

Quality of Surface Waters of the United States, 1967

Parts 12-16. North Pacific Slope Basins,
Alaska, and Hawaii and Other Pacific Areas

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 2016

*Prepared in cooperation with the States
of Alaska, Idaho, Montana, Oregon,
Washington, Wyoming, U.S. Bureau of
Reclamation, and with other agencies*



UNITED STATES DEPARTMENT OF THE INTERIOR

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PREFACE

This report was prepared by the U.S. Geological Survey in co-operation with the States of Alaska, Idaho, Montana, Oregon, Washington, Wyoming, and with other agencies, by personnel of the Water Resources Division, E. L. Hendricks, chief hydrologist, G. W. Whetstone, assistant chief hydrologist for Scientific Publications and Data Management, under the general direction of G. A. Billingsley, chief, Reports Section, and B. A. Anderson, chief, Data Reports Unit.

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QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1967

Parts 12-16

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 of surface waters given in this volume serve as a basis for determining the suitability of waters for various uses. The flow and water quality of a stream are related to variations in rainfall and other forms of precipitation. In general, lower concentrations of dissolved solids may be expected during periods of high flow than during periods of lowflow. Conversely, the suspended solids in some streams may change materially with relatively small variations in flow, whereas for other streams the quality of the water may remain relatively uniform throughout large ranges in discharge.

The Geological Survey has published annual records of chemical quality, water temperature, and suspended sediment since 1941. The records prior to 1948 were published each year in a single volume for the entire country, and in two volumes in 1948 and in 1949. From 1950 to 1958, the records were published in 4 volumes; from 1959 to 1963 in 5 volumes; and since 1964 in 6 volumes. The drainage basins covered by the six volumes are shown in Figure 1. The shaded area in Figure 1 represents the section of the country covered in this volume for the water year 1967 (October 1, 1966 to September 30, 1967).

To meet interim requirements, water-quality records have been released by the Geological Survey in annual reports, beginning with the 1964 water year, by State. These reports are entitled, "Water Resources Data for (State), Part 2. Water Quality

Records." Distribution of these reports is limited and primarily for local needs. Any revisions or corrections found necessary to the records published in these annual State reports have been made and published in this volume without reference.

The records herein are listed by drainage basins in a downstream direction along the main stream. All stations on a tributary entering above a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. In the list of water-quality stations in the front of this volume, the rank of the tributaries is indicated by an indentation. Each indentation represents one rank.

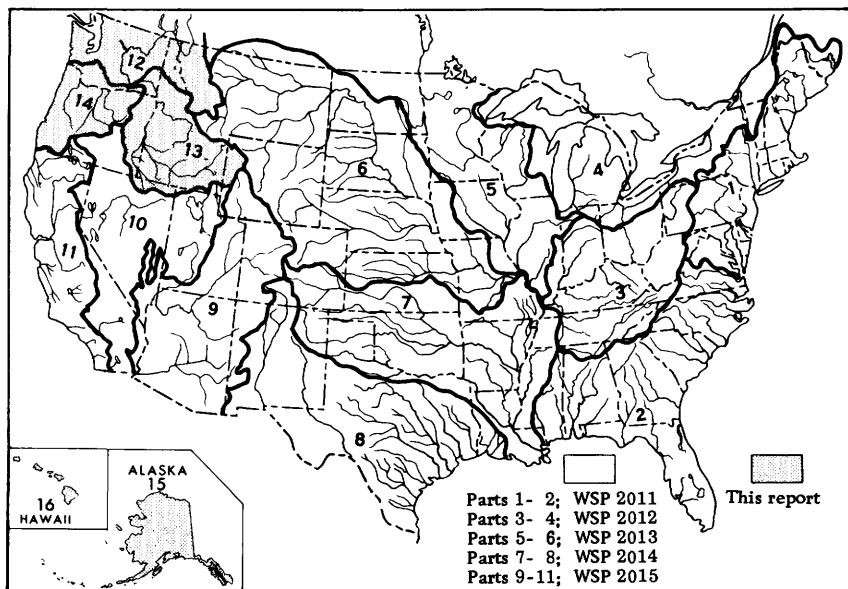


Figure 1.--Map of the United States showing basins covered by the six water-supply papers on quality of surface waters in 1967. The shaded part represents the section of the country covered by this volume; the unshaded part represents the section of the country covered by other water-supply papers.

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 2 digits followed by a hyphen and a 6-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 location of the station in the standard downstream order within each of the 16 parts (Fig. 1). 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 4-0100 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 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, 1967, the Geological Survey maintained 227 stations on 172 streams for the study of chemical and physical characteristics of surface water. Samples were collected daily and monthly at 93 of these locations for chemical-quality studies. Samples also were collected less frequently at many other points. Water temperatures were measured continuously at 144 and daily at 30 stations. All surface water samples collected and analyzed during the year have not been included. Single analyses made of daily samples before compositing have not been reported. Specific conductance is determined and reported for almost all daily samples.

At chemical-quality stations where data are continuously recorded at the stream site (monitors), the records consist of daily maximum, minimum, and mean values for each constituent measured. More detailed records (hourly values) may be obtained by writing the district office listed under Division of Work on page 28.

Quantities of suspended sediment are reported for 25 stations during the year ending September 30, 1967. 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 24 stations.

Some of the stations for which data are published in this volume are included in special networks and programs. These stations are identified by their title, set in parentheses, under the station name.

Hydrologic bench-mark station is one that provides hydrologic data for a basin in which the hydrologic regimen will likely be governed solely by natural conditions. Data collected at a bench-mark station may be used to separate effects of natural from manmade changes in other basins which have been developed and in which the physiography, climate, and geology are similar to those in the undeveloped bench-mark basin.

International Hydrological Decade (IHD) River Stations provide a general index of runoff and materials in the water balance (discharge of water, and dissolved and transported solids) of the world. In the United States, IHD Stations provide indices of runoff and the general distribution of water in the principal river basins of the conterminous United States and Alaska.

Irrigation network stations are water-quality stations located at or near certain streamflow gaging stations west of the main stem of the Mississippi River. Data collected at these stations are used to evaluate the chemical quality of surface waters used for irrigation and the changes resulting from the drainage of irrigated lands. Prior to water year 1966, these data were published in the annual water-supply paper series, "Quality of Surface Water for Irrigation, Western States."

Pesticide program is a network of regularly sampled water-quality stations where additional monthly samples are collected to determine the concentration and distribution of pesticides in streams whose waters are used for irrigation or in streams in areas where potential contamination could result from the application of the commonly used insecticides and herbicides.

Radiochemical program is a network of regularly sampled water-quality stations where additional samples are collected twice a year (at high and low flow) to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

COLLECTION AND EXAMINATION OF DATA

Quality of water stations usually are located at or near points on streams where streamflow is measured by the U.S. Geological Survey. The concentration of solutes and sediments at different locations in the stream-cross section may vary widely with dif-

ferent 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 concentration for the section.

The near uniformly dispersed ions of the solute load move with the velocity of the transporting water. 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 the sediment samplers do 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 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 the method of 10-day periods or the equivalent of three composite samples per month generally is practiced, modifications usually are 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. Large streams have

a small diurnal temperature change while small, shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges. The thermometers used for determining water temperature were accurate to plus or minus 0.5°F.

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

SEDIMENT

In general, suspended-sediment samples were collected daily with depth-integrating cable-suspended samplers (U.S. Inter-Agency, 1963, and 1952.) from a fixed sampling point at one vertical in the cross section. A 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 generally were taken two or more times a day.

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 before

and after 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 an 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 sediment 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. Inter-Agency, 1957). The fine fractions were classified by the pipet method (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U.S. Inter-Agency, 1943).

EXPRESSION OF RESULTS

The quantities of solute concentrations analyzed in the laboratory are measured by weight-volume units (milligrams per liter) and for reporting, are converted to weight-weight units (parts per million). For most waters, this conversion is made by assuming that the liter of water sample weighs 1 kilogram; and thus milligrams per liter are equivalent to parts per million (ppm).

Equivalents per million are not reported, but they can be calculated easily from the parts per million data. 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 reciprocals of the combining weights. The table below 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).

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 quan-

Conversion factors: Parts per million to equivalents per million

Ion	Multi- ply by	Ion	Multi- ply by
Aluminum (Al^{+3}).....	0.11119	Iodide (I^{-1})	0.00788
Ammonia as NH_4^{+1} ....	.05544	Iron (Fe^{+3}).....	.05372
Barium (Ba^{+2}).....	.01456	Lead (Pb^{+2}).....	.00965
Bicarbonate (HCO_3^{-1}) .	.01639	Lithium (Li^{+1}).....	.14411
Bromide (Br^{-1}) .....	.01251	Magnesium (Mg^{+2})...	.08226
Calcium (Ca^{+2}).....	.04990	Manganese (Mn^{+2})....	.03640
Carbonate (CO_3^{+2}).....	.03333	Nickel (Ni^{+2}).....	.03406
Chloride (Cl^{-1}).....	.02821	Nitrate (NO_3^{-1}).....	.01613
Chromium (Cr^{+6}).....	.11539	Nitrite (NO_2^{-1}).....	.02174
Cobalt (Co^{+2}) .....	.03394	Phosphate (PO_4^{+3})....	.03159
Copper (Cu^{+2}).....	.03148	Potassium (K^{+1}).....	.02557
Cyanide (CN^{-1}).....	.03844	Sodium (Na^{+1}).....	.04350
Fluoride (F^{-1}).....	.05264	Strontium (Sr^{+2}).....	.02283
Hydrogen (H^{+1}).....	.99209	Sulfate (SO_4^{+2}).....	.02082
Hydroxide (OH^{-1}).....	.05880	Zinc (Zn^{+2}).....	.03060

tity 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. 25) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892). 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.

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 containing all of the water passing a given station during the year. 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. For most streams, discharge-weighted averages are lower than arithmetical averages because at times of high discharge the rivers generally have low concentrations of dissolved solids.

A program for computing these averages by 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 concentrations in parts per million by the daily mean discharge in cubic feet per second, and the conversion factor, normally 0.0027.

Particle size analyses are expressed in percentages of material finer than classified sizes (in millimeters). The size classification used in this report agrees closely with recommendations made by the American Geophysical Union Subcommittee on sediment terminology (Lane and others, 1947). The particle size distributions given in this report are not necessarily representative of the particle sizes of sediment in transport in the natural stream. Most of the organic matter is removed and the sample is subjected to mechanical and chemical dispersion before analysis of the silt and clay.

COMPOSITION OF SURFACE WATERS

All natural waters contain dissolved 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. Ground water is generally more highly mineralized than surface runoff because it remains in contact with the rocks and soils for much longer periods. Some streams are fed by both surface runoff and ground water from springs or seeps. Such streams reflect the chemical character of their concentrated underground sources during dry periods and are more dilute during periods of heavy rainfall. 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 water use. The results of analyses generally include silica, iron, calcium, magnesium, sodium, potassium (or

sodium and potassium together calculated as sodium), lithium, carbonate, bicarbonate, sulfate, chloride, fluoride, nitrate, boron, pH, dissolved solids, and specific conductance. Aluminum, manganese, color, acidity, dissolved oxygen, 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, and other trace elements are determined occasionally for a few streams in connection with specific problems and the results are reported. 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 in the tables.

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 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. 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 potas-

sium have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 to 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, sodium and potassium values that are calculated and reported as sodium are indicated by footnote.

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, alkalinity in moderate amounts 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 in water that contains a high content of calcium and magnesium increases the water's corrosiveness.

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, p. 20). 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 by Faucett and Miller (1946), Waring (1949) and by the National Research Council (Maxcy, 1950) concluded that drinking water containing nitrates 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. Some sources that contribute nitrate, such as organic wastes are also important sources of phosphate. 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 often 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) 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 prevent 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 on 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 con-

tain rather high concentrations. It occurs in sea water to the extent of less than 1 ppm. Rankama and Sahama (1950) 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) equals 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

Durfor and Becker, 1964, p. 23-27.

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:

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

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. 9). The more dissolved solids in water that 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 p. 27-29).

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. 9). 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. 9).

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 impart 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).

Dissolved oxygen (DO)

Adequate dissolved oxygen is necessary for the life of fish and other aquatic organisms and is an indicator for corrosivity of water, photosynthetic activity, and septicity. It is one of the most important indicators of the condition of a water supply for biological, chemical and sanitary investigations (Rose, 1965).

Biochemical oxygen demand (BOD)

Biochemical oxygen demand is a measure of the oxygen required to oxidize the carbonaceous organic material usable as a source of food by aerobic organisms.

Chemical oxygen demand (COD)

Chemical oxygen demand indicates the quantity of oxidizable

compounds present in a water and will vary with water compositions, concentration of reagent, temperature, period of contact, and other factors.

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.

Coliform organisms.--A group of bacteria used as an indicator of the sanitary quality of the water. The number of coliform colonies per 100 milliliters of water is determined by the immediate or delayed incubation membrane filter method. Most probable number (MPN) is also a method of determining a direct count of coliform colonies per 100 milliliters of water.

Detergents (MBAS).--Anionic surfactants (methylene blue active substance, MBAS) in detergents 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 (Wayman, and others, 1962). Although the physiological implications of MBAS 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 MBAS should not exceed 0.5 ppm in drinking and culinary waters.

Temperature

Temperature is an important factor in properly 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. 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 to the stream-bed. 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 result 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 toxic 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.

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 of 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 or higher (Rainwater, Thatcher, 1960, p. 289). Although turbidity does not directly measure the safety of drinking water, it is related to the consumer's 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 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 the Geological Survey water-supply paper series, "Surface Water Supply of the United States, 1966-70." 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 obtained at the time samples were collected and computed from a stage-discharge relation or from a discharge measurement.

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 1941-67, are listed below:

Numbers of water-supply papers containing records for
Parts 12-16, 1967

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1948	1133	1955	1403	1962	1945
1942	950	1949	1163	1956	1453	1963	1951
1943	970	1950	1189	1957	1523	1964	1959
1944	1022	1951	1200	1958	1574	1965	1966
1945	1030	1952	1253	1959	1645	1966	1996
1946	1050	1953	1293	1960	1745	1967	2016
1947	1102	1954	1353	1961	1885	----	----

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 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, D.C. 20402, who will, upon request, furnish lists giving prices.

COOPERATION

Many Municipal, State and Federal agencies assisted in collecting records for these quality-of-water investigations. Many of the investigations were supported by funds appropriated directly to the U.S. Geological Survey. The State, local, and Federal agencies that cooperated in these quality-of-water investigations are listed below:

Alaska--Alaska Department of Health and Welfare, J. S. McDonald, commissioner; Greater Anchorage Area Borough, J. M. Asplund, chairman; Greater Juneau Borough Assembly, M. R. Charney, chairman; City of Anchorage, R. E. Sharp, manager; City of Haines, Edward Novak, mayor; Corps of Engineers, U.S. Army; Alaska Power Administration, U.S. Department of the Interior; Forest Service, U.S. Department of Agriculture; Fish and Wildlife Service, U.S. Department of the Interior.

Hawaii--City and county of Honolulu; Corps of Engineers, U.S. Army.

Idaho--Idaho Department of Reclamation, R. K. Higginson, State reclamation engineer; Corps of Engineers, U.S. Army; Forest Service, U.S. Department of Agriculture; U.S. Department of State; Bureau of Commercial Fisheries, U.S. Department of the Interior.

Montana--Montana Fish and Game Commission, A. N. Whitney, chief of Fisheries Division.

Oregon--Oregon Board of Higher Education; Oregon State Game Commission; Counties of Douglas and Lane; Portland General Electric Company; Corps of Engineers, U.S. Army; Bureaus of Fish and Wildlife, and Reclamation, U.S. Department of the Interior; Forest Service, U.S. Department of Agriculture.

Washington--Washington State Department of Water Resources (Department of Conservation prior to July 1, 1967), H. M. Ahlquist, director; Washington State Pollution Control Commission, R. M. Harris, director; Washington State Department of Fisheries, T. C. Tollefson, director; Washington State Department of Game, J. A. Biggs, director; city of Tacoma, Department of Public Utilities, C. A. Erdahl, director; Corps of Engineers, U.S. Army; National Park Service, U.S. Department of the Interior.

Wyoming--Wyoming Department of Agriculture, G. J. Hertzler, commissioner; Wyoming State Engineer, F. A. Bishop; Wyoming Natural Resources Board, M. W. Goodson, chief water development, Bureaus of Land Management, and Reclamation, U.S. Department of the Interior.

DIVISION OF WORK

The quality-of-water work was performed by the Water Resources Division of the Geological Survey, E. L. Hendricks, chief hydrologist, and under the direction of the district chiefs listed in the preface.

Correspondence regarding the records in this report or any additional information should be directed to the district chief of the appropriate Geological Survey-Water Resources Division office indicated in the following table.

State	District Office	Address
Alaska	Anchorage 99501	218 "E" St. Skyline Bldg.
Hawaii	Honolulu 96814	Room 337 First Insurance Bldg. 1100 Ward Ave.
Idaho	Boise 83702	Room 365, Federal Bldg. 550 West Fort St.
Montana	Helena 59601	P. O. Box 1696 421 Federal Bldg.
Oregon	Portland 97208	P. O. Box 3202 830 N. E. Holladay

State	District Office	Address
Washington	Tacoma 98402	Room 300 1305 Tacoma Ave. South
Wyoming	Cheyenne 82001	P. O. Box 2087 2nd Floor, Blue Cross Bldg. 215 East Eighth Ave.

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WATER-QUALITY STATIONS IN DOWNSTREAM ORDER
PART 12. PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN
NASELLE RIVER BASIN

12-0100. NASELLE RIVER NEAR NASELLE, WASH.

LOCATION --Lat 46°22'25", long 123°44'30", at gaging station 2.5 miles upstream from Salmon Creek and 3.5 miles east of Naselle, Pacific County.
DRAINAGE AREA --54.8 square miles
RECORDS AVAILABLE --Chemical analyses: October 1965 to September 1967.

Water temperatures: August 1963 to September 1967.

EXTREMES, 1966-67. --Water temperatures: Maximum, 73°F Aug. 15, 17; minimum, 40°F Mar. 10.

EXTREMES, 1963-67. --Water temperatures: Maximum, 73°F July 30, 1965, Aug. 15, 17, 1967; minimum, 37°F Dec. 23, 1965.

Chemical analyses, in parts per million, water year October 1966 to September 1967																				
Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Color or pH	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 27, 1966	266	11	4.5	1.2	4.5	0.3	20	0	2.0	4.5	0.1	1.4	A 39	0.05	28.0	16	0	57	7.1	10
Nov. 22.....	422	12	4.0	1.7	4.4	0.3	20	0	4.0	4.0	0.1	1.5	44	0.06	50.1	17	0	44	55	7.2
Dec. 30.....	565	11	4.5	1.6	4.3	0.2	18	0	3.0	4.0	0.1	1.4	37	0.05	56.4	14	0	50	50	7.3
Jan. 26, 1967	1210	11	3.7	1.1	3.6	0.4	16	0	3.0	4.0	0.1	1.0	39	0.05	127	14	0	45	7.1	10
Feb. 26.....	325	13	4.2	1.5	4.1	0.4	18	0	3.6	4.0	0.1	0.8	41	0.06	36.0	16	2	54	7.2	5
Mar. 31.....	505	11	4.0	0.9	3.9	0.3	18	0	2.8	4.0	0.1	1.1	A 37	0.05	50.4	14	0	48	7.2	0
Apr. 27.....	242	10	4.0	1.0	4.1	1.1	18	0	3.0	3.5	0.0	0.6	42	0.06	27.4	14	0	49	7.6	5
May 16.....	154	9.6	4.1	1.2	4.5	0.8	20	0	3.4	4.5	0.1	0.5	A 38	0.05	12.7	15	0	55	7.4	5
June 18.....	154	11	4.5	1.7	4.8	0.8	20	0	3.4	3.8	0.1	0.5	44	0.06	6.42	14	0	59	7.4	5
July 17.....	35	12	4.5	1.5	5.0	0.4	25	0	3.6	4.2	0.1	1.1	44	0.06	4.16	17	0	58	7.5	5
Aug. 24.....	21	12	5.0	1.2	5.7	0.5	28	0	2.0	4.2	0.1	1.0	44	0.06	2.49	18	0	63	7.6	5
Sept. 22.....	23	12	5.0	1.4	5.5	1.0	27	0	4.0	4.0	0.0	1.1	46	0.06	2.86	19	0	65	7.3	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966	11.3	230	0.00	0.01	0.00	0.00	Apr. 27, 1967	13.2	--	--	--	--	--
Nov. 22, 1966	12.0	150	0.00	0.01	0.00	0.00	May 16, 1967	13.7	230	0.00	0.00	0.00	0.00
Dec. 30, 1966	--	--	0.00	0.01	0.00	0.00	June 18, 1967	9.6	91	0.00	0.00	0.00	0.00
Jan. 26, 1967	--	--	0.00	0.01	0.00	0.00	July 17, 1967	10.0	36	0.00	0.00	0.00	0.00
Feb. 26, 1967	12.7	230	0.00	0.01	0.00	0.00	Aug. 24, 1967	9.6	36	0.00	0.00	0.00	0.00
Mar. 31, 1967	14.0	0	0.00	0.01	0.00	0.00	Sept. 22, 1967	10.7	36	0.00	0.00	0.00	0.00

Temperature (°F) of water, water year October 1966 to September 1967

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	59	57	57	57	57	59	58	55	53	54	52	51	50	51	49	49	48	50	48	51	52	53	52	53	52	53	52	50	51	51	50	52			
	Maximum	57	54	54	55	56	57	55	52	50	52	50	49	48	49	48	47	48	47	47	46	48	51	52	50	51	50	48	49	50	48	50			
November	49	49	48	49	49	47	46	46	47	46	47	49	49	49	49	48	48	48	48	48	46	47	47	46	46	47	47	46	47	47	48	—	46		
	Maximum	47	48	47	46	48	47	46	44	44	45	45	46	47	49	48	48	48	48	48	46	44	46	46	46	45	45	46	47	47	47	47	—	47	
December	48	48	47	47	46	46	46	45	45	47	47	48	48	47	47	48	48	48	48	48	46	45	45	46	46	45	45	46	46	46	46	46	46		
	Maximum	48	47	46	45	45	44	44	43	47	47	47	47	47	47	47	48	48	48	48	46	45	45	45	45	45	45	46	46	46	46	46	46		
January	46	46	46	46	45	45	45	45	45	46	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	45	45	45	46	46	46	45	45		
	Maximum	46	46	46	46	45	45	45	45	46	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	45	45	45	46	46	46	45	45		
February	46	46	46	47	46	46	46	45	46	46	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	45	45	46	47	47	46	45	45		
	Maximum	46	46	46	47	46	46	45	46	46	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	45	45	46	47	47	46	45	45		
March	44	45	46	46	44	44	44	43	45	46	45	46	44	43	42	43	44	44	43	44	43	44	43	43	44	44	44	43	44	45	45	—	—	44	
	Maximum	45	45	44	43	44	45	45	45	41	42	43	42	42	42	43	44	46	45	46	45	46	46	46	46	46	46	46	46	46	46	45	46	44	
April	44	44	42	42	42	43	43	43	43	45	41	40	41	41	41	42	44	44	44	44	44	43	43	43	43	43	43	43	44	44	43	43	42	43	
	Maximum	47	47	47	47	46	48	48	47	46	49	48	46	45	46	46	46	46	46	46	48	48	48	49	50	49	49	48	47	46	48	48	—	47	
May	43	43	44	45	44	44	44	46	45	44	44	45	44	44	45	44	43	42	44	44	44	45	46	46	47	45	45	45	45	45	45	46	—	44	
	Maximum	48	47	47	50	54	55	57	54	51	50	52	51	52	56	59	62	60	61	63	64	62	62	58	57	58	59	58	57	56	54	57	55		
June	46	47	47	47	49	51	51	51	49	47	48	49	48	49	48	51	54	56	55	56	56	54	53	51	53	54	55	53	52	51	51	51	51		
	Maximum	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51		
July	61	59	57	53	57	55	55	53	55	55	55	55	57	57	60	63	65	66	67	68	69	67	67	67	67	66	65	64	67	69	69	—	62		
	Maximum	72	72	72	70	70	66	67	68	64	67	68	67	69	68	68	69	67	65	64	62	66	68	68	68	68	65	63	65	66	67	67	69		
August	62	64	65	65	63	63	60	62	61	58	61	63	64	62	61	63	64	63	62	61	60	61	62	63	62	61	59	59	63	62	63	62	63		
	Maximum	69	69	69	67	64	63	64	67	70	70	71	72	72	72	73	72	73	71	71	69	71	69	68	67	69	70	69	70	69	70	69	70		
September	62	63	63	63	62	62	62	62	66	66	66	66	66	67	67	67	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	64		
	Maximum	69	68	67	67	66	67	66	66	65	64	64	62	63	64	65	64	64	65	65	68	68	66	63	62	64	65	63	63	63	61	61	61		
October	66	65	62	63	62	63	62	62	63	62	61	58	58	59	60	62	62	61	61	63	65	62	58	58	60	60	59	60	61	60	61	60	61	—	64
	Maximum	66	65	62	63	62	63	62	62	63	62	61	58	58	59	60	62	62	61	61	63	65	62	58	58	60	60	59	60	61	60	61	60	61	

WILLAPA RIVER BASIN

12-0115. WILLAPA RIVER AT LEBAM, WASH.

LOCATION.--Lat 46°33'50", long 123°33'50", temperature recorder at gaging station, 0.5 mile west of Lebam, Pacific County, and 1 mile upstream from Walker Creek.

DRAINAGE AREA.--41.4 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to July 1960.

EXTREMES, 1966-67.--Water temperatures: Maximum, 68°F Aug. 12, 13; minimum, 40°F Mar. 4, 5, 12, 13.

EXTREMES, 1952-57.--Water temperatures: Maximum, 72°F July 19, 20, 1956; minimum, freezing point Jan. 28-30, 1957, Jan. 21-23, 1962.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
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			
October	59	57	55	54	56	56	56	54	51	52	51	50	47	47	47	47	46	49	46	50	52	52	52	51	51	51	50	50	50	50	51		
Maximum	57	55	53	54	56	56	54	51	50	50	47	47	47	47	46	46	46	45	46	50	51	49	50	51	49	47	48	50	49	49	49		
Minimum	50	50	48	46	47	47	46	45	45	45	46	49	49	49	49	48	49	50	50	49	48	47	43	48	47	47	49	49	49	49	47		
November	47	48	44	45	46	46	45	44	44	44	45	46	49	49	48	47	48	49	49	48	45	46	47	47	46	46	47	49	49	49	49	47	
Maximum	47	48	44	45	46	46	45	44	44	44	45	46	49	49	48	47	48	49	49	48	45	46	47	47	46	46	47	49	49	49	49	47	
Minimum	49	49	49	48	48	47	46	46	47	47	48	48	48	48	48	48	48	48	47	45	45	45	45	44	44	45	44	44	44	44	44	46	
December	49	49	49	49	48	48	47	46	46	47	47	48	48	48	48	48	48	48	47	45	45	45	45	44	44	45	44	44	44	44	44	46	
Maximum	49	49	49	49	48	48	47	46	46	47	47	48	48	48	48	48	48	48	47	45	45	45	45	44	44	45	44	44	44	44	44	46	
Minimum	45	45	45	45	45	45	45	45	45	45	45	46	46	46	46	45	45	46	46	46	46	45	44	44	45	45	46	46	45	45	45	45	
January	45	44	45	45	45	45	45	45	44	44	45	45	45	46	45	45	45	44	46	46	46	45	44	44	44	45	45	46	46	45	45	44	
Maximum	45	44	45	45	45	45	45	45	44	44	45	45	45	46	45	45	45	44	46	46	46	45	44	44	44	45	45	46	46	45	45	44	
Minimum	45	44	45	45	45	45	45	45	44	44	45	45	45	46	45	45	45	44	46	46	46	45	44	44	44	45	45	46	46	45	45	44	
February	45	46	46	47	46	43	44	42	44	46	46	46	46	45	44	44	45	45	44	44	44	44	44	44	44	45	45	46	46	45	45	44	
Maximum	45	46	46	47	46	43	44	42	44	46	46	46	46	45	44	44	45	45	44	44	44	44	44	44	44	45	45	46	46	45	45	44	
Minimum	44	45	46	46	44	43	44	42	44	45	45	45	45	44	44	44	45	45	44	44	44	44	44	44	44	45	45	46	46	45	45	43	
March	45	44	44	44	44	45	44	44	42	44	42	44	43	42	44	45	46	46	47	47	47	47	47	47	47	47	47	47	47	46	45	45	
Maximum	45	44	44	44	44	45	44	44	42	44	42	44	43	42	44	45	46	46	47	47	47	47	47	47	47	47	47	47	47	46	45	45	
Minimum	43	43	41	40	42	44	42	44	42	41	40	40	41	42	44	45	45	45	44	46	46	47	47	47	46	46	46	46	46	44	44	43	
April	50	51	49	49	50	50	49	48	48	50	50	48	47	48	47	46	46	47	48	47	50	51	50	49	48	48	47	47	47	47	47	47	
Maximum	48	50	49	49	50	50	49	48	48	50	50	48	47	48	47	46	46	47	48	47	50	51	50	49	48	48	47	47	47	47	47	47	
Minimum	43	44	45	47	45	44	46	46	45	44	46	45	44	45	44	42	44	43	43	45	46	45	46	46	45	45	44	46	45	44	45	44	
May	50	48	48	50	53	55	57	52	50	52	52	50	54	58	60	60	60	61	61	58	58	55	55	55	55	55	55	55	55	55	55	54	
Maximum	47	48	47	49	51	52	49	48	48	49	48	48	51	54	56	56	55	57	56	56	54	52	51	53	53	53	53	53	53	53	53	51	
Minimum	47	48	47	49	51	52	49	48	48	49	48	48	51	54	56	56	55	57	56	56	54	52	51	53	53	53	53	53	53	53	53	51	
June	60	63	57	60	60	60	56	56	56	56	58	59	61	62	63	64	65	64	62	59	61	64	64	64	64	63	64	64	64	64	64	64	
Maximum	54	57	56	59	59	56	55	54	56	56	58	59	60	61	62	63	64	65	64	62	59	61	64	64	64	63	64	64	64	64	64	64	
Minimum	54	57	56	59	59	56	55	54	56	56	58	59	60	61	62	63	64	65	64	62	59	61	64	64	64	63	64	64	64	64	64	64	
July	66	68	68	67	65	64	62	65	66	66	66	66	66	66	66	66	66	66	66	65	64	66	65	65	65	65	65	66	67	64	65	65	
Maximum	62	65	66	65	64	63	62	63	62	60	62	64	65	63	61	62	63	63	63	61	62	63	64	65	65	64	62	64	64	65	65	65	
Minimum	66	66	66	64	64	63	63	66	67	67	69	69	68	68	68	68	68	68	67	66	65	67	67	65	63	64	66	66	65	65	65	65	
August	64	64	64	63	63	62	61	62	66	66	66	66	66	66	66	66	66	66	65	65	65	65	65	65	64	64	64	64	64	64	64	64	
Maximum	64	64	64	63	63	62	61	62	66	66	66	66	66	66	66	66	66	66	65	65	65	65	65	65	64	64	64	64	64	64	64	64	
Minimum	65	66	65	64	63	62	61	62	66	66	66	66	66	66	66	66	66	66	65	65	65	65	65	65	64	64	64	64	64	64	64	64	
September	65	65	63	62	62	62	60	61	61	61	60	58	60	61	62	63	62	62	64	64	64	61	58	60	60	60	60	60	60	60	60	60	60
Maximum	65	65	63	62	62	62	60	61	61	61	60	58	60	61	62	63	62	62	64	64	64	61	58	60	60	60	60	60	60	60	60	60	60
Minimum	65	65	63	62	62	62	60	61	61	61	60	58	60	61	62	63	62	62	64	64	64	61	58	60	60	60	60	60	60	60	60	60	60

12-0135. WILLAPA RIVER NEAR WILLAPA, WASH.
 LOCATION.--Lat 46°39'00", long 123°38'50", at county road bridge, 200 feet downstream from gage and 2.5 miles southeast of Willapa, Pacific County.
 DRAINAGE AREA.--130 square miles.
 RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (micro-mhos at 25°C)	pH or Col- or	
															Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate			
Oct. 27, 1966....	227	12		4.5	1.7	5.4	0.5	23	0	4.8	5.0	0.2	1.0		50	0.07	30.6	18	0	65	7.1	10
Nov. 22.....	462	13		4.0	1.7	5.3	.6	20	0	5.2	4.5	.0	1.9		47	.06	58.6	17	1	62	7.0	10
Dec. 30.....	830	12		4.0	1.0	4.7	.5	17	0	3.4	5.0	.1	1.5		43	.06	96.4	14	0	55	7.0	10
Jan. 20, 1967....	1940	12		3.5	1.2	4.0	.9	14	0	3.4	5.0	.0	1.8		38	.03	199	14	2	48	6.8	10
Feb. 26.....	526	13		4.4	1.6	4.7	.5	18	0	4.0	5.0	.1	1.2	0.00	A	.06	61.1	18	2	57	7.0	5
Mar. 31.....	874	13		3.6	1.2	4.5	.4	17	0	3.6	4.5	.1	1.6		41	.06	96.8	14	0	53	7.1	5
Apr. 27.....	403	12		3.8	1.6	5.0	.5	18	0	4.0	4.5	.1	3.2		44	.06	47.9	16	1	56	7.2	5
May 16.....	180	11		4.5	1.1	5.3	.9	23	0	4.0	4.2	.0	.5		45	.06	21.9	16	0	59	7.5	5
June 18.....	68	12		5.0	1.5	5.8	.9	26	0	4.2	4.2	.1	.5		50	.07	9.18	19	0	67	6.9	10
July 17.....	5.0	13		6.0	1.7	6.2	1.0	30	0	4.4	4.0	.0	.2		52	.07	5.62	20	0	69	7.3	5
Aug. 24.....	16	14		6.5	1.5	7.2	.9	34	0	3.0	4.8	.1	.5		64	.09	2.76	22	0	82	7.0	5
Sept. 22.....	22	13		6.0	1.9	7.0	1.4	34	0	4.6	4.8	.1	.1		58	.08	3.43	23	0	79	7.2	10

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection		Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966.	10.5	930					Apr. 27, 1967.	13.2	--					
Nov. 22.....	11.5	300					May 16.....	12.9	390					
Dec. 30.....	--	--					June 19.....	9.3	230					
Jan. 28, 1967.	--	430					July 14.....	8.7	750					
Feb. 26.....	12.2	150	0.01	0.00	0.00	0.00	Aug. 24.....	8.7	430					
Mar. 31.....	12.1						Sept. 22.....	9.2	430					

CHEHALIS RIVER BASIN

12--0275. CHEHALIS RIVER NEAR GRAND MOUND, WASH.

