1
21..	1.0	52	.1	18	565	S 75	1.3	49	.2
22..	1.1	49	.1	14	125	S 6.5	1.3	39	.1
23..	1.3	95	.3	7.7	80	1.7	1.2	48	.2
24..	1.1	26	.1	6.1	58	1.0	1.2	25	.1
25..	1.1	22	.1	5.8	54	.8	1.3	43	.2
26..	.9	19	T	5.0	48	.6	1.2	36	.1
27..	1.0	31	.1	4.5	48	.6	1.1	11	T
28..	1.5	240	A 1.0	4.0	52	.6	1.0	13	T
29..	2.3	350	A 2.2	3.8	43	.4	1.1	20	.1
30..	4.2	315	S 4.7	3.6	40	.4	1.0	30	.1
31..	2.2	72	.4	--	--	--	1.0	40	.1
Total	57.2	--	41.2	337.8	--	1416.1	51.8	--	4.8

	JANUARY			FEBRUARY			MARCH		
1..	0.9	49	0.1	0.8	64	0.1	0.7	53	0.1
2..	.8	44	.1	.8	8	T	1.0	48	.1
3..	.8	14	T	.9	21	.1	1.0	11	T
4..	.9	22	.1	4.0	65	.7	.9	10	T
5..	1.0	65	.2	8.4	62	1.4	.8	11	T
6..	.9	26	.1	2.4	58	.4	.8	15	T
7..	.9	47	.1	1.7	72	.3	.8	22	T
8..	.8	50	.1	1.5	51	.2	.9	21	.1
9..	.8	21	T	1.3	64	.2	.9	23	.1
10..	1.2	35	.1	1.2	35	.1	1.0	10	T
11..	2.5	64	.4	2.3	110	.7	7.0	640	12
12..	3.8	30	.3	7.8	220	4.6	14	440	17
13..	3.0	48	.4	5.0	190	2.6	9.4	190	4.8
14..	1.9	26	.1	3.5	96	.9	6.0	120	1.9
15..	1.4	17	.1	2.3	60	.4	4.5	74	.9
16..	1.2	15	T	1.5	79	.3	3.7	45	.4
17..	1.2	17	.1	1.2	81	.3	9.7	730	S 25
18..	1.2	26	.1	1.1	33	.1	34	1960	S 304
19..	1.2	20	.1	1.6	31	.1	122	3490	S 1300
20..	1.2	18	.1	1.4	45	.2	20	620	33
21..	1.1	14	T	1.6	46	.2	41	1410	S 296
22..	1.1	32	.1	1.3	53	.2	29	1040	S 111
23..	.9	12	T	1.2	44	.1	33	955	S 147
24..	.9	15	T	1.1	34	.1	28	885	S 112
25..	.9	18	T	1.0	34	.1	19	635	S 40
26..	1.5	47	.2	.9	63	.2	12	190	6.2
27..	2.3	48	.3	.9	66	.2	12	160	5.2
28..	1.6	25	.1	.8	55	.1	9.8	180	4.8
29..	1.2	25	.1	--	--	--	7.4	120	2.4
30..	1.0	19	.1	--	--	--	6.1	65	1.1
31..	.9	16	T	--	--	--	5.8	54	.8
Total	41.0	--	3.8	59.5	--	14.9	442.2	--	2426.1

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated concentration graph.

5-4550. RALSTON CREEK AT IOWA CITY, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	5.5	48	0.7	1.5	51	0.2	2.3	47	0.3
2	5.0	46	.6	1.4	43	.2	2.0	30	.2
3	4.0	40	.4	1.3	46	.2	11	790 S	35
4	5.2	280 A	3.9	1.2	52	.2	4.5	105	1.3
5	14	2270 S	141	1.2	47	.2	3.8	150	1.5
6	8.4	92	2.1	1.1	56	.2	3.2	100	.9
7	6.4	93	1.6	1.3	58	.2	2.9	61	.5
8	6.4	115	2.0	1.4	44	.2	2.4	55	.4
9	4.5	60	.7	1.2	67	.2	2.4	60	.4
10	3.8	40	.4	1.2	60	.2	2.2	44	.3
11	3.4	38	.3	11	2130 S	113	1.8	45	.2
12	3.8	56	.6	8.7	840 S	24	1.3	53	.2
13	2.8	46	.3	3.6	120	1.2	1.2	54	.2
14	2.6	26	.2	1.9	78	.4	1.1	55	.2
15	2.3	25	.2	1.3	59	.2	1.0	58	.2
16	2.3	27	.2	1.0	43	.1	1.0	47	.1
17	2.3	26	.2	1.2	40	.1	1.0	43	.1
18	2.0	21	.1	1.2	35	.1	.9	37	.1
19	1.9	25	.1	1.1	32	.1	.8	43	.1
20	1.9	40	.2	1.0	32	.1	.8	40	.1
21	1.9	27	.1	1.0	33	.1	.8	39	.1
22	1.8	38	.2	1.0	27	.1	.8	29	.1
23	1.6	31	.1	.9	18	T	1.5	220 A	.9
24	1.6	31	.1	.9	19	T	.6	45	.1
25	1.6	38	.2	.9	17	T	.5	67	.1
26	1.6	29	.1	6.2	1570 S	44	.5	35	T
27	1.6	24	.1	2.8	905 S	9.7	.5	42	.1
28	1.6	28	.1	14	2690 S	982	.5	15	T
29	1.6	45	.2	39	4930 S	1160	.3	17	T
30	1.5	41	.2	5.2	185	2.6	.3	30	T
31	--	--	--	3.2	72	.6	--	--	--
Total	104.9	--	157.2	119.9	--	2340.5	53.9	--	43.8

Day	JULY			AUGUST			SEPTEMBER		
1	0.3	26	T	1.4	36	0.1	0.4	36	T
2	.5	26	T	1.2	41	.1	.4	37	T
3	.3	51	T	1.1	47	.1	.4	31	T
4	.3	49	T	1.0	52	.1	.4	37	T
5	.3	49	T	.9	43	.1	.4	43	T
6	.3	47	T	.9	47	.1	.3	29	T
7	.3	44	T	.8	37	.1	.3	47	T
8	.4	210 A	0.2	.7	8	T	.8	59	0.1
9	.2	40	T	.6	39	.1	.6	130	.2
10	.2	47	T	.5	32	T	.6	110	.2
11	.2	54	T	.5	46	.1	.4	44	T
12	.3	61	T	.5	43	.1	.4	58	.1
13	3.6	2140 S	43	.5	31	T	.3	40	T
14	184	3530 S	3080	.4	24	T	.3	23	T
15	5.0	130	1.8	.3	21	T	.3	49	T
16	3.2	78	.7	.3	28	T	.3	28	T
17	1.9	57	.3	.3	37	T	.3	33	T
18	1.5	47	.2	.3	44	T	.3	22	T
19	1.6	39	.2	.3	8	T	.2	75	T
20	1.5	50	.2	.3	9	T	.2	53	T
21	1.1	43	.1	.3	36	T	.2	41	T
22	3.2	255 S	2.5	.3	31	T	.2	32	T
23	1.7	220	1.0	.5	98 A	.1	.2	22	T
24	1.0	54	.1	7.8	2940 A	62	.2	30	T
25	.9	51	.1	.9	76	.2	.2	21	T
26	.8	32	.1	.8	61	.1	.2	23	T
27	.8	21	T	.7	58	.1	.2	22	T
28	22	3030 S	509	.6	71	.1	.2	76	T
29	2.6	84	.6	.5	66	.1	.2	76	T
30	1.8	54	.3	.5	51	.1	.3	49	T
31	1.5	31	.1	.4	36	T	--	--	--
Total	243.3	--	3640.9	26.1	--	64.1	9.7	--	1.4

Total discharge for year (cfs-days)	1547.3
Total load for year (tons)	10154.8

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated concentration graph.

IOWA RIVER BASIN--Continued

5-4550. RALSTON CREEK AT IOWA CITY, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 18, 1962.....	1415		38	55	5,940	882		23		39	72	96	99	100				SPWC
Apr. 5.....	1130		38	36	10,200	991		28		45	77	97	99	100				SPWC
July 28.....	0715		64	140	12,900	4,880		40		66	89	97	99	100				SPWC

IOWA RIVER BASIN--Continued

5-4620. SHELL ROCK RIVER AT SHELL ROCK, IOWA

LOCATION.--Temperature recorder at gaging station, 400 feet upstream from bridge on State Highway 3 in Shell Rock, Butler County, and 11 miles upstream from mouth.
DRAINAGE AREA.--1,746 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1953 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 74°F July 7-10, 12, 13; minimum, 33°F on many days during January to April.
EXTREMES, 1953-62.--Water temperatures: Maximum, 88°F June 19, 1953; minimum, freezing point on several days during December 1953, January 1954, and March and April 1956.

Temperature (°F) of water, water year October 1961 to September 1962
/Water-stage recorder with temperature attachment/

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

DES MOINES RIVER BASIN

5-4816.5. DES MOINES RIVER NEAR SAYLORVILLE, IOWA

LOCATION.--At gaging station at bridge on County Road W, 2.0 miles west of Saylorville, Polk County, 2.0 miles downstream from Rock Creek, and 2.2 miles upstream from Beaver Creek.
DRAINAGE AREA.--5,841 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1961 to September 1962.
Sediment records: October 1961 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 83°F June 25, 28, July 2; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 4,290 ppm May 29; minimum daily, 7 ppm Feb. 3.
Sediment loads: Maximum daily, 64,900 tons Mar. 26; minimum daily, 8 tons Feb. 3.
REMARKS.--Flow affected by ice Dec. 7 to Mar. 25.

Temperature (°F) of water, water year October 1961 to September 1962

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

DES MOINES RIVER BASIN--Continued

5-4816.5. DES MOINES RIVER NEAR SAYLORVILLE, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

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	2520	650	4420	1180	160	510	1210	51	167
2	1940	545	2850	1280	150	518	1210	45	147
3	1660	350	1570	1380	200	745	1210	77	252
4	1420	275	1050	1660	255	1140	1210	68	222
5	1350	245	893	1780	210	1010	1100	75	223
6	1140	190	585	1520	140	575	1080	68	198
7	1080	200	583	1380	115	428	1040	82	230
8	990	200	535	1460	115	453	1000	67	181
9	930	155	389	1490	120	483	900	54	131
10	930	175	439	1380	105	391	600	67	109
11	1820	730	3590	1350	105	383	300	56	45
12	3070	1690	14000	1380	105	391	450	75	91
13	3570	960	9250	1280	105	363	620	88	147
14	2790	600	4520	1100	105	312	700	62	117
15	2340	405	2560	1100	100	297	760	65	133
16	2100	310	1760	1380	155	578	780	59	124
17	1900	300	1540	1460	160	631	780	57	120
18	2020	305	1660	1460	110	434	760	54	111
19	2020	275	1500	1280	78	270	740	57	114
20	1780	230	1110	1280	60	207	710	60	115
21	1560	180	758	1180	63	201	680	63	116
22	1380	165	615	1080	64	187	660	68	121
23	1420	175	671	1320	77	274	630	70	119
24	1320	160	570	1380	77	287	600	50	81
25	1180	130	414	1380	79	294	560	23	35
26	1240	130	435	1420	87	334	540	24	35
27	1100	105	312	1380	82	306	530	30	43
28	1050	120	340	1350	80	292	520	22	31
29	960	105	272	1280	60	207	520	24	34
30	990	115	307	1240	52	174	520	31	44
31	1100	140	416	--	--	--	530	20	29
Total	50670	--	59914	40590	--	12675	23450	--	3665

Day	JANUARY			FEBRUARY			MARCH		
1	540	25	36	360	17	17	480	23	30
2	560	16	24	380	12	12	470	15	19
3	590	16	25	400	7	8	470	22	28
4	590	18	29	420	10	11	470	21	27
5	590	13	21	480	10	13	470	20	25
6	580	19	30	540	34	50	480	20	26
7	580	25	39	660	41	73	490	18	24
8	580	31	49	780	42	88	510	23	32
9	560	37	56	700	41	77	520	20	28
10	540	36	52	590	40	64	520	22	31
11	540	34	50	540	32	47	540	31	45
12	520	21	29	560	36	54	560	35	53
13	520	25	35	600	37	60	600	58	94
14	510	32	44	640	67	116	660	49	87
15	500	24	32	700	52	98	680	35	64
16	490	17	22	740	71	142	660	18	32
17	470	21	27	660	59	105	660	15	27
18	460	25	31	600	57	92	660	22	39
19	430	14	16	570	67	103	830	320	717
20	410	31	34	550	63	94	1050	450	1280
21	390	30	32	530	50	72	1500	650	2630
22	370	32	32	520	82	115	2200	1160	6890
23	360	17	17	520	53	74	3300	1270	11300
24	350	25	24	540	48	70	5200	1510	21200
25	340	12	11	530	49	70	6200	1850	31000
26	330	19	17	520	47	66	9690	2480	64900
27	330	18	16	510	46	63	11700	1870	59100
28	330	26	23	490	49	65	12700	1480	50700
29	330	21	19	--	--	--	14900	1410	56700
30	340	15	14	--	--	--	19400	1050	55000
31	350	35	33	--	--	--	22900	560	34600
Total	14380	--	919	15630	--	1919	121470	--	396728

5-4816.5. DES MOINES RIVER NEAR SAYLORVILLE, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--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	25000	435	29400	6390	225	3880	5100	495	6820
2	28300	405	30900	5980	220	3550	4420	455	5430
3	31000	365	30600	5590	200	3020	4200	380	4310
4	28300	255	19500	5340	175	2520	4420	455	5430
5	24600	200	13300	4980	225	3030	4310	340	3960
6	21800	200	11800	4750	310	3980	4200	305	3460
7	20700	215	12000	4310	210	2440	4750	465	5960
8	20000	200	10800	4420	315	3760	5100	600	8260
9	18700	215	10900	4420	670	8000	4900	440	5820
10	17800	240	11500	3980	250	2690	4640	400	5010
11	17300	230	10700	3670	185	1830	4200	370	4200
12	16700	290	13100	3470	185	1730	3870	355	3710
13	16200	225	9840	3270	170	1500	3570	305	2940
14	16400	240	10600	3170	205	1750	3370	285	2590
15	16200	220	9620	2970	165	1320	2970	240	1920
16	15400	220	9150	2790	150	1130	2790	275	2070
17	14400	215	8360	2610	130	916	2520	270	1840
18	13500	220	8020	2430	120	787	2430	260	1710
19	12500	300	10100	2340	140	885	2180	230	1350
20	11700	260	8210	2180	165	971	2020	195	1060
21	11300	295	9000	2340	250	1580	2020	220	1200
22	11100	305	9140	2340	160	1010	2050	240	1330
23	10600	300	8590	2520	260	1770	2100	255	1450
24	9690	300	7850	2700	255	1860	2000	220	1190
25	8880	275	6590	3070	270	2240	1860	190	954
26	8250	290	6460	2880	290	2260	1740	190	893
27	7800	265	5580	2790	285	2150	1660	190	852
28	7510	270	5470	2790	450	3390	1630	205	902
29	7230	280	5470	4860	4290	56300	1560	200	842
30	6810	235	4320	6110	1290	21300	1490	200	805
31	--	--	--	5980	755	12200	--	--	--
Total	475670	--	346870	117440	--	155749	94070	--	88268

Day	JULY			AUGUST			SEPTEMBER		
1	1560	230	969	5100	430	5920	2800	1330	10100
2	1600	190	821	4200	365	4140	8400	850	19300
3	3930	3850 S	41700	3570	340	3280	11900	725	23300
4	5850	1210	19100	3200	300	2590	17500	670	31700
5	7090	950	18200	2880	245	1900	21400	320	18500
6	8250	760	16900	2520	235	1600	19400	235	12300
7	9040	645	15700	2260	215	1310	16200	245	10700
8	9690	625	16400	2100	210	1190	14000	245	9260
9	9040	510	12400	1900	205	1050	11300	280	8540
10	7800	505	10600	1780	195	937	8880	300	7190
11	7090	445	8520	1630	180	792	7510	285	5780
12	6530	415	7320	1520	185	759	6530	245	4320
13	5720	420	6490	1380	180	671	5720	225	3470
14	5590	560	8450	1320	165	588	5100	215	2960
15	8400	1240	28100	1210	155	506	4640	220	2760
16	7800	560	11800	1140	165	508	4090	230	2540
17	7650	485	10000	1080	170	496	3670	185	1830
18	6950	390	7320	960	160	415	3470	170	1120
19	6110	410	6760	900	130	316	3170	150	1280
20	5980	450	7270	872	120	282	2880	130	1010
21	6390	565	9750	818	115	254	2610	120	846
22	6500	360	6320	760	100	205	2430	115	755
23	6530	305	5380	708	91	174	2260	125	763
24	6250	340	5740	708	92	176	2100	115	652
25	5590	380	5740	735	96	190	1940	98	513
26	4860	385	5050	790	105	224	1900	95	487
27	4420	340	4060	680	100	184	1740	88	413
28	4090	305	3370	630	100	170	1630	75	330
29	4200	375	4250	580	80	125	1600	77	333
30	5340	480	6920	535	75	108	1560	84	354
31	5980	415	6700	560	79	119	--	--	--
Total	191820	--	318100	49026	--	31179	198330	--	183406

Total discharge for year (cfs-days)..... 1392546
Total load for year (tons)..... 1599392

S Computed by subdividing day.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
RED RIVER OF THE NORTH BASIN																							
5-517. WILD RICE RIVER NEAR CAYUGA, N. DAK.																							
Mar. 16, 1961.	0.6	10		0.11	--	61	24	164	10	141	0	388	88	1.3	0.0	0.58	850	252	136	4.5	1,270	7.2	25
Mar. 28, 1962.	39	5.5		.11	--	8.0	3.9	3.1	6.5	32	0	13	.8	.2	11	.02	78	36	10	.2	115	7.0	
Mar. 29.....	55	6.3		.15	0.00	8.5	4.6	5.0	7.6	37	0	17	2.0	.2	11	.04	94	40	10	.3	132	6.7	
May 30.....	296	16		.06	.00	71	34	28	12	206	0	202	9.9	.2	.4	.14	508	317	148	.7	722	7.6	
June 6.....	188	13		.04	--	78	37	28	11	230	0	202	8.1	.2	.0	.12	527	348	159	.7	766	7.5	
July 27.....	221	22		.05	--	77	36	25	11	266	0	167	7.0	.1	.3	.08	495	340	122	.6	719	7.6	
Sept. 5.....	1.8	18		.04	--	101	46	44	16	389	0	188	19	.3	4.6	.17	660	440	121	.9	958	7.6	
5-550.8. BUFFALO LAKE NEAR ESMOND, N. DAK.																							
Apr. 19, 1961.	(a)	11		0.04	--	17	23	436	22	880	51	202	47	0.5	0.6	0.78	1,370	139	0	16	1,960	8.7	
July 13.....	(a)	4.6		.06	0.00	21	28	592	28	1,060	136	306	64	.6	2.9	.89	1,860	168	0	20	2,600	9.0	60
Sept. 12.....	(a)	18		.13	.00	17	21	741	36	1,080	217	390	79	.6	.9	2.1	2,150	129	0	28	3,060	9.3	
June 12, 1962.	(a)	18		.20	--	14	17	364	20	792	0	206	38	.4	1.9	.65	1,150	104	0	16	1,670	8.1	
5-555.2. BIG COULEE NEAR FORT TOTTEN, N. DAK.																							
Jan. 10, 1962.	b 0.4	33		0.01		65	26	24	5.1	348	0	24	9.8	0.4	0.3	0.08	358	269	0	0.6	591	7.8	4
Mar. 27.....	b .5	17		.13		29	13	10	12	142	0	30	8.3	.4	7.3	.07	238	126	10	.4	328	7.6	
Apr. 19.....	b .5	26		.10		64	17	16	5.4	286	0	23	6.1	.2	1.3	.04	300	228	0	.5	488	7.6	
May 28.....	b .5	40		.11	0.00	84	26	26	4.5	408	0	31	2.9	.4	.2	.10	429	318	0	.6	646	8.0	
June 12.....	b .5	41		.07		74	26	26	3.5	396	0	15	1.3	.4	.4	.11	404	290	0	.7	599	8.0	
Sept. 8.....	b .5	27		.06		74	22	26	6.4	359	0	25	11	.3	.1	.07	376	274	0	.7	600	7.9	
5-562.2. SWEETWATER LAKE AT SWEETWATER, N. DAK.																							
May 2, 1960...	(a)	12		0.03	0.00	32	21	35	18	166	0	105	11	0.1	1.0	0.08	365	167	31	1.2	527	6.8	32
Sept. 8, 1962.	(a)	40		.05	.15	36	25	39	23	232	0	80	14	0.2	10	.09	412	194	4	1.2	580	7.6	

5.562.5. LAC AUX MORTES NEAR CHURCHS FERRY, N. DAK.

May 2, 1960...		19		0.04	0.01	41	13	8.8	8.6	152	0	55	3.0	0.1	0.3	0.05	242	156	31	0.3	357	7.3	47
Sept. 9, 1962.	(a)	.8		.04	.11	63	40	46	18	282	0	167	21	.2	.6	.10	538	322	91	1.1	846	7.9	45

5-565. DEVILS LAKE NEAR DEVILS LAKE, N. DAK.

Jan. 2, 1962..	(a)	21		0.05	--	101	476	2,490	262	995	0	5,430	1,190	0.1	4.9	1.5	10,800	2,210	1,390	23	12,600	8.0	35
May 28.....	c 1,413.0	13		.02	0.00	86	412	2,140	233	854	0	4,670	1,060	.5	1.1	1.7	9,250	1,910	1,210	21	11,000	8.1	23
Sept. 8.....	c 1,413.5	5.6		.03	.13	88	433	2,170	241	890	0	4,690	1,070	.2	5.0	1.7	9,740	2,000	1,270	21	11,500	8.2	19

5-565.7. EAST DEVILS LAKE NEAR HAMAR, N. DAK.

May 28, 1962..	c 1,399.7	8.7		0.03	0.00	67	2,780	14,000	1,130	1,570	195	32,700	5,510	0.1	5.3	4.9	60,500	11,600	9,980	57	51,500	8.5	180
Sept. 8.....	c 1,399.6	5.2		.08	.13	48	3,110	15,100	1,310	1,530	349	36,700	5,970	.1	1.4	6.4	67,200	12,900	11,100	58	55,800	8.7	34

5-566.3. EASTERN STUMP LAKE NEAR LAKOTA, N. DAK.

May 29, 1962..	c 1,383.0	6.5		0.02	0.06	188	7,500	29,800	1,450	993	0	76,800	13,100	0.1	5.6	12	139,000	31,300	30,500	73	87,700	8.0	310
Sept. 7.....	c 1,382.6	5.8		.08	2.1	212	8,630	37,800	1,730	969	76	97,000	15,000	.6	1.2	16	175,000	36,000	35,100	91	99,400	8.3	55

5-566.7. WESTERN STUMP LAKE NEAR LAKOTA, N. DAK.

Apr. 18, 1961.	c 1,394.58	4.8		0.13	0.00	285	814	3,660	329	331	0	7,950	2,820	0.1	30	3.2	16,100	4,060	3,790	25	18,900	7.5	32
May 29, 1962..	c 1,395.1	17		.05	.00	122	131	900	89	225	0	1,880	567	.2	3.2	.91	3,990	844	659	13	5,340	7.2	22
Sept. 7.....	c 1,395.5	24		.05	.13	144	360	2,100	206	290	0	4,610	1,350	.1	5.8	2.4	8,970	1,840	1,600	21	11,200	7.5	27

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.
b Estimated.
c Lake elevations, in feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
RED RIVER OF THE NORTH BASIN--Continued																							
5-566.8. TOLNA COULEE RESERVOIR NEAR TOLNA, N. DAK.																							
May 29, 1962..	(a)	7.9		0.03	0.05	30	25	33	8.2	246	0	41	8.2	0.3	0.7	0.07	301	179	0	1.1	495	7.5	
Sept. 8.....	(a)	1.1		.03		32	30	36	7.7	266	0	52	10	.1	.7	.08	330	202	0	1.1	529	7.7	
5-570. SHEYENNE RIVER NEAR COOPERSTOWN, N. DAK.																							
Jan. 4, 1962..	5.0	30		0.12	--	71	38	90	9.2	388	0	168	24	0.2	0.3	0.15	648	332	14	2.2	979	7.8	7
May 30.....	284	21		.07	0.00	57	22	69	7.2	236	0	184	12	.3	.7	.13	510	234	40	2.0	746	7.5	32
Sept. 6.....	15	21		.03	.19	59	28	61	8.1	343	0	97	12	.2	.0	.13	476	263	0	1.6	725	7.9	28
5-575. LAKE ASHTABULA AT BALDHILL DAM, N. DAK.																							
Feb. 19, 1960.	d57,350	22		0.02	--	57	36	89	13	369	0	158	23	0.2	1.6	0.21	595	292	0	2.3	904	7.4	20
Apr. 14.....	d73,560	15		.03	--	42	25	58	8.8	258	0	106	9.0	.2	1.5	.13	416	206	0	1.8	641	7.3	28
May 10.....	d71,060	16		.03	0.04	43	22	54	8.4	257	0	92	13	.2	1.2	.12	396	197	0	1.7	612	7.4	20
Sept. 5, 1962.	d68,810	.7		.02	.21	40	20	41	8.8	231	0	76	10	.0	.2	.09	326	182	0	1.3	529	7.6	--
5-580. SHEYENNE RIVER BELOW BALDHILL DAM, N. DAK.																							
Dec. 5, 1961..	15	1.0		0.18	--	39	24	56	9.6	260	0	105	13	0.2	1.6	0.18	382	198	0	1.7	636	7.4	8
Mar. 31, 1962.	71	9.0		.06	1.7	54	30	67	11	334	0	113	17	.4	2.5	.13	498	258	0	1.8	791	7.5	
May 30.....	163	5.7		.03	.10	40	21	46	9.3	234	0	83	11	.2	.0	.10	342	185	0	1.5	553	7.8	
June 11.....	256	6.5		.10	.41	39	21	43	10	224	0	82	12	.2	4.1	.13	339	182	0	1.4	562	7.6	
July 23.....	29	6.0		.07	--	38	18	39	8.4	212	0	69	9.7	.0	.8	.10	308	168	0	1.3	504	7.6	
Sept. 5.....	13	1.0		.01	.77	40	20	41	8.5	228	0	73	9.7	.2	.5	.11	323	181	0	1.3	528	7.8	

5-993.8. PEMBINA RIVER NEAR VANG, N. DAK.

Apr. 12, 1962.	60	14		0.06	0.16	38	14	30	5.9	136	0	99	8.0	0.2	1.5	0.08	292	153	41	1.1	455	7.1	17
Apr. 18.....	1,200	18		.07	.10	40	7.8	13	3.6	135	0	44	.0	.2	4.0	.04	215	132	21	.5	322	7.1	22

5-1202. WINTERING RIVER NEAR BERGEN, N. DAK.

Mar. 21, 1961.	1.7	13		0.49		16	6.3	84	10	170	0	100	13	0.2	1.6	0.23	367	66	0	4.5	526	7.0	130
Mar. 29, 1962.	21	11		.01		13	5.2	49	11	123	0	62	4.4	.1	1.7	.13	259	54	0	2.9	357	6.9	--
June 7.....	1.7	37		.74	0.03	28	13	269	12	655	0	132	24	.5	7.1	.78	1,020	125	0	10	1,280	7.4	560

5-1234. WILLOW CREEK NEAR WILLOW CITY, N. DAK.

Mar. 21, 1961.	0.1	5.2		0.10		52	33	19	24	75	0	248	12	0.1	6.1	0.09	474	266	204	0.5	666	6.7	67
Apr. 20.....	.3	6.7		.07		62	40	60	20	233	0	239	20	.2	.5	.15	614	320	129	1.5	880	7.9	--
Apr. 13, 1962.	.5	18		.19		60	33	95	19	170	0	315	25	.2	10	.25	710	285	146	2.4	988	6.9	90

5-1236.5. BUFFALO LODGE LAKE NEAR GRANVILLE, N. DAK.

June 13, 1962.	(a)	11		0.05		37	95	277	32	589	0	496	74	0.3	4.7	0.25	1,440	485	2	5.5	1,980	8.0	
Sept. 10.....	(a)	35		.07		30	109	360	43	640	0	615	98	.4	9.0	.33	1,770	522	0	6.9	2,460	8.0	

LAKE OF THE WOODS BASIN

5-1255. STONY RIVER NEAR ISABELLA, MINN.

May 22, 1962.	b 700	4.4		0.36	0.00	4.7	2.7	1.2	0.3	15	0	12	0.7	0.2	0.6	0.02	83	23	11	0.1	50	6.3	140
Sept. 26.....	83	8.8		.84	.04	8.9	2.9	1.7	.4	33	0	9.0	.3	.3	.8	.09	95	34	7	.1	66	7.1	200

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.
b Estimated.
d Lake content, in acre-feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
LAKE OF THE WOODS BASIN--Continued																							
5-1260. DUNKA RIVER NEAR BABBITT, MINN.																							
May 23, 1962.	b 181	5.6		0.44	0.00	5.2	3.4	2.2	0.2	14	0	15	0.6	0.2	2.4	0.05	82	27	16	0.2	65	6.3	110
Sept. 26.....	27	14		1.1	.05	8.5	7.0	3.1	.8	42	0	11	3.9	.3	3.8	.08	118	50	16	.2	100	7.0	230
5-1265. BEAR ISLAND RIVER NEAR ELY, MINN.																							
May 22, 1962.	193	3.6		0.25	0.00	4.1	1.9	1.5	0.2	15	0	6.3	0.4	0.2	0.3	0.03	63	18	6	0.2	43	6.4	90
Sept. 26.....	14	4.3		.41	.02	4.7	2.2	1.3	.4	18	0	6.8	.0	.2	.9	.05	65	21	6	.1	46	6.6	90
5-1282. VERMILION LAKE NEAR SOUDAN, MINN.																							
Aug. 9, 1960.	c 1,357.26	5.0		0.07	0.00	9.6	2.0	1.8	0.5	31	0	8.0	0.0	0.1	1.0	0.03	71	32	7	0.1	73	6.9	50
May 10, 1961.	c 1,358.23	4.4		.12	.00	9.2	1.0	1.4	.6	26	0	8.8	.0	.1	.6	.03	60	27	6	.1	63	6.9	65
May 23, 1962.	c 1,358.68	3.0		.11	.00	9.8	2.1	1.7	.5	31	0	10	.0	.1	.5	.03	68	33	8	.1	75	6.7	30
5-1285. PIKE RIVER NEAR EMBARRASS, MINN.																							
May 23, 1962.	b 430	2.8		0.58	0.00	5.7	1.9	1.6	0.5	14	0	11	0.7	0.2	0.6	0.05	85	22	11	0.1	51	6.3	180
Sept. 26.....	26	10		1.5	.01	9.2	4.4	2.3	1.6	38	0	11	1.0	.2	2.3	.06	104	41	10	.2	84	6.8	200
5-1296.5. LITTLE FORK RIVER AT COOK, MINN.																							
Oct. 4, 1961.	36.6	8.1		1.1	--	9.3	2.6	1.9	1.4	32	0	11	0.2	0.4	3.0	0.05	134	34	8	0.1	63	6.1	250
Oct. 31.....	25.5	8.2		.72	0.00	12	2.0	2.6	.4	26	0	16	.0	.5	3.3	.18	140	38	17	.2	73	6.6	320
Apr. 17, 1962	39.7	7.0		.31	--	12	3.4	4.5	3.0	39	0	15	4.8	.3	3.4	.07	111	44	12	.3	119	6.5	130
May 24.....	422	3.5		.36	.08	6.3	2.0	1.7	.8	19	0	11	.2	.3	.5	.05	106	24	8	.2	50	6.2	220
June 12.....	51.2	.6		.33	--	7.4	3.1	2.0	.7	28	0	8.8	.0	.3	.7	.01	105	31	8	.2	58	6.7	320
July 11.....	279	5.8		.64	.00	7.4	2.3	1.2	.8	21	0	9.8	.2	.4	1.2	.08	125	28	11	.1	48	6.8	300
Sept. 27.....	23.2	6.6		.71	.00	9.8	2.3	2.2	.6	29	0	9.0	.1	.4	2.3	.06	118	34	10	.2	66	6.5	280

5-1299. SOUTH BRANCH LITTLE FORK RIVER NEAR COOK, MINN.

Oct. 4, 1961.	51.2	10		1.1	--	7.7	3.1	2.2	1.4	22	0	13	0.9	0.3	2.0	0.04	106	32	14	0.2	64	6.5	250
Oct. 31.....	--	10		.58	0.03	8.3	2.3	2.2	1.2	23	0	11	.5	.3	1.8	.05	104	30	11	.2	62	6.7	250
Nov. 1.....	50.2	10		.78	--	7.6	3.2	1.9	.8	26	0	14	1.3	.3	1.9	.01	100	32	11	.1	63	6.7	150
Apr. 27, 1962	243	7.8		.33	--	5.7	2.1	1.6	1.2	17	0	9.3	.6	.2	1.5	.06	76	23	9	.1	56	6.4	110
May 24.....	622	5.3		.34	.00	5.7	2.4	1.5	.6	20	0	8.0	.6	.2	.5	.05	85	24	8	.1	50	6.3	150
June 13.....	127	4.7		.91	--	6.7	2.7	2.0	.9	26	0	8.3	.1	.2	.4	.04	78	28	7	.2	59	6.9	140
July 11.....	407	--		--	--	7.0	2.6	1.4	.9	23	0	7.0	--	--	--	--	108	28	9	.1	50	7.0	--
Sept. 27.....	38.7	10		.57	.07	9.2	3.7	1.7	1.5	37	0	8.3	.3	.2	.9	.06	95	38	8	.1	71	6.7	180

MISSISSIPPI RIVER MAIN STEM

5-2010. WINNIBIGOSHISH LAKE NEAR DEER RIVER, MINN.

Nov. 1, 1961.	d256,100	11		0.04	0.00	32	15	4.2	1.4	180	0	7.5	0.0	0.1	0.2	0.02	166	143	0	0.2	284	7.4	7
May 24, 1962.	d316,200	6.8		.18	.00	27	11	3.1	1.1	136	0	6.0	.0	.1	.8	.10	145	112	0	.1	222	7.2	90

SWAN RIVER BASIN

5-2170. SWAN RIVER NEAR WARBA, MINN.

May 24, 1962.	607	8.1		0.24	0.00	18	6.1	2.6	1.5	70	0	16	1.9	0.2	0.6	0.06	129	70	13	0.1	148	6.8	95
Sept. 28.....	94	8.2		.24	.04	28	9.5	4.7	1.7	117	0	19	.0	.2	1.1	.06	156	109	13	.2	228	7.5	50

b Estimated.
c Lake elevation, in feet.
d Lake content, in acre-feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
MINNESOTA RIVER BASIN																							
5-2900. LITTLE MINNESOTA RIVER NEAR PEEVER, S. DAK.																							
June 1, 1960.	16	18		0.02	0.16	146	57	57	8.0	324	0	405	15	0.3	0.4	0.35	931	600	334	1.0	1,200	8.0	22
Oct. 12.....	--	18		.03	.19	182	57	76	9.8	332	0	552	16	.2	.5	.38	1,120	688	416	1.3	1,430	7.3	3
Mar. 19, 1961	--	16		.02	.35	108	38	54	6.9	239	0	311	18	.2	2.6	.24	706	425	229	1.1	983	7.5	7
Mar. 29, 1962	690	6.7		.11	.26	28	7.3	3.2	7.8	86	0	32	.0	.1	7.4	.06	203	100	29	.1	239	6.7	50
5-2910. WHETSTONE RIVER NEAR BIG STONE CITY, S. DAK.																							
June 1, 1960.	16	13		0.02	0.00	135	60	52	8.2	325	0	378	23	0.3	1.5	0.24	886	582	315	0.9	1,180	7.9	14
Oct. 12.....	--	20		.03	.06	135	45	31	7.7	353	0	273	16	.2	1.3	.19	725	522	233	.6	1,020	7.6	4
Mar. 19, 1961	b 60	16		.02	.61	93	33	29	7.1	238	0	206	17	.2	2.5	.12	549	367	172	.7	795	7.2	7
May 15.....	25	10		.05	.05	145	59	71	9.2	298	0	459	23	.2	.0	.27	997	606	362	1.3	1,300	7.2	7
Mar. 29, 1962	2,740	5.3		.09	.19	27	5.5	2.5	7.8	83	0	27	.0	.1	5.2	.06	140	90	22	.1	218	6.6	40
CANNON RIVER BASIN																							
5-3552. CANNON RIVER AT WELCH, MINN.																							
Aug. 16, 1961	151	11		0.04	0.00	54	22	9.8	3.8	226	0	41	13	0.2	5.7	0.04	280	226	41	0.3	471	7.2	8
Apr. 1, 1962.	4,190	7.0		.10	.05	31	9.1	3.0	4.8	105	0	18	5.1	.2	17	.01	179	115	29	.1	251	6.7	30
DES MOINES RIVER BASIN																							
5-4756. WEST FORK DES MOINES RIVER AT WINDOM, MINN.																							
Sept. 28, 1957	--	--		--	--	--	--	--	--	216	0	--	--	--	--	--	--	377	200	--	760	7.3	--
Oct. 4, 1960..	b 125	22		0.02	--	36	96	18	4.9	265	0	279	11	0.5	6.1	0.09	669	484	267	0.4	914	7.4	13
Mar. 21, 1961.	b 870	13		.06	0.02	72	27	9.9	7.4	182	0	142	8.7	.3	8.4	.06	406	290	141	.3	593	6.9	44
May 16.....	304	5.6		.03	.00	125	48	19	4.9	258	0	295	13	.4	1.8	.06	694	508	296	.4	956	7.6	4
Apr. 3, 1962..	5,350	7.8		.09	.22	33	9.6	4.5	5.5	84	0	50	2.5	.2	13	.02	214	122	53	.2	284	6.6	22

b Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
RED RIVER OF THE NORTH BASIN																		
5-993.8. PEMBINA RIVER NEAR VANG, N. DAK.																		
Apr. 12, 1962.....	1630		33	e 60	94	15	--	--	--	--	--	--	--	--	--			
Apr. 14.....	1600		32	66	76	14	--	--	--	--	--	--	--	--	--			
Apr. 16.....	1515		32	100	490	132	--	--	--	--	--	40	41	42	53	54	100	SV
Apr. 17.....	1630		32	950	4,180	10,700	52	62	73	80	89	93	97	99	100			VPWC
Apr. 18.....	1050		35	e 1,200	2,670	8,650	47	58	71	82	89	93	97	100	--			VPWC
Apr. 18.....	1900		34	e 1,700	5,390	24,700	--	--	--	--	--	--	--	--	--			
Apr. 19.....	0915		35	e 1,500	2,840	11,500	52	61	--	86	--	95	97	98	100			VPWC
CROW RIVER BASIN																		
5-2800. CROW RIVER AT ROCKFORD, MINN.																		
July 29, 1961.....	1715			136	69	25												
Apr. 1, 1962.....	1655		34	e 950	200	513												
MINNESOTA RIVER BASIN																		
5-2910. WHETSTONE RIVER NEAR BIG STONE CITY, S. DAK.																		
Oct. 2, 1960.....	1445		--	d 3.6	73	0.7												
Mar. 19, 1961.....	1545		34	d 24	9	.6												
May 15.....	0935		52	25	38	2.6												
Mar. 29, 1962.....	1330		33	2,740	275	2,030												
5-2930. YELLOW BANK RIVER NEAR ODESSA, MINN.																		
Oct. 2, 1960.....	1645		--	1.0	127	0.3												
Mar. 19, 1961.....	1715		32	38	5	.5												
May 15.....	1205		56	31	67	5.6												

e Estimated.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
MINNESOTA RIVER BASIN--Continued																		
5-2940. POMME DE TERRE RIVER AT APPLETON, MINN.																		
Oct. 3, 1960.....	0720		52	42	74	8.4'												
Mar. 29, 1962.....	0735		33	42	25	2.8												
5-3000. LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MINN.																		
Oct. 3, 1960.....	1030		52	2.9	93	0.7												
May 15, 1961.....	1725		64	66	127	23												
Mar. 29, 1962.....	0930		33	150	62	25												
5-3135. YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MINN.																		
Oct. 3, 1960.....	1215		56	7.1	81	1.6												
Mar. 20, 1961.....	1115		34	83	39	8.7												
May 15.....	2010		60	52	126	18												
5-3165. REDWOOD RIVER NEAR REDWOOD FALLS, MINN.																		
Oct. 3, 1960.....	1420		56	32	101	8.7						--	--	--	--			
May 16, 1961.....	1010		54	98	174	46						55	70	99	100			V
Apr. 2, 1962.....	1340		34	2,460	280	1,860						80	84	93	100			V
5-3170. COTTONWOOD RIVER NEAR NEW ULM, MINN.																		
Oct. 3, 1960.....	1715		60	142	238	91		--		--		--	--	--	--			
Mar. 20, 1961.....	1600		36	666	1,420	2,550		30		45		60	74	98	100			VPWC
May 16.....	1300		59	330	292	260		--		--		74	80	99	100			V
Mar. 28, 1962.....	1425		33	1,400	1,120	4,230	28	33		51		73	81	100	--			VPWC
5-3250. MINNESOTA RIVER AT MANKATO, MINN.																		
Oct. 4, 1960.....	0715		55	1,460	166	654												
Mar. 20, 1961.....	1700		34	2,470	148	987												
Apr. 1, 1962.....	2145		--	39,200	978	102,000												

CANNON RIVER BASIN

5-3552. CANNON RIVER AT WELCH, MINN.

Aug. 16, 1961.....	0930		73	126	50	17												
Apr. 1, 1962.....	1215		35	4,260	346	4,020												

ZUMBRO RIVER BASIN

5-3740. ZUMBRO RIVER AT ZUMBRO FALLS, MINN.

Aug. 16, 1961.....	1220		77	728	60	118												
Apr. 1, 1962.....	0840		34	e 3,010	372	3,020												

ROOT RIVER BASIN

5-3840. ROOT RIVER NEAR LANESBORO, MINN.

Aug. 17, 1961.....	1315		81	122	70	23												
Mar. 31, 1962.....	0855		35	1,670	584	2,630												

5-3850. ROOT RIVER NEAR HOUSTON, MINN.

Aug. 17, 1961.....	1045		78	300	124	100												
Mar. 31, 1962.....	1220		36	e 3,600	1,480	14,400												

DES MOINES RIVER BASIN

5-4756. WEST FORK DES MOINES RIVER AT WINDOM, MINN.

Oct. 4, 1960.....	1355		59	e 125	57	19												
Mar. 21, 1961.....	0845		34	e 870	80	188												
May 16.....	1840		56	304	96	79												
Apr. 3, 1962.....	1005		33	5,350	154	2,220												

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN HUDSON BAY AND UPPER MISSISSIPPI RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
MINNESOTA RIVER BASIN																	
5-2910. WHETSTONE RIVER NEAR BIG STONE CITY, S. DAK.																	
May 15, 1961	0935	7		25		3	5	14	37	66	77	88	98	100			SV
Mar. 29, 1962	1330	2		2,740		2	6	30	76	99	100						SV
5-2930. YELLOW BANK RIVER NEAR ODESSA, MINN.																	
Oct. 2, 1960	1645	2		1.0		2	2	5	18	38	51	64	80	95	100		SV
May 15, 1961	1205	8		31		6	9	23	51	68	78	88	94	98	100		SV
5-3000. LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MINN.																	
Oct. 3, 1960	1030	1		2.9		2	2	4	10	16	20	27	37	58	76	100	SV
May 15, 1961	1725	12		66		6	9	19	39	52	60	72	86	95	100		SV
5-3165. REDWOOD RIVER NEAR REDWOOD FALLS, MINN.																	
May 16, 1961	1010	6		98		7	8	13	23	39	51	66	80	97	100		SV
Apr. 2, 1962	1340	5		2,460		9	11	18	47	68	78	84	89	100			SV
5-3170. COTTONWOOD RIVER NEAR NEW ULM, MINN.																	
Oct. 3, 1960	1715	2		142		0	2	5	18	32	42	61	79	100			SV
May 16, 1961	1300	5		330		1	3	31	54	67	74	83	91	100			SV
Mar. 28, 1962	1425	5		1,400		19	30	62	78	90	95	98	100	--			SV
CANNON RIVER BASIN																	
5-3552. CANNON RIVER AT WELCH, MINN.																	
Aug. 16, 1961	0930	5		126			0	6	27	36	40	43	48	63	74	100	SV
Apr. 1, 1962	1215	4		4,260		0	1	28	78	95	96	98	100				SV

ZUMBRO RIVER BASIN

5-3740. ZUMBRO RIVER AT ZUMBRO FALLS, MINN.

Aug. 16, 1961.....	1220	4		728			0	4	37	65	76	82	92	100			SV
Apr. 1, 1962.....	0840	5		e 3,010			0	12	96	100							SV

ROOT RIVER BASIN

5-3840. ROOT RIVER NEAR LANESBORO, MINN.

Aug. 17, 1961.....	1315	3		122		0	1	4	53	76	96	99	100				SV
Mar. 31, 1962.....	0855	4		1,670			0	1	54	90	97	98	99	100			SV

5-3850. ROOT RIVER NEAR HOUSTON, MINN.

Aug. 17, 1961.....	1045	7		300			0	7	58	84	91	96	99	100			SV
Mar. 31, 1962.....	1220	5		e 3,600		6	9	43	83	91	94	98	99	100			SV

DES MOINES RIVER BASIN

5-4756. WEST FORK DES MOINES RIVER AT WINDOM, MINN.

Oct. 4, 1960.....	1355	6		e 125			0	1	2	6	11	24	66	100			SV
May 16, 1961.....	1840	9		304		3	4	15	28	38	47	58	70	78	87	100	SV

e Estimated.

PART 6. MISSOURI RIVER BASIN

BIG HOLE RIVER BASIN

6-255. BIG HOLE RIVER NEAR MELROSE, MONT.

LOCATION.--At gaging station at bridge on Interstate Highway 15 and U.S. Highway 91, 0.1 mile downstream from Rock Creek and 7 miles south of Melrose, Madison County.
DRAINAGE AREA.--2,476 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1956 to September 1957, August 1960 to Septemher 1962.
Water temperatures: August 1956 to September 1957, August 1960 to Septemher 1962.
Sediment records: August 1956 to September 1957, August 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 165 ppm Sept. 7-22; minimum, 73 ppm May 9-31.
Hardness: Maximum, 117 ppm Sept. 7-22; minimum, 35 ppm May 9-31.
Specific conductance: Maximum daily, 274 micromhos Sept. 22; minimum daily, 82 micromhos May 9, 10.
Water temperatures: Maximum, 71°F Aug. 14; minimum, freezing point on many days during November to February, April.
Sediment concentrations: Maximum daily, 193 ppm Apr. 17; minimum daily, 1 ppm on many days.
Sediment loads: Maximum daily, 2,200 tons Apr. 17; minimum daily, 1 ton on many days.
EXTREMES, 1956-57, 1960-62.--Dissolved solids: Maximum, 192 ppm Aug. 17-31, 1961; minimum, 64 ppm May 11-21, 1957.
Hardness: Maximum, 140 ppm Aug. 17-31, 1961; minimum, 29 ppm May 11-21, 1957.
Specific conductance: Maximum daily, 340 micromhos Sept. 6, 1961; minimum daily, 74 micromhos May 19, 1957.
Water temperatures: Maximum, 74°F Aug. 1, 1961; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 200 ppm June 29, 1961; minimum daily, 1 ppm on many days in 1960-62.
Sediment loads: Maximum daily, 2,200 tons Apr. 17, 1962; minimum daily, less than 0.50 ton on several days during August 1961.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples availahle in district office at Worland, Wyo. Flow affected by ice Dec. 5-12, Jan. 9 to Mar. 23.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-12, 1961.	411	17	0.01	29	7.2	8.7	2.7	126	0	17	1.1	0.2	0.1	0.01	152	0.21	169	102	0	0.4	244	7.2	5
Oct. 13-31.....	465	18	.00	24	6.8	8.1	2.9	111	0	14	1.6	.2	.2	.02	134	.18	168	88	0	.4	209	7.6	5
Nov. 1-16.....	454	17	.01	23	5.7	8.7	3.1	104	0	13	1.2	.2	.2	.02	130	.18	159	81	0	.4	218	7.3	6
Nov. 17-30.....	303	16	.01	24	6.6	7.9	2.5	107	0	14	1.3	.2	.0	.02	131	.18	107	87	0	.4	210	7.1	6
Dec. 1-14.....	254	19	.02	25	6.2	8.3	3.1	112	0	16	1.5	.2	.1	.01	135	.18	92.6	88	0	.4	218	7.6	6
Dec. 15-31.....	408	19	.02	23	6.5	7.7	2.1	108	0	14	1.4	.2	.1	.02	130	.18	143	84	0	.4	205	7.7	5
Jan. 1-31, 1962.	234	19	.00	23	5.7	8.0	2.8	104	0	14	1.9	.2	.4	.01	132	.18	83.4	81	0	.4	205	7.5	2
Feh. 1-21.....	292	18	.04	22	5.4	9.4	2.4	99	0	13	3.2	.1	.1	.02	130	.18	102	77	0	.5	200	7.3	4
Feb. 22-28.....	231	20	.04	25	6.7	9.2	2.4	118	0	16	1.5	.1	.0	.02	144	.20	89.8	90	0	.4	220	7.4	4
Mar. 1-13.....	278	19	.00	24	6.3	7.4	2.2	106	0	13	1.4	.2	.1	.03	131	.18	98.3	86	0	.3	207	7.2	4
Mar. 14-31.....	321	17	.00	22	5.6	6.9	2.2	98	0	13	1.4	.2	.2	.04	127	.17	110	78	0	.3	193	7.1	7
Apr. 1-10.....	618	17	.03	18	4.6	7.2	3.8	82	0	11	1.5	.1	.1	.00	110	.15	184	64	0	.4	172	7.6	12
Apr. 11-15.....	1,301	16	.07	14	2.7	6.7	4.7	64	0	8.5	1.1	.1	.3	.00	93	.13	327	46	0	.4	136	7.0	25
Apr. 16-30.....	3,237	14	.08	11	2.3	4.6	3.2	46	0	8.3	.0	.1	.7	.00	78	.11	682	37	0	.3	104	6.8	27
May 1-8.....	2,164	15	.03	10	3.2	4.8	1.6	48	0	8.0	.0	.2	.3	.02	79	.11	462	38	0	.3	98	7.0	15

May 9-31, 1962..	3,733	15	.04	12	1.2	4.5	1.6	44	0	7.5	.0	.2	.6	.05	73	.10	736	35	0	.3	92	7.0	25
June 1-17.....	3,974	15	.03	13	2.3	4.6	1.6	54	0	9.0	.0	.1	.3	.03	81	.11	869	42	0	.3	107	6.8	25
June 18-30.....	3,375	15	.03	16	2.9	4.9	1.7	66	0	8.0	.0	.1	.3	.03	88	.12	802	52	0	.3	125	6.9	25
July 1-20.....	1,355	16	.02	22	4.9	6.7	2.2	95	0	10	.0	.2	.3	.03	119	.16	435	75	0	.3	176	6.8	10
July 21-31.....	811	16	.02	24	4.6	7.2	2.4	102	0	10	.0	.2	.2	.02	121	.16	265	79	0	.4	185	6.8	8
Aug. 1-16.....	694	16	.01	24	6.1	7.6	2.5	109	0	12	.4	.2	.2	.05	130	.18	244	85	0	.4	200	7.3	5
Aug. 17-31.....	404	15	.01	29	7.2	8.3	2.9	126	0	14	.8	.2	.1	.02	149	.20	163	102	0	.4	235	7.2	5
Sept. 1-6.....	341	16	.01	31	7.4	9.5	2.9	133	0	17	1.0	.3	.1	.01	160	.22	147	108	0	.4	253	7.3	5
Sept. 7-22.....	292	15	.02	33	8.4	9.7	2.9	143	0	18	1.6	.3	.4	.02	165	.22	130	117	0	.4	268	7.1	5
Sept. 23-30.....	304	16	.01	30	8.5	9.7	2.6	137	0	17	1.5	.2	.1	.01	159	.22	131	110	0	.4	254	7.1	5
Weighted average.....	1,091	16	0.03	16	3.3	5.7	2.2	69	0	9.7	0.3	0.2	0.4	0.03	96	0.13	282	54	0	0.3	137	6.9	19
Time-weighted average.....	--	17	0.02	22	5.3	7.4	2.5	97	0	13	1.1	0.2	0.2	0.02	122	--	--	77	0	0.4	188	7.1	10
Tons per day..	--	46.0	0.10	48.0	9.8	17.0	6.4	203	0	28.0	1.0	0.5	1.1	0.08	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

BIG BOLE RIVER BASIN--Continued

6-255. BIG HOLE RIVER NEAR MELROSE, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962

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	390	3	3	506	6	8	346	-- E	6
2	400	3	3	506	2	3	342	10	9
3	395	3	3	400	1	1	346	3	3
4	400	3	3	415	2	2	286	9	7
5	395	4	4	415	-- E	2	260	9	6
6	400	4	4	400	1	1	240	4	3
7	400	3	3	470	2	3	220	10	6
8	410	3	3	482	1	1	200	1	1
9	415	2	2	476	2	3	180	2	1
10	420	3	3	482	1	1	150	2	1
11	450	4	5	506	1	1	140	2	1
12	460	6	7	494	2	3	220	6	4
13	460	1	1	410	1	1	286	11	8
14	455	2	2	435	1	1	334	16	14
15	470	2	3	482	1	1	362	1	1
16	465	4	5	380	1	1	385	13	14
17	455	2	2	317	1	1	405	4	4
18	445	2	2	240	1	1	405	2	2
19	425	1	1	294	1	1	440	1	1
20	410	2	2	286	1	1	460	1	1
21	440	2	2	283	1	1	420	1	1
22	500	6	8	286	2	2	354	1	1
23	494	2	3	280	1	1	400	1	1
24	500	2	3	298	1	1	430	1	1
25	482	1	1	314	1	1	420	1	1
26	482	3	4	330	2	2	375	1	1
27	494	3	4	338	1	1	380	2	2
28	494	3	4	322	2	2	420	2	2
29	482	1	1	310	1	1	460	2	2
30	430	3	3	350	3	3	435	5	6
31	460	2	2	--	--	--	390	1	1
Total	13778	--	96	11507	--	52	10491	--	112

	JANUARY			FEBRUARY			MARCH		
1	366	4	4	260	38	27	200	4	2
2	358	6	6	280	36	27	240	2	1
3	405	4	4	290	14	11	280	2	2
4	430	5	6	290	7	5	300	2	2
5	375	5	5	260	4	3	310	2	2
6	425	5	6	210	6	3	320	5	4
7	410	6	7	220	8	5	330	4	4
8	375	5	5	240	7	5	340	3	3
9	300	5	4	280	7	5	330	3	3
10	200	6	3	300	7	6	300	1	1
11	150	4	2	320	6	5	240	5	3
12	160	4	2	330	6	5	220	2	1
13	180	4	2	330	4	4	210	4	2
14	200	4	2	325	8	7	220	2	1
15	200	4	2	320	4	3	230	4	2
16	200	2	1	320	1	1	240	5	3
17	180	4	2	315	1	1	250	4	3
18	160	4	2	315	1	1	260	6	4
19	140	2	1	310	1	1	270	5	4
20	120	-- E	1	310	5	4	280	-- E	3
21	100	4	1	300	2	2	300	2	2
22	110	7	1	290	2	2	310	4	3
23	120	6	2	270	1	1	320	2	2
24	140	6	2	250	2	1	322	6	5
25	160	14	6	230	1	1	346	3	3
26	180	-- E	6	210	6	3	395	15	16
27	200	10	5	190	7	4	506	18	25
28	210	40	23	180	1	1	410	4	4
29	220	42	25	--	--	--	380	4	4
30	230	55	34	--	--	--	366	4	4
31	240	24	16	--	--	--	375	3	3
Total	7244	--	188	7745	--	144	9400	--	121

E Estimated.

BIG HOLE RIVER BASIN--Continued

6-255. BIG HOLE RIVER NEAR MELROSE, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962--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	405	10	11	1980	12	64	3440	13	121
2	470	15	19	1930	8	42	3340	15	135
3	465	15	19	1900	8	41	3440	15	139
4	494	9	12	2030	10	55	4350	20	235
5	560	21	32	2220	13	78	4320	17	198
6	566	12	18	2270	10	61	4070	11	121
7	692	19	35	2350	10	63	3520	10	95
8	758	25	51	2630	10	71	2980	10	80
9	857	28	65	3040	22	181	2740	11	81
10	911	20	49	3200	16	138	2850	11	85
11	875	18	43	3360	8	73	3440	20	186
12	940	23	58	3560	17	163	3720	19	191
13	1110	30	90	3740	19	192	3940	20	213
14	1460	67	264	3870	12	125	4950	38	508
15	2120	101	578	3780	16	163	5710	38	586
16	3380	189	1720	3380	11	100	5560	22	330
17	4230	193	2200	3180	14	120	5190	31	434
18	4090	94	1040	3020	27	220	5090	18	247
19	3870	65	679	3000	34	275	4830	15	196
20	4000	61	659	3320	42	376	4490	12	145
21	3650	37	365	4180	40	451	4250	12	138
22	3020	28	228	4760	25	321	3940	6	64
23	2790	30	226	4400	21	249	3500	8	76
24	2960	34	272	4370	23	271	3120	8	67
25	3240	32	280	4490	17	206	2880	6	47
26	3060	24	198	4400	14	166	2850	6	46
27	2870	18	139	4090	12	133	2560	6	41
28	2790	15	113	3940	14	149	2300	4	25
29	2450	11	73	3870	12	125	2090	4	23
30	2150	12	70	3560	14	135	1980	2	11
31	--	--	--	3340	10	90	--	--	--
Total	61233	--	9606	103160	--	4897	111440	--	4864

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	1930	4	21	821	5	11	395	1	1
2	1850	3	15	812	8	18	370	1	1
3	1640	3	13	812	7	15	350	2	2
4	1490	2	8	767	8	17	322	1	1
5	1380	2	7	830	8	18	306	1	1
6	1360	1	4	812	5	11	302	4	3
7	1260	2	7	776	6	13	290	3	2
8	1160	1	3	724	8	16	286	2	2
9	1070	1	3	668	6	11	286	3	2
10	1040	1	3	653	8	14	290	2	2
11	1050	1	3	632	6	10	290	1	1
12	1000	1	3	632	8	14	294	1	1
13	1320	1	4	597	6	10	290	1	1
14	1690	6	27	548	6	9	290	1	1
15	1730	2	9	518	6	8	298	-- E	1
16	1510	2	8	494	6	8	298	-- E	1
17	1310	2	7	470	4	5	298	1	1
18	1190	2	6	450	6	7	294	3	2
19	1120	3	9	430	-- E	7	294	2	2
20	1000	2	5	420	6	7	290	3	2
21	920	32	79	390	6	6	286	1	1
22	857	4	9	400	4	4	290	2	2
23	803	3	6	430	4	5	294	1	1
24	724	4	8	435	5	6	314	2	2
25	684	1	2	415	6	7	326	2	2
26	692	2	4	385	4	4	310	1	1
27	724	37	72	358	4	4	294	2	2
28	857	23	53	350	6	6	298	3	2
29	940	8	20	370	4	4	298	2	2
30	884	2	5	375	5	5	298	2	2
31	839	3	7	385	5	5	--	--	--
Total	36024	--	430	17159	--	285	9141	--	47

Total discharge for year (cfs-days)	398322
Total load for year (tons)	20842

E Estimated.

BIG HOLE RIVER BASIN--Continued

6-260. BIRCH CREEK NEAR GLEN, MONT.

LOCATION.--At gaging station, 2.2 miles downstream from Sheep Creek and 8 miles southwest of Glen, Beaverhead County.
DRAINAGE AREA.--36.0 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1958 to September 1959, August 1960 to June 1962 (discontinued).

Chemical analyses, in parts per million, October 1961 to June 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 4, 1961....	18	10	0.00	11	2.6	2.3	1.2	46	0	7.8	0.0	0.1	0.4	0.02	56	0.08	2.72	38	0	0.1	96	7.0	2
Nov. 1.....	14	12	.00	14	2.2	2.2	1.2	52	0	7.8	.0	.1	.4	.02	64	.09	2.42	44	1	.1	101	6.9	2
Dec. 5.....	8.0	13	.00	17	2.3	2.8	1.0	62	0	6.8	.6	.1	.2	.01	76	.10	1.64	52	1	.2	127	6.9	4
Jan. 4, 1962....	9.0	12	.01	16	2.2	2.9	1.3	60	0	6.3	.2	.1	.2	.01	74	.10	1.80	49	0	.2	121	7.0	3
Jan. 31.....	5.4	13	.01	15	2.8	2.6	1.2	59	0	5.5	.2	.1	.0	.01	74	.10	1.08	49	1	.2	118	7.0	3
Mar. 6.....	6.1	13	.00	16	2.0	2.7	1.0	60	0	5.5	.9	.1	.0	.01	76	.10	1.25	48	0	.2	114	7.4	1
Apr. 3.....	7.4	13	.00	15	2.1	3.2	2.0	58	0	6.3	.4	.1	.1	.00	75	.10	1.50	46	0	.2	115	7.0	1
May 2.....	17	12	.02	12	2.0	2.4	1.0	44	0	6.8	.0	.1	.0	.01	71	.10	3.26	38	2	.2	130	6.9	4
June 7.....	59	10	.01	8.4	1.5	2.8	.7	34	0	5.5	.0	.1	.1	.01	51	.07	8.12	27	0	.2	69	6.9	3
June 30.....	108	7.9	.01	6.6	1.1	1.3	.7	26	0	3.8	.0	.0	.1	.00	40	.05	11.7	21	0	.1	52	6.6	1

BIG HOLE RIVER BASIN--Continued

6-260. BIRCH CREEK NEAR GLEN, MONT.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 4, 1961.....	0710		37	18	5	0.2											
Nov. 1.....	0750		35	14	1	t											
Dec. 5.....	1525		34	8.0	1	t											
Jan. 4, 1962.....	0745		33	9.0	3	.1											
Jan. 31.....	1145		34	5.4	3	t											
Mar. 6.....	1455		33	6.1	6	.1											
Apr. 3.....	1530		41	7.4	5	.1											
May 2.....	1600		49	17	30	1.4											
May 15.....	0750		40	40	9	1.0											
June 7.....	0815		40	59	7	1.1											
June 20.....	1610		53	126	20	6.8											
June 30.....	1030		50	108	10	2.9											

t Less than 0.05 ton.

MISSOURI RIVER MAIN STEM

6-265. JEFFERSON RIVER NEAR TWIN BRIDGES, MONT.

LOCATION.--At gaging station at private bridge, 0.1 mile upstream from Hell Canyon Creek, 4 miles downstream from confluence of Beaverhead and Big Hole Rivers, and 5 miles north of Twin Bridges, Madison County.
DRAINAGE AREA.--7,632 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1957 to September 1959, August 1960 to September 1962 (discontinued).
Water temperatures: March 1958 to September 1959, August 1960 to September 1962 (discontinued).
Sediment records: October 1957 to September 1959, August 1960 to September 1962 (discontinued).
EXTREMES, 1961-62.--Dissolved solids: Maximum, 415 ppm Dec. 9-14; minimum, 126 ppm May 1-15.
Hardness: Maximum, 287 ppm Dec. 9-14; minimum, 73 ppm May 1-15.
Specific conductance: Maximum daily, 665 micromhos Dec. 12; minimum daily, 168 micromhos May 8.
Water temperatures: Maximum, 70°F July 22; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 1,300 ppm Oct. 24; minimum daily, 7 ppm June 30.
Sediment loads: Maximum daily, 5,350 tons Apr. 16; minimum daily, 17 tons Jan. 16, 25, Aug. 20.
EXTREMES, 1957-59, 1960-62.--Dissolved solids: Maximum, 423 ppm Aug. 13-31, 1961; minimum, 93 ppm June 1-14, 1959.
Hardness: Maximum, 287 ppm Dec. 9-14, 1961; minimum, 49 ppm May 11-31, 1958.
Specific conductance: Maximum daily, 687 micromhos Aug. 25, 1961; minimum daily, 102 micromhos May 23, 1958.
Water temperatures (1958-59, 1960-62): Maximum, 78°F July 16, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 1,300 ppm Oct. 24, 1961; minimum daily, not determined.
Sediment loads: Maximum daily, 5,350 tons Apr. 16, 1962; minimum daily, 5 tons July 30, Aug. 1, 1961.
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. 18, Dec. 7, Dec. 10 to Feb. 10, Feb. 22 to Mar. 14.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-21, 1961.	761	20	0.00	57	21	22	4.5	212	0	86	9.9	0.3	0.2	0.06	334	0.45	686	227	53	0.6	524	7.4	5
Oct. 22-31.....	1,166	23	.00	62	22	24	7.7	225	0	97	14	.4	.5	.07	368	.50	1,160	246	61	.7	574	7.6	5
Nov. 1-30.....	1,176	20	.00	61	21	21	4.8	222	0	87	11	.3	.6	.06	348	.47	1,100	237	55	.6	540	7.5	5
Dec. 1-8.....	1,108	21	.02	65	17	21	4.1	220	0	82	11	.3	.1	.06	332	.45	993	231	51	.6	535	7.6	5
Dec. 9-14.....	702	25	.02	76	24	25	4.7	266	0	108	13	.3	.1	.08	415	.56	787	287	69	.6	640	7.5	6
Dec. 15-31.....	1,041	26	.01	61	21	20	5.0	224	0	85	11	.3	.1	.05	339	.46	953	237	53	.6	533	8.0	6
Jan. 1-31, 1962.	649	21	.00	60	18	20	4.4	212	0	72	10	.4	.5	.03	329	.45	577	224	50	.6	516	7.8	2
Feb. 1-22.....	1,084	21	.04	60	19	20	4.4	217	0	83	10	.3	.5	.04	326	.44	954	227	49	.6	522	7.6	4
Feb. 23-28.....	660	22	.03	67	23	24	4.4	240	0	94	12	.4	.1	.06	372	.51	663	260	63	.6	578	7.7	4
Mar. 1-18.....	845	19	.00	59	20	20	3.2	207	0	82	10	.4	.7	.03	322	.44	735	228	58	.6	514	7.8	4
Mar. 19-31.....	1,270	20	.00	53	19	19	4.1	194	0	75	9.8	.3	.6	.09	306	.42	1,050	209	50	.6	480	7.5	7
Apr. 1-13.....	1,732	21	.04	49	15	18	4.9	180	0	66	8.6	.2	.3	.02	279	.38	1,300	186	38	.6	436	7.5	12
Apr. 14-17.....	3,205	22	.08	32	8.5	12	5.3	118	0	36	5.0	.2	1.7	.00	191	.26	1,650	115	18	.5	291	7.3	37
Apr. 18-30.....	3,854	16	.07	23	6.2	8.9	3.5	86	0	27	3.0	.2	.3	.00	140	.19	1,460	83	12	.4	213	6.9	22
May 1-15.....	3,154	16	.02	20	5.6	7.7	2.1	76	0	25	1.8	.3	.3	.03	126	.17	1,070	73	11	.4	184	7.0	15

May 16-31, 1962.	4,413	17	.03	21	6.5	8.6	2.5	81	0	26	2.0	.3	.5	.04	136	.18	1,620	79	13	.4	200	7.1	20
June 1-5.....	4,394	17	.02	24	6.3	9.4	2.6	88	0	29	2.9	.3	.3	.03	142	.19	1,680	86	14	.4	213	6.8	20
June 6-11.....	4,640	19	.02	32	9.2	13	3.1	121	0	42	4.6	.1	.4	.03	190	.26	2,380	118	19	.5	289	7.1	25
June 12-30.....	4,682	18	.03	27	7.0	9.6	2.5	104	0	25	2.9	.2	.3	.05	152	.21	1,920	96	11	.4	231	7.0	25
July 1-16.....	2,204	19	.00	36	11	13	3.0	142	0	39	3.5	.2	.4	.05	202	.27	1,200	135	19	.5	318	7.5	9
July 17-31.....	1,764	21	.00	48	17	19	3.9	188	0	58	7.4	.3	1.0	.08	278	.38	1,320	190	36	.6	439	7.6	8
Aug. 1-17.....	1,104	19	.01	48	17	19	4.4	188	0	65	8.0	.3	.3	.06	280	.38	835	189	35	.6	439	7.4	5
Aug. 18-28.....	873	21	.02	62	21	24	5.3	232	0	90	11	.3	.4	.06	358	.49	844	242	52	.7	554	7.7	5
Aug. 29-Sept. 19	1,150	22	.01	67	25	26	5.3	250	0	99	12	.4	.4	.07	394	.54	1,220	271	66	.7	602	7.6	5
Sept. 20-30.....	1,045	23	.00	69	26	26	5.3	257	0	102	13	.4	.4	.07	404	.55	1,140	280	69	.7	625	7.6	5
Weighted average.....	1,760	19	0.02	40	13	15	3.6	150	0	52	6.2	0.3	0.4	0.04	233	0.32	1,110	153	30	0.5	360	7.2	14
Time-weighted average....	--	20	0.01	51	17	18	4.2	187	0	69	8.5	0.3	0.4	0.05	289	--	--	196	42	0.6	451	7.4	9
Tons per day.	--	91.0	0.11	191	61.0	70.0	17.0	713	0	248	29.0	1.0	2.1	0.21	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

MISSOURI RIVER MAIN STEM--Continued

6-265. JEFFERSON RIVER NEAR TWIN BRIDGES, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962

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..	760	22	45	1300	29	102	1170	87	275
2..	751	30	61	1360	--	E 260	1180	30	96
3..	733	20	40	1260	87	296	1170	87	275
4..	715	220	425	1200	85	275	1090	32	94
5..	715	640	1240	1180	79	252	1070	66	191
6..	697	660	1240	1160	57	179	1070	14	40
7..	742	880	1760	1190	67	215	1060	15	43
8..	760	650	1330	1260	136	463	1050	58	164
9..	751	--	E 1000	1280	100	346	960	45	117
10..	780	520	1100	1290	94	327	550	50	74
11..	770	670	1390	1290	47	164	500	46	62
12..	800	240	518	1330	--	E 150	650	34	60
13..	790	650	1390	1240	23	77	750	44	89
14..	800	340	734	1180	27	86	800	46	99
15..	820	--	E 700	1240	18	60	950	13	33
16..	840	320	726	1200	70	227	1000	10	27
17..	790	190	405	1100	45	134	1000	11	30
18..	760	620	1270	1000	42	110	1000	22	59
19..	742	40	80	982	85	225	1050	14	40
20..	742	110	220	1050	79	224	1100	10	30
21..	733	270	534	1050	18	51	1100	11	33
22..	860	80	186	1030	15	42	1100	16	48
23..	982	1050	2780	1060	71	203	1050	9	26
24..	1070	1300	3760	1090	15	44	1050	16	45
25..	1170	1010	3190	1120	27	82	1050	20	57
26..	1170	890	2810	1150	50	155	1050	34	96
27..	1250	260	877	1160	84	263	1050	14	40
28..	1310	160	566	1180	54	172	1050	24	68
29..	1330	260	934	1180	20	64	1050	16	45
30..	1260	53	180	1160	43	135	1050	20	57
31..	1260	52	177	--	--	--	1000	16	43
Total	27653	--	31668	35272	--	5383	30770	--	2456
	JANUARY			FEBRUARY			MARCH		
1..	950	32	82	1100	16	48	650	32	56
2..	950	26	67	1150	65	200	700	22	42
3..	1000	28	76	1160	55	170	750	46	93
4..	1000	30	81	1150	26	81	830	50	110
5..	1000	30	81	1100	16	48	850	65	150
6..	1000	100	270	1040	12	34	850	55	130
7..	950	55	140	1000	20	54	870	80	190
8..	900	42	100	1000	55	150	870	90	210
9..	800	100	220	1050	110	310	870	55	130
10..	650	140	250	1130	160	490	850	60	140
11..	450	160	190	1170	423	1340	800	28	60
12..	400	70	76	1180	740	2360	730	42	83
13..	450	26	32	1170	--	E 950	750	70	140
14..	470	18	23	1200	240	778	800	95	210
15..	500	13	18	1110	260	779	993	49	131
16..	510	12	17	1040	320	899	1000	56	151
17..	500	20	27	1070	280	809	1000	48	130
18..	450	24	29	1050	46	130	1040	40	112
19..	400	20	22	1050	130	369	1050	45	128
20..	350	30	28	1030	65	181	1080	34	99
21..	320	24	21	1000	--	E 100	1100	31	92
22..	320	--	E 19	900	32	78	1090	52	153
23..	350	--	E 18	800	65	140	1090	31	91
24..	400	--	E 18	720	34	66	1090	37	109
25..	450	14	17	640	22	38	1110	42	126
26..	500	18	24	600	24	39	1190	65	209
27..	600	11	18	600	20	32	1470	230	913
28..	700	14	26	600	15	24	1810	490	2390
29..	800	28	60	--	--	--	1640	270	1200
30..	950	20	51	--	--	--	1430	152	587
31..	1050	19	54	--	--	--	1360	144	529
Total	20120	--	2155	27810	--	10697	31713	--	8894

E Estimated.

MISSOURI RIVER MAIN STEM--Continued

6-265. JEFFERSON RIVER NEAR TWIN BRIDGES, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	1380	268	999	2660	28	201	3890	19	200
2..	1510	358	1460	2450	27	179	3930	21	223
3..	1690	290	1320	2360	32	204	3910	32	338
4..	1710	260	1200	2320	25	157	4830	60	782
5..	1700	228	1050	2520	70	476	5410	75	1100
6..	1780	298	1430	2620	53	375	5550	67	1000
7..	1800	270	1310	2620	52	368	5240	62	877
8..	1880	425	2160	2780	33	248	4650	58	728
9..	1880	324	1640	3210	83	719	4090	46	508
10..	1850	152	759	3520	63	599	4000	51	551
11..	1770	78	373	3690	77	767	4310	56	652
12..	1730	102	476	3930	54	573	4670	48	605
13..	1840	82	407	4070	60	659	4750	46	590
14..	2050	162	897	4290	62	718	5330	76	1090
15..	2630	410	2910	4270	47	542	6270	152	2570
16..	3550	558	5350	4270	57	657	6770	159	2910
17..	4590	314	3890	3820	47	485	6680	147	2650
18..	4870	158	2080	3700	42	420	6500	127	2230
19..	4630	108	1350	3570	42	405	6160	122	2030
20..	4540	98	1200	3640	34	334	5700	76	1170
21..	4550	98	1200	4110	66	732	5170	66	921
22..	4110	59	655	5130	78	1080	4830	55	717
23..	3620	47	459	5040	63	857	4290	64	741
24..	3520	76	722	4980	54	726	3930	38	403
25..	3670	62	614	5110	76	1050	3600	24	233
26..	3640	43	423	5000	48	648	3360	15	136
27..	3450	44	410	4830	43	561	3070	23	191
28..	3330	39	351	4570	38	469	2820	10	76
29..	3210	30	260	4540	32	392	2600	9	63
30..	2960	25	200	4310	28	326	2460	7	46
31..	--	--	--	3980	29	312	--	--	--
Total	85440	--	37555	117910	--	16239	138770	--	26331

	JULY			AUGUST			SEPTEMBER		
1..	2500	27	182	1360	32	117	1190	45	145
2..	2480	34	228	1300	20	70	1190	34	109
3..	2380	11	71	1230	18	60	1120	28	85
4..	2220	17	102	1190	15	48	1160	30	94
5..	2160	42	245	1230	20	66	1180	36	115
6..	2160	32	187	1240	17	57	1170	62	196
7..	2050	42	232	1220	12	40	1120	65	197
8..	1950	19	100	1150	16	50	1110	63	189
9..	1840	79	392	1070	11	32	1140	70	215
10..	1740	131	615	1080	12	35	1150	74	230
11..	1710	62	286	1080	12	35	1140	63	194
12..	1660	37	166	1040	8	22	1180	50	159
13..	1900	52	267	993	16	43	1190	53	170
14..	2690	59	429	950	12	31	1200	57	185
15..	2980	61	491	900	8	19	1200	46	149
16..	2850	70	539	870	10	23	1160	44	138
17..	2510	59	400	870	10	23	1150	48	149
18..	2380	48	308	880	14	33	1160	44	138
19..	2450	90	595	830	14	31	1060	42	120
20..	2220	128	767	790	8	17	1000	37	100
21..	2020	144	785	780	11	23	982	42	111
22..	1840	156	775	800	24	52	1000	46	124
23..	1710	160	739	1020	38	105	1040	37	104
24..	1520	118	484	960	22	57	1050	40	113
25..	1390	142	533	890	14	34	1080	38	111
26..	1340	--	E 340	860	22	51	1070	34	98
27..	1350	47	171	880	26	62	1040	22	62
28..	1380	--	E 180	910	27	66	1060	21	60
29..	1500	--	E 220	1030	25	70	1080	26	76
30..	1460	25	99	1140	35	108	1090	28	82
31..	1390	--	E 110	1150	42	130	--	--	--
Total	61730	--	11038	31693	--	1610	33462	--	4018

Total discharge for year (cfs-days)..... 642343
Total load for year (tons)..... 158044

E Estimated.

MISSOURI RIVER MAIN STEM--Continued

6-265. JEFFERSON RIVER NEAR TWIN BRIDGES, MONT.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 6, 1961.....	1225		63	4,810	36	468						60	76	93	100			V
Apr. 3, 1962.....	1250			1,670	220	992		55		80		94	98	100				VPWC

MADISON RIVER BASIN

6-388. MADISON RIVER AT KIRBY RANCH, NEAR CAMERON, MONT.

LOCATION.--At gaging station at bridge on county road, 0.2 mile upstream from West Fork and 22 miles southeast of Cameron, Madison County.
DRAINAGE AREA.--1,065 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1959 to September 1960.
Sediment records: October 1959 to September 1962.
EXTREMES, 1959-62.--Sediment concentrations: Maximum daily, 2,830 ppm Oct. 23, 1959; minimum daily, not determined.
Sediment loads: Maximum daily, 32,300 tons Oct. 23, 1959; minimum daily, not determined.
REMARKS.--Flow affected by ice Dec. 7-17, 22, Jan. 5-20, 25, Feb. 23 to Mar. 1, Mar. 13-17.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1961 to September 1962
/Suspended-sediment load computed from samples obtained about two times a week/

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October 1961.....	79,670	158,000	8,618	278			40	132
November.....	64,807	128,500	1,920	64			11	16
December.....	26,320	52,200	434	14			6	12
January 1962.....	23,966	47,540	651	21			10	24
February.....	20,846	41,350	504	18			9	11
March.....	24,020	47,640	403	13			6	8
April.....	18,104	35,910	330	11			7	10
May.....	14,736	29,230	372	12			9	16
June.....	50,718	100,600	2,460	82			18	33
July.....	43,110	85,510	713	23			6	8
August.....	38,810	76,980	434	14			4	7
September.....	38,190	75,750	420	14			4	6
Water year.....	443,297	879,200	17,259	47			14	132

LITTLE PRICKLY PEAR CREEK BASIN

6-711. LITTLE PRICKLY PEAR CREEK AT SIEBEN RANCH, NEAR WOLF CREEK, MONT.

LOCATION.--At gaging station at farm bridge, 0.2 mile upstream from Clark Creek and 8 miles south of Wolf Creek, Lewis and Clark County.
DRAINAGE AREA.--270 square miles.
RECORDS AVAILABLE.--Water temperatures: May to September 1962.
Sediment records: May to September 1962.
EXTREMES, May to September 1962.--Water temperatures: Maximum, 67°F June 28, Aug. 11.
Sediment concentrations: Maximum daily, 490 ppm Aug. 21; minimum daily, 5 ppm June 27, 28, July 8.
Sediment loads: Maximum daily, 286 tons May 25; minimum daily, 0.4 ton June 28.

Temperature (°F) of water, May to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	41	56	43	--	47	47	44	50	48	50	45	44	45	45	44	42	49	50	51	48	47	47	42	46	44	45	--	50	46	52	54	47
June	57	53	48	50	50	46	53	57	55	52	58	57	53	49	49	50	60	61	56	59	61	58	59	66	50	--	65	67	60	--	--	56
July	59	61	62	55	55	52	58	56	--	55	66	56	54	63	59	60	63	52	61	--	--	63	--	62	50	61	61	61	59	63	59	59
August	--	59	63	58	58	66	58	58	60	55	67	55	60	62	58	55	55	54	63	59	55	--	55	58	62	56	54	--	58	50	57	58
September	55	52	53	--	47	--	41	52	52	54	--	--	--	55	49	49	--	--	--	--	--	53	58	55	58	55	49	52	50	47	--	--

LITTLE PRICKLY PEAR CREEK BASIN--Continued

6-711. LITTLE PRICKLY PEAR CREEK AT SIEBEN RANCH, NEAR WOLF CREEK, MONT.--Continued

Suspended sediment, May to September 1962

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				96	45	12	268	57	41
2				90	43	10	225	57	35
3				84	38	8.6	190	49	25
4				82	--	E 6	179	44	21
5				87	20	4.7	152	41	17
6				87	30	7.0	135	40	15
7				87	34	8.0	124	42	14
8				87	39	9.2	107	46	13
9				90	42	10	79	34	7.3
10				90	40	9.7	70	28	5.3
11				84	34	7.7	68	25	4.6
12				84	29	6.6	63	25	4.3
13				104	56	16	64	20	3.5
14				132	51	18	72	28	5.4
15				128	51	18	97	63	16
16				146	80	32	118	46	15
17				162	66	29	135	42	15
18				152	60	25	132	32	11
19				157	69	29	114	20	6.2
20				168	68	31	114	19	5.8
21				179	118	57	104	12	3.4
22				204	140	77	95	13	3.3
23				184	83	41	77	12	2.5
24				179	109	53	64	10	1.7
25				286	371	286	61	8	1.3
26				328	258	228	50	-- E	1
27				398	--	E 180	38	5	.5
28				387	126	132	33	5	.4
29				408	96	106	30	7	.6
30				356	79	76	30	-- E	.6
31				320	66	57	--	--	--
Total				5426	--	1590.5	3088	--	295.7

	JULY			AUGUST			SEPTEMBER		
1	30	12	1.0	23	--	E 1	29	60	4.7
2	29	11	.9	20	25	1.4	30	32	2.6
3	32	7	.6	21	29	1.6	32	32	2.8
4	32	9	.8	22	21	1.2	31	27	2.3
5	34	8	.7	23	81	5.0	32	30	2.6
6	42	12	1.4	23	280	17	30	-- E	2
7	38	6	.6	22	95	5.6	28	16	1.2
8	38	5	.5	22	77	4.6	31	17	1.4
9	36	6	.6	18	115	5.6	34	20	1.8
10	37	8	.8	14	30	1.1	34	18	1.7
11	39	10	1.1	17	18	.8	34	-- E	2
12	40	9	1.0	17	13	.6	40	-- E	4
13	40	13	1.4	17	21	1.0	44	-- E	6
14	50	19	2.6	16	310	13	46	67	8.3
15	54	18	2.6	16	350	15	43	41	4.8
16	63	31	5.3	20	260	14	39	21	2.2
17	55	18	2.7	23	155	9.6	39	-- E	2
18	54	14	2.0	23	92	5.7	40	-- E	2
19	50	15	2.0	23	57	3.5	37	-- E	2
20	48	-- E	2	22	50	3.0	37	-- E	2
21	46	-- E	2	21	490	28	37	-- E	2
22	42	16	1.8	24	360	23	40	29	3.1
23	34	14	1.3	37	310	31	38	29	3.0
24	33	13	1.2	31	100	8.4	40	32	3.5
25	37	18	1.8	29	50	3.9	40	17	1.8
26	36	24	2.3	28	28	2.1	40	19	2.1
27	34	18	1.7	27	18	1.3	39	18	1.9
28	32	9	.8	25	--	E 1	39	16	1.7
29	30	8	.6	25	14	.9	39	12	1.3
30	28	10	.8	27	20	1.5	39	10	1.1
31	27	10	.7	27	9	.7	--	--	--
Total	1220	--	45.6	703	--	212.1	1101	--	79.9

Total discharge for period May to September (cfs-days)..... 11538
Total load for period May to September (tons)..... 2223.8

E Estimated.

LITTLE PRICKLY PEAR CREEK BASIN--Continued

6-713. LITTLE PRICKLY PEAR CREEK AT WOLF CREEK, MONT.

LOCATION.--At gaging station at county bridge, 150 feet south of Wolf Creek post office, Lewis and Clark County, and 0.5 mile downstream from Wolf Creek.
DRAINAGE AREA.--381 square miles.
RECORDS AVAILABLE.--Water temperatures: May to September 1962.
Sediment records: May to September 1962.
EXTREMES, May to September 1962.--Water temperatures: Maximum, 77°F Aug. 16.
Sediment concentrations: Maximum daily, 1,120 ppm May 17; minimum daily, 1 ppm Aug. 20.
Sediment loads: Maximum daily, 1,630 tons May 27; minimum daily, 0.1 ton Aug. 20, 21.

Temperature (°F) of water, May to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	48	51	52	51	50	--	46	53	52	50	47	50	46	--	--	50	50	50	51	50	47	47	--	--	49	48	53	51	49	53	58	50
June	56	59	50	52	51	--	58	62	59	--	61	60	55	51	54	61	63	--	59	66	64	59	57	65	--	--	--	67	68	65	--	59
July	62	64	60	56	60	65	67	67	68	64	65	62	62	62	58	60	60	--	65	71	68	--	70	69	69	66	70	66	65	68	67	65
August	66	67	67	--	62	66	68	--	--	60	62	69	71	70	70	77	66	64	66	--	--	--	68	68	66	65	66	56	62	--	62	--
September	--	50	58	--	56	54	46	50	52	56	60	55	55	57	56	--	--	59	58	59	53	--	64	66	58	58	--	55	53	--	--	--

6-713. LITTLE PRICKLY PEAR CREEK AT WOLF CREEK, MONT.--Continued

Suspended sediment, May to September 1962

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				180	29	14	384	114	118
2				170	26	12	342	107	99
3				170	22	10	310	101	85
4				170	21	10	288	94	73
5				170	24	11	264	34	24
6				180	--	E 11	246	--	E 22
7				180	22	11	225	34	21
8				180	23	11	210	31	18
9				180	24	12	185	20	10
10				173	21	10	171	--	E 9
11				169	19	8.7	163	17	7.5
12				165	21	9.4	153	35	14
13				192	30	16	159	28	12
14				234	--	E 30	183	25	12
15				350	--	E 110	258	83	58
16				485	975	1280	300	140	113
17				489	1120	1480	291	77	60
18				402	400	434	273	--	E 24
19				350	380	359	249	22	15
20				307	230	191	228	27	17
21				489	690	911	213	21	12
22				658	710	1260	198	16	8.6
23				549	--	E 750	181	14	6.8
24				481	--	E 320	167	8	3.6
25				605	375	613	157	--	E 3
26				722	790	1540	149	--	E 2
27				766	790	1630	129	--	E 2
28				676	360	657	117	4	1.3
29				569	180	277	111	6	1.8
30				493	139	185	111	5	1.5
31				425	125	143	--	--	--
Total				11329	--	12306.1	6415	--	854.1

	JULY			AUGUST			SEPTEMBER		
1	111	5	1.5	56	4	0.6	53	--	E 0.3
2	105	5	1.4	52	4	.6	55	2	.3
3	100	4	1.1	49	4	.5	58	6	.9
4	98	5	1.3	50	--	E .6	57	--	E .8
5	98	6	1.6	52	5	.7	54	5	.7
6	102	6	1.7	52	6	.8	53	4	.6
7	94	5	1.3	51	8	1.1	51	6	.8
8	90	4	1.0	52	--	E 1.0	55	4	.6
9	86	5	1.2	50	--	E 1.0	55	6	.9
10	81	5	1.1	49	7	.9	56	4	.6
11	78	5	1.1	49	4	.5	57	6	.9
12	80	5	1.1	50	4	.5	62	9	1.5
13	88	7	1.7	49	4	.5	64	8	1.4
14	99	9	2.4	50	3	.4	63	6	1.0
15	99	10	2.7	49	2	.3	60	6	1.0
16	105	9	2.6	49	4	.5	60	--	E .7
17	94	9	2.3	52	6	.8	58	--	E .5
18	94	--	E 2.0	54	6	.9	57	2	.3
19	93	6	1.5	54	2	.3	55	4	.6
20	87	6	1.4	51	1	.1	54	4	.6
21	84	5	1.1	48	--	E .1	55	2	.3
22	81	--	E 1.0	50	--	E 1.0	57	--	E .4
23	74	3	.6	72	24	4.7	57	3	.5
24	66	4	.7	66	15	2.7	56	3	.5
25	74	8	1.6	58	9	1.4	56	3	.5
26	70	6	1.1	56	5	.8	56	2	.3
27	76	6	1.2	53	3	.4	55	--	E .3
28	70	6	1.1	55	4	.6	53	2	.3
29	68	6	1.1	54	4	.6	52	2	.3
30	63	4	.7	55	--	E .4	52	--	E .3
31	59	5	.8	54	2	.3	--	--	--
Total	2667	--	43.0	1641	--	25.6	1686	--	18.7

Total discharge for period May to September (cfs-days)	23738
Total load for period May to September (tons)	13247.5

E Estimated.

MILK RIVER BASIN

6-1541. MILK RIVER NEAR HARLEM, MONT.

LOCATION.--At bridge on U.S. Highway 2, 0.5 mile upstream from gaging station, 3 miles southeast of Harlem, Blaine County, and 6 miles upstream from Thirty Mile Creek.
DRAINAGE AREA.--9,822 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: June to September 1960, May to October 1961, April to September 1962.
Water temperatures: August to September 1960, May to October 1961, April to September 1962.
EXTREMES, October 1961, April to September 1962.--Dissolved solids: Maximum, 764 ppm Oct. 1-31; minimum, 204 ppm July 1-21.
Hardness: Maximum, 311 ppm Oct. 1-31; minimum, 118 ppm July 1-21.
Specific conductance: Maximum daily, 1,220 micromhos Oct. 15; minimum daily, 317 micromhos July 19.
Water temperatures: Maximum, 77°F June 26.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 764 ppm Oct. 1-31, 1961; minimum, 173 ppm Sept. 1-17, 1961.
Hardness: Maximum, 311 ppm Oct. 1-31, 1961; minimum, 110 ppm Sept. 1-17, 1961.
Specific conductance: Maximum daily, 1,220 micromhos Oct. 15, 1961; minimum daily, 294 micromhos Sept. 12, 1961.
Water temperatures: Maximum, 78°F June 28, Aug. 4, 5, 1961.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, in parts per million, October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	43.0	3.7	0.01	71	33	145	3.2	315	0	296	34	0.2	0.6	0.10	764	1.04	88.7	311	53	3.6	1,140	7.9	6
Apr. 4-5, 1962..	200	--	--	--	--	46	--	134	0	100	--	--	--	--	292	.40	156	126	16	1.8	452	7.5	--
Apr. 6-7.....	112	--	--	--	--	66	--	176	0	142	--	--	--	--	403	.55	122	168	24	2.2	615	7.2	--
Apr. 8-10.....	83.3	--	--	--	--	85	--	218	0	190	--	--	--	--	500	.68	112	214	35	2.5	774	7.7	--
Apr. 11-21.....	63.0	2.4	.11	52	27	108	4.8	245	0	233	27	.2	.7	.09	598	.81	102	240	39	3.0	912	7.5	16
Apr. 22-30.....	352	5.0	.05	29	14	45	3.1	164	0	80	5.3	.1	1.3	.05	270	.37	257	130	0	1.7	452	7.3	15
May 1-18.....	574	5.1	.02	31	12	36	3.1	163	0	62	4.0	.2	.6	.06	243	.33	377	126	0	1.4	399	7.6	10
May 19-31.....	389	5.7	.02	34	14	39	3.3	174	0	77	6.8	.2	.3	.06	275	.37	289	144	1	1.4	450	7.9	10
June 1-30.....	501	5.5	.01	32	12	31	3.2	154	0	63	5.5	.3	.5	.10	231	.31	312	128	2	1.2	388	7.3	10
July 1-21.....	607	5.6	.00	28	12	27	2.6	150	0	45	3.3	.1	1.0	.05	204	.28	334	118	0	1.1	346	7.5	7
July 22-31.....	272	5.3	.01	35	13	35	3.4	170	0	70	6.3	.0	.6	.07	261	.35	192	141	2	1.3	422	7.5	12
Aug. 1-31.....	284	5.1	.01	31	13	29	2.1	159	0	57	5.2	.1	.1	.05	234	.32	179	129	0	1.1	381	8.0	9
Sept. 1-13.....	319	4.4	.01	32	14	31	2.0	165	0	62	6.5	.1	.1	.05	244	.33	144	136	1	1.2	401	7.2	6
Sept. 14-30.....	140	3.3	.00	37	15	42	2.2	174	0	87	10	.1	.1	.05	310	.42	117	154	11	1.5	480	7.3	6
Weighted average.....	a 214	5.2	0.01	32	13	36	2.9	164	0	69	5.9	0.2	0.6	0.07	255	0.35	215	134	3	1.3	417	7.5	9
Tons per day..	--	4.4	0.01	27.0	11.0	30.0	2.4	138	0	58.0	5.0	0.1	0.5	0.06	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 211 days of chemical analyses, 313 cfs.

MILK RIVER BASIN--Continued

6-1541. MILK RIVER NEAR HARLEM, MONT.--Continued

Temperature (°F) of water, October 1961, April to September 1962

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

MILK RIVER BASIN--Continued

6-1740. WILLOW CREEK NEAR GLASGOW, MONT.

LOCATION.--At gaging station, 6 miles south of Glasgow, Valley County, and 8 miles upstream from mouth.
DRAINAGE AREA.--538 square miles.
RECORDS AVAILABLE.--Sediment records: October 1953 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 56,000 ppm June 15, July 14; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 860,000 tons July 14; minimum daily, 0 tons on many days.
EXTREMES, 1953-62.--Sediment concentrations: Maximum daily, 58,000 ppm Apr. 5, 1954; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 860,000 tons July 14, 1962; minimum daily, 0 tons on many days each year.
REMARKS.--Flow affected by ice Nov. 5, Nov. 9 to Mar. 31. Bureau of Land Management has extensive spreader systems on some of the tributaries upstream from station.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1961 to September 1962

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October 1961.....	0	0	0	0	0	0		--
November.....	673.7	1,340	5,891	196	b 1,800	0		3,640
December.....	0	0	0	0	0	0		--
January 1962.....	0	0	0	0	0	0		--
February.....	444	881	3,315	118	e 1,300	0		--
March.....	7,940	15,750	203,270	6,560	47,000	0		14,900
April.....	236.2	468	1,635	54	b 380	0		2,850
May.....	5,548	11,000	323,528	10,400	182,000	0		33,600
June.....	5,618	11,140	468,925	15,600	b 280,000	b 18		60,300
July.....	31,665.4	62,810	1,873,851	60,400	b 860,000	1		59,900
August.....	706.2	1,400	13,413	433	b 9,000	0		6,200
September.....	2.6	5.2	3	.1	b 2	0		--
Water year.....	52,834.1	104,800	2,893,831	7,930	860,000	0		60,300

e Estimated.
b Computed from estimated-concentration graph.

MILK RIVER BASIN--Continued

6-1740. WILLOW CREEK NEAR GLASGOW, MONT.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 22, 1962.....	1340		54	2,410	33,600	219,000		77		92		100						PWC
May 23.....	1110		56	1,140	16,300	50,200		76		96		100						PWC
May 25.....	1540		60	332	8,880	7,960		72		95		100						PWC
June 7.....	1010		56	137	6,000	2,220		82		97		100						PWC
July 15.....	1445		--	7,940	12,600	270,000		86		99		100						PWC
July 19.....	1550		--	1,630	15,900	70,000		70		91		100						PWC

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MILK RIVER BASIN--Continued

6-1745. MILK RIVER AT NASHUA, MONT.

LOCATION.--At gaging station at bridge on State Highway 249, 0.6 mile southwest of Nashua, Valley County, and 5 miles upstream from Porcupine Creek.
DRAINAGE AREA.--22,332 square miles.
RECORDS AVAILABLE.--Chemical analyses: October and November 1961, April to September 1962.

Chemical analyses, in parts per million, October and November 1961, April to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 3, 1961....	38	7.6	0.00	70	35	198	6.4	346	0	421	36	0.4	1.3	0.33	939	1.28	96.3	320	36	4.8	1,390	7.7	6
Nov. 1.....	82	7.0	.00	71	33	154	6.0	309	0	355	28	.4	1.8	.26	817	1.11	181	312	59	3.8	1,210	7.3	6
Apr. 4, 1962....	a 1,900	7.4	.00	21	8.6	49	5.5	102	0	104	8.8	.2	.4	.09	266	.36	1,360	88	4	2.3	407	7.4	45
May 3.....	85	9.2	.56	45	17	89	7.3	184	0	203	20	.4	.2	.14	503	.68	115	184	33	2.9	766	7.2	45
June 6.....	316	8.7	.01	36	16	86	6.2	147	0	204	12	.3	1.3	.15	466	.63	398	157	36	3.0	704	7.2	7
June 30.....	502	7.5	.01	38	18	85	5.9	182	0	178	10	.2	.6	.13	458	.62	621	168	19	2.9	694	7.3	8
Aug. 2.....	615	8.3	.02	41	14	78	6.5	151	0	192	9.8	.3	1.7	.14	453	.62	752	160	36	2.7	673	7.4	31
Sept. 7.....	187	8.8	.02	78	31	150	7.9	315	0	353	27	.4	1.1	.24	833	1.13	421	321	63	3.6	1,230	7.6	5

a Daily mean discharge.