LOCATION --Lat 46°46'35", Long 123°02'05". temperature recorder at gauge station at highway bridge at Meadows, 1.5 miles south-west of Grand Mound, Thurston County, and 6 miles downstream from Stocknumuck River.

DRAINAGE AREA --895 square miles.

RECORDS AVAILABLE --Water temperatures: March 1952 to September 1967.

EXTREMES, 1966-67. --Water temperatures: Maximum, 76°y Aug. 13-16; minimum, 40°F on several days during January and March.

EXTREMES, 1956-57. --Water temperatures: Maximum, 80°y July 22, 23, 1959; minimum, freezing point Jan. 29 to Feb. 4, 1957.

REMARKS. --Clock stopped June 22, 23; temperature range, 64°F to 67°F.

Temperature (°F) of water, water year October 1966 to September 1967

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	64	62	61	61	61	60	60	60	59	58	58	57	55	54	54	53	52	51	51	51	49	48	49	49	51	51	51	51	51	50	50	54	
Maximum	61	61	59	60	60	59	59	57	56	57	55	55	53	53	53	52	51	50	51	49	48	47	47	49	51	51	51	50	50	50	53		
November	50	50	49	49	49	49	48	47	46	46	45	45	44	45	47	47	47	47	48	48	48	46	46	45	45	45	45	45	46	47	46		
Maximum	48	47	46	45	45	44	44	42	41	42	44	45	46	46	46	46	46	45	45	44	43	42	41	42	41	42	42	41	41	42	43		
Minimum	47	46	45	44	44	43	42	41	41	41	42	44	45	46	45	45	45	44	43	42	41	41	42	41	41	42	41	41	41	42	43		
December	42	42	41	41	41	40	40	40	41	41	41	41	41	41	42	43	42	41	41	41	42	41	41	41	40	40	41	41	43	42	41		
Maximum	42	41	41	41	40	40	40	40	41	41	41	41	41	41	42	43	42	41	41	41	41	41	41	41	40	40	41	41	43	42	41		
Minimum	42	42	43	44	44	42	41	41	41	42	43	43	43	42	41	41	42	42	42	42	42	42	42	41	41	42	42	41	41	41	41	41	
January	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
February	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
Maximum	42	42	43	44	44	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
Minimum	42	42	43	44	44	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
March	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
Maximum	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
Minimum	41	41	40	40	40	40	40	41	42	43	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	
April	44	46	47	48	47	46	48	48	48	48	48	49	47	47	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
Maximum	43	43	46	47	46	46	46	47	47	46	46	47	47	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
Minimum	51	51	51	52	53	54	57	57	57	56	55	54	53	54	56	59	61	62	64	65	65	65	64	62	62	61	61	61	61	60	58		
Maximum	48	50	51	51	51	52	54	56	56	55	53	52	52	52	54	55	58	60	61	62	63	63	62	61	60	59	60	60	59	59	58	56	
Minimum	62	62	61	64	66	65	64	65	65	64	64	64	64	64	66	68	69	71	72	74	72	69	---	---	---	66	68	69	71	71	72	---	---
Maximum	59	60	60	61	63	64	63	64	64	64	63	62	63	64	66	67	68	70	72	74	72	69	---	---	---	66	67	67	68	69	68	---	---
Minimum	72	74	75	75	74	72	72	71	72	74	73	72	73	72	73	72	71	70	69	70	72	73	73	72	70	70	70	71	71	72	72	71	
Maximum	68	69	71	71	70	69	68	69	68	68	69	70	68	69	70	68	66	65	64	63	65	67	69	68	67	67	68	69	67	68	69	70	68
Minimum	73	73	73	73	71	69	68	70	72	73	73	73	73	73	73	73	73	73	73	73	73	73	73	72	71	74	74	75	73	72	71	73	
Maximum	70	70	70	69	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	
Minimum	70	70	71	71	70	69	68	65	65	64	62	62	63	64	65	66	67	67	67	67	66	65	63	62	64	64	63	64	63	62	---	---	
Maximum	69	68	67	68	68	68	66	65	65	64	64	62	62	63	64	65	66	67	67	67	66	65	63	62	64	64	63	64	63	62	---	---	

CHEHALIS RIVER BASIN--Continued

12-0310. CHEHALIS RIVER AT PORTER, WASH.

LOCATION--Lat 46°56'20", long 123°18'45", at gaging station at County Highway bridge at mouth of Porter Creek, 700 feet west of Porter, Grays Harbor County.

RECORDS AVAILABLE--Chemical analyses: July 1959 to September 1967.

Water temperatures: July 1959 to September 1960, October 1961 to September 1967.

Sediment records: October 1961 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 75°F July 1, 2; minimum, 40°F Dec. 21, 23.

Sediment concentrations: Maximum daily, 452 ppm Jan. 10; minimum daily, 1 ppm on many days during October, July, and August.

Sediment loads: Maximum daily, 11,300 tons Jan. 10; minimum daily, 1 ton on many days during October, July, and August.

EXTREMES, 1969-67.--Water temperatures: Maximum, 78°F July 10, 27, 1962; July 23, 1963; minimum, 33°F Dec. 16, 1964.

Sediment concentrations: Maximum daily, 452 ppm Jan. 10, 1967; minimum daily, 1 ppm on many days during October, July, and August.

Sediment loads (1961-67).--Maximum daily, 452 tons Jan. 10, 1967; minimum daily, less than 0.50 ton on many days of most years.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (micro-mhos at 25°C)	Color or pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, non-carbonate	Non-carbonate			
Oct. 28, 1966.....	1380	15		6.0	2.2	4.8	0.7	29	0	4.0	4.5	0.1	1.3	--	56	0.08	209	24	0	74	7.1	15
Nov. 22.....	2600	15		5.5	1.8	4.4	.9	26	0	3.8	4.2	.2	1.2	--	64	.09	449	21	0	65	7.0	25
Dec. 31.....	6080	16		5.5	1.3	4.2	.5	24	0	2.6	3.5	.1	1.5	--	54	.07	886	19	0	59	7.2	25
Jan. 27, 1967.....	12500	15		5.6	1.9	4.1	.4	20	0	3.2	4.0	.0	1.2	--	43	.06	1520	18	2	53	7.0	15
Feb. 27.....	6660	15		4.8	1.6	3.8	.6	24	0	3.8	3.5	.0	.8	0.00	A	.07	548	22	0	58	7.2	15
Mar. 31.....	6060	15		4.8	1.9	4.1	.6	27	0	3.2	3.5	.2	.9	0.00	A	.07	548	22	0	58	7.2	15
Apr. 27.....	3170	14		5.5	1.8	4.5	.8	29	0	3.0	4.0	.0	.6	--	48	.07	411	21	0	64	7.2	5
May 17.....	1390	15		6.7	2.3	5.2	.8	36	0	3.6	4.0	.0	.6	--	60	.08	225	26	0	80	7.1	10
June 18.....	600	17		7.0	3.0	5.7	.4	42	0	3.0	4.5	.1	.2	--	64	.09	104	30	0	86	7.5	5
July 17.....	386	16		8.0	3.0	6.6	.4	45	0	3.0	6.0	.1	.1	--	71	.10	74.0	33	0	87	7.6	5
Aug. 24.....	187	18		8.0	2.6	7.9	1.4	44	0	3.6	6.8	.1	.1	0.00	70	.10	35.3	31	0	101	7.5	5
Sept. 22.....	212	20		8.6	3.4	8.3	1.8	49	0	3.4	9.0	.1	.2	--	78	.11	44.6	36	0	114	7.4	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 28, 1966.	10.6	11000					Apr. 27, 1967.	11.3	--				
Nov. 22.....	10.5	1500					May 17.....	12.1	430				
Dec. 31.....	--	--					June 18.....	9.1	450				
Jan. 1, 1967.	--	--					July 1.....	13.0	150				
Feb. 27.....	11.2	750	0.00	0.00	0.01		Aug. 24.....	9.1	0	0.00	0.01	0.00	
Mar. 31.....	11.7	91					Sept. 22.....	9.9	--				

CHEHALIS RIVER BASIN--Continued
12-0310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Temperature (°F) of water, water year October 1966 to September 1967

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	63	56	63	60	59	59	61	55	58	56	54	49	54	55	49	48	54	51	50	48	51	52	54	50	49	51	52	51	54	52	54
November.....		53	56	51	41	49	48	49	47	44	49	47	44	46	41	46	49	48	49	48	50	47	48	47	45	45	46	46	47	47	50	44	47
December.....		50	48	47	45	43	44	42	42	42	46	46	47	48	47	48	48	48	49	48	44	40	43	40	45	44	44	44	44	44	41	45	44
January.....		45	44	45	42	42	42	43	44	44	44	42	44	46	47	47	43	45	43	45	44	42	42	42	43	42	44	49	46	46	45	43	44
February.....		44	46	46	44	46	44	42	42	41	45	46	45	43	42	43	43	44	44	44	44	44	45	42	44	45	47	46	--	--	--	--	44
March.....		43	46	43	42	42	44	42	45	44	43	43	42	43	42	43	46	46	45	47	46	48	47	46	45	46	46	44	43	44	44	45	44
April.....		47	49	46	47	48	51	49	49	49	49	53	49	48	42	49	46	47	46	48	48	50	50	52	51	50	50	49	50	51	44	44	44
May.....		50	52	52	55	53	55	55	56	54	53	54	53	54	52	53	61	64	60	68	61	60	60	60	58	60	60	59	57	60	60	57	48
June.....		65	62	61	69	63	63	61	64	62	64	64	65	63	71	68	73	62	72	62	60	62	68	69	69	65	65	64	70	69	--	65	65
July.....		75	70	72	70	66	70	66	69	62	67	72	67	70	73	66	65	62	61	65	70	68	62	62	68	62	68	66	69	67	68	67	67
August.....		65	71	70	71	67	67	66	71	69	72	67	71	72	73	70	74	70	74	70	73	70	73	70	70	62	74	69	74	67	68	62	69
September.....		71	68	72	69	69	68	69	63	60	60	61	59	66	62	69	63	70	69	69	66	71	65	68	60	69	69	66	65	64	60	--	66

CHEHALIS RIVER BASIN--Continued

12-0310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

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..	295	C 1	1	990	C 5	13	10000	108	2920
2..	286	C 1	1	895	C 5	12	12000	83	2690
3..	276	C 1	1	826	C 3	7	14000	68	2570
4..	274	C 1	1	758	C 3	6	15000	54	2190
5..	274	C 1	1	731	C 3	6	15000	75	3040
6..	265	C 1	1	713	C 3	6	17700	61	2920
7..	265	C 1	1	780	C 3	6	17100	33	1520
8..	264	C 1	1	744	C 3	6	15500	24	1000
9..	266	C 1	1	718	C 3	6	13000	20	702
10..	293	C 2	2	754	C 3	6	10800	18	525
11..	304	C 2	2	772	C 3	6	11200	28	847
12..	304	C 2	2	905	C 3	7	13000	35	1230
13..	312	C 2	2	1780	14	67	21100	78	4160
14..	345	C 2	2	4540	30	368	26300	28	1990
15..	394	C 2	2	8080	70	1530	34000	26	2390
16..	352	C 2	2	7700	32	665	29300	46	3640
17..	330	C 2	2	5920	16	256	20200	44	2400
18..	310	C 2	2	4530	14	111	13800	33	1230
19..	337	C 2	2	3650	8	79	10700	28	809
20..	634	7	12	3190	7	60	10100	37	1010
21..	1630	58	272	2850	7	54	9880	110	2930
22..	3090	54	451	2600	7	49	8380	60	1360
23..	5080	62	850	2370	8	51	7130	56	1080
24..	3820	29	299	2120	5	29	6930	47	879
25..	2590	12	84	2200	8	48	7730	39	814
26..	1890	6	31	2740	12	89	8260	38	847
27..	1500	C 5	20	3140	6	51	7460	26	524
28..	1360	C 5	19	3190	6	52	6500	24	421
29..	1210	C 5	16	3140	7	59	6190	25	418
30..	1110	C 5	15	4460	55	770	6470	46	804
31..	1090	C 5	15	--	--	--	6080	83	1360
Total	30770	--	2113	77786	--	4535	410810	--	51220
	JANUARY			FEBRUARY			MARCH		
1..	6760	102	1860	19000	40	2050	4660	C 10	126
2..	8620	75	1750	14300	32	1240	4910	C 10	133
3..	8890	68	1630	11800	27	860	4610	C 10	124
4..	11500	71	2200	10200	23	633	4210	C 10	114
5..	15400	75	3120	8890	C 22	528	3870	C 6	63
6..	17000	18	826	7780	C 22	462	3580	C 6	58
7..	15400	11	457	6850	C 22	407	3340	C 6	54
8..	13200	48	1710	6120	C 22	364	3200	C 6	52
9..	11100	30	899	5550	20	300	3390	C 6	55
10..	9250	452	11300	5110	19	262	4140	17	190
11..	8970	434	10500	4820	17	221	4270	18	208
12..	10300	65	1810	4900	15	198	4020	22	239
13..	11500	30	932	7140	85	1860	3730	70	705
14..	13500	35	1280	12000	138	4470	3610	100	975
15..	13400	13	470	12400	45	1510	4120	95	1060
16..	12400	16	536	11800	47	1500	6740	81	1470
17..	11500	72	2240	11300	30	915	8410	74	1680
18..	9880	85	2270	11600	42	1320	8470	54	1230
19..	11100	28	839	11700	48	1520	8040	40	868
20..	18000	13	632	9730	35	919	7110	17	326
21..	25300	32	2190	8030	18	390	6720	16	290
22..	28300	26	1990	6860	17	315	6990	12	226
23..	24200	25	1630	6010	15	243	11200	7	212
24..	17400	32	1500	5390	12	175	14800	43	1720
25..	13200	28	998	4920	C 10	133	14800	50	2000
26..	11200	22	665	4530	C 10	122	12800	20	691
27..	12500	37	1250	4140	C 10	112	10300	9	250
28..	17100	87	4020	4120	C 10	111	8270	12	268
29..	23000	75	4660	--	--	--	7060	10	191
30..	25400	41	2810	--	--	--	6330	4	68
31..	23800	42	2700	--	--	--	6060	4	65
Total	459070	--	71674	236990	--	23140	203760	--	15711

S Computed by subdividing day.

C Composite period.

CHEHALIS RIVER BASIN--Continued

12-0310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	5630	12	182	2550	C 4	28	1070	C 6	17
2..	5090	C 7	96	2370	C 5	32	990	C 6	16
3..	4650	C 7	88	2260	C 5	31	955	C 6	15
4..	4320	C 7	82	2170	C 5	29	935	C 6	15
5..	4180	C 7	79	2070	C 5	28	885	C 3	7
6..	3960	C 7	75	1980	C 5	27	830	C 3	7
7..	3580	C 7	68	1900	C 5	26	793	C 3	6
8..	3310	C 7	63	1830	C 5	25	775	C 3	6
9..	3190	C 7	60	1800	C 5	24	753	C 3	6
10..	3180	C 7	60	1760	C 4	19	735	C 3	6
11..	3000	C 7	57	1710	C 4	18	721	C 3	6
12..	2810	C 7	53	1670	C 4	18	721	C 3	6
13..	3010	C 7	57	1600	C 4	17	721	C 3	6
14..	3930	C 7	74	1530	C 4	17	712	C 3	6
15..	3780	C 7	71	1480	C 6	24	679	C 3	5
16..	3520	C 7	67	1430	C 6	23	649	C 3	5
17..	3730	C 7	70	1390	C 6	23	620	C 3	5
18..	4330	8	94	1370	C 6	22	600	C 3	5
19..	6270	23	389	1320	C 6	21	580	C 3	5
20..	6280	20	339	1260	C 6	20	572	C 3	5
21..	5380	8	116	1210	C 6	20	608	C 3	5
22..	4700	6	76	1180	C 6	19	840	C 3	7
23..	4180	C 4	45	1140	C 6	18	1720	10	46
24..	3750	C 4	40	1100	C 6	18	1410	5	19
25..	3380	C 4	36	1060	C 6	17	1010	C 3	8
26..	3260	C 4	35	1010	C 6	16	825	C 3	7
27..	3170	C 4	34	970	C 6	16	730	C 3	6
28..	2960	C 4	32	955	C 6	15	676	C 3	5
29..	2800	C 4	30	975	C 6	16	628	C 3	5
30..	2710	C 4	29	1030	C 6	17	592	C 3	5
31..	--	--	--	1140	C 6	18			
Total	118040	--	2597	47220	--	662	24335	--	268
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..	560	C 1	2	295	C 1	1	189	C 4	2
2..	536	C 1	1	287	C 1	1	196	C 4	2
3..	516	C 1	1	279	C 4	3	206	C 4	2
4..	496	C 1	1	269	C 4	3	209	C 4	2
5..	484	C 1	1	261	C 4	3	215	C 4	2
6..	470	C 1	1	259	C 4	3	222	C 4	2
7..	466	C 1	1	258	C 4	3	216	C 4	2
8..	463	C 1	1	259	C 4	3	208	C 4	2
9..	459	C 1	1	263	C 4	3	215	C 4	2
10..	452	C 1	1	264	C 4	3	231	C 4	2
11..	449	C 1	1	251	C 4	3	278	C 4	3
12..	435	C 1	1	239	C 4	3	273	C 7	6
13..	417	C 1	1	229	C 4	2	339	C 7	6
14..	410	C 1	1	222	C 4	2	331	C 7	6
15..	400	C 1	1	214	C 4	2	283	C 7	5
16..	393	C 1	1	207	C 2	1	252	C 7	5
17..	386	C 1	1	200	C 2	1	237	C 7	4
18..	379	C 1	1	197	C 2	1	228	C 7	4
19..	382	C 1	1	196	C 2	1	224	C 7	4
20..	400	C 1	1	192	C 2	1	221	C 3	2
21..	389	C 1	1	193	C 2	1	218	C 3	2
22..	386	C 1	1	191	C 2	1	212	C 3	2
23..	379	C 1	1	189	C 2	1	207	C 3	2
24..	358	C 1	1	187	C 2	1	204	C 3	2
25..	337	C 1	1	188	C 2	1	203	C 3	2
26..	328	C 1	1	188	C 2	1	202	C 3	2
27..	322	C 1	1	187	C 2	1	199	C 3	2
28..	313	C 1	1	186	C 2	1	197	C 3	2
29..	313	C 1	1	187	C 2	1	207	C 3	2
30..	307	C 1	1	187	C 2	1	225	C 3	2
31..	301	C 1	1	186	C 2	1	--	--	--
Total	12686	--	32	6910	--	54	6847	--	84

Total discharge for year (cfs-days)..... 1635224
 Total load for year (tons)..... 172090

C Composite period.

CHEHALIS RIVER BASIN--Continued
12-0350. SATSOP RIVER NEAR SATSOP, WASH.

LOCATION.--Lat 47°00'05", long 123°29'35", at gaging station at bridge on U.S. Highway 410, 0.8 mile west of Satsop, Grays Harbor County.
RECORDS AVAILABLE.--Chemical analyses: October 1966 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (residue at 180° C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)	Color
														Calcium, magnesium	Non-carbonate		
Oct. 28, 1966..	974	13		6.0	1.7	3.8	0.3	28	0	4.8	2.3	0.0	0.06	22	0	64	7.1
Nov. 22.....	1900	12		5.0	1.6	3.2	.6	25	0	3.6	2.2	.2	.41	19	0	56	7.3
Dec. 31.....	3310	13		6.0	.5	3.2	.3	23	0	2.2	2.0	.1	.38	17	0	50	7.5
Jan. 27, 1967..	6680	13		4.2	1.4	2.8	.6	20	0	2.2	2.0	.1	.37	16	0	45	7.0
Feb. 27.....	3330	14		5.7	2.1	3.0	.4	26	0	2.4	2.0	.0	.43	22	1	56	7.4
Mar. 31.....	2360	14		4.7	1.6	3.4	.3	24	0	2.0	2.0	.3	.43	18	0	51	7.1
Apr. 27.....	1250	13		5.0	1.7	3.2	.5	28	0	2.0	2.0	.0	.43	20	0	54	7.5
May 15.....	432	14		6.8	2.0	3.4	.5	31	0	2.4	2.5	.1	.47	22	0	63	7.3
July 18.....	311	14		7.0	2.1	3.6	.9	36	0	2.4	2.2	.1	.50	23	0	75	7.6
Aug. 24.....	215	16		6.5	2.3	4.1	.7	36	0	2.8	2.2	.1	.53	26	0	71	7.4
Sept. 22.....	262	15		6.6	2.3	4.1	.6	36	0	3.4	2.0	.0	.55	26	0	73	7.4

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 28, 1966..	10.8	36					Apr. 27, 1967.	12.9	--				
Nov. 22.....	11.5	100					May 17.....	11.5	2400				
Dec. 31.....	--	--					June 18.....	10.3	530				
Jan. 27, 1967..	--	--					July 17.....	9.9	91				
Feb. 27.....	--	--					Aug. 24.....	9.6	341				
Mar. 31.....	11.8	36	0.01	0.01	0.00		Sept. 22.....	11.4	36	0.00	0.00	0.00	

CHEHALIS RIVER BASIN--Continued

12-0368. WYNOCHEE RIVER NEAR MONTESANO, WASH.

LOCATION.--Lat 47°04'45", long 123°41'55", at county road bridge 8.5 miles northwest of Montesano, Grays Harbor County, and 9 miles northeast of Aberdeen.
 RECORDS AVAILABLE.--Chemical analyses: October 1966 to September 1967.
 REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Specific conductance (micro-mhos at 25°C)	Color	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, silum			
Oct. 28, 1966..		9.2		8.0	1.2	2.6	0.2	30	0	3.0	2.0	0.0	0.7	--	44	0.06		25	0	62	7.1
Nov. 22.....		7.3		6.5	1.7	2.4	.3	24	0	2.5	2.5	.1	.9	--	A 37	.05		19	0	53	7.3
Dec. 10.....		10.0		5.9	1.4	2.4	.4	20	0	2.0	2.0	.1	.6	--	A 33	.04		18	2	45	7.1
Jan. 27, 1967..		9.0		5.1	1.4	2.2	.3	28	0	2.0	3.0	.0	.3	0.02	A 41	.06		24	0	56	7.4
Feb. 27.....		11		6.3	1.9	2.2	.5	25	0	1.8	2.0	.0	.5	--	36	.05		20	0	52	7.5
Mar. 31.....		11		5.8	1.4	2.4															
Apr. 27.....		9.5		6.0	1.6	2.4	.4	29	0	2.2	2.0	.0	.6	--	39	.05		22	0	55	7.5
May 17.....		8.5		7.1	1.6	2.3	.4	30	0	2.4	2.0	.1	.1	--	A 40	.05		24	0	61	7.7
June 15.....		11.2		8.0	1.9	2.7	.3	36	0	2.6	1.8	.0	.3	--	50	.07		28	0	66	7.6
July 15.....		11		7.5	1.9	2.7	.8	36	0	2.2	3.0	.1	.5	.00	52	.07		26	0	72	7.1
Aug. 24.....		14		7.5	1.7	4.0	.8	36	0	2.2	3.0	.1	.5	--	53	.07		27	0	76	6.8
Sept. 22.....		13		6.9	2.3	4.1	1.4	37	0	2.6	3.2	.1	.2	--							

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 28, 1966..	10.9	36					Apr. 27, 1967.	13.8	--				
Nov. 22.....	11.7	310					May 17.....	11.3	930				
Dec. 31.....	--	--					June 18.....	9.7	160				
Jan. 27, 1967..	--	--					July 17.....	9.9	230				
Feb. 27.....	12.5	36					Aug. 24.....	8.5	230				
Mar. 31.....	11.7	36					Sept. 22.....	6.9	230	0.00	0.00	0.00	

12-0381. WISHKAH RIVER NEAR WISHKAH, WASH.

LOCATION.--Lat 47°04'20", long 123°46'10", at Wishkah Road bridge, 500 feet upstream from East Fork, 2.3 miles downstream from Hamilton Canyon, and 3.2 miles south of Wishkah, Grays Harbor County.

RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1967.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (micro-mhos at 25°C)	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		
Oct. 27, 1966..				5.0	2.1	4.0	0.3	26	0	3.4	3.5	0.1	1.2	--	48	0.07	21	0	0	63	7.0
Nov. 22.....		12	5.5	1.6	3.4	3.4	.4	25	0	2.8	3.5	.1	1.1	--	50	.07	20	0	0	57	7.2
Dec. 31.....		12	4.0	1.6	3.2	3.2	.3	21	0	2.0	3.0	.1	.9	--	38	.05	17	0	0	48	7.1
Jan. 27, 1967..		11	3.6	1.5	3.6	3.6	.4	18	0	2.0	3.5	.0	.7	--	35	.05	15	0	0	42	7.3
Feb. 20.....		16	5.0	2.1	3.2	3.2	.6	24	0	2.2	4.0	.0	.4	0.02	48	.07	21	2	0	54	7.3
Mar. 30.....		13	4.1	1.8	3.2	3.2	.1	22	0	1.6	3.5	.1	.5	--	43	.06	18	0	0	51	7.1
Apr. 27.....		13	5.0	1.8	3.3	3.3	.5	28	0	1.0	3.0	.0	.4	--	45	.06	20	0	0	56	7.4
May 17.....		13	5.7	2.4	3.8	3.8	.4	33	0	1.6	3.0	.1	.2	--	48	.07	24	0	0	66	7.0
July 17.....		17	7.5	3.4	4.5	4.5	.4	44	0	2.0	3.8	.1	.1	--	67	.09	33	0	0	84	7.5
Aug. 24.....		18	8.0	3.0	5.2	5.2	.4	46	0	2.0	3.8	.1	.1	1.00	67	.09	33	0	0	89	7.5
Sept. 22.....		17	7.8	3.4	4.8	4.8	.5	45	0	2.4	4.2	.0	.1	--	62	.08	34	0	0	89	7.4

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966.	10.7	0					Apr. 27, 1967.	12.6	--				
Nov. 22.....	11.4	200					Mar. 17.....	10.4	430				
Dec. 31.....	--	--					July 17.....	9.6	230				
Feb. 26, 1967.	12.0	36	0.00	0.00	0.01		Aug. 24.....	9.4	0	0.00	0.00	0.00	
Mar. 31.....	11.8	36					Sept. 22.....	10.1	91				

QUINAUT RIVER BASIN

12-0393. NORTH FORK QUINAUT RIVER NEAR AMANDA PARK, WASH.

LOCATION.--lat 47°35'45", long 123°37'25", temperature recorder at gaging station 5.2 miles upstream from mouth and 18 miles northeast of Amanda Park, Jefferson Co., Wn.

DRAINAGE AREA.--74.1 square miles.

RECORDS AVAILABLE.--March 1965 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 56°F on several days during August and September; minimum, 36°F Jan. 23, 27, 28.

EXTREMES, 1965-67.--Water temperatures: Maximum, 58°F Aug. 7, 16-18, 1965; minimum, 35°F Jan. 1, 2, 5, 6, 1966.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Calcium carbonate (CaCO 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 (micro-mhos at 25°C)	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium			
Mar. 15, 1967	352	6.0		13	1.3	1.7	0.2	36	0	9.8	0.5	0.1	0.1		51	0.07	48.5	38	9	86	7.5
Sept. 13, 1967	191	4.6		14	1.0	1.6	1.0	40	0	11	.2	.0	.1		56	.08	28.9	39	6	88	7.7

Temperature (°F) of water, water year October 1966 to September 1967

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	50	51	50	50	50	49	49	49	48	48	48	48	46	45	45	45	45	45	45	45	43	43	43	44	44	45	45	44	45	44	44
Minimum	49	49	48	48	48	49	49	48	47	47	48	48	46	45	44	45	44	44	45	43	42	42	42	43	44	44	44	44	44	44	44
November																															
Maximum	45	45	45	44	44	44	44	44	43	43	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41
Minimum	44	45	44	44	44	44	44	42	42	42	41	41	42	42	42	41	42	42	42	42	42	41	41	41	41	41	40	40	41	41	41
December																															
Maximum	41	41	41	41	41	40	39	39	39	39	38	38	38	38	39	39	39	39	39	39	39	39	40	39	39	39	39	39	39	40	39
Minimum	41	41	40	41	41	39	39	39	39	38	37	37	38	38	39	39	39	39	39	39	39	39	39	38	39	39	39	39	39	40	39
January																															
Maximum	40	40	40	40	39	38	38	38	39	39	39	39	39	40	39	38	38	38	38	38	38	38	37	37	37	37	37	37	37	37	37
Minimum	40	39	39	39	38	37	38	38	38	39	39	39	39	39	38	38	38	38	37	37	38	37	36	37	37	37	36	36	37	37	37
February																															
Maximum	37	37	37	37	37	36	38	38	39	39	39	39	39	38	38	38	38	38	38	38	38	38	39	39	39	39	39	39	39	39	39
Minimum	37	37	37	37	37	37	37	38	38	38	38	38	37	37	37	38	38	38	38	38	38	38	38	38	38	39	39	39	39	39	39
March																															
Maximum	39	49	39	39	39	39	39	39	39	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
Minimum	38	38	38	38	38	38	38	39	38	38	38	38	37	37	37	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
April																															
Maximum	42	42	42	42	41	41	41	41	40	40	40	41	39	39	40	39	39	39	41	41	41	41	41	41	41	41	40	40	40	41	41
Minimum	40	40	40	41	40	39	39	40	39	39	39	39	39	38	38	38	38	39	39	39	39	40	40	39	40	39	40	39	40	39	40
May																															
Maximum	42	42	42	43	42	41	42	41	40	40	40	42	43	42	44	44	42	43	44	44	44	44	42	42	44	44	43	42	41	43	45
Minimum	40	41	41	41	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	42	42	41	41	42
June																															
Maximum	45	43	45	46	46	43	44	44	44	45	45	47	47	48	48	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Minimum	42	42	42	42	42	42	42	43	43	43	43	43	44	44	44	43	43	43	44	44	44	44	44	44	45	45	45	45	45	45	45
July																															
Maximum	49	50	50	49	49	48	49	48	48	50	51	51	50	50	50	49	48	48	48	50	51	51	51	51	51	51	51	51	51	52	49
Minimum	45	46	46	46	46	46	46	47	46	47	47	47	47	47	47	47	47	47	47	47	47	47	47	48	49	49	49	49	49	50	50
August																															
Maximum	52	53	53	52	52	52	52	52	53	53	54	55	55	55	55	56	56	56	56	56	56	55	55	55	55	54	54	55	55	56	56
Minimum	50	50	50	50	50	50	50	50	51	51	52	52	52	53	53	53	53	53	53	53	54	54	54	54	54	54	54	54	54	54	54
September																															
Maximum	54	53	54	54	52	52	53	52	51	50	51	52	53	54	54	55	54	54	54	56	56	54	53	53	53	54	53	53	53	54	52
Minimum	53	54	51	52	51	51	51	52	51	50	48	48	49	50	52	52	52	52	52	53	53	53	53	51	51	51	51	51	51	51	50

12-0585. NORTH FORK SKOKOMISH RIVER NEAR POTLATCH, WASH.

LOCATION.--Lat 47°19'40", long 123°14'30", temperature recorder at gaging station 1 mile upstream from mouth, 6 miles southwest of Potlatch, Mason County, and 7 miles downstream from city of Tacoma's Cushman Dam No. 2.
 DRAINAGE AREA.--117 square miles, including 99 square miles above Cushman Dam No. 2, which is normally noncontributing.
 RECORDS AVAILABLE.--Water temperatures: March 1965 to September 1967.
 EXTREMES, 1965-67.--Water temperatures: Maximum, 68°F July 30, 1965; minimum, 34°F Dec. 27, 1965.
 EXTREMES, 1968-67.--Water temperatures: Maximum, 68°F July 30, 1968; minimum, 34°F Dec. 27, 1968.

Month	Temperature (°F) of water, water year October 1966 to September 1967																															Average
	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	
October																																
Maximum	56	57	55	55	56	54	54	55	54	53	54	53	51	51	52	51	51	52	52	51	49	50	51	52	51	53	51	52	52	52	52	
Minimum	52	53	51	51	51	52	53	52	49	49	52	50	49	49	49	49	47	49	49	49	48	50	51	50	51	49	50	51	51	50	50	
November																																
Maximum	51	52	50	50	50	50	49	50	50	48	48	48	48	48	48	48	48	48	49	49	49	48	47	47	46	46	47	47	48	47	48	
Minimum	49	50	48	48	48	49	49	47	49	48	47	47	48	48	48	48	48	49	48	46	46	46	46	46	46	45	46	47	47	47	47	
December																																
Maximum	48	48	48	47	46	46	44	44	45	46	47	46	46	46	46	47	47	47	47	46	45	45	45	45	45	45	45	45	46	45	46	
Minimum	48	48	48	47	45	46	44	44	44	44	45	46	46	46	46	46	47	47	47	45	45	44	44	44	44	44	44	44	44	44	45	
January																																
Maximum	45	45	45	45	42	42	42	43	43	43	43	43	43	44	44	44	44	43	43	43	43	43	42	42	42	42	42	43	43	42	42	
Minimum	44	44	44	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	43	43	42	42	
February																																
Maximum	3	43	44	43	43	43	44	44	44	44	44	43	43	43	43	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	
Minimum	42	43	43	43	43	42	42	43	42	43	43	43	43	43	40	39	42	43	42	41	41	42	42	42	42	42	42	43	43	42	42	
March																																
Maximum	44	45	46	46	46	46	45	44	44	42	46	43	42	42	42	45	44	46	45	46	45	45	45	44	45	46	45	45	47	45	44	
Minimum	43	43	42	41	41	42	43	42	42	41	41	42	41	41	42	42	44	43	44	44	44	44	44	44	44	44	44	44	44	44	44	
April																																
Maximum	49	49	50	47	48	51	50	48	50	49	52	47	47	47	47	50	47	49	47	51	51	51	53	55	55	52	48	48	50	50	49	49
Minimum	42	43	43	46	44	44	44	45	46	44	46	46	45	44	43	45	45	46	46	46	46	47	46	47	46	47	46	47	46	46	46	45
May																																
Maximum	49	51	50	54	56	57	53	53	52	52	53	52	54	58	60	59	58	59	61	58	57	56	58	56	55	54	54	54	57	55	54	
Minimum	47	47	47	48	47	49	49	49	48	48	49	49	48	49	49	50	51	50	51	51	51	51	50	49	49	50	50	52	51	49	49	
June																																
Maximum	60	56	56	61	62	58	55	56	55	55	54	57	57	61	62	62	64	64	64	58	55	55	62	63	64	58	60	62	59	62	59	59
Minimum	50	53	52	50	51	52	52	52	51	51	50	51	50	51	52	53	53	53	53	54	53	53	53	53	53	53	53	53	53	53	52	52
July																																
Maximum	63	63	64	58	62	58	61	56	58	62	63	63	62	63	62	61	57	56	58	61	62	62	61	55	61	62	63	64	63	60	60	
Minimum	51	52	53	53	52	52	52	53	52	52	53	54	53	53	53	53	53	53	53	53	52	51	52	53	53	53	52	54	53	52	54	
August																																
Maximum	63	62	63	62	59	59	62	62	61	63	63	64	64	64	64	64	64	64	63	63	58	62	62	61	60	60	62	61	60	61	61	
Minimum	53	53	53	53	53	53	53	53	53	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	
September																																
Maximum	56	61	60	60	58	59	57	58	56	55	58	57	56	58	58	58	58	58	58	60	57	58	56	56	56	58	56	54	55	54	53	53
Minimum	54	54	53	54	53	52	52	52	52	53	51	50	50	50	51	52	53	53	53	53	53	53	53	53	53	53	51	51	52	53	53	53

12-0615. SKOMISH RIVER NEAR POTLATCH, WASH.