LITTLE PORCUPINE CREEK BASIN

6-1754. FRAZER RESERVOIR OUTLET AT FRAZER, MONT.

LOCATION.--In sec. 35, T. 27 N., R. 44 E., at outlet of Frazer Reservoir, 1 mile southeast of Frazer, Valley County.
RECORDS AVAILABLE.--Chemical analyses: October and November 1961, April to September 1962.
REMARKS.--Analyses represent reservoir water; no outflow at time of sampling. No discharge records available.

Chemical analyses, in parts per million, October and November 1961, April to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 3, 1961....		8.0	0.00	55	22	198	9.6	249	0	416	31	0.6	0.9	0.42	900	1.22		227	23	5.7	1,270	6.9	13
Nov. 1.....		6.0	.11	59	26	207	9.4	259	0	457	33	.5	.5	.37	961	1.31		254	34	5.6	1,370	7.4	12
Apr. 4, 1962....		6.5	.01	19	6.0	25	7.6	80	0	63	1.0	.1	1.1	.13	201	.27		72	6	1.3	278	7.0	80
May 3.....		6.2	.15	25	4.3	34	7.5	95	0	76	4.2	.2	3.2	.07	231	.31		80	2	1.7	346	6.7	45
June 6.....		7.7	.03	32	6.6	36	6.9	129	0	74	3.6	.1	5.0	.09	256	.35		107	1	1.5	405	7.4	45
June 30.....		8.7	.04	30	8.3	47	7.6	142	0	88	4.2	.1	2.4	.14	288	.39		109	0	2.0	434	7.0	33
Aug. 2.....		7.6	.04	31	9.6	49	8.8	152	0	94	3.2	.3	5.0	.14	329	.45		117	0	2.0	466	7.4	55
Sept. 7.....		9.4	.02	34	11	54	8.2	181	0	99	4.8	.3	.8	.19	322	.44		130	0	2.1	501	8.1	18

Date of collection	Hydrogen sulfide (H_2S)
Oct. 3, 1961.....	0.6
Nov. 1.....	.5
Apr. 4, 1962.....	1.0
May 3.....	2.4
June 6.....	1.5
June 30.....	.0
Aug. 2.....	.3
Sept. 7.....	1.2

MISSOURI RIVER MAIN STEM

6-1770. MISSOURI RIVER NEAR WOLF POINT, MONT.

LOCATION.--At gaging station at bridge on State Highway 13, 6 miles southeast of Wolf Point, Roosevelt County, and 6 miles downstream from Wolf Creek.
DRAINAGE AREA (revised).--82,290 square miles.
RECORDS AVAILABLE.--Chemical analyses: March 1949 to September 1951, September 1961 to September 1962 (discontinued).

Chemical analyses, in parts per million, September 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Sept. 7, 1961...	10,500	8.2	0.02	54	19	37	4.1	187	0	127	8.7	0.6	0.4	0.11	362	0.49	10,260	214	61	1.1	584	7.3	2
Nov. 1.....	10,200	7.1	.00	59	19	43	3.9	196	0	130	9.0	1.2	--	--	360	.49	9,910	224	64	1.2	581	8.2	--
Dec. 5.....	a 9,900	6.9	.00	40	29	39	3.9	196	0	131	9.1	.8	.1	.13	373	.51	9,970	220	59	1.1	590	7.6	4
Jan. 3, 1962....	a11,300	6.8	.00	57	20	43	3.8	196	2	131	9.0	1.3	--	--	364	.49	11,110	224	60	1.2	583	8.3	--
Jan. 31.....	a12,200	6.5	.01	54	21	39	3.8	194	0	128	9.1	.8	.1	.11	366	.50	12,060	222	63	1.1	582	7.6	3
Mar. 6.....	a11,000	6.6	.00	56	21	40	4.2	204	0	131	9.4	.8	.1	.14	380	.52	11,290	227	60	1.2	593	8.2	1
Apr. 4.....	11,200	6.2	.06	49	19	40	4.4	178	0	132	8.8	.6	.5	.09	363	.49	10,980	199	53	1.2	570	7.6	8
May 3.....	3,200	7.6	.05	58	22	42	3.7	200	0	136	8.7	.8	.2	.12	387	.53	3,340	234	70	1.2	602	8.0	3
June 6.....	5,360	7.7	.01	50	22	41	3.9	194	0	130	8.8	.6	.4	.11	366	.50	5,300	215	56	1.2	568	7.8	1
June 30.....	7,480	7.7	.00	48	24	42	2.8	190	0	133	8.8	.6	.4	.11	370	.50	7,470	217	61	1.2	584	7.7	3
Aug. 2.....	6,340	7.6	.01	53	19	40	3.8	186	0	128	8.7	.9	.3	.13	365	.50	6,250	210	57	1.2	577	7.9	3
Sept. 6.....	4,300	7.5	.00	57	19	41	3.7	195	0	137	9.8	.8	.4	.08	380	.52	4,410	222	62	1.2	598	7.8	5

a Daily mean discharge.

6-2043. BUTCHER CREEK NEAR ABSAROKEE, MONT.

LOCATION.--At gaging station, 0.3 mile upstream from mouth and 2.2 miles south of Absarokee, Stillwater County.
DRAINAGE AREA.--39.6 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1960 to August 1962 (discontinued).
Sediment records: May 1960 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 81°F July 11; minimum, freezing point on many days during October to December, February and March.
EXTREMES, 1960-62.--Water temperatures: Maximum, 81°F July 11, 1962; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped Apr. 1 to July 2, Sept. 1-30; range in temperature not determined. Flow affected by ice Dec. 6-10, 12-29, Jan. 6-8, Jan. 26 to Feb. 3, Feb. 6-9, Feb. 17 to Mar. 18.

Temperature (°F) of water, October 1961 to August 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2043. BUTCHER CREEK NEAR ABSAROKEE, MONT.--Continued

Monthly and annual summary of water and suspended-sediment discharge, water year October 1961 to September 1962
/Suspended-sediment load computed from samples obtained about two times a week/

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October 1961.....	673	1,330	53	1.7			29	76
November.....	458	908	83	2.8			67	169
December.....	283.3	562	32	1.0			42	158
January 1962.....	197.8	392	17	.5			32	101
February.....	444	881	120	4.3			100	226
March.....	330	655	38	1.2			43	77
April.....	633	1,260	61	2.0			36	54
May.....	1,044	2,070	404	13			143	269
June.....	1,359	2,700	1,013	34			276	256
July.....	1,517	3,010	889	29			217	323
August.....	1,601	3,180	700	23			162	339
September.....	1,027	2,040	160	5.3			58	93
Water year.....	9,567.1	18,990	3,570	10			138	339

6-2078. BLUEWATER CREEK NEAR BRIDGER, MONT.

LOCATION.--At gaging station, 200 feet downstream from outflow of State fish hatchery, 6 miles northeast of Bridger, Carbon County, and 8 miles upstream from mouth.
DRAINAGE AREA.--27.5 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1960 to September 1962.
Sediment records: April 1960 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 73°F June 26; minimum, freezing point Dec. 10, 12.
Sediment concentrations: Maximum daily, 280 ppm Aug. 10; minimum daily, not determined.
Sediment loads: Maximum daily, 21 tons June 16, Aug. 10; minimum daily, 2 tons on several days during August.
EXTREMES, 1960-62.--Water temperatures: Maximum, 80°F July 17, 1960; minimum, freezing point Dec. 10, 12, 1962.

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2078. BLUEWATER CREEK NEAR BRIDGER, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	29	C 57	4	31	--	10	29	80	6
2..	29	C 57	4	31	--	12	29	--	6
3..	29	C 57	4	31	160	13	29	--	6
4..	29	C 57	4	31	--	13	29	78	6
5..	28	C 57	4	31	--	11	29	--	6
6..	29	C 57	4	30	120	10	28	--	8
7..	29	C 57	4	30	C 97	8	29	130	10
8..	29	C 57	4	30	C 97	8	29	--	10
9..	29	C 57	4	30	C 97	8	28	--	9
10..	28	C 57	4	29	C 97	8	29	--	8
11..	28	C 57	4	29	C 97	8	28	95	7
12..	29	C 57	4	30	C 97	8	27	70	5
13..	29	C 57	4	30	C 97	8	27	60	4
14..	29	C 57	4	30	C 97	8	29	78	6
15..	29	C 57	4	30	C 97	8	29	89	7
16..	29	C 57	4	30	C 97	8	29	--	7
17..	29	C 57	4	30	81	7	29	--	9
18..	29	C 57	4	30	73	6	29	160	13
19..	29	C 57	4	29	--	6	29	135	11
20..	30	C 57	5	30	105	9	29	140	11
21..	29	C 57	4	30	100	8	28	198	15
22..	29	C 57	4	30	--	8	29	160	13
23..	29	C 57	4	30	--	8	30	--	9
24..	26	C 57	4	30	115	9	30	--	9
25..	27	C 57	4	30	--	9	30	--	9
26..	29	--	8	31	--	8	30	113	9
27..	29	110	9	31	90	8	30	119	10
28..	30	--	8	31	72	6	30	121	10
29..	30	--	8	30	66	5	30	138	11
30..	30	108	9	30	90	7	30	--	10
31..	30	112	9	--	--	--	30	--	9
Total	896	--	152	905	--	253	900	--	269

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..	31	C 150	13	31	189	16	28	C 135	10
2..	30	C 150	12	32	200	17	28	C 135	10
3..	30	C 150	12	32	--	20	28	C 135	10
4..	30	C 150	12	32	--	17	28	C 135	10
5..	30	C 150	12	31	--	15	28	C 135	10
6..	30	C 150	12	31	169	14	28	C 135	10
7..	30	C 150	12	31	C 136	11	28	C 135	10
8..	30	C 150	12	31	C 136	11	29	C 135	11
9..	31	C 150	13	30	C 136	11	29	C 135	11
10..	31	C 150	13	31	C 136	11	29	C 135	11
11..	30	C 150	12	30	C 136	11	29	C 135	11
12..	30	C 150	12	30	C 136	11	29	C 135	11
13..	30	C 150	12	30	C 136	11	29	C 135	11
14..	30	C 150	12	30	C 136	11	29	C 135	11
15..	29	C 150	12	31	C 136	11	29	C 135	11
16..	29	C 150	12	31	C 136	11	30	C 135	11
17..	29	C 150	12	31	C 136	11	30	C 135	11
18..	30	C 150	12	31	C 136	11	30	C 135	11
19..	30	C 150	12	30	C 136	11	31	C 135	11
20..	30	C 150	12	30	C 136	11	29	145	11
21..	30	C 150	12	30	C 136	11	29	250	20
22..	32	C 150	13	30	C 136	11	29	165	13
23..	31	C 150	13	30	C 136	11	29	92	7
24..	31	C 150	13	30	C 136	11	30	140	11
25..	31	C 150	13	30	C 136	11	29	138	11
26..	32	C 150	13	30	C 136	11	29	100	8
27..	32	C 150	13	29	C 136	11	29	92	7
28..	31	C 150	13	28	C 136	11	29	100	8
29..	30	C 150	12	--	--	--	28	--	8
30..	31	C 150	13	--	--	--	27	105	8
31..	31	C 150	13	--	--	--	28	--	8
Total	942	--	384	853	--	340	894	--	322

C Composite period.

YELLOWSTONE RIVER BASIN--Continued

6-2078. BLUEWATER CREEK NEAR BRIDGER, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	28	C 102	8	31	115	10	24	110	7
2	29	C 102	8	30	88	7	24	98	6
3	29	C 102	8	30	60	5	24	93	6
4	30	C 102	8	30	68	6	28	257	19
5	30	C 102	8	31	67	6	27	133	10
6	30	C 102	8	31	--	4	27	136	10
7	30	C 102	8	30	54	4	28	100	8
8	31	C 102	9	29	66	5	27	100	7
9	32	C 102	9	29	70	5	27	53	4
10	30	C 102	8	30	69	6	27	82	6
11	30	C 102	8	30	63	5	27	80	6
12	32	C 102	9	30	66	5	27	60	4
13	30	105	8	31	110	9	27	80	6
14	30	100	8	30	125	10	27	69	5
15	30	100	8	27	120	9	28	--	11
16	30	120	10	27	80	6	29	270	21
17	30	120	10	27	79	6	28	130	10
18	30	--	7	27	--	5	27	115	8
19	30	80	6	26	87	6	27	122	9
20	31	84	7	26	150	11	27	120	9
21	32	60	5	26	78	5	27	120	9
22	31	70	6	28	140	11	27	92	7
23	31	72	6	26	82	6	27	--	9
24	31	--	6	26	100	7	27	--	8
25	31	80	7	26	102	7	26	--	10
26	31	80	7	30	200	16	25	--	8
27	31	--	6	26	135	9	24	--	7
28	31	75	6	25	125	8	24	87	6
29	31	80	7	25	124	8	25	105	7
30	31	115	10	25	100	7	24	--	6
31	--	--	--	25	90	6	--	--	--
Total	913	--	229	870	--	220	793	--	249

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	25	C 54	4	24	--	6	25	C 52	4
2	24	C 54	3	26	--	15	25	C 52	4
3	25	C 54	4	25	230	16	26	C 52	4
4	26	C 54	4	25	--	10	27	C 52	4
5	26	C 54	4	24	--	5	27	C 52	4
6	26	C 54	4	24	51	3	27	C 52	4
7	26	C 54	4	24	--	3	27	C 52	4
8	26	C 54	4	24	--	4	29	C 52	4
9	25	C 54	4	24	--	4	27	C 52	4
10	24	C 54	3	28	280	21	27	C 52	4
11	24	C 54	3	26	--	10	26	C 52	4
12	24	C 54	3	27	--	6	27	C 52	4
13	25	C 54	4	26	80	6	27	C 52	4
14	24	C 54	3	25	C 36	2	27	C 52	4
15	24	C 54	3	25	C 36	2	27	C 52	4
16	24	C 54	3	25	C 36	2	27	C 52	4
17	22	C 54	3	24	C 36	2	27	C 52	4
18	22	C 54	3	25	C 36	2	27	C 52	4
19	22	C 54	3	26	C 36	3	27	C 52	4
20	22	C 54	3	26	C 36	3	27	C 52	4
21	23	C 54	3	24	C 36	2	28	C 52	4
22	24	C 54	3	24	C 36	2	27	C 52	4
23	24	C 54	3	24	C 36	2	27	C 52	4
24	22	C 54	3	24	C 36	2	27	C 52	4
25	24	C 54	3	24	C 36	2	27	C 52	4
26	24	C 54	3	24	C 36	2	27	C 52	4
27	24	C 54	3	24	C 36	2	27	C 52	4
28	24	C 54	3	24	C 36	2	26	C 52	4
29	24	C 54	3	25	C 36	2	25	C 52	4
30	26	C 54	4	25	C 36	2	26	C 52	4
31	24	C 54	3	25	C 36	2	--	--	--
Total	749	--	103	770	--	147	803	--	120

Total discharge for year (cfs-days)	10288
Total load for year (tons)	2788

C Composite period.

YELLOWSTONE RIVER BASIN--Continued

6-2079. BLUEWATER CREEK AT FROMBERG, MONT.

LOCATION.--At gaging station, 0.3 mile upstream from mouth and 0.7 mile southeast of Fromberg, Carbon County.
RECORDS AVAILABLE.--Water temperatures: August 1961 to September 1962.
Sediment records: October 1961 to September 1962.
EXTREMES, 1961-62.--Water temperatures (August 1961 to September 1962): Maximum, 75°F Aug. 15, 1961, July 9, Aug. 8, 12, 1962; minimum, freezing point on many days during December 1961, February and March 1962.
Sediment concentrations: Maximum daily, 7,200 ppm May 26; minimum daily, 40 ppm July 25.
Sediment loads: Maximum daily, 2,410 tons May 26; minimum daily, 1 ton July 25.
REMARKS.--Flow affected by ice Dec. 8-19, Jan. 8-29, Feb. 23 to Mar. 5.

Temperature (°F) of water, August and September 1961

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
August																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	75	68	68	66	70	66	64	62	64	65	60	63	63	62	62	64	64	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64	58	55	55	55	56	46	52	52	51	54	56	52	46	52	52	51	--
September																																
Maximum	57	46	53	56	60	56	52	60	52	48	52	49	51	52	54	59	64	60	55	52	47	52	48	51	52	52	48	56	51	53	--	53
Minimum	50	42	38	43	45	50	44	43	47	45	46	46	43	46	46	50	54	55	48	47	45	42	46	43	46	44	39	44	46	46	--	46

6-2079. BLUEWATER CREEK AT FROMBERG, MONT.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2079. BLUEWATER CREEK AT FROMBERG, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	50	C 353	48	43	C 326	38	31	C 228	19
2..	50	C 353	48	38	C 326	33	31	C 228	19
3..	49	C 353	47	36	C 326	32	31	C 228	19
4..	49	C 353	47	41	C 326	36	31	C 228	19
5..	49	C 353	47	37	C 326	33	31	C 228	19
6..	46	C 353	44	37	C 326	33	30	C 228	18
7..	48	C 353	46	37	C 326	33	29	C 228	18
8..	49	C 353	47	35	C 326	31	29	C 228	18
9..	47	C 353	45	37	C 326	33	28	C 228	17
10..	44	C 353	42	37	C 326	33	26	C 195	14
11..	36	C 353	34	34	C 326	30	26	C 195	14
12..	35	C 353	33	32	C 218	19	26	C 195	14
13..	36	C 353	34	32	C 218	19	26	C 195	14
14..	37	C 353	35	32	C 218	19	26	C 195	14
15..	37	C 353	35	32	C 218	19	26	C 195	14
16..	37	C 353	35	32	C 218	19	28	C 310	23
17..	38	C 353	36	32	C 218	19	28	C 310	23
18..	38	C 353	36	32	C 218	19	28	C 310	23
19..	38	C 353	36	32	C 218	19	29	C 310	24
20..	37	C 353	35	32	C 218	19	30	C 310	25
21..	37	C 353	35	32	C 218	19	31	C 310	26
22..	37	C 353	35	32	C 218	19	31	C 310	26
23..	37	C 353	35	32	C 218	19	31	C 310	26
24..	37	C 353	35	32	C 218	19	31	C 310	26
25..	34	C 353	32	32	C 218	19	30	C 236	19
26..	40	C 353	38	32	C 218	19	30	C 236	19
27..	37	C 353	35	32	C 218	19	30	C 236	19
28..	45	C 353	43	32	C 218	19	29	C 236	18
29..	38	C 353	36	32	C 218	19	29	C 236	18
30..	38	C 353	36	32	C 218	19	29	C 236	18
31..	37	C 353	35	--	--	--	29	C 236	18
Total	1267	--	1205	1019	--	725	900	--	601

Day	JANUARY			FEBRUARY			MARCH		
1..	29	C 257	20	31	600	50	26	--	60
2..	30	C 257	21	33	760	68	26	--	50
3..	29	C 257	20	40	--	90	26	--	40
4..	29	C 257	20	34	--	65	26	--	30
5..	29	C 257	20	29	C 400	31	29	350	27
6..	29	C 257	20	29	C 400	31	30	--	30
7..	29	C 257	20	29	C 400	31	34	--	70
8..	28	C 257	19	29	C 400	31	33	800	A 70
9..	26	C 260	18	30	C 400	32	33	--	60
10..	26	C 260	18	32	C 400	35	29	--	30
11..	26	C 260	18	35	C 400	38	29	C 322	25
12..	26	C 260	18	32	C 400	35	29	C 322	25
13..	26	C 260	18	31	C 400	33	29	C 322	25
14..	25	C 260	18	29	C 400	31	28	C 322	24
15..	26	C 260	18	29	C 400	31	28	C 322	24
16..	26	C 260	18	29	C 400	31	28	C 322	24
17..	26	C 260	18	28	C 400	30	29	C 322	25
18..	24	C 260	17	28	C 400	30	29	C 322	25
19..	24	C 260	17	28	C 400	30	29	390	31
20..	24	C 260	17	28	C 400	30	29	382	30
21..	24	C 260	17	28	C 400	30	29	440	34
22..	24	C 260	17	28	C 400	30	29	410	32
23..	24	C 260	17	28	C 400	30	29	325	25
24..	24	C 260	17	26	--	40	29	310	24
25..	24	C 260	17	26	--	50	29	310	24
26..	26	C 260	18	26	--	60	29	310	24
27..	26	C 260	18	26	1200	84	29	290	23
28..	28	--	24	26	--	70	28	330	25
29..	28	--	30	--	--	--	28	--	22
30..	28	540	41	--	--	--	28	250	19
31..	29	--	44	--	--	--	28	--	19
Total	823	--	633	827	--	1177	894	--	996

A Computed from partly estimated concentration graph.
C Composite period.

YELLOWSTONE RIVER BASIN--Continued

6-2079. BLUEWATER CREEK AT FROMBERG, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	28	--	18	47	800 J	110	44	400	48
2..	28	240	18	39	550 A	60	57	670	103
3..	29	--	17	29	440	34	57	560	86
4..	28	210	16	26	700 A	50	96	2100 S	668
5..	29	--	28	25	400 A	26	55	2750	408
6..	31	700 A	60	19	--	16	47	900	114
7..	30	--	24	27	400	29	48	600	78
8..	31	--	22	31	410	34	66	760	135
9..	32	--	20	35	490	46	65	590	104
10..	31	205	17	29	350	27	70	690	130
11..	29	--	16	28	380	29	77	850	177
12..	30	176	14	23	220	14	80	910	197
13..	31	134	11	52	1480 S	233	64	910	157
14..	30	197	16	46	720	89	58	700	110
15..	29	200	16	44	600	71	54	--	130
16..	29	172	13	46	550	68	101	3900 A	1100
17..	29	198	16	43	370	43	82	1350	299
18..	30	--	16	45	--	40	76	1040	213
19..	30	200	16	41	330	36	74	1140	228
20..	31	186	16	45	--	60	71	940	180
21..	31	183	15	51	530	73	64	610	105
22..	32	165	14	57	640	98	64	520	90
23..	63	2100 J	650	60	850	138	60	--	75
24..	80	--	380	63	770	131	63	--	90
25..	70	C 665	126	71	1640	314	54	440	64
26..	70	C 665	126	124	7200	2410	29	340	27
27..	78	C 665	140	84	2200	499	26	--	24
28..	70	C 665	126	77	1190	247	25	--	20
29..	64	C 665	115	76	1500	308	18	200	10
30..	51	C 665	92	60	850	138	16	--	9
31..	--	--	--	56	580	88	--	--	--
Total	1204	--	2174	1499	--	5559	1761	--	5179

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..	16	--	8	40	--	40	57	--	150
2..	20	--	10	36	--	30	64	--	160
3..	17	193	9	35	1100 J	110	70	--	170
4..	17	--	9	28	--	30	65	430	75
5..	16	--	8	38	--	70	61	410	68
6..	14	--	7	33	700 J	75	59	--	55
7..	16	--	8	29	--	30	47	300	38
8..	22	--	10	26	--	26	82	750 J	190
9..	24	320 J	24	29	--	30	97	1000 A	260
10..	14	120 A	5	46	750 J	120	101	950	259
11..	16	--	7	60	--	130	81	--	150
12..	17	180 A	8	59	--	100	65	C 393	69
13..	39	C 432	45	52	580	81	66	C 393	70
14..	59	C 432	69	42	--	50	72	C 393	76
15..	70	C 432	82	35	C 314	30	70	C 393	74
16..	55	C 432	64	35	C 314	30	71	C 393	75
17..	36	C 432	42	41	C 314	35	60	C 393	64
18..	28	C 159	12	31	C 314	26	50	C 393	53
19..	33	C 159	14	41	C 314	35	40	C 393	42
20..	32	C 159	14	41	C 314	35	36	C 393	38
21..	32	C 159	14	34	C 314	29	42	C 393	45
22..	35	C 159	15	30	C 314	25	62	C 393	66
23..	33	C 159	14	41	C 314	35	62	C 393	66
24..	20	110	6	44	C 314	37	64	C 393	68
25..	13	40	1	41	C 314	35	63	C 393	67
26..	18	--	4	46	C 314	39	63	C 393	67
27..	37	260 A	26	34	C 314	29	68	C 393	72
28..	38	--	26	23	C 314	19	68	C 393	72
29..	48	--	60	41	--	55	68	C 393	72
30..	44	--	50	49	--	100	68	C 393	72
31..	30	--	20	60	1000	162	--	--	--
Total	909	--	691	1220	--	1678	1942	--	2803

Total discharge for year (cfs-days)..... 14265
Total load for year (tons)..... 23421

S Computed by subdividing day.
A Computed from partly estimated concentration graph.
C Composite period.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2079. BLUEWATER CREEK AT FROMBERG, MONT.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 23, 1962.....	1615		59	60	926	150		21		33		73	94	99	100			VPWC
June 4.....	1840		51	151	4,420	1,800		38		56		84	95	100				VPWC
June 19.....	1500		61	74	1,480	296		50		71		91	97	100				VPWC

YELLOWSTONE RIVER BASIN--Continued

6-2303. RAY LAKE OUTLET NEAR FORT WASHAKIE, WYO.

LOCATION.--At gaging station at bridge on U.S. Highway 287, 1,000 feet downstream from Ray Lake Dam and 5 miles southeast of Fort Washakie, Fremont County.
RECORDS AVAILABLE.--Chemical analyses: August 1960 to September 1962.
Water temperatures: August 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 476 ppm Sept. 1-24; minimum, 470 ppm Aug. 9-31.
Hardness: Maximum, 211 ppm May 28 to June 12; minimum, 207 ppm Sept. 1-24.
Specific conductance: Maximum daily, 729 micromhos Aug. 10; minimum daily, 665 micromhos May 28.
Water temperatures: Maximum, 72°F Aug. 14, 15.
EXTREMES, 1960-62.--Dissolved solids: Maximum, 523 ppm Sept. 15-26, 1960; minimum, 454 ppm Aug. 1-15, 1961.
Hardness: Maximum, 214 ppm July 4-15, 1961; minimum, 188 ppm Aug. 1-15, 1961.
Specific conductance: Maximum daily, 782 micromhos Sept. 26, 1960, July 10, 1961; minimum daily, 665 micromhos May 28, 1962.
Water temperatures: Maximum, 78°F July 19, Aug. 1, 2, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1961 to September 1962 furnished by U.S. Indian Service, Fort Washakie, Wyo. No flow Oct. 1 to May 27, June 13 to Aug. 8, Sept. 25-30.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
May 28-June 12, 1962.....	18.8	5.1	0.00	41	26	65	2.1	131	0	223	6.4	0.2	1.2	0.06	472	0.64	24.0	211	104	2.0	687	7.4	5
Aug. 9-31.....	32.7	2.3	.00	45	24	69	2.2	127	0	234	6.5	.1	.2	.07	470	.64	41.5	210	106	2.1	700	7.2	3
Sept. 1-24.....	27.5	2.5	.01	41	25	69	1.8	120	0	238	6.5	.2	.0	.08	476	.65	35.3	207	109	2.1	708	7.6	5
Weighted average.....	a 4.7	2.9	0.00	43	25	68	2.0	125	0	234	6.5	0.2	0.3	0.07	473	0.64	35	209	107	2.1	701	7.4	4
Tons per day..	--	0.2	0.00	3.1	1.8	5.0	0.1	9	0	17.0	0.5	0.0	0.0	0.01	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 63 days of actual flow, 27.2 cfs.

YELLOWSTONE RIVER BASIN--Continued

6-2303. RAY LAKE OUTLET NEAR FORT WASHAKIE, WYO.--Continued

Temperature (°F) of water, water year October 1961 to September 1962
/Many days of no flow/

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
February	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53	58	58	58	57
June	60	63	62	60	58	58	62	64	63	64	62	65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	62
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August	--	--	--	--	--	--	--	--	--	61	64	64	68	72	72	68	70	68	68	69	70	68	68	65	67	69	69	60	68	63	63	67
September	63	64	61	60	60	61	63	59	60	59	58	58	59	60	59	59	59	56	57	61	61	58	58	60	--	--	--	--	--	--	--	60

6-2390. MUSKRAT CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 2 miles upstream from mouth and 7 miles southwest of Shoshoni, Fremont County.
DRAINAGE AREA.--733 square miles.
RECORDS AVAILABLE.--Sediment records: June 1950 to September 1958, October 1959 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 53,900 ppm Feb. 11; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 851,000 tons Feb. 10; minimum daily, 0 tons on many days.
EXTREMES, 1950-58, 1959-62.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 851,000 tons Feb. 10, 1962; minimum daily, 0 tons on many days each year.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1961 to September 1962

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October 1961.....	0	0	0	0	0	0		--
November.....	0	0	0	0	0	0		--
December.....	0	0	0	0	0	0		--
January 1962.....	0	0	0	0	0	0		--
February.....	6,860	13,610	1,673,562	59,800	851,000	0		162,000
March.....	0	0	0	0	0	0		--
April.....	0	0	0	0	0	0		--
May.....	18.1	36	820	26	e 300	0		--
June.....	6.2	12	700	23	e 700	0		18,400
July.....	5.3	11	669	22	669	0		55,100
August.....	0	0	0	0	0	0		--
September.....	18.0	36	1,670	56	e 1,500	0		--
Water year.....	6,907.6	13,700	1,677,421	4,600	851,000	0		162,000

e Estimated.

YELLOWSTONE RIVER BASIN--Continued

6-2390. MUSKRAT CREEK NEAR SHOSHONI, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Feb. 11, 1962.....	1810		34	2,570	37,200	258,000		33		53		83	92	99	100			VPWC
Feb. 12.....	1030		36	290	18,100	14,200		46		61		78	93	99	100			VPWC
Feb. 13.....	1520		44	51	25,900	3,570		68		86		97	99	100	--			VPWC

YELLOWSTONE RIVER BASIN--Continued

6-2445. 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.--118 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to November 1951.
Water temperatures: October 1950 to September 1951, April to September 1961.
Sediment records: October 1949 to September 1958, April 1961 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 16,000 ppm Sept. 23; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,800 tons Sept. 23; minimum daily, 0 tons on many days.
EXTREMES, 1949-58, 1961-62.--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 Oct. 29 to Dec. 31, Jan. 30 to Mar. 30.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	1.1	--	2	3.0	2200	18	3.2	C 546	5
2..	1.2	1450	5	2.5	1450	10	3.2	C 546	5
3..	1.2	--	5	2.0	650	4	3.2	C 546	5
4..	1.6	1490	6	.9	--	T	3.2	C 546	5
5..	1.7	1120	5	.5	--	T	3.2	C 546	5
6..	2.3	1220	8	.3	175	T	3.0	C 546	4
7..	3.2	4250	37	.5	--	T	2.0	--	1
8..	4.4	--	70	.8	--	T	1.0	--	T
9..	3.8	7700	79	1	282	1	.5	--	T
10..	4.4	6300	75	1	--	2	.5	26	T
11..	2.3	5200	32	1	688	2	.2	--	T
12..	2.6	5400	38	1	--	1	.1	--	T
13..	2.9	5300	41	.8	--	1	0	--	0
14..	3.2	2900	25	.6	--	T	0	--	0
15..	3.2	800	7	.4	--	T	0	--	0
16..	3.5	4700	44	.3	475	T	0	--	0
17..	3.8	1600	16	.2	426	T	0	--	0
18..	3.8	5250	54	.2	--	T	0	--	0
19..	4.7	5900	75	.2	--	T	0	--	0
20..	4.7	--	85	.3	--	T	0	--	0
21..	4.4	6200	74	.5	--	T	0	--	0
22..	3.8	2500	26	.7	--	T	0	--	0
23..	2.4	4630	S 43	1.0	--	T	0	--	0
24..	2.9	5480	S 55	1.5	206	1	0	--	0
25..	3.5	7200	J 90	2.0	--	1	0	--	0
26..	4.2	5600	J 75	3.0	--	2	0	--	0
27..	4.1	4000	44	3.2	420	4	0	--	0
28..	4.3	4000	J 55	3.2	582	5	0	--	0
29..	4.5	2700	33	3.2	--	5	0	--	0
30..	4.0	2400	26	3.2	--	5	0	--	0
31..	3.5	3000	28	--	--	--	0	--	0
Total	101.2	--	1258	39.0	--	660	23.3	--	31

S Computed by subdividing day.
T Less than 0.50 ton.
C Composite period.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2445. FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0		0	0.2	--	T	2	C 353	2
2	0		0	.3	--	T	3	C 353	3
3	0		0	.4	--	T	4	C 353	4
4	0		0	.4	--	T	5	C 353	5
5	0		0	.4	--	T	6	C 353	6
6	0		0	.4	--	T	7	C 353	7
7	0		0	2	--	2	8	C 353	8
8	0		0	7	C 654	12	9	C 353	8
9	0		0	8	C 654	14	9	C 353	8
10	0		0	8	C 654	14	7	C 353	7
11	0		0	8	C 654	14	6	C 353	6
12	0		0	5	C 1430	19	6	C 353	6
13	0		0	3	C 1430	12	6	C 353	6
14	0		0	3	C 1430	12	6	C 353	6
15	0		0	3	C 1430	12	6	C 353	6
16	0		0	3	C 1430	12	7	C 353	7
17	0		0	3	C 1430	12	8	C 968	21
18	0		0	3	C 1430	12	9	C 968	24
19	0		0	3	C 536	4	9	C 968	24
20	0		0	3	C 536	4	9	C 968	24
21	0		0	3	C 536	4	9	1600	39
22	0		0	3	C 536	4	10	--	50
23	0		0	2	C 536	3	10	--	80
24	0		0	1	C 536	1	10	--	100
25	.1		T	1	C 536	1	11	--	110
26	.1		T	1	C 536	1	12	3800	120
27	.1		T	1	C 536	1	13	4700	160
28	.1		T	1	C 536	1	12	6400	210
29	.1		T	--	--	--	10	9300	250
30	.1	14	T	--	--	--	10	10000	270
31	.1		T	--	--	--	11	10500	312
Total	0.7		T	77.1	--	172	250	--	1889

	APRIL			MAY			JUNE		
1	9.5	1 800	277	1.6	C 527	2	4.4	2800	J 42
2	7.7	7020	146	1.6	C 527	2	2.5	3900	S 28
3	8.1	6930	S 160	2.3	C 527	3	3.1	2310	S 22
4	10	5600	151	2.0	C 527	3	2.8	1620	S 13
5	7.8	--	120	1.8	C 527	3	3.1	1840	S 16
6	7.2	5720	111	1.6	C 527	2	2.7	--	14
7	9.5	--	130	.9	C 527	1	5.6	9900	J 160
8	8.8	2800	67	1.0	C 527	1	4.1	2500	28
9	7.1	--	80	1.1	C 527	2	3.5	C 1500	14
10	7.0	3720	S 92	.8	C 527	1	2.3	C 1500	9
11	5.8	--	55	.7	C 527	1	1.8	C 1500	7
12	6.8	--	70	.7	C 527	1	2.3	--	28
13	7.8	--	55	1.0	C 527	1	.7	--	3
14	7.4	--	44	.8	C 527	1	.3	--	1
15	6.2	2100	35	1.1	C 527	2	.9	--	10
16	5.0	2300	31	1.0	C 527	1	.7	--	5
17	4.4	1600	19	1.2	C 527	2	.7	--	1
18	4.0	1300	14	1.2	C 527	2	.5	523	S 1
19	3.5	1390	13	1.0	C 527	1	.3	C 284	T
20	3.8	480	5	.8	C 527	1	.2	C 284	T
21	9.4	2800	J 75	8.2	5740	S 187	.2	C 284	T
22	6.6	--	34	5.0	3400	46	.3	C 284	T
23	4.4	1480	18	3.8	1800	18	.1	C 284	T
24	3.8	1010	10	5.7	4180	S 76	0	--	0
25	3.2	960	8	21	12000	J 750	0	--	0
26	7.0	1900	J 40	22	12000	J 750	0	--	0
27	5.0	990	13	19	--	500	0	--	0
28	4.1	880	10	12	3850	125	0	--	0
29	3.0	774	S 7	7.0	5150	97	0	--	0
30	2.1	900	J 7	5.0	5050	68	0	--	0
31	--	--	--	4.1	2750	30	--	--	--
Total	186.0	--	1897	137.0	--	2680	43.1	--	403

S Computed by subdividing day.
T Less than 0.50 ton.
C Composite period.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2445. FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

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	0.2	--	T	3.8	1550	16	0	--	0
2	8.4	5380	S 136	3.5	1520	14	0	--	0
3	7.0	2390	45	1.8	605	S 3	0	--	0
4	4.2	2320	26	.6	319	1	0	--	0
5	3.0	1390	S 13	.1	--	T	0	--	0
6	2.0	--	3	0	--	0	0	--	0
7	.6	278	S 1	0	--	0	0	--	0
8	.1	68	T	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	.2	2100	S 2	0	--	0	0	--	0
13	.8	1900	J 5	0	--	0	0	--	0
14	.5	750	J 2	0	--	0	0	--	0
15	.5	--	1	0	--	0	0	--	0
16	.3	380	J 1	0	--	0	0	--	0
17	0	--	0	0	--	0	0	--	0
18	.1	--	T	0	--	0	0	--	0
19	0	--	0	0	--	0	0	--	0
20	0	--	0	0	--	0	0	--	0
21	0	--	0	0	--	0	4.0	4200	J 180
22	0	--	0	0	--	0	20	--	850
23	0	--	0	0	--	0	40	16000	J 1800
24	0	--	0	0	--	0	22	5450	324
25	0	--	0	0	--	0	12	3100	100
26	0	--	0	0	--	0	9.5	--	50
27	0	--	0	0	--	0	8.2	--	30
28	.7	1400	J 5	0	--	0	6.2	1250	21
29	.3	--	T	0	--	0	4.4	1500	18
30	1.7	1700	J 10	0	--	0	4.1	--	17
31	4.3	1800	21	0	--	0	--	--	--
Total	34.9	--	272	9.8	--	34	130.4	--	3390
Total discharge for year (cfs-days)									1032.5
Total load for year (tons)									12686

S Computed by subdividing day.
T Less than 0.50 ton.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2445. FIVEMILE CREEK ABOVE WYOMING CANAL, NEAR PAVILLION, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 27, 1962.....	1115		36	d 13	6,890	242		21		33		61	89	99	100			VPWC
May 25.....	1130		63	26	10,300	723		46		66		83	93	99	100			VPWC
Sept. 24.....	1555		64	21	4,620	262		35		55		80	90	99	100			VPWC

d Daily mean discharge.

6-2500. FIVEMILE CREEK NEAR RIVERTON, WYO.

LOCATION.--At gaging station, 3 miles downstream from Ocean drain, 12.5 miles north of Riverton, Fremont County, and 13 miles upstream from mouth.
DRAINAGE AREA.--356 square miles, of which 132 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1950 to November 1951.
Water temperatures: October 1950 to September 1951, October 1952 to September 1958, October 1959 to September 1962.
Sediment records: October 1949 to September 1958, October 1959 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 67°F June 19; minimum, freezing point on many days during October to March.
Sediment concentrations: Maximum daily, 17,400 ppm Aug. 1; minimum daily, 120 ppm Dec. 17.
Sediment loads: Maximum daily, 17,900 tons July 13; minimum daily, 9 tons Dec. 14, 16.
EXTREMES, 1949-58, 1959-62.--Water temperatures: Maximum (1959-62), 70°F July 3, 1960; minimum, freezing point on many days during winter months.
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.--Flow affected by ice Dec. 6, 9, 10, 15-24, Dec. 28 to Jan. 19, Jan. 25-27, Jan. 30 to Feb. 21, Feb. 28 to Mar. 17.

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2500. FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

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	1830	548	60	930	151	47	760	96
2..	85	1340	308	52	850	119	46	740	92
3..	70	1230	232	53	970	139	50	1100	148
4..	65	1180	207	50	1040	140	46	760	94
5..	63	1020	174	46	730	91	43	500	58
6..	63	1240	211	47	820	104	35	750	71
7..	62	1130	189	45	1000	122	30	340	28
8..	64	1100	190	46	930	116	28	360	27
9..	65	1040	183	47	--	E 120	27	190	14
10..	69	1430	266	48	930	121	26	220	15
11..	66	1200	214	50	960	130	25	200	14
12..	63	1220	208	48	1000	130	25	190	13
13..	62	1280	214	46	840	104	25	160	11
14..	61	880	145	47	1000	127	25	130	9
15..	62	920	154	46	1000	124	25	170	11
16..	63	1090	185	46	910	113	25	130	9
17..	63	840	143	42	770	87	30	120	10
18..	62	1010	169	45	780	95	35	200	19
19..	61	930	153	50	600	81	40	280	30
20..	61	890	147	51	480	66	40	340	37
21..	61	900	148	52	650	91	40	280	30
22..	62	1060	177	48	710	92	35	340	32
23..	60	780	126	45	1020	124	35	200	19
24..	59	710	113	45	630	77	35	380	36
25..	58	710	111	46	750	93	35	460	43
26..	60	680	110	49	1060	140	35	420	40
27..	61	830	137	50	990	134	30	480	39
28..	60	780	126	50	1000	135	25	550	37
29..	57	930	143	50	780	105	25	650	44
30..	58	840	132	47	680	86	30	700	57
31..	57	880	135	--	--	--	35	550	52
Total	1994	--	5698	1447	--	3357	1033	--	1235

Day	JANUARY			FEBRUARY			MARCH		
1..	35	500	47	40	500	54	35	480	45
2..	35	550	52	40	600	65	35	800	76
3..	35	550	52	40	650	70	35	1500	140
4..	35	550	52	40	550	59	35	1500	140
5..	35	550	52	40	650	70	35	1600	150
6..	32	600	52	40	700	76	35	1900	180
7..	30	500	40	40	650	70	40	1800	190
8..	25	440	30	40	750	81	40	1800	190
9..	23	280	17	45	900	110	40	2700	290
10..	20	340	18	50	1000	140	40	2100	230
11..	20	--	E 20	54	1100	160	40	1500	160
12..	20	440	24	54	1300	190	40	1400	150
13..	20	400	22	54	1700	250	40	1600	170
14..	20	500	27	54	2100	310	40	1800	190
15..	20	460	25	54	2600	380	40	2000	220
16..	20	500	27	50	3000	400	40	2400	260
17..	20	340	18	45	3900	470	40	2500	270
18..	20	260	14	43	3400	390	40	2350	254
19..	20	300	16	40	3200	350	40	2900	313
20..	20	380	21	40	2100	230	42	3000	340
21..	20	300	16	40	2000	220	44	2750	327
22..	20	460	25	40	1100	120	41	2200	244
23..	20	360	19	40	400	43	44	3350	398
24..	20	360	19	35	420	40	43	2750	319
25..	30	420	34	30	200	16	45	4120	501
26..	30	420	34	30	200	16	49	4750	628
27..	30	260	21	30	320	26	50	4350	587
28..	35	300	28	35	400	38	49	4020	532
29..	35	360	34	--	--	--	39	2600	274
30..	35	440	42	--	--	--	39	2020	213
31..	35	500	47	--	--	--	39	1940	204
Total	815	--	945	1183	--	4444	1254	--	8185

E Estimated.

YELLOWSTONE RIVER BASIN--Continued

6-2500. FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	40	2280	246	55	2400	356	104	4400	1240
2..	40	2450	265	49	2000	265	108	4400	1280
3..	40	2520	272	61	2800	461	109	4280	1260
4..	42	2960	336	62	2300	385	108	3700	1080
5..	40	2280	246	61	2300	379	101	2890	788
6..	37	1940	194	62	2270	380	102	2800	771
7..	40	2230	241	57	2200	339	126	4080	1390
8..	39	1900	200	49	1830	242	114	2890	890
9..	37	1920	192	40	1400	151	107	2950	852
10..	39	1800	190	50	1900	256	105	2600	737
11..	38	1780	183	58	2000	313	104	2540	713
12..	38	1620	166	56	1920	290	105	2700	765
13..	38	1750	180	54	1650	241	114	2520	776
14..	37	1650	165	55	1800	267	104	2320	651
15..	37	1700	170	63	2550	434	237	11300	S 14400
16..	36	1700	165	62	2000	335	101	5400	1470
17..	35	2450	232	70	1850	350	115	4380	1360
18..	34	1900	174	70	2050	387	116	4450	1390
19..	34	1800	165	75	3230	654	115	4850	1510
20..	33	1850	165	69	2890	538	125	5050	1700
21..	42	3480	395	104	5530	S 1790	133	5250	1890
22..	42	2700	306	114	5000	1540	111	4100	1230
23..	39	2020	213	102	3800	1050	113	4080	1240
24..	37	1600	160	99	3390	906	116	4260	1330
25..	76	10600	S 2330	125	5650	1910	113	3800	1160
26..	95	9300	2390	133	6660	2390	125	4250	1430
27..	78	6450	1360	138	5780	2150	129	3900	1360
28..	69	4350	810	143	6180	2390	121	3600	1180
29..	65	3400	597	119	4310	1380	138	3450	1290
30..	63	2800	476	97	3600	943	146	4300	1700
31..	--	--	--	97	3080	807	--	--	--
Total	1360	--	13184	2449	--	24279	3565	--	48833

Day	JULY			AUGUST			SEPTEMBER		
1..	154	3600	1500	253	17400	S 14000	182	2150	1060
2..	159	3600	1550	169	8900	4060	186	2220	1110
3..	162	3850	1680	159	7500	3220	186	2150	1080
4..	152	3350	1370	175	5300	2500	186	2180	1090
5..	155	3610	1510	162	5100	2230	176	2090	993
6..	150	2980	1210	155	4300	1800	169	2200	1000
7..	133	2440	876	150	4000	1620	169	2010	917
8..	143	2450	946	167	4000	1800	171	1850	854
9..	149	2420	974	168	3500	1590	175	1480	699
10..	151	2410	983	156	3750	1580	171	1820	840
11..	151	2650	1080	156	3000	1260	166	2050	919
12..	185	4410	2200	159	3100	1330	163	1700	748
13..	379	10900	S 17900	158	3200	1370	159	1510	648
14..	224	9600	5810	151	2820	1150	146	1380	544
15..	203	7800	4280	160	2820	1220	140	1300	491
16..	207	7600	4250	166	3560	1600	140	1440	544
17..	194	7800	4090	176	3000	1430	138	1120	417
18..	172	6500	3020	190	3100	1590	136	1010	371
19..	159	5700	2450	201	3020	1640	143	1350	521
20..	156	5200	2190	201	2600	1410	150	1310	531
21..	150	5050	2050	193	2750	1430	173	2930	S 2170
22..	149	4500	1810	189	2630	1340	219	5400	S 3630
23..	150	4600	1860	185	2650	1320	244	8850	5830
24..	137	4350	1610	192	2420	1250	210	4800	2720
25..	136	4100	1510	196	2710	1430	193	2980	1550
26..	142	3880	1490	201	2800	1520	187	2500	1260
27..	156	4450	1870	194	2560	1340	180	2000	972
28..	183	4500	2220	176	2290	1090	179	2200	1060
29..	196	4400	2330	171	2020	933	167	1810	816
30..	190	4250	2180	173	2250	1050	162	1470	643
31..	176	5090	S 3020	176	2300	1090	--	--	--
Total	5303	--	81819	5478	--	62193	5166	--	36028

Total discharge for year (cfs-days)..... 31047
Total load for year (tons)..... 290200

S Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2500. FIVEMILE CREEK NEAR RIVERTON, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 26, 1961.....	1020		41	63	579	98.5		24		36		48	53	66	87	100	--	VPWC
May 10, 1962.....	1615		65	51	1,650	227		23		32		50	71	90	97	100	--	VPWC
June 14.....	1250		71	109	2,080	612		20		31		50	68	90	98	100	--	VPWC
June 15.....	1825		46	259	26,800	18,700		35		53		83	97	100	--	--	--	VPWC
June 29.....	1405		71	147	3,230	1,280		28		42		69	85	98	100	--	--	VPWC
July 16.....	1715		--	214	9,240	5,340		24		37		64	82	94	99	100	--	VPWC
July 28.....	1245		68	194	4,260	2,230		21		32		53	72	90	98	100	--	VPWC
July 30.....	1545		74	192	3,700	1,920		24		38		64	88	98	99	100	--	VPWC
Aug. 1.....	1725		74	167	12,500	5,640		32		50		79	91	97	99	100	--	VPWC
Aug. 13.....	1440		78	155	2,810	1,180		14		21		36	52	77	91	98	100	VPWC
Aug. 18.....	1525		72	197	3,450	1,840		17		26		46	62	84	97	100	--	VPWC
Sept. 14.....	1105		58	151	1,330	542		14		21		35	46	68	87	97	100	VPWC
Sept. 24.....	1130		59	208	4,880	2,740		26		37		57	75	89	96	98	100	VPWC

6-2530. FIVEMILE CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 1.2 miles upstream from normal high waterline of Boysen Reservoir at elevation 4,725 feet and 5 miles west of Shoshoni, Fremont County.
DRAINAGE AREA.--418 square miles, of which 133 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1949 to November 1951.
Water temperatures: December 1958 to September 1962.
Sediment records: August 1948 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 78°F July 10; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 12,600 ppm Aug. 1; minimum daily, 150 ppm Dec. 9.
Sediment loads: Maximum daily, 26,500 tons June 15; minimum daily, 18 tons Dec. 9.
EXTREMES, 1948-62.--Water temperatures: Maximum (1948-58, 1959-62), 84°F June 10, 1949; minimum, freezing point on many days during winter months.
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. 7 to Jan. 12, Jan. 16, 30, 31, Feb. 3 to Mar. 13.

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2530. FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	180	1110	539	80	460	99	66	520	93
2..	148	840	336	76	560	115	65	--	90
3..	121	610	199	73	530	104	65	--	85
4..	97	460	120	74	510	102	65	450	79
5..	92	510	127	72	370	72	58	400	63
6..	90	460	112	72	390	76	56	300	45
7..	90	425	103	70	440	83	55	280	42
8..	95	445	114	70	420	79	50	200	27
9..	95	490	126	72	425	83	45	150	18
10..	104	595	167	72	450	87	40	--	20
11..	101	600	164	74	490	98	35	--	20
12..	92	480	119	72	460	89	35	--	22
13..	88	430	102	68	430	79	35	--	24
14..	86	405	94	69	420	78	35	280	26
15..	86	410	95	69	420	78	40	--	40
16..	86	410	95	68	240	44	40	--	55
17..	86	375	87	64	400	69	45	--	75
18..	84	355	81	61	350	58	45	--	85
19..	84	410	93	65	620	109	50	--	110
20..	85	420	96	65	380	67	50	--	120
21..	84	--	85	68	600	110	50	950	130
22..	84	335	76	66	700	125	45	--	110
23..	82	370	82	66	720	128	45	--	110
24..	82	400	89	65	460	81	45	--	100
25..	79	385	82	65	330	58	45	--	100
26..	80	360	78	65	300	53	45	--	90
27..	84	405	92	68	450	83	40	--	75
28..	85	420	96	68	330	61	35	650	61
29..	78	410	86	68	360	66	35	--	55
30..	78	370	78	66	390	69	40	--	55
31..	79	420	90	--	--	--	40	--	44
Total	2885	--	3903	2071	--	2503	1440	--	2069

	JANUARY			FEBRUARY			MARCH		
1..	40	C 360	39	50	320	43	40	280	30
2..	40	C 360	39	50	420	57	45	320	39
3..	40	C 360	39	50	550	74	45	260	32
4..	40	C 360	39	50	550	74	45	160	19
5..	40	C 360	39	50	600	81	45	340	41
6..	40	C 360	39	50	800	110	50	460	62
7..	40	C 360	39	50	650	88	50	440	59
8..	35	C 360	34	50	600	81	50	650	88
9..	30	C 360	29	55	700	100	50	400	54
10..	30	C 360	29	60	650	110	55	240	36
11..	30	C 360	29	65	750	130	55	2200	330
12..	30	C 360	29	65	1000	180	55	3500	520
13..	30	C 360	29	65	1900	330	60	1900	310
14..	30	C 360	29	65	1500	260	61	1780	293
15..	30	C 360	29	65	1200	210	61	2250	371
16..	30	C 360	29	60	1500	240	60	1580	256
17..	30	C 360	29	60	1600	260	63	1400	238
18..	30	C 360	29	60	2800	450	65	1700	298
19..	30	C 360	29	55	2500	370	66	1650	294
20..	30	C 360	29	55	1500	220	70	2210	418
21..	30	C 360	29	55	C 340	50	69	2300	428
22..	30	C 360	29	50	C 340	46	65	1800	316
23..	30	C 360	29	45	C 340	41	68	2250	413
24..	45	C 360	44	40	C 340	37	64	2000	346
25..	60	C 360	58	35	C 340	32	68	2150	395
26..	60	C 360	58	35	C 340	32	72	3200	622
27..	60	C 360	58	35	C 340	32	69	3220	600
28..	55	C 360	53	35	C 340	32	72	3600	700
29..	50	C 360	49	--	--	--	59	2200	350
30..	50	C 360	49	--	--	--	57	1750	269
31..	50	C 360	49	--	--	--	57	1600	246
Total	1195	--	1160	1460	--	3770	1811	--	8473

C Composite period.

YELLOWSTONE RIVER BASIN--Continued

6-2530. FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

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	57	1800	277	138	1550	578	191	1990	1030
2	57	2050	315	125	1480	500	191	2500	1290
3	56	2150	325	108	1450	423	211	1920	1090
4	56	2180	330	121	1750	572	214	2320	1340
5	56	2220	336	138	1850	689	202	1780	971
6	52	1850	260	162	2260	989	205	1580	875
7	57	--	280	162	1500	656	246	2750	1830
8	54	1550	226	168	1510	685	225	2040	1240
9	53	1500	215	145	1060	415	216	1710	997
10	56	1700	257	150	1100	446	214	1470	849
11	54	1380	201	155	1200	502	208	1380	775
12	54	1150	168	150	1220	494	205	1300	720
13	56	1300	197	152	1110	456	202	1470	802
14	53	1900	272	152	1110	456	186	1270	638
15	54	1050	153	155	1360	569	564	8070	S 26500
16	53	1100	157	150	1200	486	172	8140	3780
17	51	1250	172	158	1460	623	186	4430	2220
18	51	--	200	168	1340	608	178	3250	1560
19	50	1620	219	175	1430	676	183	3680	1820
20	50	1220	165	172	1430	664	222	3960	2370
21	58	2150	337	276	3620	S 3060	240	4550	2950
22	59	1850	295	320	3080	2660	231	3460	2160
23	64	1960	S 442	288	2080	1620	225	2950	1820
24	172	5500	2550	281	2180	1650	231	3180	1980
25	180	6850	3330	304	3070	2520	225	2780	1690
26	237	7110	4550	301	3320	2700	228	3030	1870
27	208	4610	2590	297	3240	2600	243	3580	2350
28	168	3220	1460	291	3590	2820	228	2890	1780
29	162	3300	1440	234	2520	1590	250	3420	2310
30	158	1950	832	197	1660	883	272	3900	2860
31	--	--	--	194	1580	828	--	--	--
Total	2546	--	22551	5987	--	34418	6794	--	74467

Day	JULY			AUGUST			SEPTEMBER		
1	294	4050	3210	443	12600	S 16000	351	2060	1950
2	301	3680	2990	378	6100	6230	351	2000	1900
3	310	4280	3580	378	5000	5100	344	2000	1860
4	307	--	3200	378	5300	5410	344	1780	1650
5	307	3590	2980	337	4400	4000	341	2300	2120
6	304	3400	2790	317	3950	3380	327	1900	1680
7	291	3200	2510	301	3400	2760	310	1650	1380
8	304	3100	2540	310	3680	3080	314	1860	1580
9	304	2820	2310	314	3280	2780	324	1900	1660
10	297	2900	2330	304	2950	2420	320	1800	1560
11	314	3100	2630	304	2700	2220	324	1910	1670
12	358	4400	4250	304	3020	2480	327	1520	1340
13	497	9550	S 17800	301	2680	2180	317	1260	1080
14	414	11800	13200	284	2400	1840	301	1160	943
15	382	9300	9590	297	2800	2250	291	1030	809
16	396	8700	9300	314	2950	2500	291	1150	904
17	386	7900	8230	327	3050	2690	294	1220	968
18	350	6400	6050	337	3080	2800	294	1280	1020
19	310	5500	4600	341	3360	3090	294	1000	794
20	305	5100	4200	341	3400	3130	294	--	800
21	301	4350	3540	341	3040	2800	361	--	4000
22	297	4150	3330	344	2720	2530	382	--	6000
23	301	4200	3410	337	2920	2660	386	--	6000
24	291	3700	2910	330	2880	2570	372	--	4000
25	288	3350	2600	344	2700	2510	347	--	3000
26	297	3750	3010	354	2700	2580	337	--	2000
27	307	3850	3190	354	2660	2540	330	--	1500
28	354	4600	4400	351	2630	2490	320	--	1000
29	354	3850	3680	354	2120	2030	310	--	900
30	358	4550	4400	351	2100	1990	307	--	800
31	341	4880	S 5000	351	1560	1480	--	--	--
Total	10220	--	147760	10421	--	102520	9805	--	56868

Total discharge for year (cfs-days)..... 56635
Total load for year (tons)..... 460462

S Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2530. *FIVEMILE CREEK NEAR SHOSHONI, WYO.--Continued*

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 25, 1961.....	1500		45	76	324	66.5		33		53		63	66	79	95	99	100	VPWC
Apr. 24, 1962.....	0920		51	160	4,980	2,150		19		33		62	84	94	99	100	--	VPWC
May 10.....	1240		57	158	1,180	503		17		28		47	65	84	97	100	--	VPWC
May 21.....	1745		49	372	5,420	5,440		24		36		69	87	95	99	100	--	VPWC
May 29.....	1515		63	225	2,450	1,490		22		34		62	80	92	98	100	--	VPWC
June 14.....	1045		67	188	1,350	685		19		29		50	70	87	95	100	--	VPWC
June 15.....	2045		47	757	20,000	40,900		50		74		94	98	100	--	--	--	VPWC
June 29.....	1040		67	262	3,260	2,310		18		27		47	70	91	97	99	100	VPWC
July 13.....	2150		58	793	20,400	43,700		43		65		90	96	99	100	--	--	VPWC
July 16.....	0940		67	414	7,920	8,850		21		32		57	77	93	99	100	--	VPWC
July 16.....	1125		67	410	8,460	9,360		22		34		60	78	93	98	99	100	VPWC
July 19.....	1230		70	354	5,160	4,930		18		28		48	68	88	96	100	--	VPWC
July 30.....	1205		66	372	4,560	4,580		15		24		42	59	81	93	98	100	VPWC
Aug. 1.....	1750		72	375	9,080	9,190		28		42		68	83	92	97	100	--	VPWC
Aug. 13.....	1120		66	317	3,000	2,570		14		21		35	52	80	94	99	100	VPWC
Aug. 28.....	1520		69	351	2,570	2,440		13		21		33	48	78	94	99	100	VPWC
Sept. 11.....	1115	*	57	337	1,940	1,770		10		17		30	40	66	89	99	100	VPWC

6-2570. BADWATER CREEK AT BONNEVILLE, WYO.

LOCATION.--At gaging station, 0.4 mile west of Bonneville, Fremont County, and 3 miles upstream from normal high waterline of Boysen Reservoir at elevation 4,725 feet.
DRAINAGE AREA.--808 square miles.
RECORDS AVAILABLE.--Sediment records: October 1947 to February 1954, August 1954 to September 1961.
REMARKS.--Records for the 1962 water year have been withheld until surface-water records become available. They will be published in a subsequent annual report.

6-2575. MUDDY CREEK NEAR PAVILLION, WYO.

LOCATION.--At gaging station, 600 feet upstream from Wyoming Canal siphon, 4.1 miles downstream from Sheep Creek, and 9.2 miles northeast of Pavillion, Fremont County.
DRAINAGE AREA.--267 square miles.
RECORDS AVAILABLE.--Water temperatures: March to July 1949, October 1954 to September 1958, April 1961 to September 1962.
Sediment records: March 1949 to November 1953, October 1954 to September 1958, April 1961 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 84°F June 19; minimum, freezing point on many days during October to March.
Sediment concentrations: Maximum daily, 27,700 ppm July 31; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 4,800 tons Sept. 22; minimum daily, 0 tons on many days.
EXTREMES, 1949-53, 1954-58, 1961-62.--Water temperatures (1954-58, 1961-62): Maximum, 89°F June 5, 1957; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily (1960-61), 54,000 ppm Sept. 19, 1961; 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.--Flow affected by ice Nov. 1 to Mar. 13, Mar. 22, 23.

Temperature (°F) of water, water year October 1961 to September 1962
/Many days of no flow/

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	42	--	62	--	--	--	38	36	38	42	46	--	61	54	57	--	47	52	--	50	36	40	33	37	32	43	32	33	32	33	--
November	32	32	32	--	32	32	32	32	33	34	32	--	32	32	32	32	32	32	32	32	33	32	32	32	32	32	32	32	32	32	--	32
December	32	32	32	32	32	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	32
March	--	32	--	--	32	34	--	32	--	32	32	32	32	32	34	33	--	--	--	34	33	--	--	--	--	36	40	34	37	37	40	--
April	45	42	42	47	39	40	38	48	49	43	53	50	52	56	60	55	58	59	69	62	53	58	68	58	62	58	62	65	60	52	--	53
May	61	61	71	61	70	60	63	66	69	59	66	62	63	62	64	67	55	64	59	--	50	55	66	58	63	60	54	57	59	59	70	62
June	48	58	63	60	70	52	58	78	75	72	67	72	79	74	--	69	71	73	84	78	73	70	--	--	--	--	--	--	--	--	--	69
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	72	--
August	82	78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61	67	65	65	68	--	--	--	--	--	65

YELLOWSTONE RIVER BASIN--Continued

6-2575. MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.2	C 114	T	0.3	C 341	T	1	C 109	T
2	.2	C 114	T	.2	C 341	T	1	C 109	T
3	.1	C 114	T	.2	C 341	T	1	C 109	T
4	.1	C 114	T	.2	C 341	T	1	C 109	T
5	.1	C 114	T	.2	C 341	T	1	C 109	T
6	1.0	C 114	T	.2	C 341	T	1	C 109	T
7	1.6	C 114	T	.2	C 70	T	1	C 109	T
8	.4	C 114	T	.4	C 70	T	.7	C 109	T
9	.5	C 114	T	.5	C 70	T	.3	C 109	T
10	.7	C 114	T	.6	C 70	T	.1	C 109	T
11	2.7	C 114	1	.6	C 70	T	0	--	0
12	.5	C 41	T	.6	C 70	T	0	--	0
13	.4	C 41	T	.6	C 70	T	0	--	0
14	.4	C 41	T	.5	C 70	T	0	--	0
15	.4	C 41	T	.4	C 70	T	0	--	0
16	.4	C 41	T	.3	C 70	T	0	--	0
17	.5	C 41	T	.2	C 70	T	0	--	0
18	.5	C 41	T	.2	C 70	T	0	--	0
19	.7	C 41	T	.2	C 70	T	0	--	0
20	.9	C 41	T	.2	C 70	T	0	--	0
21	.9	C 41	T	.1	C 70	T	0	--	0
22	.7	C 322	1	.1	C 70	T	0	--	0
23	.3	C 322	T	.2	C 70	T	0	--	0
24	.8	C 322	1	.3	C 70	T	0	--	0
25	.7	C 322	1	.5	C 70	T	0	--	0
26	1.5	C 322	1	.8	C 70	T	0	--	0
27	2.0	C 322	2	1	C 70	T	0	--	0
28	1.2	C 322	1	1	C 70	T	0	--	0
29	.4	C 322	T	1	C 70	T	0	--	0
30	.3	C 322	T	1	C 70	T	0	--	0
31	.3	C 322	T	--	--	--	0	--	0
Total	21.4	--	12	12.8	--	4	8.1	--	2

	JANUARY			FEBRUARY			MARCH		
1				0	--	0	1	C 274	1
2				0	--	0	2	C 274	1
3				0	--	0	1	C 274	1
4				0	--	0	1	C 274	1
5				0	--	0	2	C 274	1
6				0	--	0	3	C 274	2
7				0	--	0	3	C 274	2
8				0	--	0	3	C 274	2
9				.1	--	T	3	C 274	2
10				.2	--	T	3	C 274	2
11				.8	1600	3	2	C 274	1
12				1	84	T	1	C 274	1
13				1	495	1	1	826	2
14				1	347	1	1	546	1
15				1	408	1	1	484	1
16				1.2	1230	4	1	645	2
17				1.4	1460	6	3	650	5
18				1.6	512	2	5	1100	15
19				1.8	1340	7	10	1700	46
20				2.0	408	2	16	3400	150
21				2.5	289	2	16	3100	130
22				2.5	314	2	15	4000	160
23				2.0	-- E	1	15	2900	120
24				1.0	-- E	1	15	2900 J	140
25				.5	--	T	13	8100 J	340
26				.3	--	T	15	7350	298
27				.1	--	T	13	7640 S	319
28				.2	--	T	14	6600 J	260
29				--	--	--	7.5	4350 S	153
30				--	--	--	9.0	6200 J	200
31				--	--	--	9.5	6200 J	220
Total	0		0	22.2	--	35	205.0	--	2579

E Estimated.
S Computed by subdividing day.
T Less than 0.50 ton.
C Composite period.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2575. MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	12	5800 A	190	2.7	1800	13	1.2	2520	8
2..	11	8210 S	268	2.0	2000	11	1.1	2990	9
3..	12	6200 J	220	2.4	2170	14	1.4	3000	11
4..	14	5900	223	2.6	1860	13	2.8	3520	27
5..	12	6800 J	240	2.5	2080	14	2.8	2000	15
6..	12	7320	237	2.0	1600	9	2.7	3150	23
7..	11	8200 A	240	1.5	1940	8	3.2	2050	18
8..	10	7100 A	190	1.5	2100	8	3.8	1400	14
9..	10	7700 J	240	1.5	2350	10	3.5	1000	9
10..	9.2	7750	193	1.4	1800	7	3.0	850	7
11..	8.0	8200 J	190	1.3	1280	4	2.8	920	7
12..	8.6	8500 A	200	1.2	520	2	2.7	880	6
13..	8.0	7700 A	170	1.3	700	2	3.8	1080	11
14..	8.0	6600 A	140	.8	620	1	3.2	1750	15
15..	8.3	5000 A	110	1.0	550	1	3.8	-- E	20
16..	20	21100 S	1530	.7	380	1	4.8	2100	27
17..	16	21400	924	.9	750	2	2.4	1200	8
18..	14	11200	423	1.2	1100	4	1.0	1480	4
19..	15	8200 A	330	1.1	1700	5	.4	1150	1
20..	15	8100 A	330	2.0	-- E	10	.2	780	T
21..	16	8700	376	4.0	4160	45	.1	420	T
22..	12	7100	230	4.2	4700	53	.1	735	T
23..	7.6	5050	104	4.2	2400	27	0	--	0
24..	6.2	3320	56	4.2	2480	28	0	--	0
25..	8.3	5110	115	13	20600 S	901	0	--	0
26..	10	5080	137	14	20200 J	900	0	--	0
27..	8.3	3700	83	15	10400 S	444	0	--	0
28..	6.6	3250	58	14	3130 S	138	0	--	0
29..	4.0	2850	31	3.8	1700	17	0	--	0
30..	3.8	2650	27	2.2	1900	11	0	--	0
31..	--	--	--	1.6	1550	7	--	--	--
Total	316.9	--	7805	111.8	--	2710	50.8	--	241

Day	JULY			AUGUST			SEPTEMBER		
1..	0	--	0	14	1800	68	0	--	0
2..	0	--	0	2.0	1000	5	0	--	0
3..	0	--	0	3.9	-- E	10	0	--	0
4..	0	--	0	1.0	-- E	2	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	0	--	0	0	--	0
15..	0	--	0	0	--	0	0	--	0
16..	0	--	0	0	--	0	0	--	0
17..	0	--	0	0	--	0	0	--	0
18..	0	--	0	0	--	0	0	--	0
19..	0	--	0	0	--	0	0	--	0
20..	0	--	0	0	--	0	0	--	0
21..	0	--	0	0	--	0	1.3	-- E	5
22..	0	--	0	0	--	0	47	21400 S	4800
23..	0	--	0	0	--	0	11	1740 S	55
24..	0	--	0	0	--	0	6.6	580	10
25..	0	--	0	0	--	0	2.7	300	2
26..	.2	-- E	2	0	--	0	1.4	140	1
27..	0	--	0	0	--	0	0	--	0
28..	.3	-- E	2	0	--	0	0	--	0
29..	4.6	-- E	1000	0	--	0	0	--	0
30..	5.8	6930 S	1400	0	--	0	0	--	0
31..	31	27700 S	2930	0	--	0	--	--	--
Total	41.9	--	5334	20.9	--	85	70.0	--	4873

Total discharge for year (cfs-days)..... 881.8
Total load for year (tons)..... 23680

E Estimated.
S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated concentration graph.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2575. MUDDY CREEK NEAR PAVILLION, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 26, 1962.....	1215		36	22	9,400	558		22		34		72	91	99	100			VPWC
Mar. 27.....	1235		40	22	10,600	630		21		39		80	97	100				VPWC
May 25.....	1345		62	20	33,500	1,810		49		75		95	99	100				VPWC
July 31.....	1430		72	22	14,300	849		52		78		92	97	100				VPWC

6-2580. MUDDY CREEK NEAR SHOSHONI, WYO.

LOCATION.--At gaging station, 2.2 miles upstream from normal high waterline of Boysen Reservoir at elevation 4,725 feet and 9 miles northwest of Shoshoni, Fremont County.
DRAINAGE AREA.--332 square miles.
RECORDS AVAILABLE.--Water temperatures: March to July 1949, October 1956 to September 1962.
Sediment records: March 1949 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 74°F June 3, 25; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 20,000 ppm Sept. 22; minimum daily, no flow on several days during January.
Sediment loads: Maximum daily, 9,660 tons June 15; minimum daily, 0 tons on several days during January.
EXTREMES, 1949-62.--Water temperatures: Maximum (1956-58, 1959-62), 91°F July 19, 1960; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily (1951-58, 1959-62), 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.--Flow affected by ice Nov. 2-4, Nov. 6 to Dec. 10, Dec. 14 to Jan. 9, Jan. 12-18, Jan. 28 to Apr. 3.

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2580. MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	14	C 577	22	11	C 418	12	7	C 429	8
2..	14	C 577	22	16	C 418	18	6	C 429	7
3..	13	C 577	20	10	C 418	11	6	C 429	7
4..	12	C 577	19	12	C 418	14	6	C 429	7
5..	11	C 577	17	10	C 418	11	6	C 429	7
6..	10	C 577	16	9	C 418	10	6	C 429	7
7..	17	C 577	26	7	C 418	8	6	C 429	7
8..	18	C 577	28	8	C 418	9	5	C 429	6
9..	14	C 577	22	13	C 418	15	5	C 429	6
10..	15	C 577	23	13	C 418	15	4	C 429	5
11..	16	C 577	25	13	C 418	15	3	C 361	3
12..	21	C 577	33	13	C 418	15	3	C 361	3
13..	15	C 577	23	13	C 418	15	3	C 361	3
14..	13	C 577	20	12	C 418	14	2	C 361	2
15..	12	C 577	19	11	C 418	12	2	C 361	2
16..	12	C 577	19	10	C 418	11	2	C 361	2
17..	13	C 577	20	9	C 418	10	2	C 361	2
18..	12	C 577	19	9	C 418	10	2	C 361	2
19..	12	C 577	19	9	C 418	10	2	C 361	2
20..	13	C 577	20	7	C 418	8	2	C 361	2
21..	12	C 577	19	7	C 418	8	2	C 361	2
22..	12	C 577	19	7	C 418	8	2	C 361	2
23..	12	C 577	19	7	C 418	8	2	C 361	2
24..	12	C 577	19	7	C 418	8	2	C 361	2
25..	11	C 577	17	7	C 418	8	2	C 361	2
26..	12	C 577	19	7	C 418	8	2	C 361	2
27..	12	C 577	19	7	C 418	8	2	C 361	2
28..	13	C 577	20	7	C 418	8	1	C 23	T
29..	12	C 577	19	7	C 418	8	1	C 23	T
30..	12	C 577	19	7	C 418	8	1	C 23	T
31..	12	C 577	19	--	--	--	1	C 23	T
Total	409	--	640	285	--	323	98	--	104

	JANUARY			FEBRUARY			MARCH		
1..	1	C 19	T	2	C 266	1	5	C 322	4
2..	1	C 19	T	2	C 266	1	5	C 322	4
3..	1	C 19	T	2	C 266	1	5	C 322	4
4..	0	--	0	2	C 266	1	5	C 322	4
5..	0	--	0	2	C 266	1	5	C 322	4
6..	0	--	0	2	C 266	1	5	C 322	4
7..	0	--	0	2	C 266	1	5	C 322	4
8..	0	--	0	2	C 266	1	6	C 322	5
9..	0	--	0	3	C 266	2	6	C 322	5
10..	0	--	0	4	322	3	6	C 322	5
11..	0	--	0	5	290	4	6	C 322	5
12..	1	C 183	T	6	220	4	8	173	4
13..	1	C 183	T	7	188	4	13	200	7
14..	1	C 183	T	8	206	4	13	182	6
15..	1	C 183	T	9	245	6	13	148	5
16..	1	C 183	T	11	240	7	13	154	5
17..	1	C 183	T	12	227	7	15	158	6
18..	1	C 183	T	13	199	7	18	191	9
19..	1	C 183	T	13	240	8	22	192	11
20..	1	C 183	T	13	180	6	25	187	13
21..	1	C 183	T	12	185	6	25	274	18
22..	0	--	0	9	176	4	25	284	19
23..	0	--	0	7	240	5	30	378	31
24..	0	--	0	5	C 294	4	35	368	35
25..	0	--	0	5	C 294	4	40	700	76
26..	1	C 196	1	5	C 294	4	40	900	97
27..	2	C 196	1	5	C 294	4	40	1500	160
28..	2	C 196	1	5	C 294	4	35	1600	150
29..	2	C 196	1	--	--	--	30	1400	110
30..	2	C 196	1	--	--	--	30	1800	150
31..	2	C 196	1	--	--	--	30	2600	210
Total	24	--	11	173	--	105	559	--	1170

T Less than 0.50 ton.
C Composite period.

YELLOWSTONE RIVER BASIN--Continued

6-2580. MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	30	4000	320	6.0	1800	29	7	1900	36
2..	30	4700	380	5.5	1000	15	6	900	15
3..	30	5800	470	5.0	800	11	6	1000	16
4..	32	5470	473	4.8	800	10	10	1600	43
5..	26	4920	345	32	7800	J 1900	21	2200	125
6..	22	3820	227	82	15700	3480	18	1600	78
7..	21	3250	184	60	10500	S 1850	30	5960	S 543
8..	21	2850	162	15	2070	84	21	1900	108
9..	18	3400	165	10	1040	28	20	1350	73
10..	18	3300	160	14	1760	S 84	19	1350	69
11..	17	3100	142	26	2940	206	18	1100	53
12..	16	3100	134	25	2280	154	18	850	41
13..	16	2850	123	14	1200	45	22	1530	S 100
14..	16	2400	104	11	1280	38	22	1700	101
15..	14	2600	98	11	1600	48	130	9570	S 9660
16..	14	2200	83	12	1040	34	74	8220	S 2830
17..	27	11000	802	13	1020	36	23	1160	72
18..	22	8500	505	10	750	20	14	700	26
19..	19	5400	277	10	1020	28	12	550	18
20..	18	4600	224	7.3	800	16	25	4750	S 769
21..	23	4200	261	74	11300	S 2590	18	5340	S 317
22..	24	3400	220	61	6100	1000	16	2600	112
23..	17	2800	129	42	4000	454	17	920	42
24..	11	2250	67	32	2800	242	13	550	19
25..	9.4	1900	48	38	4300	441	9.1	330	8
26..	12	2500	81	54	8660	S 1350	7.0	300	6
27..	14	2500	94	51	--	E 750	5.8	340	5
28..	10	1750	47	55	4750	705	5.0	390	5
29..	7.9	1550	33	20	2040	S 129	4.8	300	4
30..	6.8	1400	26	7	1200	23	5.8	350	5
31..	--	--	--	11	2000	J 120	--	--	--
Total	562.1	--	6384	818.6	--	15920	617.5	--	15299

Day	JULY			AUGUST			SEPTEMBER		
1..	11	600	18	39	13300	1400	46	1040	129
2..	16	680	29	26	3100	218	45	760	92
3..	21	740	42	18	1140	55	41	960	106
4..	23	700	43	44	3280	390	44	1320	157
5..	42	3120	354	44	1750	208	41	1060	117
6..	44	1550	184	37	1040	104	39	850	90
7..	54	2000	292	36	960	93	38	900	92
8..	59	2400	383	30	920	75	38	860	88
9..	60	1700	275	28	680	51	48	1500	194
10..	52	1400	197	21	580	33	57	1600	246
11..	53	1400	200	20	410	22	34	1120	S 112
12..	56	5380	S 860	16	320	14	24	580	38
13..	100	7490	S 4480	16	340	15	18	380	18
14..	69	8710	S 2010	20	400	22	17	350	16
15..	44	1800	214	18	320	16	16	340	15
16..	38	1500	154	20	380	21	16	300	13
17..	40	1100	119	22	--	E 26	16	300	13
18..	38	1100	113	25	680	46	13	240	8
19..	26	900	63	23	500	31	10	300	8
20..	18	500	24	26	580	41	10	210	6
21..	14	420	16	31	800	67	11	230	7
22..	14	560	21	31	800	67	106	20000	J 6800
23..	13	340	12	25	600	40	44	9600	A 1200
24..	14	340	13	26	700	49	31	2260	189
25..	12	300	10	32	1060	92	23	920	57
26..	12	290	9	42	1420	161	18	--	E 30
27..	14	360	14	47	1680	213	16	--	E 17
28..	16	440	19	49	1480	196	15	350	14
29..	28	4900	J 420	45	1240	151	12	--	E 10
30..	25	9500	J 700	47	1240	157	12	--	E 10
31..	33	12900	S 1650	45	1040	126	--	--	--
Total	1059	--	12938	949	--	4200	899	--	9892

Total discharge for year (cfs-days)	6453.2
Total load for year (tons)	66986

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated concentration graph.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2580. MUDDY CREEK NEAR SHOSHONI, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 7, 1962.....	1350		61	67	8,780	1,590		24		39		77	89	98	100	--		VPWC
May 21.....	1500		50	88	10,800	2,570		27		40		68	79	89	94	100		VPWC
May 21.....	1715		51	92	9,810	2,440		28		42		75	88	97	100	--		VPWC
June 15.....	1755		52	194	37,300	19,500		31		51		80	90	98	99	100		VPWC
June 16.....	0115		46	159	23,700	10,200		42		63		86	93	99	100	--		VPWC
July 12.....	1300		63	48	6,230	807		54		76		91	96	100	--	--		VPWC
Aug. 1.....	1400		73	45	12,500	1,520		56		87		94	96	99	100	--		VPWC
Aug. 28.....	1200		61	52	1,840	258		27		43		64	81	96	100	--		VPWC
Sept. 10.....	1210		55	60	1,960	318		19		31		52	70	92	100	--		VPWC
Sept. 24.....	1050		59	31	2,240	187		39		53		60	65	76	99	100		VPWC

6-2590. WIND RIVER BELOW BOYSEN RESERVOIR, WYO.

LOCATION.--At tailrace of powerplant at Boysen Dam, 0.6 mile upstream from gaging station and 12.4 miles north of Shoshoni, Fremont County.
DRAINAGE AREA.--7,741 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: November 1953 to September 1954, December 1960 to September 1962.
Water temperatures: December 1953 to September 1954, December 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 661 ppm Apr. 1-16; minimum, 332 ppm Aug. 1-31.
Hardness: Maximum, 280 ppm Jan. 19-31; minimum, 156 ppm Aug. 1-31.
Specific conductance: Maximum daily, 1,100 micromhos Mar. 31; minimum daily, 484 micromhos Aug. 11.
Water temperatures: Maximum, 69°F Aug. 20-22; minimum, 35°F on several days during December to February.
EXTREMES, 1953-54, 1960-62.--Dissolved solids: Maximum, 830 ppm June 18-19, 1954; minimum, 332 ppm Aug. 1-31, 1962.
Hardness: Maximum, 325 ppm Apr. 1-15, 1961; minimum, 156 ppm Aug. 1-31, 1962.
Specific conductance: Maximum daily, 1,380 micromhos June 18, 1954; minimum daily, 484 micromhos Aug. 11, 1962.
Water temperatures: Maximum (1960-62), 71°F on several days during August 1961; minimum, 35°F on several days during December 1961 to February 1962.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	859	10	0.00	61	21	91	2.7	175	0	260	11	0.4	0.2	0.07	562	0.76	1,300	240	96	2.6	844	7.3	4
Nov. 1-22.....	947	8.2	.00	54	27	87	2.2	178	0	266	11	.4	.2	.10	579	.79	1,480	244	98	2.4	844	7.1	11
Nov. 23-Dec. 11.	953	13	.02	62	23	85	2.2	184	0	275	11	.3	.1	.10	594	.81	1,530	250	99	2.3	863	7.7	6
Dec. 12-31.....	935	12	.01	64	23	88	2.6	192	0	280	11	.4	.3	.10	607	.83	1,530	256	99	2.4	861	7.8	5
Jan. 1-18, 1962.	951	9.6	.00	65	24	100	4.7	192	0	283	12	.6	.2	.09	617	.84	1,580	262	105	2.7	893	7.9	2
Jan. 19-31.....	828	10	.00	70	26	105	3.8	208	0	295	13	.5	.4	.09	649	.88	1,450	280	109	2.7	945	7.9	2
Feb. 1-12.....	825	11	.04	70	25	88	3.2	212	0	275	12	.4	.5	.11	615	.84	1,370	278	104	2.3	892	7.6	3
Feb. 13-28.....	989	12	.05	67	21	79	3.3	198	0	242	10	.3	.0	.09	557	.76	1,490	254	92	2.2	824	7.4	3
Mar. 1-13.....	1,341	9.2	.00	62	21	83	2.7	182	0	245	10	.4	.5	.10	547	.74	1,980	242	93	2.3	810	7.7	6
Mar. 14-31.....	1,980	9.6	.00	65	23	88	2.5	188	0	265	3.3	.4	.2	.12	573	.78	3,060	256	102	2.4	828	7.7	6
Apr. 1-16.....	1,271	10	.00	69	25	102	3.2	188	0	315	13	.4	.5	.10	661	.90	2,270	276	122	2.7	946	7.7	4
Apr. 17-30.....	1,784	9.3	.00	69	23	91	3.0	184	0	285	12	.3	.4	.09	614	.84	2,960	266	115	2.4	891	7.4	4
May 1-26.....	1,475	9.9	.00	63	22	81	3.2	173	0	258	11	.4	.5	.08	556	.76	2,210	247	105	2.0	815	7.4	4
May 27-June 21..	1,379	9.9	.01	57	20	72	3.3	160	0	223	11	.4	.3	.09	499	.68	1,860	223	92	2.1	731	7.5	5
June 22-30.....	1,706	8.3	.01	47	17	57	2.6	140	0	178	7.3	.3	.5	.08	404	.55	1,860	187	72	1.8	607	7.4	5
July 1-14.....	1,596	8.0	.00	46	15	54	2.3	136	0	167	6.7	.3	.2	.09	399	.53	1,630	173	66	1.8	586	7.5	5
July 15-31.....	1,256	6.1	.00	42	13	46	2.2	126	0	151	5.7	.3	.2	.07	340	.46	1,150	160	57	1.6	526	7.4	4

YELLOWSTONE RIVER BASIN--Continued

6-2590. WIND RIVER BELOW BOYSEN RESERVOIR, WYO.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Aug. 1-31, 1962.	1,604	5.8	0.02	44	11	46	2.5	126	0	141	5.8	0.1	0.7	0.06	332	0.45	1,440	156	53	1.6	514	7.0	5
Sept. 1-30.....	1,435	7.7	.01	44	13	49	2.2	133	0	148	6.2	.2	.1	.01	359	.49	1,390	165	56	1.7	539	7.3	3
Weighted average.....	1,267	9.1	0.01	57	20	75	2.8	166	0	228	9.0	0.3	0.3	0.08	505	0.69	1,730	223	88	2.1	744	7.4	5
Time-weighted average.....	--	9.3	0.01	58	20	77	2.8	169	0	235	9.5	0.3	0.3	0.08	519	--	--	228	89	2.2	763	7.4	5
Tons per day..	--	31.0	0.03	195	67.0	255	9.5	566	0	780	31.0	1.0	1.1	0.28	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

6-2685. FIFTEEN MILE CREEK NEAR WORLAND, WYO.

LOCATION.--At gaging station, 1.8 miles upstream from mouth and 2.8 miles west of Worland, Washakie County.
DRAINAGE AREA.--518 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1960 to September 1962.
Sediment records: March 1951 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 88°F June 28; minimum, freezing point on several days during February and March.
Sediment concentrations: Maximum daily, 110,000 ppm Mar. 20; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 157,000 tons May 26; minimum daily, 0 tons on many days.
EXTREMES, 1951-62.--Water temperatures (1960-62): Maximum, 88°F June 28, 1962; minimum, freezing point on many days during winter months.
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.--Flow affected by ice Feb. 9-23, Mar. 3-21. Bureau of Land Management has extensive spreader systems on some of the tributaries upstream from station.

Temperature (°F) of water, water year October 1961 to September 1962
/Many days of no flow/

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	52	54	54	59	60	53	50	40	42	41	44	50	52	52	55	54	47	53	--	55	52	45	46	--	--	--	--	--	--	--	--	50
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	--	--	--	32	32	33	33	32	34	--	32	32	32	32	32	32	32	32	32	--	--	--	--	32
March	--	--	--	--	--	--	--	32	34	32	32	32	32	32	32	34	35	35	38	34	41	42	39	46	51	54	53	34	40	44	37	38
April	54	56	54	54	46	53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	55	--	--	--	--	--	--	--	--	--	49	54	52	58	66	--	71	58
June	72	73	73	66	63	64	53	67	71	71	72	74	69	80	67	69	73	74	70	70	70	62	64	66	70	67	84	88	--	--	--	70
July	--	--	--	--	--	--	--	--	--	--	--	--	60	63	66	77	76	75	--	--	--	--	--	--	--	--	--	--	--	--	71	--
August	68	76	71	67	70	--	--	--	--	--	77	74	67	77	66	--	--	--	--	--	--	68	72	72	71	80	--	--	--	--	--	72
September	--	--	--	--	--	--	--	--	--	66	67	60	72	--	--	--	--	--	--	--	--	63	65	69	55	71	--	--	--	--	--	65

YELLOWSTONE RIVER BASIN--Continued

6-2685. FIFTEEN MILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	12	14000	454						
2	9.5	13800	354						
3	6.2	13500	226						
4	5.8	12200	191						
5	5.8	9500	149						
6	5.8	9700	152						
7	6.6	9900	176						
8	8.3	11000	J 280						
9	12	14000	A 460						
10	331	5 100	S 53200						
11	118	27700	S 9680						
12	64	13800	2380						
13	49	11300	1490						
14	40	9680	1050						
15	37	7950	794						
16	27	6580	480						
17	15	6100	247						
18	3.5	6400	60						
19	3.0	--	E 46						
20	2.4	4840	31						
21	1.2	3800	12						
22	1.2	3000	10						
23	.3	2450	2						
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	764.6	--	71924	0		0	0		0

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0	--	0	0	--	0
2				0	--	0	0	--	0
3				0	--	0	0	--	0
4				0	--	0	0	--	0
5				0	--	0	0	--	0
6				0	--	0	5	--	E 20
7				0	--	0	50	--	E 1100
8				0	--	0	300	12000	9700
9				0	--	0	480	15000	19000
10				0	--	0	150	8200	3300
11				30	--	E 200	60	2700	440
12				160	4300	1900	10	2500	68
13				300	8500	6900	5	1400	19
14				300	12000	9700	5	1300	18
15				180	8600	4200	20	3200	170
16				120	8100	2600	50	18000	2400
17				70	5600	1100	100	31000	8400
18				50	--	E 500	190	37000	19000
19				30	3400	280	180	56000	27000
20				10	2100	57	140	10000	42000
21				4	1400	15	180	99000	48000
22				3	--	E 10	41	29200	S 3450
23				2	--	E 5	37	31100	S 3600
24				1	--	E 2	7	23000	430
25				.8	--	E 2	4	25000	270
26				.5	--	E 1	3	28000	230
27				.3	300	T	3	47000	390
28				0	--	0	2	34000	190
29				--	--	--	1	30000	81
30				--	--	--	1	26000	70
31				--	--	--	1	20000	54
Total	0		0	1261.6	--	27472	2025	--	189400

E Estimated.
S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated concentration graph.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2685. FIFTEEN MILE CREEK NEAR WORLAND, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	1	22000	59	0	--	0	28	17200	1300
2	.5	8200	11	0	--	0	24	14200	920
3	.5	23000	31	0	--	0	25	13500	911
4	1	22000	59	0	--	0	24	13000	842
5	1	30000	81	0	--	0	24	17000 J	1200
6	1	15000	40	0	--	0	20	-- E	950
7	.3	-- E	10	0	--	0	19	17000 A	900
8	.1	-- E	2	0	--	0	13	16200	569
9	0	--	0	0	--	0	10	18000	486
10	0	--	0	0	--	0	8.0	16200	350
11	0	--	0	0	--	0	7.5	15800	320
12	0	--	0	0	--	0	6	15000	240
13	0	--	0	0	--	0	2	14000	76
14	0	--	0	0	--	0	.5	16000	22
15	0	--	0	1	-- E	20	3	14000 A	110
16	0	--	0	0	--	0	20	40000 A	2200
17	0	--	0	0	--	0	10	66000 A	1800
18	0	--	0	0	--	0	8	51000 A	1100
19	0	--	0	0	--	0	15	51000	2100
20	0	--	0	0	--	0	51	56000 J	9500
21	0	--	0	0	--	0	43	37000 J	5900
22	0	--	0	0	--	0	78	46000 J	13000
23	0	--	0	0	--	0	10	20000	540
24	0	--	0	0	--	0	3	14000	110
25	0	--	0	1.8	-- E	80	1	11000	30
26	0	--	0	588	92100	157000	.2	5000	3
27	0	--	0	189	66100	35000	.1	1200	T
28	0	--	0	144	40000 S	19200	.1	1000	T
29	0	--	0	81	41100 S	9840	0	--	0
30	0	--	0	43	-- E	3000	0	--	0
31	--	--	--	37	21200	2120	--	--	--
Total	5.4	--	293	1084.8	--	226260	453.4	--	45480

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	--	0	83	72400 S	22600	0	--	0
2	0	--	0	16	53100	2380	0	--	0
3	0	--	0	11	39000 A	1200	0	--	0
4	0	--	0	6.6	22400 S	437	0	--	0
5	0	--	0	1.8	19200	93	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	4.1	-- E	200	2.7	19000 J	240
11	0	--	0	14	60600 S	2860	8.5	19600	450
12	0	--	0	10	44000 J	1300	7.5	13200	267
13	67	28700 S	21600	7.5	36000	756	2.4	11000	71
14	184	98800 S	59800	4.6	24000	298	0	--	0
15	22	52200 S	3680	.6	14000	23	0	--	0
16	6.6	39000	721	0	--	0	0	--	0
17	1	28000	76	0	--	0	0	--	0
18	.3	11000	9	0	--	0	0	--	0
19	0	--	0	0	--	0	0	--	0
20	0	--	0	0	--	0	0	--	0
21	0	--	0	0	--	0	0	--	0
22	0	--	0	6.1	14500 S	784	27	42000 J	11000
23	0	--	0	10	30000 J	1500	16	62000 S	2970
24	0	--	0	12	51000 J	1800	4.2	44800	527
25	0	--	0	4.6	32200 S	460	3.4	31000 J	340
26	0	--	0	1.2	2880 S	16	.3	13400	11
27	0	--	0	0	--	0	0	--	0
28	.3	-- E	10	0	--	0	0	--	0
29	0	--	0	0	--	0	0	--	0
30	50	-- E	10000	0	--	0	0	--	0
31	20	78000 A	4400	0	--	0	--	--	--
Total	351.2	--	100296	193.1	--	36707	72.0	--	15876

Total discharge for year (cfs-days)..... 6211.1
Total load for year (tons)..... 713708

E Estimated.
S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated concentration graph.
J Computed from partly estimated concentration graph and subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2685. FIFTEEN MILE CREEK NEAR WORLAND, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 10, 1961.....	1615		39	524	51,300	72,600		44		64		92	98	100	--			VPWC
Oct. 11.....	0730		39	131	31,200	11,000		72		90		98	100	--	--			VPWC
Mar. 8, 1962.....	2115		32	d 300	12,800	10,400		43		62		93	98	100	--			VPWC
May 26.....	1500		54	705	107,000	204,000		50		67		83	91	97	99	100		VPWC
May 26.....	1835		52	859	94,300	219,000		45		62		83	94	99	100			VPWC
June 17.....	1510		73	d 10	61,700	1,660		83		100		--	--	--	--			PWC
Aug. 1.....	1055		66	300	103,000	83,400		39		58		95	99	100	--			VPWC
Sept. 22.....	1955		63	81	124,000	27,100		56		84		99	100	--	--			VPWC

d Daily mean discbarge.

6-2795. BIGHORN RIVER AT KANE, WYO.

LOCATION.--At bridge on State Highway 14, 0.5 mile upstream from Shoshone River, 1.5 miles northeast of Kane, Big Horn County, and 12.5 miles downstream from gaging station.
DRAINAGE AREA.--15,846 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1953, June 1955 to September 1957, December 1960 to September 1962.
Water temperatures: July to September 1949, October 1950 to September 1962.
Sediment records: March 1946 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,110 ppm Apr. 6-8; minimum, 343 ppm June 23-30.
Hardness: Maximum, 479 ppm Apr. 6-8; minimum, 171 ppm June 23-30.
Specific conductance: Maximum daily, 1,600 micromhos Apr. 8; minimum daily, 459 micromhos June 29.
Water temperatures: Maximum, 79°F July 3, 9, Aug. 4; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 23,800 ppm May 27; minimum daily, 50 ppm on several days during December and January.
Sediment loads: Maximum daily, 322,000 tons May 27; minimum daily, 40 tons Dec. 12.
EXTREMES, 1946-62.--Dissolved solids (1955-57, 1960-62): Maximum, 2,860 ppm July 7, 1961; minimum, 292 ppm June 6, 1956.
Hardness (1955-57, 1960-62): Maximum, 1,450 ppm July 7, 1961; minimum, 152 ppm June 6, 1956.
Specific conductance (1955-57, 1960-62): Maximum daily, 3,030 micromhos July 7, 1961; minimum daily, 459 micromhos June 29, 1962.
Water temperatures (1950-62): Maximum, 85°F July 14, 30, 1953, July 12, 1954; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 33,300 ppm July 7, 1961; minimum daily, not determined.
Sediment loads: Maximum daily, 972,000 tons June 25, 1946; 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. No appreciable inflow between gaging station and sampling point except during periods of intense local precipitation. Flow affected by ice Dec. 6 to Feb. 3, Feb. 8-20, Mar. 5-20.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-9, 1961..	1,322	11	0.00	98	31	117	3.8	228	0	383	18	0.5	0.6	0.13	822	1.12	2,930	373	186	2.7	1,140	7.4	5
Oct. 10-31.....	1,714	11	.01	89	27	114	3.7	214	0	357	15	.5	2.2	.10	756	1.03	3,500	332	157	2.7	1,060	7.3	5
Nov. 1-30.....	1,660	10	.01	94	32	103	2.5	232	0	356	17	.5	.4	.12	777	1.06	3,480	365	175	2.3	1,080	7.4	6
Dec. 1-11.....	1,264	12	.01	96	35	113	3.6	240	0	376	19	.4	.8	.15	810	1.10	2,760	382	185	2.5	1,130	8.1	6
Dec. 12-15.....	475	15	.01	102	43	150	5.0	244	0	496	25	.5	1.2	.22	1,010	1.37	1,300	433	230	3.1	1,370	7.7	5
Dec. 16-31.....	884	13	.01	85	34	103	3.6	221	0	359	17	.4	.4	.13	768	1.04	1,830	353	172	2.4	1,080	7.7	5
Jan. 1-10, 1962.	830	13	.01	88	31	96	2.9	230	0	339	17	.4	.2	.14	736	1.00	1,650	345	156	2.3	1,050	7.9	4
Jan. 11-27.....	747	17	.02	97	35	108	4.0	257	0	369	19	.4	.9	.14	807	1.10	1,630	385	174	2.4	1,140	7.8	5
Jan. 28-31.....	1,163	12	.02	87	30	95	3.2	234	0	326	17	.4	.5	.12	720	.98	2,260	342	150	2.2	1,030	7.6	5
Feb. 1-10.....	1,060	11	.04	90	29	99	4.6	223	0	338	17	.4	1.7	.11	740	1.01	2,120	342	159	2.3	1,040	7.6	6
Feb. 11-18.....	5,038	11	.07	94	24	86	5.0	192	0	340	13	.3	2.0	.10	717	.98	9,750	335	178	2.0	991	7.5	7
Feb. 19-28.....	2,354	12	.06	101	31	105	4.8	228	0	370	19	.4	.2	.11	826	1.12	5,250	379	192	2.3	1,110	7.6	4
Mar. 1-8.....	2,238	11	.00	91	31	100	3.1	224	0	343	16	.4	1.0	.26	747	1.02	4,510	354	170	2.3	1,050	7.7	5
Mar. 9-31.....	3,157	11	.00	80	25	95	4.3	198	0	304	14	.4	1.3	.13	665	.90	5,670	304	142	2.4	956	7.8	6
Apr. 1-5.....	2,340	12	.01	94	32	123	4.2	226	0	404	18	.4	1.2	.14	850	1.16	5,370	367	182	2.8	1,150	7.7	5

YELLOWSTONE RIVER BASIN--Continued

6-2795. BIGHORN RIVER AT KANE, WYO.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 6-8, 1962..	2,567	13	0.01	115	47	156	5.0	250	0	563	26	0.4	0.6	0.16	1,110	1.51	7,690	479	274	3.1	1,460	7.6	5
Apr. 9-19.....	2,638	12	.01	86	32	113	4.4	218	0	368	19	.4	.8	.11	787	1.07	5,610	347	168	2.6	1,110	7.5	5
Apr. 20-May 6...	3,298	16	.02	67	23	72	3.3	178	0	245	11	.3	1.0	.27	558	.76	4,970	262	116	1.9	797	7.2	5
May 7-15.....	2,814	10	.01	54	15	49	2.4	139	0	169	7.9	.2	.7	.06	406	.55	3,080	198	84	1.5	597	7.0	5
May 16-June 11..	2,717	12	.01	68	21	75	3.6	175	0	251	11	.3	1.9	.10	554	.75	4,060	255	111	2.0	799	7.3	5
June 12-16.....	5,522	11	.01	55	13	40	2.4	147	0	143	5.1	.3	2.3	.06	367	.50	5,470	189	68	1.3	542	7.2	5
June 17.....	6,000	--	--	--	--	125	--	224	0	358	--	--	--	--	664	.90	10,760	292	108	3.2	1,090	7.8	--
June 18-22.....	5,812	12	.01	57	15	55	3.2	160	0	173	7.5	.2	1.5	.07	426	.58	6,680	204	73	1.7	624	7.2	5
June 23-30.....	5,009	11	.02	46	14	41	2.4	136	0	136	5.5	.2	.6	.03	343	.47	4,640	171	59	1.4	511	7.1	5
July 1-13.....	2,396	13	.00	60	18	58	2.6	153	0	197	8.1	.3	.7	.26	459	.62	2,970	224	99	1.7	682	7.6	7
July 14-31.....	1,920	13	.00	99	26	100	5.0	211	0	363	14	.5	2.5	.14	766	1.04	3,970	356	183	2.3	1,060	7.6	6
Aug. 1-10.....	2,032	11	.01	82	23	86	4.4	188	0	296	13	.4	2.7	.10	638	.87	3,500	300	146	2.2	913	7.5	5
Aug. 11.....	3,550	--	--	--	--	119	--	191	0	510	13	--	--	--	--	--	--	460	303	2.4	1,270	7.3	--
Aug. 12-31.....	1,570	11	.01	91	26	98	4.6	207	0	331	14	.4	2.3	.14	718	.98	3,040	336	166	2.3	1,010	7.7	5
Sept. 1-9.....	1,553	11	.00	86	29	100	4.7	212	0	335	15	.4	1.0	.12	722	.98	3,030	333	159	2.4	1,010	7.3	5
Sept. 10-30.....	1,795	11	.00	84	28	95	4.1	199	0	327	15	.4	1.3	.10	701	.95	3,400	325	162	2.3	988	7.2	4
Weighted average.....	2,188	12	0.01	79	25	87	3.7	195	0	297	13	0.4	1.3	0.13	648	0.88	3,830	301	142	2.2	919	7.4	5
Time-weighted average.....	--	12	0.01	84	27	94	3.8	206	0	320	15	0.4	1.3	0.13	694	--	--	322	153	2.3	979	7.4	5
Tons per day..	--	70.0	0.08	469	147	516	22.0	1,150	0	1,750	78.0	2.0	7.8	0.75	--	--	--	--	--	--	--	--	--

YELLOWSTONE RIVER BASIN--Continued

6-2795. BIGHORN RIVER AT KANE, WYO.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2795. BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

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	1400	850	3200	1540	1420	5900	1680	720	3270
2	1200	750	2400	1590	1880	8070	1650	800	3560
3	1100	650	1900	1530	1680	6940	1680	880	3990
4	1350	1400	5100	1530	1250	5160	1700	800	3670
5	1650	1600	7100	1610	1280	5560	1650	800	3560
6	1400	1100	4200	1560	1200	5050	1490	800	3220
7	1300	800	2800	1590	1000	4290	1200	300	970
8	1150	650	2000	1620	1000	4370	1200	220	710
9	1350	800	2900	1610	1050	4560	800	150	320
10	2750	10000	74000	1650	900	4010	500	460	620
11	3500	20000	190000	1650	700	3120	350	200	190
12	2550	13000	90000	1660	980	4390	300	50	40
13	1950	3800	20000	1590	920	3950	400	300	320
14	1900	2100	11000	1570	850	3600	500	60	81
15	1650	1600	7100	1630	1100	4840	700	50	94
16	1250	850	2900	1670	1180	5320	900	300	730
17	1250	1000	3400	1700	500	2300	900	850	2100
18	1800	1400	6800	1590	400	1720	750	100	200
19	1720	1220	5670	1590	500	2150	750	160	320
20	1680	800	3630	1790	650	3140	750	300	610
21	1630	800	3520	1970	950	5050	900	240	580
22	1610	850	3690	1800	800	3890	1100	220	650
23	1330	450	1620	1770	1150	5500	1000	140	380
24	1300	400	1400	1750	1250	5910	900	120	290
25	1480	900	3600	1770	1050	5020	900	90	220
26	1470	1050	4170	1770	1000	4780	1000	140	380
27	1430	520	2010	1710	920	4250	950	140	360
28	1480	900	3600	1680	900	4080	850	50	110
29	1450	1150	4500	1650	900	4010	800	100	220
30	1270	450	1540	1660	720	3230	800	130	280
31	1260	700	2380	--	--	--	900	160	390
Total	49610	--	478130	49800	--	134160	29950	--	32435
	JANUARY			FEBRUARY			MARCH		
1	850	190	440	1300	320	1100	2400	110	710
2	900	90	220	1200	240	780	2200	160	950
3	950	110	280	1100	500	1500	2000	340	1800
4	1000	160	430	1000	320	860	2000	240	1300
5	950	320	820	1000	1300	3500	2000	70	380
6	950	220	560	1000	3600	9700	2300	300	1900
7	900	280	680	1000	600	1600	2400	550	3600
8	700	300	570	1000	260	700	2600	750	5300
9	600	140	230	1000	420	1100	3000	1700	14000
10	500	100	140	1000	380	1000	3000	2300	19000
11	550	50	74	1300	1400	4900	3000	1900	15000
12	700	50	94	2000	1200	6500	3000	1600	13000
13	900	90	220	5000	2500	34000	3000	1200	9700
14	950	50	130	14000	2700	100000	3000	1800	15000
15	1000	50	140	8400	2600	59000	2000	2000	11000
16	1000	110	300	4500	2200	27000	2400	2600	17000
17	950	60	150	2600	1700	12000	3400	4900	45000
18	850	70	160	2500	1900	13000	3400	5600	51000
19	650	220	390	2400	1400	9100	3400	5500	50000
20	500	120	160	2400	800	5200	3200	6400	55000
21	500	100	130	2300	650	4040	3400	7000	64000
22	500	300	400	2240	600	3630	3400	4900	45000
23	550	240	360	2200	400	2400	3200	3700	32000
24	600	140	230	2400	240	1600	3200	3000	26000
25	700	170	320	2400	60	390	3200	2500	22000
26	850	150	340	2400	90	580	3400	2200	20000
27	950	360	920	2400	100	650	3400	2200	20000
28	1050	380	1100	2400	100	650	3400	3200	29000
29	1100	600	1800	--	--	--	3400	2700	25000
30	1200	420	1400	--	--	--	3400	1800	17000
31	1300	380	1300	--	--	--	3400	1600	15000
Total	25650	--	14488	74440	--	306480	90500	--	645640

YELLOWSTONE RIVER BASIN--Continued

6-2795. BIGHORN RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	3200	1800	16000	2910	2100	16500	2960	1700	13600
2..	3200	2000	17000	2750	2050	15200	3010	1800	14600
3..	1700	1900	8700	2600	1650	11600	3140	2200	18700
4..	1800	800	3900	2540	1700	11700	3500	2600	25000
5..	1800	550	2700	2570	2300	16000	3750	2300	23000
6..	2100	500	2800	3030	2300	18800	3400	1700	16000
7..	2800	500	3800	2840	1450	11100	2950	1500	12000
8..	2800	650	4900	2890	1950	15200	2800	1300	9800
9..	2600	1800	13000	3140	1900	16100	2600	900	6300
10..	2600	1700	12000	3230	2000	17400	2410	1700	11000
11..	2200	1100	6500	3050	1900	16000	2750	2600	19000
12..	2400	1600	10000	2980	1500	12100	4100	2500	28000
13..	2400	1900	12000	2780	1120	8410	5200	3200	45000
14..	2480	1700	11400	2320	980	6140	5810	5100	80000
15..	2670	2100	14600	2100	680	3860	6000	3200	52000
16..	2960	4650	37200	2290	1240	7670	6500	9600	170000
17..	3070	5200	43100	2020	1500	8180	6000	5700	92000
18..	2780	--	E 26000	1900	1280	6570	5600	3200	48000
19..	2960	2950	23600	1860	850	4270	5800	6600	100000
20..	3380	2750	25100	1830	1150	5680	6060	4700	76900
21..	3530	4520	43100	1790	1400	6770	5810	3080	48300
22..	3690	4470	44500	1930	900	4690	5790	3860	60300
23..	3530	4520	43100	2200	1350	8020	5670	4000	61200
24..	3270	3250	28700	2110	900	5130	5450	2650	39000
25..	3670	3650	36200	2080	880	4940	5470	2300	34000
26..	4140	3940	44000	3690	9180	S 137000	5430	2780	40800
27..	4200	3800	43100	4740	23800	S 322000	5080	2440	33500
28..	3710	2840	28400	2960	12200	97500	4800	2000	25900
29..	3400	2200	20200	2940	6500	51600	4300	1650	19200
30..	3140	2150	18200	2910	3600	28300	3870	1600	16700
31..	--	--	--	2850	2400	18500	--	--	--
Total	88080	--	643800	81830	--	912930	136010	--	1239800

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..	3890	1550	16300	1850	8400	42000	1420	550	2110
2..	3670	1350	13400	2170	5290	31000	1430	530	2050
3..	3270	1150	10200	2400	6080	39400	1480	620	2480
4..	3100	1150	9630	2400	4400	29000	1530	580	2400
5..	2890	900	7020	2150	2200	13000	1600	600	2590
6..	2590	900	6290	1950	1400	7400	1560	560	2360
7..	2460	900	5980	1900	1000	5100	1530	500	2070
8..	2320	1050	6580	1850	1100	5500	1530	700	2890
9..	1740	950	4460	1700	900	4100	1900	1650	8460
10..	1620	700	3060	1950	11000	58000	2040	1480	8150
11..	1360	500	1840	3550	15000	140000	1880	1300	6600
12..	1100	380	1130	3050	6100	50000	1760	1000	4750
13..	1140	600	1850	2350	2800	18000	1710	800	3690
14..	4060	14000	S 232000	2150	1900	11000	1680	620	2810
15..	4730	18700	239000	1900	1100	5600	1660	520	2330
16..	2680	9200	66600	1750	850	4000	1650	500	2230
17..	2340	3600	22700	1600	650	2800	1620	480	2100
18..	2010	2400	13000	1500	650	2600	1610	420	1830
19..	1830	1200	5930	1450	550	2200	1570	350	1480
20..	1700	820	3760	1400	550	2100	1570	340	1440
21..	1380	650	2420	1350	600	2200	1600	400	1730
22..	1170	580	1830	1250	420	1400	1740	650	3050
23..	1100	550	1630	1600	5300	23000	2330	4510	28400
24..	1060	400	1140	1290	3440	12000	1970	7780	41400
25..	1060	580	1660	1240	1000	3350	1900	2750	14100
26..	1120	600	1810	1190	1160	3730	1910	1250	6450
27..	1370	3460	S 16500	1170	720	2270	1930	1000	5210
28..	1900	4200	22000	1190	490	1570	1880	700	3550
29..	1850	11000	55000	1260	480	1630	1860	600	3010
30..	1550	7700	32000	1330	500	1800	1830	750	3710
31..	1650	4500	20000	1390	520	1950	--	--	--
Total	65710	--	826720	55280	--	527700	51680	--	175430

Total discharge for year (cfs-days)..... 798540
Total load for year (tons)..... 5937713

E Estimated.
S Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2795. BIGHORN RIVER AT KANE, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 5, 1961.....	1655		58	d 1,650	1,660	7,400		22		41		75	82	93	100	--		VPWC
Oct. 18.....	1705		50	d 1,800	1,400	6,800		19		29		71	82	94	100	--		VPWC
Nov. 21.....	1520		33	1,980	955	5,100		9		15		35	47	86	100	--		VPWC
Dec. 7.....	1420		33	d 1,200	301	975		--		--		38	52	91	100	--		V
Feb. 14, 1962.....	1710		33	d14,000	2,730	103,000		61		77		85	88	96	100	--		VPWC
Feb. 15.....	1050		34	d 8,400	2,360	53,500		70		85		86	90	96	100	--		VPWC
Mar. 20.....	1440		43	d 3,200	6,620	57,200		45		64		84	89	92	99	100		VPWC
May 17.....	1540		62	2,170	2,160	12,700		53		71		86	95	99	100	--		VPWC
May 23.....	1035		57	2,300	1,530	9,500		12		22		56	70	91	100	--		VPWC
June 9.....	1115		66	d 2,600	970	6,800		21		27		56	78	94	100	--		VPWC
June 14.....	1520		68	d 5,810	4,510	7,070		48		63		80	90	97	100	--		VPWC
June 18.....	0940		64	d 5,600	3,070	46,400		44		59		78	90	96	99	100		VPWC
July 2.....	1230		72	3,730	1,250	12,600		18		30		60	81	94	100	--		VPWC
July 16.....	1025		65	2,720	11,900	87,400		65		87		96	98	99	100	--		VPWC
July 31.....	1055		73	d 1,650	5,920	26,400		60		83		92	97	100	--	--		VPWC
Aug. 17.....	1020		72	d 1,600	593	2,560		30		47		75	94	100	--	--		VPWC
Sept. 9.....	1415		54	1,910	1,200	6,190		10		17		48	64	92	100	--		VPWC
Sept. 25.....	1225		66	1,910	3,130	16,100		56		80		92	96	99	100	--		VPWC

d Daily mean discharge.

6-2862. SHOSHONE RIVER AT KANE, WYO.

LOCATION.--At gaging station at bridge on county road, 1 mile north of Kane, Big Horn County, and 1.5 miles upstream from mouth.
DRAINAGE AREA.--2,989 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to June 1953, August 1958 to September 1962.
Water temperatures: October 1959 to September 1962.
Sediment records: October 1959 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 77°F July 21; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 23,000 ppm June 16; minimum daily, 20 ppm Dec. 17, 28, Jan. 17, 18.
Sediment loads: Maximum daily, 428,000 tons June 16; minimum daily, 49 tons Jan. 17, 18.
EXTREMES, 1959-62.--Water temperatures: Maximum, 80°F June 26, 1960; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 23,000 ppm June 16, 1962; minimum daily, 20 ppm Dec. 17, 28, 1961, Jan. 17, 18, 1962.
Sediment loads: Maximum daily, 524,000 tons Sept. 19, 1961; minimum daily, 41 tons Apr. 1, 1961.
REMARKS.--Flow affected by ice Feb. 12, 18-25.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 3, 1961....	1,060	16	0.00	105	41	160	4.3	265	0	517	14	0.6	4.9	0.32	1,020	1.39	2,920	430	213	3.4	1,380	7.6	4
Nov. 4.....	1,460	19	.00	103	37	133	4.5	268	0	437	12	.6	5.9	.33	901	1.23	3,550	408	188	2.9	1,240	7.4	3
Dec. 7.....	1,280	17	.00	81	26	88	3.0	221	0	284	9.7	.4	3.6	.15	642	.87	2,220	308	127	2.2	922	7.1	4
Jan. 2, 1962....	a 940	16	.01	83	25	84	3.1	228	0	274	9.6	.5	3.0	.16	633	.86	1,610	308	121	2.1	916	7.2	4
Feb. 2.....	a 1,000	18	.00	96	33	110	3.9	258	0	355	15	.5	4.8	.23	789	1.07	2,130	377	165	2.5	1,110	7.2	2
Mar. 8.....	1,140	15	.00	66	21	80	3.6	194	0	237	8.1	.4	3.2	.14	544	.74	1,670	251	92	2.2	826	7.3	2
Apr. 6.....	1,300	14	.01	75	29	91	3.7	223	0	291	10	.4	1.2	.17	661	.90	2,320	305	122	2.3	947	7.6	5
May 1.....	896	16	.09	67	45	122	3.8	215	0	394	13	.7	3.4	.11	819	1.11	1,980	350	174	2.8	1,120	7.4	7
June 9.....	1,380	17	.01	78	28	108	3.0	202	0	340	9.8	.4	3.3	.20	721	.98	2,690	310	144	2.7	1,010	7.7	6
July 2.....	4,520	17	.01	35	9.8	34	1.4	119	0	93	1.5	.2	1.6	.05	264	.36	3,220	128	30	1.3	402	7.3	6
July 31.....	1,870	17	.01	77	26	104	3.4	202	0	325	8.5	.6	6.2	.16	698	.95	3,520	298	132	2.6	979	7.6	8
Sept. 9.....	1,650	19	.00	82	28	106	3.3	216	0	350	8.8	.5	5.9	.20	723	.98	3,220	320	143	2.6	1,030	7.8	5

a Daily mean discharge.

YELLOWSTONE RIVER BASIN--Continued

6-2862. SHOSHONE RIVER AT KANE, WYO.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2862. SHOSHONE RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962

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	1080	260	758	1230	140	465	1360	3180	11700
2	1040	210	590	1170	100	316	1240	650	2310
3	1040	210	590	1190	110	353	1270	520	1780
4	1070	240	693	1380	260	969	1290	340	1180
5	1040	190	533	1490	180	724	1290	280	975
6	1160	310	971	1480	160	639	1300	270	948
7	1190	260	835	1450	160	626	1300	220	772
8	1020	160	441	1450	150	587	1240	170	569
9	1100	130	386	1450	150	587	1200	180	580
10	1310	180	637	1480	140	559	1150	200	620
11	1430	220	849	1450	180	705	1100	140	420
12	1440	240	933	1430	180	695	1100	120	360
13	1440	210	816	1440	140	544	1100	80	240
14	1460	240	946	1440	110	428	1050	110	310
15	1390	700	2630	1390	110	413	1050	150	430
16	1400	160	605	1380	200	745	1050	60	170
17	1310	100	354	1320	290	1030	1050	20	57
18	1280	140	484	1440	500	1940	950	280	720
19	1300	160	562	1380	880	3280	950	260	670
20	1310	220	778	1330	920	3300	950	550	1400
21	1310	220	778	1320	610	2170	950	1000	2600
22	1660	-- E	1100	1360	640	2350	950	400	1000
23	1700	250	1150	1350	920	3350	950	280	720
24	1390	140	525	1360	820	3010	950	170	440
25	1280	100	346	1380	650	2420	950	600	1500
26	1280	100	346	1340	650	2350	950	420	1100
27	1260	100	340	1340	900	3260	950	80	210
28	1250	100	338	1330	2050	7360	950	20	51
29	1220	120	395	1320	1450	5170	950	190	490
30	1240	90	301	1320	8930	31800	950	650	1700
31	1270	100	343	--	--	--	950	1100	2800
Total	39670	--	21353	41190	--	82145	33440	--	38822
	JANUARY			FEBRUARY			MARCH		
1	940	460	1200	840	380	860	1200	360	1200
2	940	550	1400	1000	1300	3500	1150	700	2800
3	940	950	2400	1200	1900	6200	1200	1500	4900
4	950	500	1300	1460	900	3500	1200	1300	4200
5	950	340	870	1400	300	1100	1050	460	1300
6	950	340	870	1300	460	1600	1100	300	890
7	950	300	770	1300	700	2500	1200	700	2300
8	950	120	310	1300	1400	4900	1150	1350	4190
9	920	30	75	1300	2500	8800	1080	700	2040
10	900	140	340	1300	3000	11000	1020	380	1050
11	880	220	520	1400	2000	7600	1000	250	675
12	880	170	400	1500	1100	4500	984	200	531
13	880	150	360	1740	810	3810	984	170	452
14	880	120	290	1710	780	3600	1040	160	449
15	900	40	97	1640	500	2210	1030	180	501
16	900	40	97	1500	300	1200	1040	160	449
17	900	20	49	1400	260	1000	1090	220	647
18	900	20	49	1300	240	840	942	220	560
19	900	500	1200	1200	220	710	864	1340	3130
20	900	80	190	1200	280	910	928	1250	3230
21	900	30	73	1200	260	840	1070	740	2140
22	900	70	170	1200	280	910	1090	820	2410
23	900	110	270	1150	320	990	1150	900	2790
24	900	150	360	1150	340	1100	1180	720	2290
25	900	220	530	1200	120	390	1180	450	1430
26	900	280	680	1200	120	390	1200	410	1330
27	880	300	710	1200	160	520	1190	480	1540
28	880	300	710	1200	80	260	1180	350	1120
29	860	160	370	--	--	--	1170	320	1010
30	840	220	500	--	--	--	1100	420	1250
31	820	-- E	600	--	--	--	1190	320	1030
Total	27990	--	17760	36490	--	75740	33952	--	53834

E Estimated.

YELLOWSTONE RIVER BASIN--Continued

6-2862. SHOSHONE RIVER AT KANE, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	1200	270	875	956	960	2480	1620	1050	4590
2..	1200	510	1650	984	1100	2920	1820	3340 S	17300
3..	1260	440	1500	890	690	1660	1690	1400	6390
4..	1250	340	1150	890	820	1970	1760	1400	6650
5..	1250	315	1060	690	510	950	1770	1560	7460
6..	1300	290	1020	1180	550	1750	1640	1090	4830
7..	1300	220	772	896	720	1740	1510	2360	9620
8..	1290	200	697	838	550	1240	1450	1120	4380
9..	1340	230	832	793	400	856	1410	820	3120
10..	1360	180	661	734	380	753	1300	750	2630
11..	1330	150	539	679	310	568	1410	1770	6740
12..	1290	170	592	679	380	697	1140	1330	4090
13..	1310	260	920	799	710	1530	1140	1800	5540
14..	1380	270	1010	883	800	1910	935	1600	4040
15..	1330	170	610	991	830	2220	977	700	1850
16..	1330	440	1580	998	790	2130	4750	23000 S	428000
17..	1160	410	1280	970	660	1730	1980	6840	36600
18..	1160	-- E	1800	1070	1300	3760	1860	2800	14100
19..	1160	770	2410	1100	1190	3530	2330	12800 S	87900
20..	1070	1070	3090	1060	950	2720	2200	3250	19300
21..	1200	2480 S	8610	1380	3090 S	12700	2190	1490	8810
22..	1300	2950	10400	1190	1440	4630	2150	880	5110
23..	1290	2250	7840	1190	1030	3310	3940	3040 S	36000
24..	1140	1600	4920	1220	1150	3790	7520	4650	94400
25..	1010	1150	3140	1810	3260	15900	9140	3540	87400
26..	1100	1130	3360	2710	9820 S	81800	9310	2410	60600
27..	1130	880	2680	2640	9930 S	78000	9590	2010	52000
28..	1100	790	2350	2260	4400	26800	9660	1880	49000
29..	991	850	2270	2090	3750	21200	8500	1410	32400
30..	1040	950	2670	1880	1390	7060	7140	1360	26200
31..	--	--	--	1740	1120	5260	--	--	--
Total	36571	--	72288	38190	--	297564	103832	--	1127050

Day	JULY			AUGUST			SEPTEMBER		
1..	6640	1630	29200	3210	8560 S	80900	1710	320	1480
2..	4500	1200	14600	2350	1870	11900	1620	350	1530
3..	4900	1090	14400	2370	910	5820	1560	350	1470
4..	4720	860	11000	2130	610	3510	1570	380	1610
5..	3920	870	9210	1860	500	2510	1520	370	1520
6..	3360	700	6350	1730	480	2240	1380	340	1270
7..	3380	650	5930	1190	400	1290	1230	300	996
8..	3800	500	5130	900	360	875	1280	350	1210
9..	3190	570	4910	710	310	594	1610	520	2260
10..	3100	400	3350	1370	8870 S	66900	1520	450	1850
11..	2760	420	3130	2350	12600 S	98700	1380	360	1340
12..	2570	380	2640	1650	1700	7570	1230	310	1030
13..	5040	8140 S	176000	1600	570	2460	1210	300	980
14..	6310	9710 S	174000	1500	520	2110	1110	270	809
15..	3310	2400	21400	1300	420	1470	1040	270	758
16..	2710	1180	8630	1260	390	1330	1010	240	654
17..	2260	-- E	5000	1170	400	1260	960	220	570
18..	1870	500	2520	1170	440	1390	850	200	459
19..	1690	400	1830	1240	450	1510	810	200	437
20..	1460	420	1660	1240	370	1240	830	200	448
21..	1290	480	1670	1090	340	1000	960	300	805
22..	1220	400	1320	1070	330	953	1580	4860 S	31100
23..	1140	350	1080	1200	380	1230	1290	1400	4880
24..	1000	360	972	1320	410	1460	1290	620	2160
25..	1020	330	909	1430	400	1540	1240	500	1670
26..	800	630	1360	1430	350	1350	1260	510	1730
27..	1300	1180 S	4600	1430	320	1240	1300	450	1580
28..	1470	2140	8490	1500	310	1260	1380	450	1680
29..	1510	890	3630	1730	640	2990	1340	420	1520
30..	1800	520	2530	1840	640	3180	1340	390	1410
31..	1970	480	2550	1780	450	2160	--	--	--
Total	86010	--	530001	48120	--	313942	38410	--	71216

Total discharge for year (cfs-days)	563865
Total load for year (tons)	2701715

E Estimated.
S Computed by subdividing day.

6-2862. SHOSHONE RIVER AT KANE, WYO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 7, 1961.....	1330		33	1,280	258	892		25		43		88	98	100	--			VPWC
Feb. 14, 1962.....	1030		38	1,660	713	3,200		58		71		84	91	99	100			VPWC
Mar. 20.....	1630		49	963	1,240	3,220		49		78		96	98	100	--			VPWC
May 1.....	1920		48	896	764	1,850		62		83		97	98	99	100			VPWC
May 18.....	0955		54	1,050	968	2,740		40		59		89	98	100	--			VPWC
May 23.....	0935		53	1,210	960	3,140		27		40		68	91	99	100			VPWC
June 9.....	0925		61	1,390	774	2,900		27		41		69	84	96	100			VPWC
June 14.....	1640		70	942	1,100	2,800		62		83		96	98	100	--			VPWC
June 16.....	1320		65	8,500	27,800	638,000		67		88		97	99	100	--			VPWC
June 18.....	1050		66	1,720	2,120	9,850		65		81		92	97	100	--			VPWC
July 2.....	1420		68	4,250	1,140	13,100		25		39		71	88	98	100			VPWC
July 16.....	1220		63	2,620	1,710	12,100		58		79		93	96	100	--			VPWC
July 31.....	1300		67	1,870	442	2,230		33		62		82	88	98	100			VPWC

YELLOWSTONE RIVER BASIN--Continued

6-2947. BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At gaging station at bridge on U.S. Highway 10, 0.8 mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 4 miles east of Custer.
DRAINAGE AREA.--22,885 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1962.
Water temperatures: April 1949 to September 1951, August 1952 to November 1958, June 1959 to September 1962.
Sediment records: July 1947 to September 1954, October 1955 to September 1958, October 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,060 ppm Dec. 10-31; minimum, 343 ppm June 26-30.
Hardness: Maximum, 486 ppm Dec. 10-31; minimum, 174 ppm June 26-30.
Specific conductance: Maximum daily, 1,490 micromhos Dec. 14; minimum daily, 468 micromhos July 1.
Water temperatures: Maximum, 79°F Aug. 13; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 16,900 ppm May 29; minimum daily, not determined.
Sediment loads: Maximum daily, 322,000 tons May 29; minimum daily, 100 tons (estimated) on several days during January.
EXTREMES, 1947-62.--Dissolved solids (1951-62): Maximum, 1,460 ppm July 10-11, 1961; minimun, 304 ppm June 23, 1951.
Hardness (1951-62): Maximum, 617 ppm July 10-11, 1961; minimum, 151 ppm June 23, 1951.
Specific conductance (1951-62): Maximum daily, 1,940 micromhos July 10, 1961; minimum daily, 384 micromhos June 20, 1951.
Water temperatures (1949-51, 1952-62): Maximum, 89°F Aug. 7, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations (1947-54, 1955-58, 1959-62): Maximum daily, 23,200 ppm May 24, 1952; minimum daily, not determined.
Sediment loads (1947-54, 1955-58, 1959-62): Maximum daily, 727,000 tons May 24, 1952; minimum daily, 100 tons (estimated) on several days during January 1962.
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 Dec. 11 to Feb. 17, Feb. 26 to Mar. 8. Stream frozen Dec. 15 to Jan. 4, Jan. 7 to Feb. 1.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-12, 1961.	3,301	--	--	105	35	131	--	246	0	457	--	--	--	--	917	1.25	8,170	407	205	2.8	1,240	8.1	--
Oct. 13-31.....	3,134	--	--	99	29	115	--	228	0	407	--	--	--	--	820	1.12	6,940	367	180	2.6	1,130	7.9	--
Nov. 1-15.....	3,145	--	--	--	--	115	--	236	0	387	--	--	--	--	807	1.10	6,850	380	186	2.6	1,130	7.4	--
Nov. 16-30.....	3,101	--	--	--	--	112	--	240	0	370	--	--	--	--	798	1.09	6,680	376	179	2.5	1,120	7.7	--
Dec. 1-9.....	2,860	--	--	--	--	107	--	242	0	333	--	--	--	--	797	1.08	6,150	376	178	2.4	1,110	7.8	--
Dec. 10-31.....	2,184	19	0.02	119	46	143	4.8	311	0	496	20	0.5	1.3	0.25	1,060	1.44	6,250	486	231	2.8	1,410	8.2	5
Jan. 1-31, 1962.	1,897	--	--	--	--	94	--	234	0	304	--	--	--	--	720	.98	3,690	346	154	2.2	1,020	7.9	--
Feb. 1-20.....	4,908	--	--	--	--	77	--	180	0	280	--	--	--	--	602	.82	7,980	290	142	2.0	864	7.1	--
Feb. 21-28.....	2,489	--	--	--	--	112	--	246	0	396	--	--	--	--	851	1.16	5,720	405	203	2.4	1,160	7.6	--
Mar. 1-12.....	3,490	--	--	--	--	100	--	228	0	338	--	--	--	--	740	1.01	6,970	363	176	2.3	1,040	7.5	--
Mar. 13-21.....	7,359	9.6	.00	76	23	79	3.5	185	0	273	11	.4	1.1	.10	593	.81	11,780	284	132	2.0	854	7.6	8
Mar. 22-31.....	5,711	--	--	--	--	97	--	209	0	319	--	--	--	--	701	.95	10,810	326	155	2.3	997	7.4	--
Apr. 1-17.....	3,659	--	--	--	--	117	--	234	0	394	--	--	--	--	821	1.12	8,110	378	186	2.6	1,140	7.5	--
Apr. 18-23.....	4,770	--	--	--	--	95	--	214	0	318	--	--	--	--	690	.94	8,890	325	150	2.3	991	7.6	--
Apr. 24-May 8...	4,704	--	--	--	--	77	--	195	0	262	--	--	--	--	578	.79	7,340	285	125	2.0	845	7.2	--
May 9-17.....	4,219	--	--	--	--	59	--	166	0	211	--	--	--	--	477	.65	5,430	241	105	1.7	707	7.1	--
May 18-31.....	5,146	--	--	--	--	93	--	195	0	291	--	--	--	--	644	.88	8,950	290	130	2.4	929	7.7	--

June 1-13, 1962.	5,090	--	--	--	--	76	--	186	0	258	--	--	--	--	567	.77	7,790	274	121	2.0	821	7.2	--
June 14-25.....	8,918	--	--	--	--	61	--	172	0	202	--	--	--	--	476	.65	11,460	235	94	1.7	702	7.2	--
June 26-30.....	12,240	14	.02	43	16	40	2.3	150	0	125	3.5	.2	.5	.07	343	.47	11,340	174	51	1.3	509	7.4	5
July 1-13.....	7,187	--	--	--	--	44	--	152	0	141	--	--	--	--	359	.49	6,970	187	62	1.4	540	7.3	--
July 14-25.....	5,142	--	--	--	--	84	--	210	0	293	--	--	--	--	648	.88	9,000	314	142	2.1	915	7.2	--
July 26-Aug. 5..	3,216	--	--	--	--	113	--	211	0	390	--	--	--	--	801	1.09	6,960	373	200	2.5	1,100	7.4	--
Aug. 6-19.....	3,138	--	--	--	--	105	--	206	0	350	--	--	--	--	730	.99	6,180	336	167	2.5	1,020	7.6	--
Aug. 20-31.....	2,203	13	.02	95	31	114	2.4	225	0	390	13	.4	2.2	.16	806	1.10	4,790	363	179	2.6	1,120	7.5	6
Sept. 1-6.....	2,797	--	--	--	--	108	--	228	0	370	--	--	--	--	777	1.06	5,870	353	166	2.5	1,090	7.8	--
Sept. 7-23.....	3,115	13	.00	84	32	106	3.7	215	0	348	12	.4	1.0	.14	746	1.01	6,270	341	165	2.5	1,050	7.6	7
Sept. 24-30.....	3,616	--	--	--	--	110	--	219	0	374	--	--	--	--	783	1.06	7,640	353	173	2.5	1,090	7.7	--
Weighted average.....	4,029	--	--	--	--	90	--	205	0	303	--	--	--	--	662	0.90	7,200	313	144	2.2	937	7.4	--
Time-weighted average.....	--	--	--	--	--	98	--	217	0	332	--	--	--	--	719	--	--	337	159	2.3	1,010	7.5	--
Tons per day..	--	--	--	--	--	977	--	2,230	0	3,300	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-2947. BIGHORN RIVER AT HIGHORN, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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	2770	595	4450	2720	580	4260	2950	970	7730
2	2880	580	4510	2820	550	4190	3010	1040	8450
3	2840	520	3990	3050	845	6960	2910	--	6500
4	2770	465	3480	3030	625	5110	2930	705	5580
5	2620	440	3110	3030	720	5890	3010	570	4630
6	2800	690	5220	3210	815	7060	2930	480	3800
7	2930	730	5770	3210	720	6240	2820	500	3810
8	3170	850	7280	3270	625	5520	2720	440	3230
9	3110	935	7850	3250	675	5920	2460	270	1790
10	3150	825	7020	3230	495	4320	1650	--	600
11	4020	880	S 10500	3250	550	4820	1500	90	360
12	6550	5050	89300	3350	635	5740	1400	70	260
13	4320	10100	118000	3330	465	4180	1400	70	260
14	3650	7270	71600	3210	520	4510	1600	46	200
15	3530	3480	33200	3210	420	3640	2200	--	280
16	3370	1700	15500	3150	305	2590	2500	--	280
17	3130	1080	9130	3230	825	7190	2700	--	280
18	2930	790	6250	2880	540	4200	2600	--	280
19	3010	640	5200	2800	370	2800	2500	--	280
20	3130	750	6340	2880	485	3770	2600	--	280
21	3090	665	5550	2880	400	3110	2700	--	280
22	3110	--	5300	3230	705	6150	2400	--	280
23	3150	600	5100	3150	800	6800	2400	--	280
24	3210	645	5590	3150	710	6040	2500	--	280
25	2910	760	5970	3250	855	7500	2600	--	280
26	2730	520	3830	3150	845	7190	2200	--	240
27	2820	610	4640	3110	760	6380	2000	--	240
28	2820	425	3240	3050	800	6590	2000	--	240
29	2910	330	2590	3170	675	5780	2100	--	240
30	2910	475	3730	3430	655	6070	2200	--	240
31	2820	410	3120	---	--	--	2300	--	240
Total	99160	--	466360	93680	--	160520	73790	--	51720
	JANUARY			FEBRUARY			MARCH		
1	2500	--	200	2800	200	1500	2000	100	540
2	2600	--	200	3100	700	5860	2200	120	710
3	2700	--	200	3300	740	6590	2100	140	790
4	2600	--	200	3600	1100	11000	2600	140	980
5	2400	30	190	3500	480	4500	2600	100	700
6	2400	55	360	3200	200	1700	3000	120	970
7	2500	--	400	3200	160	1400	3400	440	4000
8	2300	--	300	3400	200	1800	3800	600	6200
9	2000	--	200	3800	320	3300	4130	560	6240
10	1800	--	150	4400	400	4800	4550	560	6880
11	1800	--	150	4700	600	7600	5280	530	7560
12	1800	--	150	5000	600	8100	6220	320	5370
13	1700	--	150	5400	20	14900	6730	300	5450
14	1500	--	150	6000	1350	21900	5200	250	3510
15	1400	--	100	8000	3200	69100	4670	530	6680
16	1300	--	100	13000	2200	77000	4900	420	5560
17	1300	--	100	8000	1800	39000	6120	1000	16500
18	1200	--	100	5350	1560	22500	8510	1820	41800
19	1100	--	100	4360	1460	17200	10400	2100	59000
20	1100	--	100	4050	1170	12800	10300	2990	83200
21	1200	--	100	3730	420	4230	9400	3880	98500
22	1300	--	100	3410	--	4000	8170	5600	124000
23	1400	--	100	2650	500	3580	6760	4070	74300
24	1600	--	200	2210	500	2980	5850	3140	49600
25	1900	--	500	1810	110	538	5580	2590	40500
26	2000	--	900	1900	80	410	5250	1840	26100
27	2100	--	900	2000	60	320	5050	1690	23000
28	2200	--	900	2200	90	530	5220	1280	18000
29	2300	--	900	---	--	--	5280	1270	18100
30	2400	--	900	---	--	--	5350	1500	21700
31	2500	--	900	---	--	--	4600	2010	25000
Total	58800	--	10000	118070	--	349138	165220	--	781440

S Computed by subdividing day.

6-2947. BIGHORN RIVER AT BIGHORN, MONT.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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	4580	1810	22400	4550	890	10900	5020	3250	44000
2	4600	1070	13300	4230	925	10600	5100	2100	28900
3	4470	980	11800	3950	720	7680	5280	2370	33800
4	4320	800	9330	3670	700	6940	5580	2020	30400
5	3370	650	5910	3490	640	6030	6120	1860	30700
6	2820	595	4530	3500	580	5560	6180	2730	45600
7	2750	585	4340	4010	690	7470	5500	1660	24700
8	2650	575	4110	3990	765	8240	4690	1350	17100
9	2630	540	3830	4210	800	9090	4230	1800	20600
10	3470	1490	14000	4470	825	9960	4030	1080	11800
11	3630	1130	11100	4550	730	8970	3930	940	9970
12	3690	710	7070	4580	715	8840	4690	890	11300
13	3670	520	5150	4550	775	9520	5820	2280	35800
14	3610	485	4730	4300	840	9750	7240	1800	35200
15	3870	485	5070	3910	665	7020	8450	3480	79400
16	3910	550	5810	3610	585	5700	9310	3600	90500
17	4170	655	7370	3790	580	5940	12400	8180	274000
18	4440	1010	12100	3410	595	5480	10500	7640	217000
19	4300	--	13000	3310	1060	9470	7810	3760	79300
20	4320	1270	14800	3390	1160	10600	8010	2820	61000
21	4760	1530	19700	4380	2280	27000	8660	6450	152000
22	5200	1300	18300	4110	1490	16500	8290	3300	73900
23	5600	1960	29600	4170	995	11200	7980	2100	45200
24	5600	2130	32200	4340	1190	13900	8260	2400	53500
25	5280	1910	27200	4150	925	10400	10100	3530	96300
26	5400	1520	22200	4740	1150	14700	11600	3350	106000
27	5820	1480	23300	7020	3280	62200	12600	3940	134000
28	6200	1720	28800	10100	11700	S 302000	12600	2440	83000
29	5800	1460	22900	7050	16900	322000	12500	2220	74900
30	5020	1160	15700	6200	9600	161000	11900	1980	63600
31	--	--	--	5680	5300	81300	--	--	--
Total	129950	--	419650	141460	--	1185960	234380	--	2063470

Day	JULY			AUGUST			SEPTEMBER		
1	10700	1830	52900	3350	4460	40300	2750	520	3860
2	10500	2180	61800	3790	3810	39000	2770	585	4370
3	9340	1680	42400	3690	4080	40600	2720	475	3490
4	8890	1410	33800	4010	5650	61200	2770	425	3180
5	8630	1120	26100	3930	3460	36700	2820	435	3310
6	7620	1120	23000	3550	2640	25300	2950	460	3660
7	6830	1090	20100	3190	2000	17200	2900	415	3250
8	6500	1050	18400	3030	1140	9330	3010	450	3660
9	6550	920	16300	2770	760	5680	3010	535	4350
10	5250	1050	14900	2620	675	4770	3350	630	5700
11	4620	1060	13200	2780	780	5850	3870	1000	10400
12	4190	950	10700	5510	6140	91300	3710	860	8610
13	3810	1120	11500	4230	12400	142000	3470	755	7070
14	5470	2480	S 39300	3450	6390	59500	3230	695	6060
15	9820	8820	234000	3110	2550	21400	3110	595	5000
16	9820	11700	310000	2730	1260	9290	3030	485	3970
17	6760	9980	182000	2460	865	5750	2950	400	3190
18	5750	5950	92400	2300	605	3760	2930	365	2890
19	4710	2710	34500	2200	485	2880	2820	350	2660
20	4270	1900	21900	2100	410	2320	2730	350	2580
21	3950	1540	16400	2030	380	2080	2720	305	2240
22	3430	1040	9630	1910	300	1550	2780	300	2250
23	2840	760	5830	1870	270	1360	3330	470	4230
24	2540	610	4180	1940	245	1280	3750	715	7240
25	2340	710	4490	2360	415	2640	3750	2400	24300
26	2210	485	2890	2300	910	5650	3550	2480	23800
27	2090	455	2570	2300	1730	10700	3550	3770	36100
28	2340	695	4390	2240	665	4020	3590	1240	12000
29	3450	1660	15500	2260	500	3050	3570	810	7810
30	3290	2850	25300	2440	525	3460	3550	605	5800
31	3230	2620	22800	2680	510	3690	--	--	--
Total	171740	--	1373180	89130	--	663610	95040	--	217030

Total discharge for year (cfs-days)..... 1470420
Total load for year (tons)..... 7742078

S Computed by subdividing day.

YELLOWSTONE RIVER BASIN--Continued

6-2947. BIGHORN RIVER AT BIGHORN, MONT.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 2, 1961.....	1345		55	2,910	592	4,650		41		59		69	76	96	100			VPWC
Oct. 17.....	1320		50	3,050	1,020	8,400		54		73		84	89	100	--			VPWC
Dec. 4.....	1510		38	2,680	588	4,250		42		63		76	78	99	100			VPWC
Feb. 16, 1962.....	1610		33	d13,000	2,280	80,000		46		57		73	82	98	100			VPWC
Feb. 17.....	0830		32	d 8,000	1,720	37,200		65		80		81	85	100	--			VPWC
Apr. 5.....	1330		47	3,290	646	5,740		40		66		83	89	99	100			VPWC
May 4.....	1200		60	3,690	669	6,660		35		53		78	86	99	100			VPWC
June 5.....	1350		61	6,180	1,760	29,400		36		52		81	92	99	100			VPWC
June 19.....	0910		68	8,060	3,940	85,700		56		75		92	97	100	--			VPWC
July 1.....	1700		73	10,400	1,680	47,200		27		43		74	90	100	--			VPWC
Aug. 1.....	1230		72	3,250	4,270	37,500		68		87		91	93	97	100			VPWC
Sept. 5.....	1510		65	2,860	336	2,590		33		52		67	79	94	100			VPWC

d Daily mean discharge.

6-3055. GOOSE CREEK BELOW SHERIDAN, WYO.

LOCATION.--At gaging station, 700 feet north of Sheridan city limits, Sheridan County, and 1,200 feet downstream from Soldier Creek.
DRAINAGE AREA.--392 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1960, August 1961 to September 1962.

Chemical analyses, in parts per million, August 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Aug. 3, 1961....	12	8.6	0.15	86	80	63	6.2	322	0	394	14	0.3	0.0	0.18	837	1.14	27.1	543	279	1.2	1,210	7.7	15
Sept. 14.....	52	10	.01	106	47	45	4.4	344	0	255	6.6	.3	7.0	.16	661	.90	92.8	458	176	.9	964	7.2	4
Oct. 2.....	76	8.4	.00	81	57	42	3.8	332	0	236	4.6	.4	7.3	.19	627	.85	129	435	163	.9	971	7.0	7
Oct. 31.....	142	12	.00	62	42	29	2.5	281	0	149	2.5	.3	1.0	.10	450	.61	173	326	96	.7	707	7.4	7
Dec. 4.....	117	9.0	.01	62	44	32	2.5	301	0	138	8.4	.4	.1	.10	474	.64	150	335	88	.8	745	6.9	6
Jan. 5, 1962....	a 60	14	.17	58	41	36	5.0	284	0	159	4.5	.5	.2	.15	468	.64	75.8	312	79	.9	768	7.1	27
Jan. 30.....	a 110	13	.01	59	39	27	2.9	253	0	136	4.4	.2	9.4	.08	427	.58	127	306	99	.7	666	6.9	6
Mar. 6.....	102	11	.00	63	39	30	5.3	263	0	139	7.1	.3	14	.09	458	.62	126	318	102	.7	703	7.4	4
Apr. 4.....	138	8.2	.02	70	50	34	3.5	293	0	195	4.2	.3	5.0	.08	545	.74	203	380	140	.8	809	7.4	7
May 3.....	420	9.3	.00	25	11	6.7	.5	100	0	36	.3	.1	2.3	.01	150	.20	170	108	26	.3	243	7.1	9
May 24.....	240	11	.09	31	16	12	1.4	128	0	58	.4	.1	1.7	.02	203	.28	132	145	40	.4	327	7.8	13
June 5.....	678	11	.14	21	12	9.6	1.8	106	0	34	.0	.1	.2	.04	150	.20	275	103	16	.4	235	7.0	17
July 11.....	138	8.9	.11	50	29	25	2.8	196	0	120	5.4	.3	13	.09	364	.50	136	246	85	.7	564	7.0	13
Aug. 3.....	71	8.3	.01	73	55	41	4.1	306	0	211	6.8	.5	8.0	.16	591	.80	113	407	156	.9	878	7.5	9
Sept. 6.....	103	--	--	76	48	40	--	354	0	182	6.4	.0	--	--	542	.74	151	385	95	.9	862	7.6	--

a Daily mean discharge.

Date of collection	Hydrogen sulfide (H_2S)	Date of collection	Hydrogen sulfide (H_2S)
Aug. 3, 1961.....	4.3	Apr. 4, 1962.....	0.5
Sept. 14.....	1.1	May 3.....	.6
Oct. 2.....	2.1	May 24.....	--
Oct. 31.....	.3	June 5.....	.5
Dec. 4.....	--	July 11.....	.5
Jan. 5, 1962.....	.8	Aug. 3.....	.5
Jan. 30.....	.0	Sept. 6.....	.8
Mar. 6.....	.8	.....	--

YELLOWSTONE RIVER BASIN--Continued

6-3085. TONGUE RIVER AT MILES CITY, MONT.

LOCATION.--At gaging station, 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.
DRAINAGE AREA.--5,379 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1962.
Water temperatures: April 1949 to September 1962.
Sediment records: June 1946 to September 1951.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 829 ppm July 31 to Aug. 5; minimum, 255 ppm Feb. 1-12.
Hardness: Maximum, 464 ppm Dec. 12-31; minimum, 135 ppm Feb. 1-12.
Specific conductance: Maximum daily, 1,420 micromhos Aug. 4; minimum daily, 346 micromhos Feb. 11.
Water temperatures: Maximum, 73°F July 2; minimum, freezing point on many days during October to April.
EXTREMES, 1949-62.--Dissolved solids (1951-62): Maximum, 1,790 ppm Sept. 11, 1958; minimum, 200 ppm June 23-27, 1953.
Hardness (1951-62): Maximum, 688 ppm Sept. 11, 1958; minimum, 94 ppm May 4, 1955.
Specific conductance (1951-62): Maximum daily, 2,390 micromhos Sept. 11, 1958; minimum daily, 288 micromhos June 21, 1953.
Water temperatures: Maximum, 86°F July 20, 1954; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-21, 1961.	89.1	--	--	67	42	71	--	277	0	255	--	--	--	--	600	0.82	144	338	111	1.7	886	8.0	--
Oct. 22-31.....	60.4	--	--	72	49	86	--	319	0	300	--	--	--	--	698	.95	114	382	120	1.9	1,010	8.0	--
Nov. 1-17.....	83.9	--	--	--	--	82	--	303	0	271	--	--	--	--	654	.89	148	365	117	1.9	973	7.7	--
Nov. 18-22.....	34.2	12	0.00	67	61	113	5.1	350	0	353	5.0	0.4	0.1	0.19	802	1.09	74.1	419	132	2.4	1,170	7.7	6
Nov. 23-30.....	97.1	--	--	--	--	83	--	304	0	288	--	--	--	--	683	.93	179	383	134	1.8	1,000	7.7	--
Dec. 1-11.....	130	--	--	--	--	71	--	276	0	237	--	--	--	--	645	.88	226	364	138	1.6	922	8.0	--
Dec. 12-31.....	135	--	--	--	--	80	--	352	0	294	--	--	--	--	791	1.08	288	464	175	1.6	1,110	7.9	--
Jan. 1-8, 1962..	177	--	--	--	--	54	--	272	0	187	--	--	--	--	536	.73	256	328	105	1.3	815	7.7	--
Jan. 9-22.....	110	--	--	--	--	64	--	350	0	252	--	--	--	--	693	.94	206	432	145	1.3	994	8.1	--
Jan. 23-31.....	141	--	--	--	--	61	--	288	0	256	--	--	--	--	634	.86	241	384	148	1.4	917	7.6	--
Feb. 1-12.....	228	--	--	--	--	25	--	136	0	76	--	--	--	--	255	.35	157	135	23	.9	393	7.2	--
Feb. 13-24.....	258	--	--	--	--	34	--	204	0	143	--	--	--	--	404	.55	281	242	75	1.0	607	7.5	--
Feb. 25-Mar. 10.	379	--	--	--	--	57	--	331	0	254	--	--	--	--	662	.90	677	431	160	1.2	951	7.9	--
Mar. 11-18.....	441	7.7	.00	72	47	48	5.5	290	0	214	10	.3	1.0	.11	569	.77	678	374	136	1.1	843	7.9	10
Mar. 19-31.....	810	--	--	--	--	38	--	227	0	159	--	--	--	--	439	.60	960	278	92	1.0	677	7.6	--
Apr. 1-12.....	680	--	--	--	--	42	--	266	0	190	--	--	--	--	516	.70	947	337	119	1.0	786	7.8	--
Apr. 13-24.....	460	--	--	--	--	50	--	273	0	215	--	--	--	--	557	.76	692	351	127	1.2	832	7.7	--
Apr. 25-May 8...	691	--	--	--	--	33	--	234	0	160	--	--	--	--	446	.61	832	295	103	.8	694	7.7	--
May 9-28.....	822	--	--	--	--	32	--	196	0	113	--	--	--	--	342	.47	759	215	54	.9	532	7.7	--
May 29-June 7...	1,171	--	--	--	--	32	--	171	0	89	--	--	--	--	280	.38	885	165	25	1.1	458	7.3	--

June 8-11, 1962.	1,410	7.7	.05	36	18	19	2.2	158	0	68	.0	.1	.3	.04	259	.35	986	164	34	.6	392	7.3	6
June 12-30.....	2,716	--	--	--	--	30	--	172	0	87	--	--	--	--	289	.39	2,120	170	29	1.0	456	7.2	--
July 1-18.....	558	--	--	--	--	40	--	192	0	121	--	--	--	--	347	.47	523	201	44	1.2	544	7.2	--
July 19-30.....	216	--	--	--	--	46	--	221	0	152	--	--	--	--	415	.56	242	247	66	1.3	639	7.4	--
July 31-Aug. 5..	43.8	--	--	--	--	129	--	369	0	349	--	--	--	--	829	1.13	98	396	94	2.8	1,180	8.0	--
Aug. 6-15.....	173	--	--	--	--	48	--	235	0	164	--	--	--	--	442	.60	206	266	73	1.3	683	7.7	--
Aug. 16-31.....	134	--	--	--	--	59	--	258	0	174	--	--	--	--	504	.68	182	296	84	1.5	763	7.8	--
Sept. 1-30.....	223	11	.01	58	38	50	4.5	242	0	192	3.1	.3	.4	.11	501	.68	302	299	101	1.3	743	7.3	7
Weighted average.....	467		--	--	--	39	--	213	0	138	--	--	--	--	397	0.54	501	242	68	1.1	608	7.4	--
Time-weighted average.....	--	--	--	--	--	54	--	256	0	195	--	--	--	--	518	--	--	308	98	1.3	771	7.6	--
Tons per day..	--	--	--	--	--	49.0	--	269	0	174	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-3265. 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.
DRAINAGE AREA.--13,189 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1962.
Water temperatures: February 1951 to May 1954, October 1954 to September 1962.
Sediment records: March 1950 to September 1953.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 2,560 ppm Dec. 12 to Jan. 2; minimum, 524 ppm May 12-15.
Hardness: Maximum, 997 ppm Sept. 1-8; minimum, 227 ppm July 14.
Specific conductance: Maximum daily, 3,320 micromhos Dec. 16; minimum daily, 578 micromhos Feb. 1.
Water temperature: Maximum, 81°F Aug. 11, 12; minimum, freezing point on many days during November to March.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 5,430 ppm Dec. 15-17, 1955; minimum, 278 ppm Mar. 29, 1952.
Hardness: Maximum, 2,120 ppm Dec. 15-17, 1955; minimum, 47 ppm July 9-12, 1961.
Specific conductance: Maximum daily, 9,270 micromhos Dec. 16, 1955; minimum daily, 317 micromhos July 5, 1961.
Water temperatures: Maximum (1951-53, 1954-62), 86°F July 26, 1959, July 28, Aug. 15, 1960; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-23, 1961.	115	--	--	177	57	230	--	234	0	860	--	--	--	--	1,590	2.16	494	676	484	3.9	1,980	7.8	--
Oct. 24-Nov. 10.	113	--	--	--	--	213	--	238	0	725	--	--	--	--	1,450	1.97	442	638	443	3.7	1,870	7.5	--
Nov. 11-30.....	81.8	8.2	0.01	181	79	300	7.4	256	0	963	137	0.6	2.1	0.25	1,930	2.62	426	775	565	4.7	2,440	7.6	15
Dec. 1-11.....	100	--	--	--	--	233	--	262	0	850	--	--	--	--	1,770	2.41	478	760	545	3.7	2,140	7.9	--
Dec. 12-Jan. 2, 1962.....	23.1	--	--	--	--	379	--	280	0	1,280	--	--	--	--	2,560	3.48	160	956	726	5.3	3,040	7.8	--
Jan. 3.....	35	--	--	9.5	13	96	--	131	5	335	--	--	--	--	--	--	--	293	177	--	952	8.3	--
Jan. 4-25.....	22.0	--	--	--	--	313	--	331	0	1,290	--	--	--	--	2,280	3.10	135	904	633	4.5	2,710	7.7	--
Jan. 26-31.....	69.2	--	--	--	--	218	--	302	0	810	--	--	--	--	1,660	2.26	310	726	478	3.5	2,060	7.6	--
Feb. 1-9.....	88.9	--	--	--	--	87	--	176	0	261	--	--	--	--	590	.80	142	244	100	2.4	878	7.5	--
Feb. 10-22.....	2,862	--	--	--	--	90	--	171	0	415	--	--	--	--	851	1.16	6,580	398	258	2.0	1,110	7.4	--
Feb. 23-Mar. 3..	137	--	--	--	--	200	--	203	0	742	--	--	--	--	1,470	2.00	544	652	486	3.4	1,860	7.7	--
Mar. 4-19.....	332	--	--	--	--	214	--	223	0	820	--	--	--	--	1,600	2.18	1,430	699	516	3.5	2,020	7.7	--
Mar. 20-24.....	2,092	7.3	.00	85	29	100	6.1	153	0	352	33	.3	1.4	.10	734	1.00	4,150	332	207	2.4	1,040	7.7	25
Mar. 25-Apr. 3..	1,319	--	--	--	--	162	--	213	0	592	--	--	--	--	1,200	1.63	4,270	533	358	3.0	1,580	7.5	--
Apr. 4-14.....	620	--	--	--	--	208	--	232	0	746	--	--	--	--	1,470	2.00	2,460	625	435	3.6	1,890	7.7	--
Apr. 15-20.....	423	--	--	--	--	239	--	262	0	820	--	--	--	--	1,670	2.27	1,910	711	496	3.9	2,110	7.8	--
Apr. 21-25.....	644	--	--	--	--	195	--	206	0	694	--	--	--	--	1,390	1.89	2,420	607	438	3.4	1,810	7.5	--
Apr. 26-May 11..	1,023	--	--	--	--	87	--	184	0	324	--	--	--	--	706	.96	1,950	348	197	2.0	1,000	7.6	--

May 12-15, 1962.	1,051	11	.02	67	21	69	3.6	162	0	224	21	.3	1.1	.10	524	.71	1,490	254	121	1.9	764	7.5	22
May 16-23.....	724	--	--	--	--	100	--	201	0	312	--	--	--	--	679	.92	1,330	292	127	2.6	979	7.6	--
May 24-31.....	6,301	--	--	--	--	184	--	184	0	950	--	--	--	--	1,770	2.41	30,110	841	690	2.8	2,100	7.4	--
June 1-9.....	4,111	12	.01	222	62	187	9.0	207	0	938	32	.4	3.6	.19	1,690	2.30	18,760	810	646	2.9	2,020	7.3	22
June 10-13.....	2,742	--	--	--	--	177	--	195	0	735	--	--	--	--	1,360	1.85	10,070	624	464	3.1	1,720	7.4	--
June 14-17.....	4,248	--	--	--	--	103	--	189	0	533	--	--	--	--	1,020	1.39	11,700	532	377	1.9	1,320	7.5	--
June 18-29.....	5,712	--	--	--	--	137	--	172	0	743	--	--	--	--	1,350	1.84	20,820	683	542	2.3	1,650	7.1	--
June 30-July 13.	1,570	--	--	--	--	140	--	187	0	625	--	--	--	--	1,170	1.59	4,960	564	411	2.6	1,500	7.2	--
July 14.....	3,620	--	--	--	--	93	--	196	0	249	10	--	--	--	--	--	--	227	66	2.7	819	7.7	--
July 15-22.....	4,088	--	--	--	--	108	--	176	0	725	--	--	--	--	1,290	1.75	14,240	701	557	1.8	1,560	7.4	--
July 23-31.....	658	--	--	--	--	245	--	212	0	1,040	--	--	--	--	1,860	2.53	3,300	830	656	3.7	2,230	7.5	--
Aug. 1-13.....	673	--	--	--	--	217	--	191	0	1,040	--	--	--	--	1,870	2.54	3,400	886	729	3.2	2,200	7.6	--
Aug. 14-31.....	247	11	.01	264	77	280	10	212	0	1,230	66	.5	1.6	.21	2,170	2.94	1,450	976	802	3.9	2,620	7.5	28
Sept. 1-8.....	139	--	--	--	--	342	--	196	0	1,340	--	--	--	--	2,400	3.26	901	997	836	4.7	2,870	7.7	--
Sept. 9-26.....	156	--	--	--	--	300	--	206	0	1,120	--	--	--	--	2,090	2.84	880	865	696	4.4	2,560	7.6	--
Sept. 27-30.....	647	--	--	--	--	293	--	250	0	1,070	--	--	--	--	2,010	2.73	3,510	856	651	4.4	2,500	7.5	--
Weighted average.....	1,051	--	--	--	--	151	--	188	0	716	--	--	--	--	1,350	1.84	3,830	643	489	2.6	1,660	7.3	--
Time-weighted average.....	--	--	--	--	--	216	--	222	0	845	--	--	--	--	1,620	--	--	699	517	3.5	2,000	7.5	--
Tons per day..	--	--	--	--	--	429	--	535	0	2,030	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

YELLOWSTONE RIVER BASIN--Continued

6-3295. YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At bridge on State Highway 23, 2 miles south of Sidney, Richland County, 4.5 miles downstream from gaging station, 2 miles downstream from Fox Creek, and 30 miles upstream from mouth.
DRAINAGE AREA.--69,103 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1962.
Water temperatures: January 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 775 ppm Dec. 17-27; minimum, 260 ppm June 25 to July 14.
Hardness: Maximum, 384 ppm Dec. 17-27; minimum, 150 ppm June 25 to July 14.
Specific conductance: Maximum daily, 1,180 micromhos Dec. 22-24; minimum daily, 332 micromhos July 2.
Water temperatures: Maximum, 76°F Aug. 3, 17; minimum, freezing point on many days during November to March.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 1,370 ppm Jan. 2-3, 1954; minimum, 173 ppm June 5-16, 1956.
Hardness: Maximum, 649 ppm Jan. 2-3, 1954; minimum, 102 ppm June 5-16, 1956.
Specific conductance: Maximum daily, 2,780 micromhos Jan. 14, 1951; minimum daily, 257 micromhos June 15, 1956.
Water temperatures: Maximum, 84°F July 23, 1960; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-21, 1961.	8,817	--	--	73	22	78	--	206	0	262	--	--	--	--	576	0.78	13,710	273	104	2.0	843	7.8	--
Oct. 22-31.....	8,717	--	--	68	20	70	--	193	0	234	--	--	--	--	524	.71	12,330	252	94	1.9	770	7.7	--
Nov. 1-19.....	8,321	--	--	--	--	75	--	194	0	252	--	--	--	--	544	.74	12,220	265	106	2.0	816	7.6	--
Nov. 20-30.....	7,022	--	--	--	--	79	--	209	0	236	--	--	--	--	582	.79	11,030	283	112	2.0	859	7.6	--
Dec. 1-16.....	4,250	--	--	--	--	78	--	220	0	240	--	--	--	--	615	.84	7,060	296	116	2.0	856	7.8	--
Dec. 17-27.....	4,391	17	0.07	84	42	99	3.7	292	0	328	16	0.6	1.5	0.26	775	1.05	9,190	384	145	2.2	1,100	7.9	5
Dec. 28-Jan. 14, 1962.....	6,372	--	--	--	--	71	--	221	0	229	--	--	--	--	560	.76	9,630	288	107	1.8	813	7.7	--
Jan. 15-19.....	2,960	--	--	--	--	78	--	226	0	248	--	--	--	--	595	.81	4,760	292	107	2.0	843	7.9	--
Jan. 20-31.....	3,892	--	--	--	--	87	--	224	0	287	--	--	--	--	662	.90	6,960	316	132	2.1	942	7.8	--
Feb. 1-6.....	7,717	--	--	--	--	73	--	216	0	231	--	--	--	--	567	.77	11,810	286	109	1.9	844	7.5	--
Feb. 7-13.....	10,400	11	.00	53	19	53	4.1	158	0	173	8.6	.4	1.0	.13	419	.57	11,770	210	80	1.6	632	7.6	9
Feb. 14-Mar. 2..	11,660	--	--	--	--	72	--	167	0	260	--	--	--	--	576	.78	18,130	280	143	1.9	831	7.2	--
Mar. 3-15.....	5,862	--	--	--	--	91	--	240	0	313	--	--	--	--	711	.97	11,250	355	158	2.1	1,010	7.7	--
Mar. 16-31.....	17,470	--	--	--	--	66	--	173	0	217	--	--	--	--	506	.69	23,870	245	103	1.8	752	7.3	--
Apr. 1-10.....	11,060	--	--	--	--	81	--	210	0	262	--	--	--	--	609	.83	18,190	296	124	2.0	889	7.5	--
Apr. 11-23.....	9,601	--	--	--	--	87	--	210	0	394	--	--	--	--	629	.86	16,310	301	129	2.2	915	7.9	--
Apr. 24-May 10..	15,450	--	--	--	--	49	--	182	0	157	--	--	--	--	407	.55	16,980	216	67	1.5	609	7.5	--
May 11-26.....	20,480	15	.02	40	15	38	2.9	144	0	110	5.8	.3	.5	.12	315	.43	17,420	161	43	1.3	482	7.5	10
May 27-June 6...	34,010	--	--	--	--	77	--	184	0	284	--	--	--	--	604	.82	55,460	294	143	2.0	857	7.5	--

June 7-24, 1962.	47,740	--	--	--	--	43	--	177	0	150	--	--	--	--	398	.54	51,300	222	77	1.3	594	7.1	--
June 25-July 14.	38,940	--	--	--	--	27	--	133	0	87	--	--	--	--	260	.35	27,340	150	41	1.0	407	7.3	--
July 15-31.....	23,510	--	--	--	--	57	--	160	0	184	--	--	--	--	435	.59	27,610	216	85	1.7	646	7.3	--
Aug. 1-16.....	12,380	--	--	--	--	61	--	169	0	200	--	--	--	--	466	.63	15,580	234	96	1.7	692	7.4	--
Aug. 17-31.....	7,305	--	--	--	--	73	--	173	0	228	--	--	--	--	508	.69	10,020	242	100	2.1	751	7.5	--
Sept. 1-9.....	7,334	--	--	--	--	73	--	196	0	227	--	--	--	--	522	.71	10,340	253	92	2.0	781	7.5	--
Sept. 10-30.....	8,805	13	.00	62	23	72	3.7	189	0	225	11	.4	.2	.15	522	.71	12,410	248	93	2.0	767	7.8	5
Weighted average.....	14,440	--	--	--	--	57	--	175	0	193	--	--	--	--	458	0.62	17,800	233	89	1.6	677	7.4	--
Time-weighted average.....	--	--	--	--	--	68	--	191	0	225	--	--	--	--	521	--	--	258	101	1.8	763	7.5	--
Tons per day..	--	--	--	--	--	2,230	--	6,840	0	7,510	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

MISSOURI RIVER MAIN STEM

6-3300. MISSOURI RIVER NEAR WILLISTON, N. DAK.

LOCATION.--At gaging station at Lewis and Clark Highway Bridge, 5 miles southwest of Williston, Williams County, and 25 miles downstream from Yellowstone River.
DRAINAGE AREA.--164,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: May 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 771 ppm Dec. 25-31; minimum, 279 ppm July 1-15.
Hardness: Maximum, 398 ppm Dec. 25-31; minimum, 156 ppm July 1-15.
Specific conductance: Maximum daily, 1,360 micromhos Dec. 28; minimum daily, 380 micromhos July 2.
Water temperatures: Maximum, 75°F June 27, Aug. 4; minimum, freezing point on many days during November to March.
EXTREMES, 1950-62.--Dissolved solids: Maximum, 771 ppm Dec. 25-31, 1961; minimum, 199 ppm June 21-26, 1959.
Hardness: Maximum, 398 ppm Dec. 25-31, 1961; minimum, 115 ppm June 21-26, 1959.
Specific conductance: Maximum daily, 1,360 micromhos Dec. 28, 1961; minimum daily, 297 micromhos Mar. 19, 1960.
Water temperatures (1951-62): Maximum, 80°F July 21, 22, 1958; 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	21,770	--	--	--	--	55	--	194	0	--	--	--	--	--	439	0.60	25,800	242	83	1.5	692	7.2	--
Nov. 1-30.....	17,540	--	--	--	--	57	--	200	0	--	--	--	--	--	470	.64	22,260	244	80	1.6	712	7.6	--
Dec. 1-11.....	11,980	9.6	0.12	61	26	61	4.2	212	0	191	11	0.6	0.4	0.06	491	.67	15,880	258	84	1.6	736	7.4	2
Dec. 12-24.....	10,910	--	--	--	--	51	--	203	0	--	--	--	--	--	450	.61	13,260	245	79	1.4	686	7.4	--
Dec. 25-31.....	16,690	--	--	--	--	92	--	322	0	--	--	--	--	--	771	1.05	34,740	398	134	2.0	1,090	7.7	--
Jan. 1-31, 1962.	16,750	--	--	--	--	58	--	224	0	--	--	--	--	--	505	.69	22,840	273	89	1.5	763	7.3	--
Feb. 1-19.....	22,620	--	--	--	--	54	--	185	0	--	--	--	--	--	475	.65	29,010	247	95	1.5	700	7.2	--
Feb. 20-22.....	30,800	--	--	--	--	70	--	190	0	--	--	--	--	--	617	.84	51,310	304	148	1.7	871	7.2	--
Feb. 23-28.....	16,720	--	--	--	--	53	--	187	0	--	--	--	--	--	470	.64	21,220	249	96	1.5	707	7.3	--
Mar. 1-11.....	15,460	8.3	.25	67	25	56	4.7	216	0	187	11	.8	.3	.14	485	.66	20,240	268	91	1.5	734	7.3	4
Mar. 12-23.....	22,110	--	--	--	--	64	--	204	0	--	--	--	--	--	515	.70	30,740	269	102	1.7	763	7.2	--
Mar. 24.....	36,500	12	.06	58	20	59	4.7	177	0	172	24	.5	2.3	.12	464	.63	45,730	227	82	1.7	695	7.8	34
Mar. 25-31.....	37,140	--	--	--	--	52	--	158	0	--	--	--	--	--	401	.55	40,210	203	73	1.6	619	7.1	--
Apr. 1-10.....	28,650	--	--	--	--	59	--	178	0	--	--	--	--	--	443	.60	34,270	225	79	1.7	677	7.4	--
Apr. 11-19.....	24,070	--	--	--	--	62	--	197	0	--	--	--	--	--	471	.64	30,610	244	82	1.7	717	7.3	--
Apr. 20-24.....	18,660	--	--	--	--	71	--	204	0	--	--	--	--	--	517	.70	26,050	266	99	1.9	787	7.6	--
Apr. 25-30.....	23,180	--	--	--	--	56	--	174	0	--	--	--	--	--	433	.59	27,100	220	77	1.6	660	7.6	--
May 1-13.....	19,180	--	--	--	--	45	--	168	0	--	--	--	--	--	389	.53	20,140	202	64	1.4	574	7.5	--
May 14-27.....	27,130	--	--	--	--	40	--	144	0	--	--	--	--	--	320	.44	23,440	161	43	1.4	490	7.1	--
May 28-June 7...	40,430	--	--	--	--	74	--	177	0	--	--	--	--	--	586	.80	63,970	277	132	1.9	819	7.2	--

June 8-14, 1962.	40,330	--	--	--	--	49	--	158	0	--	--	--	--	--	395	.54	43,010	193	63	1.5	595	7.5	--
June 15-30.....	64,210	11	.12	49	13	38	3.5	140	0	130	5.4	.4	1.1	.08	332	.45	57,560	174	59	1.3	517	7.6	7
July 1-15.....	42,250	--	--	--	--	30	--	141	0	--	--	--	--	--	279	.38	31,830	156	40	1.0	439	8.0	--
July 16-31.....	34,920	--	--	--	--	54	--	157	0	--	--	--	--	--	412	.56	38,850	193	64	1.7	615	7.8	--
Aug. 1-31.....	16,400	--	--	--	--	58	--	174	0	--	--	--	--	--	444	.60	19,660	223	80	1.7	668	7.3	--
Sept. 1-30.....	13,020	11	.05	49	29	66	2.0	197	0	200	10	.6	.1	.16	493	.67	17,330	242	80	1.8	728	7.8	--
Weighted average.....	23,770	--	--	--	--	53	--	178	0	--	--	--	--	--	434	0.59	27,900	224	78	1.7	654	7.4	--
Time-weighted average.....	--	--	--	--	--	56	--	188	0	--	--	--	--	--	454	--	--	235	81	1.7	683	7.4	--
Tons per day..	--	--	--	--	--	3,420	--	11,420	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

MISSOURI RIVER MAIN STEM--Continued

6-3390. MISSOURI RIVER BELOW GARRISON DAM, N. DAK.

LOCATION.--Temperature recorder at gaging station, 4.3 miles north of Stanton, 5 miles upstream from Knife River, and 9 miles downstream from Garrison Dam, Mercer County.
DRAINAGE AREA.--181,400 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: June 1952 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 62°F Sept. 13, 14; minimum, 33°F on many days during December to March.
EXTREMES, 1952, 1954-62.--Water temperatures: Maximum, 76°F July 27, 28, 1954; minimum, freezing point on many days during winter months in 1955-60.

Temperature (°F) of water, water year October 1961 to September 1962
/Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph/

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	56	57	58	58	57	57	56	55	54	55	55	55	55	55	55	55	55	55	54	54	54	54	54	53	52	52	51	51	51	50	50	54
Minimum	56	56	57	57	56	56	55	54	54	54	54	55	54	54	54	55	55	54	54	54	54	54	53	52	52	51	51	51	50	50	50	54
November																																
Maximum	50	50	46	46	46	45	45	44	44	44	44	44	44	44	43	43	43	43	43	42	42	42	41	41	41	41	40	39	39	39	--	43
Minimum	50	46	46	46	45	45	44	44	44	44	44	44	43	43	43	43	43	43	42	42	42	41	41	41	41	40	39	39	39	38	--	43
December																																
Maximum	38	38	38	38	37	36	36	35	35	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	35
Minimum	38	38	38	35	36	36	35	35	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	34
January																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
February																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	--	--	--	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	--	--	--	33
March																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	34
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	34
April																																
Maximum	35	35	35	35	35	35	35	35	35	35	35	35	36	36	36	36	36	36	38	38	38	38	39	39	39	38	38	39	39	39	--	37
Minimum	35	35	35	34	35	35	35	35	35	35	35	35	35	36	35	36	36	36	36	37	38	38	38	38	38	38	38	38	38	38	--	36
May																																
Maximum	40	41	42	41	42	41	41	41	41	42	42	43	42	43	43	44	45	44	46	45	44	44	46	46	46	45	46	45	45	46	48	44
Minimum	39	39	40	40	40	41	41	41	41	41	42	42	42	42	43	43	43	43	44	44	44	44	44	44	45	45	45	45	45	45	46	43
June																																
Maximum	50	49	49	48	49	51	51	52	51	53	52	51	51	51	53	55	53	54	55	54	55	55	57	57	56	57	57	57	57	55	--	53
Minimum	48	47	47	48	48	48	50	50	50	51	51	50	50	50	51	53	51	51	52	51	51	51	52	53	53	54	54	54	54	53	--	51
July																																
Maximum	54	55	55	55	55	59	56	59	57	57	57	57	57	56	55	56	57	56	58	57	57	58	59	61	60	59	59	59	59	59	59	57
Minimum	53	53	53	53	52	53	54	54	54	55	55	55	56	54	53	53	56	55	55	54	55	56	57	57	58	56	58	57	57	56	58	55
August																																
Maximum	59	59	60	59	60	60	60	60	60	59	60	60	60	59	59	60	60	61	60	60	60	60	60	61	61	61	60	61	61	61	61	60
Minimum	56	56	56	56	56	57	58	57	57	57	58	58	57	58	57	58	58	58	57	58	58	58	58	58	59	58	58	56	60	58	59	58
September																																
Maximum	61	61	61	61	61	61	61	59	59	60	59	60	62	62	61	60	61	61	59	58	58	58	58	60	60	60	59	58	58	58	--	60
Minimum	59	58	57	59	58	59	58	58	58	58	58	58	59	60	59	59	59	59	58	56	56	57	57	58	58	58	58	57	57	56	--	58

6-3575. GRAND RIVER AT SHADEHILL, S. DAK.

LOCATION.--At irrigation outlet of Shadehill Reservoir, 0.2 mile upstream from gaging station, 0.8 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 1962.
Water temperatures: August 1954 to September 1959.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,220 ppm Mar. 1-25; minimum, 976 ppm Aug. 1-31.
Hardness: Maximum, 143 ppm Feb. 1 to Mar. 26; minimum, 116 ppm June 14-30, Sept. 1-30.
Specific conductance: Maximum daily, 1,780 micromhos Mar. 1, 2, 14, 16, 19; minimum daily, 1,440 micromhos Aug. 1, 20, 22, 23.
EXTREMES, 1954-62.--Dissolved solids (1954-58, 1959-62): Maximum, 1,220 ppm Mar. 1-25, 1962 (irrigation outlet); minimum, 510 ppm Mar. 27, 1956 (spillway outlet).
Hardness: Maximum, 167 ppm Apr. 4-7, 1955 (irrigation outlet); minimum, 100 ppm Mar. 31 to Apr. 3, 1959 (spillway outlet).
Specific conductance: Maximum daily, 1,780 micromhos Mar. 1, 2, 14, 16, 19, 1962 (irrigation outlet); minimum daily, 790 micromhos Mar. 27, 1956 (spillway outlet).
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Flow regulated by ungated spillway and by a regulated irrigation outlet.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	17.5	4.8	0.01	23	17	328	8.4	476	0	416	6.5	0.5	0.5	0.41	1,090	1.48	51.5	129	0	13	1,600	7.7	20
Nov. 1-30.....	15.7	--	--	--	--	328	--	462	12	--	--	--	--	--	1,100	1.50	46.6	130	0	13	1,630	8.4	--
Dec. 1-31.....	16.0	--	--	--	--	340	--	493	0	--	--	--	--	--	1,120	1.52	48.4	132	0	13	1,660	8.2	--
Jan. 1-31, 1962.	15.3	4.9	.01	26	16	356	8.8	514	0	450	7.5	.6	.3	.41	1,180	1.60	48.7	132	0	13	1,730	8.2	25
Feb. 1-28.....	15.1	--	--	--	--	364	--	530	0	--	--	--	--	--	1,190	1.62	48.5	143	0	13	1,760	8.1	--
Mar. 1-25.....	14.7	--	--	--	--	368	--	519	9	--	--	--	--	--	1,220	1.66	48.4	143	0	13	1,770	8.3	--
Mar. 26.....	14	3.2	.05	26	19	346	8.7	473	26	466	.0	.7	.1	.36	1,190	1.62	45.0	143	0	13	1,740	8.3	18
Mar. 27-Apr. 30.	14.9	--	--	--	--	325	--	482	0	--	--	--	--	--	1,080	1.47	43.4	129	0	12	1,610	7.9	--
May 1-17.....	15.0	--	--	--	--	340	--	477	0	--	--	--	--	--	1,080	1.47	43.7	128	0	13	1,610	8.0	--
May 18-31.....	17.2	--	--	--	--	329	--	466	0	--	--	--	--	--	1,060	1.44	49.2	123	0	13	1,570	8.0	--
June 1-12.....	18.8	--	--	--	--	321	--	447	7	--	--	--	--	--	1,020	1.39	51.8	120	0	13	1,530	8.3	--
June 13.....	20	5.2	.08	24	14	308	7.4	432	10	392	6.2	.5	1.3	.36	1,020	1.39	55.1	117	0	12	1,510	8.6	--
June 14-30.....	20.0	--	--	--	--	312	--	422	13	--	--	--	--	--	1,010	1.37	54.5	116	0	13	1,500	8.5	--
July 1-31.....	17.2	--	--	--	--	299	--	439	0	--	--	--	--	--	990	1.35	46.0	118	0	12	1,470	8.2	--
Aug. 1-31.....	35.2	--	--	--	--	300	--	433	0	--	--	--	--	--	976	1.33	92.8	118	0	12	1,450	8.1	--
Sept. 1-30.....	56.2	5.3	--	26	12	299	7.7	405	15	379	5.0	.5	.4	.38	1,010	1.37	153	116	0	12	1,450	8.7	5
Weighted average.....	21.1	--	--	--	--	321	--	456	5	--	--	--	--	--	1,060	1.44	60	125	0	12	1,560	8.2	--
Time-weighted average.....	--	--	--	--	--	329	--	471	4	--	--	--	--	--	1,080	--	--	128	0	13	1,600	8.1	--
Tons per day..	--	--	--	--	--	18.0	--	26	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

CHEYENNE RIVER BASIN

6-4005. CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.

LOCATION.--At gaging station at bridge on State Highway 87, 0.2 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 1959.
Sediment records: April 1946 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 31,000 ppm May 21; minimum daily, 5 ppm Dec. 24.
Sediment loads: Maximum daily, 560,000 tons June 17; minimum daily, less than 0.50 ton on several days during October and December.
EXTREMES, 1946-62.--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 ton on several days in 1946-47.

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	20	23	1	24	16	1	20	17	1
2	20	21	1	25	15	1	20	11	1
3	20	17	1	25	13	1	20	7	T
4	20	8	T	24	11	1	20	7	T
5	20	7	T	24	10	1	20	7	T
6	20	7	T	24	10	1	19	10	1
7	22	6	T	23	11	1	19	12	1
8	23	6	T	21	12	1	19	13	1
9	24	6	T	21	17	1	19	13	1
10	24	7	1	22	23	1	19	14	1
11	23	8	1	26	29	2	19	14	1
12	24	8	1	26	34	2	19	14	1
13	24	9	1	25	31	2	18	13	1
14	24	10	1	23	18	1	19	12	1
15	23	10	1	24	18	1	20	12	1
16	23	11	1	25	20	1	20	11	1
17	24	12	1	25	23	2	19	7	T
18	24	13	1	26	20	1	19	8	T
19	23	11	1	26	15	1	19	12	1
20	22	8	1	27	12	1	20	16	1
21	22	9	1	28	13	1	20	20	1
22	22	9	1	28	14	1	17	14	1
23	22	10	1	29	14	1	18	6	T
24	21	10	1	29	14	1	19	5	T
25	19	11	1	25	14	1	20	12	1
26	19	16	1	24	14	1	20	24	1
27	22	21	1	25	11	1	20	35	2
28	25	20	1	25	9	1	20	41	2
29	25	20	1	23	14	1	19	46	2
30	25	19	1	20	20	1	20	50	3
31	24	18	1	--	--	--	20	60	3
Total	693	--	27	742	--	34	600	--	34

T Less than 0.50 ton.

6-4005. CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1961 to September 1962--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	20	65	4	21	69	4	31	180	15
2	20	68	4	21	74	4	29	150	12
3	20	65	4	22	76	5	26	120	8
4	21	60	3	23	76	5	24	68	4
5	20	57	3	25	120	8	24	38	2
6	20	61	3	26	--	E 6	24	46	3
7	20	66	4	114	2750	S 1280	24	60	4
8	20	73	4	89	1730	420	24	71	5
9	19	87	4	68	1870	340	27	68	5
10	19	98	5	73	2910	570	26	60	4
11	20	89	5	103	3670	S 1080	26	53	4
12	20	76	4	131	9370	3300	23	45	3
13	20	65	4	251	13400	S 10500	26	43	3
14	20	56	3	335	13800	12500	30	75	A 6
15	20	55	3	343	8500	7870	44	140	16
16	20	58	3	189	2750	A 1400	49	250	A 33
17	20	62	3	161	720	310	75	350	71
18	20	66	4	87	550	A 130	77	480	100
19	20	78	4	58	400	63	84	620	140
20	20	98	5	60	250	40	494	8130	S 13000
21	20	110	6	48	180	A 23	610	6950	11400
22	18	110	5	49	170	22	694	7000	13100
23	18	100	5	45	110	A 13	410	4600	5090
24	18	89	4	43	100	12	252	2600	1770
25	18	78	4	44	100	12	162	1500	660
26	18	69	3	31	110	A 9	117	800	250
27	18	60	3	37	200	A 20	89	390	94
28	19	54	3	30	200	16	68	300	55
29	19	55	3	--	--	--	52	250	35
30	19	60	3	--	--	--	48	160	21
31	20	64	3	--	--	--	47	98	12
Total	604	--	118	2527	--	39962	3736	--	45925

	APRIL			MAY			JUNE		
1	38	92	9	14	100	A 4	1600	5380	23200
2	33	97	A 9	14	100	4	1050	3560	10100
3	28	100	B 8	14	120	5	1650	8500	37900
4	26	110	B 8	14	130	5	1240	12200	40800
5	26	120	B 8	14	130	5	1120	10200	30800
6	25	120	B 8	14	140	5	802	6050	13100
7	24	130	B 8	13	140	5	640	4370	7550
8	24	130	B 8	12	140	5	610	2200	3620
9	22	140	B 8	11	140	4	536	1910	2760
10	23	150	A 9	8	140	3	416	1500	1680
11	23	150	9	7	130	2	350	1980	S 2240
12	23	150	A 9	8	130	3	1420	12800	S 56500
13	22	150	B 9	8	120	3	1990	18900	102000
14	21	150	B 9	9	120	3	1900	15100	77500
15	20	150	B 8	16	1200	A 52	2230	13100	78900
16	19	140	B 7	13	1000	35	6180	14500	242000
17	18	140	B 7	22	320	19	11300	16800	S 560000
18	17	140	B 6	236	30900	S 22600	13200	14700	524000
19	17	140	B 6	632	22400	38200	6000	9300	151000
20	16	140	B 6	915	17100	S 45700	2960	8020	64100
21	17	130	B 6	1140	31000	95400	2240	6970	42200
22	18	130	B 6	3430	23700	219000	1690	7730	35300
23	17	130	B 6	6440	24000	417000	1410	6460	24600
24	16	130	B 6	5680	18100	278000	1220	4400	14500
25	17	120	B 6	2730	11100	81800	916	2920	7220
26	17	120	B 6	3380	13500	S 135000	903	3900	S 10600
27	17	120	B 6	7360	21500	427000	1000	4620	12500
28	17	110	B 5	11000	17100	508000	593	2310	3700
29	16	110	B 5	7990	16600	358000	450	1690	2050
30	15	100	B 4	4630	13600	170000	378	980	1000
31	--	--	--	2970	9500	76200	--	--	--
Total	632	--	215	58744	--	2872062	67994	--	2183420

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated concentration graph.
B Computed from estimated concentration graph.

CHEYENNE RIVER BASIN--Continued

6-4005. CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	337	780	710	601	5500	S 10100	24	85	6
2..	450	2050	S 2700	396	5600	5990	22	72	4
3..	283	590	450	635	5900	10100	22	70	4
4..	260	440	310	391	4000	4220	22	77	5
5..	1030	5030	S 19600	316	3050	2600	22	96	6
6..	1340	4280	15500	263	4220	3000	21	87	5
7..	846	2810	A 6420	215	3050	1770	19	86	4
8..	410	1920	A 2130	169	1450	660	19	85	4
9..	397	4770	S 6510	134	1060	380	22	82	5
10..	306	5360	S 4870	108	690	200	22	69	4
11..	238	2390	1540	81	540	120	19	41	2
12..	461	3540	4410	65	420	74	17	30	1
13..	3290	16100	S 184000	54	350	51	16	50	2
14..	4570	8450	104000	47	230	29	16	50	2
15..	2260	6900	42100	39	310	33	17	49	2
16..	1040	4240	11900	34	220	20	17	41	2
17..	795	2880	6180	31	110	11	17	18	1
18..	552	2530	3770	27	86	6	22	32	2
19..	394	1730	1840	28	90	7	22	43	3
20..	299	920	740	30	100	8	23	30	2
21..	364	4540	S 7720	26	110	8	24	22	1
22..	474	20000	S 27100	27	120	9	31	50	S 6
23..	271	9400	6880	64	380	66	30	82	7
24..	199	3300	1770	35	280	26	26	19	1
25..	156	1540	650	28	240	18	28	22	2
26..	134	870	310	27	200	15	37	39	4
27..	122	530	170	26	290	S 31	39	51	5
28..	323	3190	S 3820	52	890	S 130	32	47	4
29..	1570	20700	87700	27	210	15	32	63	5
30..	818	12700	28000	29	94	7	30	80	6
31..	514	4360	6050	25	100	7	--	--	--
Total	24503	--	589850	4030	--	39711	710	--	107

Total discharge for year (cfs-days)	165515
Total load for year (tons)	5771465

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

6-4005. CHEYENNE RIVER NEAR HOT SPRINGS, S. DAK.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Feb. 13, 1962.....	1545		--	484	20,400	26,700	57	70	87	93	96	98	99	100	--	--		VPWC
Feb. 14.....	0830		32	219	19,100	11,300	64	78	90	96	98	98	99	100	--	--		VPWC
Feb. 14.....	1700		37	427	15,700	18,100	61	74	86	94	97	97	98	100	--	--		VPWC
Mar. 20.....	1730		40	564	10,800	16,400	48	59	73	88	94	97	98	100	--	--		VPWC
Mar. 23.....	1550		--	410	4,350	4,820	68	77	85	91	92	94	96	99	100	--		VPWC
May 18.....	0815		60	293	37,300	30,600	63	79	91	97	99	100	--	--	--	--		VPWC
May 21.....	1310		57	1,160	40,800	128,000	58	69	79	86	87	88	88	89	93	98	100	SVPWC
May 24.....	0600		54	7,240	18,200	356,000	51	62	69	74	78	82	89	98	100	--		VPWC
May 26.....	1120		57	4,220	12,600	144,000	45	52	59	67	72	78	85	94	96	100		VPWC
May 28.....	0615		54	12,900	19,900	693,000	48	55	65	72	77	86	93	98	99	100		VPWC
May 28.....	1110		57	12,200	16,600	586,000	46	54	62	68	74	80	88	98	100	--		VPWC
May 29.....	0920		58	8,000	20,500	443,000	44	53	62	70	78	80	87	95	99	100		VPWC
June 1.....	1710		60	1,350	5,070	18,800	50	58	67	72	75	79	84	95	100	--		VPWC
June 14.....	1710		74	2,070	14,200	79,400	47	57	67	76	82	91	95	98	100	--		VPWC
Sept. 12.....	1000		60	20	21	1	--	--	--	--	--	--	--	--	--	--		

CHEYENNE RIVER BASIN--Continued

6-4015. CHEYENNE RIVER BELOW ANGOSTURA DAM, S. DAK.

LOCATION.--At outlet to powerplant downstream from Angostura Dam, 800 feet upstream from gaging station, 4.8 miles upstream from Fall River, and 6.5 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 1962.

Monthly and annual summary of water and suspended-sediment discharge, water year October 1961 to September 1962
/Suspended-sediment load based on infrequent samples/

Month	Discharge (cfs-days)	Runoff (acre-feet)	Suspended sediment					
			Load (tons)	Daily load (tons)			Concentration (ppm)	
				Mean	Maximum	Minimum	Weighted mean	Maximum observed
October 1961.....	38.7	77	3.1	0.10			30	
November.....	36.7	73	2.0	.07			20	
December.....	35.3	70	1.0	.03			10	
January 1962.....	35.7	71	1.1	.04			11	
February.....	33.1	66	2.7	.96			30	
March.....	36.7	73	2.0	.06			20	
April.....	26.2	52	.9	.03			13	
May.....	24,278.7	48,160	1,403.7	45.3			21	
June.....	84,051	166,700	1,053	35.1			5	
July.....	37,514	74,410	415.9	13.4			4	
August.....	1,489.0	2,950	12	.39			3	
September.....	44.0	87	.6	.02			5	
Water year.....	147,619.1	292,800	2,898.0	7.9			7	

6-4380. BELLE FOURCHE RIVER NEAR ELM SPRINGS, S. DAK.

LOCATION.--At gaging station at highway bridge, 4.2 miles northwest of Elm Springs, Meade County, and 5.5 miles downstream from Hay Creek.
DRAINAGE AREA.--7,210 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951, July 1956 to September 1962 (discontinued).

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 31, 1961	29	0.8		--	--	230	113	170	19	140	0	1,070	31	0.5	6.2	0.32	2,050	1,040	925	2.3	2,280	7.1	20
Dec. 1.....	21	4.0		0.00	--	310	167	222	17	248	0	1,600	37	.6	15	.40	2,820	1,460	1,260	2.5	2,950	7.5	--
Feb. 14, 1962	154	5.8		.14	0.62	127	55	114	13	132	0	618	17	.5	11	.15	1,100	543	435	2.1	1,590	7.6	--
Apr. 6.....	54	4.9		.15	.71	225	121	232	16	200	0	1,270	42	.6	12	.31	2,240	1,060	896	3.1	2,480	7.3	--
Apr. 27.....	19	--		--	--	213	--	173	--	103	0	--	--	--	--	--	1,890	945	861	2.4	2,160	7.4	--
May 20.....	1,980	10		.09	.27	134	41	150	16	154	0	644	13	.6	.0	.23	1,100	502	376	2.9	1,440	7.2	2
May 23.....	8,560	11		.08	.20	132	36	87	15	170	0	510	8.2	.5	.3	.23	924	478	339	1.7	1,200	7.3	4
June 14.....	246	7.7		.10	.11	203	77	190	13	161	0	1,070	27	.5	4.1	.32	1,870	824	692	2.9	2,130	7.3	7
July 11.....	158	5.9		--	--	247	120	169	16	125	0	1,300	24	.5	2.1	.32	2,070	1,110	1,010	2.2	2,280	7.3	--
Aug. 29.....	182	4.9		--	--	208	98	139	21	160	0	1,090	19	.5	2.0	.27	1,710	920	789	2.0	1,960	7.8	--
Sept. 11.....	226	5.2		.02	--	223	99	126	13	188	0	990	17	.6	3.6	.30	1,740	962	808	1.8	2,060	7.8	--

Date of collection	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cyanides as CN
Feb. 14, 1962.	0.09	0.00	0.29	0.05	0.00	0.61
Apr. 6.....	.08	.01	.01	.03	.00	.33
May 20.....	.03	.00	.48	.05	.00	.06
June 14.....	.02	.00	.05	.00	.00	.00

NIOBRARA RIVER BASIN

6-4655. NIOBRARA RIVER NEAR VERDEL, NEBR.

LOCATION.--Temperature recorder at gaging station at Pishelville bridge, 6 miles south of Verdel, Knox County, and 7 miles upstream from Verdigre Creek.
DRAINAGE AREA.--10,900 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: June 1958 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 90°F July 7, 10; minimum, freezing point on many days during November, December, and March.
EXTREMES, 1958-62.--Water temperatures: Maximum, 99°F July 11, 1960; minimum, freezing point on many days during winter months each year.
REMARKS.--Recorder stopped Dec. 27 to Mar. 15; range in temperature not determined.

Temperature (°F) of water, water year October 1961 to September 1962
/Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph/

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	62	65	66	65	68	67	65	57	52	57	63	63	61	59	61	68	65	58	58	55	59	56	56	56	51	50	50	50	49	48	49	58
Minimum	46	48	50	50	52	55	54	47	47	51	50	52	50	54	51	53	54	51	46	45	48	54	50	50	47	46	48	49	48	46	46	50
November																																
Maximum	54	53	43	38	36	38	39	40	43	43	47	41	41	37	36	36	35	35	34	35	34	35	36	38	39	39	37	37	38	39	--	39
Minimum	47	38	38	36	36	34	36	39	39	37	38	39	35	34	32	32	32	32	32	32	32	32	33	33	35	37	33	34	36	34	--	35
December																																
Maximum	38	39	39	38	35	36	37	37	38	37	33	34	35	33	33	32	33	33	34	34	35	35	36	33	33	32	--	--	--	--	--	35
Minimum	34	34	37	32	34	32	32	32	34	33	33	32	32	32	32	32	32	32	33	32	33	33	33	32	32	32	--	--	--	--	--	33
March																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34	35	35	34	34	35	34	34	34	34	34	34	34	36	37	39	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33	33	33	32	33	33	34	34	34	33	32	32	33	34	34	34	--
April																																
Maximum	38	44	50	54	57	57	50	45	52	48	46	47	52	57	55	59	65	68	62	65	72	66	69	72	74	77	66	63	55	64	--	58
Minimum	33	34	37	43	44	48	45	38	39	44	43	40	41	44	42	42	46	50	50	48	57	51	51	52	56	58	54	51	51	49	--	46
May																																
Maximum	73	77	78	79	74	67	73	74	70	68	74	78	82	78	85	74	79	70	70	75	75	79	67	72	69	60	60	65	65	70	72	73
Minimum	51	55	59	61	62	58	56	61	57	63	61	65	67	68	66	68	64	66	62	63	66	65	61	59	60	56	58	59	62	61	63	61
June																																
Maximum	65	59	57	71	72	73	68	66	74	79	82	77	74	71	74	84	77	81	83	82	85	76	76	79	81	81	80	83	86	77	--	76
Minimum	59	57	56	56	63	64	66	63	61	67	68	69	66	68	67	70	69	69	73	72	71	72	67	66	72	70	70	70	73	70	--	67
July																																
Maximum	80	82	86	81	84	85	90	82	82	90	86	83	78	72	72	73	74	72	71	74	76	74	70	76	73	65	64	67	62	65	65	76
Minimum	68	72	76	75	74	74	76	72	71	72	71	74	69	67	67	66	64	68	69	70	70	70	62	62	62	59	61	57	56	58	58	67
August																																
Maximum	80	81	76	75	77	76	79	80	78	76	75	73	72	73	76	76	72	77	83	82	81	79	75	72	76	74	73	71	70	69	71	76
Minimum	58	73	70	75	73	73	69	72	73	73	71	68	67	69	72	69	65	64	70	72	72	71	69	66	63	66	69	66	65	64	62	69
September																																
Maximum	73	75	73	67	67	65	66	65	60	56	60	62	62	62	63	63	63	63	62	60	60	--	--	--	--	--	--	--	--	--	--	--
Minimum	61	69	66	63	57	58	62	60	55	53	56	60	61	59	60	63	63	61	60	56	55	--	--	--	--	--	--	--	--	--	--	--

JAMES RIVER BASIN

6-4690. JAMESTOWN RESERVOIR NEAR JAMESTOWN, N. DAK.