LOCATION (revised).--Lat 47°19'00", Long 123°11'05", temperature recorder 0.6 mile upstream from gaging station, 2.8 miles downstream from confluence of North Fork Skomish River, 4.7 miles southwest of Potlatch, Mason County, and 5.5 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: August 1960 to September 1961.

Water temperatures: May 1955 to September 1962, October 1963 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 58°F July 2, 3; minimum, 41°F Jan. 4, 5, Feb. 15.

EXTREMES, 1959-62, 1963-67.--Water temperatures: Maximum, 69°F July 13, 1961; minimum, (1955-62, 1964-67), 35°F Jan. 1, 2, 1965.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (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 (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate		
May 18, 1967..	960	12	7.3	1.7	1.7	0.1	32	0	1.4	1.0	0.0	0.1	0.00	43	0.06	111	25	0	60	7.5

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium			Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)	Trivalent (Cr ³⁺)				
May 18, 1967....		0.00			0.00	0.00		

CHICO CREEK BASIN

12-0720. CHICO CREEK NEAR BREMERSTON, WASH.

LOCATION.--Lat 47°35'25", long 122°42'30", at gaging station at State Highway 3, 0.5 mile downstream from Dickerson Creek, and 2.5 miles northwest of Bremerton, county seat.
 DRAINAGE AREA.--15.3 square miles.
 RECORDS AVAILABLE.--Chemical analyses: November 1964 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium	Non-carbonate			
Nov. 17, 1966..	26	13		8.0	3.4	2.9	0.6	39	0	3.4	2.8	0.1	2.6		55	0.07	3.86	34	2	79	7.5	15
Dec. 12,	344	9.2		5.0	1.5	2.1	1.3	21	0	3.2	1.5	1.1	1.3		42	0.06	39.0	19	2	48	6.8	20
Feb. 21, 1967..	45	10		5.0	2.7	2.5	2.2	31	0	2.6	1.5	1.1	1.7		46	0.06	5.59	24	0	60	7.5	20
Mar. 24,	223	8.4		4.5	1.6	1.9	2.2	21	0	2.2	1.5	0.8			35	0.05	21.1	18	1	44	7.1	10
Apr. 11,	29	11		6.8	2.3	2.5	1.5	32	0	3.2	1.5	1.1	1.5	0.00	45	0.06	3.52	26	0	65	7.1	5
May 18,	12	12		7.0	2.6	3.0	0.6	38	0	2.4	2.0	0	0.5		50	0.07	1.62	28	0	72	7.3	5
July 24,	1.0	15		7.5	3.2	3.2	1.3	42	0	2.4	2.0	0	0.6		A	0.08	1.15	32	0	78	7.8	5
Aug. 25,	1.2	12		9.0	3.2	3.6	1.5	46	0	2.8	2.0	0	0		59	0.08	1.19	36	0	86	7.4	5
Sept. 18, .....	.66	12		9.0	3.4	3.4	0.8	48	0	2.8	2.5	1.1	1.2		60	0.08	1.11	37	0	88	7.6	5

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium		Copper	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
Apr. 11, 1967...		0.00		0.02	0.00		

NISSQUALLY RIVER BASIN

12-0825. NISQUALLY RIVER NEAR NATIONAL, WASH.

LOCATION.--Lat 46°45'10", long 122°05'00", temperature recorder at gaging station 100 feet downstream from railroad bridge, 1 mile west of National, Pierce County, 2.5 miles west of Ashford, and 3 miles upstream from Mineral Creek.

DRAINAGE AREA.--133 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1967.

EXTREMES, 1966-67. --Water temperatures: Maximum, 62°F July 22, 23, 29, 30; minimum, 37°F Jan. 6, Feb. 13-15.

EXTREMES, 1951-67.---water temperatures: Maximum, 65°F July 13, 1961; minimum (1951-63, 1965-67), freezing point on many days during winter months.

Temperature ($^{\circ}\text{F}$) of water. water year October 1966 to September 1967[illegible]

12-0895. NISQUALLY RIVER AT MCKENNA, WASH.

LOCATION: --Lat 46°56'00", Long 122°33'35", at bridge at gage on highway 507 at McKenna, Pierce County, and 9.0 miles downstream from Tanwax Creek.
 DRAINAGE AREA: --517 square miles.
 RECORDS AVAILABLE: --Chemical analyses: July 1959 to June 1960, October 1966 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Bo-iron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		
Nov. 3, 1966...	1550	13		5.0	1.7	3.6	0.5	28	0	1.8	0.1	0.3		50	0.07	209	20	0	55	7.3
Jan. 4, 1967...	2410	14		5.0	1.5	3.1	.6	25	0	2.8	.2	.9		51	.07	332	19	0	52	7.1
Feb. 20, 1967...	1830	14		5.2	1.4	2.9	.6	25	0	2.0	.1	.7		43	.06	244	18	0	50	7.4
Mar. 27, 1967...	1990	15		5.1	1.5	3.2	.4	25	0	2.2	.1	.4		45	.06	242	18	0	52	7.3
Apr. 26, 1967...	1450	14		5.5	1.5	3.2	.6	29	0	1.4	.0	.3		48	.07	188	20	0	53	7.4
May 17, 1967...	862	14		5.5	1.3	3.4	.6	29	0	2.2	.0	.2		47	.06	109	19	0	54	7.4
June 12, 1967...	370	15		5.5	1.9	3.6	.6	31	0	2.2	.1	.1	0.00	50	.07	50.0	22	0	59	7.5
July 24, 1967...	205	14		5.0	1.8	3.0	.3	28	0	2.6	.1	.0	.1	49	.07	27.1	21	0	57	7.3
Sept. 18, 1967...	191	13		5.0	1.4	2.9	.8	28	0	1.8	.1	.3		43	.06	22.2	19	0	52	7.3

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 3, 1966...	10.9	0					May 17, 1967..	12.7	73				
Jan. 30, 1967...	--	--					June 24, 1967..	11.1	91				
Feb. 21, 1967...	12.6	930					July 24, 1967..	10.8	91	0.00	0.00	0.01	
Mar. 27, 1967...	12.2	73					Aug. 14, 1967..	10.8	0				
Apr. 26, 1967...	13.7	91					Sept. 18, 1967..	10.7	91				

CHAMBERS CREEK BASIN

12-0915. CHAMBERS CREEK BELOW LEACH CREEK, NEAR STEILACOOM, WASH.

LOCATION --Lat 47°11'35", long 122°34'25", at Chambers Creek Road bridge 0.9 mile upstream from mouth, and 1.5 miles northeast of Steilacoom, Pierce County.
 DRAINAGE AREA --104 square miles.
 RECORDS AVAILABLE --Chemical analyses: October 1962 to September 1967.

REMARKS --No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
												Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Nov. 1, 1966...	23		12	5.3	5.7	1.3	57	0	11	0.1	4.4	96	0.13		52	6	138	7.2	5
Nov. 15, 1966...	16		10	4.9	4.6	1.7	41	0	13	0.1	4.8	79	0.11		45	12	115	7.2	40
Jan. 4, 1967...	13		9.0	4.1	4.5	1.3	38	0	9.4	0.1	4.5	80	0.11		40	8	106	7.0	20
Jan. 30, 1967...	17		10	4.0	5.2	1.2	41	0	9.6	0.1	5.7	A 78	0.11		42	8	114	7.2	15
Feb. 21, 1967...	10		10	5.0	5.5	1.3	45	0	9.6	0.1	5.8	83	0.11		46	8	118	7.5	10
Apr. 3, 1967...	16		11	4.5	5.5	1.3	47	0	10	0.1	4.2	83	0.11		46	7	121	7.2	5
May 18, 1967...	12		11	4.8	5.7	1.3	50	0	9.6	0.1	4.2	81	0.11		47	6	127	7.8	5
June 12, 1967...	12		11	5.5	5.8	1.2	55	0	9.8	0.1	4.1	87	0.12	0.07	50	5	131	7.5	5
July 19, 1967...	21		12	5.8	6.0	1.4	58	0	11	0.1	3.7	96	0.13		54	7	141	7.6	5
Aug. 14, 1967...	22		12	5.8	6.2	2.1	58	0	11	0.1	4.6	99	0.13		54	7	141	7.5	5
Sept. 28, 1967...	23		12	6.2	6.3	1.8	60	0	11	0.1	3.4	103	0.14		56	7	144	7.5	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 1, 1966...	9.3	390					May 18, 1967...	10.2	430	0.00	0.00	0.00	
Nov. 15, 1966...	9.1	930					June 12, 1967...	9.6	36				
Feb. 21, 1967...	11.5	430					July 19, 1967...	9.4	430				
Apr. 3, 1967...	10.5	430					Aug. 14, 1967...	9.6	73				
Apr. 24, 1967...	12.6	460					Sept. 28, 1967...	9.6	73				

PUYALLUP RIVER BASIN--Continued
12-1015. PUYALLUP RIVER AT PUYALLUP, WASH.

LOCATION.--Lat 47°12'30", long 122°19'35", at gaging station, 0.8 mile upstream from bridge at Clark Creek, 1 mile northwest of Puyallup, Pierce County, and 7 miles upstream from mouth.

DRAINAGE AREA.--948 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1961, October 1965 to September 1967.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1961, October 1965 to September 1967 (determined August 1960).

EXTREMES, 1965-66.--Water temperatures: Maximum, 65°F July 27-29, Aug. 3, 1966; minimum, 33°F Dec. 15, 1965.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (micro-mhos at 25°C)	pH or Col.
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, and sodium	Non-carbonate		
Nov. 3, 1966..	1920	15		7.5	1.8	4.2	0.9	31	0	8.8	1.8	0.1	0.3		58	0.08	301	26	0	76	7.1
Nov. 15.....	3860	14		8.0	2.4	3.6	1.4	31	0	8.8	2.2	.2	2.3		61	.08	636	30	5	79	7.0
Jan. 4, 1967..	6260	14		6.0	1.5	3.4	1.0	25	0	5.4	1.8	.2	1.8		48	.07	811	21	1	62	7.0
Jan. 30.....	5180	14		7.6	1.5	2.9	.6	22	0	5.4	1.0	.1	.8		45	.06	994	20	2	56	7.1
Feb. 21.....	3320	16		7.8	2.3	3.4	.6	33	0	5.8	2.0	.1	1.0		58	.08	520	30	2	67	7.3
Mar. 27.....	3150	15		7.0	1.9	3.8	.7	31	0	6.2	2.0	.0	.6		A 52	.07	442	26	0	71	7.4
Apr. 24.....	1890	16		7.7	2.0	4.1	1.0	34	0	7.2	1.5	.1	.5		A 56	.08	286	27	0	77	7.7
May 17.....	3790	12		5.2	1.3	2.9	1.0	24	0	4.6	1.0	.1	.9		A 41	.06	420	18	0	55	7.5
June 12.....	5160	12		5.5	1.9	2.7	.6	23	0	4.6	1.0	.1	.3	.01	41	.06	571	17	0	50	7.2
July 19.....	2770	12		6.0	1.1	3.2	.7	24	0	6.2	1.0	.1	.1		46	.06	344	20	0	56	7.3
Aug. 2.....	1360	11		5.0	1.7	3.7	1.7	22	0	6.8	1.2	.1	.9		45	.06	289	20	2	53	7.3
Sept. 28.....	1360	11		5.7	1.8	3.7	1.7	23	0	9.4	1.3	.1	.1		43	.06	165	22	3	63	7.0

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 3, 1966..	10.0	430					Apr. 24, 1967.	16.5	150				
Nov. 15.....	10.5	2400					May 17.....	11.9	24000				
Jan. 30, 1967..	--	--					June 12.....	10.7	750				
Feb. 21.....	12.2	11000					July 19.....	10.2	1100	0.00	0.00	0.00	
Mar. 27.....	11.9	4600					Aug. 14.....	9.9	4600				
							Sept. 28.....	9.7	--				

Temperature (°F) of water, October 1966 to January 1967

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		
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	
October	22	20	57	27	56	27	57	50	53	54	54	54	53	53	52	51	52	53	51	51	48	48	50	51	50	51	50	49	49	50	49	52	
Maximum	52	51	49	50	51	53	53	51	47	47	50	47	47	46	47	45	45	46	47	46	42	45	46	46	46	49	47	45	46	47	47	47	
Minimum	49	49	43	47	48	48	47	40	47	40	44	40	47	47	46	46	45	46	47	47	46	44	46	46	46	44	45	44	45	45	46	46	
November	46	46	44	43	45	45	46	42	43	42	40	42	43	46	44	45	42	44	45	45	44	41	43	44	43	41	43	44	45	45	46	46	
Maximum	46	46	44	43	45	45	46	42	43	42	40	42	43	46	44	45	42	44	45	45	44	41	43	44	43	41	43	44	45	45	46	46	
Minimum	46	46	44	43	45	45	46	42	43	42	40	42	43	46	44	45	42	44	45	45	44	41	43	44	43	41	43	44	45	45	46	46	
December	43	42	43	42	40	40	41	43	42	43	44	44	44	44	44	43	42	41	41	41	41	41	40	40	40	41	41	41	41	41	41	41	
Maximum	43	42	43	42	40	40	41	43	42	43	44	44	44	44	44	43	42	41	41	41	41	41	40	40	40	41	41	41	41	41	41	41	
Minimum	43	42	43	42	40	40	41	43	42	43	44	44	44	44	44	43	42	41	41	41	41	41	40	40	40	41	41	41	41	41	41	41	
January	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
February	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
March	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
April	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
May	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
June	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
July	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
August	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
September	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Maximum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	
Minimum	41	41	42	40	38	38	40	41	41	41	43	43	44	44	43	42	40	40	40	40	40	39	39	39	39	40	41	42	42	40	38	40	

DUMAWISH RIVER BASIN

12-1126. BIG SOOS CREEK ABOVE HATCHERY, NEAR AUBURN, WASH.

LOCATION.--Lat 47°18'35", Long 122°10'03", at State Fish Hatchery diversion dam 1.0 mile upstream from gaging station, 1.8 miles upstream from mouth, and 3 miles east of Auburn, King County.
 DRAINAGE AREA.--66.7 square miles, excluding 3.67 square miles in vicinity of Youngs Lake, upstream from gaging station.
 RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1967.
 REMARKS.--Minor inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Nov. 1, 1966...	37	19	11	4.7	4.7	5.2	1.2	56	0	8.4	2.2	0.2	1.2	81	0.11	8.09	47	1		115	7.5
Nov. 15.....	90	18	10	4.4	4.4	5.0	1.6	41	0	13	3.8	0.2	3.1	90	0.12	21.9	43	2		114	7.0
Dec. 27.....	234	13	9.5	3.3	3.3	6.0	1.9	43	0	9.2	2.8	1.1	3.0	71	0.10	44.9	37	2		105	7.4
Jan. 30, 1967..	463	12	7.6	3.0	3.0	4.8	1.0	32	0	9.6	3.0	1.1	3.0	65	0.09	81.3	32	6		89	7.2
Feb. 21.....	273	13	9.1	3.6	3.6	5.5	1.7	38	0	11	3.0	1.1	2.2	A	0.09	49.4	38	6		95	7.4
Mar. 27.....	219	12	8.2	2.9	2.9	5.6	1.1	38	0	9.6	2.5	1.1	2.0	64	0.09	31.8	32	2		95	7.3
Apr. 24.....	155	12	8.6	3.5	3.5	5.8	1.1	44	0	9.6	3.0	1.1	1.4	67	0.09	28.0	36	0		102	7.4
May 17.....	102	14	9.5	3.8	3.8	5.6	1.2	48	0	8.6	3.0	1.1	1.2	78	0.10	21.9	38	0		104	7.5
June 12.....	81	16	10	3.4	3.4	5.3	1.8	50	0	7.8	2.2	1.1	0.04	72	0.10	11.9	39	0		104	7.7
July 19.....	35	16	10	3.9	3.9	5.1	1.9	47	0	6.4	5.8	1.1	1.9	71	0.10	6.71	41	3		108	7.2
Aug. 14.....	30	18	10	3.9	3.9	5.2	1.9	53	0	7.0	2.0	0.1	1.1	73	0.10	5.91	41	0		106	7.8
Sept. 18.....	28	19	10	3.9	3.9	5.3	1.2	53	0	6.8	2.0	0.1	1.8	78	0.11	5.90	41	0		109	7.6

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform bacteria per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform bacteria per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 1, 1966..	11.4	91					Apr. 24, 1967.	11.8	230				
Nov. 15.....	10.1	11000					May 17.....	11.1	430				
Dec. 27.....	--	--					June 12.....	10.8	150				
Jan. 30, 1967..	--	--					July 19.....	9.9	4600	0.00	0.00	0.00	
Feb. 21.....	12.1	2400					Sept. 18.....	9.9	230				
Mar. 27.....	11.3	930						10.6	230				

12-1130. GREEN RIVER NEAR AUBURN, WASH.

LOCATION.--Lat 47°18'05", long 122°10'23", at bridge on State Highway 18, 0.1 mile upstream from Big Soos Creek, 1.8 miles east of Auburn, King County, and 2.1 miles upstream from gaging station.

DRAINAGE AREA.--399 square miles, excluding 3.67 square miles in the vicinity of Youngs Lake, upstream from gaging station.

RECORDS AVAILABLE.--Chemical analyses: July 1956 to September 1967.

EXTREMES, 1952-67.--Water temperatures: Maximum, 71°F June 19, Aug. 13-16; minimum, 41°F Feb. 16, 17, 19-21.

EXTREMES, 1952-67.--Water temperatures: Maximum, 71°F July 28, 1958, minimum (1952-56, 1957-67), 33°F Feb. 16, 17, 1956, 18-21, 1964.

REMARKS.--Temperature recorder located at gaging station. Minor inflow between sampling point and gaging station except during periods of heavy local runoff.

Temperature recorder not operating properly May 15, 16, pen failed to ink May 17 to June 6; no temperature ranges obtained.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, silum	Non-carbonate			
Nov. 1, 1966...	701	14		7.0	1.9	3.8	0.3	34	0	3.8	2.0	0.1	52	0.07	98.4	26	0		69	7.4
Nov. 15, 1966...	1570	12		6.5	2.8	2.8	0.3	22	0	3.2	1.0	0.8	32	0.07	132.5	25	0		68	7.5
Dec. 27, 1966...	1530	14		7.0	1.7	4.0	0.3	32	0	4.2	1.0	1.2	50	0.07	207	25	0		68	7.5
Jan. 30, 1967...	4280	13		5.3	1.4	2.9	0.8	24	0	3.4	1.0	0.9	41	0.06	474	19	0		52	7.1
Feb. 21, 1967...	2210	14		6.4	1.6	3.2	0.6	26	0	4.0	1.5	1.2	46	0.06	274	22	1		61	7.1
Mar. 27, 1967...	1690	14		5.7	1.6	3.4	0.5	28	0	4.0	1.5	0.8	47	0.06	214	20	0		64	7.3
May 17, 1967...	1960	12		4.8	1.1	2.8	0.4	22	0	2.4	2.0	0.5	36	0.05	191	16	0		46	7.2
June 19, 1967...	2130	12		5.3	1.5	3.7	0.4	27	0	5.2	2.0	0.4	65	0.06	49.3	32	0		64	7.6
Aug. 14, 1967...	562	13		6.5	2.3	4.1	0.6	37	0	3.8	1.5	0.5	49	0.07	74.4	26	0		72	7.5
Sept. 18, 1967...	235	15		10	2.7	5.2	1.0	50	0	5.2	2.0	1.7	68	0.09	43.1	36	0		101	7.2

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 1, 1966...	11.3	24000					May 17, 1967...	12.0	230	0.00	0.00	0.00	
Nov. 15, 1966...	10.8	2400					June 12, 1967...	10.7	91				
Feb. 21, 1967...	12.6	230					July 19, 1967...	9.7	2400				
Mar. 27, 1967...	12.5	430					Aug. 14, 1967...	9.1	230				
Apr. 24, 1967...	14.1	91					Sept. 18, 1967...	9.5	430				

12-1134. DUWAMISH RIVER AT TUKWILA, WASH.

LOCATION.--Lat 47°28'58", long 122°16'00", at county bridge (Foster Street Bridge), in Tukwila, King County, 1.7 miles west of Renton, and 10 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

Water temperatures: July 1959 to September 1962.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (microhmhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium	Non-carbonate		
Nov. 1, 1966...		14		9.0	2.0	5.2	0.5	38	0	7.0	3.0	0.1	1.0		61	0.08		30	0	81	6.8
Nov. 15.....		13		7.0	2.3	4.2	1.1	30	0	6.0	3.2	.2	2.7		64	.09		27	3	67	6.9
Dec. 27.....		14		8.0	1.8	4.7	.8	35	0	5.6	3.0	.1	1.7		62	.08		28	0	80	7.1
Jan. 30, 1967...		14		5.7	1.6	3.1	.9	28	0	4.0	1.5	.0	1.4		47	.06		20	0	57	7.1
Feb. 27.....		13		6.8	2.2	4.7	.7	34	0	4.0	1.0	.1	1.3		46	.09		28	0	57	7.1
Mar. 27.....		14		6.6	2.0	4.7	.6	33	0	5.2	2.3	.0	1.3		A 53	.07		24	0	50	7.2
Apr. 24.....		15		8.7	2.7	6.5	1.0	40	0	5.4	6.0	.1	1.1		69	.09		32	0	99	7.0
May 18.....		14		7.5	1.9	5.3	.6	36	0	3.6	5.2	.0	.8		59	.08		27	0	82	7.0
June 12.....		14		8.5	2.2	7.4	.7	40	0	3.8	7.5	.0	.8	.01	69	.09		30	0	99	7.4
July 19.....		17		13	4.1	14	1.3	64	0	5.6	15	.1	1.0		104	.14		50	0	168	7.4
Aug. 14.....		14		7.5	2.4	6.0	.9	40	0	4.4	2.8	.0	.3		59	.08		29	0	87	7.3
Sept. 18.....		17		12	4.3	13	1.9	66	0	5.2	14	.0	.6		102	.14		48	0	164	7.2

A Calculated from determined constituents.

Additional determinations									
Date of collection	Dis-solved oxygen (DO)	MDP colonies per 100 ml	Hoxa-valent chromium (Cr ⁶)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MDP colonies per 100 ml
Nov. 1, 1966..	8.2	24000					Apr. 24, 1967.	11.4	4600
Nov. 15.....	10.2	46000					May 18.....	11.1	4600
Dec. 27.....	--	--					June 12.....	9.5	2400
Jan. 30, 1967.	--	--					July 19.....	7.6	11000
Feb. 21.....	11.6	24000					Aug. 14.....	8.3	4600
Mar. 27.....	11.7	11000					Sept. 18.....	7.4	4600

12-1190. CEDAR RIVER AT RENTON, WASH.

LOCATION.--Lat 47°29'00", long 122°12'10", at gaging station 125 feet downstream from bridge on Mill Avenue at Renton, King County, and 1.5 miles upstream from mouth.

DRAINAGE AREA.--186 square miles, including 3.67 square miles in vicinity of Youngs Lake in Big Scos Creek basin.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1961, November 1966 to September 1967.

Water temperatures: August 1965 to February 1967 (discontinued).

EXTREMES, 1965-66.--Water temperatures: Maximum, 71°F Aug. 2, 3, 1966; minimum, 36°F Dec. 24, 1965.

REMARKS.--Clock stopped Nov. 10 to Dec. 5; temperature range 44°F to 49°F.

Chemical analyses, in parts per million, November 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonylate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Nov. 1, 1966...	406	13		8.0	1.7	3.0	0.5	35	0	3.4	1.2	0.1	0.7		50	0.07	54.8	27	0		69	7.4
Nov. 15, 1966...	616	11		7.0	1.6	3.0	0.3	30	0	3.8	1.8	0.0	1.8		44	0.06	72.2	24	0		63	7.2
Dec. 27, 1966...	1010	10		6.0	1.1	2.4	0.2	24	0	3.2	1.0	0.1	1.9		41	0.06	112.2	20	0		53	7.3
Feb. 21, 1967...	1380	9.7		5.8	1.5	2.0	0.5	24	0	2.4	1.0	0.0	0.6		40	0.05	149	20	1		50	7.5
Mar. 27, 1967...	873	11		7.7	1.6	2.3	0.3	32	0	2.8	1.5	0.1	0.6		50	0.07	118	26	0		63	7.5
Apr. 24, 1967...	533	13		8.1	1.9	2.9	0.6	36	0	3.6	1.5	0.1	0.4		54	0.07	77.7	28	0		72	7.8
May 19, 1967...	342	11		6.6	1.6	2.3	0.6	49	0	3.2	1.5	0.1	0.4		A	0.11	106	33	0		90	7.1
July 12, 1967...	342	12		9.0	1.7	3.3	0.6	46	0	3.8	1.8	0.1	0.3	0.01	58	0.08	119.6	35	0		87	7.7
July 19, 1967...	125	13		11	2.7	4.7	0.6	52	0	5.0	2.2	0.0	0.1		67	0.09	13.4	39	0		99	7.6
Aug. 14, 1967...	74	14		11	2.7	4.7	0.6	52	0	5.0	2.2	0.0	0.1		64	0.09	15.4	39	0		95	8.0
Sept. 18, 1967...	89	12		11	2.8	4.4	1.4	51	0	5.4	1.8	0.0	0.1									

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 1, 1966..	11.3	91					May 18, 1967..	9.9	--	0.00	0.00	0.01	
Nov. 15, 1966..	10.9	210					June 12, 1967..	10.3	36				
Dec. 27, 1966..	12.2	36					July 19, 1967..	19.0	90				
Mar. 27, 1967..	11.6	150					Aug. 18, 1967..	18.8	230				
Apr. 24, 1967..	12.9	136					Sept. 18, 1967..	10.6					

12-1216. ISSAQUAH CREEK NEAR MOUTH, NEAR ISSAQUAH, WASH.

LOCATION.--Lat 47°33'09", long 122°02'48", at gaging station at bridge on SE 56th Street, 1.0 mile upstream from mouth, and 1.5 miles northwest of Issaquah, King County.

DRAINAGE AREA.--54.7 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1964 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Nov. 2, 1966..	52	20		12	4.1	7.1	1.2	60	8.2	3.5	0.1	3.5	A 90	0.12	12.5	47	0	129	7.0	10
Nov. 15, 1966..	229	12		8.0	2.2	3.7	1.1	29	6.4	2.8	0.2	6.5	71	0.10	43.9	29	5	74	6.9	30
Dec. 13, 1966..	1130	11		5.0	1.3	3.2	.8	14	4.8	2.5	0.1	6.6	52	0.07	159	18	6	56	6.6	25
Jan. 9, 1967..	363	14		6.5	1.9	4.0	.5	26	6.0	1.8	0.1	4.7	65	.09	63.7	24	3	72	6.8	10
Feb. 20, 1967..	263	14		6.0	3.2	4.0	.6	32	5.2	2.0	0.0	3.8	70	0.10	49.7	28	2	77	7.1	10
Mar. 17, 1967..	196	15		7.0	3.5	4.6	.6	38	6.0	2.5	0.0	3.1	63	.09	33.3	32	1	87	7.1	10
Mar. 29, 1967..	214	14		6.9	2.5	4.1	.6	34	6.4	1.5	0.0	3.2	60	.08	34.7	28	0	82	7.6	5
Apr. 22, 1967..	192	14		8.0	2.6	4.3	.7	38	5.2	1.8	0.0	2.8	84	.09	32.2	32	0	88	7.4	20
June 13, 1967..	43	17		12	4.3	6.5	1.4	61	7.4	2.2	0.1	2.8	85	.12	9.87	43	0	124	7.4	5
July 2, 1967..	35	17		12	4.9	7.1	1.0	66	8.4	2.5	0.1	1.0	89	.12	8.41	50	0	132	7.5	5
Sept. 13, 1967..	27	21		13	4.7	8.0	2.0	71	8.4	3.0	0.1	1.9	97	.13	7.07	52	0	141	7.5	5
Sept. 18, 1967..	24	23		13	5.1	8.7	2.1	70	11	3.8	0.2	1.7	107	.15	6.93	54	0	148	7.4	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexa-valent chromate (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexa-valent chromate (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	9.5	2100					June 13, 1967.	10.7	24000	0.00	0.00	0.00	
Nov. 15, 1967..	10.0	24000					Sept. 18, 1967.	9.4	24000				
Mar. 29, 1967..	12.3	2400	0.00	0.00	0.00								

12-1265. SAMMAMISH RIVER AT BOTHELL, WASH.

LOCATION.--Lat 47°45'32", long 122°11'35", at 102nd Street bridge at Bothell, King County, and 1 mile downstream from North Creek.
 RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1962, October 1966 to September 1967.
 REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean Silica discharge (cfs)	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 (microhmios at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Nov. 2, 1966..	14	12	9.0	5.1	6.6	1.3	58	0	13	4.2	0.1	2.6		88	0.12		51	4	136	7.3
Nov. 15.....	12	10	9.0	5.0	5.0	1.7	36	0	13	4.8	1.1	6.7		85	.12		42	14	114	6.8
Dec. 27.....	9.7	10	4.3	4.3	5.1	1.1	44	0	14	2.8	1.1	2.8		81	.11		42	6	116	7.1
Jan. 4, 1967..	10	10	4.3	4.3	5.1	1.1	44	0	14	2.8	1.1	2.8		81	.11		42	6	116	7.1
Jan. 24.....	9.9	9.4	4.8	5.0	5.1	1.2	42	0	12	4.0	1.1	2.7		71	.10		42	7	110	7.4
Mar. 28.....	4.8	9.4	4.2	4.2	5.1	1.5	42	0	12	2.5	1.1	1.8		61	.08		41	6	111	7.0
Apr. 25.....	6.6	9.7	4.3	4.3	5.3	1.2	46	0	12	3	0	1.6		A 67	.09		42	4	112	7.2
May 18.....	11	10	4.9	5.6	5.1	1.4	50	0	12	3.5	1.1	1.3		A 75	.10		45	4	117	7.0
June 13.....	12	12	5.3	6.1	6.1	1.2	56	0	15	3.5	1.1	1.2	0.05	87	.12		52	6	133	7.3
July 19.....	18	13	7.9	8.2	8.2	1.8	72	0	24	4.0	1.1	1.9		132	.16		60	18	172	7.3
Aug. 13.....	18	14	7.2	7.2	7.7	1.7	68	0	19	4.0	1.1	2.2		112	.15		65	9	165	7.2
Sept. 18.....	20	14	7.2	7.2	7.7	1.7	68	0	19	4.0	1.1	2.2		112	.15		65	9	165	7.2

A Calculated from determined constituents.

Additional determinations

Date of collection	Dissolved (mg)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dissolved oxygen (mg)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	9.3	2400					Apr. 25, 1967..	12.7	430				
Nov. 15.....	9.1	4600					May 18.....	11.6	230				
Dec. 27.....	--	--					June 13.....	11.8	24000	0.00	0.00	0.01	
Jan. 24.....	--	--					July 19.....	8.1	--				
Feb. 22.....	11.3	11000					Aug. 15.....	7.3	1100				
Mar. 28.....	11.4	750					Sept. 18.....	9.3	2400				

12-1411. SKYKOMISH RIVER AT MONROE, WASH.

LOCATION.--Lat 47°50'48", long 121°58'10", at gaging station at State Highway 203 crossing, and at Monroe, Snohomish County.
0.1 mile downstream from Woods Creek and at mile 25.0.

DRAINAGE AREA.--834 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1966 to September 1967.

Sediment records: October 1966 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 70°F Aug. 15, 16; minimum, 35°F Jan. 4.

Sediment concentrations: Maximum daily, 312 ppm Dec. 13; minimum daily, 1 ppm on many days during August.

Sediment loads: Maximum daily, 29,300 tons Dec. 13; minimum daily, 2 tons Aug. 29.

Remarks.--Discharge estimated on basis of daily stage readings and water discharge from nearby stations. Streamflow above 12,000 cfs gaged.