LOCATION.--At gaging station, 800 feet north of glory hole on west end of Jamestown Dam on James River, 1.9 miles north of Jamestown Post Office, Stutsman County, and 4 miles upstream from Pipestem Creek.
DRAINAGE AREA.--1,670 square miles, approximately, of which about 460 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Lake content (acre-feet)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 26, 1961	22,130	12		0.00	1.2	47	32	103	19	404	0	100	33	0.3	1.9	0.20	589	250	0	2.8	907	7.2	30
Dec. 11.....	21,650	7.7		.06	1.4	51	27	100	18	383	0	92	32	.3	5.1	.19	553	238	0	2.8	876	7.5	12
Jan. 9, 1962.	21,430	8.7		.11	1.1	53	35	117	19	454	0	122	36	.4	.1	.20	654	276	0	3.1	1,010	7.8	10
Jan. 22.....	21,380	9.4		.13	1.4	56	36	120	20	462	0	125	38	.4	1.9	.23	677	286	0	3.1	1,050	7.8	14
Feb. 26.....	21,190	10		.05	1.6	55	40	136	24	488	0	131	46	.4	11	.23	742	300	0	3.4	1,130	7.5	--
Mar. 20.....	21,190	6.4		.06	.73	35	23	76	15	284	0	84	25	.3	8.6	.14	445	184	0	2.4	692	7.8	--
Apr. 27.....	22,990	10		.04	1.5	49	34	111	19	430	0	113	36	.4	.2	.17	632	264	0	3.0	966	7.6	14
May 25.....	23,750	9.2		.04	.80	49	31	103	17	401	0	111	31	.3	1.7	.19	591	249	0	2.8	916	7.7	11
June 10.....	24,180	1.2		.01	.11	35	30	97	17	350	0	102	31	.2	.7	.19	522	209	0	2.9	822	8.1	9
June 11.....	24,040	.4		.05	.72	39	31	96	17	362	0	102	30	.1	1.2	.17	538	223	0	2.8	836	7.4	--
July 10.....	25,760	4.9		.04	1.0	42	29	93	17	368	0	98	31	.0	.9	.19	525	224	0	2.7	826	7.9	13
Aug. 28.....	27,280	11		.05	2.6	44	28	94	18	358	8	90	32	.2	.2	.15	540	224	0	2.7	815	8.3	15
Sept. 6.....	26,760	11		.03	1.6	42	27	86	17	364	0	90	28	.3	.6	.19	515	218	0	2.5	800	7.8	12

JAMES RIVER BASIN--Continued

6-4705. JAMES RIVER AT LA MOURE, N. DAK.

LOCATION.--At gaging station, downstream from bridge on State Highway 13, 0.5 mile west of La Moure, La Moure County, and 12 miles upstream from Cottonwood Creek.
DRAINAGE AREA.--5,740 square miles, approximately, of which about 2,800 square miles is probably noncontributing.
RECORDS AVAILABLE.--Water temperatures: June 1953 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 82°F Aug. 5, 6; minimum, freezing point on many days during January to April.
EXTREMES, 1953-62.--Water temperatures: Maximum, 91°F July 12, 13, 1957; minimum, freezing point on many days during winter months.

Chemical analyses, in parts per million, April to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Apr. 7, 1962.	334	8.5		0.33	--	23	6.7	15	8.7	91	0	39	6.2	0.1	3.2	0.07	176	85	10	0.1	271	6.9	45
June 9.....	96	20		.06	0.00	72	35	91	9.4	315	22	186	39	.2	.7	.24	629	322	27	2.2	959	8.4	
July 24.....	1,380	18		.24	--	29	12	14	8.0	144	0	32	3.7	.0	1.8	.07	203	122	4	.6	312	7.8	
Sept. 5.....	66	18		.05	.50	75	33	71	9.6	359	0	143	31	.1	.4	.23	581	324	30	1.7	884	7.3	

6-4705. JAMES RIVER AT LA MOURE, N. DAK.--Continued

Temperature (°F) of water, water year October 1961 to September 1962
/Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph/

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

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JAMES RIVER BASIN--Continued

6-4710. JAMES RIVER AT COLUMBIA, S. DAK.

LOCATION.--At bridge on county road, 3.5 miles north of Columbia, Brown County, about 5 miles upstream from gaging station, and 0.1 mile downstream from Columbia Road Reservoir.
DRAINAGE AREA.--7,050 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952, November 1954 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Nov. 7, 1961.	1.4	32		0.08	--	102	67	175	19	597	0	277	90	0.5	0.4	0.52	1,140	532	42	3.3	1,610	7.4	
Dec. 5.....	.2	--		--	--	135	77	230	--	704	0	352	120	--	--	--	1,410	654	77	3.9	2,010	7.7	
Mar. 29, 1962	75	--		--	--	28	20	50	--	164	0	90	30	--	--	--	350	152	18	1.8	543	7.1	
Apr. 12.....	575	20		.09	--	75	59	161	14	402	22	276	88	.4	4.8	.35	958	429	62	3.4	1,400	8.5	
May 1.....	158	5.1		.08	0.00	42	24	64	11	235	0	107	37	.3	.2	.17	434	202	9	2.0	691	7.3	28
June 8.....	363	--		--	--	37	24	60	--	244	0	85	30	--	--	--	394	190	0	1.9	638	7.8	
July 12.....	600	--		--	--	33	12	28	--	154	0	55	16	--	--	--	266	133	7	1.1	408	7.2	
Sept. 5.....	560	22		.03	.21	46	25	42	11	282	0	55	20	.2	1.2	.16	376	218	0	1.2	595	7.8	
Sept. 19.....	11	--		--	--	76	32	71	--	412	0	89	38	--	--	--	570	323	0	1.7	881	7.5	

6-4760. JAMES RIVER AT HURON, S. DAK.

LOCATION.--Just upstream from Chicago and North Western Railway Co. bridge, 135 feet upstream from gaging station, 150 feet upstream from city dam at Huron, Beadle County, and 300 feet upstream from bridge on U.S. Highway 14.
DRAINAGE AREA.--16,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1951, August 1956 to September 1962.
Water temperatures: August 1956 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,590 ppm Feb. 23-28; minimum, 153 ppm Mar. 27-29.
Hardness: Maximum, 672 ppm Feb. 23-28; minimum, 66 ppm Apr. 2-7.
Specific conductance: Maximum daily, 2,530 micromhos Feb. 24; minimum daily, 202 micromhos Mar. 27.
Water temperatures: Maximum, 80°F Aug. 8, 9; minimum, freezing point Dec. 9, 15, Mar. 31.
EXTREMES, 1956-62.--Dissolved solids (1956-58, 1959-62): Maximum, 1,790 ppm Feb. 28 to Mar. 1, 1961; minimum, 147 ppm Apr. 5-7, 1960.
Hardness: Maximum, 892 ppm Feb. 28 to Mar. 1, 1961; minimum, 63 ppm Apr. 1-4, 1960.
Specific conductance: Maximum daily, 2,640 micromhos Mar. 1, 1959; minimum daily, 176 micromhos Mar. 30, Apr. 2, 1960.
Water temperatures: Maximum, 83°F July 17, 1957, June 30, 1961; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. During some periods, all flow is diverted from the channel near the sampling site and, therefore, does not pass the gaging station.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-11, 1961a	--	--	--	--	--	286	--	343	0	347	--	--	--	--	1,220	1.66	--	320	39	7.0	1,880	7.5	--
Oct. 12-20, 22-26, 28-30.....	23.7	5.9	0.12	50	46	256	20	290	0	412	158	0.4	2.7	0.66	1,130	1.54	72.3	313	75	6.3	1,730	7.3	15
Nov. 2, 3, 12...	10.8	8.6	--	57	45	212	18	261	0	412	119	.3	.8	.61	1,030	1.40	30.0	327	113	5.1	1,550	7.6	--
Nov. 4-11, 13-30 a.....	--	--	--	--	--	145	--	210	0	311	--	--	--	--	794	1.08	--	275	103	3.8	1,210	7.3	--
Dec. 1-31 a.....	--	--	--	--	--	118	--	214	0	282	--	--	--	--	703	.96	--	275	100	3.1	1,060	7.4	--
Jan. 1-31, 1962a	--	--	--	--	--	145	--	304	0	362	--	--	--	--	923	1.26	--	382	133	3.2	1,350	7.9	--
Feb. 1-22 a.....	--	--	--	--	--	214	--	414	0	495	--	--	--	--	1,290	1.75	--	516	177	4.1	1,860	7.5	--
Feb. 23-28.....	17.5	13	.05	143	77	268	23	498	0	645	141	.4	5.9	.74	1,590	2.16	75.1	672	264	4.5	2,260	7.2	22
Mar. 1-23.....	5.7	--	--	--	--	121	--	304	0	339	--	--	--	--	892	1.21	13.7	416	167	2.6	1,280	7.2	--
Mar. 24-26.....	275	--	--	--	--	65	--	172	0	180	--	--	--	--	492	.67	365	228	87	1.9	758	7.3	--
Mar. 27-29.....	2,067	--	--	--	--	11	--	68	0	43	--	--	--	--	153	.21	854	77	21	.5	247	7.0	--
Mar. 30-31.....	4,300	--	--	--	--	23	--	72	0	48	--	--	--	--	182	.25	2,110	72	13	1.2	287	6.9	--
Apr. 1.....	5,500	7.0	--	19	7.9	33	11	73	0	73	14	.3	5.9	.10	224	.30	3,330	80	20	1.6	362	7.4	--
Apr. 2-7.....	5,357	--	--	--	--	21	--	65	0	50	--	--	--	--	168	.23	2,430	66	13	1.1	270	6.8	--
Apr. 8-11.....	2,688	--	--	--	--	19	--	74	0	53	--	--	--	--	182	.25	1,320	78	17	.9	279	7.0	--
Apr. 12-15.....	1,472	--	--	--	--	23	--	87	0	69	--	--	--	--	222	.30	882	100	29	1.0	339	7.0	--
Apr. 16-30.....	778	--	--	--	--	38	--	127	0	97	--	--	--	--	310	.42	651	138	34	1.4	480	7.2	--
May 1-21.....	660	--	--	--	--	73	--	235	0	148	--	--	--	--	497	.68	886	231	38	2.1	776	7.7	--
May 22-31.....	1,715	--	--	--	--	52	--	168	0	133	--	--	--	--	400	.54	1,850	185	47	1.7	618	7.5	--
June 1-30.....	1,380	--	--	--	--	60	--	206	0	151	--	--	--	--	456	.62	1,700	215	46	1.8	707	7.4	--

a Not included in weighted average.

JAMES RIVER BASIN--Continued

6-4760. JAMES RIVER AT HURON, S. DAK.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
July 1-14, 1962.	973	--	--	--	--	75	--	264	0	145	--	--	--	--	522	0.71	1,370	238	22	2.1	791	7.4	--
July 15.....	938	24	0.07	51	28	85	15	279	0	146	42	0.2	1.7	0.06	558	.76	1,410	241	12	2.4	832	7.7	--
July 16-31.....	748	--	--	--	--	75	--	285	0	127	--	--	--	--	524	.71	1,060	241	7	2.1	798	7.4	--
Aug. 1-31.....	728	--	--	--	--	65	--	311	0	91	--	--	--	--	491	.67	965	241	0	1.8	732	7.6	--
Sept. 1-29.....	750	--	--	--	--	57	--	326	0	66	--	--	--	--	443	.60	897	244	0	1.6	688	7.5	--
Sept. 30.....	652	27	.13	51	27	55	13	316	0	64	26	.2	.4	.19	436	.59	768	240	0	1.5	671	7.7	--
Weighted average.....	b 620	--	--	--	--	50	--	190	0	102	--	--	--	--	375	0.51	953	175	23	1.6	578	7.2	--
Tons per day..	--	--	--	--	--	127	--	483	0	259	--	--	--	--	--	--	--	--	--	--	--	--	--

b Mean discharge based on 365 days; mean discharge for 240 days of actual flow, 942 cfs.

Temperature (°F) of water, water year October 1961 to September 1962

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

JAMES RIVER BASIN--Continued

6-4785. JAMES RIVER NEAR SCOTLAND, S. DAK.

LOCATION.--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.--Chemical analyses: August 1956 to September 1962.
Water temperatures: January 1953 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 84°F July 5, 6; minimum, freezing point on many days during December to March.
EXTREMES, 1953-62.--Water temperatures: Maximum, 90°F Aug. 1, 2, 1957; minimum, freezing point on many days during winter months.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Nov. 3, 1961.	46.1	15		0.04		148	54	144	17	280	0	552	62	0.5	0.7	0.50	1,210	593	363	2.6	1,540	7.9	--
Nov. 29.....	29.2	--		--		--	--	137	--	220	0	--	--	--	--	--	1,230	593	413	2.4	1,570	8.1	--
Dec. 27.....	16.6	--		--		194	80	196	--	320	0	760	80	--	--	--	1,660	814	552	3.0	2,090	7.4	--
Feb. 7, 1962.	38.7	--		.04		264	100	244	--	431	0	944	180	--	--	--	2,220	1,070	717	3.2	2,700	7.6	--
Mar. 8.....	26.6	--		--		192	72	156	--	345	0	658	82	--	--	--	1,510	773	490	2.4	1,870	7.1	--
Apr. 2.....	10,500	6.1		.25		29	6.0	7.8	9.0	79	0	45	4.2	.0	4.8	.04	167	97	32	.3	268	6.8	23
May 8.....	978	--		--		--	--	63	--	208	0	--	--	--	--	--	556	288	117	1.6	828	7.4	--
May 22.....	2,380	12		.08		60	21	33	11	157	0	168	14	.3	1.9	.18	424	237	108	.9	637	7.2	27
June 5.....	7,020	--		--		46	16	28	--	155	0	106	11	.2	1.5	--	323	182	55	.9	498	7.5	--
June 26.....	5,320	--		.01		56	21	38	--	203	0	128	15	--	--	--	407	227	61	1.1	612	7.9	--
Aug. 15.....	1,960	--		--		72	28	46	--	217	0	188	19	--	--	--	518	293	115	1.2	747	7.6	--
Aug. 29.....	849	--		--		--	--	79	--	332	0	--	--	--	--	--	625	327	55	1.9	945	7.8	--
Sept. 2.....	904	--		--	0.01	77	38	80	--	352	0	180	42	--	--	--	662	348	59	1.9	1,080	7.5	--

JAMES RIVER BASIN--Continued

6-4785. JAMES RIVER NEAR SCOTLAND, S. DAK.--Continued

Temperature (°F) of water, water year October 1961 to September 1962
[Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph]

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	55	54	53	53	54	55	56	56	56	54	54	53	54	54	54	54	54	54	52	50	49	49	49	47	47	45	43	44	44	44	44	51
Minimum	53	53	53	53	53	54	55	56	54	54	53	53	53	54	54	54	54	52	50	48	48	49	46	46	45	43	42	43	44	44	44	50
November																																
Maximum	45	46	40	38	36	37	35	36	35	36	36	38	39	38	37	35	35	35	35	35	35	35	35	36	36	36	36	36	36	36	--	37
Minimum	44	40	38	36	34	34	34	35	35	35	36	36	38	37	35	35	35	35	35	35	34	35	35	35	35	36	36	35	35	35	--	36
December																																
Maximum	38	38	38	38	37	37	37	37	37	37	37	36	37	36	36	35	35	35	35	35	35	35	34	34	34	34	35	33	33	33	33	36
Minimum	36	38	36	37	37	36	36	37	36	36	36	36	36	36	35	35	35	34	34	35	35	34	34	34	34	34	32	32	32	32	32	35
January																																
Maximum	32	32	32	32	32	33	32	32	32	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	32
March																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	33	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	32
April																																
Maximum	33	33	33	35	36	38	39	39	39	39	39	39	39	39	39	39	41	43	45	46	47	47	47	49	50	54	54	50	48	50	--	42
Minimum	33	33	33	33	35	36	38	39	39	39	39	39	39	39	39	39	39	41	43	45	45	47	47	47	48	50	50	48	47	47	--	41
May																																
Maximum	51	52	52	--	--	63	63	63	63	63	63	63	69	69	66	65	68	69	69	69	68	67	67	67	66	67	66	64	64	63	65	64
Minimum	49	51	50	--	--	63	62	62	63	63	63	63	63	66	64	64	65	68	69	68	67	67	67	66	66	66	64	64	63	63	63	63
June																																
Maximum	65	65	66	65	65	66	68	68	70	70	73	74	74	74	76	76	76	76	77	76	77	77	79	79	73	81	83	80	78	76	--	73
Minimum	65	65	65	65	65	65	66	68	68	70	70	73	74	74	74	76	76	76	76	76	76	77	77	71	71	73	75	78	76	76	--	72
July																																
Maximum	80	76	76	80	84	84	80	83	82	79	78	83	82	80	76	73	73	73	73	73	78	79	78	76	75	74	72	70	69	73	73	77
Minimum	76	75	75	75	78	79	77	78	78	77	77	78	80	76	73	70	71	72	73	72	72	77	76	75	74	72	70	68	68	69	71	74
August																																
Maximum	74	74	74	76	78	79	80	80	80	79	78	76	75	76	77	76	76	74	75	77	78	78	78	78	76	75	76	76	75	75	71	76
Minimum	72	73	73	74	76	77	78	78	75	76	76	75	74	74	75	74	74	72	73	75	76	77	77	76	74	73	74	75	73	71	69	74
September																																
Maximum	71	72	72	69	66	65	67	67	67	64	64	67	68	68	69	70	70	70	70	68	66	65	64	64	64	64	64	64	63	61	--	67
Minimum	70	70	69	66	64	64	64	67	64	62	62	64	67	67	67	69	69	66	68	66	65	64	63	63	64	64	64	63	61	58	--	65

LITTLE SIOUX RIVER BASIN

6-6066. LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA

LOCATION.--At gaging station at bridge on State Highway 31, 0.2 mile upstream from Bacon Creek, 0.5 mile west of Correctionville, Woodbury County, and 0.8 mile downstream from Pierson Creek.
DRAINAGE AREA.--2,500 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1954 to June 1955.
Water temperatures: May 1951 to September 1962 (discontinued).
Sediment records: May 1950 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 80°F July 8; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 3,620 ppm June 29; minimum daily, 10 ppm Jan. 17.
Sediment loads: Maximum daily, 72,900 tons Mar. 28; minimum daily, 3 tons Jan. 17.
EXTREMES, 1950-62.--Water temperatures (1951-62): Maximum, 84°F July 31, 1955; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 13,300 ppm June 22, 1957; minimum daily (1958-62), 6 ppm Mar. 11, 1960.
Sediment loads: Maximum daily, 257,000 tons June 19, 1954; minimum daily, less than 0.50 ton Feb. 18-25, 1957.
REMARKS.--Maximum observed sediment concentration during water year, 6,350 ppm June 29. Flow affected by ice Nov. 18-20, Dec. 7 to Mar. 27.

Temperature (°F) of water, water year October 1961 to September 1962

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

LITTLE SIOUX RIVER BASIN--Continued

6-6066. LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

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	200	45	24	198	68	36	222	12	7
2	194	53	28	212	81	46	216	11	6
3	188	68	35	212	63	36	214	12	7
4	174	66	31	212	45	26	214	12	7
5	168	62	28	198	42	22	198	15	8
6	156	62	26	196	39	21	194	61	32
7	147	64	25	198	40	21	140	60	23
8	142	69	26	198	41	22	130	58	20
9	135	81	30	198	40	21	120	82	27
10	214	210	121	194	40	21	100	105	28
11	452	1030	1260	202	42	23	130	100	35
12	400	285	308	198	43	23	160	96	41
13	340	115	106	188	40	20	180	73	35
14	328	105	93	180	38	18	180	50	24
15	316	105	90	182	30	15	175	51	24
16	305	100	82	196	23	12	170	52	24
17	300	105	85	184	22	11	165	57	25
18	291	94	74	145	21	8	160	62	27
19	282	83	63	130	24	8	155	54	23
20	269	75	54	175	28	13	150	45	18
21	258	67	47	206	28	16	150	45	18
22	247	78	52	228	28	17	150	44	18
23	236	89	57	234	29	18	150	43	17
24	228	76	47	232	30	19	150	42	17
25	216	63	37	242	37	24	150	41	17
26	210	63	36	245	44	29	150	40	16
27	204	63	35	232	29	18	150	46	19
28	204	71	39	216	14	8	150	52	21
29	208	79	44	214	14	8	150	46	19
30	204	68	37	226	13	8	150	40	16
31	196	56	30	--	--	--	150	32	13
Total	7412	--	3050	6071	--	588	5023	--	632
	JANUARY			FEBRUARY			MARCH		
1	150	23	9	125	35	12	150	110	45
2	155	26	11	130	46	16	150	110	45
3	160	28	12	180	75	36	150	99	40
4	160	26	11	250	300	202	150	88	36
5	155	25	10	350	280	265	150	62	25
6	150	18	7	320	110	95	150	35	14
7	150	12	5	300	66	53	150	70	28
8	150	21	9	260	90	63	150	105	43
9	145	30	12	230	85	53	150	110	45
10	140	26	10	200	80	43	150	120	49
11	135	23	8	190	55	28	150	120	49
12	130	22	8	200	30	16	150	120	49
13	125	20	7	210	45	26	150	96	39
14	125	18	6	210	60	34	150	73	30
15	125	17	6	220	110	65	150	60	24
16	125	14	5	400	300	324	150	46	19
17	125	10	3	350	240	227	150	64	26
18	125	28	9	250	390	263	150	82	33
19	120	46	15	210	550	312	150	96	39
20	120	35	11	190	570	292	155	110	46
21	120	24	8	185	400	200	160	110	48
22	115	18	6	180	280	136	170	110	50
23	115	12	4	175	200	94	220	88	52
24	115	14	4	170	150	69	800	65	140
25	115	15	5	165	115	51	1500	350	1420
26	115	16	5	160	79	34	3500	1190	11200
27	115	18	6	155	95	40	7000	2550	48200
28	115	27	8	150	110	45	12800	2110	72900
29	115	36	11	--	--	--	17300	1380	64500
30	115	30	9	--	--	--	18500	740	37000
31	120	24	8	--	--	--	13200	600	21400
Total	4045	--	248	6115	--	3094	78155	--	257634

LITTLE SIOUX RIVER BASIN--Continued

6-6066. LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--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	12800	370	12800	1290	305	1060	1020	385	1060
2	12100	260	8490	1250	305	1030	950	380	975
3	11800	270	8600	1170	290	916	950	315	808
4	11100	310	9290	1100	335	995	986	355	945
5	9880	280	7470	1020	255	702	950	315	808
6	8600	340	7890	986	190	506	1060	500	1430
7	7520	410	8320	914	195	481	1140	1990	6130
8	6960	410	7700	878	215	510	1250	870	2940
9	6540	360	6360	842	165	375	1410	1910	7270
10	6200	350	5860	825	170	379	1620	1330	5820
11	5850	410	6480	791	260	555	1580	730	3110
12	5690	460	7070	791	230	491	1580	600	2560
13	5290	470	6710	757	170	347	1490	455	1830
14	4710	540	6870	757	285	583	1410	410	1560
15	4190	595	6730	706	260	496	1290	405	1410
16	3830	620	6410	658	190	338	1290	455	1580
17	3530	585	5580	626	94	159	1250	470	1590
18	3240	570	4990	715	875 S	2700	1290	415	1450
19	3020	550	4480	914	1600	3950	1290	540	1880
20	2870	565	4380	914	740	1830	1210	445	1450
21	2820	620	4720	1170	1000	3160	1250	360	1220
22	2620	530	3750	1340	1860 S	8660	1250	360	1220
23	2420	480	3140	1450	2100	8220	1140	330	1020
24	2220	420	2520	1250	800	2700	1020	310	854
25	2070	430	2400	1140	700	2150	950	290	744
26	1890	415	2120	1170	570	1800	878	275	652
27	1760	375	1780	1170	560	1770	808	255	556
28	1620	365	1600	1370	880	3260	740	225	450
29	1450	310	1210	1370	870	3220	1760	3620 S	21300
30	1370	305	1130	1170	545	1720	986	1900	5060
31	--	--	--	1100	400	1190	--	--	--
Total	155960	--	166850	31604	--	56253	35798	--	79682
	JULY			AUGUST			SEPTEMBER		
1	1060	740	2120	1800	460	2240	2270	1580	9680
2	1410	980	3730	1530	445	1840	2370	1050	6720
3	1660	1000	4480	1410	460	1750	2470	915	6100
4	1890	1130	5770	1250	395	1330	2620	785	5550
5	2470	1650	11000	1140	380	1170	2920	830	6540
6	2720	1120	8230	1060	490 A	1400	2620	600	4240
7	2720	750	5510	986	395	1050	2120	535	3060
8	2870	670	5190	914	370	913	1760	495	2350
9	2920	660	5200	878	590 A	1400	1580	460	1960
10	3080	570	4740	791	340	726	1490	390	1570
11	3350	580	5250	774	330	690	1370	335	1240
12	3770	575	5850	757	330	674	1290	315	1100
13	4010	550	5950	723	280	547	1210	285	931
14	4130	575	6410	674	270	491	1100	295	876
15	3530	615	5860	626	260	439	1060	260	744
16	2920	475	3740	595	245	394	1060	260	744
17	2570	460	3190	565	245	374	986	260	692
18	2320	430	2690	535	210	303	986	215	572
19	2300	555 S	3670	506	195	266	896	200	484
20	2920	1420	11200	492	195	259	757	170	347
21	2720	1200	8810	464	175	219	774	145	303
22	2570	930	6450	436	175	206	723	130	254
23	2370	700	4480	422	165	188	690	115	214
24	2120	545	3120	408	160	176	658	99	176
25	1840	510	2530	395	130	139	642	90	156
26	1580	505	2150	369	120	120	595	80	129
27	1830	1640 S	9780	356	110	106	565	73	111
28	2070	1380	7710	330	93	83	550	73	108
29	2670	1280	9230	330	73	65	535	72	104
30	2370	650	4160	699	1450 S	3620	535	71	103
31	2120	500	2860	1690	1720 S	7930	--	--	--
Total	78880	--	171060	23905	--	31108	39202	--	57158
Total discharge for year (cfs-days)									472170
Total load for year (tons)									827357

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

LITTLE SIOUX RIVER BASIN--Continued

6-6066. LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 10, 1962.....	0945		70	1,800	2,440	11,900	--	49	--	73	90	98	99	100				SPWC
July 27.....	1900		70	2,570	3,940	27,300	19	25	40	55	81	96	98	100				SPWC
July 27.....	1900		70	2,570	3,940	27,300	5	6	28	51	81	96	98	100				SPN

6-6300. NORTH PLATTE RIVER ABOVE SEMINOE RESERVOIR, NEAR SINCLAIR, WYO.

LOCATION.--At old bridge 150 feet downstream from new bridge on U.S. Highways 30 and 287, 1.8 miles south of Fort Steele, 6 miles downstream from Pass Creek, 8.2 miles east of Sinclair, Carbon County, and about 13 miles upstream from gaging station.
DRAINAGE AREA.--8,124 square miles upstream from gaging station, of which 4,064 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: December 1960 to September 1962.
Water temperatures: December 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 336 ppm Sept. 24-30; minimum, 116 ppm May 6-18.
Hardness: Maximum, 195 ppm Sept. 24-30; minimum, 64 ppm May 6-18.
Specific conductance: Maximum daily, 546 micromhos Sept. 29; minimum daily, 154 micromhos May 12.
Water temperatures: Maximum, 68°F July 22; minimum, freezing point on many days during November to March.
EXTREMES, 1960-62.--Dissolved solids: Maximum, 380 ppm Dec. 4-20, 1960; minimum, 116 ppm May 6-18, 1962.
Hardness: Maximum, 223 ppm Dec. 4-20, 1960; minimum, 64 ppm May 6-18, 1962.
Specific conductance: Maximum daily, 650 micromhos Aug. 14, 1961; minimum daily, 154 micromhos May 12, 1962.
Water temperatures: Maximum, 69°F July 7, Aug. 6, 7, 1961; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Worland, Wyo. No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	1,027	14	0.00	29	7.7	16	2.3	111	0	44	4.5	0.3	0.2	0.04	182	0.25	505	104	13	0.7	286	7.2	11
Nov. 1-16.....	681	13	.03	37	11	19	2.1	130	0	61	5.8	.4	.0	.05	228	.31	419	136	29	.7	353	7.0	16
Nov. 17-23.....	563	16	.01	42	12	21	3.5	142	0	72	6.8	.4	.0	.05	255	.35	388	152	36	.7	396	7.2	9
Nov. 24-Dec. 6..	599	20	.04	39	10	19	1.9	132	0	66	6.6	.3	.1	.07	239	.33	387	140	32	.7	363	7.7	6
Dec. 7-16.....	379	21	.30	49	13	24	2.1	160	0	85	8.7	.4	.1	.05	293	.40	300	176	45	.8	452	7.7	7
Dec. 17-31.....	402	20	.02	41	11	19	1.8	143	0	63	6.9	.4	.1	.04	243	.33	264	146	29	.7	376	7.7	6
Jan. 1-31, 1962.	393	16	.00	42	9.5	19	2.2	137	0	62	7.2	.4	.2	.04	239	.33	254	144	32	.7	372	7.8	2
Feb. 1-11.....	485	17	.06	40	11	20	2.4	136	0	67	6.7	.3	.1	.04	241	.33	316	147	35	.7	382	7.2	4
Feb. 12-28.....	745	15	.09	51	11	24	5.8	144	0	95	8.3	.2	.8	.06	300	.41	603	172	54	.8	454	7.4	23
Mar. 1-31.....	602	14	.00	48	12	22	4.1	150	0	82	7.1	.4	.7	.04	274	.37	445	170	47	.7	435	7.5	12
Apr. 1-14.....	1,882	16	.02	39	11	21	5.4	138	0	62	5.9	.3	.5	.07	241	.33	1,220	141	28	.8	372	7.1	20
Apr. 15-May 5...	6,137	14	.03	25	7.0	13	3.1	100	0	31	2.1	.3	.5	.09	157	.21	2,600	91	9	.6	238	7.3	20
May 6-18.....	7,527	12	.03	17	5.3	8.5	1.5	68	0	22	.0	.3	.3	.05	116	.16	2,360	64	8	.5	168	6.9	25
May 19-31.....	3,966	14	.03	24	8.3	14	1.7	96	0	39	1.4	.3	.2	.05	167	.23	1,790	94	15	.6	244	7.2	20
June 1-11.....	4,009	14	.03	29	8.1	15	1.6	113	0	39	1.7	.4	.3	.05	181	.25	1,960	106	13	.6	269	7.2	20
June 12-30.....	4,460	13	.03	27	8.1	13	1.6	112	0	31	.6	.4	.2	.04	168	.23	2,020	101	9	.6	249	7.7	20
July 1-12.....	2,942	14	.01	33	8.9	15	1.5	140	0	33	1.0	.3	.3	.07	186	.25	1,480	119	4	.6	290	7.9	20
July 13-31.....	1,269	9.0	.01	36	10	17	1.6	148	0	41	2.6	.4	.4	.07	199	.27	682	132	11	.6	320	7.6	9
Aug. 1-14.....	596	10	.01	36	10	18	1.8	138	0	46	4.0	.4	.3	.04	201	.27	323	132	19	.7	328	7.4	7
Aug. 15-31.....	333	14	.01	40	12	21	2.1	152	0	60	6.1	.5	.1	.11	237	.32	213	148	23	.7	376	7.4	6

PLATTE RIVER BASIN--Continued

6-6300. NORTH PLATTE RIVER ABOVE SEMINOE RESERVOIR, NEAR SINCLAIR, WYO.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Sept. 1-12, 1962	231	14	0.01	43	13	25	2.6	157	0	68	7.6	0.5	0.2	0.05	301	0.41	188	159	30	0.9	413	7.4	8
Sept. 13-23.....	160	15	.01	49	14	29	2.8	172	0	89	10	.6	.1	.08	308	.42	133	180	39	.9	471	7.6	6
Sept. 24-30.....	211	17	.01	53	15	33	3.2	178	0	104	12	.3	.0	.07	336	.46	191	195	49	1.0	516	7.6	7
Weighted average.....	1,715	14	0.03	29	8.2	15	2.3	110	0	40	2.5	0.3	0.3	0.06	179	0.24	827	106	15	0.6	271	7.2	18
Time-weighted average.....	--	15	0.03	37	10	19	2.6	133	0	58	5.2	0.4	0.3	0.06	225	--	--	134	26	0.7	347	7.4	12
Tons per day..	--	63.0	0.13	134	38.0	68.0	11.0	512	0	184	12.0	2.0	1.5	0.28	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

6-6379.1. ROCK CREEK AT ATLANTIC CITY, WYO.

LOCATION.--At gaging station, 500 feet downstream from Slate Creek and 1.4 miles northwest of Atlantic City, Fremont County.
DRAINAGE AREA.--21.3 square miles.
RECORDS AVAILABLE.--Chemical analyses: April to June 1957, November 1957 to September 1958.
Water temperatures: June to September 1957, May to September 1958, May to September 1959, April 1960 to September 1962.
Sediment records: June 1957 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 68°F Aug. 15; minimum, freezing point on many days during November to April.
Sediment concentrations: Maximum daily, 615 ppm June 7; minimum daily, not determined.
Sediment loads: Maximum daily, 153 tons June 7; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1957-62.--Water temperatures: Maximum, 73°F July 29, 1961; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 1,000 ppm Aug. 5, 1961; minimum daily, not determined.
Sediment loads: Maximum daily, 153 tons June 7, 1962; minimum daily, less than 0.05 ton on many days.

Temperature (°F) of water, water year October 1961 to September 1962

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

PLATTE RIVER BASIN--Continued

6-6379.1. ROCK CREEK AT ATLANTIC CITY, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2.7	C 26	0.2	3.4	--	0.2	0.8	--	T
2	3.4	C 26	.2	3.6	--	.1	.7	--	T
3	4.0	C 26	.3	3.6	--	.1	.8	--	T
4	4.8	C 26	.3	3.4	--	.1	1.2	--	T
5	2.9	C 26	.2	3.4	--	.1	1.4	--	T
6	2.7	C 26	.2	3.2	--	T	C 1.5	6	T
7	2.7	C 26	.2	3.2	--	T	C 1.5	--	T
8	4.8	C 26	.3	3.0	4	T	C 1.5	19	0.1
9	4.5	C 26	.3	2.8	--	T	C 1.5	--	T
10	5.5	C 26	.4	2.2	--	T	C 1.5	--	T
11	5.5	C 26	.4	2.0	--	T	C 1.5	--	T
12	5.1	C 26	.4	1.8	--	T	C 1.5	--	T
13	4.8	C 26	.3	1.6	12	.1	C 1.5	--	T
14	4.6	C 26	.3	1.6	--	T	C 1.5	--	T
15	4.6	C 26	.3	1.6	--	T	C 1.5	8	T
16	4.4	C 26	.3	2.0	--	T	C 1.3	--	T
17	3.8	C 26	.3	1.6	8	T	C 1.3	--	T
18	3.6	C 26	.3	1.7	--	T	C 1.3	--	T
19	3.4	C 26	.2	.9	--	T	C 1.3	--	T
20	3.2	C 26	.2	.8	--	T	C 1.3	--	T
21	3.2	C 26	.2	.9	--	T	C 1.3	--	T
22	3.2	C 26	.2	1.0	--	T	C 1.3	6	T
23	3.2	C 26	.2	1.4	--	T	C 1.3	--	T
24	3.2	C 26	.2	1.0	4	T	C 1.3	--	T
25	3.2	C 26	.2	.9	--	T	C 1.3	--	T
26	3.4	C 26	.2	.9	--	T	C 1.3	--	T
27	4.2	C 26	.3	.9	--	T	C 1.3	--	T
28	8	C 26	.6	.8	--	T	C 1.3	--	T
29	20	C 26	1.4	.8	--	T	C 1.3	2	T
30	9	C 26	.6	.8	5	T	C 1.3	--	T
31	4	C 26	.3	--	--	--	C 1.3	--	T
Total	145.6	--	10.0	56.8	--	1.3	40.7	--	0.8

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	C 1.2	--	T	C 1.2	--	T	C 1.4	12	T
2	C 1.2	--	T	C 1.2	--	T	C 1.4	--	T
3	C 1.2	--	T	C 1.2	--	T	C 1.4	--	T
4	C 1.2	--	T	C 1.2	--	T	C 1.4	--	T
5	C 1.2	--	T	C 1.2	--	T	C 1.4	--	T
6	C 1.2	--	T	C 1.2	--	T	C 1.6	--	T
7	C 1.2	--	T	C 1.2	--	T	C 1.6	--	T
8	C 1.2	--	T	C 1.2	--	T	C 1.6	--	T
9	C 1.2	--	T	C 1.2	--	T	C 1.6	4	T
10	C 1.2	--	T	C 1.2	--	T	C 1.6	--	T
11	C 1.2	--	T	C 1.2	--	T	C 1.7	--	T
12	C 1.2	--	T	C 1.2	--	T	C 1.7	--	T
13	C 1.2	--	T	C 1.2	--	T	C 1.7	--	T
14	C 1.2	--	T	C 1.2	--	T	C 1.7	--	T
15	C 1.2	--	T	C 1.2	--	T	C 1.7	12	0.1
16	C 1.2	--	T	C 1.2	16	0.1	C 2.0	--	.1
17	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
18	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
19	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
20	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
21	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
22	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
23	C 1.2	--	T	C 1.2	10	T	C 2.0	27	.1
24	C 1.2	--	T	C 1.2	--	T	C 2.0	--	.1
25	C 1.2	8	T	C 1.2	--	T	C 2.0	--	.1
26	C 1.2	--	T	C 1.2	--	T	2.2	28	.2
27	C 1.2	--	T	C 1.2	--	T	2.6	--	.3
28	C 1.2	--	T	C 1.2	--	T	2.6	--	.4
29	C 1.2	--	T	--	--	--	3.0	--	.5
30	C 1.2	--	T	--	--	--	2.8	65	.5
31	C 1.2	8	T	--	--	--	2.8	--	.5
Total	37.2	--	0.7	33.6	--	0.9	59.5	--	3.8

T Less than 0.05 ton.
C Composite period.

6-6379.1. ROCK CREEK AT ATLANTIC CITY, WYO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3.4	--	0.7	10	--	1.5	18	15	0.7
2	6	--	1.0	27	--	5.0	42	338 S	52
3	10	--	1.5	45	74	9.0	62	184 S	34
4	20	--	4.0	27	79 S	9.1	55	52	7.7
5	23	--	5.0	55	82	12	32	40	3.5
6	11	75	2.2	53	55	7.9	23	126 S	12
7	5.8	--	1.0	53	40	5.7	65	615 S	153
8	4.8	--	1.0	55	46	6.8	49	250 S	31
9	7.4	--	2.0	55	40	5.9	58	92	14
10	4.2	--	1.0	38	28	2.9	55	54	8.0
11	4.2	--	1.0	21	20	1.1	53	118	17
12	13	--	2.0	23	13	.8	55	46	6.8
13	18 C	62	3.0	55	37	5.5	55	46	6.8
14	20 C	62	3.3	53	44	6.3	23	49 S	1.7
15	25 C	62	4.2	38	28	2.9	8.2	112	25
16	22 C	62	3.7	16	9	.4	11	70	2.1
17	18 C	62	3.0	15	8	.3	26	56	3.9
18	18 C	62	3.0	14	15	.6	42	104	12
19	22 C	62	3.7	11	16	.5	51	100	14
20	25 C	62	4.2	11	14	.4	60	113 S	19
21	23 C	62	3.8	14	15	.6	24	75 S	7.4
22	16 C	62	2.7	22	46	2.7	7.4	17	.3
23	18 C	62	3.0	18	21	1.0	6.5	6	.1
24	20 C	62	3.3	16	19	.8	7.8	35	.7
25	20 C	62	3.3	16	20	.9	7.8	28	.6
26	20 C	62	3.3	16	16	.7	10	28	.8
27	15 C	62	2.5	16	14	.6	11	35 S	1.6
28	17 C	62	2.8	20	24	1.3	10	42	1.1
29	12 C	62	2.0	17	44	2.0	13	40	1.4
30	10 C	62	1.7	13	16	.6	16	38	1.6
31	--	--	--	14	16	.6	--	--	--
Total	451.8	--	78.9	857	--	96.4	956.7	--	439.8

	JULY			AUGUST			SEPTEMBER		
1	14	28	1.1	5.8	37 S	0.6	3.1	28	0.2
2	9.1	28	.7	4.8	15	.2	3.1	20	.2
3	8.2	70	1.5	5.1	15	.2	2.9	16	.1
4	11	32	1.0	4.5	16	.2	2.9	13	.1
5	8.2	115	2.5	4.5	14	.2	1.3	10	T
6	8.2	50	1.1	4.8	20	.3	1.1	9	T
7	7.2	58 S	1.2	4.2	54	.6	1.7	20	.1
8	7.8	127	2.7	3.1	12	.1	2.9	14	.1
9	7.4	142	2.8	3.6	68	.7	1.6	12	.1
10	7.4	118	2.4	3.6	20	.2	7.2	185 S	9.2
11	6.5	50	.9	3.1	28	.2	8.2	201	4.4
12	5.8	65	1.0	2.3	72 S	.7	6.1	106	1.7
13	5.1	48	.7	2.7	112	.8	4.2	70	.8
14	5.8	50	.8	2.0	71 S	.6	1.7	22	.1
15	6.1	46	.8	4.5	98	1.2	3.6	29	.3
16	5.5	490	7.3	3.1	50	.4	5.5	38	.6
17	5.5	68	1.0	1.8	16	.1	5.1	42	.6
18	5.8	42	.7	3.1	29	.2	4.5	38	.5
19	5.1	25	.3	3.4	17	.2	4.2	42	.5
20	5.8	42	.7	3.1	14	.1	5.1	53	.7
21	7.4	32	.6	1.3	4	T	6.1	58	1.0
22	7.8	6	.1	1.3	4	T	4.5	34	.4
23	6.1	7	.1	1.4	5	T	4.2	22	.2
24	4.8	6	.1	2.3	14	.1	5.1	19	.3
25	5.1	9	.1	2.7	13	.1	4.8	24	.3
26	4.8	10	.1	1.3	8	T	4.8	24	.3
27	4.8	8	.1	1.2	10	T	4.8	28	.4
28	4.8	6	.1	1.2	17	.1	5.5	32	.5
29	5.1	6	.1	1.1	8	T	5.5	26	.4
30	5.5	8	.1	2.3	20	.1	5.1	28	.4
31	5.1	6	.1	4.2	52	.6	--	--	--
Total	206.8	--	32.8	93.4	--	8.9	126.4	--	24.6

Total discharge for year (cfs-days) 3065.5
Total load for year (tons) 698.9

S Computed by subdividing day.
T Less than 0.05 ton.
C Composite period.

PLATTE RIVER BASIN--Continued

6-6468. NORTH PLATTE RIVER NEAR GLENROCK, WYO.

LOCATION.--At Dave Johnston powerplant, 0.2 mile upstream from Sand Creek, 1 mile upstream from gaging station, and 4.8 miles east of Glenrock, Converse County.
DRAINAGE AREA.--17,487 square miles upstream from gaging station, of which 5,123 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: December 1960 to September 1962.
Water temperatures: December 1960 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 640 ppm Oct. 1-3; minimum, 304 ppm Apr. 15-27.
Hardness: Maximum, 312 ppm Oct. 1-3; minimum, 163 ppm Apr. 15-27.
Specific conductance: Maximum daily, 1,060 micromhos Oct. 3; minimum daily, 399 micromhos Apr. 21.
Water temperatures: Maximum, 78°F July 11; minimum, freezing point on several days during December to February.
EXTREMES, 1960-62.--Dissolved solids: Maximum, 640 ppm Oct. 1-3, 1961; minimum, 304 ppm Apr. 15-27, 1962.
Hardness: Maximum, 312 ppm Oct. 1-3, 1961; minimum, 163 ppm Apr. 15-27, 1962.
Specific conductance: Maximum daily, 1,060 micromhos Oct. 3, 1961; minimum daily, 399 micromhos Apr. 21, 1962.
Water temperatures: Maximum, 78°F July 10, 1961, July 11, 1962; 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 Worland, Wyo. No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-3, 1961..	738	12	0.00	76	30	86	3.4	209	0	279	18	0.4	3.7	0.16	640	0.87	1,280	312	141	2.1	925	7.4	7
Oct. 4-21.....	866	11	.00	66	25	69	3.2	175	0	233	19	.4	2.7	.10	543	.74	1,270	268	124	1.8	800	7.5	5
Oct. 22-31.....	895	8.8	.00	64	24	67	3.8	172	0	229	19	.4	1.9	.10	521	.71	1,260	260	119	1.8	776	7.4	6
Nov. 1-15.....	895	7.1	.01	67	27	72	3.5	173	0	246	19	.4	2.1	.10	566	.77	1,370	277	135	1.9	822	7.2	7
Nov. 16-30.....	850	7.7	.02	67	26	68	3.3	175	0	238	18	.4	2.1	.10	546	.74	1,250	272	128	1.8	802	7.3	7
Dec. 1-14.....	649	10	.02	66	28	65	3.2	184	0	241	19	.4	1.5	.10	551	.75	966	278	127	1.7	811	7.7	9
Dec. 15-31.....	865	14	.03	61	24	55	3.3	176	0	197	17	.4	1.4	.10	486	.66	1,140	249	105	1.5	721	7.7	10
Jan. 1-24, 1962.	800	13	.00	61	23	58	3.6	172	0	192	16	.5	1.7	.07	486	.66	1,050	246	105	1.6	710	7.9	5
Jan. 25-31.....	927	13	.00	57	21	53	3.6	168	0	172	15	.4	1.6	.07	443	.60	1,110	228	90	1.5	660	7.8	5
Feb. 1-9.....	1,046	12	.04	61	21	54	3.4	165	0	191	15	.4	.9	.07	494	.67	1,400	238	103	1.5	691	7.6	6
Feb. 10-16.....	1,643	14	.04	65	18	61	4.4	156	0	216	12	.4	4.2	.13	510	.69	2,260	237	109	1.7	729	7.4	7
Feb. 17-28.....	724	13	.04	69	24	69	3.8	186	0	230	17	.4	1.5	.09	554	.75	1,080	272	119	1.8	834	7.4	6
Mar. 1-10.....	990	13	.01	68	18	59	3.2	173	0	198	15	.3	.9	.11	485	.66	1,300	245	103	1.6	720	7.5	7
Mar. 11-31.....	927	11	.01	70	23	66	3.4	177	0	225	16	.4	.9	.09	526	.72	1,320	269	124	1.7	774	7.4	7
Apr. 1-14.....	1,318	12	.01	64	17	52	3.4	171	0	173	14	.3	.5	.08	443	.60	1,580	230	90	1.5	655	7.3	7
Apr. 15-27.....	1,862	12	.02	49	9.8	32	2.6	132	0	106	13	.2	.6	.05	304	.41	1,530	163	55	1.1	457	7.2	12
Apr. 28-May 14..	1,677	12	.01	50	17	39	2.6	150	0	132	9.8	.3	.4	.08	358	.49	1,620	193	70	1.2	536	7.3	7
May 15-23.....	1,956	13	.01	58	16	45	3.4	160	0	151	11	.3	1.5	.10	401	.55	2,120	210	79	1.4	593	7.6	7
May 24-30.....	2,371	14	.02	70	20	55	3.8	162	0	215	11	.4	3.3	.08	497	.68	3,180	258	125	1.5	706	7.4	5
May 31-June 16..	2,371	12	.01	56	18	43	3.1	161	0	151	10	.4	.6	.10	395	.54	2,530	213	81	1.3	589	7.3	5

June 17-30, 1962	917	11	.02	77	26	78	4.3	174	0	276	17	.4	3.0	.09	614	.84	1,520	297	154	2.0	873	7.2	5
July 1-31.....	1,087	10	.00	58	20	53	3.5	161	0	185	13	.4	1.0	.10	442	.60	1,300	228	96	1.5	658	7.6	5
Aug. 1-31.....	997	7.9	.01	56	20	51	4.2	158	0	178	14	.3	.8	.08	432	.59	1,160	221	91	1.5	646	7.0	6
Sept. 1-22.....	1,056	8.3	.01	55	19	49	4.1	158	0	166	14	.3	.5	.08	423	.58	1,210	217	87	1.5	633	7.2	10
Sept. 23-30.....	1,121	13	.05	67	21	61	4.6	164	0	223	15	.4	2.6	.09	508	.69	1,540	254	120	1.7	743	7.8	11
Weighted average.....	1,142	11	0.01	61	20	54	3.5	164	0	187	14	0.4	1.4	0.09	459	0.62	1,420	234	100	1.5	677	7.3	7
Time-weighted average.....	--	11	0.01	62	21	57	3.5	167	0	197	15	0.4	1.4	0.09	477	--	--	242	105	1.6	702	7.4	7
Tons per day..	--	34.0	0.04	187	62.0	167	11.0	506	0	578	44.0	1.0	4.2	0.27	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

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PLATTE RIVER BASIN--Continued

6-6773. KIOWA CREEK NEAR LYMAN, NEBR.

LOCATION.--At gaging station, 65 feet upstream from Union Pacific Railroad bridge, 0.8 mile upstream from mouth, and 2.2 miles northeast of Lyman, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.

Chemical analyses, in parts per million, September 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 14, 1961.....	4.8	54		0.01		33	9.1	248	14	461	0	241	27	0.9	5.6	0.31	896	120	0	9.9	1,260	7.5	--
Oct. 4.....	32	61		.01		30	7.3	281	11	511	0	223	30	.8	8.2	.36	958	105	0	12	1,360	7.7	8
Nov. 16.....	16	57		.02		34	8.5	285	10	546	0	242	31	.9	8.0	.32	971	120	0	11	1,400	7.8	7
Jan. 3, 1962.	11	58		.05		35	8.9	283	11	556	0	205	32	.7	9.0	.30	969	124	0	11	1,420	7.8	9
Feb. 14.....	11	54		.01		37	7.7	289	11	550	0	242	31	.9	5.8	.37	971	124	0	11	1,400	7.7	--
Mar. 30.....	11	49		.04		33	8.6	306	10	554	0	256	33	.9	5.7	.34	996	118	0	12	1,450	7.6	--
May 9.....	134	20		.03		63	20	82	7.2	204	0	221	18	.5	1.7	.10	559	240	73	2.3	819	7.8	--
June 13.....	24	50		.04		29	9.6	257	11	488	0	231	29	.8	5.9	.27	901	112	0	11	1,300	7.7	--
July 10.....	55	30		.03		51	15	109	9.4	288	0	168	17	.6	.9	.14	560	189	0	3.4	828	7.5	--
Aug. 3.....	188	18		.09	0.00	58	15	82	6.0	225	0	180	15	.6	1.9	.11	503	208	23	2.5	751	7.5	--
Sept. 7.....	58	41		.02		46	14	200	11	398	0	240	25	.7	2.5	.22	800	173	0	6.6	1,170	7.2	--

6-6773. KIOWA CREEK NEAR LYMAN, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Sept. 14, 1961.....	1700		--	48	227	29	--	--	--	--	--	--	--	--	--			
Oct. 4.....	1330		59	32	178	15	--	--	--	--	--	85	99	100	--			V
Jan. 3, 1962.....	1245		44	11	127	3.8	--	--	--	--	--	--	--	--	--			
Mar. 30.....	1340		56	11	148	4.3	--	--	--	--	--	--	--	--	--			
May 9.....	1515		68	136	3,210	1,180	17	24	33	44	60	79	92	97	100			VPWC
June 13.....	1120		70	24	593	38	64	79	86	88	89	96	99	100	--			VPWC
July 10.....	1110		74	55	775	115	--	--	--	--	--	62	80	91	99	100		V
Aug. 3.....	1030		69	188	1,190	604	--	--	--	--	--	--	--	--	--			
Aug. 23.....	1050		62	37	282	28	--	--	--	--	--	--	--	--	--			
Sept. 7.....	1100		63	58	556	87	--	--	--	--	--	--	--	--	--			
Sept. 25.....	1355		64	85	1,040	239	--	--	--	--	--	--	--	--	--			

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 4, 1961.....	1330			32		2	6	25	76	90	92	95	98	99	100		SV
Jan. 3, 1962.....	1245			11		7	13	28	61	70	75	82	92	99	100		SV
Mar. 30.....	1340			11		2	7	16	46	59	66	75	86	99	100		SV
May 9.....	1515			136		10	22	45	78	88	92	96	98	100	--		SV
June 13.....	1120			24		7	24	58	81	89	92	94	97	100	--		SV
July 10.....	1110			55		1	4	44	85	93	96	98	100	--	--		SV
Aug. 3.....	1030			188		0	2	17	75	95	97	98	99	100	--		SV
Aug. 23.....	1050			37		0	4	26	70	87	92	96	100	--	--		SV
Sept. 7.....	1100			58		0	1	17	75	91	94	96	98	100	--		SV
Sept. 25.....	1355			85		0	3	9	55	75	81	86	94	98	100		SV

PLATTE RIVER BASIN--Continued

6-6787. BROWN CANYON DRAIN NEAR MITCHELL, NEBR.

LOCATION.--At Tri-State canal, 13 feet upstream from culvert and 2.7 miles southwest of Mitchell, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.

Chemical analyses, in parts per million, September 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 14, 1961.....	1.6	65		0.02		49	11	184	13	379	0	222	23	0.7	18	0.28	791	167	0	6.2	1,120	7.1	--
Oct. 10.....	1.8	66		.03		34	12	195	13	364	0	207	25	.7	21	.32	787	136	0	7.3	1,110	7.5	6
Nov. 16.....	1.4	63		.00		39	10	196	12	360	0	218	23	.6	21	.29	782	140	0	7.2	1,110	7.7	5
Jan. 3, 1962.	1.6	65		.02		35	11	193	13	360	0	201	25	.3	22	.28	784	132	0	7.3	1,110	7.8	5
Feb. 14.....	1.2	65		.01		48	11	200	12	396	0	226	25	.5	24	.30	827	166	0	6.8	1,160	7.6	--
Mar. 28.....	1.8	60		.01		50	10	211	13	344	0	276	26	.5	22	.34	861	168	0	7.1	1,200	7.5	--
May 10.....	4.6	32		.04		67	17	108	14	264	0	225	20	.6	12	.14	646	237	21	3.2	936	7.4	--
June 19.....	1.8	58		.05		59	8.5	200	15	400	0	233	29	.7	24	.28	841	182	0	6.4	1,200	8.1	--
July 10.....	16.9	29		.06		65	15	86	9.7	276	0	168	17	.6	1.6	.14	553	224	0	2.5	809	7.3	--
Aug. 3.....	19.5	22		.09	0.00	55	14	84	7.4	214	0	179	15	.5	3.0	.11	504	194	19	2.6	743	8.1	--
Sept. 7.....	17.9	26		.06		59	18	81	9.0	216	0	195	16	.5	2.2	.11	532	220	43	2.4	776	7.3	--

6-6787. BROWN CANYON DRAIN NEAR MITCHELL, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 8, 1961	1730		--	e 3	2,400	19	56	77	90	95	95	100	--	--	--	--		VPWC
Sept. 14	1440		--	1.6	105	.5	--	--	--	--	--	--	--	--	--	--		
Oct. 10	1530		51	1.8	118	.6	--	--	--	--	--	99	100	--	--	--		V
Jan. 3, 1962	1110		36	1.6	125	.5	--	--	--	--	--	--	--	--	--	--		
Mar. 28	1130		47	1.8	134	.7	--	--	--	--	--	--	--	--	--	--		
May 10	1345		77	4.6	12,000	149	10	15	23	39	58	88	98	100	--	--		VPWC
June 19	1300		81	1.8	442	2.1	--	--	--	--	--	--	--	--	--	--		
July 10	1310		80	17	1,560	72	--	--	--	--	--	--	--	--	--	--		
Aug. 3	1230		71	20	2,270	123	12	17	21	27	41	85	99	100	--	--		VPWC
Aug. 23	1245		63	10	14,700	397	9	11	15	21	33	82	96	98	99	100		VPWC
Sept. 7	1300		68	18	17,200	836	6	9	13	21	39	86	95	98	99	100		VPWC
Sept. 25	1010		62	13	3,610	127	--	--	--	--	--	--	--	--	--	--		

e Estimated.

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 10, 1961	1530			1.8		17	27	66	91	96	99	100	--	--			SV
Jan. 3, 1962	1110			1.6		14	32	68	92	97	99	100	--	--			SV
Mar. 28	1130			1.8		23	40	72	90	96	98	100	--	--			SV
May 10	1345			4.6		40	70	94	97	99	100	--	--	--			SV
June 19	1300			1.8		51	72	78	80	80	84	91	99	100			SV
July 10	1310			17		17	22	30	53	72	83	92	98	100			SV
Aug. 3	1230			20		64	74	85	100	--	--	--	--	--			V
Aug. 23	1245			10		38	73	90	99	100	--	--	--	--			V
Sept. 7	1300			18		15	59	99	100	--	--	--	--	--			V
Sept. 25	1010			13		33	59	85	100	--	--	--	--	--			V

PLATTE RIVER BASIN--Continued

6-6788. DUTCH FLATS DRAIN NEAR MITCHELL, NEBR.

LOCATION.--At gaging station, 25 feet downstream from county road bridge, 0.8 mile upstream from mouth, and 2.5 miles northwest of Mitchell, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.

Chemical analyses, in parts per million, September 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 13, 1961.....	6.8	53		0.03		99	20	56	14	318	0	179	13	0.5	8.8	0.09	611	330	69	1.3	863	7.4	--
Oct. 6.....	6.1	53		.02		91	25	56	14	308	0	163	14	.5	8.9	.13	609	328	75	1.3	860	7.3	4
Nov. 16.....	6.2	50		.03		95	22	57	13	307	0	179	14	.5	10	.11	609	327	75	1.4	860	7.5	4
Jan. 3, 1962.	4.5	50		.00		93	20	59	14	308	0	156	14	.1	9.7	.13	602	314	61	1.4	864	7.5	5
Feb. 14.....	5.1	48		.01		99	19	58	15	309	0	177	14	.4	4.9	.14	616	326	73	1.4	866	7.5	--
Mar. 28.....	4.9	49		.03		98	20	56	15	301	0	179	14	.3	11	.10	606	325	78	1.4	853	7.7	--
May 9.....	8.1	36		.01		86	21	58	12	260	0	189	15	.5	7.1	.10	573	301	88	1.5	825	7.7	--
June 12.....	6.0	52		.04		97	21	56	14	322	0	165	12	.4	7.4	.14	595	330	66	1.3	848	8.0	--
July 10.....	10.0	34		.06		79	18	50	11	240	0	163	12	.5	4.5	.10	515	272	75	1.3	732	8.2	--
Aug. 3.....	23.2	22		.14	0.02	71	19	52	7.8	208	0	168	12	.5	4.2	.09	479	255	84	1.4	703	7.5	--
Sept. 7.....	27.4	23		.02		75	21	57	8.6	224	0	188	14	.4	.2	.10	519	274	90	1.5	754	6.9	--

6-6788. DUTCH FLATS DRAIN NEAR MITCHELL, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Sept. 13, 1961.....	1530		--	6.6	94	1.7						--	--	--	--			
Oct. 6.....	1545		57	6.1	48	.8						--	--	--	--			
Jan. 3, 1962.....	1440		50	4.5	180	2.2						--	--	--	--			
Mar. 28.....	1320		57	4.9	195	2.6						--	--	--	--			
May 9.....	1400		66	8.1	287	6.3						60	93	98	100			V
June 12.....	0915		58	6.0	189	3.1						--	--	--	--			
July 10.....	1500		74	10	280	7.6						84	99	100	--			V
Aug. 3.....	1400		71	23	1,020	63						--	--	--	--			
Aug. 23.....	1400		62	23	1,190	74						--	--	--	--			
Sept. 7.....	1400		66	27	1,110	81	21	23	25	29	37	66	87	97	99	100		VPWC
Sept. 25.....	1215		60	22	477	28						--	--	--	--			

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 6, 1961.....	1545			6.1		11	27	55	79	92	98	100	--				SV
Jan. 3, 1962.....	1440			4.5		19	48	68	83	97	99	100	--				SV
Mar. 28.....	1320			4.9		26	58	75	82	90	94	100	--				SV
May 9.....	1400	7		8.1		31	91	97	100	--	--	--	--				V
June 12.....	0915			6.0		15	49	93	97	99	99	100	--				SV
July 10.....	1500			10		23	66	95	95	99	100	--	--				SV
Aug. 3.....	1400			23		1	8	42	84	95	97	99	100				SV
Aug. 23.....	1400			23		13	14	41	81	95	98	100	--				SV
Sept. 7.....	1400			27		2	10	41	81	92	96	98	100				SV
Sept. 25.....	1215			22		6	21	44	74	86	90	94	99	100			SV

PLATTE RIVER BASIN--Continued

6-6807. WINTER CREEK AT TRI-STATE CANAL, NEAR SCOTTSBLUFF, NEBR.

LOCATION.--At gaging station, 15 feet upstream from culvert under Tri-State canal and 5 miles northeast of Scottsbluff, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: July 1961 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 6, 1961.	31.2	66		0.01	--	74	18	56	6.7	236	0	149	15	0.5	6.9	0.15	544	258	64	1.5	735	7.6	0
Nov. 17.....	26.0	64		.01	--	75	16	58	6.0	240	0	154	15	.6	7.8	.17	537	254	57	1.6	731	7.7	4
Jan. 4, 1962.	22.7	61		.02	--	66	16	58	6.5	222	0	141	16	.4	6.9	.13	514	230	48	1.7	702	7.8	5
Feb. 14.....	18.5	65		.02	--	74	15	59	6.7	240	0	148	15	.6	8.4	.13	534	246	49	1.6	729	8.0	--
Mar. 29.....	18.0	62		.01	--	72	16	61	6.7	239	0	147	15	.4	5.7	.15	534	246	50	1.7	724	7.4	--
May 10.....	17.0	65		.01	--	63	16	60	6.6	209	0	149	15	.5	8.4	.12	504	222	51	1.8	689	8.0	--
June 11.....	25.4	63		.03	--	77	15	57	7.0	236	0	160	15	.5	7.7	.16	532	256	62	1.6	737	7.8	--
July 9.....	26.0	60		.00	--	75	16	58	7.8	234	0	156	16	.5	7.6	.13	540	253	61	1.6	734	7.9	--
July 16.....	28.3	55		.03	0.02	79	14	58	7.1	235	0	157	15	.6	6.9	.12	533	255	62	1.6	725	7.7	--
Aug. 4.....	30.0	62		.03	.00	79	15	57	7.0	235	0	153	15	.6	7.4	.18	534	258	65	1.5	726	7.7	--
Sept. 19.....	47.6	61		.02	--	82	16	59	7.5	241	0	166	16	.5	8.0	.13	554	272	74	1.6	756	7.8	--

6-6807. WINTER CREEK AT TRI-STATE CANAL, NEAR SCOTTSBLUFF, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 6, 1961	1140		59	31	47	3.9						33	74	100	--			V
Jan. 4, 1962	0950		48	23	73	4.5						--	--	--	--			
Mar. 29	1400		58	18	93	4.5						--	--	--	--			
May 10	1020		65	17	66	3.0						--	--	--	--			
June 11	1130		68	25	424	29						42	90	98	100			V
July 9	1340		69	26	83	5.8						--	--	--	--			
July 16	1320		64	28	387	29						53	95	100	--			V
July 26	1300		67	43	563	65						69	90	99	100			V
Aug. 4	1040		62	30	306	25						--	--	--	--			
Aug. 22	1325		62	36	390	38						--	--	--	--			
Sept. 6	1310		63	45	218	26						--	--	--	--			
Sept. 19	1330		58	48	167	22						--	--	--	--			

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material											Method of analysis
						Percent finer than size indicated, in millimeters											
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 6, 1961	1140			31		10	20	39	72	80	84	92	96	100			SV
Jan. 4, 1962	0950			23		10	43	70	84	89	91	95	98	100			SV
Mar. 29	1400			18		11	41	71	91	98	99	100	--	--			SV
May 10	1020	6		17		0	4	39	69	85	88	93	97	100			SV
June 11	1130			25		22	38	58	81	93	98	99	100	--			SV
July 9	1340			26		9	24	62	89	96	98	99	100	--			SV
July 16	1320			28		23	61	83	91	95	97	98	100	--			SV
July 26	1300			43		4	12	43	78	86	90	95	100	--			SV
Aug. 4	1040			30		5	19	26	70	79	84	94	100	--			SV
Aug. 22	1325			36		--	0	18	85	94	96	98	100	--			SV
Sept. 6	1310			45		--	0	10	78	97	99	100	--	--			SV
Sept. 19	1330			48		0	6	21	86	96	98	100	--	--			SV

PLATTE RIVER BASIN--Continued

6-6808. HALE DRAIN NEAR SCOTTSBLUFF, NEBR.

LOCATION.--At Tri-State canal, 135 feet downstream from culvert and 3 miles northeast of Scottsbluff, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to September 1962.

Chemical analyses, in parts per million, September 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 14, 1961.....	6.5	65		0.03		69	16	89	9.5	285	0	168	19	0.5	8.0	0.23	601	236	2	2.5	843	7.3	--
Oct. 10.....	4.6	66		.01		68	13	89	8.6	280	0	143	19	.5	7.9	.32	596	225	0	2.6	804	7.4	8
Nov. 16.....	2.3	63		.01		62	16	89	6.9	270	0	159	18	.5	9.0	.19	576	219	0	2.6	811	7.3	4
Jan. 4, 1962.	2.8	62		.04		62	15	82	8.0	270	0	143	18	.1	6.0	.18	564	216	0	2.4	802	7.3	5
Feb. 15.....	1.4	65		.00		50	15	87	7.7	231	0	158	17	.3	7.6	.20	535	185	0	2.8	734	7.7	--
Mar. 29.....	1.4	61		.02		63	14	86	8.3	264	0	154	17	.3	7.4	.18	566	216	0	2.6	786	7.7	--
May 10.....	1.8	48		.03		63	17	79	8.9	244	0	172	17	.6	5.6	.15	555	226	26	2.3	782	7.9	--
June 13.....	3.2	58		.02		67	14	89	11	269	0	158	17	.4	9.4	.16	556	223	2	2.6	793	7.9	--
July 9.....	3.6	43		.03		64	14	68	10	218	0	155	15	.5	19	.13	521	218	39	2.0	725	7.9	--
Aug. 3.....	7.2	44		.08	0.02	68	16	74	8.6	247	0	163	16	.5	6.8	.14	554	237	34	2.1	769	7.6	--
Sept. 6.....	12.6	50		.02		68	18	85	9.0	262	0	177	17	.4	7.6	.17	581	242	27	2.4	820	7.4	--

6-6808. HALE DRAIN NEAR SCOTTSBLUFF, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 8, 1961.....	1240		--	e 3	354	2.9	--	--	--	--	--	--	--	--	--			
Sept. 14.....	1250		--	6.5	136	2.4	--	--	--	--	--	--	--	--	--			
Oct. 10.....	1245		54	4.6	74	.9	--	--	--	--	--	--	--	--	--			
Jan. 4, 1962.....	1200		45	2.8	121	.9	--	--	--	--	--	--	--	--	--			
Mar. 29.....	1210		56	1.4	128	.5	--	--	--	--	--	--	--	--	--			
May 10.....	1130		70	1.8	643	3.1	47	68	83	86	90	96	100	--	--			VPWC
June 13.....	1440		72	3.2	278	2.4	--	--	--	--	--	--	--	--	--			
Aug. 3.....	1530		69	7.2	1,730	34	18	22	29	35	48	85	97	99	100			VPWC
Aug. 22.....	1440		60	11	2,060	61	11	13	17	21	30	63	85	94	100			VPWC
Sept. 6.....	1420		65	13	965	34	--	--	--	--	--	--	--	--	--			
Sept. 19.....	1445		58	14	584	22	--	--	--	--	--	--	--	--	--			

e Estimated.

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 10, 1961.....	1245			4.6		18	35	48	66	84	90	97	100	--	--		SV
Jan. 4, 1962.....	1200			2.8		19	36	53	82	90	95	98	100	--	--		SV
Mar. 29.....	1210			1.4		25	48	68	73	82	86	93	97	100	--		SV
May 10.....	1130			1.8		37	59	73	90	94	96	97	99	100	--		SV
June 13.....	1440			3.2		11	17	35	77	91	94	96	97	97	100		SV
July 9.....	1505			3.6		12	22	35	47	56	61	68	75	89	100		SV
Aug. 3.....	1530			7.2		10	23	42	60	68	73	78	83	98	100		SV
Aug. 22.....	1440			11		0	2	28	62	79	88	94	96	98	100		SV
Sept. 6.....	1420			13		5	9	14	30	46	51	57	66	93	100		SV
Sept. 19.....	1445			14		1	2	6	16	31	40	48	64	91	100		SV

PLATTE RIVER BASIN--Continued

6-6813. GERING DRAIN AT MITCHELL-GERING CANAL, NEAR GERING, NEBR.

LOCATION.--At Mitchell-Gering canal, 2.8 miles southwest of Gering, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: July 1961 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 6, 1961.	14.7	64		0.02		33	17	200	11	410	0	185	26	0.7	15	0.43	805	152	0	7.1	1,130	7.4	3
Nov. 16.....	13.6	60		.04		44	9.5	200	10	415	0	195	26	.7	17	.43	783	149	0	7.1	1,120	7.5	5
Jan. 3, 1962.	9.5	61		.03		41	8.6	182	11	352	0	188	28	.6	15	.45	791	138	0	6.7	1,130	7.9	5
Feb. 14.....	10.4	59		.03		48	7.1	202	11	428	0	195	29	.6	15	.43	809	149	0	7.2	1,150	7.7	--
Mar. 28.....	9.0	61		.02		41	9.6	213	12	420	0	193	29	.7	14	.44	807	142	0	7.8	1,140	8.1	--
May 10.....	15.1	40		.01		56	14	146	10	327	0	207	23	.6	8.8	.29	666	198	0	4.5	1,000	7.7	--
June 13.....	14.3	55		.03		43	6.9	168	12	380	0	161	24	.7	12	.39	692	136	0	6.3	990	8.2	--
July 10.....	96.1	38		.09		69	16	83	12	270	0	176	19	.6	1.2	.31	573	239	18	2.3	813	8.1	--
Sept. 7.....	36.9	36		.05		57	14	117	9.2	279	0	195	19	.6	7.0	.23	601	201	0	3.6	883	7.8	--

6-6813. GERING DRAIN AT MITCHELL-GERING CANAL, NEAR GERING, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 6, 1961	1350		62	15	239	9.7	--	--	--	--	--	40	86	98	100			V
Jan. 3, 1962	0925		39	9.5	178	4.6	--	--	--	--	--	--	--	--	--			
Mar. 28	1000		55	9.0	237	5.8	--	--	--	--	--	--	--	--	--			
May 10	1450		75	15	956	39	10	14	20	26	38	67	92	98	100			VPWC
June 13	0915		61	14	508	19	--	--	--	--	--	--	--	--	--			
July 10	0835		70	96	14,100	3,650	6	9	17	28	50	92	99	99	100			VPWC
Aug. 4	0925		64	36	1,360	132	--	--	--	--	--	--	--	--	--			
Aug. 23	0845		61	34	2,360	217	13	18	33	33	44	68	82	89	95	100		VPWC
Sept. 7	0910		59	37	2,700	270	--	--	--	--	--	--	--	--	--			
Sept. 25	0900		56	39	1,450	153	--	--	--	--	--	--	--	--	--			

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 6, 1961	1350			15		8	23	61	96	99	100	--	--	--			SV
Jan. 3, 1962	0925			9.5		3	11	49	91	99	100	--	--	--			SV
Mar. 28	1000			9.0		9	25	55	90	99	100	--	--	--			SV
May 10	1450	7		15		6	16	53	95	99	100	--	--	--			SV
June 13	0915			14		15	36	53	76	86	90	94	98	100			SV
July 10	0835			96		37	58	65	83	95	97	98	99	100			SV
Aug. 4	0925			36		14	43	60	86	98	99	100	--	--			SV
Aug. 23	0845			34		34	65	83	95	96	100	--	--	--			SV
Sept. 7	0910			37		16	33	68	96	97	100	--	--	--			SV
Sept. 25	0900			39		4	10	27	72	83	85	88	93	100			SV

PLATTE RIVER BASIN--Continued

6-6822. ALLIANCE DRAIN NEAR MINATARE, NEBR.

LOCATION.--At gaging station, 50 feet north of county road, 0.1 mile downstream from Tri-State canal, and 4.5 miles north of Minatare, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: July 1961 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 5, 1961.	8.1	55		0.02		83	14	59	9.1	228	0	174	18	0.5	1.6	0.09	577	266	79	1.6	769	7.4	4
Nov. 17.....	4.6	56		.02		82	16	60	9.4	229	0	189	18	.6	2.9	.24	572	272	84	1.6	780	7.4	4
Jan. 4, 1962.	2.9	52		.02		78	18	61	10	232	0	169	20	.5	3.1	.11	564	268	78	1.6	793	7.4	4
Feb. 15.....	2.9	57		.02		85	14	62	11	229	0	187	18	.6	2.8	.10	570	269	81	1.6	786	7.5	--
Mar. 28.....	1.7	54		.02		85	14	62	10	234	0	184	16	.4	.6	.10	570	270	78	1.6	771	7.6	--
May 10.....	4.7	41		.02		81	19	63	8.7	236	0	194	19	.4	.6	.10	560	279	85	1.6	796	7.6	--
June 11.....	9.5	44		.03		75	22	62	8.8	230	0	192	19	.5	.3	.13	564	276	87	1.6	795	7.5	--
July 9.....	7.1	42		.00		81	18	64	10	225	0	200	18	.5	.4	.10	568	274	89	1.7	797	7.6	--
July 16.....	8.5	44		.03	0.02	87	15	65	9.3	234	0	197	18	.7	.4	.20	570	280	88	1.7	793	7.6	--
Aug. 22.....	30.5	46		.04		89	19	67	12	244	0	212	20	.6	.5	.10	624	300	100	1.7	844	7.4	--
Sept. 6.....	34.0	49		.01		85	17	63	11	229	0	199	17	.6	2.0	.12	584	282	94	1.6	803	7.2	--

6-6822. ALLIANCE DRAIN NEAR MINATARE, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct, 5, 1961.....	1545		60	8.1	160	3.5	--	--		--		61	98	100	--	--		V
Jan. 4, 1962.....	1350		44	2.9	160	1.3	--	--		--		--	--	--	--	--		
Mar. 28.....	1445		51	1.7	86	.4	--	--		--		--	--	--	--	--		
May 10.....	0900		57	4.7	90	1.1	--	--		--		--	--	--	--	--		
June 11.....	1345		68	9.5	228	5.8	--	--		--		--	--	--	--	--		
July 9.....	1155		68	7.1	368	7.1	--	--		--		--	--	--	--	--		
July 16.....	1445		63	8.5	667	15	--	--		--		46	92	100	--	--		V
July 26.....	1100		63	18	2,560	124	10	12	16	19	26	67	94	99	100	--		VPWC
Aug. 4.....	1145		62	22	2,100	125	--	--		--		23	40	54	93	100		V
Aug. 22.....	1130		63	30	1,660	134	--	--		--		--	--	--	--	--		
Sept. 6.....	1120		60	34	4,200	386	3	3		6		22	42	48	81	98	100	VPWC
Sept. 19.....	1205		58	28	559	42	--	--		--		--	--	--	--	--		

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 5, 1961.....	1545			8.1		9	23	38	50	54	57	62	69	77	100		SV
Jan. 4, 1962.....	1350			2.9		15	43	75	93	96	96	97	98	98	100		SV
Mar. 28.....	1445			1.7		1	9	15	23	27	31	38	49	69	100		SV
May 10.....	0900	5		4.7		8	44	58	69	76	79	85	91	100	--		SV
June 11.....	1345			9.5		3	7	32	82	96	99	100	--	--	--		SV
July 9.....	1155			7.1		1	12	45	80	94	98	100	--	--	--		SV
July 16.....	1445			8.5		3	14	50	85	95	98	100	--	--	--		SV
July 26.....	1100			18		18	37	56	81	89	92	94	96	98	100		SV
Aug. 4.....	1145			22		0	3	36	90	93	98	99	100	--	--		SV
Aug. 22.....	1130			30		--	0	15	80	98	99	100	--	--	--		SV
Sept. 6.....	1120			34		0	1	9	74	90	93	97	99	100	--		SV
Sept. 19.....	1205			28		0	3	15	52	73	79	86	92	98	100		SV

PLATTE RIVER BASIN--Continued

6-6823. NINEMILE DRAIN NEAR MINATARE, NEBR.

LOCATION.--At gaging station, 25 feet downstream from county highway bridge, 0.5 mile downstream from Tri-State canal, and 6.5 miles northeast of Minatare, Scottsbluff County.
RECORDS AVAILABLE.--Chemical analyses: July 1961 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 5, 1961.	25.7	65		0.02		78	14	48	6.9	215	0	143	16	0.6	6.6	0.11	515	254	78	1.3	704	7.5	5
Nov. 17.....	15.0	62		.01		77	15	48	7.0	219	0	151	16	.6	8.0	.20	517	253	73	1.3	697	7.4	4
Jan. 5, 1962.	12.0	59		.02		68	13	46	7.6	184	0	138	16	.4	7.1	.11	475	222	71	1.3	653	7.9	4
Feb. 15.....	12.0	63		.02		77	14	47	7.5	219	0	141	15	.6	8.3	.11	507	250	70	1.3	691	8.1	--
Mar. 30.....	12.0	61		.01		79	13	48	7.5	218	0	143	15	.5	8.1	.11	513	252	73	1.3	685	7.5	--
May 9.....	11.5	63		.03		75	15	48	7.4	216	0	145	15	.6	7.5	.12	513	250	73	1.3	689	7.7	--
June 12.....	16.6	62		.02		76	15	48	8.1	224	0	149	15	.6	7.4	.13	504	252	68	1.3	694	8.0	--
July 9.....	13.0	65		.00		74	16	47	7.6	218	0	143	15	.6	6.8	.13	503	252	73	1.3	681	8.2	--
July 16.....	59.6	31		.02	0.00	70	17	54	4.0	209	0	160	14	.5	3.0	.08	476	243	72	1.5	683	8.1	--
Aug. 22.....	49.6	62		.01		81	15	52	8.1	232	0	152	16	.5	3.8	.13	527	264	74	1.4	721	7.4	--
Sept. 6.....	120	47		.08		78	17	60	8.6	227	0	174	16	.5	4.8	.11	535	265	79	1.6	752	7.5	--

6-6823. NINEMILE DRAIN NEAR MINATARE, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 5, 1961	1145		59	26	47	3.3						35	93	100	--			V
Jan. 5, 1962	1310		50	12	51	1.7						--	--	--	--			
Mar. 30	0935		48	12	48	1.6						--	--	--	--			
May 9	1045		62	12	224	7.3						56	86	99	100			V
June 12	1140		63	17	68	3.1						--	--	--	--			
July 9	1020		64	13	46	1.6						--	--	--	--			
July 16	1600		70	60	600	97	21	26		35		53	86	98	100			VPWC
Aug. 4	1305		67	60	415	67						--	--	--	--			
Aug. 22	0950		60	50	237	32						--	--	--	--			
Sept. 6	1000		59	120	672	218						--	--	--	--			
Sept. 19	1040		67	60	337	55						--	--	--	--			

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Jan. 5, 1962	1310			12		9	34	61	75	84	86	90	94	100	--	--	SV
Mar. 30	0935			12		7	28	49	61	65	67	71	77	88	100	--	SV
May 9	1045	6		12		3	10	32	51	60	63	69	76	85	100	--	SV
June 12	1140			17		12	31	50	64	71	74	77	82	85	100	--	SV
July 9	1020			13		12	24	46	50	52	55	59	67	85	100	--	SV
July 16	1600			60		1	8	22	34	38	39	40	42	52	72	100	SV
Aug. 4	1305			60		--	4	20	29	31	32	32	35	47	81	100	SV
Aug. 22	0950			50		13	22	29	33	36	38	44	60	92	100	--	SV
Sept. 6	1000			120		15	44	88	89	89	89	89	90	90	100	--	SV
Sept. 19	1040			60		4	19	45	54	56	58	59	63	68	88	100	SV

PLATTE RIVER BASIN--Continued

6-6832. WEST WILDHORSE DRAIN NEAR BAYARD, NEBR.

LOCATION.--At Tri-State canal, 8 feet upstream from culvert opening and 5.2 miles northwest of Bayard, Morrill County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to June 1962 (discontinued).

Chemical analyses, in parts per million, September 1961 to June 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 14, 1961.....	7.7	66		0.04		91	12	59	11	235	0	184	18	0.6	11	0.15	580	276	83	1.5	794	7.1	--
Oct. 10.....	4.9	69		.02		83	18	60	9.1	226	0	208	18	.6	12	.12	587	280	95	1.6	793	7.4	4
Nov. 17.....	3.5	66		.03		88	13	59	9.2	230	0	182	19	.5	13	.16	592	275	86	1.5	792	7.4	4
Jan. 5, 1962.	2.0	65		.02		88	13	59	10	232	0	175	19	.3	13	.13	603	274	84	1.5	795	2.3	4
Feb. 15.....	1.7	68		.01		87	15	61	10	230	0	184	19	.5	15	.12	601	277	88	1.6	784	7.7	--
Mar. 29.....	.9	64		.02		88	13	61	10	229	0	181	18	.5	13	.13	595	275	87	1.6	786	7.9	--
May 9.....	.5	65		.02		74	14	59	9.6	195	0	179	19	.5	13	.11	559	241	81	1.7	743	7.9	--
June 12.....	1.3	68		.03		84	15	59	10	224	0	176	19	.5	14	.14	591	271	87	1.6	773	8.2	--

6-6832. WEST WILDHORSE DRAIN NEAR BAYARD, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to June 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Sept. 14, 1961.....	1100		--	7.7	204	4.2											
Oct. 10.....	0925		54	4.9	190	2.5											
Jan. 5, 1962.....	1030		49	2.0	699	3.8											
Mar. 29.....	1030		54	.9	255	.6											
May 9.....	1000		63	.5	56	.1											
June 12.....	1440		67	1.3	258	.9											

Particle-size analyses of bed material, October 1961 to June 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 10, 1961.....	0925			4.9		0	2	3	6	12	16	21	25	33	75	100	SV
Jan. 5, 1962.....	1030			2.0		17	65	71	74	78	83	88	93	100	--		SV
Mar. 29.....	1030			.9		14	31	36	42	51	57	68	80	93	100		SV
May 9.....	1000	4		.5		14	30	34	38	44	49	60	73	84	100		SV
June 12.....	1440			1.3		19	45	47	50	53	57	67	79	94	100		SV

PLATTE RIVER BASIN--Continued

6-6833. *WILDHORSE DRAIN NEAR BAYARD, NEBR.*

LOCATION.--At Tri-State canal, 11 feet above concrete ledge control, 36 feet downstream from culvert, and 4.7 miles northeast of Bayard, Morrill County.
RECORDS AVAILABLE.--Chemical analyses: September 1961 to June 1962 (discontinued).

Chemical analyses, in parts per million, September 1961 to June 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Sept. 14, 1961.....	4.6	56		0.03		92	15	47	9.1	241	0	171	16	0.6	7.2	0.15	557	292	94	1.2	765	7.5	--
Oct. 10.....	3.2	62		.00		94	14	46	9.2	247	0	156	17	.7	7.2	.15	569	294	91	1.2	758	7.4	7
Nov. 17.....	2.2	59		.02		90	15	45	7.7	244	0	157	15	.6	7.6	.12	542	286	86	1.2	737	7.5	4
Jan. 5, 1962.	1.4	59		.02		71	12	41	8.2	176	0	137	15	.5	8.8	.10	474	228	84	1.2	636	7.7	5
Feb. 15.....	1.0	61		.00		84	13	44	7.6	226	0	150	15	.5	7.0	.12	527	264	79	1.2	691	7.3	--
Mar. 29.....	.5	58		.02		83	14	42	8.0	222	0	146	14	.3	6.0	.15	504	266	84	1.1	676	7.8	--
May 9.....	.6	58		.01		82	13	44	8.8	219	0	152	15	.5	8.8	.10	514	260	80	1.2	700	7.9	--
June 12.....	.7	62		.01		76	13	41	9.6	202	0	141	14	.5	5.9	.11	483	242	76	1.1	653	7.5	--

6-6833. WILDHORSE DRAIN NEAR BAYARD, NEBR.--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to June 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 8, 1961	0815		--	e 1.5	187	0.8											
Sept. 14	0930		--	4.6	202	2.5											
Oct. 10	2215		54	3.2	75	.6											
Jan. 5, 1962	0910		44	1.4	84	.3											
Mar. 29	0920		47	.5	331	.4											
May 9	0845		60	.6	164	.3											
June 12	1330		69	.7	295	.6											

e Estimated.

Particle-size analyses of bed material, October 1961 to June 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 10, 1961	2215			3.2		1	10	24	29	33	36	42	54	81	90	100	SV
Jan. 5, 1962	0910			1.4		51	94	98	100	--	--	--	--	--	--		V
Mar. 29	0920			.5		35	91	96	98	100	--	--	--	--	--		V
May 9	0845	3		.6		7	17	58	71	77	79	81	84	86	100		SV
June 12	1330			.7		13	65	84	92	95	96	98	99	100	--		SV

PLATTE RIVER BASIN--Continued

6-7580. KIOWA CREEK AT ELBERT, COLO.

LOCATION.--At gaging station, 0.2 mile southeast of Elbert, Elbert County, and 0.5 mile upstream from West Kiowa Creek.
DRAINAGE AREA.--28.6 square miles.
RECORDS AVAILABLE.--Sediment records: April 1956 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 0.1 ton (estimated) Nov. 20; minimum daily, 0 tons on many days.
EXTREMES, 1956-62.--Sediment concentrations: Maximum daily, 6,500 ppm July 31, 1957; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 1,400 tons Mar. 24, 1960; minimum daily, 0 tons on many days each year.
REMARKS.--Flow affected by ice during part of period Dec. 8 to Apr. 4. No flow during period July to September; record is omitted.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0		0	0		0	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	.1		T
6	0		0	0		0	.1		T
7	0		0	0		0	.1		T
8	0		0	0		0	0		0
9	.1		T	0		0	0		0
10	.1		T	0		0	0		0
11	0		0	0		0	0		0
12	0		0	0		0	0		0
13	0		0	.1		T	0		0
14	0		0	0		0	0		0
15	0		0	0		0	0		0
16	0		0	0		0	0		0
17	0		0	0		0	0		0
18	0		0	0		0	0		0
19	0		0	.1		T	0		0
20	0		0	.2		.1	0		0
21	0		0	.1		T	0		0
22	0		0	0		0	0		0
23	0		0	0		0	0		0
24	0		0	0		0	0		0
25	0		0	0		0	0		0
26	0		0	0		0	0		0
27	0		0	0		0	0		0
28	0		0	0		0	0		0
29	.1		T	0		0	0		0
30	0		0	0		0	0		0
31	0		0	--		--	0		0
Total	0.3		0.1	0.5		0.2	0.3		0.1

T Less than 0.05 ton.

PLATTE RIVER BASIN--Continued

6-7580. KIOWA CREEK AT ELBERT, COLO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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							C 0.1		T
2							C .1		T
3							C .1		T
4							C .1		T
5							C .1		T
6							C .1		T
7							C .1		T
8							C .1		T
9							C .1		T
10							C .1		T
11							C .1		T
12							C .1		T
13							C .1		T
14							C .1		T
15							C .1		T
16							C .1		T
17							C .1		T
18							C .1		T
19							C .1		T
20							C .1		T
21							C .1		T
22							C .1		T
23							C .1		T
24							C .1		T
25							C .1		T
26							C .1		T
27							C .1		T
28							C .1		T
29							C .1		T
30							C .1		T
31							C .1		T
Total	0		0	0		0	3.1		0.3

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	C 0.1		T						
2	C .1		T						
3	C .1		T						
4	C .1		T						
5	.1		T						
6	.1		T						
7	.1		T						
8	.1		T						
9	.1		T						
10	0		0						
11	0		0						
12	0		0						
13	.1		T						
14	.1		T						
15	.1		T						
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	.1		T						
29	.1		T						
30	.1		T						
31	--		--						
Total	1.5		0.4	0		0	0		0

Total discharge for year (cfs-days)	5.7
Total load for year (tons)	1.1

T Less than 0.05 ton.
C Composite period.

PLATTE RIVER BASIN--Continued

6-7582. KIOWA CREEK AT KIOWA, COLO.

LOCATION.--At gaging station, at cableway 0.7 mile upstream from bridge on State Highway 86 and 0.7 mile south of Kiowa, Elbert County.
DRAINAGE AREA.--111 square miles.
RECORDS AVAILABLE.--Sediment records: April 1956 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days during May to September.
Sediment loads: Maximum daily, 40 tons (estimated) Nov. 12, 13; minimum daily, 0 tons on many days during May to September.
EXTREMES, 1956-62.--Sediment concentrations: Maximum daily, 15,000 ppm Aug. 1, 1956; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 43,000 tons July 31, 1956; minimum daily, 0 tons on many days each year.
REMARKS.--Flow affected by ice during most of periods Nov. 16-25, Dec. 9 to Mar. 8, Mar. 11-16. No flow during period July to September; record is omitted.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2.3		2	5.6		5	4.8		3
2	2.5		2	4.8		3	4.5		2
3	2.1		2	5.2		4	4.1		2
4	1.6		2	6.3		9	4.1		2
5	1.9		2	6.6		10	5.6		6
6	2.1		2	6.6		10	6.3		9
7	2.1		2	8.5		30	5.9		7
8	2.1		2	9.0		30	4.5		2
9	3.0		2	6.6		10	C 3		.4
10	3.0		2	8.0		20	C 3		.4
11	3.2		2	7.5		20	C 3		.4
12	3.4		2	9.0		40	C 3		.4
13	3.8		2	10		40	C 3		.4
14	4.1		2	5.9		7	C 3		.4
15	4.5		2	3.8		1	C 3		.4
16	4.8		2	3.5		.8	C 3		.4
17	4.8	140	2	3.0		.4	C 3		.4
18	5.2		3	2.7		.3	C 3		.4
19	5.2		3	2.5		.2	C 3		.4
20	5.2		3	2.5		.2	C 3		.4
21	5.9		9	2.8		.3	C 3		.4
22	5.2		3	3.2		.6	C 3		.4
23	4.8		1	3.5		.8	C 3		.4
24	5.6		5	4.0		1	C 3		.4
25	5.2		3	5.5		5	C 3		.4
26	5.9		9	4.8		3	C 3		.4
27	5.6		5	3.8		1	C 3		.4
28	5.2		3	5.6		6	C 3		.4
29	6.3		10	4.8		3	C 3		.4
30	6.3		10	5.6		6	C 3		.4
31	6.6		10	--		--	C 3		.4
Total	129.5		111	161.2		267.6	108.8		42.2

C Composite period.

PLATTE RIVER BASIN--Continued

6-7582. KIOWA CREEK AT KIOWA, COLO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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	C 2.5		0.2	C 5		5	3.5	--	1
2	C 2.5		.2	C 5		5	4.5	--	5
3	C 2.5		.2	C 5		5	5	--	20
4	C 2.5		.2	C 5		5	4.5	--	5
5	C 2.5		.2	C 5		5	4	94	1
6	C 2.5		.2	C 5		5	5.5	--	4
7	C 2.5		.2	C 5		5	7	--	8
8	C 2.5		.2	C 5		5	7.5	520	11
9	C 2.5		.2	C 5		5	6.6	--	8
10	C 2.5		.2	C 5		5	7.5	--	10
11	C 2.5		.2	C 5		5	7	--	9
12	C 2.5		.2	C 5		5	6.5	--	8
13	C 2.5		.2	C 5		5	6	--	7
14	C 2.5		.2	C 5		5	7	--	9
15	C 2.5		.2	C 5		5	9	--	20
16	C 2.5		.2	C 5		5	11	670	20
17	C 2.5		.2	C 5		5	11	--	20
18	C 2.5		.2	C 5		5	10	--	20
19	C 2.5		.2	C 5		5	9.0	--	10
20	C 2.5		.2	C 5		5	8.0	--	8
21	C 2.5		.2	C 5		5	9.5	--	10
22	C 2.5		.2	C 5		5	9.5	--	10
23	C 2.5		.2	C 5		5	8.5	--	10
24	C 2.5		.2	C 5		5	9.0	--	10
25	C 2.5		.2	C 5		5	9.5	--	10
26	C 2.5		.2	C 5		5	9.0	--	10
27	C 2.5		.2	C 5		5	9.0	--	10
28	C 2.5		.2	C 5		5	8.0	--	8
29	C 2.5		.2	--		--	8.5	--	10
30	C 2.5		.2	--		--	8.0	--	8
31	C 2.5		.2	--		--	5.6	--	4
Total	77.5		6.2	140		140	234.2	--	304

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	4.8	3		3.8	2		0.4		T
2	4.8	3		3.4	1		.4		T
3	3.0	.8		3.0	.8		.1		T
4	3.4	1		2.7	.6		0		0
5	3.4	1		2.7	.6		0		0
6	3.4	1		2.5	.5		.3		T
7	3.4	1		2.3	.4		.6		.1
8	3.2	1		2.1	.3		1.2		.2
9	3.2	1		2.1	.3		.8		.1
10	3.2	1		1.9	.3		.5		T
11	3.4	1		1.9	.3		.2		T
12	3.4	1		.7	.1		.1		T
13	3.0	.8		.5	T		0		0
14	2.3	.4		.5	T		0		0
15	2.3	.4		.3	T		0		0
16	2.3	.4		.5	T		0		0
17	2.3	.4		.1	T		0		0
18	1.9	.3		.7	.1		0		0
19	1.9	.3		.1	T		0		0
20	2.3	.4		0			0		0
21	2.1	.3		0			0		0
22	2.3	.4		0			0		0
23	2.1	.3		0			0		0
24	2.3	.4		0			0		0
25	2.1	.3		0			0		0
26	2.3	.4		0			0		0
27	2.1	.3		.1	T		0		0
28	2.5	.5		.2	T		0		0
29	3.2	1		.1	T		0		0
30	3.2	1		0			0		0
31	--	--		0			--		--
Total	85.1		24.1	32.2		7.3	4.6		0.1

Total discharge for year (cfs-days)..... 973.1
Total load for year (tons)..... 902.5

T Less than 0.05 ton.
C Composite period.

PLATTE RIVER BASIN--Continued

6-7640. SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on U.S. Highway 385, 0.9 mile southeast of Julesburg, Sedgwick County, 3 miles upstream from Colorado-Nebraska State line, and 8 miles downstream from Lodgepole Creek.
DRAINAGE AREA.--23,138 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1962.
Water temperatures: October 1945 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,550 ppm May 18-26; minimum, 1,070 ppm May 27-29.
Hardness: Maximum, 702 ppm Dec. 16-19; minimum, 468 ppm May 27-29.
Specific conductance: Maximum daily, 2,490 micromhos Jan. 22; minimum daily, 1,350 micromhos May 27.
Water temperatures: Maximum, 87°F Aug. 14, 28; minimum, 33°F on many days during November to March.
EXTREMES, 1945-62.--Dissolved solids: Maximum, 1,860 ppm Apr. 13, 1955; minimum, 429 ppm June 16, 1956.
Hardness: Maximum, 860 ppm Dec. 1, 1960; minimum, 173 ppm Mar. 1-12, 1947.
Specific conductance: Maximum daily, 2,490 micromhos Jan. 22, 1962; minimum daily, 617 micromhos Aug. 19, 1953.
Water temperatures: Maximum (1946-49, 1950-62), 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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1961.	918	--	--	--	--	154	--	273	0	--	--	--	--	--	1,280	1.74	3,170	613	389	2.7	1,650	7.7	--
Oct. 11-31.....	1,384	--	--	--	--	144	--	282	0	--	--	--	--	--	1,230	1.67	4,600	596	365	2.6	1,600	7.7	--
Nov. 1-30.....	1,416	--	--	--	--	150	--	293	0	--	--	--	--	--	1,180	1.60	4,510	606	366	2.7	1,620	7.7	--
Dec. 1-15.....	1,113	19	0.01	159	58	150	11	307	0	588	55	0.8	4.7	0.16	1,290	1.75	3,880	633	381	2.6	1,650	7.4	4
Dec. 16-19.....	1,458	--	--	--	--	168	--	335	0	--	--	--	--	--	1,430	1.94	5,630	702	427	2.8	1,830	7.7	--
Dec. 20-31.....	1,433	--	--	--	--	141	--	301	0	--	--	--	--	--	1,220	1.66	4,720	606	359	2.5	1,600	7.6	--
Jan. 1-11, 1962.	1,217	--	--	--	--	162	--	331	0	--	--	--	--	--	1,370	1.86	4,500	670	399	2.7	1,750	7.8	--
Jan. 12-31.....	1,254	--	--	--	--	168	--	336	0	--	--	--	--	--	1,420	1.93	4,810	695	419	2.8	1,770	7.7	--
Feb. 1-13.....	1,839	--	--	--	--	137	--	278	0	--	--	--	--	--	1,140	1.55	5,660	564	336	2.5	1,510	7.6	--
Feb. 14-28.....	1,209	--	--	--	--	150	--	288	0	--	--	--	--	--	1,250	1.70	4,080	617	381	2.6	1,630	7.7	--
Mar. 1-31.....	1,260	19	.07	162	53	154	9.1	291	0	598	55	.8	8.4	.23	1,290	1.75	4,390	622	383	2.7	1,670	7.4	2
Apr. 1-30.....	583	--	--	--	--	160	--	274	0	--	--	--	--	--	1,290	1.75	2,030	630	405	2.8	1,660	7.4	--
May 1-15.....	32.1	--	--	--	--	169	--	254	0	--	--	--	--	--	1,370	1.86	119	655	447	2.9	1,760	7.4	--
May 16-17.....	84.5	--	--	--	--	142	--	208	0	--	--	--	--	--	1,130	1.54	258	530	359	2.7	1,490	7.5	--
May 18-26.....	201	--	--	--	--	200	--	271	0	--	--	--	--	--	1,550	2.11	841	698	476	3.3	1,950	7.4	--
May 27-29.....	864	--	--	--	--	150	--	204	0	--	--	--	--	--	1,070	1.46	2,500	468	301	3.0	1,450	7.6	--
May 30-June 30..	797	22	.02	168	54	173	15	265	0	683	61	.7	1.8	.25	1,390	1.89	2,990	641	424	3.0	1,770	7.6	7
July 1-30.....	268	--	--	--	--	169	--	253	0	--	--	--	--	--	1,370	1.86	991	635	428	2.9	1,760	7.5	--

July 31-Aug. 7, 1962.....	1,050	--	--	--	--	152	--	258	0	--	--	--	--	--	1,250	1.70	3,540	590	378	2.7	1,610	7.5	--
Aug. 8-31.....	108	--	--	--	--	170	--	255	0	--	--	--	--	--	1,390	1.89	405	653	444	2.9	1,770	7.6	--
Sept. 1-30.....	92.5	27	.00	179	56	183	16	252	0	730	69	.8	1.9	.27	1,470	2.00	367	678	471	3.0	1,860	7.6	--
Weighted average.....	849	--	--	--	--	155	--	290	0	--	--	--	--	--	1,280	1.74	2,930	623	385	2.7	1,660	7.6	--
Time-weighted average.....	--	--	--	--	--	161	--	278	0	--	--	--	--	--	1,320	--	--	634	405	2.8	1,700	7.6	--
Tons per day..	--	--	--	--	--	355	--	664	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

PLATTE RIVER BASIN--Continued

6-7657. SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.

LOCATION.--At gaging station at Parshall Flume in sec. 28, T. 13 N., R. 29 W., near Maxwell, Lincoln County.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,070 ppm Jan. 1-31; minimum, 528 ppm Oct. 11-31.
Hardness: Maximum, 530 ppm Jan. 1-31; minimum, 230 ppm Sept. 1-30.
Specific conductance: Maximum daily, 1,680 micromhos Jan. 23; minimum daily, 658 micromhos May 17.
Water temperatures: Maximum, 82°F Aug. 9; minimum, 33°F on many days during November to March.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 1,070 ppm Jan. 1-31, 1962; minimum, 368 ppm May 15, 1951.
Hardness: Maximum, 530 ppm Jan. 1-31, 1962; minimum, 171 ppm May 15, 1951.
Specific conductance: Maximum daily, 1,680 micromhos Jan. 23, 1962; minimum daily, 403 micromhos Jan. 9, 1957.
Water temperatures: Maximum, 85°F June 13, 15, 1952, July 27, 31, 1957; 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 given in reports of State Engineer.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10. 1961.	1,257	--	--	--	--	89	--	234	0	--	--	--	--	--	693	0.94	2,350	322	130	2.2	991	7.6	--
Oct. 11-31.....	1,319	--	--	--	--	72	--	218	0	--	--	--	--	--	528	.72	1,880	237	58	2.0	794	7.4	--
Nov. 1-30.....	1,521	--	--	--	--	97	--	232	0	--	--	--	--	--	758	1.03	3,110	365	175	2.2	1,070	7.4	--
Dec. 1-16.....	1,076	24	0.01	102	37	106	10	236	0	375	37	0.6	1.5	0.08	846	1.15	2,460	408	214	2.3	1,160	7.6	4
Dec. 17-31.....	1,243	--	--	--	--	113	--	266	0	--	--	--	--	--	954	1.30	3,200	473	255	2.3	1,300	7.6	--
Jan. 1-31, 1962.	1,072	--	--	--	--	128	--	260	0	--	--	--	--	--	1,070	1.46	3,100	530	317	2.4	1,430	7.2	--
Feb. 1-28.....	1,601	--	--	--	--	110	--	248	0	--	--	--	--	--	978	1.33	4,230	480	277	2.2	1,310	7.4	--
Mar. 1-31.....	1,587	27	.02	120	37	107	9.8	256	0	400	39	.7	2.7	.18	914	1.24	3,920	453	243	2.2	1,240	7.5	4
Apr. 1-30.....	1,201	--	--	--	--	100	--	196	0	--	--	--	--	--	786	1.07	2,550	381	220	2.2	1,110	7.4	--
May 1-31.....	1,380	--	--	--	--	71	--	216	0	--	--	--	--	--	538	.73	2,000	250	73	2.0	795	7.3	--
June 1-30.....	1,267	31	.01	78	23	73	11	209	0	234	26	.6	1.2	.09	599	.81	2,050	288	117	1.9	866	7.4	7
July 1-31.....	1,395	--	--	--	--	82	--	206	0	--	--	--	--	--	641	.87	2,410	299	130	2.1	923	7.6	--
Aug. 1-31.....	1,708	--	--	--	--	94	--	207	0	--	--	--	--	--	654	.89	3,020	290	120	2.4	958	7.3	--
Sept. 1-30.....	1,294	20	.00	60	20	80	11	213	0	194	23	.6	1.4	.15	534	.73	1,870	230	55	2.3	794	7.4	--
Weighted average.....	1,372	--	--	--	--	94	--	226	0	--	--	--	--	--	742	1.01	2,750	354	168	2.2	1,040	7.4	--
Time-weighted average.....	--	--	--	--	--	94	--	226	0	--	--	--	--	--	745	--	--	355	170	2.2	1,050	7.4	--
Tons per day..	--	--	--	--	--	347	--	838	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

6-7657. SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

PLATTE RIVER BASIN--Continued

6-7660. PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging station at highway bridges, 0.5 mile and 2.5 miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte Rivers.
DRAINAGE AREA.--56,900 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 665 ppm Jan. 1-31; minimum, 439 ppm June 1-30.
Hardness: Maximum, 336 ppm Jan. 1-31; minimum, 210 ppm May 1-31.
Specific conductance: Maximum daily, 1,460 micromhos Jan. 22 (chan. 1); minimum daily, 435 micromhos Sept. 17 (chan. 1).
Water temperatures: Maximum, 75°F July 21 (chan. 1); minimum, freezing point on many days during December to March.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 896 ppm Feb. 19-22, 1953; minimum, 270 ppm June 21, 1960.
Hardness: Maximum, 404 ppm Mar. 1-4, 1958; minimum, 133 ppm June 21, 1960.
Specific conductance: Maximum daily, 1,460 micromhos Jan. 22, 1962 (chan. 1); minimum daily, 305 micromhos Jan. 13, 1956, Jan. 10, 1957 (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, Nebr. Records of specific conductance of daily samples, taken at each of the two major channels, available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1961.	130	--	--	--	--	55	--	226	0	--	--	--	--	--	468	0.64	164	230	45	1.6	691	7.2	--
Oct. 11-31.....	144	--	--	--	--	52	--	225	0	--	--	--	--	--	456	.62	177	223	38	1.5	675	7.2	--
Nov. 1-30.....	192	--	--	--	--	55	--	223	0	--	--	--	--	--	496	.67	257	247	64	1.5	721	7.0	--
Dec. 1-16.....	242	36	0.00	78	23	67	11	240	0	200	22	0.6	2.6	0.03	584	.79	382	290	93	1.7	841	7.6	4
Dec. 17-31.....	254	--	--	--	--	51	--	224	0	--	--	--	--	--	488	.66	335	242	58	1.4	710	7.0	--
Jan. 1-31, 1962.	465	--	--	--	--	75	--	250	0	--	--	--	--	--	665	.90	835	336	131	1.8	959	7.5	--
Feb. 1-28.....	474	--	--	--	--	58	--	212	0	--	--	--	--	--	550	.75	704	274	100	1.5	779	7.2	--
Mar. 1-31.....	249	36	.01	72	20	53	9.6	218	0	162	19	.6	2.0	.09	504	.69	338	260	81	1.4	735	7.5	3
Apr. 1-30.....	168	--	--	--	--	58	--	216	0	--	--	--	--	--	519	.71	235	267	90	1.5	748	7.6	--
May 1-31.....	391	--	--	--	--	56	--	215	0	--	--	--	--	--	443	.60	468	210	34	1.7	659	7.4	--
June 1-30.....	357	37	.02	66	15	47	11	223	0	126	15	.6	1.2	.08	439	.60	423	225	42	1.4	644	7.6	8
July 1-31.....	247	--	--	--	--	49	--	211	0	--	--	--	--	--	441	.60	294	220	47	1.4	649	7.7	--
Aug. 1-31.....	302	--	--	--	--	65	--	216	0	--	--	--	--	--	481	.65	392	219	42	1.9	708	7.5	--
Sept. 1-30.....	140	34	.00	63	16	60	11	219	0	150	18	.6	1.4	.12	479	.65	181	224	44	1.7	694	7.4	--
Weighted average.....	280	--	--	--	--	58	--	223	0	--	--	--	--	--	512	0.70	387	253	71	1.6	744	7.4	--
Time-weighted average.....	--	--	--	--	--	57	--	222	0	--	--	--	--	--	501	--	--	248	66	1.6	729	7.4	--
Tons per day..	--	--	--	--	--	44.0	--	169	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

6-7660. PLATTE RIVER AT BRADY, NEBR.--Continued

CHANNEL 1

Temperature (°F) of water, water year October 1961 to September 1962

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

CHANNEL 4

Temperature (°F) of water, water year October 1961 to September 1962

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

PLATTE RIVER BASIN--Continued

6-7680. PLATTE RIVER NEAR OVERTON, NEBR.

LOCATION.--At gaging station at highway bridge, 4 miles south of Overton, Dawson County, and 4 miles downstream from Plum Creek.
DRAINAGE AREA.--58,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952, November 1958 to September 1962.
Water temperatures: November 1958 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 866 ppm Feb. 1-17; minimum, 440 ppm July 11-13.
Hardness: Maximum, 433 ppm Feb. 1-17; minimum, 218 ppm July 11-13.
Specific conductance: Maximum daily, 1,420 micromhos Feb. 8 (south chan.); minimum daily, 441 micromhos June 8 (north chan.).
Water temperatures: Maximum, 94°F Aug. 19 (south chan.); minimum, freezing point on many days during December to March.
EXTREMES, 1958-62.--Dissolved solids: Maximum, 866 ppm Feb. 1-17, 1962; minimum, 270 ppm Aug. 13, 1961.
Hardness: Maximum, 433 ppm Feb. 1-17, 1962; minimum, 145 ppm Aug. 13, 1961.
Specific conductance: Maximum daily, 1,420 micromhos Feb. 8, 1962 (south chan.); minimum daily, 362 micromhos Aug. 13, 1961 (south chan.).
Water temperatures: Maximum, 98°F June 13, 1959 (south chan.), July 9, 1960 (north chan.); minimum, freezing point on many days during winter months.
REMARKS.--Daily samples for chemical analysis from each of two major channels composited by discharge. Records of specific conductance of daily samples, taken at each of the two major channels, available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1961.	1,309	--	--	--	--	73	--	222	0	191	--	--	--	--	528	0.72	1,870	237	55	2.1	805	7.4	--
Nov. 1-30.....	1,729	22	0.01	69	23	76	12	223	0	216	24	0.5	1.7	0.06	571	.78	2,670	267	84	2.0	846	7.5	3
Dec. 1-31.....	1,454	--	--	--	--	83	--	244	0	274	--	--	--	--	684	.93	2,890	335	135	2.0	985	7.7	--
Jan. 1-7, 1962..	1,407	--	--	--	--	56	--	114	0	221	--	--	--	--	488	.66	1,850	220	127	1.6	710	7.8	--
Jan. 8-16.....	1,356	--	--	--	--	94	--	260	0	328	--	--	--	--	811	1.10	2,970	404	191	2.0	1,140	7.6	--
Jan. 17.....	1,200	35	.08	99	32	89	11	271	0	299	25	.7	2.9	.16	766	1.04	2,480	379	157	2.0	1,060	7.7	3
Jan. 18-31.....	1,311	--	--	--	--	93	--	263	0	332	--	--	--	--	803	1.09	2,840	397	181	2.0	1,120	7.7	--
Feb. 1-17.....	2,562	--	--	--	--	100	--	262	0	367	--	--	--	--	866	1.18	5,990	433	218	2.1	1,190	7.4	--
Feb. 18-28.....	1,562	--	--	--	--	98	--	258	0	364	--	--	--	--	861	1.17	3,630	432	220	2.1	1,180	7.3	--
Mar. 1-30.....	2,171	--	--	--	--	87	--	247	0	317	--	--	--	--	779	1.06	4,570	389	186	1.9	1,090	7.6	--
Mar. 31.....	2,370	28	--	103	35	91	15	254	0	325	34	.7	3.4	.15	776	1.06	4,970	400	192	2.0	1,090	7.9	--
Apr. 1-30.....	1,170	--	--	--	--	88	--	212	0	304	--	--	--	--	716	.97	2,260	350	176	2.0	1,020	7.4	--
May 1.....	737	21	.02	87	32	91	12	200	0	321	37	.7	.9	.20	724	.98	1,440	349	185	2.1	1,030	7.7	--
May 2-31.....	824	--	--	--	--	69	--	212	0	208	--	--	--	--	563	.77	1,250	270	96	1.8	821	7.5	--
June 1-30.....	1,947	--	--	--	--	56	--	205	0	157	--	--	--	--	470	.64	2,470	236	68	1.6	698	7.8	--
July 1-10.....	526	--	--	--	--	59	--	221	0	176	--	--	--	--	514	.70	730	257	76	1.6	760	7.6	--
July 11-13.....	941	--	--	--	--	48	--	193	0	144	--	--	--	--	440	.60	1,120	218	60	1.4	657	7.6	--
July 14-Aug. 6..	960	--	--	--	--	60	--	215	0	175	--	--	--	--	517	.70	1,340	252	76	1.7	749	7.3	--
Aug. 7-31.....	257	--	--	--	--	73	--	229	0	222	--	--	--	--	600	.82	416	287	99	1.9	867	7.5	--

Sept. 1-5, 1962.	344	--	--	--	--	84	--	227	0	253	--	--	--	--	644	.88	598	301	115	2.1	942	7.7	--
Sept. 6.....	551	19	.00	76	26	88	12	210	0	268	29	.6	1.1	.15	646	.88	961	295	123	2.2	946	7.7	3
Sept. 7-30.....	812	--	--	--	--	86	--	217	0	246	--	--	--	--	623	.85	1,370	281	103	2.2	910	7.8	--
Weighted average.....	1,330	--	--	--	--	79	--	229	0	257	--	--	--	--	654	0.89	2,350	319	131	1.9	938	7.5	--
Time-weighted average.....	--	--	--	--	--	77	--	226	0	247	--	--	--	--	635	--	--	307	122	1.9	914	7.5	--
Tons per day..	--	--	--	--	--	284	--	823	0	924	--	--	--	--	--	--	--	--	--	--	--	--	--

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PLATTE RIVER BASIN--Continued

6-7680. PLATTE RIVER NEAR OVERTON, NEBR.--Continued

NORTH CHANNEL

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	63	53	63	56	66	58	68	53	54	58	63	56	62	55	66	55	67	53	59	50	60	57	56	50	--	49	56	52	48	48	--	57
November ..	52	41	38	46	40	42	41	46	42	50	50	46	41	49	40	36	38	38	35	38	38	42	37	42	40	41	39	40	39	41	--	42
December ..	39	44	39	41	38	41	35	35	34	32	33	33	34	33	32	32	33	32	32	34	34	33	32	32	34	33	34	35	--	34	33	35
January	33	34	33	33	34	35	33	32	33	32	33	33	34	32	33	33	34	32	34	32	32	33	33	33	34	35	32	34	34	32	34	33
February	34	34	35	44	33	35	33	34	35	43	43	46	41	43	42	42	37	35	32	33	34	37	32	32	32	32	33	33	--	--	--	36
March	34	34	35	33	33	33	33	33	35	35	37	37	34	39	35	44	37	--	38	41	40	47	37	41	33	54	35	52	37	50	38	38
April	45	41	56	38	--	47	48	43	60	39	54	42	60	52	57	46	62	56	67	63	74	68	67	57	70	65	65	56	56	55	--	55
May	72	63	69	67	78	73	73	64	74	74	85	76	86	72	78	68	73	60	77	74	74	68	73	69	62	60	67	62	68	65	69	71
June	60	59	57	73	66	69	64	67	63	78	72	74	70	76	71	77	76	80	73	76	69	78	78	79	73	79	75	85	76	81	--	72
July.....	71	89	80	90	82	83	82	88	75	92	69	91	77	88	84	83	70	83	78	85	80	85	78	88	75	74	72	80	82	81	73	81
August	80	75	89	72	90	79	84	79	91	80	84	88	87	76	88	73	80	76	92	76	88	77	80	71	80	79	82	71	86	67	82	81
September ..	73	82	73	74	63	68	70	69	55	76	63	83	66	76	71	78	62	79	60	62	58	61	60	68	63	72	65	68	63	59	--	68

SOUTH CHANNEL

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	63	55	64	54	65	55	66	53	54	57	61	54	61	54	64	55	64	51	59	50	59	56	56	50	--	47	56	50	49	46	--	56
November ..	50	43	41	44	42	48	40	46	40	47	49	44	39	44	40	38	36	37	36	37	38	40	36	40	38	41	37	38	37	39	--	41
December ..	38	42	37	39	36	40	35	36	33	33	32	33	32	34	32	34	32	33	--	34	32	34	32	32	35	33	35	33	--	32	33	34
January	34	37	33	38	32	32	32	33	32	--	32	33	32	32	32	33	32	32	32	--	--	--	32	35	33	34	32	37	33	39	35	33
February	39	35	40	42	32	35	32	36	35	42	39	42	37	39	38	39	37	32	32	32	32	37	32	32	32	33	32	32	--	--	--	36
March	33	32	32	32	33	33	32	36	34	34	37	38	33	38	34	42	35	--	36	37	37	43	33	38	32	51	34	49	35	46	36	36
April	44	39	51	36	--	45	46	42	55	37	52	45	55	49	54	45	57	53	63	60	69	64	64	55	67	63	67	54	56	53	--	53
May	69	56	67	64	75	70	72	62	73	71	83	73	84	75	78	67	76	58	74	72	73	66	71	67	60	59	66	62	67	63	70	69
June	60	62	59	73	65	73	63	66	64	74	70	71	70	75	70	76	78	78	71	75	72	78	75	79	72	78	74	85	75	81	--	72
July.....	71	85	78	87	80	82	80	86	73	90	67	87	75	85	83	83	69	82	76	85	78	86	76	86	73	73	70	77	78	81	71	79
August	78	73	86	72	85	77	83	77	90	78	83	86	86	73	84	70	71	73	94	76	88	75	81	70	81	77	82	69	84	65	79	79
September ..	70	79	72	73	60	69	68	69	55	74	62	79	66	76	70	76	63	78	60	64	59	62	61	70	62	70	63	68	62	59	--	67

6-7975. ELKHORN RIVER AT EWING, NEBR.

LOCATION.--At bridge on State Bighway 108, 350 feet upstream from gaging station, 0.8 mile north of Ewing, Holt County, and 1.5 miles upstream from South Fork Elkhorn River.
DRAINAGE AREA.--1,400 square miles, approximately, of which about 740 square miles contributes directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: September 1960 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_3)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 19, 1961	71	38		0.00	--	27	3.1	8.8	5.9	115	0	7.0	2.0	0.3	0.6	0.06	168	80	0	0.4	212	7.0	12
Nov. 21.....	52	42		.03	0.08	26	3.7	8.8	5.0	112	0	7.8	.8	.3	2.0	.02	160	80	0	.4	202	7.3	2
Dec. 20.....	45	51		.03	--	29	2.3	9.0	5.3	120	0	7.0	.7	.4	2.9	.04	164	82	0	.4	222	6.9	3
Jan. 15, 1962	57	56		.01	--	30	2.7	9.3	4.9	128	0	6.5	.7	.3	1.7	.02	174	86	0	.4	218	7.7	6
Feb. 28.....	34	50		.07	--	32	1.7	9.2	5.5	125	0	9.3	.4	.3	2.0	.07	181	87	0	.4	228	6.8	--
Mar. 29.....	3,130	16		.33	.00	19	2.1	7.8	7.0	86	0	8.3	.0	.1	1.2	.04	132	56	0	.5	157	6.7	--
Apr. 24.....	166	35		.06	.23	31	3.8	11	6.1	138	0	5.5	.6	.4	1.4	.05	180	93	0	.5	239	7.5	--
May 25.....	1,260	41		.11	.00	40	6.1	17	7.3	185	0	10	.2	.7	1.9	.01	260	125	0	.7	303	7.1	--
June 29.....	886	33		.14	.07	42	6.8	15	6.0	194	0	7.0	.0	.5	1.3	.08	241	133	0	.6	319	7.2	--
July 12.....	446	30		.08	.00	39	6.7	14	7.1	182	0	7.8	.0	.5	1.9	.05	232	125	0	.5	303	7.4	--
Aug. 6.....	270	39		.05	.00	36	5.8	13	5.9	164	0	7.0	.0	.4	2.5	.03	204	114	0	.5	278	7.4	--
Sept. 12.....	81	48		.03	.01	28	4.9	9.8	5.4	126	0	11	.7	.4	1.9	.04	174	90	0	.4	225	7.2	--

PLATTE RIVER BASIN--Continued

6-7980. SOUTH FORK ELKHORN RIVER AT EWING, NEBR.

LOCATION.--At gaging station at bridge on U.S. Highway 275 at southeast limits of Ewing, Holt County, and 0.8 mile above mouth.
DRAINAGE AREA.--320 square miles, approximately, of which about 190 square miles contributes directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: September 1960 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 19, 1961	46	45		0.00	--	25	2.8	6.9	5.1	102	0	6.3	0.2	0.2	0.4	0.06	161	74	0	0.3	186	6.7	10
Nov. 21.....	51	44		.05	0.06	25	2.6	7.0	3.8	104	0	5.3	.0	.2	1.6	.01	141	73	0	.4	184	7.4	1
Dec. 20.....	a 43	52		.03	--	27	3.1	7.3	4.2	112	0	6.3	.4	.3	2.5	.03	155	80	0	.4	199	7.0	4
Jan. 15, 1962	a 41	49		.01	--	25	3.3	6.7	4.2	109	0	4.8	.0	.2	4.7	.01	151	76	0	.3	186	7.5	4
Feb. 28.....	a 26	50		.06	--	27	2.6	6.9	3.8	109	0	4.8	.0	.2	1.6	.03	175	78	0	.3	196	7.3	--
Mar. 29.....	490	21		.25	.00	23	2.8	7.3	7.6	97	0	11	.0	.1	.7	.02	153	69	0	.4	179	6.8	--
Apr. 24.....	46	39		.09	.00	30	2.5	8.0	4.6	121	0	4.3	.1	.4	.9	.02	162	85	0	.4	208	7.5	--
May 25.....	96	44		.28	.00	39	4.5	14	5.9	167	0	9.8	.2	.5	2.3	.00	243	116	0	.6	281	7.2	--
June 29.....	a 87	39		.08	.00	34	5.4	11	5.9	154	0	6.0	.0	.4	1.7	.08	207	107	0	.5	262	7.4	--
July 12.....	89	44		.06	.00	29	4.5	9.5	5.9	130	0	6.3	.0	.3	1.9	.04	185	91	0	.4	225	7.5	--
Aug. 6.....	56	43		.05	.00	29	4.0	9.2	4.9	124	0	6.0	.0	.2	1.9	.03	173	89	0	.4	217	7.3	--
Sept. 12.....	40	47		.04	.03	26	3.7	7.1	4.0	112	0	4.5	.0	.3	.9	.05	150	80	0	.3	189	7.3	--

a Daily mean discharge.

6-7990. ELKHORN RIVER NEAR NORFOLK, NEBR.

LOCATION.--At gaging station at bridge on county road, 3.5 miles west-southwest of Norfolk, Madison County, and 7 miles upstream from North Fork Elkhorn River.
DRAINAGE AREA.--2,790 square miles, approximately, of which about 1,790 square miles contributes directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: September 1960 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	484	41		0.03	0.02	45	6.0	9.1	6.5	187	0	7.3	1.8	0.4	1.0	0.05	233	137	0	0.3	313	6.9	--
Nov. 21.....	287	41		.01	.09	44	6.3	8.5	5.8	184	0	6.0	1.2	.3	2.5	.05	206	136	0	.3	315	7.9	3
Dec. 20.....	214	46		.06	--	49	7.4	9.2	6.7	203	0	9.3	1.0	.4	3.4	.04	230	153	0	.3	347	7.1	4
Jan. 15, 1962	245	52		.00	--	50	8.0	9.4	6.6	217	0	8.3	1.1	.3	3.2	.03	243	158	0	.3	351	7.2	5
Feb. 28.....	234	44		.02	--	46	6.8	9.0	7.3	192	0	7.8	.8	.3	2.1	.03	233	143	0	.3	321	7.1	--
Mar. 29.....	5,400	22		.23	.00	31	4.8	7.7	8.4	136	0	12	.0	.1	1.2	.03	171	97	0	.3	236	7.3	--
Apr. 24.....	392	36		.04	.00	46	5.6	11	7.2	191	0	8.3	1.2	.5	.9	.02	223	138	0	.4	323	7.5	--
May 25.....	1,960	40		.11	.00	42	6.1	15	7.5	183	0	10	2.2	.6	2.4	.13	252	130	0	.6	307	7.2	--
June 29.....	2,040	34		.08	.02	47	6.2	13	7.9	202	0	11	.0	.5	1.4	.07	242	143	0	.5	333	7.5	--
July 12.....	2,620	31		.06	.02	44	6.3	11	7.9	190	0	6.0	.0	.5	1.7	.06	227	136	0	.4	318	7.5	--
Aug. 5.....	892	38		.04	.00	43	6.2	12	6.4	184	0	7.5	.0	.3	2.0	.05	216	133	0	.5	311	7.5	--
Sept. 12.....	264	42		.02	.01	45	6.7	9.5	6.9	187	0	7.5	.0	.4	1.0	.04	215	140	0	.3	317	7.2	--

PLATTE RIVER BASIN--Continued

6-7991. NORTH FORK ELKHORN RIVER NEAR PIERCE, NEBR.

LOCATION.--At gaging station on county road bridge, 2.5 miles southeast of Pierce, Pierce County.
DRAINAGE AREA.--520 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: September 1960 to September 1962.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 18, 1961	39	35		0.02	--	61	12	11	5.7	246	0	15	2.4	0.3	3.9	0.09	289	202	0	0.3	427	7.2	10
Nov. 21.....	44	35		.03	0.29	63	12	11	5.2	254	0	15	2.5	.3	5.4	.03	282	205	0	.3	431	7.0	1
Dec. 20.....	a 43	39		.08	--	67	9.5	11	5.3	254	0	17	2.3	.3	6.1	.04	282	206	0	.3	440	7.2	3
Jan. 15, 1962	a 43	41		.05	--	64	12	11	5.1	261	0	17	2.2	.3	4.4	.02	283	208	0	.3	440	7.4	5
Feb. 28.....	a 27	35		.02	--	74	7.2	12	4.7	264	0	20	2.2	.3	6.4	.06	356	214	0	.4	474	7.4	--
Apr. 24.....	85	24		.02	.17	70	12	15	5.4	267	0	31	3.7	.4	4.0	.04	304	224	5	.4	485	7.7	--
May 25.....	319	26		.07	.00	58	13	16	7.8	238	0	35	2.6	.5	5.0	.02	301	198	3	.5	446	7.1	--
June 29.....	117	31		.04	.11	69	17	17	7.2	274	0	41	3.5	.4	6.0	.05	328	240	15	.5	517	7.6	--
July 12.....	63	29		.04	.15	53	13	13	6.8	218	0	26	2.5	.4	5.9	.05	259	184	5	.4	413	7.5	--
Aug. 5.....	101	33		.03	.00	75	15	18	8.1	270	0	56	3.8	.3	6.6	.06	352	247	26	.5	538	7.5	--
Sept. 12.....	52	35		.02	.13	63	11	13	3.8	243	0	23	3.1	.4	5.1	.04	282	204	5	.4	438	7.4	--

a Daily mean discharge.

6-8070. MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION.--At gaging station at Waubonsie Highway Bridge at Nebraska City, Otoe County.
DRAINAGE AREA.--414,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1962.
Water temperatures: May 1951 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 554 ppm Dec. 13-16; minimum, 220 ppm Mar. 30-31.
Hardness: Maximum, 307 ppm Dec. 13-16; minimum, 145 ppm Mar. 30-31.
Specific conductance: Maximum daily, 867 micromhos Nov. 1; minimum daily, 346 micromhos Apr. 4.
Water temperatures: Maximum, 81°F July 6, 7; minimum, freezing point on many days during December to March.
EXTREMES, 1951-62.--Dissolved solids: Maximum, 600 ppm Jan. 1-10, 1952; minimum, 217 ppm Mar. 31, 1960.
Hardness: Maximum, 344 ppm Jan. 1-10, 1952; minimum, 126 ppm Mar. 31, 1960.
Specific conductance: Maximum daily, 936 micromhos Jan. 6, 1953; minimum daily, 327 micromhos Apr. 4, 1960.
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.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-16, 1961.	29,890	--		--	--	59	--	196	0	--	--	--	--	--	459	0.62	37,040	223	62	1.7	704	7.2	--
Oct. 17-31.....	14,440	--		--	--	59	--	235	0	--	--	--	--	--	459	.62	17,900	250	57	1.6	743	7.3	--
Nov. 1-30.....	14,380	--		--	--	56	--	232	0	--	--	--	--	--	455	.62	17,670	244	54	1.6	715	7.2	--
Dec. 1-12.....	13,230	21		65	21	56	6.7	235	0	141	28	0.4	3.5	0.13	467	.64	16,680	247	54	1.6	724	7.3	3
Dec. 13-16.....	6,000	--		--	--	64	--	301	0	--	--	--	--	--	554	.75	8,970	307	60	1.6	837	7.6	--
Dec. 17-Jan. 28, 1962.....	13,050	--		--	--	64	--	241	0	--	--	--	--	--	499	.68	17,560	254	56	1.7	778	7.3	--
Jan. 29-Feb. 10.	15,060	--		--	--	53	--	208	0	--	--	--	--	--	434	.59	17,650	222	51	1.6	678	7.6	--
Feb. 11-28.....	18,530	--		--	--	49	--	201	0	--	--	--	--	--	434	.59	21,710	226	61	1.4	667	7.3	--
Mar. 1-18.....	14,810	--		--	--	55	--	224	0	--	--	--	--	--	458	.62	18,310	247	63	1.5	706	7.5	--
Mar. 19-22.....	31,220	--		--	--	38	--	184	0	--	--	--	--	--	366	.50	30,850	200	49	1.2	569	7.3	--
Mar. 23-26.....	68,150	--		--	--	27	--	171	0	--	--	--	--	--	311	.42	57,230	182	42	.9	485	7.2	--
Mar. 27-29.....	114,000	--		--	--	17	--	152	0	--	--	--	--	--	247	.34	76,030	154	29	.6	396	7.5	--
Mar. 30-31.....	147,500	12		42	9.7	15	10	146	0	47	7.0	.3	7.5	.06	220	.30	87,620	145	25	.5	365	7.4	--
Apr. 1-5.....	108,800	--		--	--	13	--	146	0	--	--	--	--	--	235	.32	69,030	153	33	.5	372	7.6	--
Apr. 6-13.....	74,080	--		--	--	16	--	158	0	--	--	--	--	--	265	.36	53,000	173	43	.5	420	7.0	--
Apr. 14-18.....	45,930	--		--	--	20	--	174	0	--	--	--	--	--	315	.43	39,960	201	58	.6	490	7.5	--
Apr. 19-30.....	35,730	--		--	--	25	--	186	0	--	--	--	--	--	356	.48	34,340	223	70	.7	548	7.2	--
May 1-21.....	32,860	--		--	--	47	--	214	0	--	--	--	--	--	444	.60	39,390	257	82	1.3	695	7.3	--
May 22-31.....	48,620	--		--	--	33	--	188	0	--	--	--	--	--	362	.49	47,520	211	57	1.0	563	7.0	--

MISSOURI RIVER MAIN STEM--Continued

6-8070. MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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°)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
June 1-30, 1962.	54,400	17		60	17	30	8.0	195	0	104	12	0.4	4.2	0.07	361	0.49	53,020	218	58	0.9	560	7.8	8
July 1-31.....	48,500	--		--	--	39	--	200	0	--	--	--	--	--	408	.55	53,430	234	70	1.1	617	7.7	--
Aug. 1-31.....	34,430	--		--	--	52	--	204	0	--	--	--	--	--	467	.64	43,410	256	89	1.4	688	7.2	--
Sept. 1-30.....	35,270	12		67	20	55	6.5	196	0	174	18	.6	2.9	.12	467	.64	44,470	248	87	1.5	705	7.6	5
Weighted average.....	32,710	--		--	--	40	--	195	0	--	--	--	--	--	394	0.54	34,800	223	63	1.1	607	7.4	--
Time-weighted average.....	--	--		--	--	48	--	209	0	--	--	--	--	--	430	--	--	235	64	1.3	663	7.3	--
Tons per day..	--	--		--	--	3,530	--	17,260	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1961 to September 1962

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

NISHNABOTNA RIVER BASIN

6-8080. MULE CREEK NEAR MALVERN, IOWA

LOCATION.--At gaging station at county highway bridge, 1.8 miles upstream from mouth and 4.4 miles south of Malvern, Mills County.
DRAINAGE AREA.--10.6 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1962.
Sediment records: July 1954 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 84°F July 3, Aug. 7; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 9,780 ppm May 28; minimum daily, 3 ppm Aug. 15, 26.
Sediment loads: Maximum daily, 8,330 tons May 28; minimum daily, less than 0.05 ton on many days during August and September.
EXTREMES, 1954-62.--Water temperatures (1958-62): Maximum, 88°F Aug. 3, 1959; minimum, freezing point on many days during winter months each year.
Sediment concentrations: Maximum daily, 14,000 ppm June 17, 1957; minimum daily, no flow Jan. 20-25, 1956.
Sediment loads: Maximum daily, 22,000 tons Aug. 21, 1954; minimum daily, 0 tons Jan. 20-25, 1956.
REMARKS.--Maximum observed sediment concentration during water year, 50,600 ppm May 28. Flow affected by ice Dec. 9-18, Dec. 23 to Jan. 1, Jan. 5 to Feb. 9, Feb. 21, 22, Feb. 25 to Mar. 9, Mar. 15-18.

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	48	46	60	48	50	54	64	57	58	62	64	64	60	56	50	62	61	54	52	52	56	50	46	54	48	50	52	58	58	52	52	55
November	58	50	44	42	36	42	44	40	44	48	46	44	42	40	42	40	38	40	36	40	42	42	42	44	44	42	40	38	40	40	--	42
December	44	40	48	42	40	40	34	34	--	32	--	--	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34
January	32	--	32	32	32	32	32	--	32	32	32	32	32	--	32	32	--	32	--	32	--	32	--	32	32	32	32	32	32	32	32	--
February	32	32	32	32	32	32	32	32	32	32	32	32	32	32	40	38	36	36	36	32	32	32	32	32	32	32	32	32	--	--	--	32
March	32	32	32	--	32	32	32	32	32	32	32	32	32	32	32	32	32	40	40	38	--	48	38	40	52	52	56	60	46	44	42	38
April	42	50	44	54	56	46	54	44	52	56	56	50	48	58	58	42	60	62	60	60	70	64	64	64	72	68	62	56	64	60	--	57
May	62	60	66	70	74	58	64	68	61	72	72	68	68	70	72	78	74	74	80	66	68	70	66	70	66	70	64	64	64	72	68	68
June	64	64	59	72	72	64	72	72	72	80	72	74	72	70	74	70	78	74	64	76	72	76	78	70	74	80	80	82	74	72	--	72
July	78	80	84	72	78	80	74	70	70	82	68	68	68	76	82	78	78	74	70	72	76	76	82	82	70	72	74	70	66	68	70	74
August	74	76	76	66	68	82	84	82	72	70	76	66	72	76	74	70	70	64	74	69	78	78	72	68	72	60	74	64	78	78	72	73
September	72	64	74	64	66	66	66	64	58	64	70	74	72	74	68	68	60	64	62	62	58	64	60	70	54	66	58	62	58	56	--	65

NISHNABOTNA RIVER BASIN--Continued

6-8080. MULE CREEK NEAR MALVERN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962

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	7.3	115	2.3	4.8	14	0.2	5.4	28	0.4
2	5.8	80	1.3	6.5	80	1.4	5.4	40	.6
3	5.4	44	.6	5.8	35	.5	5.4	27	.4
4	5.1	53	.7	4.5	39	.5	5.4	40	.6
5	4.8	30	.4	4.1	25	.3	5.1	55	.8
6	4.5	26	.3	4.1	55	.6	5.1	76	1.0
7	4.5	16	.2	4.1	18	.2	4.8	140	1.8
8	4.1	14	.2	4.1	18	.2	4.8	130	1.7
9	4.1	10	.1	4.1	21	.2	4.4	200	2.4
10	9.5	245	6.3	4.1	16	.2	4.0	275	3.0
11	6.5	50	.9	4.1	29	.3	3.5	250	2.4
12	5.1	24	.3	4.1	20	.2	4.2	225	2.6
13	5.1	17	.2	4.1	13	.1	5.0	195	2.5
14	4.5	19	.2	3.8	9	.1	5.2	155	2.2
15	4.5	21	.3	7.2	280	S 15	5.4	150	2.2
16	4.1	8	.1	22	1130	S 82	5.4	175	2.6
17	4.5	10	.1	8.2	170	3.8	5.2	165	2.3
18	3.8	15	.2	6.5	87	1.5	5.0	140	1.9
19	3.8	10	.1	6.5	88	1.5	5.4	155	2.3
20	3.8	9	.1	6.5	67	1.2	5.8	195	3.1
21	3.8	13	.1	6.5	68	1.2	5.8	150	2.3
22	4.1	19	.2	6.5	55	1.0	5.8	160	2.5
23	5.1	34	.5	6.1	45	.7	5.4	195	2.8
24	4.5	10	.1	5.8	45	.7	5.2	185	2.6
25	3.8	12	.1	5.8	37	.6	5.0	180	2.4
26	3.5	35	.3	5.8	43	.7	4.7	150	1.9
27	3.8	71	.7	5.4	26	.4	4.7	190	2.4
28	3.8	12	.1	5.4	28	.4	4.6	230	2.9
29	6.5	70	1.2	5.4	37	.5	4.5	195	2.4
30	6.1	45	.7	5.4	44	.6	4.4	185	2.2
31	4.8	20	.3	--	--	--	4.3	175	2.0
Total	150.6	--	19.2	177.3	--	116.8	154.3	--	63.3
	JANUARY			FEBRUARY			MARCH		
1	4.3	170	2.0	5.1	41	0.6	5.6	445	6.7
2	4.5	170	2.1	5.4	50	.7	5.2	345	4.8
3	4.8	175	2.2	10	1100	A 30	4.7	210	2.7
4	4.8	180	2.3	19	2600	A 133	4.5	200	2.4
5	7.6	215	4.4	11	1200	36	4.4	185	2.2
6	5.2	320	4.5	7.5	200	4.0	4.3	205	2.4
7	4.1	215	2.4	6.4	180	3.1	4.5	375	4.6
8	4.7	190	2.4	6.0	160	2.6	4.8	310	4.0
9	5.6	72	1.1	6.4	140	2.4	5.6	150	2.3
10	7.4	37	.7	7.3	115	2.3	6.5	230	4.0
11	6.2	51	.9	8.6	470	11	9.5	500	13
12	5.4	125	1.8	8.2	260	5.8	17	625	29
13	5.0	89	1.2	7.7	205	4.3	13	430	15
14	4.7	86	1.1	7.7	400	8.3	12	365	12
15	4.3	83	1.0	33	4000	A 356	10	800	A 22
16	4.1	53	.6	11	900	27	8.6	320	7.4
17	3.9	70	.7	9.0	450	11	14	460	17
18	3.7	88	.9	9.0	390	9.5	22	2900	A 172
19	3.6	81	.8	8.6	375	8.7	26	2900	A 204
20	3.5	74	.7	7.7	255	5.3	20	1100	59
21	3.5	61	.6	7.0	225	4.3	16	790	34
22	3.5	48	.5	6.6	600	11	16	1090	47
23	3.5	64	.6	7.3	240	4.7	15	1180	48
24	3.5	79	.7	7.3	130	2.6	14	1310	50
25	3.6	82	.8	7.0	240	4.5	13	1160	41
26	3.6	77	.7	6.6	170	3.0	12	850	28
27	3.7	72	.7	6.4	125	2.2	11	1050	31
28	4.0	20	.2	6.0	365	5.9	11	1080	32
29	4.3	63	.7	--	--	--	10	720	19
30	4.5	54	.7	--	--	--	9.5	545	14
31	4.8	48	.6	--	--	--	9.5	510	13
Total	139.9	--	40.6	248.8	--	699.8	339.2	--	943.5

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

NISHNABOTNA RIVER BASIN--Continued

6-8080. MULE CREEK NEAR MALVERN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	9.5	450	12	5.8	48	0.8	9.5	330	8.5
2	8.6	330	7.7	4.8	50	.6	9.5	230	5.9
3	8.6	320	7.4	4.8	22	.3	17	850 A	39
4	8.6	300	7.0	4.8	35	.5	12	550	18
5	8.6	340	7.9	5.1	60	.8	10	265	7.2
6	8.2	285	6.3	6.5	140	2.5	44	5660 S	1520
7	8.2	370	8.2	6.1	110	1.8	12	900	29
8	8.6	325	7.5	5.8	100	1.6	12	2960 S	169
9	8.2	280	6.2	5.8	105	1.6	8.2	560	12
10	7.3	230	4.5	5.4	105	1.5	6.9	240	4.5
11	7.3	215	4.2	5.1	76	1.0	6.1	210	3.5
12	7.7	235	4.9	4.8	90	1.2	5.8	120	1.9
13	6.9	250	4.7	3.8	87	.9	5.4	74	1.1
14	6.9	170	3.2	3.5	45	.4	5.4	110	1.6
15	6.9	125	2.3	3.2	38	.3	5.4	62	.9
16	6.9	125	2.3	3.2	61	.5	5.4	63	.9
17	6.9	115	2.1	3.2	48	.4	5.4	66	1.0
18	6.5	99	1.7	3.8	80	.8	5.4	90	1.3
19	6.5	99	1.7	4.5	90	1.1	5.1	54	.7
20	6.5	71	1.2	3.5	60	.6	4.8	61	.8
21	6.5	93	1.6	4.1	185	2.0	4.8	78	1.0
22	6.1	71	1.2	3.2	41	.4	4.8	50	.6
23	6.1	61	1.0	2.7	24	.2	4.5	76	.9
24	5.8	56	.9	2.4	19	.1	4.5	77	.9
25	5.4	56	.8	2.7	22	.2	4.5	74	.9
26	5.4	52	.8	3.8	34	.3	4.1	30	.3
27	5.8	350	5.5	3.8	37	.4	3.8	18	.2
28	7.7	310	6.4	154	9780 S	8330	3.5	22	.2
29	6.5	120	2.1	47	3860 S	659	4.1	51	.6
30	6.1	74	1.2	13	900	32	4.1	20	.2
31	--	--	--	9.5	530	14	--	--	--
Total	214.8	--	123.5	339.7	--	9057.8	238.0	--	1832.6

	JULY			AUGUST			SEPTEMBER		
1	3.8	16	0.2	3.5	20	0.2	3.5	60	0.6
2	3.8	52	.5	3.5	61	.6	2.2	39	.2
3	3.5	69	.7	3.5	15	.1	6.9	400 S	12
4	5.4	190	2.8	3.8	20	.2	9.2	525 S	15
5	4.1	180	2.0	3.5	22	.2	4.1	56	.6
6	3.5	32	.3	3.5	22	.2	2.7	29	.2
7	3.5	68	.6	4.8	9	.1	2.7	19	.1
8	3.2	110	1.0	3.2	7	.1	4.5	240 A	2.9
9	3.2	76	.7	2.9	7	.1	4.1	50	.6
10	3.2	66	.6	2.7	13	.1	3.5	31	.3
11	4.5	130	1.6	2.7	5	T	2.9	15	.1
12	4.1	90	1.0	2.2	15	.1	2.9	15	.1
13	13	1120 S	46	2.0	5	T	2.7	20	.1
14	7.3	300	5.9	2.0	11	.1	2.9	10	.1
15	5.1	87	1.2	2.0	3	T	3.8	43	.4
16	3.8	68	.7	1.8	5	T	2.9	14	.1
17	3.5	50	.5	1.8	9	T	2.9	19	.1
18	3.8	40	.4	1.6	6	T	2.4	6	T
19	4.1	60	.7	1.6	8	T	2.2	7	T
20	5.8	200 A	3.1	2.0	9	T	2.2	13	.1
21	8.7	1530 S	187	2.4	5	T	2.4	6	T
22	38	5100 S	802	2.0	6	T	2.9	6	T
23	6.5	510	9.0	2.0	7	T	2.9	12	.1
24	5.4	85	1.2	2.7	8	.1	2.7	7	.1
25	5.4	79	1.2	2.2	6	T	2.7	25	.2
26	3.8	28	.3	1.6	3	T	2.7	8	.1
27	7.5	2260 S	201	1.5	10	T	2.7	14	.1
28	16	1700 S	113	1.5	15	.1	2.4	8	.1
29	5.4	120	1.7	1.5	8	T	2.7	15	.1
30	3.8	63	.6	1.3	7	T	3.8	39	.4
31	3.5	23	.2	18	2050 S	164	--	--	--
Total	196.2	--	1387.7	91.3	--	166.8	99.1	--	35.0

Total discharge for year (cfs-days)..... 2389.2
Total load for year (tons)..... 14486.6

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated concentration graph.

NISHNABOTNA RIVER BASIN--Continued

6-8080. MULE CREEK NEAR MALVERN, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 28, 1962.....	1815		64	848	23,800	54,500	37	42	53	68	74	83	94	99	100			SPWC
May 28.....	1815		64	848	23,800	54,500	14	22	36	55	65	83	94	99	100			SPN

NISHNABOTNA RIVER BASIN--Continued

6-8090. DAVIDS CREEK NEAR HAMLIN, IOWA

LOCATION.--At gaging station at 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.--26.0 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1953.
Sediment records: July 1952 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 7,410 ppm June 8; minimum daily, 31 ppm Aug. 2.
Sediment loads: Maximum daily, 9,270 tons June 8; minimum daily, 0.5 ton Sept. 28, 29.
EXTREMES, 1952-62.--Sediment concentrations: Maximum daily, 10,700 ppm Apr. 23, 1955; minimum daily, no flow on many days in 1953-56.
Sediment loads: Maximum daily, 99,000 tons July 2, 1958; minimum daily, 0 tons on many days in 1953-56.
REMARKS.--Maximum observed sediment concentration during water year, 30,800 ppm June 19.
Flow affected by ice Dec. 5 to Mar. 25.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	37	495	49	11	215	6.4	13	210	7.4
2	24	420	27	17	650	S 47	13	200	7.0
3	19	350	18	18	430	21	12	210	6.8
4	17	255	12	13	285	10	11	220	6.5
5	15	280	12	12	240	7.8	10	275	7.4
6	13	255	9.0	12	240	7.8	9.4	250	6.3
7	13	255	9.0	11	235	7.0	9.0	330	8.0
8	12	180	5.8	10	230	6.2	8.4	300	6.8
9	11	235	7.0	11	280	8.3	7.8	255	5.4
10	52	2150	S 484	10	195	5.3	7.0	200	3.8
11	43	760	S 110	10	190	5.1	6.2	180	3.0
12	26	330	23	9.7	185	4.8	8.0	170	3.7
13	20	300	16	9.3	180	4.5	9.2	200	5.0
14	18	300	15	9.3	180	4.5	10	220	6.2
15	17	320	15	10	220	5.9	11	230	6.8
16	16	285	12	28	--	110	11	230	6.8
17	15	285	12	18	300	15	11	230	6.8
18	14	285	11	15	245	9.9	10	225	6.1
19	13	235	8.2	15	235	9.5	9.2	210	5.2
20	13	240	8.4	14	230	8.7	9.5	200	5.1
21	12	255	8.3	17	285	13	10	190	5.1
22	12	240	7.8	20	405	22	7.6	175	3.6
23	12	225	7.3	18	230	11	8.8	180	4.3
24	11	220	6.5	16	195	8.4	9.4	200	5.1
25	10	220	5.9	16	210	9.1	10	225	6.1
26	10	220	5.9	15	200	8.1	9.0	230	5.6
27	10	210	5.7	14	185	7.0	8.2	230	5.1
28	10	215	5.8	14	175	6.6	7.6	230	4.7
29	14	585	S 30	14	170	6.4	7.0	230	4.3
30	13	340	12	14	210	7.9	6.6	230	4.1
31	11	235	7.0	--	--	--	6.4	220	3.8
Total	533	--	965.6	421.3	--	404.2	286.3	--	171.9

S Computed by subdividing day.

NISHNABOTNA RIVER BASIN--Continued

6-8090. DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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	6.2	200	3.3	5.4	175	2.6	11	--	8.5
2	6.0	180	2.9	5.6	175	2.6	11	--	8.5
3	5.8	190	3.0	7.0	265	5.0	11	--	8.5
4	5.6	110	1.7	17	640	29	12	--	8.5
5	5.4	100	1.5	40	--	100	12	--	8.5
6	7.6	260	5.3	29	--	40	13	360	13
7	6.6	--	4.4	25	405	27	14	380	14
8	6.0	--	3.8	22	--	18	15	--	11
9	5.7	--	3.4	20	--	11	15	--	7.5
10	5.2	--	3.0	18	--	7.5	16	150	6.5
11	5.3	195	2.8	30	1600	130	16	--	5.0
12	5.4	200	2.9	70	2300 A	435	17	84	3.9
13	5.5	205	3.0	56	2400 A	363	17	--	3.8
14	5.4	190	2.8	45	3900 A	474	17	--	3.8
15	5.0	175	2.4	32	2000 A	173	25	--	20
16	4.8	175	2.3	26	1100	77	21	--	16
17	4.6	175	2.2	20	520	28	21	245	14
18	4.6	175	2.2	21	--	30	30	180	15
19	4.6	170	2.1	22	--	34	70	1280	242
20	4.6	165	2.0	23	--	40	160	1330	575
21	4.6	--	2.0	27	--	50	190	950	487
22	4.6	--	2.0	23	--	40	240	1650	1070
23	4.6	--	2.0	20	--	34	210	3400	1930
24	4.6	160	2.0	17	625	29	190	6050	3100
25	4.6	--	2.0	15	--	19	160	3280	1420
26	4.6	--	2.0	18	--	22	113	2300	702
27	4.6	160	2.0	14	--	14	136	2570 S	1160
28	4.8	--	2.4	12	280	9.1	106	1790	512
29	5.0	--	2.6	--	--	--	68	780	143
30	5.1	220	3.0	--	--	--	55	600	89
31	5.3	--	2.8	--	--	--	51	475	65
Total	162.3	--	81.8	680.0	--	2243.8	2043	--	11671.0

Day	APRIL			MAY			JUNE		
1	44	390	46	14	59	2.2	27	320	23
2	43	400	46	14	61	2.3	23	290	18
3	39	370	39	13	62	2.2	31	725 S	71
4	38	300	31	12	54	1.7	30	400	32
5	36	260	25	14	195 S	14	24	350	23
6	33	280	25	17	--	28	30	775 S	84
7	31	240	20	13	85	3.0	26	340	24
8	29	170	13	13	140	4.9	182	7410 S	9270
9	26	200	14	13	105	3.7	172	2220 S	2090
10	26	175	12	13	125	4.4	117	3370 S	1920
11	26	190	13	12	110	3.6	55	550	82
12	25	220	15	12	90	2.9	42	360	41
13	24	175	11	11	80	2.4	37	500	50
14	23	160	9.9	10	68	1.8	34	235	22
15	21	150	8.5	9.4	64	1.6	31	200	17
16	21	130	7.4	9.4	61	1.5	29	180	14
17	21	85	4.8	8.8	60	1.4	29	170	13
18	19	96	4.9	8.2	60	1.3	26	165	12
19	19	105	5.4	7.8	60	1.3	104	4610 S	4200
20	28	395	30	7.8	60	1.3	42	1000	113
21	22	195	12	42	2230 S	429	29	295	23
22	19	120	6.2	14	390	15	26	260	18
23	18	92	4.5	12	260	8.4	24	205	13
24	17	93	4.3	10	235	6.3	22	180	11
25	17	82	3.8	9.7	230	6.0	21	165	9.4
26	16	78	3.4	20	1180 S	81	20	130	7.0
27	16	74	3.2	13	250	8.8	19	120	6.2
28	17	55	2.5	115	4620 S	2920	18	110	5.3
29	16	65	2.8	110	1880 S	726	22	280 S	20
30	15	62	2.5	45	670	81	18	95	4.6
31	--	--	--	33	430	38	--	--	--
Total	745	--	426.1	656.1	--	4405.0	1310	--	18236.5

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

NISHNABOTNA RIVER BASIN--Continued

6-8090. DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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	140	6.8	9.2	36	0.9	4.5	81	1.0
2	17	140	6.4	9.5	31	.8	4.0	80	.9
3	16	145	6.3	8.6	33	.8	3.8	80	.8
4	16	140	6.0	7.8	36	.8	14	--	26
5	15	130	5.3	10	400	11	9.0	--	5.0
6	14	140	5.3	7.8	65	1.4	6.0	120	1.9
7	14	140	5.3	6.8	70	1.3	4.2	125	1.4
8	22	1070	S 88	5.9	77	1.2	3.6	130	1.3
9	15	160	6.5	12	610	20	3.5	120	1.1
10	13	90	3.2	7.2	110	2.1	3.4	115	1.1
11	13	180	6.3	6.4	130	2.2	3.3	100	.9
12	13	150	5.3	5.9	130	2.1	3.2	9[illegible]	.8
13	15	240	9.7	5.6	85	1.3	3.0	93	.8
14	16	240	10	5.6	78	1.2	2.8	100	.8
15	14	160	6.0	5.6	70	1.1	2.6	93	.7
16	13	130	4.6	5.0	64	.9	2.5	95	.6
17	12	130	4.2	4.8	73	.9	2.4	100	.6
18	11	135	4.0	4.6	81	1.0	2.8	115	.9
19	10	95	2.6	4.4	86	1.0	2.4	95	.6
20	24	760	S 69	4.2	91	1.0	2.6	99	.7
21	13	295	10	4.1	92	1.0	2.7	90	.7
22	14	200	7.6	4.0	92	1.0	3.0	80	.6
23	11	155	4.6	3.9	86	.9	3.0	80	.6
24	10	145	3.9	4.4	130	1.5	3.0	82	.7
25	10	140	3.8	6.0	74	1.2	2.8	80	.6
26	9.5	--	2.0	5.0	69	.9	2.8	79	.6
27	8.9	38	.9	4.0	64	.7	2.8	84	.6
28	9.2	70	1.7	3.4	60	.6	2.8	68	.5
29	12	--	5.0	3.3	82	.7	2.8	66	.5
30	10	105	2.8	5.6	94	1.4	3.2	76	.7
31	9.2	105	2.6	11	465	14	--	--	--
Total	417.8	--	305.7	191.6	--	76.9	112.5	--	54.0

Total discharge for year (cfs-days)..... 7558.9
Total load for year (tons)..... 39042.5

S Computed by subdividing day.

NISHNABOTNA RIVER BASIN--Continued

6-8090. DAVIDS CREEK NEAR HAMLIN, IOWA--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 10, 1961.....	1500		61	100	9,980	2,690	31	32	44	61	87	98	99	100	--			SPWC
Oct. 10.....	1500		61	100	9,980	2,690	13	20	28	49	84	98	99	100	--			SPN
May 26, 1962.....	1015		58	30	2,340	190	28	40	44	59	83	93	96	99	100			SPWC
May 26.....	1015		58	30	2,340	190	13	30	36	54	82	93	96	99	100			SPN
June 10.....	1030		60	192	9,190	4,760	--	24	--	64	88	97	99	100	--			SPWC
June 19.....	1815		60	385	27,200	28,300	--	41	--	66	88	96	98	99	100			SPWC

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KANSAS RIVER BASIN

6-8465. BEAVER CREEK AT CEDAR BLUFFS, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 83, 0.2 mile north of Cedar Bluffs, Decatur County, and 1.2 miles south of Kansas-Nebraska State line.
DRAINAGE AREA.--1,710 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
Water temperatures: October 1961 to September 1962.
Sediment records: October 1961 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 76°F July 9, 15, 21; minimum, freezing point on many days during December to March.
Sediment concentrations: Maximum daily, 7,230 ppm July 31; minimum daily, no flow on many days during December to January.
Sediment loads: Maximum daily, 8,490 tons Aug. 4; minimum daily, 0 tons on many days during December to January.
REMARKS.--Flow affected by ice Nov. 15-17, Dec. 8 to Mar. 19.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	0.1	41		0.06	0.94	95	24	57	19	461	0	65	21	0.7	0.7	0.16	558	336	0	1.4	848	8.1	--
Nov. 20.....	.4	42		.11	1.2	109	22	57	17	482	0	68	23	.8	.5	.16	579	361	0	1.3	880	8.1	10
Dec. 18.....	a .1	47		.15	1.6	103	31	64	17	528	0	59	27	.5	3.5	.13	614	383	0	1.4	967	7.9	7
Feb. 14, 1962	a 2.8	23		.07	.10	65	17	44	12	299	0	71	17	.7	.5	.10	407	231	0	1.3	641	7.3	--
Mar. 12.....	a 4.0	30		.12	.00	64	23	54	13	344	0	72	16	1.6	.6	.13	456	253	0	1.5	709	7.5	--
Apr. 9.....	9.2	29		.12	.00	78	25	61	15	406	0	79	20	1.5	.3	.15	512	296	0	1.5	802	7.8	9
May 14.....	1.6	29		.16	.13	84	28	72	18	461	0	83	24	1.5	1.2	.18	587	326	0	1.7	903	7.5	17
May 19.....	162	21		.19	.00	42	5.4	5.5	14	169	0	11	2.0	.4	.0	.04	204	127	0	.2	300	7.1	45
July 17.....	228	24		.10	.00	68	6.0	21	15	252	0	34	6.5	.5	2.1	.08	307	194	0	.7	478	7.2	--
Aug. 30.....	22	35		.02	.00	85	19	57	17	382	0	80	18	1.0	4.2	.14	511	290	0	1.5	776	7.9	--
Sept. 18.....	12	41		.01	.00	90	23	66	17	424	0	94	20	1.4	.4	.19	566	321	0	1.6	865	7.4	--

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8465. BEAVER CREEK AT CEDAR BLUFFS, KANS.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8465. BEAVER CREEK AT CEDAR BLUFFS, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.2	99	0.1	0.8	11	T	0.2	32	T
2	.2	77	T	.9	20	0.1	.2	73	T
3	.2	80	T	.9	21	.1	.2	65	T
4	.2	83	T	.9	11	T	0	--	0
5	.2	110	.1	.9	18	T	0	--	0
6	.1	65	T	.9	68	.2	.1	55	T
7	.2	63	T	.9	46	.1	0	--	0
8	.2	54	T	.9	43	.1	0	--	0
9	.2	67	T	.9	49	.1	0	--	0
10	.2	47	T	.8	79	.2	0	--	0
11	.2	45	T	.7	31	.1	0	--	0
12	.2	84	T	.6	28	T	0	--	0
13	.2	51	T	.5	45	.1	0	--	0
14	.1	60	T	.5	67	.1	0	--	0
15	.1	70	T	.4	46	.1	0	--	0
16	.1	60	T	.4	25	T	0	--	0
17	.1	94	T	.5	34	T	.1	74	T
18	.1	76	T	.5	33	T	.1	130	T
19	.2	120	.1	.5	67	.1	0	--	0
20	.3	110	.1	.4	100	.1	.2	110	T
21	.2	92	.1	.4	44	.1	.3	62	.1
22	.3	85	.1	.4	58	.1	.2	88	.1
23	.3	120	.1	.4	50	.1	.1	77	T
24	.4	54	.1	.4	70	.1	.1	72	T
25	.5	55	.1	.4	58	.1	.2	68	T
26	.5	54	.1	.3	72	.1	.2	50	T
27	.6	68	.1	.2	96	.1	.2	47	T
28	.8	47	.1	.3	64	.1	.1	76	T
29	.8	47	.1	.2	82	T	0	--	0
30	1.0	13	T	.2	78	T	.1	52	T
31	.9	6	T	--	--	--	.2	41	T
Total	9.8	--	1.8	17.0	--	2.6	2.8	--	0.6

Day	JANUARY			FEBRUARY			MARCH		
1	0.3	100	0.1	0.6	40	0.1	0.2	63	T
2	.4	71	.1	.8	19	T	.6	56	0.1
3	.5	42	.1	1.0	14	T	1.0	60	.2
4	.4	44	.1	1.2	32	.1	1.4	57	.2
5	.3	45	T	1.4	37	.1	2.0	63	.3
6	.1	80	T	1.2	75	.2	2.4	57	.4
7	.2	49	T	.6	98	.2	2.8	56	.4
8	.1	53	T	.8	68	.1	3.2	46	.4
9	0	--	0	1.0	29	.1	3.5	51	.5
10	0	--	0	1.4	14	.1	3.7	54	.5
11	0	--	0	2.5	4	T	4.0	56	.6
12	0	--	0	3.0	13	.1	4.0	70	.8
13	.1	140	T	3.0	30	.2	4.0	120	1.3
14	0	--	0	2.8	55	.4	4.0	91	1.0
15	.1	94	T	2.5	55	.4	5.0	93	1.2
16	0	--	0	2.0	45	.2	5.5	78	1.2
17	0	--	0	2.0	34	.2	6.5	80	1.4
18	0	--	0	1.5	43	.2	8.0	92	2.0
19	0	--	0	1.5	90	.4	9.0	99	2.4
20	0	--	0	2.0	38	.2	16	120	5.1
21	0	--	0	2.0	49	.3	13	170	6.0
22	0	--	0	2.0	51	.3	12	130	4.2
23	0	--	0	1.5	71	.3	15	660	27
24	0	--	0	1.0	47	.1	58	2690	421
25	.1	82	T	.5	58	.1	46	840	104
26	.1	52	T	.2	48	T	26	560	39
27	.1	61	T	.2	--	T	19	360	18
28	.2	82	T	.2	--	T	16	180	7.8
29	.2	28	T	--	--	--	13	140	4.9
30	.2	50	T	--	--	--	11	130	3.9
31	.3	50	T	--	--	--	9.8	130	3.4
Total	3.7	--	0.7	40.4	--	4.6	325.6	--	659.2

T Less than 0.05 ton.

KANSAS RIVER BASIN--Continued

6-8465. BEAVER CREEK AT CEDAR BLUFFS, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Contirued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	9.2	110	2.7	5.0	140	1.9	42	1020	116
2	8.4	110	2.5	3.4	79	.7	26	2220	156
3	8.0	120	2.6	3.6	140	1.4	37	2100	210
4	8.0	110	2.4	3.2	140	1.2	41	980	108
5	7.7	63	1.3	2.3	67	.4	26	1060	74
6	8.9	130	3.1	2.6	170	1.2	24	1720	111
7	7.3	94	1.8	2.9	130	1.0	41	1970 S	280
8	8.5	110	2.5	3.2	110	1.0	97	3990 S	1180
9	9.1	120	2.9	3.5	120	1.1	253	4180	2860
10	9.2	74	1.8	3.8	140	1.4	263	2810	2000
11	10	110	3.0	3.3	46	.4	239	2210	1430
12	9.6	96	2.5	2.5	66	.4	168	2980 S	1510
13	9.2	90	2.2	1.5	78	.3	349	2640	2490
14	10	82	2.2	1.5	77	.3	315	2660	2260
15	11	98	2.9	1.2	64	.2	422	1810	2060
16	10	110	3.0	1.0	88	.2	320	1400	1210
17	11	80	2.4	2.3	310 S	3.8	351	1820	1720
18	10	110	3.0	100	3340 S	982	418	1790	2020
19	10	69	1.9	135	3900 S	1530	229	2190	1350
20	9.2	53	1.3	122	2690	886	171	2420	1120
21	8.7	100	2.3	68	1600	294	261	3280	2310
22	10	82	2.2	33	1410	126	131	2910	1030
23	9.8	86	2.3	20	720	39	86	1900	441
24	8.9	120	3.2	14	600	23	275	3200 S	2860
25	8.9	120	2.9	11	500	15	293	2140 S	1910
26	5.7	140	2.2	8.9	420	10	320	2130	1840
27	5.0	120	1.6	8.2	320	7.1	317	2070	1770
28	5.0	120	1.6	6.4	350	6.0	169	2200	1000
29	5.1	82	1.1	6.4	300	5.2	163	3090	1360
30	4.7	120	1.5	68	3340 S	613	129	2880	1000
31	--	--	--	32	2180	188	--	--	--
Total	256.1	--	68.9	679.7	--	4741.2	5976	--	39786

Day	JULY			AUGUST			SEPTEMBER		
1	221	3510	2090	537	3680	5340	27	470	34
2	174	3600	1690	427	1780	2050	24	420	27
3	67	1610	291	449	3260	3950	22	390	23
4	49	1520	201	871	3610	8490	21	380	21
5	37	780	78	574	1820 S	3240	19	380	19
6	38	720	74	192	1680	871	18	360	17
7	34	670	62	210	1600	907	18	380	18
8	31	510	43	140	1480	559	18	380	18
9	30	680	55	108	1010	294	18	220	11
10	131	3630	1280	92	720	179	18	350	17
11	65	3400	597	85	600	138	17	360	16
12	33	1030	92	76	480	98	16	320	14
13	31	1070	90	69	420	78	15	280	11
14	112	1660 S	874	65	490	86	14	300	11
15	332	2950	2640	59	430	68	14	340	13
16	126	1600	544	53	220	31	13	360	13
17	169	2410	1100	48	400	52	13	310	11
18	258	4570	3180	45	370	45	13	310	11
19	400	2490	2690	42	320	36	14	280	10
20	393	2080	2210	43	600	70	14	310	12
21	154	1810 S	835	38	370	38	12	310	10
22	145	2400	940	34	330	30	13	270	9.4
23	85	1810	415	32	320	28	13	300	10
24	69	820	153	30	290	23	12	280	9.1
25	65	630	110	45	1120	136	12	280	9.1
26	61	630	104	39	920	97	12	260	8.4
27	55	520	77	29	770	60	12	260	8.4
28	46	430	53	25	1170	79	11	270	8.0
29	47	490	62	24	410	26	10	230	6.2
30	81	960	210	24	370	24	9.8	220	5.8
31	239	7230 S	5000	30	480	39	--	--	--
Total	3778	--	27840	4535	--	27162	462.8	--	411.4

Total discharge for year (cfs-days)	16086.9
Total load for year (tons)	100679.0

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8465. BEAVER CREEK AT CEDAR BLUFFS, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 19, 1962.....	0800		61	162	4,600	2,010	60	79		94		100	--				VPWC
June 9.....	0700		59	253	5,020	3,430	60	69		87		100	--				VPWC
June 9.....	1550		62	268	3,220	2,330	62	76		88		99	100				VPWC
June 13.....	0800		67	368	2,990	2,970	62	77		89		100	--				VPWC
June 26.....	0800		70	302	1,840	1,500	50	59		76		98	100				VPWC
July 17.....	1825		--	228	4,330	2,660	43	60		84		99	100				VPWC

KANSAS RIVER BASIN--Continued

6-8480. PRAIRIE DOG CREEK AT NORTON, KANS.

LOCATION.--At gaging station at bridge on county road, 0.5 mile downstream from Norton Dam site and 3 miles southwest of Norton, Norton County.
DRAINAGE AREA (revised).--684 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949, September 1957 to June 1958, October 1961 to September 1962.
Water temperatures: December 1948 to September 1952.
Sediment records: March 1947 to September 1952.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period January 1958 to September 1961 available from the Kansas State Department of Health. Prior to October 1961, sampling site and gaging station 2.5 miles downstream.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	1.7	31		0.13	0.00	83	16	16	--	334	0	21	8.0	0.5	0.4	0.23	334	273	0	0.4	610	7.7	
Nov. 21.....	a 5.9	26		.05	.00	75	17	16	--	307	0	23	11	.4	.4	.15	316	257	5	.4	560	8.1	
Dec. 19.....	a 2.5	30		.01	.00	93	21	35	10	344	0	60	38	.4	1.9	.12	454	318	36	.8	700	8.0	
Jan. 24, 1962	a 2.0	31		.04	.03	91	20	15	9.4	371	0	26	12	.4	2.2	.08	388	309	5	.4	630	7.7	
Feb. 14.....	9.3	24		.05	.04	62	13	14	9.5	264	0	18	9.0	.4	.4	.15	275	208	0	.4	440	7.8	
Mar. 12.....	14	25		.05	.00	66	15	15	8.4	283	0	21	10	.4	2.2	.12	298	226	0	.4	480	8.2	
Apr. 9.....	7.5	25		.05	.06	70	20	18	10	327	0	23	12	.5	.4	.13	338	256	0	.5	560	8.2	
May 15.....	3.3	35		.11	.00	79	19	15	13	339	0	19	10	.6	1.3	.15	370	275	0	.4	590	7.6	
June 12.....	57	19		.10	.00	47	5.6	3.3	11	178	0	7.8	3.0	.5	3.5	.13	206	140	0	.1	320	7.5	
June 25.....	473	18		.22	.00	45	7.7	2.1	12	185	0	7.0	3.0	.3	4.1	.10	196	144	0	.1	310	7.3	
July 16.....	21	32		--	.00	78	14	13	12	322	0	23	8.0	.4	1.5	.16	355	252	0	.4	580	7.7	
Aug. 27.....	6.8	33		.05	.00	80	16	13	12	290	19	15	10	.4	1.8	.18	356	266	0	.3	560	8.5	
Sept. 18.....	5.9	35		.02	.02	76	17	14	11	315	0	21	10	.4	.8	.19	345	260	2	.4	550	7.9	

a Daily mean discharge.

6-8530. REPUBLICAN RIVER NEAR GUIDE ROCK, NEBR.

LOCATION.--At gaging station, 300 feet upstream from Willow Creek, 0.2 mile downstream from Courtland diversion dam, and 2 miles southwest of Guide Rock, Webster County.
DRAINAGE AREA.--22,060 square miles, approximately, of which a large area does not contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: November 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, November 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Nov. 21, 1961	119	27		0.07	0.07	85	14	28	--	283	0	74	14	0.4	2.2	0.16	364	270	38	0.8	640	7.5	
Dec. 19.....	87	27		.02	.00	83	15	22	10	283	0	65	13	.2	3.1	.15	387	268	36	.6	590	7.9	
Jan. 24, 1962	81	31		.02	.07	85	15	24	8.5	295	0	62	15	.3	2.7	.10	388	274	32	.6	590	8.1	
Feb. 14.....	155	23		.05	.00	86	16	25	10	293	0	73	16	.3	3.1	.12	406	280	40	.7	620	8.1	
Mar. 13.....	90	24		.08	.00	80	14	22	13	268	0	56	17	.3	2.2	.12	360	257	37	.6	590	8.2	
Apr. 9.....	880	18		.05	.00	61	14	23	16	244	0	53	12	.6	.4	.18	308	210	10	.7	530	7.7	
May 1.....	246	18		.28	.00	70	19	23	14	268	0	66	12	.5	1.8	.16	362	252	32	.6	580	7.8	
May 22.....	273	17		.16	.04	45	9.1	12	12	161	0	40	7.0	.5	3.3	.12	231	150	18	.4	380	7.6	
June 19.....	2,348	6.0		.03	.00	53	16	20	17	232	0	46	9.0	.7	1.1	.13	280	198	8	.6	490	7.7	
July 26.....	2,761	9.0		.15	.00	44	13	14	15	195	0	33	8.0	.5	1.0	.19	239	164	4	.5	400	9.0	
Aug. 13.....	2,558	11		.07	.00	44	11	15	16	195	0	35	9.0	.6	.4	.18	242	155	0	.5	410	8.0	
Sept. 24.....	1,590	15		.08	.00	47	12	17	15	200	0	34	8.0	.5	.7	.16	254	166	2	.6	420	8.2	

KANSAS RIVER BASIN--Continued

6-8558. BUFFALO CREEK NEAR JAMESTOWN, KANS.

LOCATION.--At gaging station at highway bridge, 1.1 miles north of Jamestown, Cloud County, and 21 miles upstream from mouth.
DRAINAGE AREA.--330 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 17, 1961	29	16		0.07	0.04	163	19	139	--	407	0	198	173	0.2	4.4	0.30	970	484	150	2.8	1,670	7.2	
Nov. 15.....	42	12		.14	.16	157	26	164	--	334	0	254	221	.4	4.4	.30	1,020	498	224	3.2	1,760	7.7	
Dec. 19.....	a 20	17		.03	.00	162	28	134	11	373	0	253	179	.3	12	.16	1,040	519	213	2.6	1,670	7.8	
Jan. 25, 1962	a 20	21		.05	.00	251	30	170	9.3	598	0	326	205	.3	19	.19	1,310	750	260	2.7	1,930	7.7	
Feb. 15.....	65	12		.07	.00	144	17	120	10	329	0	195	171	.2	6.6	.19	854	430	160	2.5	1,350	8.0	
Mar. 13.....	a 50	15		.11	.28	171	22	108	4.0	378	0	246	143	.3	12	.16	940	517	207	2.1	1,460	7.8	
Apr. 9.....	49	15		.03	.00	181	22	94	8.9	437	0	243	106	.3	11	.13	922	542	184	1.8	1,410	7.9	
May 2.....	23	14		.10	.00	174	28	118	11	434	0	256	128	.4	6.2	.23	978	549	193	2.2	1,490	7.8	
May 24.....	11	17		.02	.00	134	19	83	11	339	0	191	94	.4	4.9	.19	746	412	134	1.8	1,210	7.6	
July 19.....	60	9.5		.05	.00	83	16	100	12	185	0	148	144	.5	2.6	.18	626	273	121	2.6	1,080	7.4	
Aug. 16.....	24	10		.07	.00	73	13	124	11	144	0	149	178	.5	.9	.18	650	236	118	3.5	1,110	7.1	
Sept. 27.....	36	10		.03	.08	75	17	117	12	198	0	112	168	.4	4.9	.19	618	257	95	3.2	1,080	7.5	

a Daily mean discharge.

6-8560. REPUBLICAN RIVER AT CONCORDIA, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 81, 1 mile north of Concordia, Cloud County, and 3.4 miles downstream from Buffalo Creek.
DRAINAGE AREA.--23,540 square miles, approximately, of which a large part is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for Republican River at Hardy, Nebr., for the period November 1956 to September 1958 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	249	20		0.01	0.00	94	19	68	--	320	0	97	68	0.2	1.5	0.21	564	312	50	1.7	960	7.9	
Nov. 13.....	242	19		.03	.00	101	19	79	--	310	0	121	85	.4	1.5	.23	580	330	76	1.9	980	7.9	
Dec. 19.....	a 180	23		.03	.00	96	20	85	11	281	0	147	89	.4	4.4	.13	640	322	92	2.1	1,090	8.2	
Jan. 25, 1962	250	25		.04	.00	124	20	74	11	383	0	130	78	.4	4.2	.10	660	392	78	1.5	1,050	7.7	
Feb. 15.....	742	17		.16	.00	81	16	36	14	261	0	87	36	.4	2.2	.12	424	268	54	1.0	660	8.2	
Mar. 13.....	a 565	19		.21	.00	65	12	23	10	207	0	70	22	.4	3.1	.08	342	212	42	.7	540	7.6	
Apr. 10.....	868	14		.07	.00	71	15	33	13	251	0	75	24	.6	.4	.13	377	238	32	.9	620	7.5	
May 3.....	382	18		.12	.00	72	20	46	16	273	0	91	39	.5	.7	.16	436	262	38	1.2	710	8.2	
May 23.....	310	16		.02	.00	57	15	29	14	222	0	66	24	.5	.7	.18	338	204	22	.9	570	7.5	
June 20.....	2,280	5.5		.11	.00	54	15	22	17	232	0	51	14	.6	.4	.15	298	196	6	.7	510	7.5	
July 25.....	2,840	10		.11	.00	50	11	21	14	210	0	46	12	.6	1.8	.12	266	170	0	.7	450	8.0	
Aug. 14.....	2,770	13		.01	.00	50	12	18	14	207	0	39	11	.5	2.0	.15	257	174	4	.6	430	7.7	
Sept. 26.....	1,840	15		.03	.00	48	13	25	15	203	0	44	20	.6	1.5	.19	290	174	8	.8	480	8.0	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8566. REPUBLICAN RIVER AT CLAY CENTER, KANS.

LOCATION.--At gaging station at bridge on State Highway 15, 1 mile south of Clay Center, Clay County, and 4 miles downstream from Five Creeks.
DRAINAGE AREA.--24,570 square miles, approximately, of which a large area is noncontributing.
RECORDS AVAILABLE.--Water temperatures: October 1957 to September 1962.
Sediment records: October 1957 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum, 80°F on several days during May, July, and August; minimum, 33°F on many days during December to March.
Sediment concentrations: Maximum daily, 6,230 ppm May 29; minimum daily, 16 ppm Jan. 26.
Sediment loads: Maximum daily, 87,000 tons May 29; minimum daily, 11 tons Jan. 23.
EXTREMES, 1957-62.--Water temperatures: Maximum, 94°F Aug. 12, 1958; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 6,230 ppm May 29, 1962; minimum daily, 10 ppm on several days during January 1960.
Sediment loads: Maximum daily, 277,000 tons Sept. 6, 1958; minimum daily, 3 tons Jan. 2, 3, 6, 1960.
REMARKS.--Flow affected by ice Dec. 9, 10, Dec. 13 to Jan. 27, Feb. 24 to Mar. 9.

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8566. REPUBLICAN RIVER AT CLAY CENTER, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962

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	1300	2630	S 18800	949	1490	3820	495	200	267
2	3070	5260	S 46100	666	780	1400	485	190	249
3	1600	2400	10400	588	400	635	480	200	259
4	1130	1280	3910	739	720	1440	470	210	266
5	872	630	1480	851	1290	2960	450	230	279
6	767	340	704	648	650	1140	445	220	264
7	636	270	464	576	350	544	440	180	214
8	582	240	377	534	280	404	430	200	232
9	558	230	346	522	230	324	400	170	184
10	588	150	238	516	230	320	350	330	312
11	2480	5750	S 42300	510	200	275	315	240	204
12	1230	3540	11800	500	190	256	252	200	136
13	795	970	2080	485	270	354	250	110	74
14	594	610	978	470	250	317	250	100	68
15	552	350	522	495	220	294	250	110	74
16	510	290	399	1740	2740	S 14700	250	96	65
17	490	210	278	1590	2380	10200	300	120	97
18	470	240	305	1350	1900	6930	300	64	52
19	445	240	288	865	920	2150	300	94	76
20	440	170	202	684	440	813	300	240	194
21	425	160	184	630	280	476	300	120	97
22	420	120	136	606	280	458	300	89	72
23	440	130	154	636	320	550	300	110	89
24	666	480	863	823	530	1180	300	130	105
25	718	590	1140	690	420	782	300	49	40
26	684	470	868	612	340	562	300	95	77
27	540	290	423	570	260	400	300	90	73
28	450	220	267	534	240	346	300	92	74
29	669	2100	S 6160	522	210	296	250	100	67
30	3560	5350	51400	510	220	303	250	120	81
31	1390	2120	7960	--	--	--	250	100	67
Total	29071	--	211526	21411	--	54629	10362	--	4408

Day	JANUARY			FEBRUARY			MARCH		
1	300	74	60	3980	1800	19300	300	210	170
2	300	73	59	2740	1460	10800	300	180	146
3	300	61	49	2160	1070	6240	300	170	138
4	300	70	57	1820	890	4370	300	270	219
5	300	36	29	1460	610	2400	300	200	162
6	300	24	19	1220	480	1580	350	510	482
7	300	24	19	1030	350	974	400	440	475
8	250	20	14	914	190	469	450	310	377
9	250	25	17	830	240	538	500	260	351
10	250	43	29	851	200	460	558	190	286
11	250	57	38	949	330	846	564	240	365
12	250	47	32	970	400	1050	654	930	1640
13	250	42	28	994	400	1070	630	320	544
14	250	50	34	963	380	988	660	540	962
15	250	30	20	1010	380	1040	704	680	1290
16	250	24	16	1170	540	1710	612	340	562
17	250	30	20	1020	320	881	618	280	467
18	250	22	15	956	200	516	600	230	373
19	200	47	25	886	260	622	582	290	456
20	200	68	37	970	340	890	829	1050	S 3150
21	200	31	17	970	840	2200	2130	5150	29600
22	200	42	23	823	650	1440	2050	4300	23800
23	250	17	11	690	310	578	1850	4610	23000
24	250	26	18	550	180	267	2100	2800	15900
25	250	25	17	450	110	134	3170	5290	45300
26	450	16	19	400	170	184	2620	4900	34700
27	4500	610	7410	300	330	267	1780	2660	12800
28	7290	1620	31900	300	230	186	1430	1410	5440
29	5520	1390	20700	--	--	--	1240	1030	3450
30	6220	1940	32600	--	--	--	1070	670	1940
31	4390	1810	21500	--	--	--	963	720	1870
Total	34770	--	114832	31376	--	62000	30614	--	210415

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8566. REPUBLICAN RIVER AT CLAY CENTER, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--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	879	440	1040	642	270	468	1570	2200	9330
2	816	380	837	582	200	314	1570	2480	10500
3	795	320	687	540	170	248	5920	3980	S 69300
4	760	270	554	510	150	207	7220	3290	64100
5	704	260	494	495	110	147	5070	3600	49300
6	672	220	399	475	110	141	3270	1800	15900
7	648	230	385	455	100	123	2810	1290	9790
8	636	230	395	445	140	168	2300	1000	6210
9	732	410	810	425	150	172	1920	810	4200
10	1070	850	2460	410	110	122	1750	750	3540
11	1090	790	2320	405	120	131	2280	890	5480
12	1090	620	1820	385	110	114	2340	1140	7200
13	1100	540	1600	356	120	115	2260	1080	6590
14	1100	460	1370	338	120	110	2140	1000	5780
15	1110	460	1380	328	95	84	1830	800	3950
16	1110	420	1260	320	130	112	1870	650	3280
17	1110	420	1260	315	110	94	1900	900	4620
18	1110	390	1170	310	130	109	1750	920	4350
19	1130	410	1250	328	140	124	1730	670	3130
20	1130	380	1160	2910	3790	S 50700	2010	710	3850
21	1100	390	1160	1440	3740	S 16400	2280	850	5230
22	1300	2470	S 9640	564	2530	3850	2350	800	5080
23	1170	3410	10800	505	700	954	2610	810	5710
24	823	1090	2420	516	430	599	3830	1490	15400
25	746	360	725	688	890	S 1810	4180	1350	15200
26	718	320	620	558	770	1160	3670	1900	18800
27	711	270	518	540	500	729	4910	2510	33300
28	704	250	475	1340	1980	S 7780	3310	1390	12400
29	704	260	494	5170	6230	87000	2930	890	7040
30	704	230	437	2630	4680	33200	3070	770	6380
31	--	--	--	1630	2320	10200	--	--	--
Total	27472	--	49940	26555	--	217485	86650	--	414940

	JULY			AUGUST			SEPTEMBER		
1	3080	810	6740	2860	580	4480	956	620	1600
2	3040	730	5990	2940	590	4680	914	540	1330
3	3360	840	7620	2910	690	5420	935	400	1010
4	4860	1870	24500	3070	660	5470	928	470	1180
5	4440	1490	17900	3460	970	9060	858	420	973
6	2960	1200	9590	3170	920	7870	830	470	1050
7	2340	1170	7390	3430	910	8430	816	320	705
8	2670	1120	8070	2980	810	6520	788	340	723
9	2790	1020	7680	2780	640	4800	760	130	267
10	2990	850	6860	2720	580	4260	809	200	437
11	2860	670	5170	2650	550	3940	851	270	620
12	2860	660	5100	2590	570	3990	886	370	885
13	2880	720	5600	2570	540	3750	886	310	742
14	3050	910	7490	2600	470	3300	816	300	661
15	3090	810	6760	2720	590	4330	830	400	896
16	2740	690	5100	2610	540	3800	928	360	902
17	2970	820	6580	2560	550	3800	935	350	884
18	2960	720	5750	2400	520	3370	1090	340	1000
19	4050	1040	11400	2000	390	2110	2100	3540	S 23300
20	4480	1670	20200	1870	420	2120	2050	5500	30400
21	4110	1320	14600	1840	190	944	2430	4900	32100
22	3640	1200	11800	1610	330	1440	2540	3390	23200
23	2760	890	6630	1350	310	1130	2070	2470	13800
24	2910	830	6520	1270	170	583	1900	2190	11200
25	2820	700	5330	1150	170	528	1850	830	4150
26	2730	640	4720	1060	170	486	1830	650	3210
27	2720	690	5070	978	180	475	1840	520	2580
28	2790	570	4290	1300	330	1160	1820	530	2600
29	2880	580	4510	978	810	2140	1720	440	2040
30	3250	790	6930	879	620	1470	1490	370	1490
31	3050	840	6920	844	470	1070	--	--	--
Total	98130	--	258810	68149	--	106926	39456	--	165935

Total discharge for year (cfs-days)..... 504016
Total load for year (tons)..... 1871846

S Computed by subdividing day.

6-8566. REPUBLICAN RIVER AT CLAY CENTER, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 2, 1961.....	0700		56	3,080	6,050	50,300	72	78	84	89	93	98	99	100	--	--		VPWC
Oct. 11.....	1200		67	3,250	7,740	67,900	50	65	--	84	--	93	98	100	--	--		VPWC
Oct. 12.....	0700		62	1,360	4,370	16,000	64	76	--	91	--	93	97	99	100	--		VPWC
Oct. 30.....	0700		56	5,030	6,770	91,900	46	59	--	78	--	98	99	99	100	--		VPWC
Nov. 17.....	0700		37	1,540	2,380	9,900	69	75	--	86	--	89	97	98	100	--		VPWC
Nov. 17.....	1130		42	1,580	2,140	9,130	68	75	80	86	91	98	99	100	--	--		VPWC
Jan. 29, 1962.....	1120		39	5,450	1,200	17,600	34	36	41	44	55	75	86	97	100	--		VPWC
Jan. 30.....	0700		33	6,750	2,200	40,100	26	30	--	36	--	64	68	78	89	100		VPWC
Feb. 7.....	1000		32	1,030	347	965	--	--	--	--	--	71	74	81	98	100		V
Apr. 3.....	1040		48	802	419	907	30	36	--	53	--	78	92	100	--	--		VPWC
Apr. 16.....	1020		53	1,120	450	1,360	34	46	--	58	--	97	98	99	100	--		VPWC
May 20.....	1800		71	6,170	9,520	159,000	33	47	--	74	--	98	99	100	--	--		VPWC
May 29.....	1200		68	5,900	6,450	103,000	38	46	--	69	--	97	98	100	--	--		VPWC
May 29.....	1545		69	5,810	7,300	114,000	18	39	--	70	--	96	98	100	--	--		VPN
May 29.....	1545		69	5,810	7,300	114,000	30	41	--	62	--	96	98	100	--	--		VPWC
June 1.....	1120		73	1,600	2,740	11,800	29	34	--	44	--	53	54	61	90	100		VPWC
June 3.....	1800		62	7,280	3,960	77,800	44	50	--	65	--	93	96	99	100	--		VPWC
July 12.....	0940		--	2,850	1,080	8,310	21	25	--	37	--	61	65	68	92	100		VPWC
July 25.....	1320		78	2,840	631	4,840	45	45	--	60	--	93	97	99	99	100		VPWC
Aug. 28.....	1140		77	1,410	618	2,350	56	59	--	77	--	98	99	99	100	--		VPWC
Sept. 19.....	1035		69	2,310	3,350	20,900	45	57	--	96	--	98	99	100	--	--		VPWC

KANSAS RIVER BASIN--Continued

6-8566. REPUBLICAN RIVER AT CLAY CENTER, KANS.--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 5, 1961	1025	1		879			0	6	49	81	91	98	99	100			SV
Nov. 17	1130	1		1,580			0	4	46	83	93	99	100	--			SV
Jan. 3, 1962	1135	--		300			1	8	33	69	81	93	98	100			SV
Jan. 29	1120	4		5,450			0	12	49	75	85	94	99	100			SV
Feb. 7	1000	4		1,030			0	5	45	80	92	98	100	--			SV
Mar. 16	1120	--		612			0	37	45	82	94	99	100	--			SV
Apr. 3	1040	4		802			0	4	44	81	90	98	100	--			SV
Apr. 16	1020	5		1,120			1	7	37	71	81	92	98	100			SV
May 1	1030	--		654			0	7	52	82	91	98	100	--			SV
May 16	1010	--		324			0	9	59	86	94	98	100	--			SV
June 1	1120	4		1,600			1	17	70	87	93	97	99	100			SV
July 12	0940	4		2,850			0	10	46	77	89	98	100	--			SV

6-8570. REPUBLICAN RIVER AT MILFORD, KANS.

LOCATION.--At gaging station on highway bridge at southwest city limits of Milford, Geary County.
DRAINAGE AREA.--24,900 square miles, approximately, of which a large area is noncontributing.
RECORDS AVAILABLE.--Chemical analysee: October 1955 to September 1958, October 1961 to September 1962.
Water temperatures: October 1955 to September 1958.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	a 518	22		0.08	0.00	102	19	82	--	312	0	112	97	0.4	0.4	0.18	596	332	76	2.0	1,090	7.9	
Nov. 16.....	1,910	14		.10	.00	51	12	29	--	166	0	52	33	.4	2.2	.11	288	176	40	.9	490	7.3	
Dec. 29.....	a 300	17		.03	.01	78	31	57	7.7	295	12	98	53	.3	6.2	.10	498	322	60	1.4	800	8.3	
Jan. 17, 1962	a 280	22		.05	.00	137	24	90	13	407	0	158	101	.3	2.7	.15	742	440	106	1.9	1,160	8.0	
Feb. 6.....	1,630	18		.04	.00	55	9.5	27	10	173	0	50	33	.4	4.2	.07	302	176	34	.9	480	8.0	
Mar. 6.....	458	21		.03	.00	126	23	74	12	383	0	145	60	.4	2.2	.13	692	409	95	1.6	1,060	8.1	
Apr. 3.....	823	19		.06	.00	113	19	61	12	329	0	130	66	.4	4.2	.15	603	360	90	1.4	960	8.1	
May 8.....	500	16		.02	.00	87	23	62	13	293	0	118	60	.4	.4	.18	538	312	72	1.5	870	8.0	
June 6.....	3,410	9.5		.54	.05	52	7.4	26	11	137	0	49	39	.4	4.4	.12	285	160	48	.9	450	7.7	
July 24.....	2,880	12		--	--	48	13	19	15	203	0	45	14	.6	1.9	.13	264	174	8	.6	450	8.1	
Aug. 15.....	2,880	10		.04	.00	48	13	20	15	212	0	43	13	.6	.7	.15	258	174	0	.7	440	8.0	
Sept. 13.....	851	16		.00	.00	66	12	26	12	229	0	55	22	.5	1.1	.15	336	214	26	.8	540	7.8	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8620. SMOKY HILL RIVER AT CEDAR BLUFF DAM, KANS.

LOCATION.--At gaging station, 0.2 mile downstream from Cedar Bluff Dam, Trego County, and 14 miles southwest of Ellis.
DRAINAGE AREA.--5,530 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	52	0.5		0.06	0.00	81	15	30	--	129	0	195	13	0.5	0.4	0.18	408	264	158	0.8	660	7.9	
Nov. 20.....	37	1.0		.01	.00	83	16	32	--	139	0	198	14	.6	.4	.18	416	273	159	.8	670	8.1	
Dec. 18.....	35	1.0		.05	.00	89	16	23	13	142	0	187	13	.5	.4	.15	415	288	172	.6	650	8.0	
Jan. 24, 1962	29	.5		.05	.00	88	19	24	15	151	0	212	15	.5	.4	.12	438	298	174	.6	690	7.9	
Feb. 14.....	38	1.0		.03	.00	80	15	22	14	137	0	186	12	.5	.4	.10	408	261	149	.6	620	8.0	
Mar. 15.....	6.7	3.0		.01	.00	94	17	25	13	163	0	217	15	.4	.4	.12	480	304	170	.6	700	8.0	
Apr. 9.....	74	1.0		.02	.00	88	18	25	13	156	0	204	16	.6	.4	.12	455	294	166	.6	690	7.9	
May 22.....	9.2	3.0		.12	.00	90	19	29	16	154	0	221	16	.6	.4	.15	472	302	176	.7	710	7.5	
June 20.....	618	1.5		.11	.00	87	20	22	15	149	0	207	14	.6	.4	.16	452	299	177	.6	690	7.6	
June 26.....	191	2.0		.01	.04	91	18	22	14	156	0	216	14	.6	.8	.12	463	301	173	.5	720	7.8	
July 18.....	40	3.0		.01	.00	92	18	24	14	156	0	219	16	.6	.4	.12	466	304	176	.6	710	8.0	
Aug. 14.....	93	3.0		.06	.00	92	18	25	13	151	0	216	15	.6	.4	.18	469	304	180	.6	710	7.3	
Sept. 12.....	6.7	7.5		.00	.00	93	20	25	12	149	0	238	16	.6	.7	.15	488	314	192	.6	740	7.5	

6-8633. BIG CREEK NEAR OGALLAH, KANS.

LOCATION.--At gaging station at bridge on State Highway 147, 5 miles south of Ogallah, Trego County, 9.0 miles upstream from Ogallah Creek, and 10 miles west of Ellis.
DRAINAGE AREA (revised).--297 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1958.
Water temperatures: October 1955 to September 1959, October 1961 to September 1962 (discontinued).
Sediment records: October 1955 to September 1959, October 1961 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 80°F June 24; minimum, freezing point on many days during November to March.
Sediment concentrations: Maximum daily, 1,820 ppm July 3; minimum daily, 11 ppm Mar. 4.
Sediment loads: Maximum daily, 3,850 tons July 3; minimum daily, 0.2 ton Aug. 21.
EXTREMES, 1955-59, 1961-62.--Water temperatures: Maximum, 83°F Aug. 24, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 9,630 ppm June 30, 1957; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 139,000 tons June 17, 1957; minimum daily, 0 tons on many days.
REMARKS.--Maximum observed sediment concentration during water year, 3,200 ppm July 3. Flow affected by ice Jan. 5, 10-13, 15-30.