		Temperature (°F) of water, water year October 1966 to September 1967																															Average
		Day																															
Month		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	--	--	--	--	--	--	--	--	--	--	--	--
November	.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December	.....	44	45	45	--	--	41	39	39	40	40	42	41	45	43	42	43	43	42	43	45	41	40	40	40	40	40	39	41	43	41	41	41
January	.....	41	39	41	35	36	38	39	--	--	--	--	39	39	39	41	39	39	40	41	38	39	41	38	39	39	39	41	40	41	--	40	39
February	.....	42	43	42	42	41	41	40	41	42	43	42	41	39	39	40	40	36	40	41	41	43	42	44	44	42	42	44	42	--	--	39	39
March	.....	42	--	43	43	42	41	42	39	42	40	42	42	42	42	40	44	43	43	44	45	44	44	42	43	43	43	43	42	44	42	44	42
April	.....	48	43	51	46	46	48	49	45	46	47	49	45	49	45	46	44	47	49	48	47	49	50	51	51	47	50	47	49	50	51	--	47
May	.....	50	49	49	52	52	49	50	45	46	38	40	42	50	48	48	53	51	49	52	51	50	49	47	47	47	47	47	47	48	48	49	48
June	.....	52	47	51	52	53	50	48	47	49	47	50	52	53	52	53	56	51	51	55	52	48	51	53	56	55	53	54	55	51	--	51	51
July	.....	60	60	61	55	58	54	57	53	55	59	58	58	57	58	59	60	60	58	57	51	53	55	57	59	61	60	60	62	64	65	--	58
August	.....	66	67	66	65	62	59	59	64	68	66	67	68	69	69	70	70	68	68	68	67	67	68	68	66	66	66	66	67	67	67	66	66
September	.....	65	64	65	65	66	65	64	62	60	59	58	58	59	61	63	65	64	64	64	64	64	62	61	61	62	63	63	63	56	57	--	62

SNOHOMISH RIVER BASIN--Continued

12-1411. SKYKOMISH RIVER AT MONROE, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967
(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..	900		5	3000		16	15000	22	891
2..	1400		8	2500		14	11200	8	242
3..	1200		6	2200		12	8000	C	65
4..	1000		5	2000		11	7000	C	57
5..	1000		5	2200		12	6200	C	50
6..	900		5	2700		15	5200	C	42
7..	1300		7	2500		12	4800	C	39
8..	2700		15	2000		11	4200	C	34
9..	1600		9	2700		15	3600	C	29
10..	1300		9	4000		43	4800	C	39
11..	1200		6	3000		32	7000	8	151
12..	1200		6	2700		29	11600	29	908
13..	1200		6	4000		43	34800	312 A	29300
14..	1100		6	7000		76	22600	67 S	4680
15..	1100		6	7200		78	13500	21	765
16..	1000		5	6000		65	19500	107 S	6050
17..	1300		7	5200		56	20500	50	2770
18..	1200		6	4400		48	20500	54	2990
19..	3500		38	4200		45	18900	64 J	3750
20..	7000		76	4200		45	22600	68 J	4470
21..	3900		42	4300		46	14000	19	718
22..	5200		56	3800		41	10200	9	248
23..	16000		2600	3400		37	6800	C	4
24..	10000		540	3200		35	6400	C	4
25..	7000		76	12000		810	5200	C	4
26..	6000		65	10200		360	4600	C	4
27..	6000		65	6400		69	4000	C	4
28..	4200		45	7000		76	3800	C	4
29..	4600		50	7500		81	5800	C	4
30..	5000		54	13800	33	1230	5200	C	4
31..	3200		35	--	--	--	5000	C	4
Total	104200	--	3862	145100	--	3463	332500	--	58793
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1..	8800	19	451	7040	4	76	3580	C	3
2..	6800	4	73	6110	4	66	3540	C	3
3..	13600	34	1250	7060	8	152	3670	C	3
4..	11100	9	270	16500	70	3120	3410	C	3
5..	7000	7	132	13200	20	713	3100	C	3
6..	5500	C	3	8940	C	3	2950	C	3
7..	4800	C	3	6880	C	3	2840	C	3
8..	6500	C	3	5860	C	3	3060	C	3
9..	7500	C	3	5560	C	3	4230	C	3
10..	7200	C	3	5970	C	3	3940	C	3
11..	15000	--	1600	6040	C	3	3300	C	3
12..	11400	9	277	6130	C	3	3100	C	3
13..	13000	18	632	10400	18	505	2840	C	3
14..	11100	31	929	6920	C	5	2640	C	3
15..	23600	180 S	12300	6240	C	5	2920	C	3
16..	17300	27 S	1380	6280	C	5	4120	C	3
17..	11200	7	212	6440	C	5	3520	C	3
18..	8850	--	120	8940	C	5	4530	C	3
19..	14100	65 S	3380	7010	C	5	4280	C	3
20..	17100	41 S	1990	5500	C	5	4100	C	3
21..	11600	12	376	3420	C	5	4230	C	3
22..	8520	C	2	3940	C	5	5710	14	216
23..	6780	C	2	4010	C	5	13200	27	962
24..	5630	C	2	3750	C	5	8940	10	241
25..	4920	C	2	3580	C	5	6370	C	3
26..	4860	C	2	3500	C	5	3680	C	3
27..	6510	C	2	3260	C	5	4080	C	3
28..	15500	37	1550	3840	C	5	4170	C	3
29..	13400	20	724	--	--	--	3680	C	3
30..	11900	16	514	--	--	--	3460	C	3
31..	8970	5	121	--	--	--	3140	C	3
Total	320040	--	28738	182320	--	6033	130330	--	2251

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.

SNOHOMISH RIVER BASIN--Continued

12-1411. SKYKOMISH RIVER AT MONROE, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Suspended sediment, water year October 1966 to September 1967—Continued												
Day	APRIL				MAY			JUNE				
	Mean discharge (cfs)	Suspended sediment		Tons per day	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Tons per day	
		Mean concentration (ppm)				Mean concentration (ppm)			Mean concentration (ppm)			
1..	2920	C	2	16	2940	C	3	24	7590	C	6	123
2..	2760	C	2	15	3020	C	3	24	11900	C	23	739
3..	2780	C	2	15	3130	C	3	25	12000	C	18	583
4..	3120	C	2	17	3190	C	3	26	10400	C	9	253
5..	3190	C	2	17	3940	C	3	32	11400	C	15	462
6..	3010	C	2	16	5500	C	7	104	13000	C	20	702
7..	2950	C	2	16	6900	C	14	261	12500	C	19	641
8..	3220	C	2	17	8040	C	14	304	10400	C	4	112
9..	3340	C	2	18	9410	C	16	407	8910	C	4	96
10..	3130	C	2	17	5800	C	6	94	8070	C	4	87
11..	2900	C	2	16	5750	C	5	78	7760	C	4	84
12..	2980	C	2	16	5710	C	3	46	7160	C	4	77
13..	3300	C	2	18	5040	C	3	41	8070	C	4	87
14..	3010	C	2	16	4960	C	3	40	9230	C	8	199
15..	2810	C	2	15	5350	C	3	43	12000	C	24	778
16..	2670	C	2	14	7540	C	13	265	13100	C	30	1060
17..	2630	C	2	14	11200	C	20	605	13900	C	30	1130
18..	2560	C	2	14	11200	C	13	393	14600	C	48	1890
19..	2630	C	2	14	10900	C	12	353	14700	C	40	1590
20..	2670	C	2	14	12400	C	20	670	15800	C	57	2430
21..	2900	C	2	16	15200	C	48	1970	14500	C	34	1330
22..	2840	C	2	15	15200	C	42	1720	12200	C	12	395
23..	2700	C	2	15	13100	C	26	920	10100	C	6	164
24..	2710	C	2	15	9820	C	12	318	9560	C	5	129
25..	3010	C	2	16	9110	C	6	148	10900	C	12	353
26..	3080	C	2	17	8630	C	6	140	11400	C	16	492
27..	3200	C	2	17	7560	C	6	122	9690	C	7	183
28..	3570	C	2	19	7790	C	6	126	8380	C	7	158
29..	3340	C	2	18	10400	C	12	337	8090	C	7	153
30..	3080	C	2	17	8940	C	9	217	8090	C	7	153
31..	--	--	--	--	7520	C	6	122	--	--	--	--
Total	89010	--	--	480	245190	--	--	9975	325400	--	--	16633
	JULY				AUGUST				SEPTEMBER			
1..	7200	C	2	39	2040	C	1	6	1120	C	2	6
2..	7740	C	2	42	1910	C	1	5	1390	C	2	8
3..	8040	C	2	43	1780	C	1	5	1320	C	2	7
4..	7790	C	2	42	1750	C	1	5	1200	C	2	6
5..	7010	C	2	38	1730	C	1	5	1030	C	2	6
6..	6130	C	2	33	1700	C	1	5	953	C	2	5
7..	5370	C	2	29	1610	C	1	4	925	C	2	5
8..	5540	C	2	30	1580	C	1	4	904	C	2	5
9..	5100	C	2	28	1530	C	1	4	904	C	2	5
10..	4660	C	2	25	1520	C	1	4	904	C	2	5
11..	4860	C	2	26	1510	C	1	4	932	C	2	5
12..	5250	C	2	28	1430	C	1	4	1030	C	2	6
13..	5480	C	2	30	1410	C	1	4	1170	C	2	6
14..	5460	C	2	29	1400	C	1	4	1110	C	2	6
15..	5020	C	2	27	1350	C	1	4	968	C	2	5
16..	4740	C	2	26	1290	C	1	3	925	C	2	5
17..	4640	C	2	25	1220	C	1	3	897	C	2	5
18..	4470	C	2	24	1230	C	1	3	876	C	2	5
19..	4190	C	2	23	1230	C	1	3	876	C	2	5
20..	3940	C	2	21	1210	C	1	3	841	C	2	5
21..	3920	C	2	21	1160	C	1	3	834	C	2	4
22..	3940	C	2	21	1170	C	1	3	827	C	2	4
23..	3920	C	2	21	1150	C	1	3	792	C	2	4
24..	3630	C	2	20	1110	C	1	3	750	C	2	4
25..	3280	C	2	18	1040	C	1	3	738	C	2	4
26..	3130	C	2	17	1010	C	1	3	813	C	2	4
27..	3100	C	2	17	960	C	1	3	738	C	2	4
28..	2810	C	2	15	937	C	1	3	690	C	2	4
29..	2440	C	2	13	897	C	1	2	630	C	2	3
30..	2160	C	2	12	932	C	1	3	600	C	2	3
31..	2070	C	2	11	968	C	1	3	--	--	--	--
Total	147030	--	--	794	41764	--	--	114	27687	--	--	149
Total discharge for year (cfs-days).....												2090571
Total load for year (tons).....												131285

C Composite period.

SNOHOMISH RIVER BASIN--Continued

12-1490. SNOQUALMIE RIVER NEAR CARNATION, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967
(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 discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	614	C 2	3	2010	C 3	16	9790	C 5	57	1510		
2..	717	C 2	4	1810	C 3	15	7250	C 4	24	470		
3..	980	C 2	5	1690	C 3	14	5770	C 4	11	171		
4..	788	C 2	4	1560	C 3	13	5110	C 4	12	166		
5..	706	C 2	4	1530	C 3	12	4960	C 4	14	187		
6..	671	C 2	4	1860	C 3	15	4500	C 4	6	73		
7..	694	C 2	4	1720	C 3	14	4210	C 4	6	68		
8..	1640	C 2	9	1580	C 3	13	3680	C 4	4	40		
9..	1560	C 2	8	1710	C 3	14	3220	C 4	3	26		
10..	1160	C 2	6	3890	--	60	3520	C 4	12	114		
11..	934	C 2	5	2690	--	40	5700	C 4	18	277		
12..	923	C 2	5	3320	--	50	8050	C 4	27	587		
13..	1010	C 2	5	3330	--	50	17000	506 S	26400			
14..	953	C 2	5	5300	23	329	19400	426 S	23600			
15..	886	C 2	5	6000	31	502	9680	75	1960			
16..	854	C 2	5	5050	16	218	9680	52	1360			
17..	942	C 2	5	4740	9	115	12300	76	2520			
18..	1080	C 2	6	3870	C 5	52	12300	76	2520			
19..	1280	--	20	3480	C 5	47	10100	32	873			
20..	5540	100	1500	3340	C 5	45	12900	58	2020			
21..	3370	--	530	3130	C 5	42	8800	24	570			
22..	4020	--	610	2880	C 5	39	6450	22	383			
23..	9560	192	4960	2520	C 5	34	5160	11	153			
24..	7750	--	3300	2390	C 5	32	4590	10	124			
25..	4310	110	1280	6020	187 S	4300	4430	8	96			
26..	3290	--	830	7120	52 S	1290	3820	6	62			
27..	4140	--	1000	4970	11	148	3340	6	54			
28..	3130	--	340	5550	11	165	3110	23	193			
29..	2480	--	470	5490	10	148	4380	27	319			
30..	3000	C 3	24	8810	71	1690	4740	43	550			
31..	2450	C 3	20	--	--	--	4390	30	356			
Total	71432	--	14976	109360	--	9522	222330	--	67802			
Day	JANUARY				FEBRUARY				MARCH			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	7200	60	1170	5240	5	71	4310	C 4	47			
2..	5760	129	2010	4890	6	79	3610	C 4	39			
3..	8740	122	2880	4790	7	91	3120	C 4	34			
4..	8120	99	2170	9780	143 S	4370	2850	C 4	31			
5..	6970	87	1640	9460	82 S	2370	2620	C 4	28			
6..	5480	27	399	6320	10	171	2570	C 4	28			
7..	4730	27	345	5040	6	82	2420	C 11	72			
8..	5400	25	364	4340	5	59	2360	C 11	70			
9..	7310	27	533	4000	4	43	3010	C 11	89			
10..	6130	15	248	4640	8	100	2570	C 11	76			
11..	9660	16	417	4500	9	109	2290	C 11	68			
12..	7550	13	265	4420	--	80	2120	C 11	63			
13..	9860	16	426	6320	29	495	2070	C 11	61			
14..	12900	14	488	5700	14	215	1950	C 4	21			
15..	15700	13	551	4930	9	120	2080	C 4	22			
16..	12600	19	646	4460	7	84	2710	C 4	29			
17..	8000	24	518	5290	14	200	3550	C 4	38			
18..	6280	25	424	7570	42	858	3330	C 4	36			
19..	9000	22	535	5860	14	222	2990	C 4	32			
20..	14200	35	1340	4780	C 5	65	2890	C 4	31			
21..	9540	35	902	4180	C 5	56	3240	C 4	52			
22..	7000	32	605	3720	C 5	50	3870	C 4	387			
23..	5680	30	460	3320	C 5	45	7130	C 4	1480			
24..	4840	24	314	3190	C 5	43	5510	C 4	193			
25..	4210	22	250	3080	C 5	42	4460	C 4	48			
26..	3850	--	200	2990	C 5	40	3820	C 4	41			
27..	5730	19	294	2790	C 5	38	3510	C 4	38			
28..	11800	82	2610	3110	C 5	42	3100	C 4	33			
29..	9890	49	1310	--	--	--	3020	C 4	33			
30..	8400	34	771	--	--	--	2800	C 4	30			
31..	6310	13	221	--	--	--	2610	C 4	28			
Total	248840	--	25306	138710	--	10240	98490	--	3278			

S Computed by subdividing day.

C Composite period.

SNOHOMISH RIVER BASIN--Continued

12-1490. SNOQUALMIE RIVER NEAR CARNATION, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	2320	C 2	13	2310	C 4	25	4350	5	59
2..	2310	C 2	12	2220	C 4	24	6530	34	599
3..	2340	C 2	13	2300	C 4	25	6810	22	405
4..	2440	C 2	13	2390	C 4	26	5680	7	107
5..	2420	C 2	13	2650	C 4	29	5980	15	242
6..	2220	C 2	12	3120	C 4	34	6520	16	282
7..	2230	C 2	12	3850	9	94	6020	9	146
8..	2240	C 2	12	4450	14	176	4840	7	91
9..	2380	C 2	13	5500	20	297	4260	C 4	46
10..	2300	C 2	12	4460	9	108	4110	C 4	44
11..	2100	C 2	11	3880	C 4	42	4030	C 4	44
12..	2110	C 2	11	3760	C 4	41	3890	C 4	42
13..	2370	C 2	13	3300	C 4	36	4300	C 8	93
14..	2300	C 2	12	3130	C 4	34	5010	C 8	108
15..	2100	C 2	11	3280	C 4	35	5640	C 8	122
16..	2050	C 2	11	5040	12	163	5830	C 8	126
17..	2060	C 2	11	6810	37	680	6070	C 8	131
18..	2040	C 2	11	6530	22	388	6290	13	221
19..	2290	C 2	12	6150	32	531	5970	11	177
20..	2190	C 2	12	7020	22	417	6760	26	475
21..	2280	C 2	12	8560	65	1500	6010	14	227
22..	2180	C 2	12	8150	38	836	5490	12	178
23..	2120	C 2	11	7020	20	379	4410	C 5	60
24..	2170	C 2	12	5400	7	102	4250	C 5	57
25..	2150	C 2	12	4470	5	60	4390	C 5	59
26..	2240	C 2	12	4120	7	78	4500	C 5	61
27..	2250	C 2	12	4320	6	70	4290	C 5	58
28..	2630	C 2	14	4600	19	236	3730	C 5	50
29..	2540	C 2	14	6130	20	331	3550	C 5	48
30..	2380	C 2	13	5420	7	102	3400	C 5	46
31..	--	--	--	4290	5	58	--	--	--
Total	67750	--	365	144830	--	6957	152910	--	4404
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..	2950	C 2	16	1010	C 2	5	604	C 2	3
2..	3080	C 2	17	985	C 2	5	557	C 2	3
3..	3310	C 2	18	939	C 2	5	634	C 2	3
4..	3170	C 2	17	914	C 2	5	677	C 2	4
5..	2940	C 2	16	903	C 2	5	655	C 2	4
6..	2440	C 2	13	920	C 2	5	648	C 2	3
7..	2210	C 2	12	893	C 2	5	637	C 2	3
8..	2090	C 2	11	840	C 2	5	637	C 2	3
9..	1970	C 2	11	820	C 2	4	626	C 2	3
10..	1710	C 2	9	840	C 2	5	740	C 2	4
11..	1740	C 2	9	830	C 2	4	975	C 2	5
12..	1950	C 2	11	820	C 2	4	1290	C 2	7
13..	2030	C 2	11	800	C 2	4	1050	C 2	6
14..	1950	C 2	11	790	C 2	4	800	C 2	4
15..	1730	C 2	9	770	C 2	4	700	C 2	4
16..	1610	C 2	9	750	C 2	4	640	C 2	3
17..	1560	C 2	8	740	C 2	4	610	C 2	3
18..	1500	C 2	8	720	C 2	4	600	C 2	3
19..	1420	C 2	8	700	C 2	4	530	C 2	3
20..	1390	C 2	8	670	C 2	4	570	C 2	3
21..	1350	C 2	7	680	C 2	4	560	C 2	3
22..	1320	C 2	7	700	C 2	4	550	C 2	3
23..	1270	C 2	7	670	C 2	4	540	C 2	3
24..	1290	C 2	7	640	C 2	3	530	C 2	3
25..	1260	C 2	7	620	C 2	3	515	C 2	3
26..	1250	C 2	7	589	C 2	3	494	C 2	3
27..	1200	C 2	6	569	C 2	3	484	C 2	3
28..	1150	C 2	6	558	C 2	3	462	C 2	2
29..	1140	C 2	6	545	C 2	3	452	C 2	2
30..	1010	C 2	5	545	C 2	3	484	C 2	3
31..	1020	C 2	6	873	C 2	5	--	--	--
Total	56010	--	303	23643	--	127	19251	--	102
Total discharge for year (cfs-days).....									1353556
Total load for year (tons).....									143381

C Composite period.

SNOHOMISH RIVER BASIN--Continued

12-1555. SNOHOMISH RIVER AT SNOHOMISH, WASH.

LOCATION.--Lat 47°54'40", long 122°05'50", at gaging station at bridge on State Highway 9 in Snohomish, Snohomish County, and 0.8 mile downstream from Pilchuck River.

DRAINAGE AREA.--1,714 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

Water temperatures: July 1959 to September 1961.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col.
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-bicarbonate		
Nov. 2, 1966..		5.8		5.0	0.6	1.7	0.4	18	0	2.8	1.0	0.1	0.8	28	0.04		15	0	39	7.0
Nov. 15.....		6.1		4.0	1.0	1.7	.5	14	0	3.4	1.0	.1	2.2	A 27	.04		14	3	38	6.8
Dec. 28.....		7.9		4.7	1.3	2.0	.4	21	0	3.4	1.2	.1	1.6	A 35	.03		17	2	38	7.0
Jan. 24, 1967.		7.2		4.7	1.3	1.8	.5	18	0	5.8	2.0	.1	1.9	A 34	.03		17	2	46	6.8
Feb. 22.....		7.2		3.3	1.3	1.7	.4	20	0	3.0	1.5	.1	1.2	A 31	.04		16	0	44	7.1
Mar. 28.....		6.8		4.8	1.2	2.0	.4	20	0	3.0	1.5	.1	.8	31	.05		18	0	44	7.5
Apr. 18.....		7.3		5.3	1.2	2.3	.8	22	0	3.0	2.5	.1	1.8	A 34	.05		18	0	49	7.1
May 18.....		4.3		2.8	.6	1.1	.5	12	0	1.8	.0	.1	.4	17	.02		10	0	26	6.9
June 13.....		4.6		3.0	.7	1.2	.4	14	0	1.8	.5	.1	2.0	19	.03		11	0	27	7.2
July 20.....		5.1		3.5	1.0	1.3	.4	17	0	1.8	.5	.1	.2	A 35	.03		19	0	52	6.9
Aug. 15.....		7.0		5.6	1.2	2.5	.9	23	0	2.2	1.5	.0	.3	36	.05		20	0	56	7.3
Sept. 19.....		6.8		5.6	1.4		.8	28	0	2.4	1.5	.0	.3							

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	11.1	430					Apr. 18, 1967.	11.3	930				
Nov. 15.....	11.2	2400					Apr. 19.....	12.1	930				
Dec. 28.....	--	--					June 13.....	12.2	--	0.00	0.00	0.00	
Jan. 24, 1967.	--	--					July 20.....	9.7	--				
Feb. 22.....	12.2	36					Aug. 15.....	8.4	150				
Mar. 28.....	12.1	430					Sept. 19.....	8.9	24000				

12-1685. PILGRUCK CREEK NEAR BRYANT, WASH.

LOCATION: --Lat 48°16'00", long 122°09'45", temperature recorder at gaging station 500 feet upstream from highway bridge, and 2 miles north of Bryant, Snohomish County.
 INSTRUMENTS: Beckman thermograph, model 22, 0.
 RECORDS AVAILABLE: --Water temperatures: March 1952 to September 1957.
 EXTREMES, 1952-57: --Water temperatures: Maximum, 74° Aug. 16; minimum, 39° on several days during December, February and March.
 EXTREMES, 1952-57: --Water temperatures: Maximum, 82° July 28, 1956; minimum, 33° on many days during winter months.

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	57	56	53	53	53	53	53	53	51	50	51	50	48	47	47	45	46	47	47	46	47	46	45	48	50	51	50	48	50	50	50	49		
Minimum	55	53	51	50	51	52	53	51	49	48	50	48	47	46	45	44	45	45	47	46	46	45	46	48	49	50	48	48	48	48	49	48		
November																																		
Maximum	49	48	47	45	46	45	44	44	43	42	42	42	43	44	44	44	44	44	44	45	45	44	44	44	44	44	44	44	44	45	45	44		
Minimum	48	47	45	45	45	44	44	43	42	42	41	42	42	43	44	44	44	44	44	44	45	44	44	44	44	44	44	44	44	44	45	45	43	
December																																		
Maximum	45	45	45	45	44	44	44	44	42	39	40	41	42	43	43	44	44	44	44	44	44	44	43	42	42	42	42	41	41	41	41	42	42	
Minimum	45	45	45	44	44	44	44	44	42	39	39	40	41	42	43	44	44	44	44	44	44	44	43	42	42	42	42	41	41	41	41	41	41	
January																																		
Maximum	42	42	42	42	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	40	40	40	40	40	40	40	40	41	41	40	40	
Minimum	41	41	41	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	40	40	40	40	40	40	40	40	40	40	40	40	
February																																		
Maximum	40	41	41	41	41	41	41	41	42	42	42	42	41	41	41	40	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	40	
Minimum	40	40	41	41	41	41	40	41	42	42	41	42	41	41	41	40	40	40	40	40	39	40	40	40	40	40	40	40	40	40	40	40	40	
March																																		
Maximum	40	40	40	40	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	
Minimum	40	40	40	39	39	40	40	40	40	40	39	39	39	39	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	
April																																		
Maximum	42	42	43	43	43	43	43	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	
Minimum	40	41	41	42	42	41	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	44	45	44	44	43	43	43	43	42	
May																																		
Maximum	45	45	45	49	48	48	47	47	46	45	45	45	47	47	51	53	53	54	55	55	55	54	52	52	53	55	55	55	55	55	55	55	52	
Minimum	44	44	45	45	45	46	47	47	46	45	45	45	46	47	49	50	50	50	52	52	51	51	50	52	53	55	55	55	55	55	55	55	51	
June																																		
Maximum	57	56	54	59	60	59	57	56	59	57	56	58	58	62	63	63	64	66	68	66	63	59	61	66	69	66	66	64	66	66	66	66	61	
Minimum	52	53	52	53	56	57	56	55	55	55	55	55	55	56	58	59	60	61	62	63	59	57	57	59	62	63	62	61	60	60	60	60	57	
July																																		
Maximum	67	69	70	68	69	65	65	63	64	67	70	69	69	69	70	68	65	63	62	65	66	68	69	67	67	67	62	63	67	68	70	69	66	
Minimum	60	62	64	66	64	62	60	61	60	59	62	64	63	61	60	60	62	61	61	61	60	61	60	61	61	60	61	60	59	61	63	61	61	
August																																		
Maximum	70	69	70	68	64	61	61	67	70	71	71	72	72	73	74	71	70	70	67	69	69	64	66	65	65	65	65	65	65	65	65	65	65	
Minimum	59	60	60	60	60	60	58	61	63	64	62	62	62	63	63	61	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
September																																		
Maximum	64	66	66	66	65	65	63	64	61	62	59	58	58	59	62	63	62	63	63	63	63	60	59	58	60	60	60	58	58	58	58	58	58	61
Minimum	61	62	59	60	59	61	58	59	59	57	55	54	55	57	55	57	55	59	58	58	59	56	54	54	55	54	54	55	57	55	55	55	57	

12-1825. CASCADE RIVER AT MARBLEMOUNT, WASH.

LOCATION:--Lat 48°31'25", long 121°23'00", temperature recorder at gaging station 1.5 miles downstream from Boulder Creek, 2 miles east of Marblemount, Skagit County, and 2.5 miles upstream from mouth.

DRAINAGE AREA:--168 square miles.

RECORDING METHOD:--Water temperatures: May 1952 to September 1964, October 1965 to September 1967.

EXTREMES: 1714642.---water temperatures: 50°F. Aug. 26-29, 1958, on several days during August 1961.

REMARKS: 1952-63, 1965-67.---water temperatures: Maximum 58°F July 27-29, 1958, on several days during August 1961.

Aug. 12, 13, 1963: minimum (1952-63, 1965-66), freezing point Feb. 1, 2, 18, 1956, Nov. 16, 1959, Jan. 19, 1960, Jan. 5, 1966.

REMARKS:--Clock stopped Dec. 22 to Jan 18 and Apr. 28 to May 17; temperature ranges, 37°F to 39°F and 41°F to 47°F, respectively.

Month	Temperature (°F) of water, water year October 1966 to September 1967																												Average			
	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	
October																																
Maximum	48	47	47	47	47	47	47	47	47	47	45	47	49	47	47	44	46	48	47	44	42	42	42	43	44	44	44	43	43	43	45	
Minimum	47	47	45	46	47	47	47	47	45	45	45	45	43	42	40	44	43	44	42	42	42	42	42	42	43	44	43	42	42	43	43	
November																																
Maximum	48	48	46	43	43	43	42	42	42	42	41	40	40	40	40	41	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	
Minimum	43	44	43	42	42	42	42	41	40	40	40	40	40	40	40	41	42	41	41	41	41	41	41	41	41	41	41	40	41	41	41	
December																																
Maximum	41	41	41	41	41	41	40	40	40	39	40	39	39	39	39	39	39	40	40	40	39	---	---	---	---	---	---	---	---	---	---	
Minimum	41	41	41	41	41	41	40	40	40	39	39	39	39	39	39	39	39	40	39	39	39	---	---	---	---	---	---	---	---	---	---	
January																																
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
February																																
Maximum	38	38	38	38	38	38	38	38	38	38	39	39	37	37	38	38	38	38	38	39	39	39	39	39	39	40	40	40	40	40	40	
Minimum	38	38	38	38	38	38	38	38	38	38	39	39	37	37	38	38	38	37	38	38	39	39	39	39	39	39	40	40	40	40	40	
March																																
Maximum	39	40	40	39	40	40	40	40	39	39	39	40	39	40	40	40	40	40	40	40	41	41	40	40	40	40	41	41	41	41	41	
Minimum	39	39	39	38	39	40	40	37	39	39	39	37	39	40	40	40	40	40	40	40	40	40	39	39	39	40	40	39	40	39	40	
April																																
Maximum	42	42	43	43	42	43	43	42	42	43	46	43	41	41	42	46	46	43	43	43	43	46	46	46	46	46	46	46	46	46	46	
Minimum	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	42	42	42	42	42	42	42	42	43	42	41	---	---	---	---	
May																																
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
June																																
Maximum	46	44	43	46	46	45	43	42	42	42	45	46	47	47	47	47	48	49	49	49	46	47	48	49	49	48	48	47	49	49	46	
Minimum	43	42	42	42	42	42	42	42	42	42	42	42	42	43	44	44	45	46	46	46	46	46	46	46	46	46	46	46	47	45	---	
July																																
Maximum	50	51	51	49	50	49	49	49	49	49	51	52	51	52	52	52	51	50	49	52	52	53	54	54	53	54	54	53	54	55	51	51
Minimum	46	47	47	47	47	47	46	47	47	47	48	49	48	48	48	49	49	49	49	49	49	49	49	50	51	51	51	51	51	51	48	48
August																																
Maximum	54	55	54	54	54	54	51	54	54	55	55	55	55	56	56	55	55	54	54	54	54	54	54	54	54	54	54	54	56	56	54	54
Minimum	51	51	52	51	51	51	51	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
September																																
Maximum	55	54	56	55	56	54	54	54	53	53	52	52	52	52	52	52	56	56	54	54	55	55	52	52	53	53	53	52	52	52	52	52
Minimum	54	53	52	52	53	53	52	52	53	52	51	51	50	50	50	52	52	52	52	53	54	53	52	51	51	52	52	52	52	52	52	52

SKAGIT RIVER BASIN--Continued

12-2005. SKAGIT RIVER NEAR MOUNT VERNON, WASH.

LOCATION (revised) Lat 48°22'40", long 122°20'25", at U.S. Interstate Highway 5, 1,200 feet downstream from gaging station, 1 mile north of Mount Vernon, Washington, 49 miles upstream from Nookschamps Creek.

DRAINAGE AREA 3,093 square miles, of which 400 square miles is in Canada.

RECORDS AVAILABLE--Chemical analyses: July 1959 to September 1967.

Water temperatures: July 1962 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 80°F Aug. 15-17, 27; minimum, 39°F Jan. 5-8.

EXTREMES, 1962-67.--Water temperatures: Maximum, 82°F Aug. 8, 9, 30, 31, 1963; minimum, 36°F Dec. 17, 1964.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH or Col		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, silum	Non-carbonate				
Nov. 2, 1966..	12200	6.3		6.5	1.2	1.2	0.5	25	0	4.6	0.5	0.1	0.2	34	0.05	1120	21	0	0	51	7.4	5
Nov. 16.....	17200	5.3		7.0	1.1	1.1	.8	24	0	4.4	.2	.2	.5	32	.04	1490	22	3	3	50	7.5	10
Dec. 7.....	17600	7.7		8.0	1.1	1.4	.5	29	0	4.6	.5	.1	.7	44	.06	2090	28	4	4	63	7.2	5
Jan. 24, 1967.	18600	9.9		8.4	1.8	1.3	.7	30	0	5.2	1.0	.1	.5	A	.06	2090	28	4	4	63	7.2	5
Feb. 10.....	18600	7.9		8.4	1.8	1.3	.7	30	0	5.2	1.0	.1	.5	47	.06	1730	30	4	4	66	7.1	5
Mar. 28.....	15600	7.0		8.0	1.5	1.4	.6	30	0	4.8	.5	.1	.4	38	.05	1600	26	2	2	65	7.3	5
Apr. 25.....	12000	7.5		9.0	1.6	1.6	.9	34	0	4.8	1.0	.1	.4	45	.06	1460	29	1	1	69	7.3	0
May 23.....	28800	5.0		4.8	.9	.9	.6	18	0	3.0	.0	.1	.4	26	.04	2020	16	0	0	39	7.0	0
June 13.....	28300	5.1		5.5	.9	1.2	.7	22	0	3.4	.5	.0	.1	30	.04	2290	17	0	0	42	7.3	5
July 20.....	18700	5.1		5.0	1.1	1.1	.6	21	0	3.4	.2	.1	.1	26	.04	1510	17	0	0	41	7.2	5
Aug. 19.....	13700	6.1		5.3	1.2	1.1	.6	21	0	3.4	.2	.1	.1	26	.04	962	17	1	1	41	7.2	5
Sept. 19.....	8110	6.3		6.5	1.2	1.3	.4	26	0	4.0	.5	.1	.3	36	.05	788	21	0	0	52	7.2	5

--A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	NPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	NPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966...	11.4	200					Apr. 25, 1967.	12.6	91	0.00	0.00	0.00	
Nov. 16.....	11.5	430					May 23.....	11.8	430				
Dec. 7.....	--	--					June 13.....	10.5	36				
Jan. 24, 1967.	--	--					July 20.....	10.5	1500				
Feb. 10.....	12.4	36					Aug. 15.....	10.1	1500				
Mar. 28.....	12.2	91					Sept. 19.....	10.2	1500				

SAMISH RIVER BASIN

12-2015. SAMISH RIVER NEAR BURLINGTON, WASH.

LOCATION --Lat 48°32'55", long 123°20'00", at Washington State Fisheries fish trap, 0.2 mile upstream from bridge on U.S. Highway 99, 4.9 mile north of Burlington, Skagit County, 0.3 mile upstream from gaging station, and 0.2 mile downstream from Friday Creek.

DRAINAGE AREA --87.8 square miles.

RECORDS AVAILABLE --Chemical analyses: July 1959 to July 1960, October 1966 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boride (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium, Sodium				
Nov. 2, 1966..	119	8.2		9.0	2.6	3.5	0.7	38	0	5.6	3.0	0.1	2.2		56	0.08	18.0	33	2	86	7.2	15
Nov. 16.....	326	6.7		9.5	2.7	2.6	1.2	23	0	5.0	2.8	.1	3.7		47	.06	41.4	27	7	68	7.0	30
Nov. 23.....	470	6.3		6.4	1.9	3.1	.7	22	0	5.2	3.0	.1	3.9		44	.06	54.8	23	5	65	7.0	15
Jan. 24, 1967.	362	6.6		6.7	2.4	2.7	.5	26	0	5.2	3.0	.1	3.5		46	.06	45.0	26	5	68	7.4	10
Feb. 22.....	352	5.9		6.0	1.9	2.7	.5	24	0	4.4	2.0	.0	3.1		39	.05	37.1	23	4	62	7.2	10
Mar. 28.....	180	7.0		7.0	2.3	2.8	.8	30	0	5.2	2.0	.1	2.2		48	.07	23.3	27	2	71	7.7	5
Apr. 25.....	135	6.0		7.6	2.3	2.5	.4	30	0	4.4	3.0	.1	1.8		44	.06	16.0	28	4	67	7.1	5
May 23.....	98	8.5		9.5	2.6	3.0	.9	41	0	4.2	1.2	.1	2.0	0.03	53	.09	9.73	34	1	102	7.4	5
June 30.....	25	13		11	4.3	3.6	1.2	56	0	5.0	2.8	.0	2.7		71	.10	4.79	45	0	110	7.4	5
Aug. 15.....	23	13		12	4.5	4.1	1.2	58	0	5.4	3.0	.1	2.5		77	.10	4.78	49	1	117	7.4	5
Sept. 19.....																						

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hera-t chromatium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hera-t chromatium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	11.2	430					Apr. 25, 1967.	13.1	140				
Nov. 16.....	10.6	2400					May 23.....	11.6	2400				
Dec. 27.....	--	--					June 13.....	12.4	930				
Jan. 24, 1967.	12.4	73					July 30.....	8.6	2400				
Mar. 28.....	11.6	150					Sept. 19.....	10.8	11000				

WHATCOM CREEK BASIN

12-2025. WHATCOM LAKE NEAR BELLINGHAM, WASH.