Temperature (°F) of water, water year October 1961 to September 1962

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

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KANSAS RIVER BASIN--Continued

6-8633. BIG CREEK NEAR OGALLAH, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	11	98	2.9	9.6	80	2.1	10	55	1.5
2	11	110	3.3	8.8	83	2.0	9.9	52	1.4
3	11	110	3.3	8.5	39	.9	9.9	51	1.4
4	10	120	3.2	8.5	48	1.1	9.9	69	1.8
5	9.9	110	2.9	8.8	57	1.4	9.6	51	1.3
6	9.6	97	2.5	8.2	110	2.4	9.6	60	1.6
7	9.6	110	2.9	8.2	20	.4	9.2	41	1.0
8	9.9	110	2.9	8.2	45	1.0	9.2	44	1.1
9	12	94	3.0	8.5	27	.6	8.5	43	1.0
10	14	150	5.7	8.5	47	1.1	7.7	84	1.7
11	11	130	3.9	8.8	32	.8	7.7	53	1.1
12	11	120	3.6	8.2	50	1.1	9.6	42	1.1
13	11	180	5.3	7.9	52	1.1	9.2	32	.8
14	10	130	3.5	8.2	38	.8	8.8	43	1.0
15	10	140	3.8	9.6	84	2.2	8.5	29	.7
16	9.9	140	3.7	10	120	3.2	9.2	52	1.3
17	9.9	130	3.5	13	67	2.4	9.6	50	1.3
18	9.6	110	2.9	12	41	1.3	10	55	1.5
19	9.9	120	3.2	11	48	1.4	9.2	16	.4
20	9.9	47	1.3	11	66	2.0	9.2	38	.9
21	9.9	58	1.6	12	77	2.5	11	21	.6
22	9.9	85	2.3	13	79	2.8	11	27	.8
23	9.9	44	1.2	12	65	2.1	9.6	33	.9
24	9.9	47	1.3	11	72	2.1	8.8	40	1.0
25	9.9	27	.7	11	47	1.4	9.6	36	.9
26	9.2	28	.7	11	54	1.6	9.2	28	.7
27	9.2	33	.8	10	60	1.6	8.8	17	.4
28	9.6	54	1.4	11	62	1.8	7.4	22	.4
29	9.6	43	1.1	11	43	1.3	7.7	35	.7
30	9.9	26	.7	11	52	1.5	9.2	43	1.1
31	9.9	37	1.0	--	--	--	9.2	34	.8
Total	317.1	--	80.1	298.5	--	48.0	286.0	--	32.2
	JANUARY			FEBRUARY			MARCH		
1	9.2	22	0.5	13	59	2.1	7.9	24	0.5
2	9.2	31	.8	12	67	2.2	7.9	46	1.0
3	9.6	32	.8	12	33	1.1	8.5	41	.9
4	9.6	33	.9	11	69	2.0	8.8	11	.3
5	9.0	31	.8	11	44	1.3	8.5	26	.6
6	7.7	37	.8	9.9	82	2.2	9.6	24	.6
7	10	34	.9	9.6	81	2.1	8.8	38	.9
8	9.2	43	1.1	9.6	69	1.8	9.2	23	.6
9	6.8	58	1.1	9.6	85	2.2	8.8	28	.7
10	7.0	48	.9	9.6	53	1.4	8.8	26	.6
11	8.5	43	1.0	9.2	77	1.9	8.8	22	.5
12	9.5	22	.6	9.2	140	3.5	8.2	40	.9
13	10	40	1.1	8.8	100	2.4	7.4	34	.7
14	11	43	1.3	8.5	82	1.9	8.5	54	1.2
15	7.5	30	.6	8.8	86	2.0	8.8	38	.9
16	7.7	50	1.0	8.8	120	2.8	8.5	38	.9
17	7.5	34	.7	8.5	77	1.8	8.5	47	1.1
18	7.2	37	.7	7.1	61	1.2	8.8	65	1.5
19	6.5	32	.6	8.8	51	1.2	8.8	74	1.8
20	6.0	55	.9	8.8	68	1.6	9.6	78	2.0
21	7.0	56	1.1	8.8	43	1.0	10	100	2.7
22	9.0	63	1.5	8.5	72	1.7	9.9	98	2.6
23	11	28	.8	7.7	41	.9	9.6	97	2.5
24	12	26	.8	6.8	88	1.6	12	120	3.9
25	13	21	.7	7.7	91	1.9	14	100	3.8
26	15	30	1.2	7.4	23	.5	14	100	3.8
27	23	62	3.8	6.5	20	.4	13	100	3.5
28	26	52	3.6	8.2	44	1.0	14	150	5.7
29	20	33	1.8	--	--	--	13	190	6.7
30	16	39	1.7	--	--	--	12	140	4.5
31	15	67	2.7	--	--	--	12	130	4.2
Total	335.7	--	36.8	255.4	--	47.7	306.2	--	62.1

KANSAS RIVER BASIN--Continued

6-8633. BIG CREEK NEAR OGALLAH, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	12	140	4.5	7.9	200	4.3	4.8	260	3.4
2	11	80	2.4	7.7	210	4.4	7.1	250	4.8
3	11	160	4.8	7.7	250	5.2	7.9	160	3.4
4	11	130	3.9	7.4	270	5.4	7.7	210	4.4
5	11	140	4.2	7.1	270	5.2	6.8	210	3.9
6	11	150	4.5	7.1	280	5.4	6.0	180	2.9
7	11	95	2.8	7.4	280	5.6	8.2	340	7.5
8	11	87	2.6	7.1	300	5.8	8.8	270	6.4
9	10	130	3.5	6.8	280	5.1	7.7	230	4.8
10	11	140	4.2	6.5	320	5.6	6.5	200	3.5
11	11	200	5.9	6.3	290	4.9	5.5	240	3.6
12	11	210	6.2	6.0	290	4.7	5.5	240	3.6
13	10	220	5.9	5.5	300	4.5	6.8	360	6.6
14	10	210	5.7	5.3	290	4.1	9.2	140	3.5
15	10	220	5.9	5.1	320	4.4	7.4	210	4.2
16	9.9	190	5.1	5.1	280	3.9	6.0	230	3.7
17	9.6	200	5.2	5.3	290	4.1	5.3	210	3.0
18	9.6	310	8.0	7.7	260	5.4	5.5	250	3.7
19	9.6	260	6.7	7.7	260	5.4	5.7	180	2.8
20	9.6	200	5.2	6.5	260	4.6	4.9	240	3.2
21	9.6	300	7.8	6.0	280	4.5	4.9	240	3.2
22	9.2	280	7.0	5.7	290	4.5	4.8	280	3.6
23	8.8	240	5.7	5.7	280	4.3	4.9	300	4.0
24	8.5	240	5.5	5.3	250	3.6	4.9	220	2.9
25	8.5	240	5.5	5.1	240	3.3	4.6	250	3.1
26	8.5	270	6.2	5.7	190	2.9	4.6	230	2.9
27	8.5	260	6.0	6.0	190	3.1	4.8	230	3.0
28	8.2	240	5.3	6.5	240	4.2	4.6	230	2.9
29	8.2	220	4.9	6.8	210	3.9	4.2	230	2.6
30	8.2	210	4.6	6.0	220	3.6	4.2	230	2.6
31	--	--	--	4.9	210	2.8	--	--	--
Total	296.5	--	155.7	196.9	--	138.7	179.8	--	113.7

Day	JULY			AUGUST			SEPTEMBER		
1	5.5	260	3.9	8.8	230	5.5	3.5	150	1.4
2	85	1020	S 475	8.5	210	4.8	3.0	170	1.4
3	784	1820	3850	8.2	220	4.9	2.6	150	1.1
4	581	1000	1570	7.7	200	4.2	2.4	130	.8
5	157	890	377	7.4	180	3.6	2.3	87	.5
6	76	680	140	6.8	180	3.3	2.6	92	.6
7	54	460	67	6.5	140	2.5	3.3	95	.8
8	41	370	41	5.7	160	2.5	3.5	130	1.2
9	35	340	32	5.3	190	2.7	4.9	100	1.3
10	31	320	27	5.1	220	3.0	4.9	88	1.2
11	28	420	32	4.8	220	2.8	4.0	110	1.2
12	25	760	51	4.4	200	2.4	3.3	140	1.2
13	24	680	44	3.8	200	2.1	2.4	170	1.1
14	22	530	31	3.5	190	1.8	2.3	170	1.1
15	21	400	23	3.1	190	1.6	2.6	160	1.1
16	20	330	18	2.4	190	1.2	2.8	140	1.1
17	29	480	38	1.6	150	.6	2.9	140	1.1
18	27	430	31	1.5	160	.6	2.8	160	1.2
19	33	420	S 50	.9	140	.3	2.3	150	.9
20	72	1350	S 298	1.0	160	.4	2.1	130	.7
21	15	740	30	.5	150	.2	2.4	170	1.1
22	13	420	15	1.6	200	.9	3.0	130	1.1
23	11	250	7.4	1.0	200	.5	3.1	150	1.3
24	11	230	6.8	7.1	400	7.7	3.0	150	1.2
25	9.6	220	5.7	6.5	340	6.0	2.4	140	.9
26	8.8	210	5.0	7.4	240	4.8	2.3	120	.7
27	8.8	300	7.1	4.0	240	2.6	2.6	130	.9
28	8.5	290	6.7	2.5	210	1.4	2.3	130	.8
29	7.9	160	3.4	2.0	190	1.0	1.9	120	.6
30	8.5	220	5.0	2.5	220	1.5	1.7	140	.6
31	8.8	230	5.5	3.0	210	1.7	--	--	--
Total	2261.4	--	7296.5	135.1	--	79.1	85.2	--	30.2

Total discharge for year (cfs-days)..... 3953.8
Total load for year (tons)..... 8120.8

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8635. BIG CREEK NEAR HAYS, KANS.

LOCATION.--At gaging station at county highway bridge, 0.5 mile upstream from Custer Island Park Dam, 3 miles southeast of Hays, Ellis County, and 49 miles upstream from mouth.
DRAINAGE AREA.--542 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	24	24		0.05	0.00	89	11	34	--	283	0	59	31	0.3	3.1	0.19	406	267	35	0.9	720	7.4	
Nov. 20.....	37	17		.06	.00	80	12	31	--	259	0	51	33	.3	3.1	.18	356	249	37	.9	630	8.0	
Dec. 18.....	23	18		.08	.00	107	16	40	9.9	327	0	69	40	.4	8.0	.12	466	333	65	1.0	770	7.7	
Jan. 24, 1962	27	23		.06	.10	110	14	42	10	325	0	70	54	.5	9.7	.19	518	332	66	1.0	840	7.3	
Feb. 14.....	17	16		.04	.04	84	11	33	10	268	0	60	35	.4	6.6	.19	395	254	34	.9	640	7.6	
Mar. 16.....	19	12		.01	.00	78	15	31	6.8	254	0	64	38	.3	3.1	.15	391	256	48	.8	640	7.7	
Apr. 10.....	17	13		.04	.00	78	15	33	9.8	249	0	64	37	.4	3.1	.16	384	256	52	.9	660	7.4	
May 24.....	24	22		.14	.00	80	16	30	15	259	0	67	41	.4	1.8	.19	414	266	54	.8	670	7.2	
June 19.....	13	18		.12	.00	70	15	36	11	207	0	82	45	.4	2.1	.18	402	236	66	1.0	660	7.6	
July 18.....	2,350	12		.05	.00	34	5.1	7.5	7.4	127	0	10	8.0	.3	4.4	.12	153	106	2	.3	260	8.0	
Aug. 15.....	14	21		.03	.00	75	14	49	11	234	0	88	45	.8	12	.34	445	244	52	1.4	710	7.4	
Sept. 13.....	15	21		.01	.00	72	14	34	13	232	0	62	45	.6	5.8	.23	382	237	47	1.0	640	7.5	

6-8640. SMOKY HILL RIVER NEAR RUSSELL, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 281, 0.2 mile upstream from Landon Creek and 7.7 miles south of Russell, Russell County.
DRAINAGE AREA.--6,965 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951, October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	155	13		0.81	0.00	140	28	303	--	259	0	278	440	0.5	0.4	0.52	1,370	464	252	6.1	2,520	7.6	
Nov. 20.....	196	14		.10	.00	144	23	181	--	249	0	228	286	.5	2.7	.30	1,030	454	250	3.7	1,790	7.8	
Dec. 18.....	a 85	13		.04	.00	162	26	205	13	290	0	260	330	.5	4.2	.16	1,150	511	273	3.9	1,920	8.0	
Jan. 24, 1962	a 80	13		.05	.00	166	29	220	14	305	0	271	330	.5	3.6	.18	1,260	533	283	4.1	1,990	7.6	
Feb. 14.....	112	13		.01	.00	145	24	220	15	266	0	240	330	.5	1.5	.24	1,130	460	242	4.5	1,840	7.8	
Mar. 26.....	118	6.0		.03	.00	139	24	195	12	222	0	251	326	.5	.4	.19	1,120	446	264	4.0	1,840	7.5	
Apr. 11.....	150	7.0		.06	.00	117	23	117	14	198	0	223	176	.5	.4	.16	794	386	224	2.6	1,290	7.5	
May 24.....	50	17		.13	.00	157	35	440	21	278	0	302	670	.6	.7	.46	1,840	536	308	8.3	3,100	8.0	
June 18.....	630	5.5		.10	.00	94	19	36	15	161	0	214	36	.6	.4	.18	508	312	180	.9	790	7.4	
July 19.....	1,590	15		.01	.00	59	7.0	24	10	163	0	41	41	.4	3.1	.12	288	176	42	.8	480	7.5	
Aug. 17.....	135	13		.02	.16	129	27	208	15	217	0	266	324	.6	.7	.23	1,110	433	255	4.3	1,810	7.6	
Sept. 14.....	80	14		.01	.00	130	31	304	15	246	0	256	480	.6	.8	.31	1,410	452	250	6.2	2,340	7.6	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8645. SMOKY HILL RIVER AT ELLSWORTH, KANS.

LOCATION.--At gaging station at bridge on State Highway 14 in Ellsworth, Ellsworth County, 2 miles downstream from Turkey Creek.
DRAINAGE AREA.--7,580 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: September 1957 to September 1959, October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	206	12		0.22	0.00	155	26	289	--	264	0	258	450	0.5	0.4	0.41	1,350	494	278	5.6	2,490	7.5	
Nov. 20.....	390	12		.04	.00	130	18	131	--	212	0	156	244	.4	3.1	.23	830	398	224	2.9	1,480	7.7	
Dec. 18.....	a 165	13		.02	.00	170	29	239	11	239	0	267	425	.5	5.3	.16	1,350	543	347	4.5	2,240	8.2	
Jan. 15, 1962	a 150	13		.04	.00	182	32	220	13	295	0	277	393	.5	7.1	.18	1,320	586	344	4.0	2,180	8.1	
Feb. 14.....	188	15		.03	.00	168	25	212	14	290	0	238	355	.4	3.1	.21	1,200	522	284	4.0	1,950	8.0	
Mar. 23.....	164	9.0		.08	.00	176	29	230	13	285	0	273	410	.5	1.5	.16	1,350	558	324	4.2	2,220	7.9	
Apr. 23.....	242	8.5		.04	.00	164	26	168	13	190	0	264	323	.6	1.5	.21	1,110	516	360	3.2	1,810	7.4	
May 25.....	79	12		.13	.00	138	31	312	18	205	0	259	515	.6	.5	.41	1,440	472	304	6.3	2,390	7.3	
June 18.....	596	9.0		.21	.00	115	21	46	15	210	0	214	58	.6	.9	.18	592	374	202	1.0	920	7.2	
July 20.....	2,390	13		.04	.00	63	9.5	31	10	151	0	52	65	.4	2.9	.13	330	196	72	1.0	560	8.0	
Aug. 14.....	234	12		.01	.00	136	22	190	17	200	0	243	326	.5	.4	.24	1,100	430	266	4.0	1,810	7.6	
Sept. 19.....	117	13		.03	.13	138	30	282	16	222	0	257	479	.5	.5	.28	1,380	468	486	5.7	2,310	7.6	

a. Daily mean discharge.

6-8655. SMOKY HILL RIVER NEAR LANGLEY, KANS.

LOCATION.--At gaging station at county highway bridge, 0.5 mile downstream from Kanopolis Dam and 5 miles north of Langley, Ellsworth County.
DRAINAGE AREA.--7,857 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	55	12		0.04	0.00	84	11	91	--	176	0	109	137	0.3	1.5	0.19	547	254	110	2.5	1,030	7.8	
Nov. 9.....	248	10		.08	.00	96	14	126	--	193	0	133	193	.4	1.5	.23	674	297	139	3.2	1,230	7.9	
Dec. 14.....	156	10		.06	.00	110	15	122	12	173	14	141	214	.5	2.6	.15	737	336	170	2.9	1,250	8.3	
Jan. 12, 1962	164	10		.02	.00	128	18	143	11	229	0	167	250	.4	1.9	.16	856	394	206	3.1	1,460	8.2	
Feb. 9.....	589	11		.03	.00	110	17	128	12	205	0	149	216	.4	2.2	.12	768	344	176	3.0	1,270	7.5	
Mar. 23.....	192	8.0		.04	.00	122	19	122	11	224	0	176	214	.4	1.5	.15	810	382	198	2.7	1,360	7.8	
Apr. 27.....	29	7.0		.07	.00	121	21	140	10	205	0	190	230	.5	.4	.16	876	388	220	3.1	1,420	7.6	
May 21.....	12	.1		.01	.00	114	24	126	13	222	0	176	209	.5	.4	.19	815	383	201	2.8	1,350	7.6	
June 22.....	402	5.5		.01	.00	98	20	116	13	163	0	168	211	.5	1.1	.16	754	326	192	2.8	1,270	7.3	
July 11.....	2,380	6.0		.01	.00	81	13	74	11	129	0	122	129	.4	1.5	.15	516	256	150	2.0	900	7.3	
Aug. 15.....	113	10		.04	.06	75	13	58	8.0	163	0	82	110	.4	.4	.18	455	240	106	1.6	790	7.7	
Sept. 21.....	144	10		.12	.19	86	17	82	12	176	0	123	143	.4	1.2	.24	582	284	140	2.1	980	8.0	

KANSAS RIVER BASIN--Continued

6-8669. SALINE RIVER NEAR WAKEENEY, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 283, 1 mile upstream from Trego Creek and 5 miles north of Wakeeney, Trego County.
DRAINAGE AREA.--696 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1958, October 1961 to September 1962.
Water temperatures: October 1955 to September 1959.
Sediment records: October 1955 to September 1959.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period December 1957 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	14	18		0.52	0.00	99	17	26	--	310	0	86	20	0.5	0.4	0.21	419	317	63	0.6	720	8.0	
Nov. 20.....	20	25		.03	.00	90	17	26	--	303	0	70	19	.5	.4	.15	384	294	46	.7	660	7.9	
Dec. 18.....	a 13	25		.03	.00	112	20	25	9.7	361	0	89	21	.6	2.7	.10	478	362	66	.6	760	7.7	
Jan. 24, 1962	a 14	25		.03	.00	109	23	24	9.6	371	0	86	23	.6	2.7	.10	470	366	62	.5	790	7.6	
Feb. 14.....	23	25		.02	.00	93	21	23	11	324	0	71	19	.6	1.0	.18	433	318	52	.6	670	8.0	
Mar. 15.....	22	22		.01	.00	91	19	22	5.6	315	0	73	21	.6	.4	.16	424	305	47	.5	670	8.1	
Apr. 2.....	25	21		.04	.00	91	20	27	9.2	278	25	81	22	.6	.4	.13	432	309	39	.7	690	8.3	
May 22.....	41	24		.15	.00	48	13	13	16	195	0	30	9.0	.6	2.0	.13	243	174	14	.4	410	7.7	
June 20.....	28	25		.00	.00	67	14	14	14	217	17	38	13	.6	1.8	.13	318	224	18	.4	500	8.5	
July 18.....	73	20		.01	.00	61	12	11	11	207	0	42	12	.5	.5	.12	275	202	32	.3	460	7.6	
Aug. 1.....	64	22		.02	.00	69	15	12	11	234	0	49	14	.6	1.6	.13	318	234	42	.3	520	7.5	
Sept. 12.....	10	24		.08	.00	82	18	18	11	281	0	70	18	.5	1.8	.15	389	278	48	.5	620	7.9	

a Daily mean discharge.

6-8670. SALINE RIVER NEAR RUSSELL, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 281, 2 miles downstream from Salt Creek and 5 miles north of Russell, Russell County.
DRAINAGE AREA.--1,502 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1946 to September 1949, October 1961 to September 1962.
Water temperatures: January 1946 to September 1951.
Sediment records: May 1946 to September 1951.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 10, 1961	98	16		0.10	0.00	168	36	219	--	278	0	339	327	0.5	1.0	0.38	1,290	567	339	4.0	2,220	7.9	
Nov. 20.....	144	16		.05	.00	152	29	157	--	249	0	303	224	.5	2.2	.31	968	498	294	3.0	1,680	7.8	
Dec. 18.....	a 90	21		.04	.00	176	39	214	11	249	0	381	324	.6	4.2	.19	1,340	600	396	3.8	2,170	7.8	
Jan. 24, 1962	a 80	18		.03	.00	198	40	216	13	339	0	382	345	.5	3.6	.21	1,440	658	380	3.7	2,260	7.8	
Feb. 14.....	115	21		.03	.00	168	35	179	13	295	0	324	265	.6	1.5	.28	1,170	563	321	3.3	1,820	8.0	
Mar. 27.....	165	15		.02	.00	166	34	127	11	259	0	339	195	.6	.4	.16	1,060	554	342	2.3	1,640	7.8	
Apr. 24.....	88	14		.03	.00	165	37	215	13	239	0	376	330	.6	.4	.23	1,360	564	368	3.9	2,070	7.6	
May 24.....	95	19		.10	.00	146	32	160	15	227	0	316	235	.6	1.9	.27	1,070	496	310	3.1	1,660	7.3	
June 19.....	201	20		.11	.00	130	27	105	13	237	0	230	176	.6	2.1	.19	850	436	242	2.2	1,360	7.7	
July 4.....	3,940	20		.31	.00	53	6.8	8.5	10	166	0	31	12	.4	1.9	.08	240	160	24	.3	370	7.6	
July 30.....	276	18		.01	.00	149	31	174	13	239	0	294	285	.5	.5	.23	1,130	500	304	3.4	1,830	7.4	
Aug. 16.....	115	18		.01	.00	157	40	196	15	227	0	346	329	.6	1.5	.28	1,260	556	370	3.6	2,020	7.7	
Sept. 13.....	83	16		.00	.00	154	37	195	14	198	0	364	331	.6	1.2	.24	1,270	536	374	3.7	1,970	7.7	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8695. SALINE RIVER AT TESCOTT, KANS.

LOCATION.--At gaging station at highway bridge, 0.5 mile south of Tescott, Ottawa County, and 0.5 mile upstream from Dry Creek.
DRAINAGE AREA.--2,820 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1953, October 1961 to September 1962.
Water temperatures: April 1950 to September 1953, August 1959 to September 1962.
Sediment records: August 1959 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,680 ppm May 1-31; minimum, 471 ppm July 1-31.
Hardness: Maximum, 522 ppm May 1-31; minimum, 254 ppm July 1-31.
Specific conductance: Maximum daily, 3,290 micromhos May 25; minimum daily, 367 micromhos July 7.
Water temperatures: Maximum, 61°F July 9; minimum, freezing point Dec. 21, Jan. 31, Mar. 4, 8.
Sediment concentrations: Maximum daily, 6,680 ppm Oct. 30; minimum daily, 89 ppm Oct. 13.
Sediment loads: Maximum daily, 36,700 tons Aug. 6; minimum daily, 51 tons Oct. 20.
EXTREMES, 1950-53, 1959-62.--Dissolved solids (1950-53, 1961-62): Maximum, 3,180 ppm Sept. 12-30, 1953; minimum, 170 ppm June 8-10, 1951.
Hardness (1950-53, 1961-62): Maximum, 656 ppm Jan. 1-16, 1953; minimum, 120 ppm July 20, 1950.
Specific conductance (1950-53, 1961-62): Maximum daily, 5,550 micromhos Sept. 30, 1953; minimum daily, 253 micromhos June 8, 1951.
Water temperatures: Maximum, 85°F Aug. 1, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations (1959-62): Maximum daily, 10,900 ppm July 24, 1961; minimum daily, 10 ppm Dec. 6, 31, 1959, Jan. 7, 1961.
Sediment loads (1959-62): Maximum daily, 69,000 tons Mar. 25, 1960; minimum daily, 2 tons Dec. 6, 31, 1959.
REMARKS.--Maximum observed during water year: Dissolved solids, 1,800 ppm Dec. 21; hardness, 714 ppm Dec. 21. Minimum observed during water year: Dissolved solids, 380 ppm July 8; hardness, 224 ppm July 8. Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period October 1956 to September 1961 available from the Kansas State Department of Health. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station. Flow affected by ice Dec. 11 to Feb. 1.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 24-29, 1961..	203	16		125	40	388	--	200	0	384	535	0.3	1.5	0.41	1,630	2.22	893	476	312	7.7	2,930	7.8
Oct. 30-31.....	1,258	--		90	13	147	--	190	--	130	212	--	--	--	750	1.02	2,550	278	122	3.8	1,280	--
Nov. 1-2.....	360	--		83	13	123	--	173	--	140	166	--	--	--	634	.86	612	260	118	3.3	1,040	--
Nov. 3-15.....	200	15		138	34	290	13	256	0	340	410	.4	5.3	.27	1,320	1.80	713	484	274	5.7	2,380	8.2
Nov. 16-30.....	355	14		139	29	199	11	256	0	297	280	.4	6.6	.27	1,130	1.54	1,080	466	256	4.0	1,890	8.2
Dec. 1-9.....	266	17		110	31	228	11	144	0	341	315	.5	6.2	.21	1,150	1.56	826	402	284	5.0	1,920	8.1
Jan. 31-Feb. 24, 1962.....	379	--		112	23	163	--	198	--	243	218	--	--	--	920	1.25	941	374	212	3.7	1,490	--
Mar. 7-31.....	260	16		157	27	260	9.8	242	0	363	360	.5	8.0	.27	1,360	1.85	955	502	304	5.1	2,150	7.9
Apr. 1-30.....	231	--		135	36	277	--	205	--	370	374	--	--	--	1,350	1.84	842	485	317	5.5	2,180	--
May 1-31.....	171	--		147	39	387	--	251	--	409	515	--	--	--	1,680	2.28	776	522	316	7.4	2,730	--
June 1-30.....	850	--		93	16	91	--	183	--	164	120	--	--	--	616	.84	1,410	298	148	2.3	990	--
July 1-31.....	1,211	--		82	12	60	--	168	--	127	77	--	--	--	471	.64	1,540	254	116	1.3	770	--

Aug. 1-31, 1962...	697	--		100	16	127	--	190	--	172	177	--	--	--	720	.98	1,350	316	160	3.1	1,210	--	
Sept. 1-30.....	256	--		138	30	309	--	259	--	321	416	--	--	--	1,380	1.88	954	468	256	6.2	2,320	--	
Weighted average	a 427	--		105	20	149	--	196	--	212	202	--	--	--	827	1.12	1,080	345	184	3.2	1,360	--	
Tons per day....	--	--		138	26.0	195	--	255	--	277	263	--	--	--	--	--	--	--	--	--	--	--	

a Mean discharge based on 365 days; mean discharge for 280 days of chemical analyses, 483 cfs.

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
May 25, 1961.	12,400	15		--	--	65	8.5	18	7.3	173	0	61	22	0.2	1.5	0.04	298	197	55	0.6	466	7.0	9
Oct. 23.....	192	14		0.03	0.00	166	38	381	--	327	0	380	520	.4	2.2	.56	1,710	570	302	6.9	3,070	7.4	
Nov. 8.....	191	16		.06	.00	173	33	324	--	351	0	359	430	.4	4.2	.44	1,520	567	279	5.9	2,640	7.4	
Dec. 21.....	a 175	18		.07	.00	222	39	327	11	437	0	427	450	.5	12	.31	1,800	714	356	5.3	2,760	7.5	
Jan. 4, 1962.	a 200	16		.02	.00	193	32	222	13	371	0	360	320	.5	9.7	.24	1,390	613	309	3.9	2,190	7.8	
Feb. 9.....	300	19		.05	.00	154	28	188	13	315	0	277	256	.5	5.3	.19	1,100	499	241	3.7	1,750	7.7	
Mar. 12.....	249	16		.04	.00	174	32	236	8.0	324	0	344	355	.5	7.1	.32	1,380	566	300	4.3	2,160	7.9	
Apr. 9.....	240	13		.05	.00	173	35	268	11	322	0	348	360	.5	5.3	.23	1,410	576	312	4.9	2,290	8.2	
May 2.....	195	22		.04	.00	144	41	351	12	254	0	398	490	.6	.4	.34	1,590	528	320	6.6	2,610	7.4	
June 6.....	1,240	13		1.1	.00	82	15	38	8.6	176	0	143	49	.5	3.3	.16	454	266	122	1.0	730	7.4	
July 8.....	1,100	18		.54	.00	72	11	33	10	171	0	92	46	.5	3.3	.15	380	224	84	1.0	620	7.6	
Aug. 21.....	288	15		.26	.00	151	37	290	15	264	0	343	437	.6	3.1	.32	1,490	528	312	5.5	2,430	7.8	
Sept. 17.....	204	15		.05	.00	150	41	317	14	278	0	367	460	.5	3.9	.34	1,540	542	314	5.9	2,470	7.5	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8695. SALINE RIVER AT TESCOTT, KANS.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8695. SALINE RIVER AT TESCOTT, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962
Where no concentrations are reported, loads are estimated

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..	278	550	413	440	3460	4110	290	220	172
2..	267	450	324	281	2530	1920	282	170	129
3..	253	440	301	226	1060	647	275	220	163
4..	242	460	301	212	510	292	272	240	176
5..	236	410	261	212	330	189	266	410	294
6..	231	380	237	209	230	130	264	120	86
7..	226	300	183	197	280	149	254	200	137
8..	222	240	144	192	320	166	247	180	120
9..	217	220	129	191	290	150	246	220	146
10..	221	250	149	191	220	113	242	--	150
11..	224	270	163	193	270	141	180	--	150
12..	219	150	89	194	290	152	130	--	150
13..	216	89	52	194	270	141	140	--	150
14..	215	100	58	192	220	114	160	--	150
15..	219	100	59	199	260	140	170	--	150
16..	217	93	54	382	1180	S 1330	190	--	240
17..	209	100	56	418	1410	1590	180	--	240
18..	205	98	54	423	780	891	180	--	240
19..	201	100	54	349	650	612	160	--	240
20..	198	96	51	297	580	465	170	--	240
21..	196	140	74	284	310	238	175	500	236
22..	195	170	90	290	270	211	180	--	240
23..	192	130	67	319	340	293	170	--	240
24..	191	130	67	482	600	781	165	--	240
25..	190	120	62	418	610	688	175	--	240
26..	189	110	56	374	570	576	185	--	240
27..	187	120	61	345	400	373	180	--	240
28..	188	260	132	326	280	246	170	--	240
29..	272	800	S 936	313	190	161	160	--	240
30..	1600	6680	28900	300	180	146	175	--	240
31..	916	5030	12400	--	--	--	185	--	240
Total	8832	--	45977	8643	--	17155	6218	--	6159
	JANUARY			FEBRUARY			MARCH		
1..	190	--	240	700	1610	3040	245	--	150
2..	200	--	240	648	2030	3550	254	--	130
3..	210	--	240	671	2610	4730	237	170	109
4..	200	440	238	521	2280	3210	212	530	304
5..	180	--	240	426	1820	2090	221	--	300
6..	190	--	240	382	1470	1520	249	--	320
7..	205	--	240	344	1890	1760	259	460	322
8..	190	--	220	315	930	791	213	350	201
9..	170	--	200	303	680	556	315	560	476
10..	150	--	200	301	540	439	303	590	483
11..	160	--	200	290	600	470	278	660	495
12..	180	--	200	283	580	443	249	640	430
13..	200	--	200	275	490	364	237	480	307
14..	190	--	200	269	530	385	227	440	270
15..	180	--	200	276	630	469	216	340	198
16..	175	--	180	284	630	483	219	300	177
17..	160	--	170	288	550	428	218	340	200
18..	140	--	150	293	450	356	214	360	208
19..	120	--	140	291	350	275	213	340	196
20..	100	--	120	295	360	287	217	380	223
21..	105	--	120	338	620	566	224	400	242
22..	130	--	120	290	540	423	226	510	311
23..	140	--	130	271	590	432	231	490	306
24..	150	--	140	270	--	300	233	420	264
25..	160	--	160	253	--	200	234	420	265
26..	180	--	200	210	--	150	262	430	304
27..	520	--	3800	223	--	150	365	1070	1050
28..	1750	--	10000	247	--	150	379	1130	1160
29..	1500	--	7700	--	--	--	332	1000	896
30..	1000	2000	5400	--	--	--	321	690	598
31..	850	1270	2910	--	--	--	317	660	565
Total	9975	--	34738	9557	--	28017	7920	--	11460

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8695. SALINE RIVER AT TESCOTT, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Contirued
/Where no concentrations are reported, loads are estimated/

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	296	520	416	200	210	113	271	1570	1150
2..	277	400	299	196	250	132	432	2370	2760
3..	266	310	223	193	310	162	1010	4580	12500
4..	259	280	196	189	250	128	1920	6340	32900
5..	255	300	207	189	210	107	2330	5580	35100
6..	251	270	183	185	160	80	1460	5120	20200
7..	248	270	181	181	140	68	833	3490	7850
8..	242	260	170	178	120	58	659	3040	5410
9..	240	290	188	176	120	57	722	3160	6160
10..	236	220	140	171	140	65	796	2750	5910
11..	235	230	146	166	180	81	1460	6060	23900
12..	235	240	152	161	200	87	1060	5490	15700
13..	234	210	133	155	190	80	794	3450	7400
14..	234	250	158	150	230	93	701	3020	5720
15..	233	210	132	147	300	119	568	2740	4200
16..	228	160	98	144	350	136	519	2500	3500
17..	225	170	103	143	400	154	519	1790	2510
18..	221	150	90	137	370	137	460	1750	2170
19..	217	170	100	140	470	178	419	1940	2190
20..	214	160	92	144	450	175	384	1520	1580
21..	215	220	128	144	440	171	366	1520	1500
22..	225	300	182	142	360	138	360	1210	1180
23..	233	380	239	168	490	222	391	1510	1590
24..	217	250	146	218	730	430	498	2620	3520
25..	215	200	116	180	820	399	790	2900	S 6600
26..	204	170	94	159	540	232	1760	6460	30700
27..	195	170	90	156	560	236	1580	6600	28200
28..	195	190	100	199	910	489	1460	6400	25200
29..	196	180	95	216	2110	1230	553	5320	7940
30..	203	190	104	179	700	338	429	3860	4470
31..	--	--	--	187	800	404			
Total	6944	--	4701	5293	--	6499	25504	--	309710

Day	JULY			AUGUST			SEPTEMBER		
1..	408	1540	1700	675	2840	5180	228	700	431
2..	545	3480	S 5490	663	2380	4260	232	760	476
3..	1140	4020	12400	700	2630	4970	332	1100	986
4..	2210	5400	32200	824	3980	8850	307	1090	904
5..	2750	4390	32600	779	5320	11200	355	2470	2370
6..	2920	4400	34700	2220	6120	36700	299	2460	1990
7..	2520	3790	25800	3430	3230	29900	263	1200	852
8..	1150	5020	15600	3530	2010	19200	228	920	566
9..	847	3460	7910	1010	5030	13700	226	910	555
10..	1210	4360	14200	627	2210	3740	301	1450	1180
11..	2200	4000	23800	541	1510	2210	297	1290	1030
12..	1610	3180	13800	491	1180	1560	271	1030	754
13..	925	3440	8590	451	1070	1300	267	810	584
14..	809	3300	7210	416	1040	1170	240	740	480
15..	659	2620	4660	394	1210	1290	225	650	395
16..	622	1950	3270	372	1030	1030	214	540	312
17..	781	3590	7570	358	1020	986	206	500	278
18..	707	3110	5940	398	1110	1190	204	480	264
19..	761	2300	4730	339	1010	924	208	500	281
20..	1300	5150	S 19100	309	1030	859	198	470	251
21..	2050	6120	33900	289	1000	780	242	800	523
22..	1690	3800	17300	277	970	725	239	1120	723
23..	1680	3350	15200	266	1000	718	240	1030	667
24..	1380	4820	18000	272	1050	771	324	3000	2620
25..	856	3630	8390	279	1010	761	331	2100	1880
26..	683	2480	4570	314	1300	1100	271	2020	1480
27..	605	1850	3020	344	1380	1280	252	770	524
28..	537	1570	2280	276	1090	812	235	560	355
29..	500	1310	1770	257	940	652	223	550	331
30..	724	2420	4730	258	820	571	233	540	340
31..	770	3130	6510	242	800	523	--	--	--
Total	37549	--	396940	21601	--	158912	7691	--	24382

Total discharge for year (cfs-days)..... 155727
Total load for year (tons)..... 1044650

S Computed by subdividing day.

6-8695. SALINE RIVER AT TESCOTT, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 30, 1962.....	1400		37	d 1,000	2,020	5,450	56	58	65	74	90	99	100	--				VPWC
Mar. 12.....	1035		37	249	822	553	45	53		73		96	98	99	100			VPWC
June 6.....	1520		74	1,240	5,240	17,500	40	54		78		100	--	--				VPWC
July 8.....	1210		78	1,100	5,550	16,500	41	55		80		100	--	--				VPWC
July 20.....	0810		79	1,160	4,210	13,200	38	48		66		98	99	100				VPWC
July 21.....	0750		79	2,030	6,550	35,900	39	51		73		99	100	--				VPWC
July 24.....	0805		70	1,540	5,130	21,300	35	60		77		99	100	--				VPWC
Aug. 21.....	1545		83	288	1,120	871	59	66		88		98	100	--				VPWC

d Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8699.5. MULBERRY CREEK NEAR SALINA, KANS.

LOCATION.--At county highway bridge, 2 miles downstream from Spring Creek, 2.2 miles west of Salina, Saline County, and 9 miles upstream from mouth.
DRAINAGE AREA.--250 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 13, 1961	6.5	17		0.05	0.30	75	21	46	--	271	0	107	27	0.4	0.4	0.21	447	274	52	1.2	770	7.5	
Nov. 8.....	5.6	18		.04	.10	85	21	52	--	295	0	121	29	.4	.4	.23	464	298	56	1.3	800	7.4	
Dec. 8.....	9.2	11		.03	.06	83	22	53	--	273	0	139	30	.4	.4	.21	475	298	74	1.3	820	7.8	
Jan. 2, 1962.	11.0	8.5		.02	.00	82	25	50	4.1	268	0	149	30	.3	3.1	.16	468	308	88	1.2	720	8.0	
Feb. 9.....	18.7	14		.02	.28	86	23	50	6.8	261	0	153	32	.3	4.2	.16	494	309	95	1.2	760	7.8	
Mar. 12.....	16.6	6.0		.01	.00	74	24	50	1.6	239	0	146	31	.3	1.5	.10	462	283	87	1.3	730	8.0	
Apr. 9.....	13.6	1.0		.06	.44	80	24	57	2.4	251	0	160	35	.4	.4	.13	503	298	92	1.4	820	7.9	
May 2.....	12.0	22		.07	.70	90	26	60	4.9	298	0	156	36	.5	1.5	.16	562	332	88	1.4	880	7.6	
May 20:																							
At 0630....	1,230	8.0		.98	.19	13	5.7	9.1	9.5	68	0	18	5.0	.1	2.3	.10	100	56	0	.5	160	6.6	
At 1430....	3,430	3.5		.99	.13	13	6.7	9.3	8.9	49	0	39	7.0	.1	2.5	.10	113	60	20	.5	180	6.5	
June 1.....	1,570	5.5		.49	.19	16	5.4	6.3	14	66	0	16	15	.1	2.1	.07	116	62	8	.3	190	6.8	
July 11.....	15	16		.06	.00	75	19	39	8.2	249	0	118	27	.4	2.0	.10	430	265	61	1.0	710	7.8	
Aug. 15.....	2.1	11		.14	.00	77	19	41	6.4	276	0	93	26	.4	1.5	.21	425	270	44	1.1	690	7.8	
Sept. 17.....	1.7	16		.02	.17	62	16	32	7.0	227	0	77	20	.4	3.2	.18	344	220	34	.9	570	7.8	

6-8699.5. MULBERRY CREEK NEAR SALINA, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 20, 1962.....	0620		54	1,230	5,940	19,700	43	55		82		99	100					VPWC
May 20.....	1425		--	3,430	1,450	13,400	69	82		98		100	--					PWC
June 1.....	1920		74	1,650	2,680	11,900	64	76		93		99	99	100				VPWC

KANSAS RIVER BASIN--Continued

6-8725. NORTH FORK SOLOMON RIVER NEAR DOWNS, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 24, 3 miles west of Downs, Osborne County, and 4.5 miles upstream from Oak Creek.
DRAINAGE AREA.--2,390 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period December 1957 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 17, 1961	48	21		0.89	0.00	130	18	58	--	351	0	172	37	0.3	6.6	0.27	594	398	110	1.3	1,000	7.9	
Nov. 21.....	60	22		.01	.00	141	18	63	--	366	0	190	40	.3	11	.24	632	426	126	1.3	1,020	7.7	
Dec. 19.....	a 52	25		.08	.00	138	21	58	10	346	0	195	41	.4	16	.15	702	431	147	1.2	1,080	8.1	
Jan. 25, 1962	a 40	25		.01	.00	146	20	57	13	378	0	191	38	.3	18	.19	718	446	136	1.2	1,060	7.9	
Feb. 15.....	79	22		.03	.05	142	20	53	15	361	0	194	37	.3	12	.18	679	436	140	1.1	990	8.0	
Mar. 12.....	63	21		.01	.00	139	17	53	10	339	0	194	38	.3	12	.18	667	417	139	1.1	980	8.1	
Apr. 9.....	74	18		.05	.00	144	21	61	12	346	0	220	44	.3	12	.12	719	446	162	1.3	1,060	8.0	
May 8.....	46	19		.09	.00	126	23	60	17	327	0	208	43	.4	4.4	.18	664	409	141	1.3	990	7.7	
June 1.....	935	15		.16	.00	56	6.0	7.5	9.0	185	0	28	6.0	.4	3.1	.08	218	164	12	.3	380	7.5	
June 22.....	188	18		.02	.00	87	13	33	13	237	0	114	27	.4	8.4	.15	449	270	76	.9	690	7.6	
Aug. 1.....	161	20		.01	.00	90	13	27	14	232	0	118	22	.3	7.1	.13	446	278	88	.7	680	7.6	
Aug. 21.....	66	22		.03	.12	114	16	41	14	305	0	146	32	.3	8.0	.18	568	350	100	1.0	860	8.2	
Sept. 10.....	92	20		.06	.00	99	17	37	12	271	0	130	31	.3	3.5	.30	492	317	95	.9	770	7.8	

a Daily mean discharge.

6-8740. SOUTH FORK SOLOMON RIVER AT OSBORNE, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 281, 0.5 mile south of Osborne, Osborne County, and 0.6 mile downstream from Covert Creek.
DRAINAGE AREA.--2,024 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period December 1957 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 10, 1961	76	20		0.48	0.00	153	21	81	--	332	0	238	83	0.4	7.5	0.23	738	468	196	1.6	1,230	7.8	
Nov. 11.....	92	20		.01	.00	166	22	85	--	320	0	255	108	.4	9.7	.24	780	504	242	1.6	1,290	8.0	
Dec. 19.....	a 74	23		.07	.00	170	24	85	9.0	315	0	277	109	.4	17	.16	912	522	264	1.6	1,390	8.1	
Jan. 25, 1962	a 60	23		.02	.00	187	23	80	10	378	0	267	98	.4	19	.18	938	561	251	1.5	1,360	7.8	
Feb. 15.....	97	23		.01	.00	181	22	87	13	329	0	293	111	.4	9.7	.23	912	542	272	1.6	1,330	8.1	
Mar. 12.....	118	15		.02	.00	149	20	72	9.8	276	0	250	89	.4	8.0	.16	760	454	228	1.5	1,140	8.2	
Apr. 9.....	395	8.0		.07	.00	110	19	53	12	207	0	198	61	.5	1.5	.10	577	352	182	1.2	910	7.7	
May 8.....	90	16		.21	.00	138	23	72	15	273	0	233	87	.5	4.4	.19	742	439	215	1.5	1,130	7.8	
June 1.....	271	14		.02	.00	86	11	34	10	168	0	145	42	.6	2.9	.15	449	260	122	.9	710	7.7	
June 3.....	1,440	15		.04	.00	49	7.3	12	8.2	144	0	55	11	.4	7.1	.07	250	152	34	.4	390	7.7	
June 22.....	1,110	10		--	--	88	16	36	13	176	0	163	48	.5	2.1	.13	476	286	142	.9	750	7.6	
Aug. 1.....	303	18		.00	.00	100	15	44	12	210	0	149	63	.4	1.4	.16	520	311	139	1.1	820	7.7	
Aug. 21.....	601	13		.03	.00	86	11	28	12	178	0	134	38	.4	.9	.12	420	260	114	.8	660	7.7	
Sept. 10.....	407	13		.08	.00	90	16	27	11	188	0	141	38	.4	1.5	.27	440	290	136	.7	690	7.8	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8760. SOLOMON RIVER AT BELOIT, KANS.

LOCATION.--At bridge on State Highway 14 in Beloit, Mitchell County, 8.5 miles upstream from gaging station, about 1.5 miles upstream from Leban Creek, and 300 feet downstream from dam at city waterplant.
DRAINAGE AREA.--5,430 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1952, September 1957 to September 1958, October 1959 to September 1962.
Water temperatures: February 1949 to September 1952, September 1957 to September 1958.
Sediment records: May 1948 to September 1952.
REMARKS.--Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health, Topeka, Kans.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 7, 1961.	369	25		0.03	0.00	152	20	91	11	363	0	200	96	0.2	12	0.09	820	462	164	1.8	1,220	7.3	--
Nov. 21.....	333	23		.05	.18	160	24	88	9.4	364	0	243	89	.3	11	.10	864	499	201	1.7	1,280	7.3	6
Dec. 19.....	a 200	28		.00	.11	205	23	113	9.0	448	0	267	126	.1	17	.11	1,060	608	241	2.0	1,530	7.6	5
Jan. 25, 1962	a 220	30		.06	.11	144	23	113	9.4	284	0	273	111	.1	18	.13	928	453	220	2.3	1,290	7.7	--
Feb. 15.....	329	25		.09	.06	174	19	87	10	372	0	254	89	.3	8.9	.10	910	514	209	1.7	1,290	7.4	--
Mar. 12.....	292	24		.08	.16	167	21	88	8.7	348	0	256	91	.4	11	.08	874	503	218	1.7	1,270	7.4	--
Apr. 9.....	581	18		.07	.02	132	21	66	9.6	263	0	232	69	.4	6.8	.08	695	415	199	1.4	1,050	7.5	--
May 4.....	212	16		.10	.01	136	23	107	9.0	294	0	261	107	.4	5.5	.12	844	435	194	2.2	1,250	7.3	--
May 25.....	559	23		.06	.04	86	10	29	9.4	243	0	75	28	.4	4.6	.06	391	256	57	.8	621	7.0	--
June 15.....	1,170	22		.04	.00	93	12	42	12	221	0	128	43	.4	5.9	.08	497	283	102	1.1	739	7.5	--
July 24.....	895	21		.02	.00	87	11	39	11	207	0	119	42	.4	3.2	.06	449	262	92	1.1	695	7.0	--
Aug. 15.....	688	20		.01	.00	100	14	50	10	224	0	151	53	.4	2.0	.07	530	308	124	1.2	811	7.0	--
Sept. 27.....	286	25		.00	.00	126	18	69	10	299	0	182	69	.4	7.5	.10	679	390	145	1.5	1,020	7.4	--

a Daily mean discharge.

6-8769. SOLOMON RIVER AT NILES, KANS.

LOCATION.--At gaging station at county highway bridge, 0.8 mile west of Niles, Ottawa County.
DRAINAGE AREA.--6,770 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,100 ppm Jan. 1-26; minimum, 244 ppm May 13.
Hardness: Maximum, 498 ppm Dec. 1-31; minimum, 161 ppm Oct. 31.
Specific conductance: Maximum daily, 1,840 micromhos Dec. 24, 25; minimum daily, 342 micromhos June 5.
Water temperatures: Maximum, 83°F July 5; minimum, freezing point Dec. 24, Jan. 10.
REMARKS.--Maximum observed during water year: Dissolved solids, 1,130 ppm Jan. 2; hardness, 541 ppm Jan. 2. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 16-21, 23-30, 1961	503	27		152	23	155	10	416	0	189	188				1,010	1.37	1,370	472	131	3.1	1,570	7.4
Oct. 31	2,180	16		55	5.8	33	7.4	169	0	44	40				464	.63	2,730	161	22	1.1	512	7.1
Nov. 1-2	814	15		79	15	81	9.0	238	0	100	93				542	.74	1,190	259	64	2.2	878	7.4
Nov. 3-16	466	17		142	25	152	9.4	394	0	184	179				978	1.33	1,230	459	136	3.1	1,510	7.3
Nov. 17-21	859	16		92	17	105	8.4	248	0	135	123				659	.90	1,530	299	96	2.6	1,050	8.1
Nov. 22-30	565	22		141	26	133	8.6	356	0	198	144				916	1.25	1,400	458	166	2.7	1,400	7.6
Dec. 1-31	361	25		149	31	159	8.2	394	0	236	198				1,070	1.46	1,040	498	175	3.1	1,640	7.5
Jan. 1-26, 1962	313	--		151	26	180	7.6	376	0	258	203				1,100	1.50	930	485	177	3.6	1,680	7.2
Jan. 27-Feb. 5	2,656	--		61	4.4	26	8.5	165	0	51	36				297	.40	2,130	170	35	.9	485	7.4
Feb. 6-28	581	--		141	16	112	10	327	0	201	134				825	1.12	1,290	416	148	2.4	1,260	7.4
Mar. 1-20	451	--		98	43	145	9.0	300	0	237	167				938	1.28	1,140	422	176	3.1	1,430	7.7
Mar. 21-31	1,949	--		71	23	55	9.0	211	0	133	59				513	.70	2,700	272	99	1.5	785	7.7
Apr. 1-30	655	--		116	31	105	9.6	295	0	224	115				816	1.11	1,440	416	174	2.2	1,210	7.8
May 1-12	384	14		105	25	144	9.8	253	0	237	164				855	1.16	887	366	159	3.3	1,350	7.6
May 13	337	14		59	5.1	14	7.5	175	0	42	12				244	.33	222	168	24	.5	408	7.6
May 14-23	450	20		113	26	153	11	285	0	236	183				904	1.23	1,100	387	153	3.4	1,420	8.0
May 24-31	1,046	16		69	10	46	9.2	183	0	90	50				399	.54	1,130	213	63	1.4	643	8.0

KANSAS RIVER BASIN--Continued

6-8769. SOLOMON RIVER AT NILES, KANS.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 1-30, 1962...	2,612	--		67	7.5	31	8.5	170	0	81	32				346	0.47	2,440	198	59	1.0	548	7.4
July 1-Aug. 10....	1,863	--		74	9.8	37	10	181	0	101	41				399	.54	2,010	225	77	1.1	624	7.7
Aug. 11-31.....	775	18		83	14	63	11	206	0	130	70				519	.71	1,090	266	97	1.7	802	7.9
Sept. 1-30.....	700	17		87	15	69	10	218	0	133	77				538	.73	1,020	278	99	1.8	850	7.7
Weighted average	a977	--		87	15	66	9.3	224	0	128	75				540	0.73	1,450	278	95	1.6	838	7.5
Time-weighted average.....	--	--		106	20	100	9.3	274	0	170	115				716	--	--	349	124	2.2	1,100	7.5
Tons per day....	--	--		233	40.0	177	25.0	600	0	344	201				--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 349 days of chemical analyses, 991 cfs.

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 14, 1961	539	23		0.06	0.11	141	18	136	10	384	0	169	163	0.3	5.5	0.12	901	427	112	2.9	1,400	7.3	--
Nov. 8.....	497	23		.04	--	159	20	155	9.2	416	0	203	181	.4	2.5	.11	1,010	477	136	3.1	1,550	7.4	--
Dec. 8.....	447	24		.13	.12	120	24	158	8.8	288	0	218	187	.3	7.8	.14	947	398	162	3.4	1,460	7.5	4
Jan. 2, 1962.	a 345	26		.00	.34	136	49	167	8.5	445	0	228	194	.2	10	.13	1,130	541	176	3.1	1,710	7.7	5
Feb. 9.....	624	19		.16	.07	108	15	80	10	265	0	152	91	.3	7.1	.08	652	330	113	1.9	1,000	6.7	--
Mar. 6.....	381	26		.94	.02	171	26	160	9.1	426	0	257	180	.3	7.3	.12	1,090	534	185	3.0	1,630	7.6	--
Apr. 4.....	744	20		.17	.00	145	20	94	9.6	316	0	240	102	.4	6.5	.09	829	446	187	1.9	1,230	7.6	--
May 2.....	428	14		.16	.01	111	25	138	9.0	263	0	239	157	.4	2.9	.13	866	378	162	3.1	1,340	7.6	--
June 6.....	6,840	16		.99	.36	63	4.1	13	7.2	174	0	44	12	.3	4.3	.04	263	174	31	.4	419	7.4	--
July 7.....	4,720	18		.06	.09	61	6.1	21	11	169	0	53	25	.2	4.9	.04	295	177	38	.7	467	7.5	--
Aug. 21.....	816	18		.15	.00	77	8.8	35	9.2	202	0	94	36	.4	3.1	.07	385	228	62	1.0	613	7.0	--
Sept. 17.....	584	21		.05	.00	96	20	75	9.8	242	0	159	81	.4	4.2	.08	607	322	124	1.8	943	7.3	--

a Daily mean discharge.

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8769. SOLOMON RIVER AT NILES, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 5, 1961	0740		59	1,010	1,620	4,420	--	--		--		--	--					
Nov. 8	0855		49	497	306	411	--	--		--		--	--					
Dec. 8	1030		41	447	311	375	--	--		--		--	--					
Jan. 2, 1962	1330		39	d 345	273	254	--	--		--		--	--					
Jan. 30	1010		35	5,300	2,060	29,500	58	63	69	79	89	98	100					VPWC
Mar. 6	1030		34	381	272	280	--	--		--		--	--					
Mar. 22	1340		47	2,400	5,310	34,400	--	--		63		99	100					VPN
Mar. 22	1340		47	2,400	5,310	34,400	36	48		73		99	100					VPWC
Apr. 4	0945		51	744	854	1,720	48	66		85		96	100					VPWC
May 2	0930		63	428	249	288	--	--		--		--	--					
June 4	1435		70	6,140	4,010	66,500	1	28		76		99	100					VPN
June 4	1435		70	6,140	4,010	66,500	40	54		79		99	100					VPWC
June 6	1040		--	6,840	2,480	45,800	62	74		88		99	100					VPWC
July 7	1540		86	4,720	2,560	32,600	60	72		89		99	100					VPWC
Aug. 21	1025		82	816	3,860	8,500	63	76		94		100	--					VPWC
Sept. 17	1015		72	584	432	681	--	--		--		--	--					

d Daily mean discharge.

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Jan. 30, 1962	1010	9		5,300		42	50	58	84	96	99	100					SV
Apr. 4	0945	6		744		20	23	32	63	94	98	100					SV

6-8776. SMOKY HILL RIVER AT ENTERPRISE, KANS.

LOCATION.--At gaging station at bridge on State Highway 43 in Enterprise, Dickinson County, 18.6 miles upstream from Chapman Creek.
DRAINAGE AREA.--19,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1958, October 1961 to September 1962.
Water temperatures: October 1955 to September 1962.
Sediment records: October 1957 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 1,440 ppm Dec. 12-31; minimum, 259 ppm Sept. 22-30.
Hardness: Maximum, 574 ppm Dec. 12 to Jan. 27; minimum, 152 ppm Sept. 22-30.
Specific conductance: Maximum daily, 2,610 micromhos May 21; minimum daily, 294 micromhos Sept. 23.
Water temperatures: Maximum, 79°F July 8, 11, 13; minimum, freezing point on several days during January.
Sediment concentrations: Maximum daily, 8,090 ppm Mar. 24; minimum daily, 51 ppm May 8.
Sediment loads: Maximum daily, 217,000 tons Sept. 22; minimum daily, 117 tons May 8.
EXTREMES, 1955-62.--Dissolved solids (1955-58, 1961-62): Maximum, 3,220 ppm Jan. 22-24, 1957; minimum, 199 ppm May 17-22, 1957.
Hardness (1955-58, 1961-62): Maximum, 652 ppm Jan. 22-24, 1957; minimum, 124 ppm Oct. 5-7, 1955.
Specific conductance (1955-58, 1961-62): Maximum daily, 5,340 micromhos Jan. 24, 1957; minimum daily, 292 micromhos May 20, 1957.
Water temperatures: Maximum, 88°F June 21, 1956; minimum, freezing point on many days during winter months.
Sediment concentrations (1957-62): Maximum daily, 8,090 ppm Mar. 24, 1962; minimum daily, 4 ppm Dec. 6, 22, 1958.
Sediment loads (1957-62): Maximum daily, 254,000 tons Mar. 27, 1960; minimum daily, 5 tons Dec. 6, 22, 1958.
REMARKS.--Maximum observed during water year: Hardness, 596 ppm Jan. 3. Chemical analyses by the Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station. Flow affected by ice Dec. 12-15, 20, 23, 24, Jan. 9-11, 14-22, Feb. 27 to Mar. 2, Mar. 4-7.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 13-31, 1961..	1,507	15		136	27	235	--	300	0	239	330	0.3	1.5	0.30	1,120	1.52	4,560	450	204	4.8	2,080	7.7
Nov. 1-16.....	1,642	13		117	23	164	11	261	0	198	243	.4	3.1	.28	922	1.25	4,090	386	172	3.6	1,600	8.0
Nov. 17-20.....	2,285	12		107	23	169	13	254	0	188	232	.3	4.2	.21	854	1.16	5,270	362	154	3.9	1,520	8.1
Nov. 21-30.....	1,612	12		145	24	198	14	293	0	249	273	.3	5.3	.27	1,070	1.46	4,660	460	220	4.0	1,820	7.8
Dec. 1-11.....	1,367	15		152	28	202	12	305	0	258	297	.4	3.6	.21	1,170	1.59	4,320	494	244	4.0	1,890	8.0
Dec. 12-31.....	914	18		176	33	276	11	351	0	334	380	.4	7.1	.28	1,440	1.96	3,550	574	286	5.0	2,310	8.0
Jan. 1-27, 1962...	1,009	18		174	34	245	10	354	0	322	345	.4	4.2	.24	1,330	1.81	3,620	574	280	4.4	2,160	8.0
Jan. 28-Feb. 3....	8,236	11		64	11	37	8.0	178	0	61	53	.4	4.2	.13	346	.47	7,690	204	58	1.6	590	7.7
Feb. 4-28.....	1,966	11		126	25	133	10	276	0	202	194	.5	2.2	.18	864	1.18	4,590	418	192	2.8	1,430	7.8
Mar. 1-31.....	2,045	14		134	25	156	10	268	0	236	216	.4	1.5	.18	950	1.29	5,250	438	218	3.2	1,540	7.8
Apr. 1-30.....	1,407	--		147	29	190	--	281	--	289	257	--	--	--	1,100	1.50	4,180	486	256	3.8	1,750	--
May 1-21.....	848	--		138	36	309	--	268	--	330	425	--	--	--	1,420	1.93	3,250	492	273	3.1	2,350	--
May 22-June 1.....	2,417	--		86	13	96	--	190	--	139	124	--	--	--	594	.81	3,880	268	112	2.6	980	--
June 2-9.....	9,306	--		61	12	23	--	159	--	68	34	--	--	--	318	.43	7,990	202	72	.7	510	--
June 10-30.....	3,659	--		96	20	57	--	198	--	152	87	--	--	--	572	.78	5,650	322	159	1.4	910	--

KANSAS RIVER BASIN--Continued

6-8776. SMOKY HILL RIVER AT ENTERPRISE, KANS.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 1-31, 1962...	5,506	--		82	12	55	--	178	--	116	73	--	--	--	457	0.62	6,790	254	108	1.5	760	--
Aug. 1-31.....	3,082	--		91	14	75	--	205	--	123	105	--	--	--	524	.71	4,360	284	116	1.9	890	--
Sept. 1-21.....	1,930	--		105	20	144	--	224	--	183	198	--	--	--	802	1.09	4,180	344	160	3.4	1,350	--
Sept. 22-30.....	5,258	--		41	12	30	--	115	--	57	42	--	--	--	259	.35	3,680	152	58	1.0	450	--
Weighted average	a2,584	--		100	19	105	--	218	--	161	147	--	--	--	678	0.92	4,680	327	148	2.4	1,130	--
Time-weighted average.....	--	--		121	23	154	--	253	--	211	215	--	--	--	891	--	--	397	189	3.2	1,480	--
Tons per day....	--	--		693	129	727	--	1,510	--	1,110	1,020	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 353 days of chemical analyses, 2,558 cfs.

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 13, 1961	1,850	16		0.98	0.00	120	22	213	--	281	0	191	297	0.3	4.4	0.32	1,010	390	160	4.7	1,870	7.7	
Nov. 30.....	2,260	11		.12	.00	83	16	106	--	173	0	148	146	.4	1.9	.21	609	273	131	2.8	1,080	7.9	
Dec. 11.....	1,120	15		.01	.03	155	28	239	--	312	0	276	335	.4	6.2	.36	1,240	502	246	4.7	2,050	7.8	
Jan. 3, 1962.	1,080	15		.01	.00	186	32	255	17	381	0	327	350	.4	6.2	.27	1,420	596	284	4.5	2,240	7.8	
Feb. 7.....	2,100	15		.73	.06	106	20	91	15	220	0	179	132	.4	5.3	.27	685	346	166	2.1	1,090	7.5	
Mar. 5.....	1,920	14		1.0	.00	141	25	169	13	290	0	219	263	.5	2.2	.18	1,030	455	217	3.4	1,660	7.8	
Apr. 4.....	1,640	14		.13	.00	158	27	160	12	295	0	282	216	.4	5.3	.16	1,040	505	263	3.1	1,680	8.2	
May 1.....	950	11		.08	.00	152	33	267	11	293	0	326	385	.5	1.5	.32	1,370	514	274	5.1	2,280	7.7	
June 1.....	6,820	10		.47	.00	56	11	25	6.0	159	0	62	34	.4	2.7	.10	304	184	54	.8	480	7.3	
June 7.....	10,000	12		1.0	.00	55	8.0	19	7.8	154	0	59	21	.4	4.3	.12	280	170	44	.6	450	7.5	
July 12.....	5,940	13		.11	.00	94	14	63	14	188	0	153	98	.5	2.6	.12	554	292	138	1.6	930	7.6	
Aug. 28.....	2,030	12		.45	.00	93	17	110	14	203	0	150	162	.4	2.7	.18	678	302	136	2.8	1,140	7.8	
Sept. 19.....	6,370	7.5		.05	.00	52	12	34	7.2	134	0	73	53	.4	3.5	.13	330	179	69	1.1	550	7.4	

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8776. SMOKY HILL RIVER AT ENTERPRISE, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962

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..	3600	850	8260	4000	3290	35500	1530	397	1640
2..	3530	848	8080	2990	3660	29500	1500	405	1640
3..	3600	922	8960	2400	2480	16100	1470	301	1190
4..	3720	931	9350	1670	1520	6850	1440	296	1150
5..	3990	1180	12700	1300	1000	3510	1400	297	1120
6..	3670	1320	13100	1230	685	2270	1390	288	1080
7..	3510	1400	13300	1170	726	2290	1360	318	1170
8..	3400	1300	11900	1120	667	2020	1340	337	1220
9..	3230	1080	9420	1070	468	1350	1300	269	944
10..	2920	1390	11000	1070	404	1170	1200	244	790
11..	3110	3810	32000	1160	475	1490	1110	255	764
12..	2080	1680	9430	1120	391	1180	660	223	397
13..	1900	692	3550	1110	290	869	680	217	398
14..	1680	531	2410	1070	331	956	740	171	342
15..	1610	521	2260	1130	307	937	820	204	452
16..	1570	410	1740	2670	675	4870	910	182	447
17..	1540	391	1630	2500	1070	7220	950	168	431
18..	1420	320	1230	2360	1080	6880	1000	188	508
19..	1300	277	972	2340	1020	6440	960	156	404
20..	1220	225	741	1940	934	4890	910	169	415
21..	1170	208	657	1700	908	4170	980	172	455
22..	1140	168	517	1580	963	4110	990	178	476
23..	1130	120	366	1470	599	2380	890	158	380
24..	1220	136	448	1470	561	2230	890	75	180
25..	1220	138	455	1540	474	1970	1000	85	230
26..	1220	137	451	1700	443	2030	1000	124	335
27..	1180	122	389	1820	361	1770	1000	156	421
28..	1100	156	463	1680	448	2030	980	98	259
29..	1160	198	620	1600	467	2020	960	166	430
30..	2750	3750	S 30210	1560	485	2040	960	59	153
31..	3100	1310	11000	--	--	--	1000	52	140
Total	68990	--	207609	51540	--	161042	33320	--	19961

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..	980	71	188	9270	3780	94600	1200	464	1500
2..	1000	85	230	7020	3040	57600	1400	226	854
3..	1080	287	837	4370	2740	32300	2030	216	1180
4..	1140	66	203	3320	2100	18800	2200	509	3020
5..	1080	165	481	2810	1680	12700	2000	538	2900
6..	800	154	333	2400	1360	8810	1700	456	2090
7..	960	122	316	2100	990	5610	1600	546	2360
8..	1110	100	300	1970	762	4050	1600	578	2500
9..	790	102	218	1850	704	3520	1600	582	2510
10..	720	100	194	1850	556	2780	1500	350	1420
11..	780	119	251	1800	596	2900	1560	368	1550
12..	890	140	336	1790	498	2410	1610	406	1760
13..	910	109	268	1800	496	2410	1610	426	1850
14..	900	147	357	1760	412	1960	1540	303	1260
15..	850	136	312	1790	408	1970	1510	376	1530
16..	800	135	292	1790	392	1890	1490	312	1260
17..	750	167	338	1840	384	1910	1340	250	904
18..	700	111	210	1840	382	1900	1250	270	911
19..	700	130	246	1800	358	1740	1240	214	716
20..	700	65	123	1760	311	1480	1360	615	2260
21..	750	103	208	1790	344	1660	1970	2150	11400
22..	800	74	160	2000	380	2050	2270	1430	8760
23..	910	113	278	2180	365	2150	3540	4520	43200
24..	960	93	241	2180	582	3430	4100	8090	89600
25..	950	107	274	2090	689	3890	3010	6130	49800
26..	1180	212	675	2040	667	3670	2580	4140	28800
27..	4040	1160	12700	1400	214	809	2840	3880	29800
28..	6020	1510	24500	1200	360	1170	4470	4350	52500
29..	9840	2360	62700	--	--	--	2840	3310	25400
30..	11200	2580	78000	--	--	--	2390	2710	17500
31..	9930	3040	81500	--	--	--	2060	2210	12300
Total	64220	--	267269	69810	--	280169	63410	--	403395

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8776. SMOKY HILL RIVER AT ENTERPRISE, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--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..	1860	1630	8190	940	108	274	5220	5510	S 84100
2..	1780	1200	5770	1000	117	316	8100	4590	100000
3..	1660	962	4310	990	97	259	10300	3600	100000
4..	1640	741	3280	920	75	186	10900	4000	118000
5..	1610	704	3060	880	62	147	10800	4080	119000
6..	1560	595	2510	860	54	125	10700	4370	126000
7..	1540	432	1800	860	68	158	9940	4120	111000
8..	1510	384	1570	850	51	117	8780	3460	82000
9..	1530	371	1530	900	60	146	4930	3220	42900
10..	1580	388	1660	930	58	146	3220	2870	25000
11..	1600	424	1830	860	66	153	3020	2530	20600
12..	1540	378	1570	820	104	230	2880	1810	14100
13..	1470	340	1350	770	118	245	3640	2600	25600
14..	1420	354	1360	760	144	295	3060	2990	24700
15..	1440	389	1510	740	132	264	2630	2890	20500
16..	1420	311	1190	690	252	469	2420	2380	15600
17..	1360	314	1150	620	184	308	2270	2140	13100
18..	1320	254	905	620	154	258	2340	1730	10900
19..	1280	234	809	600	228	369	2300	1780	11100
20..	1280	224	774	610	195	321	2210	1560	9310
21..	1300	254	892	1580	1030	S 6170	2120	1350	7730
22..	1310	274	969	1720	1930	8960	2240	1030	6230
23..	1320	210	748	940	351	891	2270	1180	7230
24..	1390	382	1430	2090	1570	8860	4260	2720	31300
25..	1280	248	857	1780	3090	14900	4760	3190	41000
26..	1180	158	503	1670	1880	8480	4700	2480	31500
27..	1120	144	435	1730	2060	9620	6060	3720	60900
28..	1020	208	572	1800	3420	S 19500	7400	4270	85300
29..	950	168	431	3990	5050	54400	6990	4180	78900
30..	930	143	359	2840	2960	22700	6040	4960	80900
31..	--	--	--	2810	3140	23800			
Total	42200	--	53324	39170	--	183067	156500	--	1504500

Day	JULY			AUGUST			SEPTEMBER		
1..	3320	4100	36800	3430	1170	10800	1820	846	4160
2..	2330	3220	20300	3740	1530	15400	1760	630	2990
3..	2270	2530	15500	3570	1600	15400	1700	670	3080
4..	2620	2310	16300	3510	1710	16200	1490	472	1900
5..	4660	3120	39300	3960	2960	31600	1530	502	2070
6..	7050	5220	99400	4470	2370	28600	1780	634	3050
7..	8190	4340	96000	3960	2090	22300	1670	802	3620
8..	8330	3720	83700	6100	4130	68000	1500	690	2790
9..	6740	3470	63100	7300	6560	129000	1560	745	3140
10..	5020	2920	39600	6480	4530	79300	1720	708	3290
11..	4670	2790	35200	3780	3000	30600	1670	722	3260
12..	5630	2910	44200	2720	2310	17000	1570	626	2650
13..	6980	3910	73700	2330	1880	11800	1560	552	2320
14..	7400	3420	68300	2150	1180	6850	1500	504	2040
15..	7260	3520	69000	2000	870	4700	1460	530	2090
16..	7340	3400	67400	1670	2270	10200	1420	631	2420
17..	6260	2890	48800	1610	654	2840	1340	498	1800
18..	5640	3100	47200	1600	699	3020	1340	370	1340
19..	5520	2490	37100	1920	905	4690	4970	5310	S 76900
20..	5640	2420	36900	2140	1900	11000	2300	4380	27200
21..	6240	2830	47700	1760	2710	12900	4880	5170	S 72800
22..	6920	3400	63500	1540	1850	7690	13200	6100	217000
23..	7700	3850	80000	1510	1500	6120	7390	5960	S 131000
24..	6860	4130	76500	3540	3540	S 38300	9940	4480	S 127000
25..	6100	3790	62400	5120	6320	87400	7760	2880	60300
26..	5180	3310	46300	3180	2710	23300	2660	2590	18600
27..	4360	2620	30800	2270	1500	9190	2020	1380	7530
28..	3930	2400	25500	2040	925	5090	1630	1300	5720
29..	3710	1620	16200	2100	1050	5950	1420	905	3470
30..	3530	1500	14300	2080	940	5280	1300	946	3320
31..	3290	1240	11000	1970	921	4900	--	--	--
Total	170690	--	1512000	95550	--	725420	87860	--	798850

Total discharge for year (cfs-days)..... 943260
Total load for year (tons)..... 6116606

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8776. SMOKY HILL RIVER AT ENTERPRISE, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 5, 1961.....	1540		68	4,000	1,140	12,300	--	--		--		97	100	--	--			V
Nov. 3.....	1400		53	2,280	2,200	13,500	--	--		--		100	--	--	--			V
Jan. 29, 1962.....	1530		38	10,900	2,960	87,100	25	30	31	39	53	88	95	98	99	100		VPWC
Apr. 3.....	1505		61	1,640	924	4,090	54	75		96		100	--	--	--			VPWC
June 1.....	1520		73	5,600	6,060	91,600	38	53		78		98	99	100	--			VPWC
June 7.....	1000		--	10,000	4,030	109,000	46	61		79		96	98	99	100			VPWC
July 12.....	1545		84	5,940	2,700	43,300	33	43		64		98	99	100	--			VPWC
Aug. 28.....	1550		77	2,030	756	4,140	42	72		87		100	--	--	--			VPWC
Sept. 19.....	1450		68	6,370	8,010	138,000	27	62		89		98	99	100	--			VPWC
Sept. 24.....	1610		60	12,500	4,960	167,000	44	55		76		95	96	98	100			VPWC

6-8810. BIG BLUE RIVER NEAR CRETE, NEBR.

LOCATION.--At gaging station at bridge on State Highway 82, 1.8 miles south of Missouri Pacific Railroad Co. station in Crete, Saline County, 3.3 miles downstream from Walnut Creek, and 3.6 miles upstream from Squaw Creek.
DRAINAGE AREA.--2,680 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May 1961 to September 1962 (discontinued).
Water temperatures: October 1961 to September 1962 (discontinued).
Sediment records: October 1961 to September 1962 (discontinued).
EXTREMES, 1961-62.--Water temperatures: Maximum, 79°F July 7, 8, 10, Aug. 10; minimum, freezing point on several days during December to March.
Sediment concentrations: Maximum daily, 4,700 ppm June 27; minimum daily, 10 ppm Jan. 26.
Sediment loads: Maximum daily, 29,800 tons Mar. 24; minimum daily, 3 tons Jan. 26.
REMARKS.--Flow affected by ice Dec. 13-22.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 13, 1961	197	19		0.08	--	34	7.8	16	9.1	144	0	25	7.0	0.4	5.4	0.02	204	117	0	0.6	320	6.7	45
Dec. 15.....	126	33		.02	--	75	16	31	7.3	307	0	47	13	.4	1.8	.08	384	252	0	.9	570	7.9	8
Jan. 8, 1962.	125	32		.00	0.40	77	13	30	7.0	300	0	46	12	.2	1.7	.05	375	245	0	.8	584	7.4	4
Feb. 20.....	324	21		.06	.01	45	8.6	18	12	173	0	36	9.0	.3	10	.04	258	148	6	.6	400	7.1	--
Mar. 21.....	3,620	14		.08	.00	14	1.2	4.0	10	51	0	18	.0	.2	1.5	.02	101	40	0	.3	163	6.8	--
Mar. 27.....	3,310	12		.20	--	12	2.9	4.0	12	55	0	15	2.2	.2	1.6	.04	126	42	0	.3	152	6.6	--
Apr. 20.....	192	25		.05	.17	67	15	29	9.2	277	0	53	11	.3	4.2	.10	359	230	3	.8	567	7.6	--
May 17.....	135	20		.01	.01	73	14	31	8.8	300	0	47	13	.5	3.6	.06	364	240	0	.9	591	7.7	--
June 26.....	496	17		.07	.05	30	8.3	15	12	136	0	27	6.6	.3	7.9	.05	216	109	0	.6	316	7.1	--
July 12.....	212	22		.10	.02	43	8.6	18	11	174	0	31	9.1	.4	7.0	.05	243	143	0	.7	384	7.6	--
Aug. 7.....	445	19		.06	.00	25	5.5	11	11	106	0	19	5.5	.2	6.4	.03	171	85	0	.5	249	7.1	--
Sept. 17.....	120	26		.03	.20	57	11	25	9.2	226	0	39	13	.3	5.8	.06	308	188	3	.8	474	7.5	--

KANSAS RIVER BASIN--Continued

6-8810. BIG BLUE RIVER NEAR CRETE, NEBR.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8810. BIG BLUE RIVER NEAR CRETE, NEBR.--Continued

Suspended sediment, water year October 1961 to September 1962

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	139	--	E 150	111	120	36	136	40	15
2	139	--	E 130	119	140	45	144	42	16
3	134	320	120	165	170	76	132	54	19
4	124	280	94	160	150	65	134	62	22
5	118	220	70	148	130	52	126	50	17
6	107	170	49	132	100	36	131	50	18
7	104	150	42	126	80	27	124	56	19
8	108	150	44	142	90	34	135	42	15
9	111	170	51	123	46	15	123	42	14
10	142	560	210	130	35	12	189	30	15
11	305	1680	1380	121	40	13	88	36	9
12	310	910	760	130	50	18	124	49	16
13	221	780	460	126	67	23	110	49	15
14	176	700	330	123	54	18	100	50	13
15	138	520	190	125	47	16	121	57	19
16	136	460	170	160	63	27	124	97	32
17	120	340	110	167	90	41	110	68	20
18	102	230	63	162	50	22	113	66	20
19	110	200	59	151	35	14	116	28	9
20	107	210	61	151	32	13	126	20	7
21	106	180	52	159	46	20	109	28	8
22	101	160	44	297	320	260	116	86	27
23	104	140	39	259	150	100	154	77	32
24	109	130	38	205	140	77	116	75	23
25	106	120	34	181	110	54	109	58	17
26	107	120	35	162	100	44	118	22	7
27	103	110	31	170	74	34	126	15	5
28	110	110	33	145	60	23	117	33	10
29	110	140	42	142	58	22	125	25	8
30	117	150	47	136	49	18	121	25	8
31	116	180	56	--	--	--	104	18	5
Total	4140	--	4994	4628	--	1255	3821	--	480

Day	JANUARY			FEBRUARY			MARCH		
1	109	13	4	612	320	530	172	53	25
2	113	14	4	818	410	910	167	55	25
3	118	16	5	1100	650	1930	188	58	29
4	122	13	4	1540	980	4070	206	63	35
5	138	14	5	2000	820	4430	148	63	25
6	136	12	4	2010	550	2980	145	60	23
7	99	14	4	1150	380	1180	151	65	26
8	117	40	13	764	320	660	155	60	25
9	233	52	33	532	300	430	149	40	16
10	217	52	30	460	350	430	154	38	16
11	149	40	16	399	460	500	292	75	59
12	135	23	8	316	530	450	600	450	730
13	121	14	5	360	340	330	564	400	610
14	114	13	4	332	300	270	385	170	180
15	123	12	4	432	400	470	266	130	93
16	111	12	4	570	750	1150	231	180	110
17	116	34	11	641	1020	1770	294	320	250
18	134	30	11	490	810	1070	837	890	S 2300
19	186	83	42	362	630	620	1550	2910	12200
20	142	41	16	324	450	390	2900	3440	26900
21	126	45	15	202	400	220	3590	2820	27300
22	135	17	6	284	350	270	3900	2250	23700
23	134	16	6	237	320	200	4920	2200	29200
24	123	13	4	241	300	200	5430	2030	29800
25	112	12	4	216	180	100	5420	1800	26300
26	112	10	3	203	68	37	4510	1720	20900
27	118	17	5	231	97	60	3400	1580	15000
28	134	22	8	271	70	51	2350	1540	9770
29	163	45	20	--	--	--	1420	1580	6060
30	313	140	120	--	--	--	890	1200	2880
31	460	250	310	--	--	--	674	930	1690
Total	4663	--	728	16997	--	25708	46058	--	236277

E Estimated.
S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8810. BIG BLUE RIVER NEAR CRETE, NEBR.--Continued

Suspended sediment, water year October 1961 to September 1962--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	544	740	1090	168	120	54	356	2200	2110
2	462	600	750	166	110	49	235	1200	760
3	398	490	530	163	120	53	234	970	610
4	365	400	390	161	130	56	266	940	680
5	327	280	250	157	120	51	269	670	490
6	308	210	170	156	110	46	237	450	290
7	286	170	130	155	98	41	217	420	250
8	272	120	88	153	85	35	598	1790	2890
9	255	130	90	149	98	39	1220	4360	14400
10	247	130	87	144	97	38	1770	3500	16700
11	235	120	76	144	90	35	2100	2930	16600
12	234	120	76	142	86	33	1320	1790	6380
13	226	120	73	141	81	31	488	1070	1410
14	220	120	71	140	90	34	353	800	760
15	207	120	67	138	110	41	281	590	450
16	203	120	66	132	110	39	235	420	270
17	200	120	65	135	110	40	206	280	160
18	197	120	64	138	100	37	184	240	120
19	193	130	68	138	110	41	166	220	99
20	192	140	73	147	130	52	155	220	92
21	189	170	87	201	150	81	147	200	79
22	188	150	76	186	160	80	147	200	79
23	181	150	73	160	180	78	314	1710	1450
24	176	160	76	148	220	88	566	3520	5380
25	175	100	47	143	210	81	287	2420	1880
26	175	140	66	141	220	84	858	2900	6720
27	177	140	67	153	220	91	1480	4700	18800
28	176	120	57	201	340	180	769	3500	7270
29	172	110	51	220	470	280	656	2900	5140
30	172	130	60	356	700	670	536	2420	3500
31	--	--	--	558	2100	3160	--	--	--
Total	7352	--	4934	5434	--	5718	16650	--	115819

Day	JULY			AUGUST			SEPTEMBER		
1	612	2290	3780	1130	2270	6930	270	1340	980
2	337	2220	2020	683	1910	3520	329	1000	890
3	316	2040	1740	494	1440	1920	357	880	850
4	421	1980	2250	418	1440	1630	279	830	630
5	306	2000	1650	447	1500	1810	202	920	500
6	237	1450	930	441	1400	1670	170	1000	460
7	203	1040	570	443	1230	1470	153	980	400
8	180	680	330	401	1300	1410	185	1060	530
9	165	450	200	325	1340	1180	163	800	350
10	159	360	150	280	1150	870	153	530	220
11	174	470	220	234	1030	650	137	430	160
12	230	480	300	197	780	410	136	400	150
13	482	1580	2060	170	670	310	142	380	150
14	560	1830	2770	148	530	210	137	350	130
15	822	2170	4820	129	380	130	137	320	120
16	880	2360	5610	116	320	100	129	310	110
17	612	2070	3420	113	260	79	124	290	97
18	488	1480	1950	95	230	59	116	260	81
19	401	1320	1430	110	280	83	113	230	70
20	1280	3990	13800	113	420	130	106	230	66
21	1520	3260	13400	113	400	120	106	240	69
22	1560	3020	12700	115	350	110	107	220	64
23	694	1910	3600	119	400	130	111	240	72
24	526	1450	2060	211	1140	650	116	270	85
25	390	1420	1500	156	550	230	110	240	71
26	357	1040	1000	133	340	120	108	240	70
27	329	1000	890	129	270	94	103	240	67
28	296	840	670	129	240	84	92	240	60
29	490	1340	1770	129	240	84	101	220	60
30	902	2820	6870	129	240	84	111	220	66
31	1040	2630	7390	466	3390	4270	--	--	--
Total	16969	--	101850	8316	--	30547	4603	--	7628

Total discharge for year (cfs-days)..... 139631
Total load for year (tons)..... 535938

6-8810. BIG BLUE RIVER NEAR CRETE, NEBR.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 13, 1961.....	1500		59	197	775	412	86	91	95	96	97	99	99	100				VPWC
Mar. 21, 1962.....	1445		36	3,600	2,640	25,700	53	60	67	75	87	98	99	100				VPWC
Mar. 27.....	1420		49	3,310	1,530	13,700	63	69	74	76	88	98	99	100				VPWC
June 26.....	1040		72	506	1,820	2,490	71	78	85	92	95	100	--	--				VPWC
June 26.....	1610		76	1,200	3,740	12,100	58	65	73	82	93	99	100	--				VPWC
July 12.....	1405		78	219	417	247	84	--	--	88	94	100	--	--				SPWC
Aug. 7.....	1125		80	445	1,200	1,440	74	75	77	82	92	100	--	--				VPWC
Sept. 17.....	1600		73	120	278	90	78	75	82	91	98	100	--	--				PWC

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Nov. 9, 1961.....	0820	4		128		1	5	--	--	--	41	65	100				S
Mar. 27, 1962.....	1420	16		3,310		1	2	21	55	77	86	94	98	100			SV
Aug. 7.....	1125	3		445		6	6	7	39	87	96	100	--				SV

KANSAS RIVER BASIN--Continued

6-8824. BIG BLUE RIVER NEAR OKETO, KANS.

LOCATION.--At county highway bridge near Oketo, Marshall County, about 3 miles downstream from Kansas-Nebraska State line and 8 miles downstream from gaging station.
DRAINAGE AREA.--4,420 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for Big Blue River at Schroyer for the period November 1956 to September 1961 available from the Kansas State Department of Health. Records of discharge are given for Big Blue River at Barneston, Nebr. No appreciable inflow between gaging station and sampling point except during periods of intense local precipitation.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 17, 1961	267	18		0.20	0.01	43	9.9	22	--	168	0	36	11	0.3	3.6	0.11	240	148	10	0.8	420	7.5	
Nov. 15.....	264	21		.04	.16	78	19	38	--	310	0	59	27	.3	.4	.16	382	272	18	1.0	680	8.0	
Dec. 20.....	270	18		.05	.06	91	20	49	7.6	356	0	70	38	.3	4.2	.10	481	309	17	1.2	760	8.1	
Jan. 17, 1962	30	25		.05	.16	93	20	53	7.6	351	0	77	41	.2	2.7	.13	485	314	26	1.3	770	7.8	
Feb. 5.....	3,040	8.0		.24	.05	21	5.7	8.1	7.2	88	0	12	6.0	.2	3.1	.08	116	76	4	.4	190	6.9	
Mar. 6.....	555	25		.05	.05	74	17	39	10	288	0	64	30	.3	6.2	.16	412	254	18	1.1	660	7.8	
Apr. 2.....	1,045	9.5		.17	.00	40	9.7	19	10	156	0	40	11	.2	6.2	.10	230	140	12	.7	390	7.6	
May 7.....	264	7.5		.02	.00	75	20	47	6.4	307	0	63	38	.3	.4	.16	410	269	17	1.2	720	7.8	
June 5.....	900	6.5		.57	.02	25	3.3	10	8.2	90	0	13	9.0	.1	5.8	.08	126	76	2	.5	200	7.1	
July 12.....	259	20		.15	.00	37	11	19	7.8	149	0	28	19	.4	4.9	.13	226	138	16	.7	380	7.5	
Aug. 9.....	654	9.0		.26	.00	29	9.1	18	9.2	124	0	20	20	.1	3.8	.12	194	110	8	.7	320	7.8	
Sept. 5.....	1,010	6.0		.20	.00	19	5.5	7.5	8.9	85	0	5.8	8.0	.1	3.6	.08	95	70	0	.4	170	7.2	

6-8830. LITTLE BLUE RIVER NEAR DEWEESE, NEBR.

LOCATION.--At bridge on State Highway 14, 0.2 mile downstream from gaging station, 0.8 mile upstream from Walnut Creek, 4 miles southeast of Deweese, Clay County, and 5.8 miles northwest of Angus.
DRAINAGE AREA.--1,140 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1956 to September 1958, October 1959 to June 1960, November 1960 to September 1962.
Water temperatures: August 1956 to September 1961.
Sediment records: August 1956 to September 1961.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 13, 1961	69	32		0.05	--	59	9.5	16	6.4	218	0	28	8.5	0.6	0.9	0.05	278	186	7	0.5	429	7.4	0
Nov. 9.....	74	33		.03	0.03	55	12	17	6.4	221	0	31	8.8	.4	1.7	.04	278	187	6	.5	441	7.8	--
Dec. 19.....	a 66	34		.00	--	63	6.8	18	6.3	216	0	29	11	.4	2.0	.07	275	185	8	.6	448	7.4	3
Jan. 8, 1962.	a 78	34		.00	.00	61	8.8	15	6.3	218	0	31	8.5	.4	.0	.01	277	188	9	.5	427	7.1	4
Feb. 20.....	86	32		.01	.16	58	9.1	15	6.4	213	0	30	8.2	.4	2.2	.08	275	182	7	.5	430	7.7	--
Mar. 21.....	1,920	22		.40	.00	12	4.6	1.8	9.1	59	0	10	.2	.2	.5	.08	91	49	1	.1	121	6.6	--
Apr. 30.....	77	29		.01	.02	61	10	16	7.0	223	0	31	9.0	.4	1.2	.03	276	194	11	.5	433	7.9	--
May 17.....	69	32		.06	--	60	9.4	15	6.8	219	0	30	8.7	.4	1.4	.05	274	188	8	.5	428	7.5	--
June 26.....	109	23		.06	.05	37	6.9	9.4	10	141	0	20	5.8	.3	4.5	.03	234	121	5	.4	291	7.6	--
July 21.....	416	19		.30	.05	12	1.7	3.1	11	55	0	8.0	.0	.2	.4	.03	111	37	0	.2	119	7.0	--
Aug. 9.....	125	26		.05	.01	37	7.2	9.3	10	144	0	20	5.2	.5	6.3	.03	197	122	4	.4	295	7.7	--
Sept. 17.....	77	13		.02	.00	54	8.6	14	7.0	197	0	29	7.7	.4	2.4	.03	251	170	8	.5	394	7.3	--

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8845. LITTLE BLUE RIVER AT WATERVILLE, KANS.

LOCATION.--At gaging station at bridge on State Highway 15 E., 0.4 mile downstream from Malone Creek, 9 miles northwest of Waterville, Washington County, and 18 miles upstream from mouth.
DRAINAGE AREA.--3,330 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1956 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 16, 1961	368	17		0.04	0.00	90	12	30	--	268	0	74	28	0.3	3.1	0.16	413	274	54	0.8	710	7.8	
Nov. 15.....	263	19		.05	.00	105	13	40	--	310	0	94	34	.3	3.1	.18	469	316	62	1.0	760	8.0	
Dec. 19.....	a 320	22		.04	.00	107	15	38	6.2	303	0	100	32	.2	5.3	.08	504	328	80	.9	770	8.1	
Jan. 17, 1962	a 220	24		.05	.06	109	17	40	6.3	322	0	100	35	.3	2.2	.12	494	342	78	.9	760	8.2	
Feb. 6.....	1,120	8.5		.10	.00	38	8.0	13	8.5	127	0	42	11	.1	4.2	.16	201	128	24	.5	300	7.3	
Mar. 6.....	a 310	23		.04	.02	111	16	37	7.2	332	0	104	31	.4	3.1	.19	515	343	71	.9	780	8.0	
Apr. 3.....	612	18		.04	.00	91	16	28	8.3	281	0	89	26	.3	3.1	.10	432	293	63	.7	680	8.1	
May 8.....	296	14		.02	.00	94	19	37	6.7	290	0	104	38	.4	.4	.16	456	312	74	.9	760	8.1	
June 6.....	1,330	10		1.1	.05	35	6.5	9.3	9.2	117	0	25	11	.4	7.5	.10	182	114	18	.4	280	7.4	
July 13.....	428	17		.07	.00	61	15	25	7.7	195	0	71	27	.4	1.8	.13	330	214	54	.7	550	7.4	
Aug. 8.....	360	17		.01	.00	43	7.9	8.2	8.9	149	0	14	17	.4	1.9	.13	206	140	18	.3	370	7.6	
Sept. 6.....	464	12		.11	.00	33	5.7	13	8.8	117	0	27	14	.5	3.8	.12	170	106	10	.6	310	7.4	

a Daily mean discharge.

6-8870. BIG BLUE RIVER NEAR MANHATTAN, KANS.

LOCATION.--At outlet to Tuttle Creek Reservoir, 2.4 miles upstream from gaging station, about 6.5 miles northwest of Manhattan, Riley County, and 9.7 miles upstream from mouth.
DRAINAGE AREA.--9,560 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1958, October 1961 to September 1962.
Water temperatures: October 1955 to September 1958.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period February 1957 to September 1961 available from the Kansas State Department of Health. Prior to January 1962, sampling site 2.4 miles downstream.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	4,390	17		0.16	0.00	40	8.8	13	--	154	0	23	9.0	0.4	1.5	0.10	214	136	10	0.5	350	7.4	
Nov. 15.....	1,360	15		.10	.20	100	22	29	--	283	30	81	23	.3	4.2	.16	439	340	58	.7	750	8.4	
Dec. 29.....	a 900	18		.05	.00	93	23	34	5.7	273	22	95	26	.3	5.3	.10	498	326	66	.8	800	8.3	
Jan. 22, 1962	a 700	20		.13	.00	114	26	36	6.2	388	0	106	28	.4	6.2	.16	540	392	74	.8	840	8.0	
Feb. 12.....	3,060	9.0		.05	.00	55	15	14	8.7	200	0	52	10	.2	4.4	.15	270	198	34	.4	430	7.5	
Mar. 12.....	2,110	16		.02	.00	86	23	24	6.2	295	0	82	19	.3	5.3	.10	417	309	67	.6	660	8.1	
Mar. 28.....	11,800	--		--	--	27	6.9	7.8	--	102	--	20	6.0	--	--	--	118	96	12	.3	205	--	
Apr. 9.....	3,420	14		.05	.00	69	17	22	8.9	246	0	64	15	.3	5.3	.12	336	242	40	.6	560	8.0	
May 14.....	999	5.0		.19	.05	87	25	34	7.8	317	0	99	27	.3	.1	.12	448	320	60	.8	720	7.9	
June 15.....	7,180	5.5		.18	.00	48	14	11	5.8	181	0	36	9.0	.2	3.6	.08	226	178	30	.4	390	7.5	
July 17.....	2,540	12		.03	.00	53	13	13	7.0	195	0	42	12	.4	2.7	.12	254	186	26	.4	440	7.7	
Aug. 10.....	a 230	12		.06	.00	41	8.6	14	7.3	149	0	37	10	.4	2.7	.10	189	138	16	.5	320	7.3	
Sept. 7.....	228	13		.03	.00	51	11	14	8.9	188	0	40	13	.4	3.5	.14	242	172	18	.5	420	7.7	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8875. KANSAS RIVER AT WAMEGO, KANS.

LOCATION.--At gaging station at bridge on State Highway 99 at Wamego, Pottawatomie County, 3 miles downstream from Antelope Creek.
DRAINAGE AREA.--55,240 square miles, approximately, of which a large area is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1956 to September 1958, October 1961 to September 1962.
Water temperatures: August 1956 to September 1962.
Sediment records: October 1957 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 734 ppm Jan. 1-26; minimum, 249 ppm Jan. 27 to Feb. 6.
Hardness: Maximum, 370 ppm Jan. 1-26; minimum, 156 ppm Jan. 27 to Feb. 6.
Specific conductance: Maximum daily, 1,430 micromhos Dec. 20; minimum daily, 295 micromhos Sept. 23.
Water temperatures: Maximum, 87°F Aug. 12; minimum, freezing point Dec. 26, 27, Jan. 6.
Sediment concentrations: Maximum daily, 7,510 ppm Sept. 23; minimum daily, 130 ppm May 5.
Sediment loads: Maximum daily, 489,000 tons Sept. 23; minimum daily, 900 tons (estimated) Jan. 21, 22.
EXTREMES, 1956-62.--Dissolved solids (1956-58, 1961-62): Maximum, 1,180 ppm Feb. 2, 1957; minimum, 160 ppm July 27-28, 1958.
Hardness (1956-58, 1961-62): Maximum, 448 ppm Feb. 2, 1957; minimum, 102 ppm July 27-28, 1958.
Specific conductance (1956-58, 1961-62): Maximum daily, 1,980 micromhos Nov. 12, 1956; minimum daily, 217 micromhos Sept. 8, 1958.
Water temperatures: Maximum (1956-60, 1961-62), 90°F Aug. 4, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily (1957-62), 10,000 ppm July 5, 1959; minimum daily (1960-62), 80 ppm Jan. 10, 1961.
Sediment loads: Maximum daily (1957-62), 752,000 tons May 7, 1959; minimum daily (1960-62), 280 tons (estimated) Jan. 25, 26, 1961.
REMARKS.--Maximum observed during water year: Dissolved solids, 849 ppm Dec. 29; hardness, 454 ppm Jan. 5. Minimum observed during water year: Dissolved solids, 208 ppm Feb. 5; hardness, 140 ppm Feb. 5. Chemical analyses by Kansas State Department of Health, Topeka, Kans. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station. Flow affected by ice Dec. 12 to Jan. 29, Mar. 2.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 18-19, 1961..	9,260	--		62	12	36	--	205	--	40	48	--	--	--	334	0.45	8,350	204	36	1.1	570	--
Oct. 20-30.....	4,297	16		102	20	106	--	298	0	120	136	0.3	4.4	0.15	636	.86	7,380	336	92	2.5	1,160	8.0
Oct. 31.....	17,700	--		67	9.0	33	--	190	--	45	48	--	--	--	316	.43	15,100	204	48	1.0	550	-
Nov. 1-4.....	11,480	10		61	14	39	8.7	190	0	65	53	.3	4.2	.16	334	.45	10,350	210	54	1.2	600	8.0
Nov. 5-16.....	4,781	14		94	21	74	9.0	232	26	103	96	.3	4.2	.19	544	.74	7,020	321	87	1.8	960	8.3
Nov. 17-20.....	12,940	12		61	11	34	7.1	190	0	57	41	.3	4.4	.19	310	.42	10,830	197	41	1.1	540	8.0
Nov. 21-Dec. 8....	4,701	13		106	22	74	9.3	293	0	128	99	.3	4.2	.19	606	.82	7,690	355	115	1.7	1,040	8.1
Dec. 9-31.....	3,030	18		104	26	100	8.1	255	0	167	132	.3	3.6	.13	716	.97	5,860	366	132	2.3	1,160	8.0
Jan. 1-26, 1962...	2,308	16		104	27	107	8.0	290	0	169	141	.4	2.2	.18	734	1.00	4,570	370	132	2.4	1,190	8.1
Jan. 27-Feb. 6....	22,250	9.5		56	4.0	18	7.4	161	0	36	22	.4	3.1	.13	249	.34	14,960	156	24	.6	400	7.8
Feb. 7-28.....	6,629	12		80	15	47	8.4	229	0	87	63	.4	1.5	.15	438	.60	7,840	261	73	1.3	710	8.0
Mar. 1-20.....	4,758	--		80	23	76	--	220	--	132	104	--	--	--	560	.76	7,190	294	114	2.0	910	--
Mar. 21-28.....	20,040	--		50	11	27	--	181	--	47	24	--	--	--	258	.35	13,960	170	30	.9	430	--

Mar. 29-Apr. 30, 1962.....	6,043	--		80	17	60	--	234	--	110	63	--	--	--	468	.64	7,640	270	78	1.6	760	--
May 1-21.....	2,781	--		83	29	116	--	247	--	165	142	--	--	--	694	.94	5,210	326	124	2.8	1,160	--
May 22-28.....	4,114	--		75	20	70	--	229	--	104	86	--	--	--	520	.71	5,780	269	81	1.9	840	--
May 29-June 30....	15,840	--		59	11	28	--	195	--	51	25	--	--	--	286	.39	12,230	192	32	.9	490	--
July 1-31.....	11,200	--		66	13	35	--	193	--	72	40	--	--	--	355	.48	10,740	218	60	1.0	570	--
Aug. 1-31.....	6,988	--		74	9.6	46	--	198	--	74	57	--	--	--	390	.53	7,360	224	62	1.3	640	--
Sept. 1-19.....	3,224	--		89	16	87	--	234	--	116	114	--	--	--	582	.79	5,070	288	96	2.2	950	--
Sept. 20-30.....	12,150	--		55	9.0	29	--	161	--	44	38	--	--	--	291	.40	9,550	174	42	.9	480	--
Weighted average	a7,831	--		70	14	46	--	207	--	78	55	--	--	--	394	0.54	8,140	231	61	1.3	653	--
Time-weighted average.....	--	--		80	17	64	--	228	--	103	79	--	--	--	487	--	--	270	81	1.6	807	--
Tons per day....	--	--		1,460	283	956	--	4,290	--	1,620	1,140	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 348 days of chemical analyses, 7,664 cfs.

KANSAS RIVER BASIN--Continued

6-8875. KANSAS RIVER AT WAMEGO, KANS.--Continued

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	7,450	16		0.15	0.00	62	12	55	--	190	0	65	69	0.3	1.9	0.13	390	204	48	1.7	710	7.6	
Nov. 16.....	4,970	15		.05	.00	114	23	93	--	288	22	132	120	.3	3.1	.23	682	379	107	2.1	1,180	8.3	
Dec. 29.....	2,600	18		.02	.00	126	29	111	8.7	351	0	181	145	.3	5.8	.13	849	434	146	2.3	1,350	8.0	
Jan. 5, 1962.	3,000	20		.44	.00	136	28	119	8.2	366	0	180	147	.3	2.7	.18	816	454	154	2.4	1,300	7.8	
Feb. 5.....	19,300	7.5		.83	.24	45	6.8	15	7.7	144	0	36	16	.3	5.3	.13	208	140	22	.5	340	7.2	
Mar. 6.....	4,460	19		.25	.00	124	26	96	14	293	19	163	136	.6	4.2	.16	758	416	144	2.1	1,250	8.3	
Apr. 4.....	6,660	14		.19	.00	67	17	40	8.2	198	0	88	50	.4	12	.07	400	237	75	1.1	650	7.7	
May 2.....	3,290	10		.02	.00	101	25	88	9.8	281	0	149	116	.4	.4	.16	666	355	125	2.0	1,090	7.7	
May 30.....	15,800	9.5		--	--	52	9.9	22	7.2	161	0	48	27	.4	4.9	.08	264	170	38	.7	430	7.5	
June 11.....	15,700	5.0		.69	.00	48	11	15	6.5	159	0	43	16	.2	4.4	.10	228	165	35	.5	390	7.5	
July 2.....	11,900	11		.51	.00	53	13	18	9.6	183	0	52	20	.4	3.5	.13	271	186	36	.6	460	7.6	
Aug. 27.....	5,770	11		.07	.00	61	13	43	9.0	168	0	76	61	.4	2.2	.19	364	206	68	1.3	620	8.0	
Sept. 18.....	2,930	14		.03	.00	89	17	84	11	242	0	120	121	.5	1.6	.18	556	292	94	2.1	990	8.0	

Temperature (°F) of water, water year October 1961 to September 1962

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

KANSAS RIVER BASIN--Continued

6-8875. KANSAS RIVER AT WAMEGO, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	5200	820	11500	14300	3700	143000	4310	390	4540
2..	10800	1530	44600	10200	2510	69100	3720	390	3920
3..	13900	1510	56700	10600	2590	74100	3520	320	3040
4..	9880	2070	55200	10800	2500	72900	3440	280	2600
5..	8140	1500	33000	7900	1860	39700	3400	300	2750
6..	6380	1130	19500	6330	1180	20200	3400	270	2480
7..	5690	1000	15400	5210	970	13600	3150	240	2040
8..	5380	1000	14500	4480	800	9670	3290	280	2490
9..	5140	1050	14600	4220	590	6720	6080	610	10000
10..	8320	1840	41300	3940	510	5420	4590	490	6070
11..	16100	2730	119000	3880	480	5030	3420	--	3700
12..	20000	1910	103000	3800	450	4620	2500	--	2000
13..	19500	1720	90600	3720	390	3920	2200	--	1800
14..	18000	1170	56900	3600	360	3500	2300	--	1800
15..	17600	1200	56400	3580	540	5220	2600	--	2100
16..	15400	1080	44900	6710	1190	S 25800	3000	--	2400
17..	6160	700	11600	15200	3330	137000	3200	--	2600
18..	7120	510	9800	15300	2460	102000	3300	--	2700
19..	11400	620	19100	12100	1910	62400	3200	--	2600
20..	6880	2220	S 35200	9160	1560	38600	3200	--	2600
21..	3860	1730	18000	7000	1010	19100	3000	--	2400
22..	3580	710	6860	5950	690	11100	2900	--	2300
23..	3380	680	6210	5240	580	8210	2800	--	2300
24..	3290	500	4440	5410	560	8180	2800	--	2300
25..	3200	440	3800	6500	760	13300	2800	--	2300
26..	3380	450	4110	6470	720	12600	2700	270	1970
27..	3420	550	5080	5460	570	8400	2700	320	2330
28..	3400	580	5320	5090	450	6180	2600	--	2100
29..	3600	1110	S 13300	4800	410	5310	2600	--	2100
30..	9280	4090	S 161000	4460	400	4820	2600	--	2100
31..	17700	6580	314000	--	--	--	2600	--	2100
Total	275080	--	1394920	211410	--	939700	97920	--	88530
	JANUARY			FEBRUARY			MARCH		
1..	2600	--	2100	31900	3030	261000	3560	--	3800
2..	2600	--	2100	29200	2740	216000	4000	--	5700
3..	2600	240	1680	24000	2750	178000	4220	--	5700
4..	2900	250	1960	20200	2800	144000	4460	--	6000
5..	3000	280	2270	19400	2640	138000	4440	--	6000
6..	3100	270	2260	16000	1980	85500	4440	--	6000
7..	2700	--	1800	9940	1310	35200	4440	550	6590
8..	2700	--	1800	8050	820	17800	3540	510	4870
9..	2800	--	1900	7810	720	15200	3560	590	5670
10..	2600	--	1800	7840	670	14200	3380	440	4020
11..	2400	--	1600	7600	700	14400	3720	410	4120
12..	2300	--	1600	7240	490	9580	4130	450	5020
13..	2200	--	1500	6580	430	7640	4800	540	7000
14..	2200	--	1500	6270	640	10800	5260	490	6960
15..	2200	--	1500	6300	490	8330	5800	480	7520
16..	2100	--	1400	8470	500	11400	6060	440	7200
17..	2000	--	1100	10100	2100	57300	6060	440	7200
18..	1900	--	1000	7780	2000	42000	5980	490	7910
19..	1800	--	950	6550	1600	28300	5850	360	5690
20..	1800	--	950	6220	1100	18500	7450	1720	S 38600
21..	1800	--	900	5770	680	10600	14300	5290	204000
22..	1800	--	900	5460	600	8840	12600	4790	163000
23..	1800	--	1500	5280	550	7840	12800	3190	110000
24..	1900	--	2400	5310	530	7600	16800	2100	95300
25..	2000	--	3800	5020	--	6800	18500	2370	118000
26..	2200	--	4000	4510	--	6100	32600	3900	343000
27..	3500	--	35000	4040	--	4900	32400	3290	288000
28..	9000	--	100000	3700	--	4500	20300	3150	173000
29..	23000	3000	186000	--	--	--	11300	2340	71400
30..	32900	3110	276000	--	--	--	7090	2200	42100
31..	35600	3380	325000	--	--	--	4950	1730	23100
Total	164000	--	968270	286540	--	1370330	278790	--	1782470

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8875. KANSAS RIVER AT WAMEGO, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

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..	6920	1650	30800	3600	190	1850	12300	2280	75700
2..	8860	1530	36600	3290	210	1870	15800	2770	S 127000
3..	5820	1000	15700	3260	180	1580	26600	3620	260000
4..	5260	700	9940	2860	170	1310	31800	3670	315000
5..	8530	770	17700	2910	130	1020	30400	2960	243000
6..	12500	800	27000	2600	140	983	28200	2520	192000
7..	12100	590	19300	2670	140	1010	25400	2360	162000
8..	11600	440	13800	2790	140	1050	25200	2270	154000
9..	8500	290	6660	2900	170	1330	23100	1730	108000
10..	4710	270	3430	3090	190	1590	18800	1150	58400
11..	4590	290	3590	3360	300	2720	15800	1120	47800
12..	5330	370	5320	2990	370	2990	15300	770	31800
13..	5330	430	6190	2840	310	2380	15000	650	26300
14..	5260	330	4690	2740	250	1850	15300	610	25200
15..	5160	280	3900	2380	240	1540	13700	1000	37000
16..	5000	280	3780	2260	300	1830	11000	960	28500
17..	3640	320	3140	2230	260	1570	9400	820	20800
18..	4370	330	3890	2150	220	1280	8410	780	17700
19..	4480	240	2900	2180	210	1240	8140	750	16500
20..	4590	270	3350	2320	210	1320	7240	720	14100
21..	4510	410	4990	2980	340	2740	7210	730	14200
22..	4590	370	4590	4030	2820	S 39000	7480	1440	29100
23..	4590	290	3590	4440	1960	23500	7960	1050	22600
24..	4710	290	3690	3820	930	9590	8050	530	11500
25..	4680	490	6190	3560	690	6630	11000	1660	S 53400
26..	4220	530	6040	4220	510	5810	14600	2150	84800
27..	3800	400	4100	4150	1170	13100	14600	1400	55200
28..	4260	230	2650	4580	1740	S 24000	14900	1890	76000
29..	4110	170	1890	19400	5870	S 325000	14500	2190	85700
30..	4070	170	1870	17300	5710	267000	14600	2300	90700
31..	--	--	--	14200	4390	168000	--	--	--
Total	176090	--	261280	138100	--	916683	471790	--	2484000

Day	JULY			AUGUST			SEPTEMBER		
1..	13500	2030	74000	8740	850	20100	3600	670	6510
2..	11800	1640	52300	8860	690	16500	3460	580	5420
3..	9250	1130	28200	9160	680	16800	3420	570	5260
4..	7390	1060	21200	10300	920	25600	3290	570	5060
5..	8020	1190	25800	11200	1190	36000	3290	550	4890
6..	10000	1720	46400	13100	1140	40300	3240	570	4990
7..	11600	2620	82100	12600	1130	38400	3200	490	4230
8..	11400	3350	103000	9310	1070	26900	3380	500	4560
9..	12300	3210	107000	9250	1640	41000	3200	550	4750
10..	11000	2590	76900	10700	2080	60100	3170	520	4450
11..	9490	2270	58200	10100	2820	76900	3260	540	4750
12..	8950	1830	44200	8200	2380	52700	3420	560	5170
13..	9220	1690	42100	6610	1150	20500	3170	520	4450
14..	10500	2020	57300	5980	1130	18200	2970	490	3930
15..	12300	2060	68400	5640	1170	17800	3000	460	3730
16..	12900	1900	66200	5510	800	11900	3040	430	3530
17..	12700	1730	59300	5360	850	12300	3020	550	4480
18..	12700	1700	58300	5000	700	9450	2950	430	3420
19..	12000	990	32100	4830	520	6780	3170	490	4190
20..	12300	1160	38500	4570	620	7650	7410	3820	S 83000
21..	15100	1430	58300	4660	600	7550	8140	5550	122000
22..	16200	1460	63900	4510	870	10600	13500	6170	S 244000
23..	12000	1910	61900	4090	790	8720	24100	7510	489000
24..	12500	2320	78300	4040	690	7530	17600	4670	222000
25..	13900	2410	90400	5160	950	13200	22400	6260	379000
26..	12800	1840	63600	7270	2720	53400	17100	3900	180000
27..	10500	1890	53600	6080	2500	41000	7900	2510	53500
28..	8920	1610	38800	4510	1650	20100	5870	1190	18900
29..	8860	1390	33300	3880	970	10200	5070	900	12300
30..	8440	990	22600	3800	800	8210	4590	770	9540
31..	8590	990	23000	3620	710	6940	--	--	--
Total	347130	--	1729200	216640	--	743330	194930	--	1901010
Total discharge for year (cfs-days)									2858420
Total load for year (tons)									14579723

S Computed by subdividing day.

6-8875. KANSAS RIVER AT WAMEGO, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 18, 1961.....	1305		65	7,630	514	10,600	60	60	62	71		94	97	100	--	--		VPWC
Nov. 16.....	1050		46	4,970	686	9,200	40	45	--	69		96	98	99	100	--		VPWC
Feb. 5, 1962.....	1305		35	19,300	2,530	132,000	36	42	45	53	70	86	91	97	100	--		VPWC
Mar. 26.....	0700		48	32,900	4,090	363,000	30	--	37	--		87	93	97	98	100		VPWC
Apr. 5.....	1050		50	8,770	796	18,800	47	49	--	59		79	82	84	89	98		VPWC
May 30.....	1320		70	15,800	5,480	234,000	--	9	--	73		98	99	100	--	--		VPN
May 30.....	1320		70	15,800	5,480	234,000	33	44	--	69		93	99	100	--	--		VPWC
June 11.....	1040		74	15,700	1,040	44,100	34	41	--	53		90	95	99	100	--		VPWC
July 2.....	1020		81	11,900	2,140	68,800	47	59	--	77		96	97	98	99	100		VPWC
July 21.....	0700		80	14,800	1,410	56,300	32	47	--	55		97	99	100	--	--		VPWC
July 22.....	0645		80	16,100	1,440	62,600	23	36	--	49		96	98	100	--	--		VPWC
July 23.....	1815		84	11,000	2,050	60,900	41	53	--	65		98	99	100	--	--		VPWC
Aug. 2.....	2100		80	8,860	581	13,900	10	58	--	90		98	99	100	--	--		VPWC
Aug. 13.....	1900		83	6,360	1,060	18,200	49	50	--	72		98	98	99	100	--		VPWC
Aug. 23.....	1830		79	3,780	739	7,540	48	48	--	76		98	99	100	--	--		VPWC
Aug. 27.....	1450		79	5,980	2,500	40,400	44	59	--	82		99	100	--	--	--		VPWC
Sept. 18.....	1035		75	2,930	348	2,750	56	62	--	82		99	99	100	--	--		VPWC

KANSAS RIVER BASIN--Continued

6-8875. KANSAS RIVER AT WAMEGO, KANS.--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material											Method of analysis
						Percent finer than size indicated, in millimeters											
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Oct. 18, 1961	1305	10		7,630		0	1	5	54	75	84	92	95	97	100		SV
Feb. 5, 1962	1305	5		19,300		0	1	22	52	70	82	93	98	100	--		SV
Mar. 7	1110	--		4,550		--	0	5	50	80	90	97	98	100	--		SV
Apr. 5	1050	5		8,770		--	0	7	38	70	83	93	95	98	100		SV
May 2	1520	--		3,290		0	1	5	36	66	78	91	96	100	--		SV
May 30	1320	8		15,800		0	1	10	40	66	79	94	99	100	--		SV
June 11	1040	6		15,700		--	0	9	46	76	87	95	98	100	--		SV
July 2	1020	4		11,900		--	0	5	32	69	83	96	99	100	--		SV
Aug. 27	1450	6		5,980		--	0	14	37	66	76	87	94	100	--		SV
Sept. 18	1035	4		2,930		0	1	5	32	54	64	76	85	89	100		SV

KANSAS RIVER BASIN--Continued

6-8880. VERMILLION CREEK NEAR WAMEGO, KANS.

LOCATION.--At gaging station at highway bridge, 1 mile upstream from Indian Creek and 14 miles northeast of Wamego, Pottawatomie County.
DRAINAGE AREA.--243 square miles.
RECORDS AVAILABLE.--Water temperatures: April 1958 to September 1959.
Sediment records: April 1958 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 9,240 ppm June 24; minimum daily, not determined.
Sediment loads: Maximum daily, 136,000 tons May 29; minimum daily, 1 ton Aug. 22.
EXTREMES, 1958-62.--Sediment concentrations: Maximum daily, 11,400 ppm June 2, 1960; minimum daily, not determined.
Sediment loads: Maximum daily, 136,000 tons May 29, 1962; minimum daily, less than 0.50 ton Sept. 10, 15-17, 1959, Jan. 10, 1961.
REMARKS.--Flow affected by ice Dec. 11 to Jan. 1, Jan. 8-24, Feb. 6-8, Feb. 23 to Mar. 7, Mar. 15.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	95	--	50	156	500	211	107	140	40
2..	46	--	24	858	1400 S	3840	102	--	38
3..	37	--	20	1520	1550 S	7250	101	--	38
4..	33	--	18	265	440	315	102	180	50
5..	30	--	9	182	270	133	92	--	44
6..	28	--	8	156	--	110	88	--	42
7..	26	--	8	145	--	110	84	--	36
8..	25	110	7	132	--	95	82	--	36
9..	25	--	7	126	--	90	93	--	40
10..	1640	3610 S	14400	122	--	90	78	--	26
11..	2080	1620	9100	114	140	43	70	--	22
12..	188	--	360	108	--	40	70	--	22
13..	145	--	200	102	--	38	70	--	22
14..	109	--	120	96	--	36	70	--	22
15..	97	--	80	191	290 S	265	65	--	18
16..	91	--	55	1310	1600 S	5900	65	--	18
17..	86	--	50	342	620 S	643	70	--	19
18..	79	220	47	195	--	220	70	--	19
19..	71	140	27	183	--	150	65	--	18
20..	67	--	26	165	--	130	60	--	13
21..	66	--	24	156	200	84	60	--	13
22..	66	120	21	162	--	85	60	--	13
23..	63	--	20	151	--	80	60	--	13
24..	60	--	19	133	--	70	60	--	10
25..	58	--	19	127	230	79	60	60	10
26..	55	--	18	122	--	75	60	--	10
27..	55	--	18	113	--	70	60	--	10
28..	57	130	20	108	--	65	55	--	9
29..	403	870 S	3150	108	--	65	50	--	8
30..	1140	2150 S	7200	108	--	65	50	--	8
31..	234	820	518	--	--	--	50	--	8
Total	7255	--	35643	7756	--	20447	2229	--	695

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8880. VERMILLION CREEK NEAR WAMEGO, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

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	60	--	6	791	860	1840	70	--		46	
2	70	--	8	610	630	1040	70	--		46	
3	88	40	10	678	1700	3110	80	--		50	
4	117	--	48	535	1540	2220	80	240		52	
5	182	380	187	216	1010	589	70	--		38	
6	147	--	100	120	--	160	70	140		26	
7	117	--	65	120	--	160	70	99		19	
8	90	--	48	120	--	160	135	--		36	
9	60	--	32	115	--	120	134	--		36	
10	50	--	28	118	340	108	106	360		103	
11	45	--	24	121	380	124	428	6700	S	9150	
12	50	--	20	123	--	120	242	3210	S	2420	
13	55	--	22	116	--	110	109	1060		312	
14	55	--	22	103	--	95	91	--		170	
15	55	--	19	112	320	97	90	--		120	
16	50	--	18	163	--	180	86	--		95	
17	50	130	18	117	490	155	83	--		55	
18	50	--	18	141	--	110	84	150		34	
19	50	--	18	112	380	115	86	130		30	
20	50	--	18	99	--	95	378	4660	S	7910	
21	50	--	18	100	--	90	1350	6450	S	25500	
22	50	--	18	93	--	75	278	2030	S	1710	
23	50	--	18	90	--	70	198	--		320	
24	50	--	18	90	--	65	173	550		257	
25	88	--	42	80	--	55	165	510		227	
26	359	380	368	80	--	50	149	460		185	
27	1300	500	1760	80	--	50	135	--		160	
28	716	240	464	70	--	46	130	--		120	
29	687	330	612	--	--	--	117	290		92	
30	1320	650	2320	--	--	--	108	--		65	
31	634	850	1460	--	--	--	106	200		57	
Total	6795	--	7827	5313	--	11209	5471	--		49441	

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	101	--	55	52	--	13	301	3150	S	3020	
2	94	--	38	48	110	14	219	2960		1750	
3	94	--	30	46	--	14	636	2620	S	5250	
4	93	110	28	45	--	13	1520	4710	S	20700	
5	91	--	26	43	90	10	301	2030	S	1770	
6	88	--	26	40	--	10	214	910		526	
7	85	--	26	38	--	9	180	670		326	
8	84	110	25	39	--	9	162	530		232	
9	81	--	24	39	--	9	168	460		208	
10	80	--	24	40	--	10	145	410		160	
11	80	--	24	39	--	9	174	740	S	520	
12	70	--	20	35	110	10	214	1650	S	1220	
13	70	--	20	31	--	9	88	--		120	
14	68	--	20	30	--	9	74	--		80	
15	67	64	12	28	--	8	65	--		55	
16	65	--	11	27	--	8	58	--		40	
17	64	--	11	26	--	8	50	--		32	
18	62	--	11	25	120	8	44	240		29	
19	60	--	10	25	--	8	39	--		20	
20	59	--	10	27	--	9	34	160		15	
21	59	--	10	27	--	9	44	260		31	
22	60	80	13	27	--	9	49	200		26	
23	70	--	15	24	--	8	359	4020	S	5150	
24	58	--	12	22	--	7	2530	9240	S	49800	
25	55	--	12	23	--	7	1810	3370	S	15600	
26	54	--	12	27	--	9	203	1570	S	905	
27	53	--	11	25	170	11	146	600		237	
28	63	--	14	900	3460	S 24100	123	--		200	
29	67	96	17	9870	5120	136000	162	700		306	
30	58	--	15	1630	4540	S 15000	150	750		304	
31	--	--	--	252	1670	1140	--	--		--	
Total	2153	--	582	13550	--	176497	10262	--		108632	

S Computed by subdividing day.

6-8880. VERMILLION CREEK NEAR WAMEGO, KANS.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1..	107	420	121	37	--	14	405	2660 S	3510
2..	90	320	78	34	--	13	87	870	204
3..	80	--	70	36	120	12	59	--	55
4..	69	--	60	42	--	14	150	425 S	498
5..	61	--	55	88	800 S	450	663	2600 S	5700
6..	63	--	55	91	1950 S	551	131	1130	400
7..	66	--	55	37	500	50	94	--	260
8..	56	210	32	28	--	38	112	780	236
9..	45	--	26	24	130	8	246	1100	731
10..	40	--	22	22	--	8	623	2380 S	4270
11..	44	209 S	30	21	--	7	196	800	423
12..	196	2180 S	1300	19	76	4	127	--	160
13..	356	3200 S	5250	16	--	3	104	130	36
14..	445	3700 S	5700	15	80	3	154	438 S	487
15..	363	3020 S	4480	15	--	3	632	3440 S	6160
16..	317	3420 S	3290	14	--	3	180	1040 S	534
17..	111	1140	342	13	--	3	122	340	112
18..	92	--	200	12	--	3	104	300	84
19..	87	--	140	12	130	4	363	1860 S	2540
20..	77	--	60	11	--	4	230	1300 S	890
21..	87	--	110	10	--	4	137	460	170
22..	63	210	36	9.7	46	1	175	280	132
23..	82	510	113	14	330 S	26	149	230	93
24..	52	--	70	364	3350 S	3720	344	2100 S	2800
25..	48	--	65	156	1650 S	796	229	1740 S	1280
26..	44	--	60	43	420	49	105	410	116
27..	40	--	55	26	160	11	89	--	36
28..	56	340	51	20	--	9	79	--	26
29..	61	170	28	16	--	7	75	--	26
30..	62	890	149	13	--	6	80	150	32
31..	44	140	17	781	4030 S	12500	--	--	--
Total	3404	--	22120	2039.7	--	18324	6244	--	32001

Total discharge for year (cfs-days)	72471.7
Total load for year (tons)	483418

S Computed by subdividing day.

KANSAS RIVER BASIN--Continued

6-8880. VERMILLION CREEK NEAR WAMEGO, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 10, 1961.....	0945		--	1,350	6,540	23,800	--	--		--		99	100					V
Nov. 16.....	0920		46	1,580	2,260	9,640	38	46	52	63	80	98	100					VPWC
May 29, 1962.....	1000		--	13,700	5,010	185,000	53	66		93		100	--					VPWC
July 13.....	0915		74	101	1,190	324	72	79		89		100	--					VPWC
July 15.....	1845		77	696	6,390	12,000	45	54		78		100	--					VPWC
Aug. 6.....	0830		77	96	2,210	573	79	86		98		100	--					VPWC
Aug. 24.....	0645		73	350	3,100	2,930	45	52		77		100	--					VPWC
Aug. 24.....	1215		73	488	4,780	6,300	50	61		80		100	--					VPWC
Aug. 25.....	0755		68	202	1,940	1,060	64	78		94		100	--					VPWC
Aug. 31.....	1400		--	1,100	9,390	27,900	43	53		81		100	--					VPWC
Aug. 31.....	1930		--	1,600	6,090	26,300	51	62		85		100	--					VPWC
Sept. 6.....	0825		60	143	1,170	452	82	95		97		100	--					VPWC
Sept. 10.....	0800		55	806	3,890	8,470	43	50		73		100	--					VPWC
Sept. 15.....	1000		73	790	4,320	9,210	42	50		78		100	--					VPWC

6-8905. DELAWARE RIVER AT VALLEY FALLS, KANS.

LOCATION.--At gaging station at highway bridge, 200 feet downstream from Walnut Creek, 300 feet upstream from Atchison, Topeka and Santa Fe Railway Co. bridge, and 0.2 mile north of Valley Falls, Jefferson County.
DRAINAGE AREA.--922 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period November 1957 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	304	19		0.02	0.00	112	20	25	--	405	0	58	14	0.2	3.1	0.21	448	362	30	0.6	810	7.9	
Nov. 6.....	620	14		.04	.00	99	21	16	--	361	0	49	12	.2	4.4	.15	388	334	38	.4	710	8.1	
Dec. 27.....	274	13		.01	.07	107	20	23	7.5	383	0	60	17	.2	4.2	.12	449	349	35	.5	720	7.9	
Jan. 24, 1962	a 190	17		.11	.00	106	28	19	3.0	390	0	63	13	.2	3.1	.07	447	380	60	.4	720	7.6	
Feb. 15.....	1,340	13		.12	.00	66	14	15	3.2	237	0	44	9.0	.4	4.2	.12	288	222	28	.4	460	8.0	
Mar. 14.....	510	14		.09	.00	78	17	17	3.3	290	0	55	10	.4	6.2	.10	346	264	26	.5	550	8.0	
Apr. 11.....	246	9.0		.08	.00	90	25	21	2.5	349	0	63	14	.2	.4	.08	405	328	42	.5	690	8.2	
May 17.....	81	13		.11	.02	94	25	26	4.6	356	0	67	21	.3	1.2	.15	438	338	46	.6	720	7.8	
June 12.....	333	12		--	--	70	16	13	3.2	261	0	37	9.0	.4	3.1	.12	298	240	26	.4	520	7.6	
July 17.....	173	11		.07	.00	61	12	13	5.1	205	10	28	8.0	.4	1.6	.12	256	202	18	.4	430	8.3	
Aug. 21.....	29	11		.35	.00	88	24	27	4.9	332	0	59	25	.3	.4	.18	420	318	46	.6	690	8.1	
Sept. 18.....	105	14		.07	.00	83	17	16	6.2	312	0	40	12	.4	1.8	.12	336	277	21	.4	580	8.1	

a Daily mean discharge.

KANSAS RIVER BASIN--Continued

6-8910. KANSAS RIVER AT LECOMPTON, KANS.

LOCATION.--At gaging station at highway bridge at Lecompton, Douglas County, 0.6 mile (revised) downstream from Delaware River.
DRAINAGE AREA.--58,420 square miles, approximately, of which a large area is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1958, October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for Kansas River at Lawrence for the period January 1957 to September 1961 available from the Kansas State Department of Health.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 18, 1961	7,470	13		0.30	0.00	65	12	49	--	202	0	63	59	0.3	3.1	0.18	362	212	46	1.5	670	7.5	
Nov. 6.....	11,300	11		.10	.00	61	12	30	--	195	0	61	29	.3	2.2	.13	300	202	42	.9	540	7.5	
Dec. 27.....	a 4,200	16		.05	.00	112	26	95	8.1	317	0	160	120	.3	5.3	.08	732	386	126	2.1	1,220	7.8	
Feb. 1, 1962.	a40,000	14		.14	.00	44	8.8	14	6.6	139	0	28	17	.2	3.6	.08	213	146	32	.5	340	7.4	
Mar. 1.....	a 5,100	15		.04	.00	120	24	63	6.8	361	0	126	76	.3	4.2	.13	625	398	102	1.4	990	7.9	
Mar. 29.....	20,000	11		.10	.00	52	10	21	7.4	161	0	53	24	.2	4.2	.08	273	170	38	.7	450	7.6	
May 4.....	4,700	8.5		.02	.00	88	28	86	10	281	0	148	105	.4	.4	.31	622	334	104	2.0	1,030	7.4	
May 25.....	5,100	8.5		.28	.02	90	23	124	11	229	0	161	178	.4	2.1	.19	744	319	131	3.0	1,220	7.5	
June 29.....	16,000	10		.49	.00	66	15	31	10	198	0	88	37	.5	2.7	.12	372	226	64	.9	610	7.5	
Aug. 6.....	15,000	11		.18	.00	60	13	30	8.6	181	0	72	41	.4	3.2	.15	318	203	55	.9	570	7.5	
Sept. 4.....	4,000	13		.07	.00	86	16	72	11	229	0	119	105	.5	3.5	.16	530	280	92	1.9	920	7.8	

a Daily mean discharge.

6-8925. KANSAS RIVER AT BONNER SPRINGS, KANS.

LOCATION.--At gaging station at bridge on State Highway 7, 0.6 mile east of Bonner Springs, Wyandotte County, and 0.9 mile downstream from Wolf Creek.
DRAINAGE AREA.--59,890 square miles, approximately, of which a large area is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 713 ppm Jan. 1-4; minimum, 216 ppm Oct. 31.
Hardness: Maximum, 406 ppm Jan. 1-4; minimum, 148 ppm Oct. 31.
Specific conductance: Maximum daily, 1,180 micromhos Jan. 1; minimum daily, 294 micromhos June 23.
Water temperatures: Maximum, 89°F Aug. 5; minimum, freezing point on many days during December to March.
REMARKS.--Maximum observed during water year: Dissolved solids, 716 ppm Jan. 24; hardness, 443 ppm Jan. 24. Chemical analyses by Kansas State Department of Health, Topeka, Kans. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 19-23, 1961..	8,840	13		75	15	47	--	234	0	66	61	0.4	3.6	0.13	386	0.52	9,210	248	56	1.5	710	8.0
Oct. 24-30.....	6,726	15		108	19	82	--	315	0	106	110	.3	1.8	.16	584	.79	10,600	348	90	2.2	1,060	7.9
Oct. 31.....	41,800	--		48	6.8	10	--	146	--	15	24	--	--	--	216	.29	24,380	148	28	.3	370	--
Nov. 1-7.....	29,130	10		54	10	21	6.8	149	11	38	25	.3	3.1	.13	262	.36	20,610	176	36	.7	440	8.4
Nov. 8-15.....	9,182	12		78	17	39	6.9	203	26	71	48	.3	4.4	.15	402	.55	9,970	264	54	1.0	680	8.5
Nov. 16-22.....	20,910	10		61	9.7	26	6.3	183	0	51	32	.3	2.2	.12	286	.39	16,150	192	42	.8	500	7.8
Nov. 23-Dec. 12...	7,394	14		104	20	60	7.4	312	0	112	72	.3	4.4	.16	550	.75	10,980	342	86	1.4	930	8.1
Dec. 13-31.....	4,606	14		112	23	79	6.4	334	0	137	93	.2	5.3	.13	640	.87	7,960	374	100	1.8	1,040	8.0
Jan. 1-4, 1962....	4,625	15		118	27	87	6.6	283	29	151	111	.2	7.5	.13	713	.97	8,900	406	126	1.9	1,110	8.3
Jan. 31-Feb. 28...	19,030	10		58	13	21	6.2	188	0	50	26	.4	6.2	.12	295	.40	15,160	198	44	.6	490	7.9
Mar. 1-31.....	13,220	11		75	15	38	5.5	217	0	82	47	.4	6.2	.13	397	.54	14,170	248	70	1.0	660	8.0
Apr. 1-30.....	7,767	--		88	19	40	--	256	--	103	58	--	--	--	490	.67	10,280	298	88	1.2	780	--
May 1-29.....	4,716	--		84	23	78	--	256	--	124	95	--	--	--	548	.74	6,980	304	94	1.9	930	--
May 30-June 19....	25,540	--		51	8.5	22	--	171	--	41	20	--	--	--	250	.34	17,240	162	22	.8	410	--
June 20-July 31...	13,770	--		64	13	34	--	190	--	74	38	--	--	--	350	.48	13,010	213	57	1.0	580	--
Aug. 1-31.....	8,455	--		67	12	40	--	205	--	69	45	--	--	--	360	.49	8,220	216	48	1.2	610	--
Sept. 1-21.....	5,326	--		74	15	50	--	205	--	84	70	--	--	--	448	.61	6,440	246	78	1.4	710	--
Sept. 22-30.....	14,270	--		49	9.7	18	--	154	--	38	25	--	--	--	254	.34	9,790	162	36	.6	410	--
Weighted average	a11,740	--		68	14	35	--	205	--	69	42	--	--	--	361	0.49	11,400	225	55	1.0	600	--
Time-weighted average.....	--	--		75	16	44	--	225	--	83	54	--	--	--	416	--	--	252	66	1.2	691	--
Tons per day....	--	--		2,140	430	1,110	--	6,470	--	2,180	1,330	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 321 days of chemical analyses, 11,710 cfs.

KANSAS RIVER BASIN--Continued

6-8925. KANSAS RIVER AT BONNER SPRINGS, KANS.--Continued

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 19, 1961	8,400	12		2.9	0.00	61	12	30	--	200	0	47	36	0.3	2.6	0.11	315	202	38	0.9	560	7.6	
Nov. 6.....	13,100	22		.07	.00	65	13	34	--	215	0	58	35	.3	3.1	.15	374	216	40	1.0	590	7.6	
Dec. 27.....	4,520	15		.02	.00	114	25	79	6.7	334	0	141	98	.3	6.2	.10	660	388	114	1.7	1,100	7.9	
Jan. 24, 1962	4,400	16		.05	.00	133	27	83	7.2	388	0	149	101	.2	4.2	.12	716	443	125	1.7	1,130	7.8	
Feb. 14.....	10,700	15		.02	.00	74	16	32	7.7	229	0	75	37	.3	4.2	.15	373	250	62	.9	610	7.6	
Mar. 14.....	8,460	13		.05	.00	90	17	53	5.4	259	0	97	70	.4	6.2	.16	496	294	82	1.3	820	7.7	
Apr. 11.....	9,810	12		.07	.00	75	19	32	7.8	234	0	84	39	.4	7.1	.15	403	265	73	.9	670	7.9	
May 16.....	3,650	8.5		.10	.00	98	27	85	9.8	300	0	145	111	.3	2.1	.18	652	356	110	2.0	1,060	7.8	
June 20.....	10,600	13		.28	.00	72	16	32	9.0	224	0	83	35	.4	4.9	.12	388	246	62	.9	630	7.9	
July 26.....	14,600	12		.01	.00	62	15	39	12	173	0	96	54	.5	2.1	.12	374	216	74	1.2	640	7.9	
Aug. 21.....	5,240	13		.57	.00	77	15	46	12	227	0	81	64	.5	6.6	.16	436	254	68	1.3	740	8.1	
Sept. 13.....	4,800	13		.05	.00	76	16	57	10	220	0	97	81	.4	8.9	.18	471	256	76	1.6	790	7.6	

Temperature (°F) of water, water year October 1961 to September 1962

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

CHARITON RIVER BASIN

6-9035. HONEY CREEK NEAR RUSSELL, IOWA

LOCATION.--At gaging station at county highway bridge, 0.7 mile upstream from Chariton River and 5.5 miles southeast of Russell, Lucas County.
DRAINAGE AREA.--13.2 square miles.
RECORDS AVAILABLE.--Sediment records: June 1952 to September 1962 (discontinued).
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 600 ppm Feb. 4; minimum daily, no flow on many days during June to September.
Sediment loads: Maximum daily, 340 tons Nov. 2; minimum daily, 0 tons on many days during June to September.
EXTREMES, 1952-62.--Sediment concentrations: Maximum daily, 9,840 ppm June 20, 1952; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 6,300 tons May 21, 1959; minimum daily, 0 tons on many days each year.
REMARKS.--Maximum observed sediment concentration during water year, 1,710 ppm Aug. 11. Flow affected by ice Dec. 9 to Mar. 18.

Suspended sediment, water year October 1961 to September 1962
/Where no concentrations are reported, loads are estimated/

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..	25	--	3.0	10	45	1.2	4.0	--	0.2
2..	14	--	1.7	370	340	A 340	3.6	19	.2
3..	8.0	47	1.0	60	--	32	3.6	--	.2
4..	4.5	--	.5	13	--	3.6	4.1	30	.3
5..	3.0	--	.3	8.6	--	1.2	3.0	--	.2
6..	2.3	--	.2	7.0	34	.6	2.8	--	.2
7..	2.0	--	.2	6.0	--	.6	2.0	19	.1
8..	1.6	--	.2	4.1	--	.5	1.6	--	.1
9..	1.6	33	.1	3.8	--	.4	1.4	26	.1
10..	3.5	--	.3	3.5	--	.3	1.2	--	.1
11..	33	160	A 14	3.5	26	.2	1.0	--	.1
12..	4.6	53	.7	3.4	--	.2	.9	--	.1
13..	28	155	12	122	240	S 140	1.4	--	.1
14..	5.8	58	.9	72	110	21	1.3	--	.1
15..	4.0	--	.6	27	--	16	1.2	--	.1
16..	2.7	54	.4	310	180	A 151	1.8	--	.1
17..	2.2	--	.3	73	--	12	4.0	--	.2
18..	1.9	--	.3	25	53	3.6	3.7	--	.2
19..	1.7	--	.3	10	--	1.4	3.3	--	.2
20..	1.6	--	.3	8.6	--	1.0	3.0	--	.2
21..	1.5	83	.3	20	--	4.4	2.7	--	.2
22..	1.4	--	.3	38	170	A 17	3.3	--	.2
23..	1.4	--	.2	11	--	2.6	4.3	--	.2
24..	1.4	25	.1	8.0	--	1.5	5.2	--	.2
25..	1.2	--	.1	6.0	56	.9	5.4	--	.2
26..	1.0	--	.1	5.0	--	.8	4.9	--	.2
27..	1.0	--	.1	4.2	--	.6	4.4	--	.2
28..	1.0	--	.1	3.6	--	.4	3.9	--	.2
29..	17	--	14	3.6	--	.4	3.5	--	.2
30..	100	280	A 76	3.8	--	.2	3.2	20	.2
31..	30	47	3.8	--	--	--	3.0	--	.2
Total	307.9	--	132.4	1243.7	--	755.6	92.7	--	9.3

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

CHARITON RIVER BASIN--Continued

6-9035. HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated)

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3.3	--	0.2	15	24	1.0	4.3	--	0.3
2	3.8	--	.2	11	20	.6	4.0	--	.3
3	5.0	17	.2	20	40	2.2	3.9	--	.2
4	6.2	--	.3	150	600 A	243	3.8	--	.2
5	9.0	--	1.2	200	80	43	3.7	--	.2
6	14	--	3.8	25	--	4.4	3.6	--	.2
7	9.0	--	1.2	15	--	2.0	3.6	--	.2
8	6.0	--	.6	12	--	1.3	9.0	--	.6
9	4.0	--	.3	10	--	.8	13	--	1.4
10	3.2	--	.2	9.0	--	.5	12	--	1.6
11	2.8	--	.1	35	--	9.5	80	--	13
12	2.6	--	.1	80	--	32	120	65	21
13	2.4	19	.1	64	--	12	80	93	20
14	2.3	--	.1	80	110	24	40	--	7.5
15	2.2	--	.1	105	160	45	30	--	4.0
16	2.2	15	.1	40	--	9.5	60	125	20
17	2.2	--	.1	25	--	4.8	100	380 A	103
18	2.1	--	.1	18	--	2.4	150	--	160
19	2.1	--	.1	15	--	1.2	210	450	255
20	2.0	--	.1	12	--	.8	100	--	55
21	2.0	--	.1	10	--	.5	60	76	12
22	2.0	--	.1	9.0	--	.4	35	--	7.0
23	2.0	18	.1	8.0	--	.4	25	--	5.0
24	2.0	--	.1	6.8	--	.4	18	77	3.7
25	2.0	--	.1	7.5	--	.4	14	--	2.6
26	7.0	--	.5	9.2	--	.4	11	--	1.8
27	72	27	5.2	7.0	--	.4	8.0	--	1.1
28	54	37	5.4	5.0	--	.3	6.0	44	.7
29	40	105	11	--	--	--	5.0	--	.5
30	30	--	6.5	--	--	--	4.0	--	.3
31	22	--	3.0	--	--	--	3.4	--	.2
Total	321.4	--	41.3	1003.5	--	443.2	1220.3	--	698.6

	APRIL			MAY			JUNE		
1	3.4	--	0.2	2.1	60	0.3	2.5	43	0.3
2	3.0	18	.1	1.8	35	.2	1.9	45	.2
3	3.0	--	.1	1.5	33	.1	2.5	--	.3
4	10	65	1.8	1.4	31	.1	3.1	59	.5
5	5.8	47	.7	1.4	110 S	.5	2.3	--	.2
6	3.6	20	.2	16	240 S	12	1.9	29	.1
7	3.1	30	.3	2.9	--	1.0	1.7	--	.1
8	3.1	28	.2	8.0	180 S	5.2	1.7	--	.1
9	3.0	26	.2	2.8	98	.7	2.6	72	.5
10	2.6	25	.2	2.5	--	.6	34	--	40
11	2.5	26	.2	2.0	--	.4	130	350	123
12	3.2	42	.2	1.8	73	.4	20	96	5.2
13	3.2	--	.2	1.4	--	.3	6.0	53	.9
14	2.6	--	.2	1.0	--	.2	3.0	--	.3
15	2.5	--	.1	.7	--	.1	1.5	--	.2
16	2.2	20	.1	.5	67	.1	1.0	--	.1
17	2.3	25	.2	.5	--	.1	.7	--	.1
18	2.2	21	.1	.4	--	.1	.6	--	.1
19	2.0	20	.1	.4	--	.1	.5	--	T
20	7.9	125 S	5.6	.3	--	.1	.4	--	T
21	9.6	185 S	7.0	.3	64	.1	.3	25	T
22	3.2	--	.4	.2	--	T	.5	--	T
23	3.1	--	.3	.2	--	T	.4	--	T
24	2.3	39	.2	.2	69	T	.3	--	T
25	2.2	37	.2	.1	--	T	.2	--	T
26	2.0	36	.2	13	430 S	17	.1	--	T
27	1.9	35	.2	29	--	55	.1	--	T
28	2.7	84	.6	25	330 S	49	.1	--	T
29	2.3	80	.5	170	300	138	0	--	0
30	2.0	74	.4	9.0	--	3.4	0	--	0
31	--	--	--	4.0	51	.6	--	--	--
Total	102.5	--	21.0	300.4	--	285.8	219.9	--	172.4

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated concentration graph.

CHARITON RIVER BASIN--Continued

6-9035. HONEY CREEK NEAR RUSSELL, IOWA--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
/Where no concentrations are reported, loads are estimated/

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	--	0	0	--	0	1.2	--	0.1
2	0	--	0	0	--	0	.3	--	T
3	.2	--	T	0	--	0	.1	--	T
4	.1	--	T	0	--	0	.1	37	T
5	.1	--	T	.2	--	T	.1	--	T
6	0	--	0	0	--	0	0	--	0
7	0	--	0	0	--	0	0	--	0
8	0	--	0	0	--	0	.1	--	T
9	0	--	0	0	--	0	15	--	14
10	0	--	0	0	--	0	32	380 A	33
11	0	--	0	20	450 S	33	2.3	--	.6
12	0	--	0	6.0	--	2.4	1.0	--	.2
13	0	--	0	.3	--	.1	.5	--	.1
14	1.0	--	T	.1	--	T	.3	67	.1
15	.2	--	T	.1	--	T	.2	76	T
16	.1	--	T	0	--	0	.2	--	T
17	.1	--	T	0	--	0	.1	--	T
18	0	--	0	0	--	0	.1	--	T
19	.4	--	.1	0	--	0	.1	--	T
20	25	300 A	20	0	--	0	.1	--	T
21	2.5	195 A	1.3	0	--	0	.1	--	T
22	.6	--	.2	0	--	0	.1	--	T
23	.2	99	.1	.1	--	T	.1	--	T
24	.1	--	T	27	240 A	17	.1	--	T
25	.1	--	T	5.7	--	1.4	.1	--	T
26	0	--	0	1.0	--	.1	.1	--	T
27	0	--	0	.3	--	T	.1	--	T
28	0	--	0	.1	--	T	0	--	0
29	0	--	0	.1	--	T	0	--	0
30	0	--	0	0	--	0	0	--	0
31	0	--	0	1.3	170 A	.6	--	--	--
Total	30.7	--	21.9	62.3	--	54.8	54.5	--	48.4

Total discharge for year (cfs-days)..... 4959.8
Total load for year (tons)..... 2680.7

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated concentration graph.

SLOUGH CREEK BASIN

6-9066. BURGE BRANCH NEAR ARROW ROCK, MO.

LOCATION.--At gaging station, 30 feet upstream from culvert on county road, 1.5 miles south of Arrow Rock, Saline County.
DRAINAGE AREA.--0.33 square miles.
RECORDS AVAILABLE.--Sediment records: July 1961 to September 1962.
EXTREMES, 1961-62.--Sediment concentrations: Maximum daily, 5,360 ppm Mar. 20; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 251 tons Mar. 20; minimum daily, 0 tons on many days.
EXTREMES, July 1961 to September 1962.--Sediment concentrations: Maximum daily, 5,360 ppm Mar. 20, 1962; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 251 tons Mar. 20, 1962; minimum daily, 0 tons on many days.
REMARKS.--Records good except for those from estimated-concentration graph, which are poor. Flow affected by ice Jan. 3-5, 12-14, 26-31, Feb. 1-4.

Suspended sediment, water October 1961 to September 1962
(Where no concentrations are reported, loads are estimated for monthly totals)

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..	0.03		0	0.13		M	0.06		T
2..	.01		0	4.11		K 21	.06		T
3..	.01		0	.32		B .1	.06		T
4..	.01		0	.13		M	.05		T
5..	0		0	.08		M	.03		T
6..	0		0	.06		M	.03		T
7..	0		0	.06		M	.02		T
8..	0		0	.06		M	.03		T
9..	0		0	.06		M	.08		T
10..	0		0	.06		M	.08		T
11..	.01		T	.06		M	.03		T
12..	0		0	.03		M	.02		T
13..	.10		B .4	.96		K 1.5	0		0
14..	.01		T	.10		M	0		0
15..	0		0	5.06	510	J 29	0		0
16..	0		0	.70		B .2	.20		T
17..	0		0	.15		M	.10		T
18..	0		0	.12		M	.05		T
19..	0		0	.18		M	.10		T
20..	0		0	.16		M	.10		T
21..	0		0	1.15		K 2.7	.10		T
22..	0		0	.64		B .2	.60		T
23..	.05		T	.20		M	.40		T
24..	.03		T	.12		M	.20		T
25..	.01		T	.10		M	.09		T
26..	0		0	.10		M	.13		T
27..	0		0	.06		T	.09		T
28..	.22		K .1	.06		T	.03		T
29..	.04		M	.06		T	.01		T
30..	3.67		K 25	.06		T	.01		T
31..	.38		B .2	--		--	.01		T
Total	4.58		25.7	15.16	--	54.9	2.77		0

T Less than 0.05 ton.
B Computed from estimated-concentration graph.
J Computed from partly estimated-concentration graph and subdividing day.
K Computed from estimated-concentration graph and subdividing day.
M Less than 0.05 ton, computed from estimated-concentration graph.

SLOUGH CREEK BASIN--Continued

6-9066. BURGE BRANCH NEAR ARROW ROCK, MO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated for monthly totals)

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	0.01	--	0	1	--	T	0.05	--	0
2	.02	--	0	.80	--	T	.05	--	0
3	.10	--	0	.60	--	T	.08	--	0
4	.20	--	0	.30	--	T	.08	--	0
5	.20	--	0	.16	--	T	.05	--	0
6	.10	--	0	.06	--	T	.06	--	0
7	.07	--	0	.05	--	T	.05	--	0
8	.03	--	0	1.01	1220 J	25	.16	--	T
9	.03	--	0	1.31	1950 J	27	.10	--	T
10	.01	--	0	.26	--	T	.15	--	T
11	.01	--	0	.33	--	T	.55	-- B	.2
12	.05	--	0	.30	--	T	.22	--	T
13	.10	--	T	.26	--	T	.09	--	T
14	.30	--	T	.15	--	T	.06	--	T
15	2	--	T	.22	--	T	.06	--	T
16	.05	--	0	.16	--	T	.04	--	T
17	.02	--	0	.12	--	T	.04	--	T
18	.01	--	0	.13	--	T	.05	--	T
19	.01	--	0	.06	--	T	.06	--	T
20	.01	--	0	.04	--	T	11.40	5360 J	251
21	.02	--	0	.24	--	T	3.20	1300 J	22
22	.02	--	0	.09	--	T	.38	-- B	.1
23	.03	--	0	.06	--	T	.28	-- B	.1
24	.03	--	0	.16	--	M	.16	--	M
25	.06	--	0	1.04	-- K	3.8	.12	--	T
26	3	58 A	.5	.60	-- B	.7	.06	--	T
27	4	-- B	.5	.06	--	T	.06	--	T
28	1	--	T	.05	--	0	.06	--	T
29	3	399 A	3.2	--	--	--	.05	--	T
30	2	--	T	--	--	--	.04	--	T
31	2	--	T	--	--	--	.03	--	T
Total	16.69	--	4.2	9.62	--	56.7	17.84	--	273.5

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	0.03		0	0.05		0	0		0
2	.03		0	.02		0	0		0
3	.02		0	.02		0	.02	35	M
4	.03		0	.05		0	.03		T
5	.04		0	.03		0	.01		T
6	.03		0	.19	K	.4	0		0
7	.03		0	.01		0	0		0
8	.05		0	0		0	0		0
9	.03		0	.01		0	0		0
10	.02		0	0		0	0		0
11	.03		0	0		0	0		0
12	.03		0	0		0	0		0
13	.02		0	0		0	0		0
14	.03		0	0		0	0		0
15	.03		0	0		0	0		0
16	.03		0	0		0	0		0
17	.02		0	0		0	0		0
18	.02		0	0		0	0		0
19	.02		0	0		0	0		0
20	.02		0	0		0	0		0
21	.02		0	0		0	0		0
22	.02		0	0		0	0		0
23	.02		0	0		0	0		0
24	.02		0	0		0	0		0
25	.02		0	0		0	0		0
26	.02		0	0		0	0		0
27	.02		0	.02		T	0		0
28	.03		0	0		0	0		0
29	.02		0	.02		T	0		0
30	.13	K	.7	.03		T	0		0
31	--		--	.01		T	--		--
Total	0.88		0.7	0.45		0.4	0.06	--	0

T Less than 0.05 ton.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.
J Computed from partly estimated-concentration graph and subdividing day.
K Computed from estimated-concentration graph and subdividing day.
M Less than 0.05 ton, computed from estimated-concentration graph.

SLOUGH CREEK BASIN--Continued

6-9066. BURGE BRANCH NEAR ARROW ROCK, MO.--Continued

Suspended sediment, water year October 1961 to September 1962--Continued
(Where no concentrations are reported, loads are estimated for monthly totals)

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	.14		T	0		0
4	0		0	3.60		K 17	0		0
5	0		0	.28		B .1	0		0
6	0		0	.20		T	0		0
7	.02		T	.04		T	0		0
8	0		0	0		0	.32		T
9	0		0	0		0	.01		T
10	0		0	0		0	0		0
11	0		0	0		0	0		0
12	0		0	0		0	0		0
13	0		0	0		0	0		0
14	0		0	0		0	0		0
15	0		0	0		0	0		0
16	0		0	0		0	0		0
17	0		0	0		0	0		0
18	0		0	0		0	0		0
19	0		0	0		0	0		0
20	0		0	0		0	0		0
21	0		0	0		0	0		0
22	0		0	0		0	0		0
23	0		0	0		0	0		0
24	0		0	0		0	0		0
25	0		0	0		0	0		0
26	0		0	0		0	0		0
27	0		0	0		0	0		0
28	0		0	0		0	0		0
29	0		0	0		0	0		0
30	0		0	0		0	0		0
31	0		0	0		0	--		--
Total	0.02		0	4.26		17.1	0.33		0

Total discharge for year (cfs-days)..... 72.66
Total load for year (tons)..... 433.2

T Less than 0.05 ton.
B Computed from estimated-concentration graph.
K Computed from estimated-concentration graph and subdividing day.

SLOUGH CREEK BASIN--Continued

6-9066. BURGE BRANCH NEAR ARROW ROCK, MO.--Continued

Particle-size analyses of suspended sediment, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 26, 1962.....	1410		34	10.3	120		33	51	64	70	80	97	98	100	--			SBWC
Feb. 8.....	2330		36	10.4	10,300		23	30	36	47	66	91	97	100	--			SBWC
Feb. 8.....	2330		36	10.4	10,300		15	20	26	41	55	95	99	100	--			SBN
Feb. 9.....	0120		36	8.2	5,310		31	33	36	55	74	97	99	100	--			SBWC
Feb. 9.....	0120		36	8.2	5,310		20	31	49	53	72	91	96	99	100			SBN
Mar. 20.....	0835		40	.4	654		61	68	81	90	95	100	--	--	--			SBWC
Mar. 20.....	1555		40	10.3	11,800		25	32	37	50	72	98	99	100	--			SBWC
Mar. 20.....	1555		40	10.3	11,800		15	24	32	46	65	94	98	99	100			SBN
Mar. 21.....	0840		37	1.9	1,110		54	61	68	77	93	99	100	--	--			SBWC

MISSOURI RIVER MAIN STEM--Continued

6-9090. MISSOURI RIVER AT BOONVILLE, MO.

LOCATION.--Temperature recorder at gaging station at Missouri-Kansas-Texas Railroad bridge at Boonville, Cooper County.
DRAINAGE AREA.--505,700 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: May 1953 to February 1959, October 1960 to September 1962.
EXTREMES, 1961-62.--Water temperatures: Maximum daily mean, 83°F July 4-5, 11-13; minimum daily mean, 34°F on many days during December to March.
EXTREMES, 1953-59, 1960-62.--Water temperatures: Maximum daily mean (1953-58), 90°F July 31-Aug. 3, 1955; minimum daily mean, freezing point on many days during winter months.

Daily mean temperature (°F) of water, water year October 1961 to September 1962
(Recorder with temperature attachment, continuous ethyl alcohol-actuated thermograph)

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

6-9135. MARAIS DES CYGNES RIVER NEAR OTTAWA, KANS.

LOCATION.--At East Seventh Street Bridge, 0.9 mile downstream from gaging station, 0.5 mile east of Ottawa City limits, Franklin County, and 0.8 mile downstream from Skunk Creek.
DRAINAGE AREA.--1,250 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
Water temperatures: October 1961 to September 1962.
EXTREMES, 1961-62.--Dissolved solids: Maximum, 421 ppm May 1-25; minimum, 152 ppm Nov. 3-5.
Hardness: Maximum, 325 ppm May 1-25; minimum, 108 ppm Nov. 3-5.
Specific conductance: Maximum daily, 733 micromhos Dec. 16; minimum daily, 176 micromhos May 30.
Water temperatures: Maximum, 91°F July 19; minimum, freezing point Jan. 22.
REMARKS.--Maximum observed during water year: Dissolved solids, 445 ppm May 16; hardness, 350 ppm Jan. 23. Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for the period October 1956 to September 1961 available from the Kansas State Department of Health. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in subdistrict office at Topeka, Kans. Additional samples were collected to further define the quality of water at this station. Prior to September 1962, gaging station 0.9 mile downstream.

Chemical analyses, in parts per million, water year October 1961 to September 1962

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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 19-31, 1961..	365	13		91	15	15	--	300	0	54	13	0.2	0.4	0.18	360	0.49	355	288	42	0.4	630	8.1
Nov. 1-2.....	4,770	--		67	8.0	10	--	210	--	40	6.0	--	--	--	234	.32	3,010	200	28	.3	420	--
Nov. 3-5.....	13,770	10		34	5.6	5.5	6.7	105	5	24	6.0	.3	1.9	.05	152	.21	5,650	108	14	.2	240	8.3
Nov. 6-12.....	982	13		61	14	12	5.1	181	17	49	9.0	.2	2.7	.08	269	.36	713	210	33	.4	420	8.5
Nov. 13-18.....	6,557	8.5		42	10	6.6	4.4	142	0	19	11	.3	2.2	.03	166	.23	2,940	146	30	.2	280	7.8
Nov. 19-Dec. 11...	780	11		94	11	14	3.6	295	0	54	10	.2	3.1	.07	354	.48	748	280	38	.4	590	7.9
Dec. 12-Jan. 3, 1962.....	311	7.0		86	19	19	1.7	288	0	79	12	.2	1.9	.08	365	.50	306	292	56	.5	610	8.0
Jan. 4-8.....	779	6.0		91	16	19	2.7	283	0	76	10	.2	1.9	.12	356	.48	749	293	61	.5	600	8.1
Jan. 9-26.....	349	8.0		96	15	19	3.0	295	0	77	11	.2	3.6	.08	370	.50	349	301	59	.5	620	8.0
Jan. 27-Feb. 4....	6,056	7.5		45	7.8	9.1	3.2	149	0	28	6.0	.3	5.3	.08	192	.26	3,140	144	22	.3	320	7.8
Feb. 5-28.....	1,178	9.0		71	15	14	2.6	232	0	59	9.0	.4	4.2	.13	306	.42	973	238	48	.4	500	8.1
Mar. 1-31.....	1,887	8.0		49	9.3	10	2.0	149	0	45	8.0	.4	3.1	.08	210	.28	1,070	160	38	.3	340	7.8
Apr. 1-30.....	258	--		80	16	20	--	259	--	75	13	--	--	--	359	.49	250	266	54	.6	580	--
May 1-25.....	89.9	--		94	22	21	--	320	--	77	20	--	--	--	421	.57	102	325	63	.5	690	--
May 26-June 10....	2,593	--		38	7.0	6.9	--	129	--	24	6.0	--	--	--	181	.25	1,270	124	18	.3	290	--
June 11-30.....	280	--		63	13	12	--	222	--	41	9.0	--	--	--	272	.37	206	210	28	.4	460	--
July 1-31.....	134	--		54	11	11	--	190	--	30	12	--	--	--	228	.31	82.5	180	24	.4	410	--

OSAGE RIVER BASIN--Continued

6-9135. MARAIS DES CYGNES RIVER NEAR OTTAWA, KANS.--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 1-31, 1962...	86.0	--		54	10	13	--	183	--	31	15	--	--	--	236	0.32	54.8	176	26	0.4	410	--
Sept. 1-30.....	1,354	--		32	7.8	4.6	--	112	--	18	8.0	--	--	--	156	.21	570	112	20	.2	220	--
Weighted average	a1,193	--		51	9.6	9.4	--	166	--	36	8.2	--	--	--	218	0.30	648	167	30	0.3	355	--
Time-weighted average.....	--	--		66	13	13	--	218	--	49	11	--	--	--	282	--	--	218	38	0.4	467	--
Tons per day....	--	--		152	29.0	28.0	--	494	--	107	24.0	--	--	--	--	--	--	--	--	--	--	--

a Mean discharge based on 365 days; mean discharge for 347 days of chemical analyses, 1,103 cfs.

Analyses of additional samples

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
Oct. 19, 1961	564	15		0.07	0.07	89	13	15	--	295	0	46	11	0.3	2.2	0.16	354	276	34	0.4	620	7.7	
Nov. 7.....	1,040	13		.03	.08	82	13	11	--	273	0	41	9.0	.2	1.9	.15	314	258	34	.3	560	7.7	
Dec. 28.....	a 350	6.0		.06	.00	93	18	19	2.2	290	0	82	13	.2	3.1	.10	398	306	68	.5	670	7.8	
Jan. 23, 1962	a 290	9.0		.02	.00	109	19	20	2.7	344	0	78	11	.2	3.6	.07	390	350	68	.5	670	7.7	
Feb. 13.....	771	24		.05	.02	82	14	26	5.3	256	0	73	23	.4	3.1	.15	368	262	52	.7	570	7.9	
Mar. 13.....	325	6.0		.02	.00	97	17	18	1.6	315	0	85	12	.2	2.2	.13	380	312	54	.4	610	8.1	
Apr. 10.....	283	4.0		.08	.00	98	19	22	2.2	329	0	76	14	.2	.4	.16	396	322	52	.5	680	8.0	
May 16.....	49	4.5		.10	.05	102	20	25	3.8	342	0	78	21	.2	3.3	.13	445	336	56	.6	710	7.7	
June 19.....	116	12		.49	.00	80	16	15	2.4	281	0	48	12	.3	3.2	.13	343	266	36	.4	560	7.8	
July 25.....	41	7.5		.01	.00	40	6.8	11	3.5	142	0	31	7.0	.4	1.8	.07	178	128	12	.4	300	7.6	
Aug. 17.....	39	7.5		.05	.00	59	12	12	3.5	205	0	38	10	.4	.9	.15	246	196	28	.4	430	7.7	
Sept. 12.....	480	4.0		.09	.00	42	9.5	5.7	3.7	142	0	28	7.0	.1	.9	.10	175	144	28	.2	310	7.6	

a Daily mean discharge.

OSAGE RIVER BASIN--Continued

6-9135. MARAIS DES CYGNES RIVER NEAR OTTAWA, KANS.--Continued

Temperature (°F) of water, water year October 1961 to September 1962

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	68	69	57	57	60	58	60	59	57	58	60	58	58	--
November	59	60	52	53	48	47	57	45	47	48	49	50	47	49	47	45	46	45	43	43	42	44	45	46	44	45	46	46	44	42	--	47
December	44	45	47	48	48	47	45	42	42	39	33	34	33	34	37	37	37	36	34	35	37	38	34	34	38	35	35	33	33	34	34	38
January	36	37	37	35	34	33	34	33	33	33	33	36	35	33	35	34	33	33	33	33	33	32	33	35	37	37	35	35	36	35	38	34
February	35	38	40	43	40	40	38	38	38	40	45	47	47	47	45	45	45	44	43	40	40	39	39	37	37	35	33	33	--	--	--	40
March	35	37	39	36	36	37	37	39	39	41	42	41	41	41	43	44	45	48	50	49	49	48	48	50	52	53	55	57	54	55	53	45
April	49	51	50	50	54	55	56	54	55	52	57	53	56	58	58	55	62	64	65	67	68	65	68	71	73	73	68	66	73	65	--	60
May	68	72	74	74	76	74	78	78	80	80	82	80	80	78	80	78	81	80	80	81	83	80	80	78	82	74	74	74	70	71	70	77
June	67	67	72	69	73	74	74	71	68	69	72	69	74	75	76	81	77	86	86	84	85	85	88	80	82	78	80	77	75	79	--	76
July	80	83	88	87	83	84	84	88	80	88	83	90	88	87	85	89	87	85	91	81	83	84	87	77	86	83	82	83	83	86	81	85
August	78	85	86	90	80	90	87	85	86	86	89	83	86	84	86	82	83	85	87	90	90	90	87	82	79	78	82	84	87	85	81	85
September	83	78	78	71	75	75	72	73	68	69	74	77	83	83	75	77	76	77	73	76	63	68	62	65	66	68	68	65	65	65	--	72

OSAGE RIVER BASIN--Continued

6-9175. MARMATON RIVER NEAR FORT SCOTT, KANS.

LOCATION.--At bridge on U.S. Highway 69 at Fort Scott, Bourbon County, 0.3 mile upstream from Mill Creek and 1.4 miles upstream from gaging station.
DRAINAGE AREA.--393 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1962.
REMARKS.--Chemical analyses by Kansas State Department of Health, Topeka, Kans. Chemical analyses for tbe period November 1956 to September 1961 available from the Kansas State Department of Health. No appreciable inflow between sampling point and gaging station except during periods of intense local precipitation.

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 19, 1961	99	14		0.04	0.00	72	4.5	8.7	--	222	0	23	7.0	0.2	0.4	0.10	264	198	16	0.3	440	7.9	
Nov. 7.....	352	10		.03	.00	81	5.8	5.5	--	249	0	23	6.0	.2	1.5	.11	261	226	22	.2	470	7.8	
Dec. 29.....	121	11		.20	.00	89	6.3	7.2	1.3	254	0	38	7.0	.2	2.2	.03	272	248	40	.2	420	8.0	
Jan. 31, 1962	469	6.0		.07	.00	52	6.9	6.1	2.2	156	0	25	9.0	.3	2.7	.10	197	158	30	.2	330	7.6	
Feb. 28.....	131	3.0		.05	.00	80	8.9	9.0	1.5	237	0	47	10	.2	.4	.07	288	236	42	.3	470	8.0	
Mar. 28.....	270	7.0		.02	.05	81	6.8	8.5	1.9	242	0	35	6.0	.2	1.5	.07	281	230	32	.2	460	7.7	
May 3.....	24	3.0		.03	.03	96	7.9	10	1.5	285	0	48	8.0	.2	.4	.13	318	272	38	.3	550	7.7	
May 24.....	1.2	5.5		.09	.04	96	11	7.1	2.6	285	0	44	12	.2	.8	.12	340	284	50	.2	590	7.8	
June 27.....	18	6.5		.07	.00	60	7.4	5.4	2.0	188	0	23	7.0	.3	2.4	.07	220	180	26	.2	360	7.5	
Aug. 1.....	22	6.5		.04	.00	44	7.3	4.4	2.2	156	0	14	6.0	.3	.4	.10	164	140	12	.2	280	7.4	
Aug. 30.....	.6	7.5		.02	.19	68	8.4	9.3	3.3	224	0	18	12	.3	.4	.15	244	204	20	.3	430	7.6	

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN

Chemical analyses, in parts per million, water year October 1961 to September 1962

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
TURTLE CREEK BASIN																							
6-3413.9. LAKE ORDWAY NEAR TURTLE LAKE, N. DAK.																							
June 14, 1962.	(a)	4.3		0.10	0.01	16	7.1	3,170	66	2,850	989	2,190	77	0.5	2.3	4.6	8,990	69	0	166	11,300	9.3	
Sept. 9.....	(a)	6.9		.12		1.5	20	4,050	153	3,310	1,580	3,610	96	.6	1.9	5.2	11,700	88	0	188	14,100	9.6	
PAINTED WOODS CREEK BASIN																							
6-3418. PAINTED WOODS CREEK NEAR WILTON, N. DAK.																							
Mar. 27, 1962.	176	5.7		0.21		11	5.2	16	8.3	63	0	35	1.6	0.2	5.6	0.06	144	49	0	1.0	202	6.7	
May 28.....	4.9	6.5		.14		51	45	228	11	489	0	405	6.4	.5	1.2	.49	1,100	312	0	5.6	1,500	7.9	
June 14.....	1.4	2.2		.15	0.00	52	48	239	11	560	0	362	5.9	.4	1.7	.49	1,060	328	0	5.7	1,510	8.2	
Sept. 4.....	1.8	6.0		.09		34	29	169	9.3	421	0	190	32	.1	1.4	.25	729	204	0	5.1	1,080	7.9	
GRAND RIVER BASIN																							
6-3570. SHADEHILL RESERVOIR AT SHADEHILL, S. DAK.																							
Oct. 7, 1960..	b2,270.92	3.1		0.05		26	16	281	7.9	371	26	404	5.8	0.5	0.0	0.40	977	130	0	11	1,430	8.3	23
Oct. 5, 1961..	b2,261.4	3.8				27	15	329	9.0	465	6	447	6.0	.6	.4	.43	1,090	129	0	13	1,610	8.3	
June 13, 1962.	b2,265.5	5.0				24	14	312	7.8	429	10	396	7.3	.5	1.1	.35	1,010	117	0	13	1,510	8.4	
CHEYENNE RIVER BASIN																							
6-4000. HAT CREEK NEAR EDGEMONT, S. DAK.																							
July 31, 1961.	12.8	16		0.03	0.00	51	7.8	46	9.4	140	0	145	1.5	0.4	2.5	0.09	363	159	44	1.6	541	7.2	21
May 21, 1962..	6	38		.09	.00	51	4.9	110	12	176	0	226	3.4	.8	2.9	.11	543	147	3	4.0	784	7.4	16

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.
b Lake elevation, in feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
CHEYENNE RIVER BASIN--Continued																							
6-4060. BATTLE CREEK AT HERMOSA, S. DAK.																							
Nov. 10, 1959.	1.4	17		0.09	--	119	27	8.4	4.6	267	0	200	2.5	0.2	0.9	0.05	532	410	191	0.2	766	7.7	9
June 9, 1960..	1.2	15		.04	0.02	86	49	8.0	4.1	269	0	211	2.5	.2	.0	.05	577	416	195	.2	775	7.8	3
May 25, 1962..	34	14		.11	.00	35	8.4	5.7	3.5	83	0	61	1.5	.3	1.1	.05	191	122	54	.2	278	7.3	25
6-4255. ELK CREEK NEAR ELM SPRINGS, S. DAK.																							
June 16, 1960.	0.2	3.6		0.03	0.00	79	179	375	13	118	0	1,630	22	0.4	0.1	0.42	2,540	933	836	5.3	2,950	7.5	18
June 30.....	368	12		.05	.02	70	21	69	8.5	113	0	326	2.1	.4	.8	.16	573	259	166	1.9	806	6.8	--
May 23, 1962..	664	8.2		.05	.00	54	12	30	8.7	114	0	152	.0	.4	.2	.11	337	185	92	1.0	515	7.3	6
WHITEWOOD CREEK NEAR VALE, S. DAK.																							
Apr. 13, 1960.	32.6	10		0.27	0.14	95	43	21	21	192	0	304	12	0.4	0.3	0.11	611	412	255	0.4	861	7.4	6
June 13.....	28.0	13		.10	.10	106	45	24	20	188	0	339	11	.4	.6	.10	706	449	295	.5	925	7.4	--
Aug. 18.....	13.0	12		.09	.12	124	44	36	22	189	0	402	21	.8	.2	.11	788	489	334	.7	1,060	6.8	9
May 18, 1962..	411	11		.06	.96	324	83	22	32	126	0	1,040	8.0	.8	.0	.16	1,690	1,150	1,050	.3	1,790	6.9	3
INDIAN CREEK NEAR NEWELL, S. DAK.																							
Sept. 3, 1959.	0.9	6.2		0.15	--	247	83	117	11	182	0	986	16	0.6	0.6	0.31	1,710	956	807	1.6	1,930	7.8	7
Apr. 13, 1960.	.5	5.0		.01	0.03	167	69	190	8.0	187	0	864	33	.4	.2	.36	1,570	700	547	3.1	1,900	7.7	14
June 13.....	81.4	6.1		.02	.00	95	30	64	7.7	92	0	397	7.2	.5	2.9	.19	698	359	284	1.5	933	7.1	--
Aug. 18.....	36.0	5.7		.01	.00	178	62	100	12	148	0	750	21	.7	1.7	.23	1,310	699	578	1.6	1,550	7.2	20
May 19, 1962..	99.7	9.6		.10	.00	126	37	53	11	153	0	416	11	.4	3.6	.21	809	468	342	1.1	1,050	7.1	18
6-4370. BELLE FOURCHE RIVER NEAR STURGIS, S. DAK.																							
Mar. 26, 1959.	109	5.8		0.04	0.28	178	94	178	20	184	0	1,030	23	0.5	8.9	0.24	1,740	832	681	2.7	2,060	7.0	5
Apr. 14, 1960.	47.0	6.6		.02	.48	191	97	128	15	206	0	906	22	.5	8.3	.24	1,630	874	705	1.9	1,900	7.5	5
June 14.....	224	8.3		.02	.11	175	71	145	26	177	0	852	19	.5	.2	.27	1,480	728	583	2.3	1,770	7.4	--

Aug. 20, 1960.	177	7.7		.02	.00	186	73	159	20	167	0	925	23	.7	.6	0.31	1,590	766	629	2.5	1,870	7.0	10
May 19, 1962..	2,830	12		.05	.53	169	57	170	18	174	0	850	18	.6	.0	.25	1,400	655	512	2.9	1,720	7.5	2
6-4375. BEAR BUTTE CREEK NEAR STURGIS, S. DAK.																							
Apr. 14, 1960.	0.1	7.2		0.05	--	235	70	55	6.4	229	0	760	13	0.4	0.4	0.16	1,360	876	688	0.8	1,600	7.5	8
Mar. 26, 1962.	5.4	8.7		.04	0.21	110	29	20	6.8	124	0	319	4.5	.2	2.8	.08	604	392	290	.4	817	7.1	18
May 19.....	99	9.1		.12	.17	244	48	22	8.3	142	0	700	.7	.4	2.2	.11	1,210	807	691	.3	1,390	7.0	10
BELLE FOURCHE RIVER NEAR HEREFORD, S. DAK.																							
Mar. 26, 1959.	141	5.4		0.05	0.20	172	100	232	16	174	0	1,090	31	0.5	23	0.24	1,860	840	697	3.5	2,220	7.1	6
Apr. 15, 1960.	50.0	6.4		.00	.39	209	111	156	18	198	0	1,080	27	.5	5.0	.30	1,900	979	817	2.2	2,140	7.7	7
June 15.....	186	6.4		.04	.02	197	88	167	25	186	0	988	24	.5	1.5	.29	1,710	852	699	2.5	1,990	7.5	--
Aug. 20.....	154	6.9		.00	.00	200	89	181	25	166	0	1,040	28	.7	6.8	.29	1,810	863	727	2.7	2,070	7.1	12
May 20, 1962..	1,630	11		.09	.53	142	46	146	18	161	0	674	15	.6	.0	.24	1,160	542	410	2.7	1,490	6.9	2
RED OWL CREEK NEAR MARCUS, S. DAK.																							
Mar. 28, 1962.	2.3	4.6		0.11	0.00	15	3.1	16	3.3	47	0	43	0.0	0.0	0.2	0.04	123	50	11	1.0	185	6.9	23
May 23.....	43.1	9.7		.09	.02	54	16	79	9.4	147	0	239	4.7	.2	5.2	.16	515	199	78	2.4	756	7.1	27
6-4390. CHERRY CREEK NEAR PLAINVIEW, S. DAK.																							
Mar. 28, 1962.	84	8.0		0.08		25	6.2	27	6.2	94	0	74	0.3	0.0	4.0	0.07	224	88	11	0.1	335	6.9	45
May 22.....	6,230	9.5		.06	0.01	34	8.5	26	6.1	103	0	98	.0	.2	.2	.06	235	120	36	1.0	375	7.5	8

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
OKOBOJO RIVER BASIN																							
6-4397.8. COTTONWOOD LAKE NEAR AGAR, S. DAK.																							
Dec. 6, 1961..	(a)	13		0.05		64	52	293	50	473	0	500	92	0.3	0.2	0.56	1,380	375	0	6.6	1,990	8.0	12
Mar. 8, 1962..	(a)	15		.07		66	53	279	51	492	0	535	85	.3	.4	.75	1,470	384	0	6.2	1,960	8.2	
June 6.....	(a)	7.4		.02		63	47	260	44	436	0	472	73	.2	.2	.56	1,220	351	0	6.0	1,790	8.1	
Sept. 4.....	(a)	21		.03		65	53	248	41	402	0	512	63	.3	.0	.48	1,240	378	48	5.5	1,760	8.0	
6-4398.2. SULLY LAKE NEAR ONIDA, S. DAK.																							
Dec. 6, 1961..	(a)	5.4		0.05		59	22	54	17	304	0	118	6.2	0.3	0.4	0.12	458	238	0	1.5	694	8.0	10
Mar. 8, 1962..	(a)	5.7		.13		57	27	62	20	301	0	145	6.2	.3	3.5	.11	505	254	7	1.7	796	7.9	
June 6.....	(a)	10		.02		40	15	32	11	167	0	96	1.0	.1	2.2	.09	294	161	24	1.1	483	7.6	
Sept. 4.....	(a)	16		.64		45	15	35	14	201	0	88	2.3	.2	1.5	.09	335	174	9	1.2	524	7.5	
CROW CREEK BASIN																							
BEDASHOSHA LAKE NEAR SHELBY, S. DAK.																							
Sept. 21, 1961	(a)	14		0.02	0.40	62	24	105	15	150	0	339	25	0.4	0.1	0.23	677	252	129	2.9	970	7.1	8
Mar. 31, 1962.	b1,402.8	9.8		.09	.13	34	7.1	36	6.2	83	0	110	7.5	.0	3.4	.07	277	114	46	1.5	416	6.7	30
BULL CREEK BASIN																							
BULL CREEK NEAR OACOMA, S. DAK.																							
Apr. 27, 1961.	c 0.5	3.1		0.01	0.31	284	76	405	21	223	0	1,180	414	1.0	0.0	0.13	2,760	1,020	837	5.5	3,590	7.7	5
Mar. 31, 1962.	592	33		.06	.11	50	13	33	9.0	172	0	104	4.1	.2	5.7	.09	338	178	37	1.1	510	7.4	25

CHOTEAU CREEK BASIN

CHOTEAU CREEK NEAR WAGNER, S. DAK.

Apr. 27, 1961.	c 0.3	1.7		0.04	0.32	245	66	158	24	326	0	822	120	0.6	0.3	0.09	1,740	883	616	2.3	2,150	7.7	20
Mar. 30, 1962.	2,420	8.4		.09	.13	22	3.9	3.1	9.4	77	0	17	.0	.1	6.6	.04	130	71	8	.7	187	6.7	45
Apr. 2.....	690	9.2		.13	--	25	4.8	4.4	10	80	0	27	.6	.0	3.9	.02	137	82	16	.2	216	7.3	32
May 31.....	342	19		.21	--	62	22	26	14	176	0	149	12	.2	.9	.11	414	243	99	.7	613	7.4	--
June 16.....	c 30	17		.10	.00	54	20	21	12	200	0	93	6.3	.2	.4	.10	336	216	52	.6	592	7.7	--
July 6.....	941	17		.05	--	51	18	17	12	188	0	84	4.0	.2	.3	.08	307	202	48	.5	478	7.3	--
Sept. 2.....	c .1	14		.03	1.0	116	45	56	17	274	0	334	19	.3	.3	.17	789	476	251	1.1	1,070	8.0	--

NIOBRARA RIVER BASIN

6-4565. NIOBRARA RIVER NEAR HAY SPRINGS, NEBR.

Jan. 4, 1962..	25.4	48		0.00	0.00	47	8.6	23	7.6	225	0	16	2.8	0.6	1.4	0.03	272	153	0	0.8	402	7.5	4
Mar. 14.....	24.6	48		.06	.00	48	8.8	24	7.2	233	0	18	2.6	.7	1.9	.12	279	156	0	.8	406	7.9	3
June 18.....	28.0	52		.06	.01	41	15	26	10	250	0	20	2.8	.8	.7	.05	303	164	0	.9	445	7.5	--
Sept. 14.....	26.0	45		.04	.15	50	9.7	27	10	249	0	20	2.9	.7	1.2	.03	301	165	0	.9	438	7.4	--

6-4620. NIOBRARA RIVER NEAR NORDEN, NEBR.

Oct. 19, 1961.	970	58		0.00	--	32	3.0	8.5	5.9	128	0	7.5	1.2	0.3	1.1	0.04	195	92	0	0.4	229	7.1	7
Jan. 16, 1962.	715	66		.01	--	32	3.7	9.7	5.9	138	0	8.5	.3	.3	.2	.02	195	95	0	.4	240	7.2	3
May 23.....	1,960	38		.18	0.00	33	3.8	9.8	7.8	138	0	11	.2	.5	1.8	.04	193	98	0	.4	246	7.5	45
Aug. 31.....	1,010	56		.10	.01	31	4.5	9.1	6.2	135	0	6.8	.0	.4	.2	.03	185	96	0	.4	234	7.7	5

EMANUEL CREEK BASIN

EMANUEL CREEK NEAR TYNDALL, S. DAK.

Apr. 28, 1961.	c 0.3	5.6		0.03	0.16	185	88	64	10	307	0	679	14	0.3	1.2	0.02	1,300	825	573	1.0	1,570	7.6	13
Mar. 30, 1962.	592	7.4		.07	.14	31	5.0	3.6	7.4	94	0	30	2.9	.2	6.8	.03	152	98	21	.2	237	7.0	30

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.
b Lake elevation, in feet.
c Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
JAMES RIVER BASIN																							
6-4676. JAMES RIVER NEAR MANFRED, N. DAK.																							
Mar. 26, 1962.	22	5.0		0.09	--	9.4	4.5	21	11	59	0	39	6.8	0.2	7.1	0.08	161	42	0	1.4	224	7.1	90
June 12.....	1.3	15		.17	0.03	53	38	192	9.5	546	41	170	12	.5	1.0	.58	643	290	0	4.9	1,220	8.5	--
June 14.....	.5	14		.08	--	56	37	183	8.7	630	0	155	4.6	.4	1.2	.65	829	291	0	4.7	1,210	8.0	--
Sept. 9.....	.1	9.8		.14	.01	43	25	104	12	432	0	79	2.1	.4	.8	.52	534	210	0	3.1	823	7.8	85
6-4679. BIG SLOUGH AT HAMBERG, N. DAK.																							
May 23, 1962..	0.1	17		0.09		70	72	222	25	336	0	623	44	0.4	0.9	0.19	1,330	471	195	4.5	1,780	7.3	
June 12.....	.1	22		.07	0.03	76	81	244	23	428	0	653	52	.5	.7	.23	1,470	522	171	4.7	1,920	8.2	
6-4682. LAKE JUANITA NEAR GRACE CITY, N. DAK.																							
June 10, 1962.	(a)	24		0.22	0.06	25	30	54	11	252	0	77	19	0.6	1.2	0.12	405	187	0	1.7	597	7.4	
Sept. 6.....	(a)	23		.04		18	35	60	12	277	0	73	21	.2	4.9	.14	420	190	0	1.9	627	7.3	
6-4683. NICCUM RESERVOIR ON KELLY CREEK, NEAR BORDULAC, N. DAK.																							
June 10, 1962.	(a)	2.2		0.03	0.00	25	16	22	5.7	180	0	23	4.8	0.2	1.0	0.08	201	127	0	0.9	348	7.9	
Sept. 6.....	(a)	1.8		.03		24	25	31	7.2	244	0	21	7.6	.2	4.6	.11	270	162	0	1.1	456	7.9	
6-4685. JAMES RIVER NEAR PINGREE, N. DAK.																							
Oct. 1, 1958..	0.2	34		0.05		37	39	147	16	462	0	164	38	0.3	0.5	0.38	730	254	0	4.0	1,110	7.0	--
Apr. 14, 1960.	185	13		.08		25	24	77	12	228	0	121	24	.2	4.9	.16	448	163	0	2.6	672	7.0	45
May 11.....	7.3	3.4		.06	0.00	23	23	78	10	237	0	108	24	.3	1.4	.15	425	154	0	2.7	654	7.2	28
July 10, 1962.	73	29		.13		31	32	127	12	341	0	146	46	.2	.6	.28	636	208	0	3.8	935	7.3	--

6-4695. PIPESTEM CREEK NEAR BUCHANAN, N. DAK.

Mar. 27, 1962.	210	5.7		0.19		12	4.4	7.9	9.2	48	0	23	3.0	0.1	8.2	0.02	118	48	9	0.5	170	6.7	
May 25.....	46	18		.06		58	34	56	12	271	0	167	8.4	.2	.8	.15	519	283	61	1.4	752	7.5	
June 10.....	49	9.9		.10		53	29	52	8.2	265	0	131	7.3	.2	.4	.13	444	251	34	1.4	676	7.9	
June 12.....	42	15		.12		44	36	51	8.0	264	0	138	6.3	.2	.4	.11	466	257	41	1.4	686	7.7	
Sept. 6.....	8.2	12		1.5		42	22	45	7.6	276	0	58	10	.3	.2	.13	348	196	0	1.4	559	8.2	

6-4700. JAMES RIVER AT JAMESTOWN, N. DAK.

Jan. 9, 1962..	2.2	32		0.07	--	105	34	173	8.1	556	0	207	73	0.5	0.2	0.60	936	402	0	3.8	1,410	8.0	
Mar. 20.....	4.8	25		.08	--	50	32	125	5.6	388	0	120	57	.4	1.3	.39	629	255	0	3.4	974	7.8	
May 26.....	38	15		.04	--	59	30	78	9.8	324	0	139	24	.2	1.5	.21	541	270	4	2.1	841	7.7	
June 10.....	55	12		.09	0.01	52	26	54	8.0	268	0	120	14	.2	.5	.15	444	236	16	1.5	679	8.0	
June 11.....	47	12		.11	--	40	30	52	8.2	256	0	105	13	.1	.3	.18	413	224	14	1.5	639	7.3	
Sept. 6.....	23	17		.06	.43	57	28	63	8.3	342	0	92	16	.3	1.3	.22	468	258	0	1.7	729	7.7	

6-4719. MOCCASIN CREEK NEAR NAHON, S. DAK.

Apr. 5, 1962..	42	7.0		0.11		15	7.2	47	13	65	0	69	35	0.5	14	0.16	258	67	14	2.5	421	6.5	
Apr. 12.....	24	11		.07		38	13	91	19	141	0	136	63	.8	23	.25	484	148	32	3.3	760	7.0	
May 1.....	2	16		.13		45	22	117	24	203	0	195	81	1.4	.2	.44	643	201	35	[illegible].6	991	7.4	
June 8.....	1.5	10		.03		67	31	195	32	304	0	309	123	1.3	4.0	.81	958	296	47	[illegible].9	1,460	[illegible].7	
Sept. 4.....	1.0	15		.04		128	59	274	30	471	0	540	191	1.2	.2	.79	1,540	564	178	[illegible].0	2,210	[illegible].6	

6-4737.55. LAKE LOUISE NEAR MILLER, S. DAK.

Dec. 6, 1961..	(a)	5.9		0.09		31	11	12	11	154	0	24	6.5	0.2	1.1	0.08	183	122	0	0.5	320	7.7	9
Mar. 8, 1962..	(a)	6.7		.07		36	13	13	12	188	0	22	6.8	.2	.4	.08	216	145	0	.5	358	7.6	
June 6.....	(a)	7.7		.02		35	13	14	11	170	0	29	8.7	.2	.7	.08	213	141	2	.5	362	7.5	
Sept. 4.....	(a)	12		.03		32	14	16	11	175	0	25	9.3	.2	2.3	.10	280	139	0	.6	371	7.4	

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
JAMES RIVER BASIN--Continued																							
6-4743.1. COTTONWOOD LAKE NEAR REDFIELD, S. DAK.																							
Dec. 6, 1961..	(a)	27		0.52	0.16	46	47	298	28	496	0	348	132	0.4	1.9	0.60	1,240	308	0	7.4	1,880	7.6	8
Mar. 8, 1962..	(a)	35		.10		63	69	399	34	666	0	573	172	.5	.7	.84	1,700	440	0	8.3	2,460	7.9	
June 7.....	(a)	21		.04		42	33	210	22	362	0	289	90	.3	.2	.45	911	242	0	5.9	1,400	7.9	
Sept. 3.....	(a)	29		.04		37	35	197	23	377	0	232	84	.5	1.1	.45	868	236	0	5.6	1,320	8.0	
6-4745. TURTLE CREEK AT REDFIELD, S. DAK.																							
Apr. 11, 1962.	122	5.2		0.14		14	5.1	16	8.2	60	0	33	11	0.2	3.1	0.06	147	56	7	0.9	220	6.7	
June 8.....	120	18		.07	0.00	47	26	107	13	263	0	172	58	.2	.4	.29	593	223	7	3.1	933	7.9	
6-4759. LAKE BYRON NEAR HURON, S. DAK.																							
Dec. 4, 1961..	b1,247.7	8.7		0.19		87	67	288	35	283	0	690	122	0.5	0.5	0.98	1,620	494	262	5.6	2,260	7.7	13
Mar. 6, 1962..	b1,248.2	18		.27		87	88	363	42	343	0	923	143	.6	4.8	.99	1,940	577	296	6.6	2,620	7.8	
June 7.....	b1,249.7	14		.05		48	29	106	14	198	0	259	40	.3	.6	.34	622	238	76	3.0	948	7.6	
Sept. 3.....	b1,248.6	8.5		.02		55	51	166	13	235	0	417	63	.4	1.5	.68	994	346	153	3.9	1,450	7.8	
6-4775. FIRESTEEL CREEK NEAR MOUNT VERNON, S. DAK.																							
Apr. 10, 1961.	0.1	3.6		0.02	0.44	100	43	157	12	261	0	500	56	0.4	0.4	0.19	1,050	426	212	3.3	1,470	7.7	9
Mar. 30, 1962.	300	4.9		.11	.39	17	4.8	8.2	9.9	50	0	37	4.0	.1	8.1	.08	134	62	21	.6	204	6.4	50
BIG SIOUX RIVER BASIN																							
6-4795. BIG SIOUX RIVER AT WATERTOWN, S. DAK.																							
June 2, 1960..	26	10		0.02	0.00	57	32	15	5.2	260	0	83	2.2	0.1	0.8	0.11	359	273	60	0.4	558	7.6	17
Mar. 29, 1962.	130	7.4		.07	.24	18	5.6	1.4	4.7	66	0	14	.0	.1	5.6	.11	96	68	14	.1	154	6.7	45

6-4800. BIG SIOUX RIVER NEAR BROOKINGS, S. DAK.

June 2, 1960..	111	12		0.02	0.00	80	45	36	10	270	0	209	23	0.2	2.4	0.19	596	386	165	0.8	846	7.6	23
Oct. 11.....	15	17		.02	.22	78	55	29	5.5	301	0	200	27	.3	.7	.14	590	420	173	.6	866	7.4	6
Mar. 18, 1961.	286	13		.11	.06	48	16	9.5	9.6	152	0	74	7.1	.2	.5	.07	276	185	60	.3	418	7.0	41
Mar. 30, 1962.	8,120	6.7		.06	.30	25	12	5.4	8.3	81	0	54	.0	.0	8.4	.06	179	110	44	.2	272	6.6	45

6-4810. BIG SIOUX RIVER NEAR DELL RAPIDS, S. DAK.

June 1, 1960..	186	10		0.02	0.00	88	43	31	7.9	268	0	207	18	0.2	2.2	0.15	586	395	175	0.7	827	7.7	15
Oct. 11.....	37	12		.03	.06	88	43	27	6.3	270	0	211	19	.2	.2	.13	559	397	176	.6	822	7.4	7
Mar. 18, 1961.	429	12		.09	.07	41	12	6.1	9.5	134	0	52	3.8	.2	6.0	.06	228	153	43	.2	345	6.9	40
Mar. 30, 1962.	17,800	4.6		.09	.27	15	5.0	2.3	7.8	61	0	12	.0	.1	6.0	.04	109	58	8	.1	151	6.6	45

6-4815. SKUNK CREEK NEAR SIOUX FALLS, S. DAK.

May 31, 1960..	38	9.5		0.02	0.11	124	52	23	7.7	320	0	291	3.6	0.2	2.3	0.08	719	525	263	0.4	973	7.8	17
Oct. 10.....	2.2	12		.06	.00	27	82	14	7.7	284	0	194	8.3	.3	.6	.08	536	406	173	.3	781	7.4	7
Mar. 17, 1961.	114	12		.10	.00	44	16	5.5	13	147	0	68	.0	.2	4.5	.06	262	174	53	.2	388	6.9	70
Mar. 30, 1962.	1,300	4.6		.12	.29	16	3.9	1.2	8.2	57	0	12	.0	.1	8.2	.03	100	56	9	.1	148	6.5	35

6-4855. BIG SIOUX RIVER AT AKRON, IOWA

Mar. 29, 1962.	21,700	4.8		0.39		22	4.4	3.2	9.0	79	0	18	3.3	0.1	4.4	0.02	118	73	8	0.2	196	6.9	15
Apr. 3.....	27,600	7.0		.11		27	6.7	2.6	7.7	103	0	21	.2	.1	1.0	.03	141	95	11	.1	218	6.9	33

PLATTE RIVER BASIN

6-7142. BURLINGTON DITCH BELOW HEADGATE, AT DENVER, COLO.

June 16, 1962.	227	11		0.20		49	11	62	4.1	233	0	58	48	1.4	0.9	0.17	368	168	0	2.1	645	7.2	
Sept. 14.....	20	16		.10		89	14	153	10	414	0	114	135	1.7	.7	.38	710	280	0	4.0	1,340	7.3	

a Lake content not known. Information on lake stage available in district office at Lincoln, Nebr.
b Lake elevation, in feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	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 $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
																		Calcium, magnesium	Noncarbonate				
PLATTE RIVER BASIN--Continued																							
6-7205. SOUTH PLATTE RIVER AT HENDERSON, COLO.																							
June 16, 1962.	398	9.5		0.40		30	6.8	32	2.6	110	0	57	22	0.8	0.1	0.10	213	103	13	1.4	382	7.1	
Sept. 14.....	56	17		.76		107	21	141	8.9	280	0	221	138	1.3	15	.37	816	356	126	3.3	1,280	7.3	
6-7540. SOUTH PLATTE RIVER NEAR KERSEY, COLO.																							
June 15, 1962.	1,460	12		1.5		79	33	55	3.9	177	0	276	18	0.8	0.7	0.17	594	333	188	1.3	853	7.2	
Aug. 3.....	1,520	13		--		136	50	108	5.0	262	0	502	37	.9	6.3	.21	1,010	544	329	2.0	1,370	7.5	
Sept. 13.....	420	12		.36		180	72	136	5.0	304	0	708	32	.6	8.7	.23	1,350	745	496	2.2	1,700	7.6	
Sept. 29.....	378	11		--		180	83	140	5.3	336	0	724	45	.0	9.0	.28	1,410	790	514	2.2	1,790	7.7	
6-7600. SOUTH PLATTE RIVER AT BALZAC, COLO.																							
June 15, 1962.	655	14		0.12		128	52	105	6.1	244	0	491	35	0.9	5.6	0.22	1,020	532	332	2.0	1,360	7.9	
Sept. 13.....	320	16		.31		220	62	161	8.2	328	0	765	54	.8	4.5	.22	1,500	805	536	2.5	1,890	7.8	
6-7670.4. JOHNSON RESERVOIR BELOW POWER PLANT NO. 2, NEAR LEXINGTON, NEBR.																							
May 13, 1962..	d34,595	7.1		0.00	0.00	91	34	102	10	172	0	378	39	0.7	0.0	0.17	794	368	227	2.3	1,120	8.0	
Sept. 7.....	d 1,500	11		.01	.01	72	28	93	13	185	0	314	31	.6	.1	.11	664	295	143	2.4	969	7.3	5

6-7725. WOOD RIVER NEAR CHAPMAN, NEBR.

Nov. 9, 1961..	16	31		0.09	0.22	78	11	37	48	410	0	51	1.4	0.3	1.0	0.13	497	239	0	1.0	835	7.9	
Mar. 19, 1962.	12	22		.00	.00	56	10	28	9.0	199	0	63	20	.3	.7	.21	314	182	19	.9	502	7.2	
June 28.....	37	24		.11	.07	59	11	18	15	198	0	54	12	.4	15	.09	322	194	32	.6	490	7.3	
Sept. 5.....	9.6	28		.01	.09	72	11	33	11	207	0	79	22	.3	23	.15	389	223	53	1.0	592	7.8	

KANSAS RIVER BASIN

6-8650. KANOPOLIS RESERVOIR NEAR KANOPOLIS, KANS.