LOCATION.--Lat 48°45'45" long 122°25'10" at bridge on Electric Avenue, 2.1 miles east of Bellingham, Whatcom County.

RECORDS AVAILABLE.--Chemical analyses: October 1964 to September 1967.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	Color	pH
												Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-bicarbonate			
Nov. 2, 1966..		2.1		6.0	1.3	3.1	0.4	25	0	5.0	0.1	35	0.05		21	0	58	7.0	5
Nov. 16.....		1.7		5.5	1.6	2.8	.8	23	0	5.6	.2	A 32	.04		20	0	57	7.2	5
Dec. 27.....		1.8		5.0	1.6	3.6	.4	22	0	5.2	.1	A 35	.05		19	1	59	7.2	10
Jan. 24, 1967.		2.4		5.6	1.3	3.1	.5	22	0	5.6	.1	A 34	.05		22	4	58	7.1	5
Feb. 28.....		1.8		5.1	1.3	3.1	.5	22	0	5.2	.1	A 32	.04		20	2	57	7.1	5
Mar. 28.....		1.6		5.1	1.7	3.2	.5	22	0	5.2	.1	A 32	.04		20	2	57	7.3	5
Apr. 24.....		1.7		4.9	1.6	3.3	.7	22	0	5.2	.1	31	.04		18	0	57	7.0	0
May 23.....		1.0		5.3	1.7	3.1	.5	21	0	5.0	.1	28	.04		20	3	55	7.0	0
June 13.....		1.2		5.0	1.6	3.0	.7	24	0	5.2	.2	32	.04		19	0	56	7.3	5
July 20.....		1.0		5.5	1.6	3.0	.6	24	0	5.0	.1	36	.05		20	0	57	7.3	5
Aug. 19.....		1.1		5.1	1.7	2.9	.8	24	0	5.0	.1	33	.05		19	0	57	7.3	5
Sept. 19.....		1.2		5.0	1.6	3.1	.8	24	0	5.0	.1	35	.05		19	0	57	7.2	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform counts per 100 ml)	Hexa-valent chromium (Cr ⁶)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform counts per 100 ml)	Hexa-valent chromium (Cr ⁶)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	9.5	0					May 23, 1967..	11.6	36				
Nov. 16.....	10.5	230					June 13.....	11.1	930				
Feb. 22, 1967.	12.7	230					July 20.....	8.2	--				
Mar. 28.....	11.9	36					Aug. 15.....	9.5	0				
Apr. 24.....	13.4	0					Sept. 19.....	8.6	36				
										0.00	0.00	0.00	

NOOKSACK RIVER BASIN

12-2131. NOOKSACK RIVER AT FERDALE, WASH.

LOCATION --Lat 48°50'45", long 122°35'15", at Main Street Bridge at Ferdale, Whatcom County, 1.3 miles downstream from Tennile Creek.
 RECORDS AVAILABLE: October 1961 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio (micro-mhos at 25°C)	Col or pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Nov. 2, 1966..	2100	8.8	10	3.6	3.6	2.8	0.6	41	0	10	1.8	0.1	0.9	A 59	0.08	335	40	1		96	7.4	5
Nov. 16.....	4600	7.4	8.0	2.9	2.9	2.4	0.8	32	0	7.6	2.2	0.2	2.5	B 63	0.09	782	32	7		78	7.2	25
Dec. 27.....	3920	9.4	12	3.0	3.0	3.0	0.7	44	0	11	2.5	0.1	1.2	77	0.10	815	42	7		102	7.4	10
Jan. 24, 1967.	4580	9.2	11	3.8	3.1	3.1	0.8	42	0	9.2	3.0	0.1	1.9	A 70	0.10	866	43	8		101	7.3	10
Feb. 22.....	2830	11	12	4.1	3.3	3.3	0.9	47	0	9.8	3.0	0.1	1.8	A 69	0.09	527	47	8		108	7.6	10
Mar. 28.....	3350	9.1	10	3.8	2.9	2.9	0.6	43	0	8.0	2.5	0	1.3		0.08	561	41	6		97	7.3	10
Apr. 25.....	2020	9.4	11	3.9	3.9	3.5	0.9	46	0	9.4	3.0	0.1	0	63	0.09	344	44	6		107	7.4	5
May 23.....	7380	6.0	11	2.1	2.1	1.5	0.7	26	0	5.6	1.0	0.1	0.5	37	0.09	752	25	4		58	7.7	5
June 13.....	5830	5.8	6.0	2.6	2.6	1.5	0.6	27	0	6.2	1.5	0.1	0.01	38	0.05	578	26	4		59	7.3	5
July 20.....	2910	6.7	8.5	2.4	2.0	2.0	0.5	30	0	9.4	1.5	0.1	1.1	48	0.07	377	31	7		75	7.4	5
Aug. 15.....	2180	6.7	8.1	2.3	1.9	1.9	1.0	28	0	10	1.0	0	0.2	47	0.06	277	30	7		71	7.2	5
Sept. 19.....	1380	8.1	11	2.9	2.4	2.4	0.7	36	0	11	1.8	0	0.1	60	0.08	224	40	10		91	7.2	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 2, 1966..	11.2	280					Apr. 25, 1967.	12.5	750				
Nov. 16.....	11.3	430					May 23.....	11.8	930				
Dec. 27.....	--	--					June 13.....	13.3	230	0.00	0.00	0.00	
Jan. 24, 1967.	--	--					July 20.....	9.9	--				
Feb. 22.....	12.0	36					Aug. 15.....	9.6	24000				
Mar. 28.....	11.6	230					Sept. 19.....	10.1	11000				

KOOTENAI RIVER BASIN

112-3018.5. KOOTENAI RIVER AT WARLAND BRIDGE, NEAR LIBBY, MONT.

LOCATION.--Lat 48°30'00", long 115°17'02" (revised), temperature recorder at gaging station, on right bank at county road bridge, 0.1 mile downstream from Barron Creek, 14.5 miles northeast of Libby, Lincoln County, and at mile 228.6.

DRAINAGE AREA.--8,892 square miles.

RECORDS AVAILABLE.--Water temperatures: June 1962 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 67°F Aug. 19, 20.

EXTREMES, 1962-67. --Water temperatures: Maximum, 68°F Aug. 14, 15, 1963.

REMARKS.--Recorder removed Nov. 18 to May 4. Recorder stopped June 18-28.

Y

Temperature (°F) of water, water year October

[illegible][illegible]

KOOTENAI RIVER BASIN--Continued

12-3020. FISHER RIVER NEAR JENNINGS, MONT.

LOCATION.--Lat 48°14'50", long 115°17'30", temperature recorder at gaging station, on left bank 0.4 mile downstream from bridge, 2.3 miles downstream from Wolf Creek, 8.5 miles southeast of Jennings, Lincoln County, and 8.6 miles upstream from mouth.

DRAINAGE AREA.--780 square miles.

ICE DENSE AVAILABLE.--Water temperatures: May to November 1963, May 1964 to September 1967.

EXTREMES.--Water temperatures: Maximum, 67° F., July 25, 1965; minimum (1963-64), freezing point Nov. 21, 22, 1963.

REMARKS.--Recorder removed Nov. 17 to May 1. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, water year October 1966 to September 1967

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	51	51	50	51	51	52	53	53	47	48	48	47	45	44	44	44	44	42	43	43	42	44	47	47	46	47	46	45	45	45	47
Minimum	50	51	49	48	49	49	50	52	46	45	46	47	44	42	43	42	43	40	39	42	42	41	42	44	45	44	46	44	44	44	43	45
November																																
Maximum	43	41	40	39	39	39	39	37	37	37	37	35	36	38	39	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	40	40	39	37	39	37	39	36	36	36	35	35	35	36	36	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May																																
Maximum	--	45	45	47	47	47	47	47	46	43	40	42	44	45	47	47	47	48	48	49	49	48	48	47	49	50	47	46	46	46	46	
Minimum	--	41	41	41	41	45	44	43	43	40	39	40	41	43	44	43	43	42	42	43	43	43	42	42	41	44	44	45	43	44	42	
June																																
Maximum	51	50	47	45	52	51	49	48	48	49	50	47	51	53	54	54	53	55	56	56	53	53	53	55	56	57	58	58	57	--	--	--
Minimum	44	45	44	45	43	46	47	45	45	45	44	45	44	45	48	47	47	48	49	49	51	49	51	52	53	53	55	54	--	--	--	--
July																																
Maximum	58	60	60	61	60	60	60	60	57	59	60	62	64	64	63	62	64	64	62	61	62	63	64	67	66	64	64	64	64	63	62	
Minimum	54	55	57	58	57	56	56	55	55	55	57	59	60	59	58	59	60	59	58	57	58	57	58	59	60	59	59	60	59	59	57	
August																																
Maximum	62	64	63	65	65	64	60	60	62	64	63	64	65	64	64	64	65	64	65	63	64	65	65	62	60	59	59	61	62	63	63	63
Minimum	57	57	58	59	59	58	55	57	59	59	60	60	60	60	60	60	60	60	59	61	59	58	57	55	55	57	55	57	55	57	58	58
September																																

12-3045. YAAK RIVER NEAR TROY, MONT.

LOCATION (revised).--Lat 48°33'43", long 115°58'09", temperature recorder at gaging station, on right bank 500 feet upstream from bridge on U.S. Highway 2, 0.2 mile upstream from mouth, and 7.5 miles northwest of Troy, Lincoln County.

DRAINAGE AREA.--766 square miles.

RECORDS AVAILABLE.--Water temperatures: May to November 1963, May 1964 to September 1967.

REMARKS.--Water temperatures: Maximum, 73°F. Second day of rising stage, Aug. 1, 1963.

EXTREMES, 1963-67.--Water temperatures: Maximum, 75°F Aug. 9, 1965, Aug. 3, 1966; minimum (1963-64), freezing point Nov. 30, 1963.

REMARKS.--Recorder removed Nov. 18 to May 3. Recorder stopped July 15-17, Sept. 5-7. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
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	
October	58	54	54	53	54	54	55	55	54	50	50	50	49	48	46	46	45	43	42	45	45	44	43	42	42	43	46	47	47	47	45	45	48
Maximum	53	53	50	50	50	51	52	54	49	46	48	49	47	45	44	44	43	40	40	42	43	42	42	43	46	46	46	46	45	44	44	43	46
Minimum	44	42	41	40	40	39	38	36	37	37	37	36	36	36	37	39	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	41	41	40	38	39	39	38	36	36	36	36	35	35	35	36	37	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December	58	54	54	53	54	54	55	55	54	50	50	50	49	48	46	46	45	43	42	45	45	44	43	42	42	43	46	47	47	47	45	45	48
Maximum	53	53	50	50	50	51	52	54	49	46	48	49	47	45	44	44	43	40	40	42	43	42	42	43	46	46	46	46	45	44	44	43	46
Minimum	44	42	41	40	40	39	38	36	37	37	37	36	36	36	37	39	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	61	63	65	65	66	65	64	62	61	64	65	68	70	71	--	--	--	70	65	64	66	66	67	69	69	70	70	70	70	69	67	66	
Maximum	55	56	59	61	63	61	60	60	59	58	59	62	66	64	--	--	--	61	63	62	62	63	65	65	66	67	67	67	67	66	65	62	
Minimum	64	64	65	67	68	63	61	61	64	65	66	67	67	67	66	66	66	65	65	65	63	63	61	60	62	63	64	64	64	64	64	64	
February	70	69	68	69	--	--	--	64	64	61	61	61	61	61	64	65	64	66	67	65	60	60	60	60	60	60	60	59	59	--	63	57	
Maximum	64	64	61	60	--	--	--	58	60	58	57	57	55	55	56	57	57	56	57	59	60	59	55	53	53	53	53	54	55	56	--	57	
Minimum	64	64	61	60	--	--	--	58	60	58	57	57	55	55	56	57	57	56	57	59	60	59	55	53	53	53	53	54	55	56	--	57	

KOOTENAI RIVER BASIN--Continued

12-3050. KOOTENAI RIVER AT LEONIA, IDAHO

LOCATION.--Lat 48°37'04" long 116°02'47" temperature recorder at gaging station at Leonia, Boundary County, 450 feet east of Montana-Idaho State line, 0.5 mile upstream from Boulder Creek, and at mile 171.6.

DRAINAGE AREA.--11,740 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: July 1962 to May 1963, April 1965 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 67°F Aug. 22.

EXTREMES, 1962-63, 1965-67.--Water temperatures: Maximum, 68°F Aug. 4, 1966; minimum (1962-63), freezing point on many days during winter months.

Month	Temperature (°F) of water, water year October 1966 to September 1967																												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	55	54	53	51	52	52	52	52	52	51	50	50	49	48	47	46	45	44	44	44	44	44	43	43	43	44	44	44	44	43	47	
Maximum	55	54	53	51	52	52	52	52	52	51	50	50	49	48	47	46	45	44	44	44	44	44	43	43	43	44	44	44	44	43	47	
Minimum	54	53	51	51	52	52	52	52	52	50	50	49	48	47	46	45	44	44	44	44	44	43	43	43	42	43	43	43	44	43	46	
November	43	42	41	40	39	38	38	37	36	35	35	33	33	33	34	35	36	37	37	37	37	37	37	36	37	37	37	36	37	37	37	
Maximum	43	42	41	40	39	38	38	37	36	35	35	33	33	33	34	35	36	37	37	37	37	37	37	36	37	37	37	36	37	37	37	
Minimum	42	41	40	39	38	38	37	36	35	35	33	33	33	33	34	35	36	37	37	37	37	37	36	36	37	37	36	36	36	37	36	
December	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	
Maximum	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	
Minimum	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	
January	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
February	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
March	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
April	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May	47	47	47	48	49	50	50	49	49	47	45	46	47	48	49	50	50	50	50	50	50	50	49	49	49	49	49	49	49	49	49	
Maximum	47	47	47	48	49	50	50	49	49	47	45	46	47	48	49	50	50	50	50	50	50	50	49	49	49	49	49	49	49	49	49	
Minimum	45	47	46	47	47	49	49	48	47	45	44	46	47	48	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	
June	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
July	56	57	57	58	59	59	59	58	58	57	57	58	60	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
Maximum	56	57	57	58	59	59	59	58	58	57	57	58	60	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
Minimum	56	57	57	58	59	59	59	58	58	57	57	58	60	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
August	63	63	63	63	63	63	63	62	61	62	63	64	64	65	65	65	65	66	66	66	66	67	66	66	66	66	65	64	64	63	64	
Maximum	63	63	63	63	63	63	63	62	61	62	63	64	64	65	65	65	65	66	66	66	66	67	66	66	66	66	65	64	64	63	64	
Minimum	62	62	62	62	63	63	62	61	61	62	63	64	64	65	65	65	65	66	66	66	66	67	66	66	66	66	65	64	63	62	63	
September	65	66	66	66	65	65	66	65	62	62	61	60	58	58	58	59	59	59	59	60	61	61	61	59	58	57	57	57	57	57	57	
Maximum	64	65	65	65	64	64	64	62	62	61	60	58	57	57	57	58	58	58	58	59	60	60	60	59	57	56	56	56	56	56	56	
Minimum	64	65	65	65	64	64	64	62	62	61	60	58	57	57	57	58	58	58	58	59	60	60	60	59	57	56	56	56	56	56	56	

12-3185. KOOTENAI RIVER NEAR COPELAND, IDAHO

LOCATION (revised).--Lat 48°54'43", long 116°24'59", at Andrews Ranch, 0.8 mile downstream from Mission Creek 1.5 miles northwest of Copeland, and at mile 123.2.

DRAINAGE AREA.--13,400 square miles, approximately, upstream from gaging station.

RECORDS AVAILABLE.--Water temperatures: May 1966 to September 1967.

Sediment records: May 1966 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 70°F Aug. 20; minimum, 34°F on several days during January.

Sediment concentrations: Maximum daily, 620 ppm May 24; minimum daily, 3 ppm on many days during August and September.

Sediment loads: Maximum daily, 14,000 tons Dec. 11, 12, Sept. 30.

EXTREMES, 1966 to September 1967.--Water temperatures: Maximum, 70°F Aug. 20, 1966; minimum, 34°F on several days during January 1967.

Sediment concentrations: Maximum daily, 740 ppm May 30, 1966; minimum daily, 1 ppm on many days.

Sediment loads: Maximum daily, 155,000 tons May 30, 1966; minimum daily, 41 tons Dec. 11, 12, Sept. 30, 1967.

REMARKS.--This station is maintained by the United States in cooperation with Canada.

Temperature (°F) of water, water year October 1966 to September 1967																																	
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.....	--	61	--	57	--	--	--	54	--	54	--	54	--	54	--	50	--	46	--	--	--	45	--	45	--	45	--	45	--	45	--	45	--
November.....	--	45	--	45	--	--	--	41	--	--	--	39	--	39	--	36	--	36	--	37	37	37	37	37	37	37	37	37	37	37	37	--	
December.....	37	37	37	37	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	37	
January.....	36	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	
February.....	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	
March.....	39	39	39	39	39	39	39	39	39	39	39	37	37	37	37	37	37	37	37	37	37	37	39	39	39	39	39	41	43	43	43	39	
April.....	43	43	43	45	45	45	45	46	46	--	46	46	46	46	46	46	46	46	45	45	45	45	45	48	48	48	48	48	48	48	48	46	
May.....	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	50	50	50	50	50	52	52	52	52	52	52	52	52	52	52	50	
June.....	48	50	50	48	50	52	52	52	52	52	52	52	52	52	52	54	54	54	54	54	55	55	55	55	55	55	55	55	55	55	55	52	
July.....	55	55	57	57	57	57	57	57	57	57	57	57	57	57	57	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
August.....	--	64	66	66	66	66	66	66	66	66	--	66	66	66	--	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	64	
September.....	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	61	59	61	59	59	59	61	61	61	61	61	61	61	59	61	61	--	

INSTANTANEOUS SUSPENDED SEDIMENT AND PARTICLE SIZE, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967
(METHODS OF ANALYSIS: B, BOTTOM WITHDRAWAL TUBE; C, CHEMICALLY DISPENSED; N, IN NATIVE WATER; P, PIPE; S, SIEVE;
V, VISUAL ACCUMULATION TUBE; M, IN DISTILLED WATER)

DATE	WATER TEMP- ERATURE (C)	DISCHARGE (CFS)	CONCENTRATION (ppm)	SUSPENDED SEDIMENT DISCHARGE (TONS/DAY)	PARTICLE SIZE											METHOD OF ANALY- SIS	
					PERCENT FINER THAN THE SIZE (IN MILLIMETERS) INDICATED												
					.002	.004	.008	.016	.031	.062	.125	.250	.500	1.00	2.00		
MAY 30, 1967	1120	10	70400	192	36500	10	17	28	41	53	66	82	97	100	--	--	VPAC
JUN 5, 1968	1100	10	75300	660	134000	6	18	31	48	69	86	97	100	--	--	--	VPAC

QUALITY OF SURFACE WATERS, 1967

KOOTENAI RIVER BASIN--Continued

12-3185. KOOTENAI RIVER NEAR COPELAND, IDAHO--Continued

DAILY SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

OCTOBER					NOVEMBER					DECEMBER				
DAY	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)					
1	5250	C 4	57	4960	C 4	54	5100	C 4	55					
2	5520	C 4	60	4940	C 4	53	4550	C 4	49					
3	5580	C 4	60	4720	C 4	51	4500	C 4	49					
4	5560	C 4	60	4720	C 4	51	4490	C 4	48					
5	5460	C 4	59	4560	C 4	49	4810	C 4	52					
6	5230	C 4	56	4760	C 4	51	4800	C 4	52					
7	5080	C 4	55	4460	C 4	48	4670	C 4	50					
8	5240	C 4	57	4660	C 4	50	4760	C 4	51					
9	5150	C 4	56	4500	C 4	49	4420	C 4	48					
10	5210	C 4	56	4870	C 4	53	3980	C 4	43					
11	5120	C 4	55	4380	C 4	47	3770	C 4	41					
12	5050	C 4	55	4290	C 4	46	3800	C 4	41					
13	5210	C 4	56	4280	C 4	46	4720	C 4	51					
14	5120	C 4	55	4450	C 4	48	5440	C 4	59					
15	4960	C 4	54	4870	C 4	53	5480	C 4	59					
16	4940	C 4	53	5570	C 4	60	5460	C 4	59					
17	4860	C 4	52	5850	C 4	63	5340	C 4	58					
18	4840	C 4	52	5800	C 4	63	5220	C 4	56					
19	4650	C 4	50	5310	C 4	57	5570	C 4	60					
20	4460	C 4	48	5320	C 4	57	6440	C 0	156					
21	4640	C 4	50	5530	C 4	60	7180	C 9	174					
22	4780	C 4	52	5390	C 4	58	7100	C 9	173					
23	4780	C 4	52	5410	C 4	58	6510	C 9	158					
24	4930	C 4	53	5110	C 4	55	5810	C 9	141					
25	4760	C 4	51	4880	C 4	53	5630	C 9	137					
26	4970	C 4	54	5210	C 4	56	5120	C 9	124					
27	4970	C 4	54	4960	C 4	54	4720	C 9	115					
28	5250	C 4	57	4810	C 4	52	4640	C 9	113					
29	5240	C 4	57	4760	C 4	51	4820	C 9	117					
30	5170	C 4	56	5010	C 4	54	4650	C 9	113					
31	4970	C 4	54	--	--	--	4670	C 9	113					
TOTAL	156950	--	1696	148340	--	1600	158160	--	2615					
JANUARY					FEBRUARY					MARCH				
DAY	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)					
1	4410	C 9	107	7670	C 13	269	5440	C 13	191					
2	4640	C 9	113	6980	C 13	245	5590	C 13	186					
3	4730	C 9	115	6640	C 13	233	5710	C 13	200					
4	4620	C 9	112	6730	C 13	236	5710	C 13	200					
5	4680	C 9	114	7140	C 13	251	5460	C 13	192					
6	5070	C 9	123	7190	C 13	252	5440	C 13	191					
7	4360	C 9	105	7150	C 13	251	5310	C 13	186					
8	4310	C 9	105	6770	C 13	238	5170	C 13	181					
9	4360	C 9	106	6500	C 13	228	5260	C 13	185					
10	4900	C 9	119	6270	C 13	220	5490	C 13	193					
11	5020	C 9	122	6190	C 13	217	5400	C 13	190					
12	4900	C 9	119	6080	C 13	213	5180	C 13	182					
13	4890	C 9	119	5930	C 13	208	5010	C 13	176					
14	4840	C 9	118	6400	C 13	225	4880	C 13	171					
15	5010	C 9	122	6410	C 13	225	4940	C 13	173					
16	5230	C 9	127	6060	C 13	213	5020	C 13	176					
17	5200	C 9	126	6140	C 13	216	5380	C 13	189					
18	5020	C 9	122	6000	C 13	211	5470	C 13	192					
19	5050	C 9	123	5950	C 13	209	5510	C 13	193					
20	5380	C 9	131	5740	C 13	201	5630	C 13	198					
21	5770	C 9	140	5590	C 13	196	5590	C 13	196					
22	5610	C 9	136	5590	C 13	196	5460	C 13	192					
23	5310	C 9	129	5520	C 13	194	6490	C 12	210					
24	5020	C 9	122	5470	C 13	192	7150	C 12	232					
25	4850	C 9	118	5430	C 13	191	7240	C 12	235					
26	4610	C 9	112	5450	C 13	191	7310	C 12	237					
27	4850	C 9	118	5470	C 13	192	7200	C 12	233					
28	5360	C 13	130	5550	C 13	195	7030	C 12	228					
29	6590	C 13	231	--	--	--	7000	C 12	227					
30	7650	C 13	269	--	--	--	6780	C 12	220					
31	8150	C 13	286	--	--	--	6760	C 12	219					
TOTAL	160400	--	4140	174010	--	6108	181000	--	6184					
C Composite period.														

KOOTENAI RIVER BASIN--Continued

12-3185. KOOTENAI RIVER NEAR COPELAND, IDAHO--Continued

DAILY SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

DAY	APRIL				MAY			JUNE		
	MEAN DISCHARGE (CFS)		MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)
1	6630	C	12	215	10800	15	437	83600	255	57600
2	6540	C	12	212	10500	16	454	87100	335	78800
3	6510	C	12	211	10800	8	233	88300	305	72700
4	6710	C	12	217	11100	7	210	92400	255	63600
5	7140	C	12	231	11300	9	275	95700	350	90400
6	7520	C	12	244	11900	10	321	93700	278	70300
7	7960	C	12	258	13900	18	676	89200	227	54700
8	8550	C	12	277	18400	35	1740	88800	202	48400
9	9190		14	347	24700	72	4900	90600	192	46900
10	9720		16	420	29600	139	11100	92900	194	48700
11	10200	--	E	500	30100	140	11400	95000	235	60300
12	10800		20	583	27100	83	6070	94700	350	89500
13	11100		32	959	23800	51	3280	90200	225	54800
14	11500		46	1440	21900	34	2010	81000	182	39800
15	11900		25	803	21900	18	1060	72600	135	26500
16	11700		21	663	25300	28	1910	70900	138	26400
17	11200		22	665	32500	75	6580	75300	125	25400
18	10600		17	487	42200	162	18500	81300	185	40600
19	10300		16	445	49900	170	22900	85800	248	57500
20	9780		12	317	55000	265	39400	87600	277	65500
21	9330		14	353	60700	225	36900	88000	228	54200
22	8870		14	335	70800	425	81200	87900	206	48900
23	8680		10	234	81600	370	82000	88500	184	44000
24	8680		10	234	87900	620	147000	86900	200	46900
25	9040	--	E	220	87000	500	120000	82600	230	51300
26	9810		8	212	79200	300	64200	74300	212	42500
27	10900		20	589	69700	218	40400	67800	178	32600
28	11500		8	248	62000	150	25100	65100	159	28400
29	11600		9	282	62900	155	26300	66600	168	30200
30	11200		8	242	69200	150	28000	66300	155	27700
31	--	--	--	--	76200	275	56600	--	--	--
TOTAL	285260	--	--	12443	1288900	--	841056	2511500	--	1525100

DAY	JULY			AUGUST			SEPTEMBER		
	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)
1	64000	157	27100	17100	-- E	510	7980	C 3	65
2	59100	158	25200	16500	8	356	7470	C 3	61
3	53400	140	20200	15900	8	343	7480	C 3	61
4	49600	140	18700	15100	8	326	7440	C 3	60
5	49000	126	16700	14200	8	307	7380	C 3	60
6	49800	118	15900	13600	14	514	7610	C 3	62
7	48700	120	15800	13300	12	431	7250	C 3	59
8	45800	115	14200	13300	12	431	7200	C 3	58
9	41500	110	12300	13400	12	434	7130	C 3	58
10	38600	92	9590	13600	10	367	7030	C 3	57
11	36800	99	9840	13300	-- E	360	6860	C 3	56
12	34000	98	9000	12900	10	348	6810	C 3	55
13	31800	85	7300	12600	10	340	6830	C 3	55
14	31900	74	6370	12300	10	332	6780	C 3	55
15	33400	73	6580	12100	-- E	330	6560	C 3	53
16	33900	70	6410	11800	10	319	6400	C 3	52
17	32400	71	6210	11500	8	248	6250	C 3	51
18	30700	60	4970	11100	8	240	6200	C 3	50
19	29400	64	5080	10800	10	292	6070	C 3	49
20	27900	53	3990	10600	8	229	6050	C 3	49
21	26300	39	2770	10300	9	250	6090	C 3	49
22	24600	42	2790	10200	12	330	6040	C 3	49
23	23500	38	2410	10100	7	191	5940	C 3	48
24	22600	36	2200	9830	7	186	5900	C 3	48
25	21200	32	1830	9730	7	184	5540	C 3	45
26	20300	27	1480	9420	7	178	5660	C 3	46
27	19900	23	1240	9210	4	99	5660	C 3	46
28	19300	20	1040	9030	6	146	5560	C 3	45
29	18600	16	804	8610	C 3	70	5570	C 3	45
30	18000	15	729	8220	C 3	67	5090	C 3	41
31	17500	14	662	7980	C 3	65	--	--	--
TOTAL	1053500	--	259395	367630	--	8823	195830	--	1588

TOTAL DISCHARGE FOR YEAR (CFS-DAYS)
TOTAL LOAD FOR YEAR (TONS)6681480
2870748

E Estimated.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

PEND OREILLE RIVER BASIN
12-3598. SOUTH FORK FLATHEAD RIVER ABOVE TWIN CREEK, NEAR HUNGRY HORSE, MONT.

LOCATION (revised).--Lat 47°58'45", long 113°33'36", temperature recorder at gaging station, on left bank 0.1 mile downstream from Twin Creek, 0.4 mile upstream from Twin Creek, 36 miles southeast of Hungry Horse, Flathead County, and at mile 46.7. DRAINAGE AREA --1,160 square miles.

RECORDS AVAILABLE.--Water temperatures: May 1965 to September 1967.

EXTREMES, 1966-67. --- Water temperatures: Maximum, 66°F Aug. 17-19; minimum, 34°F on several days during December and February. EXTREMES, 1965-66. --- Water temperatures: Maximum, 66°F Aug. 17-19; minimum, freezing point on many days during winter. EXTREMES, 1965-67. --- Water temperatures: Maximum, 66°F Aug. 17-19; minimum, freezing point on many days during winter.

EXREMES, 1963-64.--Water temperatures: Maximum, 66 F Aug. 17-19, 1961; minimum, freezing point on many days during winter months in 1966.

REMARKS.--Recorder stopped July 6, 7.

Temperature (°F) of water, water year October 1966 to September 1967																																	
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	50	49	50	51	51	50	50	49	47	47	46	45	45	44	43	43	42	42	41	40	41	40	41	41	43	43	43	42	43	43	45	
Maximum	48	49	47	47	47	47	48	49	46	45	45	45	44	43	42	41	40	40	40	40	40	40	40	40	41	41	41	42	42	40	42	43	
Minimum	42	41	40	49	49	49	38	37	37	38	37	37	36	35	35	37	37	36	36	36	36	36	36	36	36	37	37	36	36	36	36	37	
November	40	39	38	38	38	38	36	36	36	36	36	36	36	35	35	35	35	36	36	36	36	36	36	36	36	36	36	36	35	35	36	36	
Maximum	36	36	36	35	35	35	35	36	37	36	35	35	34	35	34	36	36	37	37	37	37	37	37	37	37	37	37	37	36	36	36	36	
Minimum	36	35	35	35	35	35	35	35	35	35	35	34	34	34	34	35	35	36	36	37	37	37	37	37	37	37	37	36	36	36	36	36	
December	36	36	36	36	36	37	37	36	35	35	35	35	35	35	35	35	35	35	36	36	35	35	35	35	37	37	36	36	35	35	35	35	
January	36	36	36	35	35	35	36	37	36	35	35	35	35	35	35	35	35	35	36	36	35	35	35	35	37	37	36	36	35	35	35	35	
February	37	36	36	35	35	35	36	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	37	37	36	36	35	35	35	35	
Maximum	37	36	36	35	35	35	36	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	37	37	36	36	35	35	35	35	
Minimum	36	36	35	35	35	35	35	35	34	34	34	35	35	35	35	35	35	35	35	35	35	35	35	35	34	34	35	37	38	37	36	36	
March	36	38	38	37	37	37	38	37	36	37	37	38	38	38	37	36	36	36	36	36	36	36	38	38	40	40	40	40	41	41	41	40	37
Maximum	37	37	36	36	36	36	36	36	36	36	37	36	36	36	35	35	35	35	35	35	35	36	36	36	37	38	39	39	40	39	38	36	36
Minimum	41	42	43	43	42	42	45	44	44	42	45	44	43	43	43	43	43	42	42	41	41	41	41	41	41	41	41	41	41	41	41	41	40
April	43	42	43	43	42	42	45	44	44	42	45	44	43	43	43	43	42	42	42	41	41	40	40	41	42	42	42	42	42	42	42	42	42
Maximum	38	38	39	40	41	41	41	42	41	41	41	42	42	42	42	41	41	41	41	40	40	41	42	42	42	42	42	42	41	41	41	41	40
Minimum	43	42	45	47																													

PEND OREILLE RIVER BASIN--Continued

12-3630. FLATHEAD RIVER AT COLUMBIA FALLS, MONT.

LOCATION.--Lat 48°21'43", long 114°11'02", at gaging station at county road bridge at Columbia Falls, Flathead County, 5.7 miles downstream from South Fork, and at mile 143.0.

DRAINAGE.--44,460 acres.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1950, August 1963 to September 1967 (discontinued).

Water temperatures: January 1949 to September 1950, August 1963 to September 1967 (discontinued).

Sediment records: July 1965 to September 1967 (discontinued).

EXTREMES, 1966-67.--Dissolved solids: Maximum, 114 ppm Mar. 1-6; minimum, 74 ppm June 20-30.

Hardness: Maximum, 106 ppm Mar. 1-6; minimum, 74 ppm June 20-30.

Specific conductance: Maximum daily, 233 micromhos Sept. 17; minimum daily, 133 micromhos July 4.

Water temperatures: Maximum, 67°F Sept. 4; minimum, 35°F Feb. 1. Daily, 1 ppm on several days during December to April and August.

Sediment concentrations: Maximum daily, 860 ppm May 21; minimum daily, 4 ppm Mar. 4-6.

Sediment loads: Maximum, 43,114,000 lbs. Mar. 4-6; minimum, 2,150,000 lbs. Apr. 1-7, 1966; maximum, 77 ppm July 1-10, 1950.

EXTREMES, 1949-50, 1963-67.--Dissolved solids: Maximum, 150 ppm Apr. 1-7, 1966; minimum, 77 ppm July 1-10, 1950.

Hardness: Maximum, 119 ppm Jan. 11-31, 1949; minimum, 67 ppm June 1-10, 1949.

Specific conductance (1963-67): Maximum daily, 233 micromhos Sept. 17, 1967; minimum daily, 133 micromhos July 4, 1967.

Water temperatures: Maximum, 69°F Aug. 23, 1963; minimum, freezing point on many days during winter months.

Sediment concentrations (1965-67): Maximum daily, 980 ppm May 23, 1967; minimum daily, 1 ppm on many days.

Sediment loads (1965-67): Maximum daily, 140,000 tons May 23, 1967; minimum daily, 4 tons Mar. 4-6, 1967.

REMARKS.--Daily samples for chemical analysis composited by discharge. The sediment samples are taken from a county road bridge 12 miles downstream from the gaging station. No appreciable inflow or outflow occurs between the two points.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbocation (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH or color	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 1-31, 1966	10440	4.3		24	5.9	1.0	0.5	103	0	3.0	1.0	0.0	0.0	0.00	96	0.13	2710	84	0	0.0	166	7.6
Nov. 1-30,	9588	4.4		26	4.7	1.5	.4	108	0	3.8	.6	.0	.2	.01	93	.13	2410	84	0	.0	184	7.7
Dec. 1-15,	11800	1.0		22	6.1	.9	.4	98	0	2.0	1.2	.1	.2	.02	87	.12	2770	80	0	.0	161	7.6
Dec. 16-31,	2408	1.0		27	6.2	1.1	.2	119	0	5.8	.9	.1	.0	.01	100	.14	650	90	0	.0	196	7.7
Jan. 1-12, 1967	8822	3.6		23	6.2	.9	.4	104	0	3.8	1.0	.0	.5	.01	93	.13	2220	83	0	.0	164	7.9
Jan. 13-20,	4975	4.8		25	6.2	1.3	.5	104	0	5.0	.6	.1	.2	.01	100	.14	1340	88	2	.0	173	7.5
Jan. 21-31,	3484	4.6		26	5.6	1.0	.4	108	0	4.5	.8	.0	.2	.02	102	.14	958	88	0	.0	176	7.4
Feb. 1-14,	3800	5.2		27	5.8	1.2	.8	109	0	5.2	.0	.2	.0	.00	99	.13	1020	91	0	.0	175	7.8
Feb. 15-28,	5099	4.5		27	5.8	1.3	.6	110	0	4.5	.6	.2	.0	.01	97	.13	1340	91	0	.0	175	7.7
Mar. 1-6,	1662	4.6		30	7.6	1.3	.8	127	0	7.5	.8	.1	.0	.00	114	.16	512	106	1	.0	209	8.2
Mar. 7-22,	8565	3.5		25	5.0	.9	.6	102	0	3.5	.6	.1	.0	.01	91	.12	2100	83	0	.0	164	7.8
Mar. 23-31,	2677	4.1		28	6.8	1.1	.6	117	0	5.8	.8	.1	.0	.00	104	.14	752	98	2	.0	191	7.9
Apr. 1-30,	8866	6.2		25	6.0	.9	.4	104	0	4.5	.8	.1	.0	.00	94	.13	2250	87	1	.0	170	8.1
May 1-14,	9605	8.6		26	6.1	.8	.3	108	0	5.2	.4	.1	.0	.02	102	.14	2650	90	1	.0	176	8.1
May 15-31,	34650	5.8		27	4.9	1.4	.5	108	0	5.2	.4	.1	.0	.01	101	.14	9450	88	0	.0	172	8.0

[illegible]Temperature ($^{\circ}\text{F}$) of water. water year October 1966 to September 1967[illegible]

PEND OREILLE RIVER BASIN--Continued

12-3630. FLATHEAD RIVER AT COLUMBIA FALLS, MONT.--Continued

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	171	173	158	192	188	205	202	171	164	135	159	160
2.....	177	170	161	196	190	208	173	172	162	135	157	165
3.....	159	187	156	159	187	203	164	172	164	134	157	179
4.....	159	172	155	160	188	---	199	173	164	133	163	185
5.....	161	156	164	159	187	205	198	172	163	135	161	167
6.....	168	160	155	159	160	203	199	180	163	151	167	161
7.....	160	169	155	162	163	176	198	182	166	146	167	168
8.....	163	174	160	161	167	175	159	169	155	142	159	170
9.....	160	159	157	160	196	159	159	176	162	138	159	185
10.....	157	159	156	196	195	159	160	169	159	145	168	164
11.....	161	158	157	199	195	159	161	168	160	151	171	160
12.....	159	157	158	160	195	159	171	168	156	151	167	161
13.....	156	157	155	195	195	161	161	172	155	148	170	188
14.....	158	160	163	197	198	160	162	170	164	146	170	197
15.....	159	190	166	197	159	160	164	168	154	150	170	190
16.....	159	196	206	207	169	161	162	164	154	150	164	188
17.....	159	188	196	200	166	161	162	164	153	151	168	233
18.....	160	163	206	162	195	159	159	168	153	151	167	163
19.....	157	168	195	162	161	163	162	163	150	151	175	157
20.....	162	176	191	160	159	159	164	159	145	151	177	160
21.....	159	166	186	191	160	163	161	169	142	152	163	163
22.....	159	157	195	194	196	160	162	157	147	157	176	162
23.....	163	181	180	194	201	196	162	154	142	151	178	165
24.....	160	158	192	165	201	161	161	153	141	148	178	162
25.....	161	156	192	171	201	---	161	150	153	178	163	163
26.....	164	168	195	205	203	---	160	139	142	154	177	163
27.....	162	162	201	190	204	203	170	140	138	157	167	161
28.....	162	162	201	190	204	203	170	140	138	157	167	161
29.....	158	170	196	180	204	200	174	163	134	158	180	163
30.....	159	171	198	179	---	202	173	141	145	158	181	163
31.....	158	---	198	181	---	203	---	140	---	169	165	---
Average	161	169	177	180	184	178	169	162	152	148	168	170

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
June 1, 1967.....	0915	46		38400	392	41000		28	52	81	89	98	100		YPWC		

PEND OREILLE RIVER BASIN--Continued

12-3630. FLATHEAD RIVER AT COLUMBIA FALLS, MONT.--Continued

Suspended sediment, water year October 1966 to September 1967
(Where no daily 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..	4340	7	82	4410	7	83	11800	13	410
2..	3940	8	85	4300	5	58	11800	13	410
3..	8020	7	150	4230	7	80	11900	9	290
4..	10900	6	180	8410	4	91	12000	10	320
5..	10800	5	150	11400	5	150	11700	19	600
6..	10800	6	170	11300	6	180	12000	15	490
7..	10800	6	170	11300	7	210	12000	12	390
8..	10800	9	260	11200	4	120	12000	15	490
9..	10800	5	150	11200	4	120	12000	13	420
10..	10800	5	150	11300	6	180	11900	12	390
11..	10800	5	150	11400	7	220	12000	5	160
12..	10900	9	260	11400	5	150	12100	9	290
13..	10200	6	170	11400	7	220	12300	15	500
14..	10900	9	260	8260	8	180	12600	10	340
15..	10900	5	150	2260	3	18	8870	5	120
16..	10900	5	150	2610	8	56	2160	2	12
17..	10900	5	150	2490	11	74	2150	1	6
18..	10900	4	120	5760	4	62	2240	6	36
19..	10900	4	120	11800	--	160	2490	--	40
20..	10900	4	120	11800	6	190	3030	--	57
21..	11000	5	150	11900	5	160	3260	--	53
22..	11000	5	150	11900	6	190	2990	--	40
23..	11000	6	180	11900	8	260	2740	4	30
24..	11100	3	90	11900	6	190	2510	1	7
25..	11100	5	150	11900	6	190	2430	2	13
26..	11300	5	150	12100	6	200	2270	1	6
27..	11500	6	190	12000	5	160	2070	3	17
28..	11700	5	160	12000	14	450	2060	4	22
29..	11700	5	160	11900	13	420	2110	4	23
30..	11600	4	130	11900	9	290	2050	14	77
31..	10300	6	170	--	--	--	1960	13	69
Total	323500	--	4877	287630	--	5112	215490	--	6128
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..	2010	--	49	2450	3	20	1690	3	14
2..	3130	--	59	2420	2	13	1720	1	5
3..	12100	6	200	2480	4	27	1700	2	9
4..	12300	5	170	2520	5	34	1620	1	4
5..	12300	7	230	2610	23	160	1600	--	4
6..	12100	9	290	10000	23	620	1640	1	4
7..	12100	--	330	11200	13	390	2050	1	6
8..	12200	11	360	6300	7	120	3290	1	9
9..	10600	7	200	2330	1	6	9570	4	160
10..	3470	3	28	2250	2	12	9230	5	120
11..	1860	3	15	2180	3	18	8680	2	47
12..	11700	7	220	2140	2	12	9070	3	73
13..	2510	13	88	2170	2	12	9470	3	77
14..	1750	6	28	2150	6	35	9580	3	78
15..	1740	3	14	9400	13	330	9730	--	79
16..	1860	4	20	10300	10	280	9690	--	78
17..	2540	7	48	6640	3	54	9710	3	79
18..	9660	8	210	4140	7	78	9760	2	53
19..	9770	5	130	10600	3	86	9750	2	53
20..	9970	7	190	10400	14	390	9750	2	53
21..	2850	3	23	7430	31	620	9100	4	98
22..	1900	3	15	1940	4	21	8610	3	70
23..	4480	6	73	1830	1	5	3110	2	17
24..	9520	4	100	1800	1	5	7840	2	42
25..	6170	3	50	1760	1	5	2770	4	30
26..	1540	2	8	1730	3	14	1810	5	24
27..	1720	3	14	1710	2	9	1760	3	14
28..	2120	1	6	1700	3	14	1780	1	5
29..	2470	4	27	--	--	--	1690	2	9
30..	2820	4	30	--	--	--	1690	7	32
31..	2730	4	29	--	--	--	1640	5	22
Total	183990	--	3254	124580	--	3390	171100	--	1368

PEND OREILLE RIVER BASIN--Continued

12-3630. FLATHEAD RIVER AT COLUMBIA FALLS, MONT.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued
(Where no daily 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..	1600	4	17	9080	4	98	37800	400	41000
2..	3560	--	38	6170	4	67	39800	510	55000
3..	4640	11	140	5510	6	89	38600	400	42000
4..	1870	10	50	5430	5	73	38600	370	39000
5..	1970	5	27	5530	6	90	33700	300	27000
6..	2040	4	22	4510	7	85	34300	300	28000
7..	2210	3	18	6040	14	230	35800	240	23000
8..	6620	8	140	14800	60	2400	37000	230	23000
9..	10700	11	320	15800	140	6000	35000	320	34000
10..	10900	--	350	16200	140	6100	39000	300	32000
11..	11100	11	330	14100	65	2500	38100	200	21000
12..	11500	9	280	12300	30	1000	38400	--	22000
13..	11900	10	320	9840	15	400	33600	220	20000
14..	12200	12	400	9160	10	250	30200	220	18000
15..	12200	9	300	12400	20	670	30300	200	16000
16..	12000	9	290	15200	25	1000	33900	240	22000
17..	11800	7	220	20500	140	7700	35600	270	26000
18..	11700	3	95	28800	510	40000	37500	280	28000
19..	11500	5	160	33200	660	59000	37100	250	25000
20..	11300	2	61	33500	520	47000	35100	210	20000
21..	11100	5	150	35700	980	94000	35400	200	19000
22..	11000	--	89	47200	800	100000	36700	220	22000
23..	11000	1	30	54400	940	140000	32700	160	14000
24..	11100	2	60	52100	880	120000	26800	130	9400
25..	11400	3	92	43300	560	65000	23800	120	7700
26..	11900	2	64	33400	220	20000	23400	110	6900
27..	11300	2	61	28700	350	27000	24700	100	6700
28..	9660	2	52	29300	740	59000	25100	100	6800
29..	7410	5	100	37100	720	72000	25300	100	6800
30..	6810	6	110	43300	660	77000	25600	100	6900
31..	--	--	--	40900	--	62000	--	--	--
Total	265990	--	4386	723470	--	1010752	1003200	--	668200
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..	23100	60	3700	6760	3	55	9510	6	150
2..	20500	50	2800	6560	13	230	7180	5	97
3..	19600	55	2900	6520	15	260	3840	4	41
4..	19000	50	2600	5700	10	150	2120	6	34
5..	18700	34	1700	5770	9	140	6430	12	210
6..	17800	27	1300	6590	9	160	7790	15	320
7..	16600	33	1500	5200	5	70	7900	11	230
8..	15400	30	1200	4540	4	49	8310	12	270
9..	14400	35	1400	7900	4	85	4310	10	120
10..	13900	28	1100	4140	6	67	2400	8	52
11..	13900	28	1100	4400	5	59	5760	13	200
12..	12200	21	690	5020	9	120	6960	10	190
13..	12800	19	660	3570	5	48	2470	7	47
14..	12000	18	580	3530	3	29	1930	8	42
15..	11200	18	540	3480	4	38	1850	8	40
16..	10500	16	450	4540	11	130	1780	9	43
17..	9920	16	430	4480	8	97	1730	12	56
18..	9450	16	410	4780	8	100	5330	15	220
19..	10200	13	360	4450	7	84	8400	7	160
20..	11100	12	360	3030	5	41	6910	6	110
21..	10600	16	460	6020	7	110	8370	11	250
22..	10100	9	250	3250	5	44	8320	12	270
23..	9390	11	280	3230	4	35	8370	11	250
24..	9560	9	230	2650	4	29	8260	11	250
25..	6990	8	150	2580	2	14	8330	11	250
26..	7420	12	240	2520	1	7	8250	13	290
27..	6640	11	200	2470	2	13	9050	13	320
28..	6740	5	91	2800	3	23	10400	11	310
29..	7090	3	57	2410	3	20	10400	14	390
30..	6820	3	55	2360	2	13	10400	12	340
31..	7520	7	140	8720	25	590	--	--	--
Total	381140	--	27933	139970	--	2910	193060	--	5552
Total discharge for year (cfs-days).....									
Total load for year (tons).....									
								4013120	
								1743862	

PEND OREILLE RIVER BASIN--Continued

12-3955. PEND OREILLE RIVER AT NEWPORT, WASH.

LOCATION.--Lat 48°11'00", long 117°02'00", at bridge on U.S. Highway 2 at Newport, Pend Oreille County, 0.2 mile downstream from gaging station, and 1.8 miles downstream from Albeni Falls Dam, and at mile 88.5.

DRAINAGE AREA.--24,200 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

REMARKS.--No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-boronate			
Oct. 30, 1966.	21500	4.9		25	6.0	2.7	0.7	99	0	8.8	1.5	0.1	0.2	A 99	0.13	5750	87	6	169	7.7	0
Nov. 20,	25400	5.4		23	6.2	2.7	0.6	99	0	9.4	0	0.1	0.3	103	0.14	7070	83	2	175	7.5	0
Dec. 18,	21600	6.6		23	5.8	3.0	0.7	90	2	9.4	0.5	0.1	0.2	94	0.13	5480	82	8	168	8.3	5
Jan. 8, 1967.	14600	7.4		22	6.0	2.8	0.9	94	0	9.2	0.5	0.1	0.3	98	0.13	3860	80	3	170	8.0	5
Feb. 25,	25700	6.6		24	5.8	3.0	0.6	95	0	11	0.5	0.2	0.1	98	0.13	6800	84	6	169	8.1	0
Mar. 26,	24900	7.0		22	5.8	2.8	0.9	94	0	10	0.8	0.1	0.2	102	0.14	6860	79	2	168	8.1	5
Apr. 23,	7800	9.1		25	6.8	3.4	1.3	108	0	9.6	1.0	0.2	0.6	A 110	0.15	2320	90	2	188	7.5	0
May 21,	48600	3.9		14	6.1	2.7	1.0	84	0	17.0	1.0	0.2	0.1	98	0.16	1360	80	8	174	7.6	5
June 15,	38600	5.9		17	6.3	2.7	0.7	70	0	7.0	0.5	0.1	0.1	78	0.10	12360	60	3	124	7.7	10
July 16,	26400	6.5		20	5.1	2.2	0.7	83	0	8.8	0.5	0.1	0.1	91	0.12	6490	71	3	148	8.1	5
Aug. 19,	8010	6.0		20	5.6	2.3	1.1	87	0	8.4	0.0	0.0	0.2	92	0.13	1990	73	2	156	8.0	5
Sept. 17,	7200	3.7		22	5.8	2.5	0.9	92	0	9.4	0.2	0.1	0.0	90	0.12	1750	79	4	165	7.9	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromi-um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 30, 1966.	9.6	390					Apr. 23, 1967.	10.4	36				
Nov. 20,	12.9	230					May 21,	10.6	62				
Dec. 18,	12.9	36					June 23,	9.8	240				
Jan. 8, 1967.	11.5	36					July 16,	9.7	--				
Feb. 25,	12.1	36					Aug. 19,	--	--	0.00	0.00		
Mar. 26,	11.6	91					Sept. 17,	9.5	36				

COLUMBIA RIVER MAIN STEM

12-3995. COLUMBIA RIVER AT INTERNATIONAL BOUNDARY, WASH.
(Irrigation network station)

LOCATION: --Lat 48°55'00", long 117°47'40", at bridge on State Highway 25 at Northport, Stevens County, 12 miles downstream from gaging station at international boundary, and at mile 734.1.

DRAINAGE AREA: --59,700 square miles, approximately, upstream from gaging station.

RECORDS AVAILABLE: --Chemical analyses: February 1910 to January 1911, November 1951 to September 1967.

Water temperatures: November 1951 to September 1967.

EXTREMES, 1966-67: --Dissolved solids: Maximum, 110 ppm July 12 to Aug. 1, Aug. 16 to Sept. 8.

Hardness: Maximum, 85 ppm Mar. 1-29; minimum, 62 ppm July 12 to Aug. 1.

Specific conductance: Maximum daily, 205 micromhos Apr. 15; minimum daily, 125 micromhos July 27, 29, 30.

Temperature: Minimum, 66° on several days during September, 1967; minimum, 8-25, 1964, during January and February.

EXTREMES, 1958-67: --Dissolved solids: Maximum, 128 ppm Aug. 2, 1963; minimum, 62 ppm July 16-31, Aug. 16-31, 1959, July 1-31, 1961, July 26 to Aug. 15, 1964, July 12 to Aug. 1, 1967.

Hardness: Maximum, 128 ppm Feb. 23, 1963; minimum, 62 ppm July 16-31, Aug. 16-31, 1959, July 1-31, 1961, July 26 to Aug. 15, 1964, July 12 to Aug. 1, 1967.

Specific conductance: Maximum daily, 257 micromhos Feb. 23, 1963; minimum daily, 123 micromhos Aug. 2, 1960, Aug. 12, 1963.

Water temperatures: Maximum, 70°F May 14, 19, 1959; minimum, freezing point on several days during January in 1960, 1962, and 1963.

REMARKS: --No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Ca)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potas- tassium (K)	Bicarbonate (HCO ₃)	Car- bonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bor- on (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		So- dium ad- sor- p- tion ratio (micro- mhos at 25°C)	Col- or pH		
														Parts per million	Tons per acre- foot	Tons per day	Cal- cium, Mag- nesium	Non- car- bonate				
Oct. 1-14, 1966..	65000	3.7	21	4.6	1.6	0.8	74	0	14	1.0	0.2	0.5	0.03	84	0.11	14740	72	11	0.1	152	7.5	0
Oct. 15-31.....	63260	4.6	22	5.0	2.1	0.7	81	0	14	1.0	0.2	0.6	0.03	89	0.12	15200	76	9	0.1	163	7.5	0
Nov. 1-30.....	55830	4.2	23	5.0	2.2	0.7	80	0	16	1.0	0.2	0.5	0.03	95	0.13	14320	73	7	0.1	166	7.5	5
Dec. 1-31.....	47020	4.8	23	5.1	2.3	0.8	82	0	16	1.0	0.2	0.6	0.03	A 94	0.13	11930	78	11	0.1	169	7.7	5
Jan. 1-31, 1967..	44920	5.2	24	5.5	2.4	1.2	82	0	19	1.0	0.2	0.3	0.00	A 99	0.13	12010	82	16	0.1	178	7.9	5
Feb. 1-28.....	54200	6.0	24	5.6	2.6	1.4	84	0	18	1.0	0.2	0.5	0.03	110	0.15	16100	83	14	0.1	178	7.8	5
Mar. 1-29.....	47855	6.2	23	6.7	2.6	1.1	88	0	17	1.0	0.2	0.3	0.03	110	0.15	14210	85	13	0.1	181	8.0	5
Mar. 30-Apr. 12..	50410	5.9	24	5.5	2.6	1.0	84	0	18	1.0	0.2	0.6	0.03	A 100	0.14	13610	82	14	0.1	176	7.9	0
Apr. 13-30.....	52400	6.6	24	5.7	2.4	1.7	84	0	16	0.8	0.3	0.4	0.03	104	0.14	14710	84	15	0.1	173	7.9	5
May 1-27.....	121000	5.5	22	5.2	2.2	0.7	79	0	16	0.5	0.2	0.5	0.03	91	0.12	29730	77	12	0.1	160	7.8	5
May 28-June 11..	320500	5.4	21	4.4	1.8	0.8	75	0	14	0.2	0.2	0.4	0.03	87	0.12	75990	71	9	0.1	146	7.9	5
June 12-July 11..	389900	5.0	20	4.3	1.6	0.9	73	0	12	0.2	0.2	0.5	0.03	87	0.11	85270	68	10	0.1	139	7.9	5
July 12-Aug. 11..	227700	4.4	18	4.1	1.3	0.8	68	0	10	0.5	0.1	0.4	0.00	76	0.10	46720	64	7	0.1	129	7.8	5
Aug. 12-Aug. 15..	140500	4.6	20	3.4	1.3	0.9	67	0	10	0.5	0.1	0.4	0.00	78	0.11	29590	62	9	0.1	135	7.8	5
Aug. 16-Sept. 8..	99920	3.9	19	3.8	1.2	0.8	66	0	12	0.5	0.1	0.3	0.03	76	0.10	20500	63	9	0.1	133	7.9	5
Sept. 9-30.....	77700	3.4	20	4.1	1.3	0.7	68	0	13	0.4	0.2	0.6	0.03	77	0.10	16150	67	12	0.1	139	7.8	5
Weighted average.....	--	5.0	21	4.7	1.8	0.9	75	--	14	0.5	0.2	0.5	--	87	0.11	26830	71	10	0.1	149	7.8	--
Time-weighted average.....	114232	5.0	22	5.0	2.0	0.9	78	--	15	0.7	0.2	0.5	--	92	--	--	75	11	0.1	159	7.8	--
Tons per day...	--	1540	6480	1450	555	278	23130	--	4320	154	62	154	--	--	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	--	164	--	--	--	181	177	174	150	136	129	138
2.....	149	163	174	--	175	181	180	171	151	135	131	136
3.....	150	161	174	--	173	182	178	170	149	135	131	135
4.....	130	162	173	179	176	182	170	168	144	134	128	131
5.....	148	160	174	180	176	186	181	171	144	136	132	131
6.....	153	165	176	180	175	184	176	168	143	133	131	134
7.....	155	166	174	179	177	184	172	167	142	134	130	133
8.....	155	166	176	180	178	185	176	164	144	133	130	129
9.....	155	166	176	180	178	185	176	164	144	133	130	129
10.....	156	165	176	179	179	186	172	159	145	130	132	131
11.....	154	163	176	180	177	183	168	161	139	132	132	132
12.....	158	175	174	179	181	181	176	162	146	130	132	134
13.....	158	171	175	180	181	183	168	162	145	129	136	132
14.....	155	167	173	180	174	182	201	182	145	128	137	132
15.....	161	--	175	181	179	181	171	162	142	128	141	132
16.....	160	169	173	175	179	181	170	156	142	128	132	132
17.....	163	168	177	173	179	179	171	156	142	128	133	135
18.....	163	168	177	181	177	178	169	155	140	129	133	133
19.....	164	171	167	182	178	174	171	151	--	128	132	134
20.....	163	168	166	182	180	180	170	154	139	128	132	135
21.....	162	169	167	180	180	182	177	148	136	126	127	141
22.....	160	166	167	180	179	183	173	148	136	127	127	141
23.....	163	168	157	179	176	177	178	147	139	128	130	138
24.....	161	169	157	179	181	179	170	151	140	135	130	137
25.....	162	169	157	181	181	178	171	155	139	127	131	139
26.....	163	176	160	179	180	177	170	155	140	126	132	139
27.....	161	172	176	182	177	177	167	155	139	129	134	142
28.....	161	172	176	182	177	177	167	155	139	129	134	142
29.....	164	165	175	178	182	175	167	155	138	125	134	146
30.....	163	163	177	168	--	170	171	151	136	125	134	147
31.....	161	--	172	178	--	179	--	150	--	128	133	--
Average	157	166	170	178	177	180	174	159	142	130	131	135

Temperature (°F) of water, water year October 1966 to September 1967

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.....	58	61	59	60	60	60	59	59	---	---	54	55	54	55	52	54	53	53	53	52	52	51	52	51	52	51	51	51	51	51	51	54
November.....	21	51	50	50	50	50	49	48	48	48	47	47	47	47	47	47	47	46	46	46	46	46	46	46	46	45	45	45	44	45	44	47
December.....	44	44	44	44	44	44	44	43	42	42	42	42	42	42	41	---	47	47	47	46	46	46	46	46	46	45	45	45	45	45	45	47
January.....	38	38	38	38	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	38	38	38	37	37	
February.....	37	37	38	39	39	39	39	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
March.....	40	39	40	40	40	40	41	41	41	41	41	42	42	40	40	41	40	39	40	41	41	41	41	41	41	42	42	43	42	41	41	40
April.....	42	41	41	43	42	41	41	42	42	41	41	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	42	41	41
May.....	41	42	42	42	42	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
June.....	50	50	50	50	51	51	51	51	51	52	52	52	52	52	52	53	53	54	---	54	55	53	53	53	53	54	54	54	54	54	54	52
July.....	56	57	55	56	56	56	56	56	57	57	57	57	57	57	58	60	58	58	58	58	59	59	59	59	59	61	61	61	61	61	58	
August.....	62	62	61	61	61	61	62	62	64	64	63	64	65	66	66	64	65	66	65	66	65	66	66	66	65	64	64	62	63	64	64	59
September.....	64	66	64	63	63	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	61	61	61	61	60	62	62

SPOKANE RIVER BASIN

12-4195. SPOKANE RIVER ABOVE LIBERTY BRIDGE, NEAR OTIS ORCHARDS, WASH.

LOCATION.--Lat 47°41'55", long 117°02'35", at bridge on U.S. Highway 10 at state line, 3 miles upstream from gaging station, and 3.5 miles east of Otis Orchards, Spokane County, 880 square miles, approximately, upstream from gaging station.

DETAILED DESCRIPTION.--Upstream from gaging station, approximately 1 mile, on U.S. Highway 10, at bridge on U.S. Highway 10, at state line, 3 miles upstream from gaging station.

RECORDS AVAILABLE.--Chemical analyses, in parts per million, water year October 1966 to September 1967.

Water temperatures: December 1963 to September 1965.

REMARKS.--No appreciable inflow between sampling point and gaging station except during period of heavy local runoff.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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	Specific conductance (micro-mhos at 25°C)	pH or color
															Parts per million	Tons per acre-foot			
Oct. 18, 1966.	1900	8.5		7.5	1.3	1.9	0.6	23	0	10	0.5	0.3	0.5	--	42	24	6	62	6.8
Nov. 20.....	2040	7.7		6.7	1.8	1.5	.6	22	0	9.6	.0	.4	.5	--	A 40	24	6	62	6.8
Dec. 18.....	4500	8.5		7.5	1.3	1.9	.6	23	0	10	.5	.3	.3	--	A 42	24	5	63	7.1
Jan. 6, 1967..	6180	8.5		7.5	1.6	1.8	.6	22	0	11	.0	.2	.5	--	A 43	25	7	69	7.2
Feb. 22.....	7500	11		7.0	2.2	2.3	.3	22	0	12	.0	.3	.3	0.02	A 47	26	8	66	7.2
Mar. 26.....	9200	9.3		6.9	2.0	1.8	.9	22	0	11	.0	.4	.6	--	A 44	25	7	63	7.1
Apr. 23.....	9800	8.8		6.8	2.0	1.9	1.0	22	0	10	.0	.5	.4	--	44	25	7	65	7.4
May 21.....	21000	9.6		5.8	1.8	1.6	.9	22	0	8.0	.0	.3	.2	--	41	22	4	57	7.2
June 25.....	11400	7.6		4.5	1.5	1.2	1.0	19	0	5.4	.2	.2	.2	--	34	17	2	44	7.2
July 16.....	2090	7.9		4.5	1.6	1.2	.6	20	0	5.6	.0	.2	.1	--	36	18	1	45	7.4
Aug. 19.....	658	7.9		5.5	1.2	1.6	1.2	20	0	5.6	.0	.2	.8	0.02	38	19	2	48	7.1
Sept. 17.....	440	7.5		5.3	1.6	2.0	1.3	22	0	6.0	.0	.1	.2	--	38	20	2	50	7.3

A Calculated from determined constituents.

Additional determinations

Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Feb. 22, 1967.	--	--	0.00	0.02	0.50		June 25, 1967.	9.0	40				
Mar. 26.....	12.9	36					July 16.....	8.4	730				
Apr. 23.....	12.0	91					Aug. 19.....	--	--				
May 21.....	10.9	73					Sept. 19.....	9.9	150				

12-4245. SPOKANE RIVER AT 7-MILE BRIDGE, NEAR SPOKANE, WASH.

LOCATION.--Lat 47°44'23", long 117°31'10", at bridge on 7-Mile Road, and 7.3 miles northwest of Spokane, Spokane County.
 RECORDS AVAILABLE.--Chemical analyses: November 1966 to September 1967.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbocationate (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 (micro-mhos at 25°C)	Col- or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, slum	Non-carbonate		
Nov. 20, 1966..		8.2		15	5.3	3.4	1.1	61	0	13	3.0	0.3	1.2	--	86	0.12		60	10	137	7.0
Dec. 8, 1967...		10		10	3.2	3.0	1.3	37	0	11	2.9		1.6	--	62	.08		38	8	193	7.6
Jan. 8, 1967...		10		10	3.2	3.0	1.3	37	0	11	1.8		1.6	--	62	.08		38	8	193	7.6
Feb. 22, 1967...		9.1		11	3.5	3.0	1.0	38	0	12	2.0	.4	1.1	0.02	A 62	.08		42	11	98	7.2
Mar. 26, 1967...		9.5		8.7	2.8	2.8	1.3	31	0	11	1.0	.4	1.4	--	54	.07		33	8	87	7.0
Apr. 23, 1967...		9.4		9.0	2.9	2.9	1.6	32	0	12	2.5	.5	.7	--	A 58	.08		34	8	89	7.1
May 21, 1967...		9.3		6.5	1.9	1.9	.7	25	0	8.6	.2	.2	.3	--	48	.07		24	4	62	7.1
June 23, 1967...		8.2		7.0	1.1	1.8	1.1	25	0	6.2	.8	.2	.4	--	40	.05		22	2	66	7.4
July 19, 1967...		10.4		25	5.2	2.6	2.0	100	0	9.0	1.8	.2	1.4	--	124	.17		52	4	106	7.2
Aug. 19, 1967...		8.2		22	5.2	5.6	2.0	93	0	12	4.0		3.7	--	110	.15		82	6	203	7.2
Sept. 17, 1967...		8.2		20	7.6	5.6	2.0	93	0	11	3.8	.2	3.7	--	110	.15		82	6	191	7.1

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis- solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa- valent chromi- um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis- solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa- valent chromi- um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 20, 1966.	12.1	--		0.01	0.48		June 25, 1967.	10.3	930				
Feb. 22, 1967.	12.1	430					July 16, 1967.	8.4	4300				
Apr. 23, 1967.	12.0	930					Aug. 19, 1967.	4.9	2100				
May 21, 1967.	11.4	430					Sept. 17, 1967.						

SPOKANE RIVER BASIN--Continued

12-4330. SPOKANE RIVER AT LONG LAKE, WASH.

LOCATION.--Lat 47°50'20", long 117°51'05", at bridge 0.2 mile downstream from gaging station, 1.2 miles upstream from Chamokane Creek, and 12 miles north of Reardon, Lincoln County.

DRAINAGE AREA.--6,020 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

Water temperatures: July 1959 to September 1962, October 1966 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 72°F Sept. 3; minimum, 39°F Jan. 18, 19, Feb. 1-3.

EXTREMES, 1965-62, 1966-67.--Water temperatures: Maximum, 76°F Aug. 18, 1959; minimum, freezing point Jan. 21, Feb. 26, 1960.

REMARKS.--No inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance microhm-cm at 25°C	Color or pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Nov. 20, 1966	2850	8.0		20	7.7	4.1	1.5	90	12	2.5	0.2	2.1	106	0.14	816	82	8	183	7.1
Dec. 18, 1966	6330	10	18	5.6	3.4	1.2	1.2	73	0	1.8	2.2	1.8	95	0.13	1620	68	8	152	7.3
Jan. 8, 1967	7160	11	13	4.4	3.2	1.7	50	0	12	2.0	3.2	2.3	76	0.10	1470	50	10	121	7.1
Feb. 22, 1967	9640	9.6	10	3.4	2.6	1.4	38	0	12	1.0	4.8	0.02	59	0.08	1540	39	8	96	7.3
Mar. 26, 1967	10700	12	13	4.7	3.6	1.6	55	0	12	1.5	4.1	1.9	81	0.11	2340	52	7	128	7.1
Apr. 23, 1967	11900	10	10	3.4	2.9	1.7	40	0	12	1.5	4.1	1.0	63	0.09	1910	39	6	104	7.4
May 21, 1967	22200	9.9	8.1	2.5	2.5	1.4	33	0	16.4	1.0	3.8	0.8	A	0.07	3120	30	3	79	7.2
June 25, 1967	13300	8.3	7.5	2.8	2.1	1.9	33	0	16.4	1.0	3.8	0.8	32	0.08	1580	41	4	75	7.2
July 16, 1967	13360	7.7	10.5	3.9	2.3	1.1	46	0	9.0	1.2	2.1	0.2	62	0.08	582	41	4	95	7.3
Aug. 19, 1967	1650	9.6	18	7.4	4.1	2.4	87	0	9.0	3.8	1.2	2.7	102	0.14	434	76	4	172	7.3
Sept. 17, 1967	995	8.4	22	8.8	4.4	2.2	107	0	8.6	4.0	2.2	2.3	113	0.15	304	91	4	204	7.2

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 20, 1966	8.9	--	--	--	--	--	May 21, 1967	11.6	91	0.00	0.00	0.03	
Dec. 18, 1966	8.4	36	36	0.00	0.41		June 25, 1967	9.9	150				
Jan. 8, 1967	10.8	36	36	0.00	0.41		July 16, 1967	7.4	360				
Feb. 22, 1967	12.5	36	36	0.00	0.41		Aug. 19, 1967	--	--				
Mar. 26, 1967	12.3	430	430	0.00	0.41		Sept. 17, 1967	8.5	36				
Apr. 23, 1967	11.8	91	91	0.00	0.41								

OKANOGAN RIVER BASIN

12-4425. SIMILKAMEN RIVER NEAR NIGHTHAWK, WASH.

LOCATION.--Lat 48°56'05", long 119°26'25", at 12th Avenue bridge at Oroville, 10 miles east of Nighthawk, Okanogan County, 1.4 miles upstream from mouth, and 10.2 miles downstream from gaging station.

DRAINAGE AREA.--3,550 square miles, approximately, upstream from gaging station.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1950, October 1963 to September 1967.

Water temperatures: January 1949 to September 1950, 79° F Aug. 15; minimum, freezing point Dec. 10, 23.

EXTREMES, 1948-67.--Water temperatures: Maximum, 79° F Aug. 2, 3, 1949, Aug. 1949 to September 1950, 79° F; minimum, freezing point Dec. 10, 23.