Dec. 14, 1961.	d57,720	12		0.31	0.11	112	11	123	9.2	194	0	127	220	0.4	2.3	0.09	756	326	167	3.0	1,240	7.4	5
May 20, 1962..	d41,090	4.5		.15	.00	124	22	158	9.4	185	0	214	274	.4	2.2	.12	974	400	248	3.4	1,530	7.5	
Sept. 12.....	d58,330	11		.07	.01	86	13	83	9.0	162	0	119	134	.5	.2	.07	576	266	133	2.2	930	7.3	

d Lake content, in acre-feet.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1961 to September 1962--Continued

Date of collection	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Arsenic (As)	Selenium (Se)	Cyanide (CN)
CHEYENNE RIVER BASIN						
6-4000. HAT CREEK NEAR EDGEMONT, S. DAK.						
July 31, 1961.....					0.01	
May 21, 1962.....	0.01	0.00	0.01	0.05	.01	
WHITEWOOD CREEK NEAR VALE, S. DAK.						
Apr. 13, 1960.....	0.42	0.03	0.16	0.16	0.00	0.00
June 13.....	.08	.00	.27	.10	.00	1.1
Aug. 18.....	.08	.01	.09	.13	.01	4.0
May 18, 1962.....	.01	.00	.12	.18	.01	.00
INDIAN CREEK NEAR NEWELL, S. DAK.						
Sept. 3, 1959.....	--	--	--	--	0.00	--
Apr. 13, 1960.....	0.03	0.01	0.05	0.02	.00	0.01
June 13.....	.01	.00	.16	.02	.00	.01
Aug. 18.....	.00	.01	.12	.01	.00	.00
May 19, 1962.....	.01	.00	.01	.01	.01	.00
6-4370. BELLE FOURCHE RIVER NEAR STURGIS, S. DAK.						
Mar. 26, 1959.....	0.04	0.00	0.25	0.07	0.01	0.13
Apr. 14, 1960.....	.01	.00	.07	.10	.00	.32
June 14.....	.01	.01	.25	.06	.01	.12
Aug. 20.....	.02	.00	.30	.07	.01	.02
May 19, 1962.....	.02	.00	.70	.11	.01	.26
BELLE FOURCHE RIVER NEAR HEREFORD, S. DAK.						
Mar. 26, 1959.....	0.05	0.00	0.17	0.07	0.01	0.03
Apr. 15, 1960.....	.03	.00	.00	.09	.00	.03
June 15.....	.01	.00	.27	.11	.00	.06
Aug. 20.....	.02	.01	.13	.10	.02	.01
May 20, 1962.....	.04	.02	.32	.04	.02	.13
PLATTE RIVER BASIN						
6-7725. WOOD RIVER NEAR CHAPMAN, NEBR.						
Nov. 9, 1961.....	0.00		0.10			
Mar. 19, 1962.....	.03		.07			
June 28.....	.22		.05			
Sept. 5.....	.12		.01			

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
LITTLE PRICKLY PEAR CREEK BASIN																	
SIEBEN RANCH DITCH BELOW CLARK CREEK, NEAR WOLF CREEK, MONT.																	
May 15, 1962	1720		44	2.9	20	0.2											
June 6	0900		47	4.4	14	.2											
June 20	0845		52	e 1	21	.1											
July 1	0745		48	e 1	8	t											
July 19	1445		57	e 1	12	t											
July 31	1015		58	e 1	5	t											
Aug. 15	0700		50	3.2	1	t											
Sept. 5	0700		48	e 2	5	t											
LITTLE PRICKLY PEAR CREEK BELOW RAILROAD TUNNEL NO. 5, NEAR WOLF CREEK, MONT.																	
Apr. 4, 1962	1700		--	52	22	3.1											
Apr. 29	1500		47	143	41	16											
May 16	0915		43	163	58	26											
June 5	1150		47	152	34	14											
June 19	1530		62	119	25	8.0											
July 1	0915		53	38	11	1.1											
July 20	0815		52	51	11	1.5											
July 31	1315		63	32	14	1.2											
Aug. 15	1515		63	20	196	11											
Sept. 5	0855		47	38	8	.8											
MEDICINE ROCK CREEK NEAR WOLF CREEK, MONT.																	
May 16, 1962	1015		44	3.4	14	0.1											
June 5	1225		50	e 1.5	20	.1											
June 19	1445		56	3.4	9	.1											
July 1	1000		50	2.3	3	t											
July 20	0840		49	e 2	3	t											
July 31	1345		56	e 2	7	t											
Aug. 15	1205		56	e 3	1	t											
Sept. 5	0940		43	e .5	11	t											

e Estimated.
t Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
LITTLE PRICKLY PEAR CREEK BASIN--Continued																		
6-712. LYONS CREEK NEAR WOLF CREEK, MONT.																		
May 16, 1962	1105		44	90	686	167												
June 5	1635		50	46	14	1.7												
June 19	1410		58	45	12	1.5												
July 1	1045		53	29	14	1.1												
July 20	0855		52	16	8	.4												
July 31	1430		60	13	5	.2												
Aug. 15	1140		59	11	4	.1												
Sept. 5	1000		50	7.9	3	.1												
SHEEP CREEK NEAR WOLF CREEK, MONT.																		
Apr. 29, 1962	1045		45	2.8	20	0.1												
May 16	1205		47	12	34	1.1												
June 5	1615		52	e .4	1	t												
June 19	1310		60	8.0	3	.1												
July 1	1055		63	e 1.0	8	t												
WOLF CREEK AT WOLF CREEK, MONT.																		
Apr. 29, 1962	1145		44	26	19	1.3												
May 16	1340		45	141	2,710	1,030												
June 5	1535		51	36	8	.8												
June 19	1045		53	50	12	1.6												
July 1	1220		60	20	16	.9												
July 20	1000		57	9.9	3	.1												
July 31	1510		67	6.8	7	.1												
Aug. 15	1305		65	3.7	2	t												

BUTCHER CREEK NEAR LUTHER, MONT.

Oct. 3, 1961.....	0835		42		2	155	0.8												
Oct. 6.....	1220		50		2	8	t												
Oct. 9.....	1420		41		3	27	.2												
Oct. 13.....	1200		47		3	16	.1												
Oct. 16.....	1445		51		3	13	.1												
Oct. 20.....	1500		42		2	14	.1												
Oct. 23.....	1215		35		2	15	.1												
Oct. 27.....	1220		41		2	8	t												
Nov. 2.....	1615		32		4	22	.2												
Nov. 6.....	--		33		2	15	.1												
Nov. 8.....	1335		33		2	15	.1												
Nov. 13.....	1220		32		2	31	.2												
Nov. 21.....	0835		32		2	66	.4												
Dec. 4.....	1330		32	e	1	22	.1												
Dec. 5.....	1300		33	e	1	6	t												
Dec. 18.....	1010		32	e	1	21	.1												
Dec. 20.....	1145		34	e	1	10	t												
Dec. 22.....	1105		32	e	1	14	t												
Jan. 3, 1962.....	0700		32		1	14	t												
Jan. 5.....	1050		32	e	1	40	.1												
Jan. 31.....	1200		33	e	1	162	.4												
Feb. 1.....	1220		32	e	2	140	.8												
Feb. 6.....	1245		33	e	2	17	.1												
Feb. 9.....	1215		34	e	2	23	.1												
Feb. 15.....	0810		32	e	2	12	.1												
Feb. 21.....	1210		33	e	2	15	.1												
Feb. 27.....	1200		33	e	2	32	.2												
Mar. 5.....	1205		33		2	41	.2												
Mar. 12.....	1220		32		2	14	.1												
Mar. 16.....	1215		34		2	54	.3												

e Estimated.
t Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BUTCHER CREEK NEAR LUTHER, MONT.--Continued																		
Mar. 19, 1962	1105		33	e 2	52	0.3												
Mar. 23	1150		35	e 3	18	.1												
Mar. 26	1300		39	e 3	67	.5												
Mar. 30	1130		34	e 4	91	1.0												
Apr. 2	1020		34	5	176	2.4												
Apr. 4	1400		40	6	119	1.9												
Apr. 5	1230		37	6	32	.5												
Apr. 11	1620		40	5	38	.5												
Apr. 16	1320		49	14	74	2.8												
Apr. 19	1515		66	12	108	3.5												
Apr. 23	1110		50	12	64	2.1												
May 1	1130		44	9	49	1.2												
May 7	1215		54	7	50	.9												
May 16	1020		47	8	53	1.1												
May 16	1625		52	8	63	1.4												
May 21	1330		54	7	65	1.2												
May 25	1040		49	7	86	1.6												
May 28	1200		52	19	92	4.7												
June 4	1150		47	11	287	8.5												
June 18	1145		59	10	46	1.2												
June 22	1230		52	8	37	.8												
June 25	1245		64	7	72	1.4												
July 2	1500		66	2	38	.2												
July 3	1210		60	3	162	1.3												
July 9	1140		62	5	50	.7												
July 10	1050		61	6	31	.5												
July 12	1120		60	4	38	.4												
July 13	0930		59	8	78	1.7												
July 17	0735		54	6	33	.5												
July 20	1250		58	4	33	.4												

July 23, 1962......	1135		61	3	35	0.3												
July 24...........	1415		64	3	21	.2												
July 25...........	1150		61	4	30	.3												
July 27...........	1135		58	5	61	.8												
July 30...........	1225		59	5	31	.4												
Aug. 3............	1145		60	4	28	.3												
Aug. 6............	1125		59	4	26	.3												
Aug. 10...........	1140		59	6	62	1.0												
Aug. 13...........	1230		64	3	29	.2												
Aug. 16...........	1240		61	3	16	.1												
Aug. 20...........	1130		60	2	32	.2												
Aug. 24...........	1150		54	3	28	.2												
Aug. 27...........	1450		56	2	72	.4												
Aug. 30...........	1820		52	2	18	.1												
Sept. 4...........	1025		46	3	18	.1												
Sept. 5...........	1315		53	2	20	.1												
Sept. 7...........	1135		55	1	15	t												
Sept. 10..........	1145		48	3	81	.7												
Sept. 14..........	1040		50	3	24	.2												
Sept. 18..........	0750		48	2	13	.1												
Sept. 24..........	1220		55	3	6	t												

BUTCHER CREEK NEAR ROSCOE, MONT.

Oct. 3, 1961.......	0930		43	11	15	0.4												
Oct. 6............	1155		50	9	7	.2												
Oct. 9............	1440		55	12	14	.5												
Oct. 13...........	1135		50	10	7	.2												
Oct. 16...........	1525		55	11	15	.4												
Oct. 20...........	1530		44	13	10	.4												
Oct. 23...........	1145		36	11	9	.3												
Oct. 27...........	1145		42	10	7	.2												

e Estimated.
t Less than 0.05. ton.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BUTCHER CREEK NEAR ROSCOE, MONT.--Continued																		
Oct. 30, 1961	1300		33	e 10	282	7.6												
Nov. 2	1505		32	15	85	3.4												
Nov. 6	--		33	e 10	57	1.5												
Nov. 8	1305		34	e 10	64	1.7												
Nov. 13	1145		32	e 10	76	2.1												
Nov. 21	0950		32	e 8	28	.6												
Nov. 27	1245		35	e 10	52	1.4												
Dec. 1	1125		37	e 8	44	1.0												
Dec. 4	1200		33	e 8	34	.7												
Dec. 4	1400		32	e 8	83	1.8												
Dec. 5	1200		33	e 8	2	t												
Dec. 6	1755		32	e 6	128	2.1												
Dec. 13	1040		32	e 4	2	t												
Dec. 14	1020		39	e 4	6	.1												
Dec. 15	1100		32	e 6	7	.1												
Dec. 18	1120		32	e 6	16	.3												
Dec. 19	1105		34	e 6	38	.6												
Dec. 20	1105		33	e 6	14	.2												
Dec. 21	1050		32	e 6	44	.7												
Dec. 22	1030		32	e 6	16	.3												
Dec. 29	1100		32	e 6	13	.2												
Jan. 3, 1962	0805		32	4	13	.1												
Jan. 3	1045		34	4	22	.2												
Jan. 4	1030		32	e 3	11	.1												
Jan. 5	1025		32	e 3	39	.3												
Jan. 12	1200		32	e 2	14	.1												
Jan. 18	1420		32	e 2	25	.1												
Jan. 26	1545		33	e 4	18	.2												
Jan. 31	1130		33	e 20	226	12												
Feb. 1	1140		32	19	385	20												

Feb. 6, 1962.....	1220	33	e	12	101	3.3
Feb. 9.....	1150	34	e	12	111	3.6
Feb. 15.....	0835	32	e	12	40	1.3
Feb. 21.....	1140	33	e	5	117	1.6
Feh. 27.....	1130	33	e	3	24	.2
Mar. 5.....	1320	32		5	2	t
Mar. 12.....	1145	32	e	6	75	1.2
Mar. 16.....	1145	35	e	8	53	1.1
Mar. 19.....	1145	35	e	8	241	5.2
Mar. 23.....	1125	38	e	10	40	1.1
Mar. 26.....	1235	42	e	12	64	2.1
Mar. 30.....	1050	36	e	12	114	3.7
Apr. 2.....	1200	44		9	20	.5
Apr. 4.....	1240	42		13	54	1.9
Apr. 5.....	1205	42		16	129	5.6
Apr. 6.....	1620	41		10	58	1.6
Apr. 11.....	1645	48		11	54	1.6
Apr. 16.....	1350	55		16	84	3.6
Apr. 19.....	1540	60		14	67	2.5
Apr. 23.....	1130	49		14	56	2.1
May 1.....	1240	49		12	35	1.1
May 7.....	1150	55		10	34	.9
May 16.....	1050	50		14	85	3.2
May 16.....	1655	56		13	79	2.8
May 21.....	1350	58		12	80	2.6
May 25.....	1110	51		12	79	2.6
May 28.....	1215	54		20	167	9.0
June 1.....	1435	57		17	104	4.8
June 4.....	1225	49		23	694	43
June 11.....	1430	59		15	74	3.0

e Estimated.
t Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BUTCHER CREEK NEAR ROSCOE, MONT.--Continued																		
June 18, 1962	1245		66	26	199	14												
June 22	1150		61	20	126	6.8												
June 25	1315		67	18	118	5.7												
July 2	1435		72	12	91	2.9												
July 3	1140		62	11	93	2.8												
July 9	1115		63	20	279	15												
July 10	1030		61	21	227	13												
July 12	1050		62	22	203	12												
July 13	0910		58	29	540	42												
July 17	0820		55	26	204	14												
July 20	1225		60	22	181	11												
July 23	1110		63	22	175	10												
July 24	1445		70	19	158	8.1												
July 25	1125		62	20	143	7.7												
July 27	1115		60	23	224	14												
July 30	1250		62	25	130	8.8												
Aug. 3	1125		62	26	185	13												
Aug. 6	1035		58	21	121	6.9												
Aug. 10	1115		58	25	174	12												
Aug. 13	1305		65	19	81	4.2												
Aug. 16	1210		61	18	82	4.0												
Aug. 20	1105		58	27	124	9.0												
Aug. 24	1125		54	24	112	7.3												
Aug. 27	1230		54	22	75	4.5												
Aug. 30	1920		57	20	118	6.4												
Sept. 1	1055		43	15	52	2.1												
Sept. 5	1210		55	12	36	1.2												
Sept. 7	1110		54	10	30	.8												
Sept. 10	1120		48	13	29	1.0												
Sept. 14	1015		50	12	22	.7												
Sept. 18	0840		49	8	19	.4												
Sept. 24	1200		55	7	9	.2												

BUTCHER CREEK NEAR FISHTAIL, MONT.

Oct. 3, 1961.....	0945		45		23	91	5.7												
Oct. 6.....	1140		50		22	38	2.3												
Oct. 9.....	1500		45		26	52	3.6												
Oct. 13.....	1120		49		16	12	.5												
Oct. 16.....	1540		56		16	11	.5												
Oct. 20.....	1545		45		16	14	.6												
Oct. 23.....	1130		37		14	16	.6												
Oct. 27.....	1130		42		12	12	.4												
Oct. 30.....	1240		33		23	102	6.3												
Nov. 2.....	1400		32		14	50	1.9												
Nov. 6.....	1130		33	e	12	59	1.9												
Nov. 8.....	1245		34	e	12	69	2.2												
Nov. 13.....	1130		32	e	12	50	1.6												
Nov. 21.....	1005		32	e	10	21	.6												
Nov. 27.....	1220		35		12	63	2.0												
Nov. 30.....	1045		32	e	12	35	1.1												
Dec. 1.....	1045		36	e	10	20	.5												
Dec. 4.....	1130		32	e	9	51	1.2												
Dec. 4.....	1415		32	e	9	40	1.0												
Dec. 5.....	1145		33	e	9	22	.5												
Dec. 6.....	1740		32	e	8	27	.6												
Dec. 11.....	1010		38	e	5	75	1.0												
Dec. 12.....	1100		32	e	5	66	.9												
Dec. 13.....	1025		32	e	5	10	.1												
Dec. 14.....	1000		36	e	6	7	.1												
Dec. 15.....	1040		37	e	7	9	.2												
Dec. 18.....	1215		32		7	11	.2												
Dec. 19.....	1045		38	e	7	23	.4												
Dec. 20.....	1045		34	e	7	13	.2												
Dec. 21.....	1030		32	e	7	28	.5												

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BUTCHER CREEK NEAR FISHTAIL, MONT.--Continued																		
Dec. 22, 1961	1010		32	e 7	26	0.5												
Dec. 29	1045		32	e 7	13	.2												
Jan. 3, 1962	0855		32	e 6	19	.3												
Jan. 3	1015		32	e 6	13	.2												
Jan. 4	1015		32	e 5	8	.1												
Jan. 5	1010		32	e 5	43	.6												
Jan. 12	1130		32	e 4	13	.1												
Jan. 18	1510		32	6	30	.5												
Jan. 26	1430		34	e 7	28	.5												
Jan. 31	1115		33	e 25	272	18												
Feb. 1	1120		32	e 40	179	19												
Feb. 6	1200		33	e 15	145	5.9												
Feb. 9	1135		34	e 14	129	4.9												
Feb. 15	0900		32	15	66	2.7												
Feb. 15	0930		32	15	63	2.6												
Feb. 21	1120		33	e 8	42	.9												
Feb. 27	1115		33	e 3	20	.2												
Mar. 5	1435		33	e 4	15	.2												
Mar. 12	1120		33	e 7	88	1.7												
Mar. 16	1130		36	e 10	52	1.4												
Mar. 19	1220		37	10	68	1.8												
Mar. 23	1105		39	10	45	1.2												
Mar. 26	1215		42	12	40	1.3												
Mar. 30	1025		37	15	78	3.2												
Apr. 2	1310		44	11	20	.6												
Apr. 4	1215		43	15	46	1.9												
Apr. 5	1145		44	20	153	8.3												
Apr. 6	1500		42	17	62	2.8												
Apr. 11	1655		45	15	53	2.1												
Apr. 16	1410		54	18	40	1.9												

Apr. 19, 1962......	1555		60	16	39	1.7											
Apr. 23...........	1150		49	15	39	1.6											
May 1.............	1250		52	13	24	.8											
May 7.............	1130		57	12	26	.8											
May 16............	1110		50	31	254	21											
May 16............	1725		58	29	235	18											
May 21............	1415		57	23	110	6.8											
May 25............	1130		51	24	139	9.0											
May 28............	1230		55	34	268	25											
June 1............	1450		57	26	209	15											
June 4............	1305		50	34	197	18											
June 11...........	1500		60	26	177	12											
June 18...........	1300		64	30	268	22											
June 22...........	1130		59	22	149	8.8											
June 25...........	1330		68	21	110	6.2											
July 2............	1345		65	22	65	3.9											
July 3............	1125		60	24	89	5.8											
July 9............	1055		63	32	109	9.4											
July 10...........	1010		61	30	178	14											
July 12...........	1030		60	24	285	18											
July 13...........	0845		60	39	563	59											
July 17...........	0940		58	40	266	29											
July 20...........	1150		60	36	222	22											
July 23...........	1045		62	31	219	18											
July 24...........	1505		63	32	208	18											
July 25...........	1105		62	28	144	11											
July 27...........	1050		60	25	188	13											
July 30...........	1340		62	29	192	15											
Aug. 3............	1100		60	37	373	37											
Aug. 6............	1015		57	36	152	15											

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BUTCHER CREEK NEAR FISHTAIL, MONT.--Continued																		
Aug. 10, 1962.....	1050		60	34	183	17												
Aug. 13.....	1325		65	25	136	9.2												
Aug. 16.....	1125		60	28	173	13												
Aug. 20.....	1045		59	37	204	20												
Aug. 24.....	1100		54	42	168	19												
Aug. 27.....	1215		56	34	134	12												
Aug. 30.....	1935		55	36	148	14												
Sept. 4.....	1125		48	39	102	11												
Sept. 5.....	1150		52	36	97	9.4												
Sept. 7.....	1050		55	32	88	7.6												
Sept. 10.....	1100		48	38	73	7.5												
Sept. 14.....	0950		50	29	53	4.1												
Sept. 18.....	0900		51	16	41	1.8												
Sept. 24.....	1145		55	11	2	.1												
NORTH FORK BLUEWATER CREEK NEAR BRIDGER, MONT.																		
Oct. 2, 1961.....	1040		55	10	491	13												
Oct. 6.....	1530		55	11	38	1.1												
Oct. 9.....	1145		54	10	28	.8												
Oct. 13.....	1445		60	10	26	.7												
Oct. 17.....	0845		54	10	13	.4												
Oct. 20.....	1115		57	10	33	.9												
Oct. 23.....	1515		52	10	11	.3												
Oct. 27.....	1500		55	10	9	.2												
Oct. 31.....	1450		54	11	25	.7												
Nov. 13.....	1500		52	11	10	.3												
Nov. 17.....	1500		53	11	67	2.0												
Nov. 18.....	1045		50	11	12	.4												

Nov. 20, 1961.....	0950	50	11	16	.5
Nov. 21.....	1300	53	11	9	.3
Nov. 24.....	1245	52	11	14	.4
Nov. 28.....	1145	54	11	29	.9
Nov. 29.....	1300	50	11	12	.4
Nov. 30.....	1400	53	11	11	.3
Dec. 1.....	1400	53	11	9	.3
Dec. 4.....	1020	51	11	16	.5
Dec. 4.....	1410	52	11	15	.4
Dec. 7.....	0815	50	11	26	.8
Dec. 7.....	1430	52	11	20	.6
Dec. 11.....	1345	45	11	9	.3
Dec. 12.....	1445	46	11	9	.3
Dec. 13.....	1345	50	11	9	.3
Dec. 14.....	1320	52	11	12	.4
Dec. 15.....	1345	51	11	14	.4
Dec. 18.....	1445	51	11	12	.4
Dec. 19.....	1120	49	11	20	.6
Dec. 19.....	1400	50	11	10	.3
Dec. 20.....	1515	54	11	12	.4
Dec. 21.....	1415	52	11	23	.7
Dec. 22.....	1400	51	11	9	.3
Dec. 26.....	1200	52	11	12	.4
Dec. 27.....	1315	52	11	10	.3
Dec. 28.....	1010	49	11	11	.3
Dec. 29.....	1400	53	10	8	.2
Jan. 2, 1962.....	0945	51	11	10	.3
Jan. 2.....	1030	52	11	13	.4
Jan. 3.....	1330	54	10	12	.3
Jan. 4.....	1320	52	10	13	.4

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
YELLOWSTONE RIVER BASIN--Continued																		
NORTH FORK BLUEWATER CREEK NEAR BRIDGER, MONT.--Continued																		
Jan. 5, 1962	1330		51	11	19	0.6												
Jan. 19	1045		48	11	13	.4												
Jan. 25	1330		51	11	20	.6												
Jan. 29	1400		53	11	25	.7												
Feb. 1	1500		54	11	28	.8												
Feb. 2	0735		52	11	38	1.1												
Feb. 6	1555		52	11	24	.7												
Feb. 9	1530		54	11	34	1.0												
Feb. 13	1515		55	11	26	.8												
Feb. 15	1235		52	11	29	.9												
Feb. 21	1530		52	11	19	.6												
Mar. 5	1150		51	11	26	.8												
Mar. 12	1520		53	11	15	.4												
Mar. 16	1505		55	11	19	.6												
Mar. 19	1410		54	12	21	.7												
Mar. 20	0830		53	11	20	.6												
Mar. 20	1445		56	11	22	.7												
Mar. 21	1225		54	11	22	.7												
Mar. 22	1130		54	11	70	2.1												
Mar. 23	1345		54	11	33	1.0												
Mar. 24	1405		55	11	22	.7												
Mar. 25	1300		55	11	16	.5												
Mar. 26	1520		55	11	26	.8												
Mar. 27	1120		57	11	21	.6												
Mar. 28	1215		55	12	25	.8												
Mar. 30	1400		56	12	24	.8												
Apr. 2	1030		55	12	24	.8												
Apr. 4	1645		56	12	24	.8												
Apr. 10	1015		55	11	191	5.7												
Apr. 10	1650		55	11	33	1.0												

Apr. 12, 1962.....	1725	56	11	28	.8	
Apr. 13.....	0900	55	11	24	.7	
Apr. 14.....	1835	58	10	29	.8	
Apr. 15.....	1045	58	10	22	.6	
Apr. 15.....	1650	58	10	27	.7	
Apr. 16.....	0845	55	10	35	.9	
Apr. 17.....	0645	52	10	29	.8	
Apr. 19.....	0930	57	10	20	.5	
Apr. 20.....	1450	57	10	26	.7	
Apr. 21.....	1225	56	10	17	.5	
Apr. 22.....	1505	58	10	18	.5	
Apr. 23.....	1810	56	10	23	.6	
Apr. 25.....	1755	55	10	15	.4	
Apr. 26.....	1730	55	10	19	.5	
Apr. 28.....	0955	55	10	22	.6	
Apr. 28.....	1740	54	10	16	.4	
Apr. 29.....	1835	54	10	25	.7	
Apr. 30.....	0915	55	10	82	2.2	
Apr. 30.....	2000	55	10	21	.6	
May 1.....	1155	58	10	18	.5	
May 2.....	1610	58	10	17	.5	
May 3.....	1800	56	10	14	.4	
May 4.....	1030	56	10	21	.6	
May 5.....	1410	58	10	15	.4	
May 6.....	1915	55	10	17	.5	
May 7.....	0900	56	10	19	.5	
May 8.....	1800	56	10	17	.5	
May 9.....	1750	57	10	17	.5	
May 10.....	1700	58	10	19	.5	
May 11.....	1650	59	10	23	.6	

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
NORTH FORK BLUEWATER CREEK NEAR BRIDGER, MONT.--Continued																		
May 12, 1962.....	1600		56	10	19	0.5												
May 13.....	0950		55	10	20	.5												
May 13.....	1800		55	10	24	.6												
May 14.....	0855		55	10	19	.5												
May 15.....	0925		56	10	38	1.0												
May 15.....	1805		58	10	18	.5												
May 16.....	1630		58	10	19	.5												
May 17.....	1230		53	10	24	.6												
May 19.....	0900		56	10	26	.7												
May 20.....	1125		60	10	19	.5												
May 21.....	0935		--	10	15	.4												
May 22.....	0910		54	10	39	1.1												
May 23.....	1425		60	10	17	.5												
May 24.....	1350		56	12	12	.4												
May 25.....	1520		54	10	24	.6												
May 26.....	1155		51	10	34	.9												
May 26.....	1710		55	10	35	.9												
May 26.....	1900		55	10	19	.5												
May 27.....	1050		56	10	39	1.1												
May 27.....	1730		55	10	18	.5												
May 28.....	0955		56	10	50	1.4												
May 29.....	1105		58	10	58	1.6												
May 29.....	1800		57	10	33	.9												
May 30.....	1015		58	10	35	.9												
May 30.....	1800		57	10	41	1.1												
May 31.....	1025		58	10	28	.8												
June 1.....	0920		57	10	17	.5												
June 1.....	1700		57	10	49	1.3												
June 2.....	0955		58	10	32	.9												
June 3.....	1000		58	10	177	4.8												

June 4, 1962.....	0900	54	10	28	.8	
June 5.....	1835	55	10	14	.4	
June 6.....	0900	55	10	15	.4	
June 6.....	1700	55	10	16	.4	
June 7.....	1055	58	10	28	.8	
June 8.....	0905	56	10	24	.6	
June 9.....	1045	59	10	21	.6	
June 10.....	1140	61	10	25	.7	
June 11.....	1010	51	10	28	.8	
June 11.....	1730	57	10	15	.4	
June 12.....	0915	58	10	45	1.2	
June 12.....	1810	58	10	20	.5	
June 13.....	0950	58	10	22	.6	
June 13.....	1805	59	10	27	.7	
June 14.....	1700	56	10	15	.4	
June 16.....	1505	57	10	36	1.0	
June 17.....	1155	60	10	20	.5	
June 18.....	0915	58	10	19	.5	
June 18.....	1435	60	12	14	.5	
June 19.....	1005	59	10	26	.7	
June 20.....	1145	58	10	18	.5	
June 21.....	1040	59	10	32	.9	
June 22.....	1105	59	10	22	.6	
June 25.....	1145	60	10	25	.7	
June 29.....	0920	57	10	11	.3	
June 29.....	1300	61	10	19	.5	
June 29.....	1400	61	10	24	.6	
June 29.....	1500	61	10	26	.7	
June 29.....	1600	61	10	20	.5	
June 29.....	1700	59	10	16	.4	

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
YELLOWSTONE RIVER BASIN--Continued																		
NORTH FORK BLUEWATER CREEK NEAR BRIDGER, MONT.--Continued																		
June 29, 1962.....	1800		58	10	25	0.7												
June 29.....	1900		57	10	28	.8												
June 29.....	2000		56	10	17	.5												
June 29.....	2100		56	10	17	.5												
June 29.....	2200		56	10	18	.5												
June 29.....	2300		56	10	127	3.4												
June 29.....	2400		56	10	32	.9												
June 30.....	0100		56	10	23	.6												
June 30.....	0200		56	10	27	.7												
June 30.....	0300		56	10	17	.5												
June 30.....	0400		56	10	379	10												
June 30.....	0500		56	10	35	.9												
June 30.....	0600		56	10	84	2.3												
June 30.....	0700		56	10	10	.3												
June 30.....	0800		56	10	14	.4												
June 30.....	0900		57	10	9	.2												
June 30.....	1000		58	10	9	.2												
June 30.....	1100		60	10	11	.3												
June 30.....	1200		61	10	12	.3												
July 3.....	1415		60	10	11	.3												
July 9.....	1350		61	10	9	.2												
July 10.....	1305		61	10	19	.5												
July 12.....	1320		60	10	10	.3												
July 13.....	1110		60	10	11	.3												
July 16.....	1515		59	10	12	.3												
July 20.....	1400		60	10	12	.3												
July 23.....	1425		60	10	10	.3												
July 24.....	1205		60	10	7	.2												
July 25.....	1350		60	10	11	.3												
July 27.....	1340		56	10	13	.4												

Aug. 3, 1962.....	1400	60	10	8	.2	
Aug. 3.....	1645	58	10	36	1.0	
Aug. 6.....	1350	60	10	9	.2	
Aug. 13.....	1100	60	11	13	.4	
Aug. 16.....	1120	59	11	12	.4	
Aug. 20.....	1330	60	10	13	.4	
Aug. 24.....	1345	60	10	11	.3	
Aug. 31.....	1600	57	10	13	.4	
Sept. 4.....	1215	57	10	15	.4	
Sept. 5.....	1625	58	11	18	.5	
Sept. 7.....	1300	59	10	20	.5	
Sept. 10.....	1345	57	10	25	.7	
Sept. 14.....	1250	59	10	20	.5	
Sept. 18.....	1300	58	11	20	.6	

BLUEWATER CREEK AT SANFORD RANCH, NEAR BRIDGER, MONT.

Oct. 17, 1961.....	0920	52	25	197	13	
Oct. 20.....	1045	53	25	137	9.2	
Oct. 23.....	1445	50	25	97	6.5	
Oct. 27.....	1430	53	26	210	15	
Oct. 30.....	1545	48	27	237	17	
Oct. 31.....	1405	50	28	256	19	
Nov. 3.....	1155	45	29	273	21	
Nov. 6.....	1450	47	29	389	30	
Nov. 13.....	1430	46	30	164	13	
Nov. 17.....	1400	43	30	127	10	
Nov. 18.....	1215	46	30	136	11	
Nov. 20.....	1325	45	31	177	15	

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MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK AT SANFORD RANCH, NEAR BRIDGER, MONT.--Continued																		
Nov. 21, 1961	1210		44	31	137	11												
Nov. 24	1125		47	31	128	11												
Nov. 27	1545		47	31	177	15												
Nov. 28	1600		49	31	148	12												
Nov. 29	1340		46	31	117	9.8												
Nov. 30	1330		48	30	115	9.3												
Dec. 1	1330		48	31	134	11												
Dec. 4	1050		44	31	121	10												
Dec. 4	1350		48	30	145	12												
Dec. 7	0950		42	30	173	14												
Dec. 7	1400		44	30	166	13												
Dec. 11	1310		42	30	115	9.3												
Dec. 12	1410		38	30	69	5.6												
Dec. 13	1300		37	30	6	.												
Dec. 14	1230		44	30	92	7.5												
Dec. 15	1305		44	29	121	9.5												
Dec. 18	1415		42	30	149	12												
Dec. 19	1105		41	30	146	12												
Dec. 19	1330		44	29	118	9.2												
Dec. 20	1445		48	29	184	14												
Dec. 21	1350		43	29	199	16												
Dec. 22	1320		44	29	159	12												
Dec. 26	1130		45	29	167	13												
Dec. 27	1245		45	29	153	12												
Dec. 28	1415		43	29	147	12												
Dec. 29	1330		48	29	177	14												
Jan. 2, 1962	1135		41	29	209	16												
Jan. 2	1415		48	30	180	15												
Jan. 3	1300		48	29	181	14												
Jan. 4	1245		45	28	372	28												

Jan. 5, 1962.....	1255	44	28	311	24
Jan. 12.....	1520	36	28	172	13
Jan. 16.....	1100	35	28	257	19
Jan. 25.....	1420	43	28	486	37
Jan. 29.....	1430	50	29	320	25
Feb. 1.....	1330	49	31	396	33
Feb. 2.....	1000	49	30	431	35
Feb. 6.....	1520	46	30	380	31
Feb. 9.....	1500	50	28	433	33
Feb. 13.....	1440	51	28	647	49
Feb. 15.....	1400	44	28	344	26
Feb. 21.....	1445	44	28	205	15
Feb. 27.....	1445	42	28	184	14
Mar. 5.....	1350	47	28	161	12
Mar. 8.....	1030	48	28	283	21
Mar. 12.....	1445	49	27	112	8.2
Mar. 16.....	1430	54	28	167	13
Mar. 19.....	1545	55	29	182	14
Mar. 20.....	1030	50	29	287	22
Mar. 20.....	1330	53	28	159	12
Mar. 21.....	1145	49	28	134	10
Mar. 22.....	1110	48	28	143	11
Mar. 23.....	1410	52	28	113	8.5
Mar. 24.....	1345	52	28	147	11
Mar. 25.....	1240	51	28	120	9.1
Mar. 26.....	1625	54	28	139	10
Mar. 27.....	1035	54	28	118	8.9
Mar. 28.....	1100	48	30	135	11
Mar. 30.....	1430	53	28	95	7.2
Apr. 2.....	1300	56	29	133	10
Apr. 4.....	1610	59	28	80	6.0

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK AT SANFORD RANCH, NEAR BRIDGER, MONT.--Continued																		
Apr. 10, 1962.....	0915		50	27	104	7.6												
Apr. 10.....	1615		57	27	99	7.2												
Apr. 12.....	1650		59	26	88	6.2												
Apr. 13.....	0950		52	26	84	5.9												
Apr. 14.....	1805		62	26	92	6.5												
Apr. 15.....	1105		56	27	85	6.2												
Apr. 15.....	1530		60	26	85	6.0												
Apr. 16.....	0910		50	27	102	7.4												
Apr. 17.....	0955		52	28	88	6.7												
Apr. 19.....	1010		54	27	91	6.6												
Apr. 20.....	1530		61	28	86	6.5												
Apr. 21.....	1200		56	28	81	6.1												
Apr. 22.....	1215		58	28	103	7.8												
Apr. 23.....	1420		63	27	99	7.2												
Apr. 25.....	1245		59	27	119	8.7												
Apr. 26.....	1755		56	28	124	9.4												
Apr. 28.....	1045		54	28	197	15												
Apr. 28.....	1820		--	28	155	12												
Apr. 29.....	1920		55	27	146	11												
Apr. 30.....	0950		51	27	155	11												
Apr. 30.....	1740		60	25	181	12												
May 1.....	1325		57	26	193	14												
May 2.....	1520		62	26	178	12												
May 3.....	1035		58	25	178	12												
May 4.....	1430		63	25	218	15												
May 5.....	1500		62	17	284	13												
May 7.....	1100		59	13	94	3.3												
May 10.....	0830		54	13	95	3.3												
May 11.....	1720		66	14	132	5.0												
May 12.....	1620		60	14	116	4.4												

May 13, 1962.......	1030		53	16	1,350	58											
May 13.............	1850		57	14	335	13											
May 14.............	0950		55	14	207	7.8											
May 15.............	1005		55	16	954	41											
May 15.............	1740		61	15	316	13											
May 16.............	1705		64	14	156	5.9											
May 17.............	1120		60	14	217	8.2											
May 19.............	1100		61	14	184	7.0											
May 20.............	1020		56	14	199	7.5											
May 21.............	1030		57	14	193	7.3											
May 22.............	1000		51	19	2,700	139											
May 23.............	1500		68	13	223	7.8											
May 24.............	1330		58	13	210	7.4											
May 25.............	1550		56	13	224	7.9											
May 26.............	1245		52	35	10,800	1,020											
May 26.............	1625		55	21	2,790	158											
May 26.............	1825		55	19	1,580	81											
May 27.............	1120		54	17	300	14											
May 27.............	1800		57	17	305	14											
May 28.............	1040		56	16	227	9.8											
May 29.............	1150		61	16	234	10											
May 29.............	1730		65	16	195	8.4											
May 30.............	1400		57	16	181	7.8											
May 31.............	1345		65	14	182	6.9											
June 1.............	0940		59	18	334	16											
June 1.............	1255		64	16	202	8.7											
June 2.............	1155		63	16	217	9.4											
June 3.............	1030		60	16	184	7.9											
June 4.............	1345		49	93	19,700	4,950											
June 5.............	1710		59	31	1,520	127											

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK AT SANFORD RANCH, NEAR BRIDGER, MONT.--Continued																		
June 6, 1962	1045		57	29	343	27												
June 6	1645		59	29	322	25												
June 7	1025		57	28	312	24												
June 8	0945		57	28	271	20												
June 9	1700		68	26	257	18												
June 10	1630		66	28	251	19												
June 11	1350		64	26	313	22												
June 11	1650		63	26	290	20												
June 12	0940		58	26	257	18												
June 12	1700		68	25	234	16												
June 13	1130		63	26	214	15												
June 13	1830		58	26	223	16												
June 14	1635		60	25	187	13												
June 16	1550		65	29	654	51												
June 17	1525		67	27	341	25												
June 18	0950		60	27	332	24												
June 19	1235		66	28	270	20												
June 19	1640		66	27	296	22												
June 20	1640		66	27	234	17												
June 21	1310		65	27	227	17												
June 22	1450		68	27	217	16												
June 25	1840		69	20	204	11												
June 27	1300		65	20	151	8.2												
June 27	1400		68	20	141	7.6												
June 27	1500		70	21	161	9.1												
June 27	1600		70	21	120	6.8												
June 27	1700		70	21	128	7.3												
June 27	1800		69	21	151	8.6												
June 27	1900		69	21	113	6.4												
June 27	2000		66	21	113	6.4												

June 27, 1962	2100	64	21	142	8.1
June 27	2200	63	21	179	10
June 27	2300	61	21	435	25
June 27	2400	60	21	134	7.6
June 28	0100	60	21	156	8.8
June 28	0200	58	21	136	7.7
June 28	0300	57	21	124	7.0
June 28	0400	57	21	141	8.0
June 28	0500	56	21	149	8.4
June 28	0600	56	21	136	7.7
June 28	0700	55	21	116	6.6
June 28	0800	56	21	150	8.5
June 28	0900	57	21	126	7.1
June 28	1000	59	21	116	6.6
June 28	1100	60	21	107	6.1
June 28	1200	64	21	103	5.8
June 29	1135	64	19	119	6.1
July 3	1430	69	16	29	1.3
July 9	1420	71	16	23	1.0
July 10	1325	69	12	21	.7
July 12	1350	66	11	22	.7
July 13	1125	64	12	168	5.4
July 16	1715	69	9.6	38	1.0
July 20	1415	71	9.9	32	.9
July 23	1440	72	9.6	40	1.0
July 24	1115	64	10	40	1.1
July 25	1410	68	10	35	.9
July 27	1400	58	11	70	2.1
Aug. 3	1415	76	14	347	13
Aug. 3	1710	--	15	183	7.4

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK AT SANFORD RANCH, NEAR BRIDGER, MONT.--Continued																		
Aug. 6, 1962	1455		68	14	94	3.6												
Aug. 13	1015		60	20	231	12												
Aug. 16	1440		66	20	167	9.0												
Aug. 20	1345		66	19	131	6.7												
Aug. 24	1400		64	23	210	13												
Aug. 27	1500		59	19	110	5.6												
Aug. 31	1415		61	19	135	6.9												
Sept. 4	1400		60	14	92	3.5												
Sept. 5	1655		63	16	86	3.7												
Sept. 7	1330		63	15	25	1.0												
Sept. 10	1420		57	22	173	10												
Sept. 14	1305		60	19	68	3.5												
Sept. 18	1410		61	22	125	7.4												
Sept. 24	1445		61	23	31	1.9												
BLUEWATER CREEK NEAR FROMBERG, MONT.																		
Oct. 2, 1961	1220		54	28	307	23												
Oct. 6	1430		52	25	250	17												
Oct. 9	1100		47	27	230	17												
Oct. 13	1400		55	27	251	18												
Oct. 17	0935		51	27	325	24												
Oct. 20	1030		51	27	235	17												
Oct. 23	1430		48	27	227	17												
Oct. 27	1415		52	27	322	23												
Oct. 30	1530		45	28	296	22												
Oct. 31	1350		46	29	396	31												
Nov. 3	1140		41	28	429	32												
Nov. 6	1435		45	29	381	30												

Nov. 13, 1961......	1415		43	28	302	23											
Nov. 17............	1315		40	29	267	21											
Nov. 18............	1250		42	29	481	38											
Nov. 20............	1345		43	29	295	23											
Nov. 21............	1150		41	30	286	23											
Nov. 24............	1100		44	29	272	21											
Nov. 27............	1530		43	28	362	27											
Nov. 28............	1530		44	28	352	27											
Nov. 29............	1350		42	28	249	19											
Nov. 30............	1315		45	28	256	19											
Dec. 1.............	1315		45	30	247	20											
Dec. 4.............	1105		41	30	219	18											
Dec. 4.............	1335		44	30	884	72											
Dec. 7.............	1000		39	29	253	20											
Dec. 7.............	1345		40	29	263	20											
Dec. 11............	1250		32	e 29	55	4.4											
Dec. 12............	1400		36	32	182	16											
Dec. 13............	1245		35	32	214	18											
Dec. 14............	1215		40	31	207	17											
Dec. 15............	1250		41	32	225	19											
Dec. 18............	1400		38	32	237	20											
Dec. 19............	1015		36	30	219	18											
Dec. 19............	1315		38	32	237	20											
Dec. 20............	1420		46	31	362	30											
Dec. 21............	1335		41	32	429	37											
Dec. 22............	1305		40	33	295	26											
Dec. 26............	1115		41	32	288	25											
Dec. 27............	1230		42	31	266	22											
Dec. 28............	1430		40	30	278	23											
Dec. 29............	1315		45	31	297	25											

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK NEAR FROMBERG, MONT.--Continued																		
Jan. 2, 1962	1145		42	30	288	23												
Jan. 2	1530		45	31	338	28												
Jan. 3	1245		45	31	310	26												
Jan. 4	1230		43	31	274	23												
Jan. 5	1240		42	30	294	24												
Jan. 12	1500		34	31	474	40												
Jan. 16	1045		33	32	255	22												
Jan. 19	1320		33	e 30	221	18												
Jan. 25	1630		41	28	467	35												
Jan. 29	1500		45	29	506	40												
Feb. 1	1110		46	29	393	31												
Feb. 2	1100		45	30	642	52												
Feb. 6	1500		41	29	446	35												
Feb. 9	1445		48	29	531	42												
Feb. 13	1420		49	32	708	61												
Feb. 15	1415		44	30	474	38												
Feb. 21	1430		42	29	329	26												
Feb. 27	1425		34	29	1,070	84												
Mar. 5	1405		41	28	311	24												
Mar. 8	1015		46	28	510	39												
Mar. 12	1430		44	31	506	42												
Mar. 16	1415		51	30	478	39												
Mar. 19	1600		50	28	306	23												
Mar. 20	1045		48	29	304	24												
Mar. 20	1300		51	30	358	29												
Mar. 21	1115		47	29	268	21												
Mar. 22	1055		46	29	267	21												
Mar. 23	1430		49	30	571	46												
Mar. 24	1330		48	29	228	18												
Mar. 25	1225		48	29	216	17												

e Estimated.

Mar. 26, 1962.....	1650	52	28	258	20
Mar. 27.....	1015	52	29	181	14
Mar. 28.....	1025	45	29	191	15
Mar. 30.....	1450	48	30	207	17
Apr. 2.....	1330	54	30	165	13
Apr. 4.....	1540	59	30	135	11
Apr. 6.....	2050	48	30	269	22
Apr. 10.....	0855	49	30	131	11
Apr. 10.....	1555	55	30	127	10
Apr. 12.....	1555	55	30	138	11
Apr. 13.....	1010	50	31	118	9.9
Apr. 14.....	1750	60	31	108	9.0
Apr. 15.....	1120	55	32	151	13
Apr. 15.....	1545	59	31	113	9.5
Apr. 16.....	0925	50	31	83	6.9
Apr. 17.....	1045	52	33	124	11
Apr. 19.....	1030	55	32	122	11
Apr. 20.....	1545	59	33	109	9.7
Apr. 21.....	1020	52	33	114	10
Apr. 22.....	1100	52	33	115	10
Apr. 23.....	1220	58	34	147	13
Apr. 25.....	1145	56	33	138	12
Apr. 26.....	1805	54	32	148	13
Apr. 28.....	1105	52	33	138	12
Apr. 28.....	1840	52	32	149	13
Apr. 29.....	1715	56	33	139	12
Apr. 30.....	1015	50	32	163	14
Apr. 30.....	1720	58	27	110	8.0
May 1.....	1330	56	28	113	8.5
May 2.....	1150	56	27	93	6.8

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK NEAR FROMBERG, MONT.--Continued																		
May 3, 1962	1125		59	26	93	6.5												
May 4	1600		65	26	99	6.9												
May 5	1200		56	26	99	6.9												
May 7	0935		56	17	17	.8												
May 8	1645		62	15	28	1.1												
May 9	1020		58	14	41	1.5												
May 10	0900		55	14	27	1.0												
May 11	1225		64	14	38	1.4												
May 12	1630		61	12	16	.5												
May 13	1050		53	16	79	3.4												
May 13	1915		55	14	1,550	59												
May 14	1010		55	14	338	13												
May 15	1025		55	14	114	4.3												
May 15	1730		62	13	118	4.1												
May 16	1725		68	13	171	6.0												
May 17	1050		66	13	159	5.6												
May 19	1130		64	13	107	3.8												
May 21	1045		58	14	92	3.5												
May 22	1015		50	15	101	4.1												
May 23	1550		70	13	163	5.7												
May 24	1615		59	15	240	9.7												
May 25	1610		55	17	112	5.1												
May 26	1300		51	56	15,300	2,310												
May 26	1620		52	33	10,600	944												
May 26	1810		53	26	8,870	623												
May 27	1135		52	19	427	22												
May 27	1815		55	19	427	22												
May 28	1115		55	18	317	15												
May 29	1210		61	17	386	18												
May 29	1715		64	18	346	17												

May 30, 1962.....	1525	67	17	262	12
May 30.....	1650	68	17	327	15
May 31.....	1500	69	17	319	15
June 1.....	0955	59	18	331	16
June 1.....	1135	62	17	362	17
June 2.....	1525	69	17	345	16
June 3.....	1050	61	18	270	13
June 4.....	1400	53	33	4,340	387
June 4.....	1620	51	79	21,700	4,630
June 5.....	1725	59	25	785	53
June 6.....	1105	57	25	783	53
June 6.....	1600	57	24	512	33
June 7.....	1525	66	24	410	27
June 8.....	1005	57	24	468	30
June 9.....	1530	70	23	373	23
June 10.....	1635	68	24	421	27
June 11.....	1510	65	24	581	38
June 11.....	1630	64	23	528	33
June 12.....	1045	60	25	455	31
June 12.....	1710	59	24	394	26
June 13.....	1245	66	23	331	21
June 13.....	1840	69	23	355	22
June 14.....	1520	62	23	306	19
June 16.....	1610	65	25	1,630	110
June 17.....	1720	67	26	605	42
June 18.....	1055	62	26	600	42
June 19.....	1540	67	25	466	31
June 19.....	1550	67	27	458	33
June 20.....	1325	63	26	395	28
June 21.....	1520	66	25	441	30

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
YELLOWSTONE RIVER BASIN--Continued																		
BLUEWATER CREEK NEAR FROMBERG, MONT.--Continued																		
June 22, 1962.....	1630		71	25	425	29												
June 26.....	1300		72	15	190	7.7												
June 26.....	1400		74	15	173	7.0												
June 26.....	1500		76	14	182	6.9												
June 26.....	1600		76	15	185	7.5												
June 26.....	1700		76	15	149	6.0												
June 26.....	1800		75	15	154	6.2												
June 26.....	1900		73	14	139	5.3												
June 26.....	2000		72	13	138	4.8												
June 26.....	2100		70	13	174	6.1												
June 26.....	2200		69	13	198	6.9												
June 26.....	2300		67	13	388	14												
June 26.....	2400		66	13	236	8.3												
June 27.....	0100		64	13	158	5.5												
June 27.....	0200		64	13	141	4.9												
June 27.....	0300		63	13	126	4.4												
June 27.....	0400		62	13	112	3.9												
June 27.....	0500		61	13	123	4.3												
June 27.....	0600		60	13	132	4.6												
June 27.....	0700		60	13	134	4.7												
June 27.....	0800		60	13	122	4.3												
June 27.....	0900		60	13	127	4.5												
June 27.....	1000		63	13	138	4.8												
June 27.....	1100		65	13	108	3.8												
June 27.....	1200		67	13	121	4.2												
June 29.....	1200		69	13	96	3.4												
July 3.....	1450		70	8.0	41	.9												
July 9.....	1430		78	7.2	9	.2												
July 10.....	1340		74	8.5	11	.3												
July 12.....	1405		78	7.5	49	1.0												

July 13, 1962.....	1140		70	4.4	14	.2													
July 16.....	1730		74	3.7	19	.2													
July 20.....	1430		77	3.3	10	.1													
July 23.....	1500		76	3.5	14	.1													
July 24.....	1055		67	3.3	14	.1													
July 25.....	1425		73	3.3	21	.2													
July 27.....	1410		70	3.3	36	.3													
Aug. 3.....	1725		--	3.5	528	5.0													
Aug. 10.....	1440		60	11	577	17													
Aug. 13.....	1000		62	12	389	13													
Aug. 16.....	1500		68	13	305	11													
Aug. 20.....	1400		68	11	171	5.1													
Aug. 24.....	1415		64	14	217	8.2													
Aug. 27.....	1445		59	14	81	3.1													
Aug. 31.....	1630		62	11	52	1.5													
Sept. 4.....	1420		59	9.4	22	.6													
Sept. 5.....	1715		63	9.1	21	.5													
Sept. 7.....	1345		64	9.4	12	.3													
Sept. 9.....	1950		44	19	679	35													
Sept. 10.....	1440		56	19	287	15													
Sept. 14.....	1320		60	19	135	6.9													
Sept. 18.....	1450		60	19	159	8.2													
Sept. 24.....	1420		60	23	117	7.3													

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																	
6-2280. WIND RIVER AT RIVERTON, WYO.																	
Oct. 2, 1961	1635		51	700	1,020	1,930		--		--		--	--	--	--		
Oct. 27	1550		46	478	75	97		--		--		--	--	--	--		
Dec. 4	1600		32	d 230	127	79		--		--		--	--	--	--		
Jan. 3, 1962	1600		32	d 340	272	250		--		--		--	--	--	--		
Feb. 3	1210		32	d 380	19	19		--		--		--	--	--	--		
Mar. 1	1400		32	d 300	58	47		--		--		--	--	--	--		
Mar. 22	1520		32	d 300	328	266		--		--		--	--	--	--		
Apr. 10	1510		49	268	217	157		--		--		--	--	--	--		
Apr. 20	1045		58	1,070	1,180	3,410		--		--		--	--	--	--		
Apr. 20	2120		52	1,830	3,650	18,000		--		--		--	--	--	--		
Apr. 23	0915		50	600	1,210	1,960		--		--		--	--	--	--		
Apr. 24	2145		54	1,360	1,400	5,140		--		--		--	--	--	--		
Apr. 27	0920		48	1,400	863	3,260		--		--		--	--	--	--		
May 4	1605		65	350	137	129		--		--		--	--	--	--		
May 7	0930		54	1,060	685	1,960		--		--		--	--	--	--		
May 7	2130		55	1,500	1,490	6,030		--		--		--	--	--	--		
May 9	0935		53	1,400	1,440	5,440		--		--		--	--	--	--		
May 9	1800		64	1,690	1,140	5,200		--		--		--	--	--	--		
May 11	0925		51	1,450	796	3,120		--		--		--	--	--	--		
May 15	0950		49	573	290	449		--		--		--	--	--	--		
May 18	1345		63	100	38	10		--		--		--	--	--	--		
May 25	1645		56	1,070	3,720	10,700		--		--		--	--	--	--		
May 29	1130		55	1,280	957	3,310		--		--		--	--	--	--		
June 2	1130		53	1,750	1,180	5,580		--		--		--	--	--	--		
June 2	2045		58	2,420	2,570	16,800		--		--		--	--	--	--		
June 3	2045		60	3,410	2,940	27,100		--		--		--	--	--	--		
June 4	1006		56	2,550	1,620	11,200		--		--		--	--	--	--		
June 4	1985		54	3,080	2,900	24,100		--		--		--	--	--	--		
June 5	0915		55	2,720	930	6,830		--		--		--	--	--	--		
June 5	1985		56	2,390	904	5,830		--		--		--	--	--	--		

June 6, 1962.....	0850		55	1,830	853	4,210		--		--		--	--	--	--			
June 13.....	0935		56	2,840	1,260	9,660		--		--		--	--	--	--			
June 13.....	2040		61	3,930	2,400	25,500		--		--		--	--	--	--			
June 14.....	0835		56	3,080	1,260	10,500		--		--		--	--	--	--			
June 14.....	2020		60	5,440	4,860	71,400		--		--		--	--	--	--			
June 15.....	0850		55	3,920	1,610	17,000		--		--		--	--	--	--			
June 15.....	2025		56	5,280	1,450	20,700		--		--		--	--	--	--			
June 19.....	0945		60	2,790	717	5,400	8	11		18		38	51	87	100			VBWC
June 19.....	2040		62	4,660	2,470	31,100		--		--		--	--	--	--			
June 20.....	0915		58	3,580	1,320	12,800		--		--		--	--	--	--			
June 20.....	2140		60	4,880	2,150	28,300		--		--		--	--	--	--			
June 21.....	0920		60	3,950	1,280	13,700		--		--		--	--	--	--			
June 22.....	0915		57	5,850	1,570	24,800		--		--		--	--	--	--			
June 22.....	2110		63	6,640	1,520	27,200		--		--		--	--	--	--			
June 25.....	1645		66	5,680	1,200	18,400		12		24		52	70	90	99	99	100	VPWC
June 27.....	1045		63	4,900	1,360	18,000		--		--		--	--	--	--			
June 27.....	2040		64	6,260	1,740	29,400		--		--		--	--	--	--			
June 28.....	0915		61	5,110	1,420	19,600		--		--		--	--	--	--			
June 28.....	1915		65	6,230	1,360	22,900		--		--		--	--	--	--			
June 29.....	0845		60	4,550	1,300	16,000		--		--		--	--	--	--			
June 29.....	1910		62	4,860	1,260	16,500		--		--		--	--	--	--			
July 2.....	0900		59	3,020	844	6,880		--		--		--	--	--	--			
July 3.....	1055		62	2,660	684	4,910		--		--		--	--	--	--			
July 5.....	1055		63	2,230	323	1,940		--		--		--	--	--	--			
July 6.....	0945		64	1,830	591	2,920		--		--		--	--	--	--			
July 10.....	1700		70	1,930	399	2,080		--		--		--	--	--	--			
July 17.....	1615		72	860	135	313		--		--		--	--	--	--			
Aug. 3.....	1135		68	890	110	264		--		--		--	--	--	--			
Sept. 6.....	1600		70	158	11	4.7		--		--		--	--	--	--			

d Daily mean discharge.

744-550 O - 64 - 26

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
YELLOWSTONE RIVER BASIN--Continued																		
6-2355. LITTLE WIND RIVER NEAR RIVERTON, WYO.																		
Oct. 13, 1961	1150		49	458	148	183	--	--		--		--	--	--	--			
Oct. 27	1520		45	287	9	7.0	--	--		--		--	--	--	--			
Nov. 30	1615		32	d 160	14	6.0	--	--		--		--	--	--	--			
Jan. 2, 1962	1510		32	d 150	13	5.3	--	--		--		--	--	--	--			
Feb. 3	1145		32	d 220	11	6.5	--	--		--		--	--	--	--			
Feb. 12	0810		35	8,000	1,930	41,700	--	60		84		94	95	97	100			VPWC
Feb. 16	1030		33	568	246	377	--	--		--		--	--	--	--			
Mar. 1	1430		32	d 200	20	11	--	--		--		--	--	--	--			
Mar. 22	1500		39	226	249	152	--	--		--		--	--	--	--			
Apr. 10	1415		50	247	299	199	--	--		--		--	--	--	--			
Apr. 20	1015		58	540	1,430	2,080	--	--		--		--	--	--	--			
Apr. 23	0855		54	896	1,770	4,280	--	--		--		--	--	--	--			
Apr. 27	0845		49	1,100	887	2,630	--	--		--		--	--	--	--			
May 4	1550		64	750	207	419	--	--		--		--	--	--	--			
May 7	0905		53	1,450	1,190	4,660	--	--		--		--	--	--	--			
May 9	1745		65	1,770	750	3,580	--	--		--		--	--	--	--			
May 11	0855		53	d 1,600	578	2,500	--	--		--		--	--	--	--			
May 15	0915		51	d 1,000	208	562	--	--		--		--	--	--	--			
May 18	1315		60	690	125	233	--	--		--		--	--	--	--			
May 25	1620		56	1,150	432	1,340	--	--		--		--	--	--	--			
May 29	1100		55	1,760	984	4,680	--	--		--		--	--	--	--			
June 2	1100		55	1,720	402	1,870	--	--		--		--	--	--	--			
June 4	0905		54	2,420	648	4,230	--	--		--		--	--	--	--			
June 5	0830		55	2,650	585	4,190	--	--		--		--	--	--	--			
June 6	0825		54	2,060	339	1,890	--	--		--		--	--	--	--			
June 13	0915		55	2,680	546	3,950	--	--		--		--	--	--	--			
June 13	2010		58	3,140	778	6,600	--	--		--		--	--	--	--			
June 14	1945		57	3,400	770	7,070	--	--		--		--	--	--	--			
June 15	0835		56	3,200	547	4,730	--	--		--		--	--	--	--			
June 16	2010		52	3,110	1,680	14,100	--	--		--		--	--	--	--			

June 19, 1962.....	0910		61	2,210	253	1,510	16	20		32		60	74	95	100			VBWC
June 19.....	2010		61	2,730	561	4,140	--	--		--		--	--	--	--			
June 20.....	2015		60	3,270	453	4,000	--	--		--		--	--	--	--			
June 22.....	0840		55	3,580	945	9,130	--	--		--		--	--	--	--			
June 25.....	1610		62	3,390	323	2,960	6	12		20		46	59	77	97	100		VBWC
June 27.....	1015		61	3,270	260	2,300	--	--		--		--	--	--	--			
July 2.....	0825		65	2,210	256	1,530	--	--		--		--	--	--	--			
July 5.....	1040		63	1,580	110	469	--	--		--		--	--	--	--			
July 6.....	0930		65	1,350	112	408	--	--		--		--	--	--	--			
July 10.....	1620		70	1,140	96	295	--	--		--		--	--	--	--			
July 17.....	1600		71	872	70	165	--	--		--		--	--	--	--			
Aug. 3.....	1050		70	607	275	451	--	--		--		--	--	--	--			
Sept. 6.....	1540		70	200	31	17	--	--		--		--	--	--	--			

6-2803. SOUTH FORK SHOSHONE RIVER NEAR VALLEY, WYO.

Oct. 16, 1961.....	1115		45	258	12	8.4		--		--		--	--	--	--	--		
Oct. 31.....	0945		35	142	9	3.4		--		--		--	--	--	--	--		
Dec. 7.....	1015		32	102	7	1.9		--		--		--	--	--	--	--		
Jan. 5, 1962.....	1330		38	120	28	9.1		--		--		--	--	--	--	--		
Jan. 25.....	1120		35	84	11	2.5		--		--		--	--	--	--	--		
Mar. 7.....	1610		34	84	13	2.9		--		--		--	--	--	--	--		
Apr. 7.....	1115		41	97	8	2.1		--		--		--	--	--	--	--		
Apr. 16.....	0940		40	424	168	192		--		--		--	--	--	--	--		
May 4.....	0840		44	432	41	48		--		--		--	--	--	--	--		
May 16.....	1240		54	480	16	21		--		--		--	--	--	--	--		
June 8.....	1005		47	632	32	55		--		--		--	--	--	--	--		
June 21.....	1600		48	2,270	768	4,710		12		26		55	70	87	97	100		VPWC
July 3.....	1115		51	1,730	358	1,670		9		21		43	58	78	95	100		VPWC
July 17.....	1545		65	861	33	77		--		--		--	--	--	--	--		
Aug. 3.....	0955		52	585	8	13		--		--		--	--	--	--	--		
Sept. 7.....	1135		54	184	2	1.0		--		--		--	--	--	--	--		

d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
JAMES RIVER BASIN																		
6-4735. WEST BRANCH SNAKE CREEK NEAR ATHOL, S. DAK.																		
Apr. 3, 1962.....	1545		--	177	156	75												
Apr. 14.....	0840		40	19	6	.3												
Apr. 24.....	1545		61	5	15	.2												
May 2.....	1430		--	2.5	18	.1												
May 16.....	1645		--	4.0	19	.2												
June 19.....	1640		--	45	19	2.3												
July 10.....	1605		--	5	11	.1												
BIG SIOUX RIVER BASIN																		
6-4855. BIG SIOUX RIVER AT AKRON, IOWA																		
Mar. 29, 1962.....	0930		35	13,200	709	25,300												
Apr. 3.....	1500		38	27,800	318	23,900												
PLATTE RIVER BASIN																		
6-7075. SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.																		
July 12, 1961.....	1800		64	765	40	83						--	--	--	--			
Oct. 17.....	1320		--	400	37	40						--	--	--	--			
Jan. 16, 1962.....	0945		32	d 135	4	1						--	--	--	--			
May 7.....	1520		51	d 858	76	176	22	27		34		60	76	87	100			VPWC
May 23.....	1025		--	480	24	31						--	--	--	--			
May 28.....	1035		52	508	22	30						43	53	64	80	94		V
May 30.....	1040		--	516	17	24						--	--	--	--			
June 13.....	1255		59	730	20	39						65	72	85	100			V
June 27.....	0900		--	782	13	27						--	--	--	--			
June 27.....	1650		--	740	12	24						--	--	--	--			
Aug. 3.....	1000		--	675	27	49						--	--	--	--			
Sept. 12.....	1320		--	260	8	6						--	--	--	--			

6-7520. CACHE LA POUDRE RIVER AT MOUTH OF CANYON, NEAR FORT COLLINS, COLO.

Sept. 14, 1962.....	0930			34	3	t												
Sept. 29.....	1000			d 48	4	1												

6-7540. SOUTH PLATTE RIVER NEAR KERSEY, COLO.

July 13, 1961.....	1045		68	508	312	428	41	53		72		87	94	100	--	--		VPWC
Aug. 29.....	1610		76	241	75	49	--	--		--		89	97	100	--	--		V
Oct. 18.....	0800		53	2,080	282	1,580	--	--		--		--	71	89	100	--		V
Jan. 16, 1962.....	1540		33	1,060	148	424	--	--		--		73	85	94	100	--		V
May 8.....	1300		71	206	51	28	--	--		--		83	98	99	100	--		V
May 21.....	1315		63	769	238	494	34	--	43	53		67	88	97	99	100		VPWC
May 25.....	1250		65	529	269	384	36	40		51		77	93	99	100	--		VPWC
May 31.....	0920		64	848	262	600	34	36		47		66	78	94	99	100		VPWC
June 12.....	1430		69	1,500	356	1,440	26	27		36		57	76	91	100	--		VPWC
June 15.....	0930		--	d 1,620	673	2,940												
June 28.....	0910		67	330	126	112	--	--		--		86	90	97	100	--		V
June 28.....	1645		77	258	88	61	--	--		--		95	98	100	--	--		V
Aug. 3.....	1530		--	1,520	558	2,290												
Sept. 13.....	1630		--	426	136	156												
Sept. 29.....	1400		--	d 372	62	62												

6-7915. CEDAR RIVER NEAR SPALDING, NEBR.

Oct. 20, 1961.....	0935		50	182	250	120	--	--		--		32	4	3	100			V
Nov. 20.....	1605		40	68	100	18	--	--		--		--	--	--	--			
Jan. 16, 1962.....	1625		32	117	33	10	--	--		--		--	--	--	--			
Mar. 20.....	1005		32	396	290	310	--	--		--		53	89	97	100			V
Mar. 28.....	0950		45	427	1,080	1,250	5	6		7		27	60	95	100			VPWC
Apr. 3.....	0925		45	230	570	350	--	--		--		25	46	90	100			V

t Less than 0.05 ton.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
PLATTE RIVER BASIN--Continued																	
6-7915. CEDAR RIVER NEAR SPALDING, NEBR.--Continued																	
Apr. 23, 1962	1715		68	74	110	22	--	--		--		--	--	--	--			
May 24	0920		62	384	670	690	7	8		10		37	65	96	100			VPWC
June 28	1605		82	233	290	180	--	--		--		57	76	98	100			V
Aug. 7	1105		77	240	390	250	--	--		--		61	78	98	100			V
Sept. 11	0930		60	194	300	160	--	--		--		38	54	98	100			V
6-7918. CEDAR RIVER AT BELGRADE, NEBR.																	
Oct. 20, 1961	1410		55	204	570	310	--	--	--	--	--	58	73	98	100			V
Nov. 20	1300		37	208	700	390	--	--	--	--	--	45	61	96	100			V
Jan. 17, 1962	1125		32	e 210	300	170	--	--	--	--	--	--	--	--	--			
Mar. 19	1350		33	e 390	920	970	--	--	--	--	--	41	61	87	100			V
Mar. 27	1315		49	e 600	3,490	5,650	15	15	16	24	41	84	92	97	100			VPWC
Apr. 2	1150		45	404	1,490	1,630	10	10	12	14	22	48	77	99	100			VPWC
Apr. 23	1430		69	201	440	240	--	--	--	--	--	62	82	97	100			V
May 23	1015		65	349	1,500	1,410	29	30	32	36	47	69	83	98	100			VPWC
June 28	1120		80	340	760	700	11	12	--	17	--	51	68	94	100			VPWC
Aug. 7	1335		85	255	580	400	--	--	--	--	--	72	84	99	100			V
Sept. 10	1250		68	209	460	260	12	13	--	19	--	54	69	99	100			VPWC
6-7983. CLEARWATER CREEK NEAR CLEARWATER, NEBR.																	
Oct. 18, 1961	1600		54	25	56	3.8						--	--	--	--			
Nov. 21	1050		39	29	74	5.8						--	--	--	--			
Dec. 20	1530		32	26	21	1.5						--	--	--	--			
Jan. 15, 1962	1650		32	27	42	3.1						65	85	100	--			V
Mar. 29	0925		42	313	1,300	1,520	11		12	14	18	37	60	95	100			VPWC
Apr. 24	1240		68	33	59	5.2						--	--	--	--			
May 25	1025		63	41	170	19						44	62	100	--			V
June 29	1150		80	31	120	10						59	73	98	100			V
Aug. 6	1455		87	35	220	21						--	--	--	--			
Sept. 12	0955		65	23	51	3.2						--	--	--	--			

LITTLE NEMAHA RIVER BASIN

6-8105. LITTLE NEMAHA RIVER NEAR SYRACUSE, NEBR.

Sept. 13, 1961.....	1120			938	6,540	16,600												
May 28, 1962.....	1610			1,890	39,800	211,000												

KANSAS RIVER BASIN

6-8325. FRENCHMAN CREEK NEAR ENDERS, NEBR.

July 24, 1962.....	1545		76	338	21	19												
July 25.....	1120		75	334	30	27												
July 26.....	0925		70	341	20	18												
Aug. 8.....	2250		73	213	23	13												
Sept. 5.....	0805		66	486	42	55												
Sept. 6.....	0720		66	485	40	52												
Sept. 17.....	1235		67	118	31	10												
Sept. 18.....	0740		65	118	24	7.6												

6-8327. FRENCHMAN CREEK, 2.6 MILES EAST OF ENDERS DAM, NEAR WAUNETA, NEBR.

July 24, 1962.....	1625		77	e 350	777	734						43	83	93	100			V
July 25.....	1150		77	e 330	550	490						46	86	99	100			V
July 26.....	1005		73	e 330	511	455						46	86	98	100			V
Sept. 5.....	0850		66	e 500	264	356						54	58	80	99	100		V
Sept. 6.....	0755		65	e 490	242	320						45	76	93	100			V
Sept. 17.....	1310		71	e 120	110	36						72	83	96	100			V
Sept. 18.....	0830		65	e 120	115	37						57	68	86	100			V

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
KANSAS RIVER BASIN--Continued																	
6-8329. FRENCHMAN CREEK, 5.6 MILES EAST OF ENDERS DAM, NEAR WAUNETA, NEBR.																	
July 17, 1962.....	0725		68	156	626	264	--	--		--	--	64	90	98	100	--		V
July 19.....	1135		75	167	600	271	--	--		--	--	68	92	99	100	--		V
July 24.....	1705		77	372	1,380	1,390	--	--		--	--	63	87	93	98	100		V
July 25.....	1415		77	312	990	834	--	--		--	--	57	94	98	100	--		V
July 26.....	1045		72	335	1,050	950	9	10		15	28	55	92	99	100	--		V
Aug. 8.....	2030		79	208	551	309	--	--		--	--	66	95	99	100	--		V
Sept. 5.....	1015		66	e 549	707	1,050	10	11		14	21	51	80	90	99	100		VPWC
Sept. 6.....	0915		65	e 501	734	993	9	10		14	19	55	84	92	99	100		VPWC
Sept. 17.....	1410		70	128	210	73	--	--		--	--	52	79	89	99	100		V
Sept. 18.....	0920		64	142	204	78	--	--		--	--	48	74	88	99	100		V
6-8331. FRENCHMAN CREEK AT WAUNETA, NEBR.																	
July 24, 1962.....	1805		78	e 360	2,350	2,280	--	--		--	--	62	93	97	100	--		V
July 25.....	1455		77	e 310	2,040	1,710	--	--		--	--	62	91	96	100	--		V
July 26.....	1140		73	e 310	1,900	1,590	7	8		14	21	62	88	95	99	100		VPWC
Sept. 5.....	1115		67	e 520	1,600	2,250	7	9		12	19	59	85	95	100	--		VPWC
Sept. 6.....	1045		64	e 500	1,330	1,800	7	8		12	20	58	85	94	100	--		VPWC
Sept. 17.....	1515		72	e 130	278	98	--	--		--	--	45	63	82	99	100		V
Sept. 18.....	1035		64	e 140	256	97	--	--		--	--	50	74	95	100	--		V
6-8333. FRENCHMAN CREEK ABOVE SAND CANYON, NEAR HAMLET, NEBR.																	
July 24, 1962.....	1945		76	e 340	2,880	2,640	--	--		--	--	77	95	99	100			V
July 25.....	1545		75	e 310	2,470	2,040	--	--		--	--	77	95	98	100			V
July 26.....	1320		75	e 310	2,440	2,040	8	10	12	15	25	71	96	99	100			VPWC
Aug. 8.....	1850		77	e 210	944	535	16	18		26	42	82	98	100	--			VPWC
Sept. 5.....	1420		--	e 500	1,820	2,460	7	9		13	22	70	93	98	100			VPWC
Sept. 6.....	1315		65	e 500	1,680	2,270	8	10		14	23	69	92	97	99	100		VPWC
Sept. 17.....	1545		72	e 140	656	248	--	--		--	--	83	95	99	100			V
Sept. 18.....	1115		67	e 140	434	164	--	--		--	--	66	93	99	100			V

6-8335. FRENCHMAN CREEK NEAR HAMLET, NEBR.

July 24, 1962.....	2030		74	e	310	3,670	3,070	--	--	--	--	--	82	96	99	100			V
July 25.....	1605		76	e	310	3,600	3,010	--	--	--	--	--	77	91	95	100			V
July 26.....	1355		75	e	320	3,280	2,830	8	10	12	16	26	81	96	99	100			VPWC
Sept. 5.....	1455		66	e	500	1,930	2,610	9	11	--	16	27	77	96	99	100			VPWC
Sept. 6.....	1340		65	e	490	1,800	2,380	9	12	14	17	29	75	96	99	100			VPWC
Sept. 17.....	1605		72	e	140	592	224	--	--	--	--	--	71	90	97	100			V
Sept. 18.....	1145		68	e	150	594	241	--	--	--	--	--	--	--	--	--			

6-8340. FRENCHMAN CREEK AT PALISADE, NEBR.

May 13, 1962.....	1010		68		104	712	200	18	25	--	42	67	89	99	100	--			VPWC
June 11.....	1825		77		167	2,270	1,020	13	15	18	23	37	85	98	100	--			VPWC
July 16.....	1420		77		161	2,060	895	12	18	--	27	42	85	98	100	--			VPWC
July 19.....	1345		81		177	2,720	1,300	14	16	20	26	42	88	97	100	--			VPWC
July 24.....	1330		76		287	3,060	2,370	9	11	13	16	22	71	98	100	--			VPWC
July 24.....	2110		74	e	290	3,600	2,820	--	--	--	--	--	81	98	100	--			V
July 25.....	0900		73		316	3,680	3,140	9	13	15	20	32	82	98	100	--			VPWC
July 25.....	1710		78		316	3,700	3,160	10	12	15	19	32	81	97	99	100			VPWC
July 26.....	1510		76		319	3,300	2,840	12	13	16	19	33	85	98	100	--			VPWC
Aug. 1.....	1620		76		988	2,800	7,470	65	74	79	81	84	94	99	100	--			VPWC
Aug. 1.....	1835		69		1,050	2,390	6,780	70	78	84	85	90	94	97	99	100			VPWC
Aug. 2.....	0925		69	e	1,000	3,580	9,670	--	--	--	--	--	--	--	--	--			
Aug. 8.....	1650		79		311	1,190	999	21	25	--	38	55	83	94	97	100			VPWC
Aug. 9.....	0900		75		256	901	623	19	23	--	36	52	82	94	97	99	100		VPWC
Sept. 5.....	1710		66		480	2,240	2,900	7	9	--	16	27	79	96	99	100			VPWC
Sept. 6.....	1450		66		491	2,180	2,890	37	44	50	55	59	76	95	98	100			VPWC
Sept. 17.....	1705		72		151	666	272	10	13	--	--	29	71	91	99	100			VPWC
Sept. 18.....	1315		69		151	604	246	11	13	--	19	29	71	91	98	100			VPWC

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
KANSAS RIVER BASIN--Continued																		
6-8350. STINKING WATER CREEK NEAR PALISADE, NEBR.																		
May 13, 1962	1125		70	25	413	28	32	35	--	52	67	95	99	100				VPWC
June 12	0825		68	108	3,200	933	17	23	29	38	56	92	99	100				VPWC
July 16	1330		74	229	6,600	4,080	33	38	42	48	65	96	100	--				VPWC
July 19	1540		79	76	2,250	462	26	40	49	58	73	99	100	--				VPWC
July 25	1840		74	40	480	52	29	37	--	51	66	92	100	--				VPWC
July 26	1640		74	38	430	44	--	--	--	--	--	92	99	100				V
Aug. 1	1405		71	204	5,310	2,920	23	29	32	37	52	89	100	--				VPWC
Aug. 1	1730		71	216	5,360	3,130	25	29	--	38	43	87	99	100				VPWC
Aug. 2	0730		71	319	4,080	3,510	22	27	30	32	42	81	99	100				VPWC
Aug. 8	1515		78	60	801	130	28	34	--	50	63	92	100	--				VPWC
Aug. 9	1055		76	54	647	94	26	34	--	47	60	93	99	100				VPWC
Sept. 5	1815		61	40	291	31	--	--	--	--	--	--	--	--				
Sept. 6	1630		62	39	286	30	--	--	--	--	--	--	--	--				
Sept. 17	1750		71	38	298	31	--	--	--	--	--	--	--	--				
Sept. 18	1545		72	41	309	34	--	--	--	--	--	--	--	--				
6-8775. TURKEY CREEK NEAR ALILENE, KANS.																		
Oct. 5, 1961	1430		65	22	168	10	--	--		--		--						
Nov. 16	1405		47	1,150	2,530	7,860	58	64	75	82	92	99	100					VPWC
Jan. 3, 1962	1530		40	84	418	95	--	--		--		--						
Jan. 29	1445		38	863	2,430	5,660	--	50		77		100						VPWC
Feb. 23	1300		39	34	204	19	--	--		--		--						
Mar. 16	1440		46	27	114	8.3	--	--		--		--						
Apr. 16	1400		56	29	147	12	--	--		--		--						
May 16	1330		73	35	191	13	--	--		--		--						
May 29	0900		64	1,780	5,680	27,300	56	63		86		100						VPWC
May 29	1445		74	1,460	4,370	17,200	54	69		89		100						VPWC
June 19	1330		77	d 29	217	17	--	--		--		--						
July 25	1520		78	17	169	7.8	--	--		--		--						

Aug. 24, 1962.....	1515		--	958	2,720	7,040	50	63		84		100						VPWC
Sept. 19.....	1255		67	776	6,140	12,900	53	65		87		100						VPWC
Sept. 22.....	1700		58	4,360	3,520	41,400	--	71		96		100						VPWC
Sept. 24.....	1045		65	3,030	3,340	27,300	54	66		90		100						VPWC

6-8780. CHAPMAN CREEK NEAR CHAPMAN, KANS.

Oct. 5, 1961.....	1255		65	26	259	18	--	--		--		--						
Nov. 16.....	1500		43	538	2,820	4,100	71	79	86	89	98	100						VPWC
Jan. 3, 1962.....	1330		39	34	165	15	--	--		--		--						
Jan. 29.....	1325		38	816	810	1,780	--	--		--		--						
Feb. 23.....	1120		39	44	166	20	--	--		--		--						
Mar. 16.....	1315		45	40	111	12	--	--		--		--						
Apr. 16.....	1215		54	46	131	16	--	--		--		--						
May 16.....	1155		73	31	266	22	--	--		--		--						
May 29.....	1100		65	960	4,480	11,600	59	71		84		100						VPWC
May 29.....	1345		74	514	4,430	6,150	67	79		95		100						VPWC
June 19.....	1150		77	34	235	22	--	--		--		--						
Sept. 19.....	1105		65	1,340	11,400	41,200	71	72		93		100						VPWC
Sept. 22.....	1055		58	2,030	5,560	30,500	59	73		94		100						VPWC

6-8785. LYON CREEK NEAR WOODBINE, KANS.

Oct. 5, 1961.....	1400		65	41	202	22	--	--		--		--	--					
Nov. 16.....	1330		48	1,640	2,540	11,200	63	69	72	83	95	99	100					VPWC
Jan. 3, 1962.....	1500		40	79	162	35	--	--		--		--	--					
Jan. 29.....	1415		36	920	1,420	3,530	52	60		70		93	96	98	99	100		VPWC
Feb. 23.....	1235		35	58	57	8.9	--	--		--		--	--					
Mar. 16.....	1410		45	51	38	5.2	--	--		--		--	--					

d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
KANSAS RIVER BASIN--Continued																		
6-8785. LYON CREEK NEAR WOODBINE, KANS.--Continued																		
Apr. 16, 1962.....	1330		--	53	88	13	--	--		--		--	--					
May 16.....	1305		74	43	259	30	--	--		--		--	--					
May 29.....	0945		--	2,630	6,900	49,000	51	62		85		100	--					VPWC
May 29.....	1220		75	2,280	6,090	37,500	42	58		85		100	--					VPWC
June 19.....	1300		78	52	192	27	--	--		--		--	--					
July 25.....	1455		79	46	370	46	--	--		--		--	--					
Aug. 24.....	1440		71	1,780	3,830	18,400	47	63		87		100	--					VPWC
Sept. 19.....	1225		67	1,910	7,570	39,000	49	61		86		100	--					VPWC
Sept. 24.....	1155		65	9,250	3,640	90,900	58	63		86		100	--					VPWC
Sept. 27.....	1550		58	377	3,920	3,990	64	70		92		100	--					VPWC
6-8792. CLARK CREEK NEAR JUNCTION CITY, KANS.																		
Oct. 5, 1961.....	1335		65	28	128	10	--	--		--		--						
Nov. 16.....	1300		48	1,400	1,820	6,880	--	64	74	82	91	99	99	99	100			VPWC
Jan. 3, 1962.....	1425		40	81	244	53	--	--		--		--						
Jan. 29.....	1350		38	498	732	984	--	--		--		--						
Feb. 23.....	1210		35	59	48	7.6	--	--		--		--						
Mar. 16.....	1340		45	47	49	6.2	--	--		--		--						
Apr. 16.....	1245		54	55	116	17	--	--		--		--						
May 16.....	1240		74	23	264	16	--	--		--		--						
May 29.....	1030		65	3,360	4,320	39,200	48	59		82		100						VPWC
May 29.....	1255		73	2,730	5,400	39,800	42	54		78		100						VPWC
June 19.....	1230		78	59	91	14	--	--		--		--						
Sept. 19.....	1205		67	1,550	4,820	20,200	48	58		81		100						VPWC
Sept. 24.....	1230		65	3,730	3,160	32,100	44	49		70		100						VPWC
6-8915. WAKARUSA RIVER NEAR LAWRENCE, KANS.																		
Oct. 10, 1961.....	1400		66	4,050	2,230	24,400	--	--		--		--	--					
Oct. 10.....	1545		--	3,950	2,480	26,400	--	--		--		99	100					VPWC
Nov. 6.....	1545		45	365	331	326	--	--		--		--	--					
Dec. 27.....	1200		33	82	96	21	--	--		--		--	--					
Feb. 2, 1962.....	1145		36	2,080	737	4,140	41	51		77		100	--					VPWC

Mar. 26, 1962.....	1700		56	323	348	303	--	--		--		--	--				
Apr. 27.....	1830		67	47	414	52	--	--		--		--	--				
May 29.....	1810		70	21	3,840	218	44	57		86		100	--				VPWC
Sept. 19.....	1235		--	629	459	780	60	66		72		98	99	100			VPWC

Particle-size analyses of bed material, water year October 1961 to September 1962
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
PLATTE RIVER BASIN																	
6-7075. SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.																	
July 12, 1961.....	1800	10		765		--	0	1	11	28	42	71	93	100	--		SV
July 12.....	1800	50		765		--	--	0	1	3	6	57	78	100	--		SV
Oct. 17.....	1300	10		400		--	0	3	38	42	60	86	97	100	--		SV
Oct. 17.....	1300	20		400		0	1	1	18	27	35	53	80	100	--		SV
Oct. 17.....	1300	30		400		--	0	2	14	29	41	62	85	100	--		SV
Oct. 17.....	1300	40		400		--	0	2	14	29	42	59	79	100	--		SV
Oct. 17.....	1300	50		400		--	0	3	22	35	42	56	73	100	--		SV
Oct. 17.....	1300	60		400		--	0	5	32	33	42	56	73	87	100		SV
Jan. 16, 1962.....	0945	40		d 135		0	1	7	19	27	35	54	76	97	100		SV
Sept. 12.....	1400	5		255		--	--	0	1	5	36	83	98	100	--		S

d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
PLATTE RIVER BASIN--Continued																	
6-7075. SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.--Continued																	
Sept. 12, 1962.....	1400	10		255		--	0	1	8	27	50	74	93	100	--		S
Sept. 12.....	1400	20		255		--	0	1	5	16	27	43	58	97	100		S
Sept. 12.....	1400	30		255		--	0	1	3	11	22	36	69	99	100		S
Sept. 12.....	1400	40		255		--	0	1	3	7	16	29	52	86	100		S
Sept. 12.....	1400	50		255		--	0	3	11	18	27	42	61	96	100		S
Sept. 12.....	1400	60		255		--	0	1	2	4	8	19	49	90	100		S
Sept. 12.....	1400	65		255		0	2	14	33	46	58	75	89	98	100		S
Sept. 12.....	1400	70		255		7	28	74	89	90	92	94	98	100	--		S
6-7540. SOUTH PLATTE RIVER NEAR KERSEY, COLO.																	
July 13, 1961.....	1045	--	68	508		0	1	6	22	39	51	68	83	93	98	100	SV
Aug. 29.....	1610	--	76	241		0	1	8	34	53	69	77	88	98	100	--	SV
Oct. 18.....	0800	20	53	2,080		--	--	0	7	41	80	99	100	--	--	--	SV
Oct. 18.....	0800	60	53	2,080		--	--	0	6	24	49	81	95	100	--	--	SV
Oct. 18.....	0800	100	53	2,080		--	--	1	16	29	38	65	94	100	--	--	SV
Oct. 18.....	0800	140	53	2,080		--	0	3	43	60	68	78	89	100	--	--	SV
Oct. 18.....	0800	180	53	2,080		--	0	4	37	49	57	78	92	100	--	--	SV
Oct. 18.....	0800	220	53	2,080		--	--	0	4	44	76	93	97	100	--	--	SV
Oct. 18.....	0800	260	53	2,080		--	--	--	--	15	18	25	42	57	100	--	SV
Oct. 18.....	0800	430	53	2,080		--	--	0	2	46	80	94	100	--	--	--	SV
Jan. 16, 1962.....	1540	--	33	1,060		--	0	6	35	46	54	73	86	98	100	--	SV
Jan. 16.....	1540	--	33	1,060		--	0	2	17	23	29	38	45	57	100	--	SV
Jan. 16.....	1540	--	33	1,060		--	0	2	15	48	62	79	94	100	--	--	SV
May 8.....	1300	--	71	206		--	1	5	22	43	58	76	92	99	100	--	SV
May 8.....	1300	--	71	206		4	13	22	36	72	75	79	35	92	100	--	SV
May 21.....	1315	--	63	769		--	0	6	26	49	64	84	94	100	--	--	SV
May 25.....	1250	--	65	529		0	1	5	25	45	60	78	89	98	100	--	SV
May 31.....	0920	--	64	848		0	1	6	22	40	53	72	89	97	100	--	SV
May 31.....	0920	--	64	848		--	0	2	10	50	67	77	83	100	--	--	SV
June 12.....	1430	--	69	1,500		0	1	3	14	43	62	81	93	98	100	--	SV

June 28, 1962.....	0910	--	67	330		--	0	5	36	64	78	90	98	100	--	--	SV
Sept. 13.....	1700	40	70	426		0	1	2	5	39	82	96	99	100	--	--	S
Sept. 13.....	1700	60	70	426		--	--	0	1	26	63	90	98	100	--	--	S
Sept. 13.....	1700	80	70	426		--	0	1	7	35	70	93	99	100	--	--	S
Sept. 13.....	1700	100	70	426		0	1	4	19	33	48	67	85	100	--	--	S
Sept. 13.....	1700	120	70	426		0	1	8	29	36	42	57	841	100	--	--	S
Sept. 13.....	1700	140	70	426		0	1	13	29	32	36	49	84	100	--	--	S
Sept. 13.....	1700	160	70	426		0	1	7	24	34	46	66	85	100	--	--	S
Sept. 13.....	1700	180	70	426		--	0	6	24	30	39	56	80	100	--	--	S
Sept. 13.....	1700	200	70	426		--	0	5	21	33	48	72	90	99	100	--	S
Sept. 13.....	1700	220	70	426		--	0	2	15	47	81	94	99	100	--	--	S
Sept. 13.....	1700	240	70	426		--	0	2	27	66	88	98	99	100	--	--	S
Sept. 13.....	1700	260	70	426		1	8	17	28	39	49	59	66	69	69	100	S
Sept. 13.....	1700	434	70	426		1	2	8	16	29	46	64	78	92	100	--	S
Sept. 13.....	1700	455	70	426		2	3	7	15	29	45	58	73	91	100	--	S

6-7915. CEDAR RIVER NEAR SPALDING, NEBR.

Oct. 20, 1961.....	0935	22		182		1	8	37	97	100	--						V
Nov. 20.....	1605	19		68		0	2	38	95	99	100						SV
Mar. 28, 1962.....	0950	4		427		0	1	43	96	100	--						V
Apr. 3.....	0925	21		230		0	3	58	97	100	--						V
Apr. 23.....	1715	7		74		0	4	53	95	99	100						SV
May 24.....	0920	21		384		0	5	58	97	100	--						V
June 28.....	1605	20		233		0	1	54	96	100	--						V
Aug. 7.....	1105	7		240		0	3	45	94	99	100						SV
Sept. 11.....	0930	13		194		0	3	70	99	99	100						SV

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
PLATTE RIVER BASIN--Continued																	
6-7918. CEDAR RIVER AT BELGRADE, NEBR.																	
Oct. 20, 1961	1410	18		204		4	12	59	96	99	100	--					SV
Nov. 20	1300	19		208		3	19	69	97	100	--	--					V
Mar. 19, 1962	1350	10		e 390		4	15	57	95	100	--	--					V
Mar. 27	1315	6		e 600		9	19	61	95	98	98	99	99	100			SV
Apr. 2	1150	14		404		0	9	72	97	100	--	--					V
Apr. 23	1430	6		201		2	5	52	98	100	--	--					V
May 23	1015	19		349		2	11	74	97	100	--	--					V
June 28	1120	19		340		2	8	65	95	99	99	100					SV
Aug. 7	1335	9		255		1	6	61	98	100	--	--					V
Sept. 10	1250	19		209		2	6	66	98	100	--	--					V
6-7983. CLEARWATER CREEK NEAR CLEARWATER, NEBR.																	
Oct. 18, 1961	1600	17		25		0	1	46	89	97	99	100					SV
Nov. 21	1050	17		29		0	1	35	88	97	99	100					SV
Mar. 29, 1962	0925	8		313		0	7	81	99	99	100	--					SV
Apr. 24	1240	6		33		0	5	50	95	99	100	--					SV
May 25	1025	19		41		0	9	80	98	100	--	--					SV
June 29	1150	16		31		0	2	49	93	99	100	--					SV
Aug. 6	1455	7		35		2	6	55	95	99	100	--					SV
Sept. 12	0955	12		23		--	0	42	92	98	100	--					SV
KANSAS RIVER BASIN																	
6-8325. FRENCHMAN CREEK NEAR ENDERS, NEBR.																	
Sept. 17, 1962	1235	5		118		1	5	13	26	36	44	62	87	99	100		SV
Sept. 18	0740	5		118		0	2	12	42	54	60	71	83	93	100		SV

7-8327. FRENCHMAN CREEK, 2.6 MILES EAST OF ENDERS DAM, NEAR WAUNETA, NEBR.

July 24, 1962.....	1625	3		e	350		0	3	31	89	98	100	--	--			SV
July 26.....	1005	5		e	330		0	2	31	84	92	94	96	98	100		SV
Sept. 5.....	0850	3		e	500		--	0	7	60	88	94	99	100			SV
Sept. 18.....	0830	3		e	120		--	0	6	42	78	92	98	100			SV

6-8329. FRENCHMAN CREEK, 5.6 MILES EAST OF ENDERS DAM, NEAR WAUNETA, NEBR.

July 17, 1962.....	0725	8			156		0	2	18	69	85	94	98	100	--		SV
July 19.....	1135	8			167		0	1	11	59	87	94	98	100	--		SV
July 24.....	1705	4			372		1	6	22	62	80	87	94	98	100		SV
July 25.....	1415	9			312		1	4	20	65	82	90	96	99	100		SV
July 26.....	1045	9			335		1	3	15	50	80	90	97	99	100		SV
Aug. 8.....	2030	10			208		4	14	28	58	74	83	91	96	100		SV
Sept. 5.....	1015	3		e	549		--	0	8	57	78	87	94	98	99	100	SV
Sept. 6.....	0915	3		e	501		0	2	16	58	87	93	98	100	--		SV
Sept. 17.....	1410	7			128		0	2	11	57	82	91	97	100	--		SV
Sept. 18.....	0920	4			142		0	1	10	67	92	96	98	100	--		SV

6-8331. FRENCHMAN CREEK AT WAUNETA, NEBR.

July 24, 1962.....	1805	3		e	360			0	4	44	83	89	93	96	97	100	SV
July 26.....	1140	3		e	310			0	11	66	79	86	91	95	97	100	SV
Sept. 5.....	1115	3		e	520			0	13	69	86	91	97	100	--	--	SV
Sept. 18.....	1035	7		e	140			0	10	56	84	93	98	100	--	--	SV

6-8333. FRENCHMAN CREEK ABOVE SAND CANYON, NEAR HAMLET, NEBR.

July 24, 1962.....	1945	3		e	340		4	23	64	92	98	99	100				SV
July 26.....	1320	3		e	310		4	19	51	91	98	100	--				SV
Sept. 5.....	1420	3		e	500		0	2	23	71	90	94	96	98	99	100	SV
Sept. 18.....	1115	8		e	140		1	7	34	86	97	99	100				SV

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN MISSOURI RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1961 to September 1962--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
						0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
KANSAS RIVER BASIN--Continued																	
6-8335. FRENCHMAN CREEK NEAR HAMLET, NEBR.																	
July 24, 1962	2030	3		e 310		7	22	52	69	77	82	89	97	100			SV
July 26	1355	3		e 320		2	11	31	60	77	86	95	99	100			SV
Sept. 5	1455	3		e 500		0	3	16	51	77	86	94	98	100			SV
Sept. 18	1145	7		e 150		0	1	11	62	84	92	98	100	--			SV
6-8340. FRENCHMAN CREEK AT PALISADE, NEBR.																	
May 13, 1962	1010	12		104		2	8	22	64	88	95	98	100	--			SV
June 11	1825	6		167		2	12	35	71	91	93	97	100	--			SV
July 16	1420	10		161		1	4	24	57	86	93	98	100	--			SV
July 19	1345	10		177		4	12	22	51	81	91	98	100	--			SV
July 24	1330	10		287		4	15	35	71	88	95	99	100	--			SV
July 25	0900	10		316		3	6	21	61	83	91	97	99	99	100		SV
July 25	1710	10		316		3	13	31	69	85	93	98	100	--			SV
July 26	1510	10		319		2	8	30	67	88	94	98	100	--			SV
Aug. 1	1620	7		988		4	13	34	74	91	95	98	100	--			SV
Aug. 1	1835	6		1,050		1	2	14	54	84	93	98	100	--			SV
Aug. 8	1650	13		311		--	0	8	56	82	92	98	100	--			SV
Aug. 9	0900	26		256		--	0	8	49	84	93	98	100	--			SV
Sept. 5	1710	6		480		0	4	30	76	94	98	99	100	--			SV
Sept. 6	1450	6		491		0	4	30	59	78	87	95	99	100			SV
Sept. 17	1705	10		151		0	1	13	54	84	94	98	100	--			SV
Sept. 18	1315	6		151		--	0	11	57	86	93	98	100	--			SV

6-8350. STINKING WATER CREEK NEAR PALISADE, NEBR.

May 13, 1962.....	1125	9		25		8	22	33	67	82	89	95	100	--			SV
June 12.....	0825	5		108		6	10	20	43	64	73	89	98	100			SV
July 16.....	1330	6		229		11	25	37	74	88	93	96	99	100			SV
July 19.....	1540	9		76		7	26	41	61	77	85	93	98	100			SV
July 25.....	1840	11		40		7	20	29	49	65	76	88	98	100			SV
July 26.....	1640	11		38		3	10	20	42	60	71	86	96	100			SV
Aug. 1.....	1405	5		204		2	5	15	80	99	100	--	--	--			SV
Aug. 2.....	1730	5		216		3	11	17	55	78	86	94	99	100			SV
Aug. 8.....	0730	5		319		26	46	54	76	89	93	98	99	100			SV
Aug. 8.....	1515	12		60		3	8	20	47	64	74	86	95	100			SV
Aug. 9.....	1055	12		54		4	9	21	48	64	74	85	94	98	100		SV

e Estimated.

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U. S. GOVERNMENT PRINTING OFFICE : 1964 O - 747-559