EXTREMES, 1948-67.--Water temperatures: Maximum, 72° F Aug. 2, 3, 1949, Aug. 1949 to September 1950, 72° F; minimum, freezing point Dec. 10, 23.

Remarks.--Chemical analyses: Maximum, 72° F Aug. 2, 3, 1949, Aug. 1949 to September 1950, 72° F; minimum, freezing point Dec. 10, 23.

for period October 1963 to September 1966 published as a miscellaneous station. Temperature records obtained at county bridge at Nighthawk, 1.7 miles upstream from gaging station.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Color	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium (Ca)	Non-carbonate (Mg)			
Nov. 17, 1966..	640	9.1	26	4.4	4.0	0.8	90	0	15	0.0	0.2	0.2	0.2	--	113	0.15	195	83	9	178	7.3	0
Dec. 22, 1967..	564	11	27	5.2	4.1	1.0	98	0	17	0.0	0.2	0.2	0.5	0.01	116	0.16	177	89	8	192	8.1	5
May 24, 1967..	13300	9.4	10	2.0	1.8	0.6	41	0	4.4	0.0	0.1	0.1	0.5	--	50	0.07	1800	33	0	79	7.2	10
Aug. 16, 1967..	732	12	26	4.5	3.9	1.6	96	0	15	0.0	0.1	0.1	0.1	0.03	112	0.15	221	84	5	181	7.9	5

Additional determinations

Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Nov. 17, 1966..	12.3	36	0	0.00	0.01		May 24, 1967..	12.0	72	0	0.00	0.00	
Feb. 23, 1967..	12.8	0					Aug. 16, 1967..	7.9	0	0.00	0.00	0.00	

Temperature (°F) of water, water year October 1966 to September 1967

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.....	59	--	49	68	48	--	54	--	43	59	45	51	39	45	--	37	55	45	51	--	42	--	51	59	50	43	46	42	--	38	--	
November.....	48	--	49	46	39	--	38	42	37	46	52	43	39	45	42	41	44	41	44	41	44	44	44	44	44	44	44	44	44	44	44	
December.....	37	36	38	--	37	38	33	35	34	32	--	37	42	37	41	39	39	--	39	39	34	36	32	33	--	34	33	35	36	34	34	
January.....	--	33	33	33	35	33	--	34	38	34	36	32	--	37	42	37	41	39	39	34	36	33	--	34	35	34	37	35	37	--	36	34
February.....	34	39	36	35	--	37	39	33	41	36	37	--	39	42	37	41	35	37	--	35	44	36	43	34	38	--	38	44	--	49	40	
March.....	39	38	33	34	--	41	45	38	43	36	33	--	34	41	40	43	42	38	--	42	49	45	50	43	40	--	49	43	46	42	41	
April.....	43	--	44	50	48	51	45	47	--	46	--	47	49	43	--	45	49	49	50	45	47	--	47	49	49	46	46	46	46	46	46	
May.....	46	58	54	56	49	54	--	49	52	47	47	44	45	48	48	58	50	49	49	50	47	--	47	49	49	46	46	46	46	46	46	
June.....	50	48	48	--	48	49	51	53	52	53	--	51	56	51	54	52	--	52	69	61	53	--	58	64	57	66	66	66	66	66	66	
July.....	56	--	63	64	69	67	52	58	--	57	69	63	73	64	67	--	67	68	63	64	58	59	--	64	74	67	73	67	66	--	64	64
August.....	73	65	69	68	69	--	63	72	63	75	69	69	--	69	79	70	75	70	68	--	69	75	66	70	64	60	--	69	75	66	69	75
September.....	65	64	--	66	65	64	69	61	60	--	59	--	--	--	--	--	--	71	64	70	60	56	--	62	70	69	68	62	56	55	--	55

WENATCHEE RIVER BASIN

12-4625-2. WENATCHEE RIVER AT WENATCHEE, WASH.

LOCATION.--Lat. 47°27'30", long 120°20'10", at bridge on U.S. Highway 97, 0.8 mile northwest of Wenatchee, Chelan County, and 0.9 mile upstream from mouth.

REMARKS.--No discharge records available. Published as a miscellaneous station for period October 1963 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180° C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25° C)	pH or Col.
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		
Oct. 25, 1966..		6.6	4.5	2.2	1.6	1.3	26	0	2.4	2.0	0.0	0.2	--	35	0.05	20	0	48	7.2
Nov. 18.....		8.3	6.6	3.7	2.7	1.1	42	0	4.0	1.0	1.1	.3	--	A49	.07	32	0	77	7.3
Dec. 28.....		8.8	5.5	2.3	2.0	.8	32	0	3.0	.8	1.1	.4	--	A40	.05	23	0	56	7.4
Dec. 30.....		8.6	5.0	2.7	2.0	.9	32	0	3.0	1.2	1.1	.6	--	39	.05	24	0	58	7.5
Jan. 25, 1967..		8.7	5.9	3.0	2.0	1.1	36	0	3.6	1.0	1.1	.1	--	47	.06	27	0	65	7.5
Feb. 23.....		9.7	7.0	3.8	2.1	1.2	48	0	4.4	1.5	1.1	.5	0.01	A48	.07	33	0	73	7.4
Mar. 24.....		12	6.7	3.6	2.7	1.3	40	0	3.2	.5	1.1	.2	--	53	.07	32	0	76	7.5
Apr. 20.....		12	6.8	3.5	2.3	1.6	41	0	3.6	1.0	1.1	.3	--	A51	.07	32	0	76	7.4
May 23.....		7.4	4.0	1.1	1.2	1.1	20	0	1.8	.2	0.0	.3	--	31	.04	15	0	37	7.1
May 24.....		7.3	3.7	1.6	1.1	.9	20	0	2.0	.0	0.0	.3	--	30	.04	16	0	39	7.0
June 15.....		6.5	3.0	1.1	1.0	1.1	16	0	2.6	.0	0.0	.2	--	24	.03	12	0	30	7.2
Aug. 3.....		6.7	5.5	2.2	1.9	1.9	29	0	2.6	.2	1.1	.1	--	36	.05	32	0	51	7.6
Sept. 1.....		6.7	7.0	3.8	2.1	1.2	48	0	4.4	1.5	1.1	.5	0.01	A48	.07	33	0	73	7.4
Sept. 21.....		5.5	7.0	3.4	2.6	1.3	42	0	4.0	.5	0.0	.1	--	45	.06	32	0	77	8.1

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 25, 1966.	11.2	2400	0.00	0.01	0.00		May 24, 1967..	12.1	230	0.00	0.00	0.00	
Feb. 23, 1967.	13.0	430					Aug. 17.....	12.2	1500				

CRAB CREEK BASIN

12-4726. CRAB CREEK NEAR BEVERLY, WASH.

LOCATION.--Lat 46°49'55", long 119°48'55", at county bridge 4.8 miles east of Beverly, Grant County, 0.7 miles upstream from gaging station, and 5.2 miles up-stream from mouth.

DRAINAGE AREA.--4,842 square miles, of which 665 square miles in the vicinity of Soap Lake is noncontributing.

RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1967.

Water temperatures: August 1959 to September 1962.

REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Specific conductance (microhm-cm at 25°C)	Color
												Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium, Sulfate	Non-carbonate	
Oct. 25, 1966.	183	22	51	34	192	24	444	198	67	1.0	1.8	A 837	1.14	414	287	0	1970 8.6
Nov. 25,	248	23	57	38	260	24	479	289	91	1.0	1.9	1771	1.41	564	286	0	1540 8.8
Dec. 25,	148	31	57	37	145	17	410	182	65	1.0	7.7	771	1.05	308	286	0	1200 8.3
Jan. 25, 1967.	126	34	55	35	149	16	404	2	180	3.9	8.2	751	1.02	95 6	281	0	1130 8.3
Feb. 24,	112	30	54	32	150	12	400	183	65	1.1	5.1	739	1.01	223	266	0	1080 8.0
Mar. 29,	126	22	42	30	138	15	340	0	169	5.6	5.4	654	.89	222	228	0	1060 8.0
Apr. 19,	136	20	43	30	162	18	374	173	63	1.0	4.8	A 713	.97	262	231	0	1100 8.5
May 25,	109	20	40	26	103	13	304	0	126	1.9	3.2	A 537	.72	155	207	0	812 8.2
June 4,	104	25	38	27	121	14	346	126	40	1.7	2.8	560	.68	140	206	0	840 8.4
June 20,	104	25	38	27	121	14	346	126	40	1.7	2.8	560	.68	140	206	0	781 8.4
Aug. 17,	106	28	42	27	94	13	294	0	124	.9	1.5	526	.72	131	216	0	816 8.1
Sept. 20,	123	28	44	29	104	16	304	12	132	.8	3.6	563	.77	181	230	0	896 8.5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 25, 1966.	9.3	30					May 25, 1967..	11.9	36				
Nov. 17,	12.6	430					June 14,	8.6	150				
Feb. 24, 1967.	11.6	430					July 20,	10.4	--				
Mar. 29,	12.4	0					Aug. 17,	9.2	230				
Apr. 19,	11.0	930					Sept. 20,	10.1	36				

YAKIMA RIVER BASIN

12-4840, WILSON CREEK AT THRALL, WASH.

LOCATION.--Lat 46°55'00", long 120°30'25", at bridge on Highway 97, 1.0 mile south of Thrall, Kittitas County, and approximately 100 feet upstream from mouth.
 RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.
 REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 26, 1966...		42		35	17	25	4.9	228	0	12	11	0.4	3.4	--	A 263	0.36		158	0	395	7.5
Nov. 26, 1966...		43		35	17	25	4.9	228	0	12	11	0.4	3.4	--	A 263	0.36		158	0	395	7.5
Dec. 26, 1966...		38		30	16	21	3.6	196	0	13	8.0	3.0	3.6	--	231	.37		140	0	358	7.6
Jan. 25, 1967...		44		31	15	22	4.0	196	0	13	9.0	3.0	4.0	--	242	.33		139	0	357	7.4
Feb. 24, 1967...		40		29	14	20	4.0	182	0	11	6.0	4.2	2.7	0.02	217	.30		130	0	359	7.6
Mar. 29, 1967...		40		29	16	22	4.0	195	0	12	9.0	3.0	2.9	--	233	.32		139	0	356	8.0
Apr. 19, 1967...		23		18	8.0	9.8	3.4	106	0	7.6	3.0	2.2	3.1	--	130	.18		78	0	198	7.3
May 25, 1967...		29		21	12	13	3.5	150	0	7.8	3.0	3.1	3.3	--	167	.23		102	0	271	7.3
June 24, 1967...		37		30	15	14	3.2	198	0	7.6	4.8	2.1	1.7	--	A 282	.25		109	0	265	7.0
July 20, 1967...		36		30	15	15	3.2	198	0	13	4.2	2.1	1.6	0.0	A 236	.28		132	0	345	7.2
Aug. 17, 1967...		36		30	13	17	4.8	189	0	8.0	4.2	2.1	1.6	--	208	.28		127	0	316	7.6
Sept. 20, 1967...		32		26	12	16	4.4	166	0	8.8	4.0	3.1	1.1	--	191	.26		115	0	287	7.6

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 26, 1966...	8.2	110000					May 25, 1967...	11.7	2400				
Nov. 18, 1966...	8.8	24000					June 14, 1967...	11.7	24000				
Feb. 24, 1967...	12.3	11000	0.00	0.04	0.02		July 20, 1967...	9.1	--				
Mar. 29, 1967...	13.0	4600					Aug. 17, 1967...	10.1	4600				
Apr. 19, 1967...	10.6	4600					Sept. 20, 1967...	11.1	2400	0.00	0.00	0.00	

YAKIMA RIVER BASIN--Continued

12--4849. YAKIMA RIVER AT ROZA DAM, WASH.

LOCATION.--Lat 46°46'50", long 120°27'10", at Roza diversion dam, 8.0 miles downstream from Untanum Creek, 12.3 miles north of Yakima, Yakima County, and at mile 127.9.

DRAINAGE AREA.--1,802 square miles.

Water temperatures: October 1965 to September 1967.

RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

EXTREMES, 1966-67.--Dissolved solids: Maximum, 131 ppm Nov. 16-26; minimum, 54 ppm July 4-31.

Sardness: Maximum, 84 ppm Oct. 22 to Nov. 15; minimum, 37 ppm July 4 to Aug. 31.

Water temperatures: Maximum, 67°F July 5, 17, 18; minimum, 34°F Dec. 28, 29.

EXTREMES, 1965-67.--Dissolved solids: Maximum, 138 ppm Oct. 24 to Nov. 15, 1965; minimum, 54 ppm July 5-26, 1966, July 4-31, 1967.

Hardness: Maximum, 88 ppm Oct. 24 to Nov. 15, 1965; minimum, 34 ppm July 27 to Aug. 31, 1966.

Specific conductance: Maximum daily, 224 micromhos Nov. 15, 1965; minimum daily, 76 micromhos July 31, 1966.

Water temperatures: Maximum, 67°F July 5, 17, 18, 1967; minimum, freezing point on several days during January 1966.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	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		Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.			
Oct. 1-21, 1966..	17	14	5.4	6.2	1.4	76	0	3.6	2.0	0.1	0.6	92	0.13	87	0	134	0	4	134	7.5	0
Oct. 22-Nov. 15..	21	20	8.4	9.9	2.0	116	0	5.4	4.0	2.1	0.8	A 129	0.18	84	0	132	0	1	132	7.5	5
Nov. 16-26.....	22	18	8.9	11.5	2.2	116	0	5.6	5.0	2.2	1.4	A 131	0.18	82	0	135	0	1	135	7.5	5
Nov. 27-Dec. 14..	18	15	6.7	7.6	1.5	90	0	4.4	3.0	1.1	1.3	A 110	0.15	65	0	140	0	1	140	7.5	5
Dec. 15-26.....	17	12	4.9	5.3	.9	70	0	3.4	2.0	1.1	.9	81	.11	50	0	124	0	1	124	7.3	0
Dec. 27-Jan. 1, 1967.....	17	13	5.7	6.1	1.0	78	0	3.8	2.0	1.1	1.1	A 88	.12	56	0	141	0	1	141	7.4	0
Jan. 2-14.....	18	14	5.6	6.0	1.8	78	0	4.0	3.0	1.1	1.0	95	.13	58	0	139	0	1	139	7.9	5
Jan. 15-22.....	16	12	4.4	5.0	1.2	66	0	3.2	3.0	1.0	.8	A 76	.12	48	0	135	0	1	135	7.9	5
Jan. 23-Feb. 4.....	18	13	5.3	5.7	1.6	76	0	3.6	3.0	1.1	.8	A 86	.12	54	0	133	0	1	133	7.9	5
Feb. 5-Mar. 3.....	15	12	4.2	4.6	1.4	64	0	3.2	2.0	1.1	.6	A 74	.10	48	0	130	0	1	130	7.7	5
Mar. 4-24.....	16	14	5.6	5.8	1.6	82	0	3.6	2.0	1.1	.6	A 89	.12	58	0	140	0	1	140	7.8	5
Mar. 25-31.....	16	13	4.5	5.1	1.3	68	0	3.2	2.0	1.1	.5	A 80	.11	51	0	120	0	1	120	7.5	0
Apr. 1-22.....	12	9.9	3.5	3.7	1.3	52	0	2.8	2.0	1.1	.6	65	.09	39	0	94	0	1	94	7.6	5
Apr. 23-May 12.....	15	12	3.2	4.1	1.0	64	0	3.0	1.0	1.1	.6	A 71	.10	47	0	108	0	1	108	7.7	5
May 13-22.....	12	9.5	3.4	3.5	1.1	56	0	3.2	1.2	1.1	.7	69	.09	46	0	107	0	1	107	7.7	5
June 3-July 3.....	12	9.5	4.4	3.5	.9	51	0	2.8	1.2	1.0	.3	54	.07	36	0	87	0	1	87	7.7	5
July 4-31.....	11	8.5	3.6	3.3	.9	51	0	2.8	1.0	.8	.0	53	.08	36	0	86	0	1	86	7.7	5
Aug. 1-31.....	12	8.5	3.5	3.3	.9	51	0	1.0	.8	.0	.3	58	.08	36	0	86	0	1	86	7.7	5
Sept. 1-30.....	13	10	4.5	4.2	1.1	61	0	1.6	1.3	1.1	.4	67	.09	44	0	105	0	1	105	7.7	5
Time-weighted average.....	15	12	5.0	5.2	1.3	70	--	3.0	1.9	0.1	0.6	79	--	51	0	121	0	0.3	121	7.7	--

A Calculated from determined constituents.

12-5050. YAKIMA RIVER NEAR PARKER, WASH.

LOCATION.--Lat 46°29'50", long 120°26'35", at Sunnyside diversion dam, 700 feet upstream from gaging station, 1.5 miles east of Parker, Yakima County, 3 miles downstream from Ahtanum Creek, and at river mile 103.7.

DRAINAGE AREA (revised).--3,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1967.

Water temperatures: August 1959 to September 1967.

EXTREMES, 1966-67.--Dissolved solids: Maximum, 136 ppm Oct. 16 to Nov. 15; minimum, 59 ppm June 1-19.

Specific conductance: Maximum, 233 micromhos Nov. 9, 10; minimum daily, 71 micromhos June 19.

Water temperatures: Maximum, 72°F July 13; minimum, 35°F Dec. 26, Jan. 7.

EXTREMES, 1959-67.--Dissolved solids: Maximum, 204 ppm Nov. 29, 30, 1962; minimum, 44 ppm Jan. 1-13, 1960.

Hardness: Maximum, 122 ppm Nov. 29, 30, 1963; minimum, 27 ppm Jan. 1-13, 1960.

Specific conductance: Maximum daily, 317 micromhos Nov. 29, 1963; minimum daily, 69 micromhos June 4, 1961, May 22, 1963.

Water temperatures: Maximum, 72°F on several days during July or August of most years; minimum, freezing point on many days during most years.

REMARKS.--Approximately 15 percent of yearly flow is diverted at Sunnyside Diversion Dam. No inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Color		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-15, 1966	251	19		16	5.8	10	1.6	88	0	7.6	3.0	0.1	1.0	A 107	0.15	72.5	64	0	0.5	167	7.6	0
Oct. 16-Nov. 15	1120	21		20	7.7	14	2.2	114	0	9.2	6.0	0.2	1.4	A 138	0.19	417	82	0	0.7	214	7.7	5
Nov. 16-26	1350	21		18	7.9	13	2.1	112	0	9.0	5.0	0.2	1.8	136	0.18	496	78	0	0.6	212	7.4	5
Nov. 27-Dec. 13	2060	18		15	5.9	9.3	1.5	87	0	7.0	4.0	0.1	1.5	105	0.14	584	62	0	0.5	164	7.3	5
Dec. 14-Dec. 29	3360	16		13	4.4	6.9	0.9	67	0	5.2	2.0	0.1	1.0	81	0.11	735	50	0	0.4	126	7.3	5
Dec. 30-Jan. 14, 1967																						
Jan. 15-Feb. 4	2040	19		14	5.5	7.7	1.7	78	0	6.0	4.0	0.1	1.0	98	0.13	540	58	0	0.4	149	7.9	5
Jan. 15-Feb. 4	2730	19		13	4.9	6.9	1.2	72	0	5.2	3.0	0.1	0.9	94	0.13	693	52	0	0.4	134	7.7	5
Feb. 5-Mar. 2	3100	17		12	4.5	6.2	1.2	66	0	4.4	3.0	0.1	0.6	81	0.11	678	48	0	0.4	123	7.6	5
Mar. 3-10	1850	16		11	4.8	6.1	1.1	62	0	4.5	3.0	0.1	0.8	74	0.11	584	50	0	0.5	144	8.1	0
Mar. 20-30	554	20		14	4.9	8.1	1.3	78	0	5.6	3.0	0.1	0.8	96	0.13	443	55	0	0.5	144	8.1	0
Mar. 31-Apr. 17	559	16		12	3.9	6.2	1.2	64	0	4.8	3.0	0.1	0.7	A 79	0.11	119	46	0	0.4	113	7.9	5
Apr. 18-May 3	1240	17		12	3.6	6.1	1.1	64	0	4.2	1.2	0.1	0.7	77	0.11	379	45	0	0.4	114	7.7	5
May 4-10	1800	18		10	3.6	5.2	1.1	58	0	3.8	1.2	0.1	0.6	73	0.10	564	40	0	0.4	102	7.7	5
May 11-23	2860	18		10	3.6	5.2	1.1	58	0	3.8	1.2	0.1	0.6	73	0.10	564	40	0	0.4	102	7.7	5
May 23-31	4080	16		9.0	3.0	4.4	0.9	50	0	3.6	1.8	0.1	0.5	62	0.08	683	35	0	0.3	89	7.7	5
June 1-19	4890	15		8.5	2.8	4.1	1.0	47	0	3.2	1.2	0.1	0.3	59	0.08	779	33	0	0.3	84	7.7	5
June 20-July 13	2970	14		8.5	3.2	4.4	1.0	48	0	3.6	1.2	0.1	0.4	60	0.08	481	34	0	0.3	89	7.7	10
July 14-31	364	15		9.5	3.6	5.7	1.3	57	0	4.0	2.0	0.1	0.7	A 71	0.10	69.7	39	0	0.4	103	7.7	5
Aug. 1-31	350	15		10	3.8	5.9	1.4	60	0	4.4	2.0	0.1	0.8	73	0.10	69.0	41	0	0.4	109	7.7	5
Sept. 1-9	313	16		12	3.6	6.8	1.6	67	0	4.8	2.2	0.2	0.8	81	0.11	68.5	45	0	0.4	124	7.9	5
Sept. 10-30	277	17		12	4.4	7.1	1.4	67	0	5.0	2.1	0.1	0.5	84	0.11	62.7	48	0	0.4	126	7.8	5
Weighted average	--	--		12	4.4	6.6	1.2	67	--	4.9	2.5	0.1	0.7	83	0.11	390	48	0	0.4	123	7.6	--
Time-weighted average	1752	17		13	4.7	7.4	1.4	72	--	5.4	2.7	0.1	0.8	88	--	--	51	0	0.4	133	7.6	--
Tons per day	--	80		56	21	31	5.8	315	--	23	12	0.6	3.4	--	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

YAKIMA RIVER BASIN--Continued

12-5050. YAKIMA RIVER NEAR PARKER, WASH.--Continued

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	152	224	143	148	133	131	126	125	94	86	103	119
2.....	158	218	143	148	133	146	146	122	86	86	105	121
3.....	158	221	148	146	135	145	123	112	87	86	105	122
4.....	159	225	150	148	133	146	123	116	87	86	104	122
5.....	161	224	150	145	119	149	119	121	89	81	101	119
6.....	163	225	154	147	113	150	121	121	86	81	102	119
7.....	164	226	155	147	122	152	107	115	82	84	101	123
8.....	166	225	163	154	120	157	106	98	80	84	101	123
9.....	163	233	164	154	119	157	106	98	80	82	107	121
10.....	167	231	163	154	117	157	106	98	81	84	106	119
11.....	167	233	170	155	123	153	117	100	83	81	108	120
12.....	163	231	169	154	123	153	117	124	83	81	108	120
13.....	190	229	170	150	122	152	118	117	82	81	108	123
14.....	192	226	143	151	121	158	116	117	82	103	108	122
15.....	202	220	125	124	121	158	119	113	80	108	108	123
16.....	207	220	127	123	124	158	117	111	79	104	108	126
17.....	200	219	126	114	125	159	117	101	74	103	110	124
18.....	198	223	128	122	125	159	110	99	72	98	108	124
19.....	205	222	117	124	121	157	110	99	71	100	109	123
20.....	205	222	117	131	120	157	116	89	72	100	110	127
21.....	204	223	113	132	126	146	119	85	76	100	110	127
22.....	209	223	113	139	128	146	119	79	76	102	109	126
23.....	206	210	117	140	125	148	120	79	75	104	112	124
24.....	207	210	118	143	127	146	120	79	82	103	108	123
25.....	200	192	129	149	128	138	125	87	83	103	109	125
26.....	202	191	129	153	128	137	126	86	83	103	109	125
27.....	207	191	131	154	128	137	126	86	80	104	110	127
28.....	207	172	138	140	132	141	126	92	70	104	110	127
29.....	210	179	144	139	--	142	128	96	107	107	112	129
30.....	201	179	146	140	--	142	123	90	81	103	114	129
31.....	217	--	145	125	--	127	--	90	--	104	114	--
Average	187	214	141	142	124	148	118	121	81	98	107	123

Temperature (°F) of water, water year October 1966 to September 1967

Month	Day												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
October.....	58	61	56	50	51	57	57	51	51	52	52	52	51
November.....	47	48	47	47	46	46	45	44	43	41	42	43	44
December.....	45	44	42	42	40	39	36	37	39	41	40	39	41
January.....	39	39	38	40	38	37	35	39	39	41	39	40	39
February.....	38	38	39	40	38	37	38	37	38	41	41	40	37
March.....	43	43	38	38	38	38	38	38	39	40	39	40	39
April.....	41	46	45	48	45	44	45	44	44	44	44	44	44
May.....	47	48	58	53	51	51	51	48	50	47	50	52	51
June.....	55	54	54	53	54	53	54	54	53	55	57	59	56
July.....	63	62	65	65	65	64	63	62	59	62	64	66	62
August.....	68	63	61	63	60	62	62	66	62	62	65	68	65
September.....	66	64	64	64	66	61	68	67	64	64	60	63	61

12-5105. YAKIMA RIVER AT KIONA, WASH.
(Irrigation network station)

LOCATION.--Lat 46°15'10", long 119°28'35", at highway bridge downstream from gaging station at Kiona, Benton County, 3.5 miles downstream from intake of Kiona Canal, and at mile 29.8.

DRAINAGE AREA (revised).--5615 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1952 to September 1967.

EXTREMES, 1962-67.--Dissolved solids: Maximum, 246 ppm Oct. 1-16; minimum, 103 ppm June 24-30.

Hardness: Maximum, 142 ppm Oct. 1-16; minimum, 59 ppm June 24-30.

Water temperatures: Maximum, 142 ppm Oct. 1-16; minimum, 59 ppm June 24-30.

Water conductance: Maximum, 142 ppm Oct. 1-16; minimum, 59 ppm June 24-30.

Water hardness: Maximum, 142 ppm Oct. 1-16; minimum, 59 ppm June 24-30.

EXTREMES, 1952-67.--Dissolved solids: Maximum, 246 ppm Oct. 1-16, 1966; minimum, 76 ppm May 1-23, 1957, Dec. 16-31, 1959.

Hardness: Maximum, 148 ppm Oct. 1-11, 1958; minimum, 42 ppm May 1-23, 1957, Dec. 16-31, 1959.

Specific conductance: Maximum daily, 410 microhos Oct. 13, 1966; minimum daily, 99 microhos Dec. 17, 1959.

Water temperatures: Maximum, 84°F July 16, 1960, July 21, 1961; minimum, freezing point on several days during winter months.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Coliform or pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium, Sodium	Non-carbonate				
Oct. 1-16, 1966..	1750	29	37	12	25	4.0	200	0	25	7.0	0.3	4.5	246	0.33	1160	142	0	0.9	387	7.9	5
Oct. 17-Nov. 15..	2230	27	32	13	27	4.5	179	0	23	8.0	0.3	4.9	224	0.30	1340	130	0	0.9	351	7.9	0
Nov. 16-Dec. 15..	3120	24	25	16	18	3.4	135	2	18	7.0	0.3	3.7	A 177	0.24	1480	106	0	1.8	281	8.2	5
Dec. 16-28.....	4460	21	20	7.1	13	2.1	105	0	13	4.5	0.2	2.8	A 136	0.18	1640	79	0	0.6	210	8.2	5
Dec. 29-Jan. 16, 1967..	2960	22	23	9.2	16	2.6	128	0	16	6.0	0.2	3.4	166	0.23	1330	96	0	0.7	255	8.2	5
Jan. 17-27.....	3390	20	20	7.6	14	2.4	112	0	13	5.0	0.2	2.6	A 140	0.19	1280	82	0	0.7	221	8.1	5
Jan. 28-Feb. 15..	4660	23	19	5.8	11	2.1	98	0	10	4.0	0.2	2.0	A 134	0.18	1690	72	0	0.6	193	8.0	5
Feb. 16-Mar. 5..	3460	21	18	7.1	12	2.1	104	0	11	3.0	0.1	1.7	A 132	0.18	1230	74	0	0.6	205	8.0	5
Mar. 6-13.....	2490	23	22	8.3	15	2.5	124	0	14	5.0	0.2	2.1	A 153	0.21	1030	89	0	0.7	243	8.0	0
Mar. 14-Apr. 10..	2020	25	23	8.6	16	2.5	128	0	16	6.0	0.2	2.4	A 163	0.22	889	93	0	0.7	252	8.2	0
Apr. 11-29.....	1840	23	20	9.5	17	2.7	134	0	19	5.8	0.3	3.5	171	0.23	850	102	0	0.7	268	8.0	5
Apr. 30-May 8....	3700	24	20	16	18	2.8	143	0	18	5.2	0.3	3.1	A 175	0.24	1090	106	0	0.8	279	8.0	5
May 9-17.....	2660	25	20	10.9	13	2.6	135	0	16	4.5	0.3	2.8	A 168	0.23	1210	100	0	0.9	206	7.9	5
May 18-25.....	6170	21	16	5.8	10	1.8	87	0	9.6	2.5	0.3	2.5	113	0.15	1880	64	0	0.5	169	7.8	5
May 26-June 23..	6510	20	16	5.0	8.6	1.8	82	0	8.4	2.5	0.1	2.1	105	0.14	1850	61	0	0.5	160	7.8	5
June 24-30.....	6550	19	15	5.1	8.4	1.8	78	0	8.0	2.8	0.2	1.9	103	0.14	1820	59	0	0.5	153	8.0	10
July 1-20.....	1900	25	28	10	17	3.5	149	0	18	6.0	0.3	3.3	0.00	0.26	975	111	0	0.7	293	8.2	5
July 21-Aug. 8...	1440	33	34	11	21	3.9	176	0	22	7.0	0.3	3.6	A 223	0.30	867	129	0	0.8	345	8.0	5
Aug. 9-20.....	1390	33	34	12	22	4.1	181	0	22	7.2	0.3	3.6	A 226	0.31	848	133	0	0.8	354	8.1	5
Aug. 21-Sept. 8..	1640	30	34	11	21	4.2	174	1	22	6.5	0.3	3.3	A 223	0.30	987	131	0	0.8	348	8.3	5
Sept. 9-30.....	1520	29	34	12	24	4.4	189	0	23	7.7	0.2	4.1	A 243	0.33	1010	135	0	0.9	368	8.2	5
Weighted average.....	--	23	23	8.1	15	2.7	123	--	15	5.0	0.2	2.9	158	0.21	1250	91	0	0.7	244	7.4	--
Time-weighted average.....	2938	25	26	9.3	17	3.0	140	--	17	5.8	0.2	3.2	178	--	--	103	0	0.7	277	7.5	--
Tons per day....	--	186	181	65	119	21	976	--	117	39	1.7	23	--	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON

CHEHALIS RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967

Chemical analyses, in parts per million, water from October 1966 to September 1967.																					
Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe) (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄) (CO ₃)	Chloride (Cl) (SO ₄)	Fluoride (F) (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium concentration (micro-mhos at 25°C)	Color or pH					
											Parts per million	Tons per acre-foot	Calcium, magnesium	Non-boronate							
12-0200. CHERALIS RIVER NEAR DOTY, WASH. (Lat. 46°38'05", long 123°15'20")																					
Feb. 27, 1967.	438	15	5.3	1.9	3.9	0.5	24	0	2.6	4.0	0.1	0.5	0.01	A	46	0.06	54.4	21	2	58	7.2
May 16,	164	14	5.6	1.8	4.7	.7	28	0	2.8	5.0	.1	.3	-.04		49	.07	21.7	22	0	64	7.3
AUG. 24,	22	16	7.0	2.2	6.8	.6	36	0	3.2	6.0	.1	.1	.04		60	.08	3.56	27	0	85	7.3
																					10

12-0200. CHEHALIS RIVER NEAR DOTY, WASH. (Lat 46°38'05", long 123°15'20")

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	P. B. I. (Pearl-Benson Index)	Slime solids			Total phosphate as P ₂ O ₅	Ammonium as N (NH ₄)
									M. P. N. (most probable number per 100 ml)	Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	
Nov. 14, 1966...						11.0	930						
Feb. 27, 1967...						12.3	36			0.00			
May 16, 1967...						13.8	2400			.00			
Aug. 24, 1967...						8.8	0			.00			

A Calculated from determined constituents.

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

CHEMICAL ANALYSES, IN PARTS PER MILLION, WATER FROM OCTOBER 1966 TO SEPTEMBER 1967--Continued																					
Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Po- tas- sium (K)	Bi- car- bon- ate (HCO ₃)	Car- bon- ate (CO ₃)	Sul- fate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	So- dium ad- just- ed, (micro- mhos at 25°C)	Col- or pH				
													Parts per million	Tons per acre-foot				Tons per day			
12-0250. NEWAUKUM RIVER NEAR CHERALTS, WASH. (Lat 46°37'10", Long 122°56'35")																					
Nov. 14, 1966.	1140	13	4.5	1.5	3.8	0.9	18	0	2.2	4.2	0.1	2.4	--	51	0.07	157	1	52	6.9	40	
Feb. 27, 1967.	447	16	4.8	1.9	3.4	.4	25	0	1.2	4.0	.1	6.0	0.01	A	43	.07	51.9	20	0	55	7.3
May 16, 1967.	171	14	6.5	1.6	4.2	.6	33	0	1.4	4.0	.0	.2	-.02	--	54	.07	24.9	23	0	67	7.2
Aug. 24, 1967.	20	16	9.5	3.0	6.4	.6	44	0	1.2	8.5	.1	.1	.02	66	.09	3.56	34	0	101	7.5	5

12-0250. NEWAUKUM RIVER NEAR CHEHALIS, WASH. (Lat 46°37'10", long 122°56'35")

HUMPTULIPS RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH or		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium-sium	Non-carbonate				
12-0390. HUMPTULIPS RIVER NEAR HUMPTULIPS, WASH. (lat 47°13'45", long 123°57'40")																						
May 18, 1967...	659	7.9		5.8	1.5	2.6	0.4	27	0	2.4	2.0	0.1	0.1	0.02	37	0.05	65.8	20	0	55	7.3	0

Additional determinations

Date of collection	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)				
May 18, 1967.....		0.00	0.00	0.01		

QUINULT RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or		
														Parts per million	Tons per acre-foot	Tons per day						
12-0395. QUINULT RIVER AT QUINULT LAKE, WASH. (Lat 47°27'30", long 123°53'15")																						
May 18, 1967...	2910	4.7		8.8	0.7	1.6	0.2	26	0	5.8	1.5	0.1	0.1	0.01	41	0.07	322	25	4	61	7.2	0

Additional determinations

Date of collection	Chromium			Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 18, 1967...		0.00		0.00	0.00		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

QUEETS RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH or color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
12-0406. QUEETS RIVER AT QUEETS, WASH. (Lat 47°32'30", Long 124°20'00")																				
May 18, 1967..	4.2		8.2	0.9	2.2	0.7	26	0	6.2	1.5	0.1	0.1	0.01	37	0.05	24	2	63	7.2	5

Additional determinations

Date of collection	Chromium			Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 18, 1967....		0.00	0.00	0.00	0.00		

HOH RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	Color or pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
12-0412. HOH RIVER NEAR FORKS, WASH. (Lat 47°48'25", long 124°15'00")																					
May 18, 1967..	2800	5.8	12	1.0	1.7	0.3	32	0	9.2	1.0	0.1	0.3	0.01	51	0.07	397	34	8	75	7.3	0

Additional determinations

Date of collection	Chromium			Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 18, 1967....		0.00	0.00	0.00	0.01		

QUILLAYUTE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)		Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH		
														Parts per million	Tons per acre-foot					Calcium	Non-carbonate
														12-0420. SOLEDUCK RIVER ABOVE KUGEL CREEK, NEAR FAIRHOLM, WASH. (Lat 48°04'00", Long 124°05'50")							
May 18, 1967...		8.0		8.8	1.3	2.0	0.3	33	0	4.4	1.5	0.1	0.1	0.04	43	0.06	28	0	68	7.7	5

Additional determinations

Date of collection	Time (24 hr)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 18, 1967....		0.00		0.00	0.02		

ELWHA RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

CHEMICAL ANALYSES, IN PARTS PER MILLION, WATER YEAR OCTOBER 1966—CONTINUED																					
Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH	
														parts per million	Tons per acre-foot	Tons per day	Calcium				Non-carbonate
12-0455. ELWHA RIVER AT McDONALD BRIDGE, NEAR PORT ANGELES, WASH. (Lat 48°03'55", long 123°34'35")																					
May 17, 1967..	2680	6.3		15	1.5	2.1	0.4	47	0	8.2	0.5	0.1	0.1	0.04	60	0.08	44	5	96	8.1	0

Additional determinations

Date of collection	Time (24 hr)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 17, 1967....		0.00		0.00	0.00		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

DUNGENESS RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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 (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH or color	
															Parts per million	Tons per acre-foot					
12-0480. DUNGENESS RIVER NEAR SEQUIM, WASH. (Lat 48°04'35", long 123°09'00")																					
May 17, 1967..	918	5.9	14	2.2	2.3	0.6	52	0	6.0	0.0	0.1	0.1	0.02	57	0.08	141	44	2	99	7.6	5

Additional determinations

Date of collection	Chromium			Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)	Coprecipitated (Cr ³⁺)			
May 17, 1967.....		0.00	0.00	0.01		

BIG QUILCENE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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 (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per acre-day			
12-0523. BIG QUILCENE RIVER NEAR QUILCENE, WASH. (Lat 47°48'40", Long 122°54'35")																				
May 18, 1967...	7.7	10	1.9	2.0	0.5	40	0	1.8	3.0	0.0	0.2	0.02	47	0.06	33	0	75	7.9	5	

Additional determinations

Date of collection	Chromium			Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)	Coprecipitated (Cr ³⁺)			
May 18, 1967.....		0.00	0.00	0.02		

DOSEWALLIPS RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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		Specific conductance (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
12-0535. DOSEWALLIPS RIVER AT BRINNON, WASH. (Lat 47°41'25", long 122°53'50")																					
May 18, 1967...	5.5	11	1.1	1.4	0.4	37	0	5.2	0.5	0.1	0.2	0.01	45	0.06		32	2	73	7.4	0	

Additional determinations

Date of collection	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)				
May 18, 1967....		0.00	0.00	0.01		

DUCKABUSH RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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 at 25°C	Specific conductance (micro-mhos at 25°C)	Color or pH	
															Parts per million	Tons per acre-foot	Tons per day					
12-0541. DUCKABUSH RIVER AT U.S. HIGHWAY 101 BRIDGE, NEAR BRINNON, WASH. (Lat 47°38'55", Long 122°56'00")																						
May 18, 1967...	4.1		8.0	0.8	1.1	0.5	28	0	3.6	0.5	0.1	0.2	0.00	32	0.04		24	0	54	7.7	5	

Additional determinations

Date of collection	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
	Time (24 hr)	Hexavalent (Cr ⁶⁺)				
May 18, 1967...		0.00	0.00	0.02		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

HAMMA HAMMA RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

CHEMICAL ANALYSES, ALL PARTS PER MILLION, WATER YEAR OCTOBER 1966-Continued																					
Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Color or pH	
															Parts per million	Tons per acre-foot	Calcium, magnesium, sodium	Non-carbonate			
12-0550, HAMMA HAMMA RIVER AT ELDON, WASH. (Lat 47°32'55", Long 123°02'25")																					
May 18, 1967..	8.4			9.6	1.0	1.3	0.4	34	0	2.8	0.0	0.1	0.2	0.00	41	0.06	28	0	62	7.7	0
0																					

Additional determinations

Date of collection	Time (24 hr)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
May 18, 1967....		0.00		0.02	0.02		

GOLDSBOROUGH RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Color or pH		
														Parts per million	Tons per acre-foot	Calcium, magnesium, sodium	Non-carbonate				
12-0770. GOLDSBOROUGH CREEK AT SHELTON (Lat 47°12'30", Long 123°06'00")																					
Apr. 13, 1967..	14			11	4.6	2.8	0.6	56	0	4.0	2.0	0.1	0.5	0.02	71	0.10	46	0	102	7.2	25

Additional determinations

Date of collection	Time (24 hr)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
Apr. 13, 1967....		0.00		0.00	0.00		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

PUYALLUP RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
12-1005. WHITE RIVER NEAR SUMNER, WASH. (Lat 47°15'55", Long 122°13'40")																				
Dec. 27, 1966..	220	19		10	2.8	4.4	1.1	39	0	9.4	0.1	2.3	77	0.10	45.7	37	5	98	7.3	10
Mar. 27, 1967..	232	18		9.8	2.6	4.2	1.7	40	0	9.0	0.1	1.3	71	0.10	44.5	35	2	95	7.8	10
June 12,	1570	13		5.5	1.1	2.7	0.6	24	0	5.2	0.8	1.1	44	0.06	187	18	0	51	7.3	5
Sept. 18,	82	15		11	2.6	5.4	1.8	42	0	14	2.8	1.1	80	0.11	17.7	38	4	108	7.6	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (5-day biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Total phosphate as PO ₄	Total nitrogen as N (NH ₄)
									P.B.I. (Pearlman Index)	Settleable (ml/l)	Total (mg/l)	Hexavalent (Cr ⁶)	Total (Cr)					
Mar. 27, 1967...						12.3		430										
June 12, 1967...						10.5		36				0.00						
Sept. 18, 1967...						10.3		230							0.00	0.01		

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

112-1345. SKYKOMISH RIVER NEAR GOLD BAR, WASH. (Lat 47°50'15", long 121°39'25")

Additional determinations

18. 1967....

A Residue at 180°C.

[illegible]

112-1382. SULTAN RIVER AT SULTAN, WASH. (Lat 47°51'40", long 121°49'10")

0	0.4	1	0	3	13	0	2.0	0.5	0.1	0.6	23
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Additional determinations

11.7		
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11.7		
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MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

SNOHOMISH RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium carbonate ratio	Specific conductance (microhmhos at 25°C)	pH or Col	
														Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate				
12-1444. SNOQUALMIE RIVER AT SNOQUALMIE, WASH. (Lat 47°31'40", long 121°48'40")																					
Oct. 25, 1966.	5.2			3.5	0.6	1.1	0.7	12	0	0.0	2.0	0.1	0.5	—	21	0.03	11	1	26	6.9	10
Jan. 24, 1967.	7.0			4.7	.9	1.4	.7	18	0	2.6	.5	.1	.5	0.04	29	.04	15	0	38	7.0	5
Mar. 29.....	6.1			4.5	.9	1.4	.6	18	0	2.6	.5	.1	.5	.06	26	.04	14	0	37	7.2	5
June 12.....	3.5			2.0	.2	1.8	.3	10	0	1.6	.5	.1	.5	.06	26	.04	14	0	37	6.9	5
Sept. 20.....	7.0			6.6	1.1	2.0	.7	26	0	3.2	1.0	.0	.3	—	38	.05	21	0	52	7.2	5

Additional determinations

Date of collection	Time section (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M. P. N. (most probable coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Ammonium as N (NH ₄)
									P. B. I. (Pearson Index)	Total (mg/l)	Settleable (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)						
Oct. 25, 1966...						11.8		230				--		--	0.02	--			
Jan. 24, 1967...						--		35				0.01		--	0.00	--			
Mar. 29.....						12.6		35				--		--	--	--			
June 12.....						14.3		2400				.00		--	.00	--			
Sept. 20.....						9.3		4800				--		--	--	--			

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967—Continued																																					
Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Po- tas- sium (K)	Bi- car- bon- ate (HCO ₃)	Car- bon- ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		So- dium sorp- tion ratio	Specific con- ductance (micro- mhos at 25°C)	Col- or pH															
															Parts per million	Tons per acre-foot	Tons per day	Cal- cium, Mag- ne- sium	Non-car- bon- ate																		
12-1485. TOLT RIVER NEAR CARNATION, WASH. (Lat 47°38'15", long 121°54'55")																																					
Dec. 27, 1966..	590	7.4		6.0	1.0	2.0	0.3	22	0	4.2	1.0	0.1	0.8	38	0.05	60.5	19	1		48	7.3	10															
Mar. 29, 1967..	430	8.4		5.9	1.4	2.0	5	24	0	4.0	1.0	0.7		A	36	0.05	41.8	20	1	53	7.4	5															
June 14, 1967..	525	5.4		4.5	1.7	1.4	6	17	0	2.8	5	0	2	0.00	26	0.04	36.9	14	0	35	7.3	5															
Sept. 19, 1967..	113	7.4		7.2	1.7	2.1	5	30	0	4.0	8	0	1	39	0.05	11.9	25	1		60	7.4	5															

Additional determinations

Date of collection	Cross section (24 hr)	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical oxygen demand ppm)	M.P.N. (most probable coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Total phosphate as PO ₄	Total ammonia as N (NH ₄)
								P.B.I. (Parl. Reason Index)	Settleable (ml/l)	Total (mg/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)					
Feb. 27, 1967....					11.8		36										
Mar. 29, 1967....					13.0		0				0.00			0.00			
June 14, 1967....					12.9		72										
Sept. 19, 1967....					9.6												

A Calculated from determined constituents.

STILLAGUAMISH RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Po- tas- sium (K)	Bi- car- bon- ate (HCO ₃)	Car- bon- ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific con- duct- ance (micro- mhos at 25°C)	Col- or pH				
														Parts per million	Tons per acre-foot	Tons per day	Cal- cium, Mag- ne- sium	Non-car- bon- ate						
12-1670. NORTH FORK STILLAGUAMISH RIVER NEAR ARLINGTON, WASH. (Lat 48°16'05", long 122°00'45")																								
Dec. 28, 1966.	1640	8.0			6.5	2.2	2.0	0.4	30	0	2.6	1.2	0.1	1.1	0.06	195	25	1	59	7.3				
Mar. 28, 1967.	1980	7.1			5.7	2.0	1.8	4	26	0	3.6	1.5	1.1	7	A	36	0.05	192	22	0	54	7.3		
June 13, 1967.	2210	4.1			4.0	0.7	1.2	6	18	0	1.8	5	0	0.03	23	0.03	137	13	0	33	7.3	5		
Sept. 19, 1967.	311	9.5			9.1	2.6	2.9	.8	44	0	2.6	2.8	0	.2	57	.08	47.9	33	0	81	8.2	5		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

STILLAGUAMISH RIVER BASIN--Continued

12-1670. NORTH FORK STILLAGUAMISH RIVER NEAR ARLINGTON, WASH.--Continued

Date of collection	Time sec- (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dis- solved oxygen ppm)	B.O.D. (bio- chemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phos- phate as N PO ₄	Am- mon- ium (NH ₄)
									P.B.I. (Pearl- Benson Index)	Settle- able (ml/l)	Total (mg/l)	Vol- ume (ml/l)	Hexa- valent (Cr ⁶⁺)						
Mar. 28, 1967...						12.7		430					0.00	0.00	0.00				
June 13, 1967...					12.2	12.2		91											
Sept. 19, 1967...					11.0	11.0		36											

A Calculated from determined constituents.

SKAGIT RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bi-car- bon- ate (HCO ₃)	Car- bon- ate (CO ₃)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conduct- ance (micro- mhos at 25°C)
														Parts per million	Tons per acre- foot	Tons per day	Cal- cium, Mag- ne- sium	Non- car- bon- ate	
Dec. 28, 1966...		5.0	8.0	0.9	1.1	0.4	28	0	5.0	0.0	0.0	0.4		A	35	0.05	24	1	55
Mar. 28, 1967...		5.6	9.7	1.5	1.0	0.7	34	0	4.8	0	0.1	0.3			42	0.06	30	2	67
June 13, 1967...		4.0	6.0	0.5	0.9	0.6	22	0	3.0	0.0	0.0	0.1	0.05		28	0.04	17	0	40
Sept. 19, 1967...		4.2	7.1	0.9	0.8	0.6	26	0	3.4	0.0	0.1	0.1			30	0.04	21	0	48

12-1810. SKAGIT RIVER AT WAREHOUT, WASH. (Lat 48°31'35", long 121°25'40")

Additional determinations

Date of collection	Cross section (24 hr)	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dis- solved oxygen ppm)	B.O.D. (bio- chemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phos- phate as N PO ₄	Am- mon- ium (NH ₄)
								P.B.I. (Pearl- Benson Index)	Settle- able (ml/l)	Total (mg/l)	Vol- ume (ml/l)	Hexa- valent (Cr ⁶⁺)						
Mar. 28, 1967...					12.6		0											
June 13, 1967...					12.5		36											
Sept. 19, 1967...					11.8		0					0.00	0.00	0.00	0.01			

A Calculated from determined constituents.

NOOKSACK RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium carbonate ratio	Specific conductance (micro-mhos at 25°C)	Color or pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-boronate				
12-2105. NOOKSACK RIVER AT DEMING, WASH. (Lat 48°50'30", long 122°17'35")																					
Dec. 28, 1966.	2980	8.1		11	2.9	2.0	0.3	42	0	0.8	0.0	1.0		57	0.08	459	40	5	89	7.4	
Mar. 25, 1967.	A3920	8.4		10	3.1	2.0	.3	41	0	7.2	1.2	.1	.8		52	.07	550	38	4	86	7.5
June 13, 1967.	5600	5.2		6.0	1.9	1.2	.6	24	0	5.8	.0	.0	.1	0.01	36	.05	544	23	4	52	7.5
Sept. 19, 1967.	1440	7.3		9.8	2.4	1.8	.6	31	0	.8	.0	.2		35	.07	214	35	9	80	7.4	

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D. O. (dissolved oxygen ppm)	B. O. D. (biochemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Total phosphate as PO ₄	Total ammonia as N (NH ₄)
									P. B. I. (Pearl-Benson Index)	Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)					
Mar. 28, 1967...						12.2		36										
June 13, 1967...						14.0		73				0.00		0.00	0.00			
Sept. 19, 1967...						11.3		36										

A Discharge at time of sampling.

KETTLE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Po- tas- sium (K)	Bi- car- bon- ate (HCO ₃)	Car- bon- ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		So- dium ad- sorp- tion ratio	Specific con- duct- ance (micro- mhos at 25°C)	Col- or or pH	
															Parts per million	Tons per acre- foot	Cal- cium, Mag- ne- sium	Non- boron- ate				
12-4049. KETTLE RIVER NEAR BARTOW, WASH. (Lat 48°43'30", long 118°03'40")																						
Dec. 22, 1966.		12		22	4.6	4.3	0.9	88	0	11	0.5	0.2	0.4	105	0.14		74	2	163	7.9	5	
Feb. 23, 1967.		12		22	4.9	4.2	1.3	88	0	12	.0	.3	.3	0.00	.17		75	3	162	7.9	5	
June 7,		8.6		6.0	5.5	1.3	1.5	21	0	12.4	.0	.1	.3	40	.05		17	0	160	7.0	20	
Aug. 11,		12		22	5.1	4.2	1.4	91	0	11	.2	.2	.2	106	.14		76	2	167	8.1	20	

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

KETTLE RIVER BASIN--Continued

12-4049. KETTLE RIVER NEAR BARSTOW, WASH.--Continued

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D. O. (dis-solved oxygen ppm)	B. O. D. (bio-chemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	Slime solids				Chromium	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as N (NH ₄) PO ₄
									Settle-able (ml/l)	Total (mg/l)	Volume (ml/l)	Hexa-valent (Cr ⁶⁺)						
Dec. 22, 1966...					12.3			430										
Feb. 23, 1967...					13.5		0	90										
June 7, 1967...					11.8		90	91										
Aug. 11, 1967...					8.5								0.00	0.00	0.01			

A. Calculated from determined constituents.

COLVILLE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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	Specific conductance (microhmios at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, silum	Non-sorp-tion ratio
Dec. 22, 1966...	417	18	37	12	5.5	2.5	157	0	22	1.5	0.2	3.2	0.00		179	0.24	202	142	14
Feb. 23, 1967...	357	--	--	--	--	--	--	--	--	--	--	--	--		146	20	190	--	--
June 7, 1967...	481	14	32	9.3	4.0	1.4	142	0	12	2.5	.5	.1	.8		214	29	34.7	118	2
Aug. 11, 1967...	60	15	44	16	7.9	2.9	208	0	20	2.5	.2	.4						176	6

12-4090. COLVILLE RIVER AT KETTLE FALLS, WASH. (Lat 48°33'35", long 118°05'45")

Dec. 22, 1966...	417	18	37	12	5.5	2.5	157	0	22	1.5	0.2	3.2	0.00		179	0.24	202	142	14	290	7.5	10
Feb. 23, 1967...	357	--	--	--	--	--	--	--	--	--	--	--	--		146	20	190	--	--	--	--	--
June 7, 1967...	481	14	32	9.3	4.0	1.4	142	0	12	2.5	.5	.1	.8		214	29	34.7	118	2	234	7.8	5
Aug. 11, 1967...	60	15	44	16	7.9	2.9	208	0	20	2.5	.2	.4						176	6	358	8.1	10

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D. O. (dis-solved oxygen ppm)	B. O. D. (bio-chemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	Slime solids				Chromium	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as N (NH ₄) PO ₄
									Settle-able (ml/l)	Total (mg/l)	Volume (ml/l)	Hexa-valent (Cr ⁶⁺)						
Dec. 22, 1966...						10.9		210										
Feb. 23, 1967...						12.7		230										
June 7, 1967...						8.8		930										
Aug. 11, 1967...						8.4							0.01	0.02	0.00			

SPOKANE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967---Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carb- onate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		So- dium ad- sorp- tion (micro- mhos at 25°C)	Col- or or pH	
															Parts per million	Tons per acre- foot	Tons per day	Cal- cium, Mag- ne- sium	Non- sorp- tion, car- bon- ate			
12-4310. LITTLE SPOKANE RIVER AT DARTFORD, WASH. (Lat 47°47'05", Long 117°24'10")																						
Oct. 31, 1966.	138	17	36	8.2	5.8	2.2	153	0	7.0	0.2	1.8	--	156	0.21	58.1	194	0	252	7.9	5		
Dec. 18.....	346	17	22	6.3	5.0	2.1	101	0	6.6	0.2	2.1	--	121	.16	113	81	0	180	7.8	15		
Feb. 22, 1967.	415	23	20	5.0	5.0	1.1	87	0	7.4	1.0	1.0	0.2	1.6	.01	108	.15	70	0	157	7.7	5	
May 21.....	437	20	27	4.3	4.3	2.0	77	0	4.8	1.5	0.5	0.3	1.0	--	91	.12	107	60	0	139	7.4	5
Aug. 19.....	114	18	32	9.0	5.3	2.4	144	0	7.2	0.2	2.5	.2	1.7	.00	151	.21	46.5	117	0	248	8.1	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (gpm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M. P. N. (most probable number per 100 ml)	Slime solids			Copper (Cu)	Zinc (Zn)	Arsenic (As)	Total phosphate as PO ₄	Total nitrogen as N (NH ₄)
									P. B. I. (Pearl-Benson Index)	Settleable (ml/l)	Total (mg/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)			
Oct. 31, 1966....						12.5		930				--	--			
Nov. 20.....						12.5		71				--	--			
Dec. 18.....						11.2		430				--	--			
Feb. 22, 1967....						10.7		230				0.01	0.01			
May 21.....						8.7		150				--	--			
Aug. 19.....						--		--				.00	.02			

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued
OKANOGAN RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH			
														Parts per million	Tons per acre-foot					Calcium, magnesium, boron, sulfate		
12-4395. OKANOGAN RIVER AT OROVILLE, WASH. (Lat 48°55'55", long 119°23'05")																						
Nov. 17, 1966.	220	5.4		36	10	12	2.5	150	0	32	2.0	0.4	0.2	--	182	0.25	108	131	8	301	7.5	0
Feb. 23, 1967.	324	4.6		38	10	10	2.3	142	6	32	1.5	.3	0.02	--	176	.24	154	136	10	304	8.3	5
May 24, 1967.	1480	4.8		35	9.7	11	2.4	148	0	30	1.0	.4	.6	-- A	168	.23	671	128	6	296	8.1	0
Aug. 16, 1967.	238	5.3		32	8.5	9.4	2.4	123	4	27	1.0	.2	.1	--	131	.21	97.0	115	8	260	8.4	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biological demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	P.B.I. (Pearl-Benson Index)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)						
Nov. 17, 1966...						10.8		0					--	--	--	--	--			
Feb. 23, 1967...						13.7		36					0.00	0.01	0.00	0.01				
May 24, 1967...						11.3		0					--	--	--	--				
Aug. 16, 1967...						12.1		0					.00	.00	.00	.02				

A Calculated from determined constituents.

Chemical analyses, in parts per million, water year October 1966 to September 1967--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 (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
12-4472. OKANOGAN RIVER AT MALOTT, WASH. (Lat 48°16'55", long 119°42'15") (Formerly published as 12-4473. Okanogan River near Malott, Wash.)																						
Nov. 17, 1966.	990	8.7	33	9.2	9.8	8.4	1.8	130	0	30	1.0	0.2	0.2	--	156	0.21	417	120	14	263	7.5	0
Feb. 23, 1967.	990	9.0	34	9.8	8.5	1.9	136	0	30	2.0	0.2	0.2	0.02	A 163	0.22	436	126	14	276	7.9	5	
May 24, 1967.	14600	9.3	12	2.8	2.8	1.0	50	0	7.4	1.0	0.2	0.5	--	A 61	0.08	2400	42	0	100	7.1	10	
Aug. 16, 1967.	874	1.0	32	5.0	8.3	2.1	132	0	29	1.2	0.2	1.1	0.02	--	163	0.22	385	117	9	264	8.2	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Zinc (Zn)	Total phosphate as PO ₄	Ammonium as N (NH ₄)
									P.B.I. (Pearl-Benson Index)	Settleable (ml/l)	Total (mg/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)			
Nov. 17, 1966....						11.8		230				--	--	--		
Feb. 23, 1967....						12.8		0				0.00	0.00	0.00		
May 24, 1967....						12.0		750				--	--	--		
Aug. 16, 1967....						13.3		36				.00	.00	.01		

A Calculated from determined constituents.

METHOW RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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 (micro-mhos at 25°C)	Color or pH			
															Parts per million	Tons per acre-foot				Tons per day		
12-4499.5. METHOW RIVER NEAR PATEROS, WASH. (Lat 48°03'00", Long 119°54'10")																						
Nov. 17, 1966.	452	11	25	4.4	4.4	4.0	0.7	98	0	8.4	0.0	0.3	0.8	--	106	0.14	129	80	0	174	7.4	0
Feb. 23, 1967.	352	12	26	5.0	4.0	4.0	0.9	102	0	8.4	0.0	0.2	0.8	0.00	A 107	0.15	102	86	2	180	8.0	5
May 24, 1967.	900	8.9	10	1.6	1.6	1.6	0.6	40	0	2.8	0.0	0.1	0.4	--	A 46	0.06	1160	32	0	72	7.2	5
Aug. 16, 1967.	550	12	25	4.5	4.5	3.7	1.0	100	0	8.0	0.0	0.2	0.5	0.02	106	0.14	157	81	0	173	8.2	5

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued

METHOW RIVER BASIN--Continued
12-4499.5. METHOW RIVER NEAR PATEROS, WASH.--Continued

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D. O. (dissolved oxygen ppm)	B. O. D. (biochemical demand ppm)	Additional determinations							Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
								M. P. N. (most probable number coliform groups per 100 ml)	P. B. I. (Pearl-Benson Index)	Slime solids			Chromium						
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)					
Nov. 17, 1966....						12.4		360											
Feb. 23, 1967....						12.8		36					0.00			0.02			
May 24, 1967....						13.2		73											
Aug. 16, 1967....						11.4		91											

A Calculated from determined constituents.

CHELAN RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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	Specific conductance (microhmhos at 25°C)					
															Parts per million	Tons per acre-foot	Tons per day							
																				Calcium, magnesium	Non-carbonate	Specific conductance (microhmhos at 25°C)		
12-4525. CHELAN RIVER AT CHELAN, WASH. (Lat 47°50'05"N, long 120°00'40"W)																								
Nov. 17, 1966.	2090	4.2			6.5	0.9	1.7	0.5	24	0	4.2	0.0	0.1	0.1	--	A	26	0.04	147	20	0	50	7.0	5
Feb. 23, 1967.	2060	5.5			6.5	1.2	1.6	.6	24	0	4.8	.0	.1	.2	0.01	36	.05	200	21	2	50	7.4	0	5
May 24,	20	6.2			6.8	1.0	1.4	.7	26	0	4.2	.0	.1	.2	--	35	.05	1.89	21	0	52	7.3	0	5
Aug. 16,	1870	4.6			7.0	.6	1.8	.8	26	0	4.4	.0	.0	.1	.01	33	.04	167	20	0	49	7.6	5	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	Slime solids				Chromium		Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
									P. B. I. (Pearl-Benson Index)	Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)					
Nov. 17, 1966...						10.1		36											
Feb. 23, 1967...						11.5		0			0.00			0.06	0.02				
May 24, 1967...						10.9		36											
Aug. 16, 1967...						13.4		--											

A Calculated from determined constituents.

ENTIAT RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium	Non-carbonate				
12-4530. ENTIAT RIVER NEAR ENTIAT, WASH. (Lat 47°40'00", long 120°16'55")																					
Nov. 17, 1966.	13			12	2.6	2.9	1.1	50	5.6	0.5	0.1	0.2	--	63	0.09		40	0	93	7.1	5
Feb. 23, 1967.	15			14	3.0	2.9	1.5	56	5.6	1.0	.1	2.0	0.00	71	.10		48	2	102	7.7	5
May 24,	13			5.4	1.0	1.5	.8	23	2.2	.0	.0	.2	--	35	.05		18	0	45	7.4	5
Aug. 16,	12			8.5	2.2	2.1	1.3	39	3.4	.2	.1	.2	.02	50	.07		30	0	70	7.4	5

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	P.B.I. (Pearl-Benson Index)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Total phosphate as PO ₄	Total nitrogen as N (NH ₄)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)					
Nov. 17, 1966....						13.0		210					--	--	--	--	--		
Feb. 23, 1967....						12.5		150					0.00	0.00	0.00	0.00			
May 24,						12.1		91					--	--	--	--			
Aug. 16,						10.1		930					.00	.00	.00	.00			

A Residue at 180°C.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN WASHINGTON--Continued
WENATCHEE RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--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		Specific conductance (micro-mhos at 25°C)	pH or Col or
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
12-4578. WENATCHEE RIVER NEAR LEAVENWORTH, WASH. (Lat 47°40'25", Long 120°34'00")																					
Nov. 28, 1966.	7.0			3.5	1.5	1.4	0.9	37	0	2.0	0.2	0.1	0.1			0.04		15	1	33	7.4
Apr. 18, 1967.	11			4.5	1.3	1.8	1.2	22	0	2.8	1.0	.1	.3		A	.05		16	0	45	7.2
July 20,	6.3			3.0	.4	1.0	1.5	14	0	2.2	.2	.0	.1	0.02		.03		9	0	24	7.4

Additional determinations

Date of collection	Time (24 hr)	Cross-section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Slime solids			Chromium		Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
									P.B.I. (Pearlman Index)	Settleable (ml/l)	Total (mg/l)	Hexavalent (Cr+6)	Total (Cr+3)					
Apr. 18, 1967....						11.6		0				0.00		0.00				
July 20, 1967....						9.9		--						0.00				

A Calculated from determined constituents.

YAKIMA RIVER BASIN

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967, continued																				
Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (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		Specific conductance (micro-mhos at 25°C)	Color or pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium Magnesium			Non-carbonate
12-4795, YAKIMA RIVER AT CLE ELUM, WASH. (Lat 47°11'35", long 120°56'55")																				
Oct. 25, 1966.	294	14	9.0	1.6	2.6	0.3	42	0	0.0	1.8	0.1	0.2	--	A 51	0.07	40.5	29	0	72	7.7
Jan. 24, 1967.	602	11	8.3	2.1	3.3	8.42	0	1.0	1.5	1.5	1.2	0.01	A 48	0.07	78.0	29	0	71	7.6	
Mar. 29, 1967.	883	8.5	7.2	1.8	3.1	5.35	0	1.8	0	1.1	1.1	0	--	35	0.06	100	26	0	63	7.5
June 14, 1967.	1750	6.3	5.5	2.3	1.6	6.32	0	1.6	0.2	0	0	0	.01	35	.05	165	23	0	53	7.8

Additional determinations

Date of collection	Time (24 hr)	Cross section	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	P. B. I. (Pearl-Benson Index)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr ⁶⁺)	Total (Cr)						
Oct. 25, 1966....						11.6		36					--	0.01	--	0.02	0.01			
Jan. 24, 1967....						12.2		0					--	--	--	--	--			
Mar. 29, 1967....						13.9		0					--	--	--	--	--			
June 14, 1967....						--		0					--	--	--	--	--			
Sept. 20, 1967....						--		0					--	--	--	--	--			

A Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN MONTANA

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃	Sodium carbonate ratio	Specific conductance (microhm-cm at 25° C)	pH or Col				
													Parts per million	Tons per acre-foot								
KOOTENAI RIVER BASIN																						
12-3015. KOOTENAI RIVER NEAR REXFORD (lat 48°52'28", long 115°13'37")																						
June 29, 1967..	56200	4.6	--	34	6.4	1.1	0.6	109	0	16	0.4	0.3	0.0 0.00	123	0.17	18660	111	22	210	7.7	5	
July 27, 1967..	17500	5.0	0.02	37	8.6	1.8	1.4	112	0	34	1.8	1.5	0.02	147	0.20	6950	128	36	254	7.6	--	
Sept. 8, 1967..	6680	6.1	0.00	52	11	2.8	1.3	132	0	71	1.2	1.3	0.01	219	0.30	3950	174	66	354	7.3	3	
12-3019.33. KOOTENAI RIVER BELOW LIBBY DAM, NEAR LIBBY (lat 48°22'00", long 115°19'20")																						
June 29, 1967..	56800	4.3	--	32	6.6	1.4	0.5	108	0	17	0.9	0.5	0.0 0.00	122	0.17	18710	107	18	208	7.7	5	
July 26, 1967..	18200	5.2	0.02	37	8.7	1.6	1.6	114	0	38	1.4	0.7	0.01	158	0.21	7760	128	34	266	7.1	3	
Sept. 7, 1967..	6930	5.8	0.01	53	11	2.8	0.7	136	0	68	1.8	1.3	0.01	216	0.29	4040	177	65	356	7.2	2	
12-3019.9. FISHER RIVER ABOVE WOLF CREEK, NEAR LIBBY (lat 48°13'00", long 115°16'20")																						
June 27, 1967..	760	8.8	--	10	3.6	1.4	0.4	49	0	1.8	0.4	0.0	0.2 0.00	65	0.09	133	40	0	--	86	7.0	
July 25, 1967..	205	11	0.04	20	7.5	2.3	0.5	98	0	3.5	1.3	0.0	0.01	104	0.14	57.5	81	0	0.1	159	7.6	
Sept. 6, 1967..	95	12	0.01	25	10	3.0	1.1	130	0	1.5	0.6	0.2	0.00	118	0.16	30.2	104	0	0.1	204	7.3	4
12-3019.99. WOLF CREEK NEAR LIBBY (lat 48°14'00", long 115°16'20")																						
June 27, 1967..	120	16	--	22	5.0	5.4	2.0	92	0	8.0	0.9	0.1	0.2 0.00	112	0.15	36.2	75	0	0.3	158	7.6	10
July 25, 1967..	20	15	0.04	29	7.4	7.4	2.0	132	0	9.0	1.8	0.1	0.02	150	0.20	8.10	103	0	0.3	226	7.6	--
Sept. 6, 1967..	8.8	12	0.03	32	8.4	9.0	2.6	146	0	10	1.6	0.2	0.00	148	0.20	3.50	114	0	0.4	255	7.3	3
12-3020.55. FISHER RIVER NEAR LIBBY (lat 48°21'20", long 115°18'50")																						
June 27, 1967..	880	9.6	--	15	5.0	2.2	0.6	71	0	2.0	1.0	0.0	0.0 0.01	72	0.10	171	58	0	0.1	120	7.4	1
July 25, 1967..	256	11	0.05	25	8.4	3.0	0.8	114	0	3.0	1.2	0.0	0.01	108	0.15	74.6	97	3	0.1	189	7.7	7
Sept. 6, 1967..	110	12	0.00	25	10	3.6	1.3	144	0	4.8	0.4	0.1	0.00	129	0.18	38.2	104	0	0.2	235	7.3	2

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN IN IDAHO

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean Silica discharge (SiO ₂) (cfs)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio (mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium		Non-carbonate	
SPOKANE RIVER BASIN																				
12-4160. HAYDEN CREEK BELOW NORTH FORK, NEAR HAYDEN LAKE, IDAHO (Lat 47°49'22", long 116°39'10")																				
Nov. 1, 1966.....	3.2	11	0.02	10	3.5	1.5	0.4	48	0	2.8	0.5	0.1	0.0	0.02	53	0.07	0.46	40	0	0.1
Jan. 30, 1967....	229	13	—	4.0	1.4	1.1	.7	20	0	2.4	.5	.0	.1	.1	34	.05	21.0	16	0	38
May 3.....	54	13	.07	6.1	2.0	1.3	.5	30	0	1.8	.0	.1	.2	.4	42	.06	6.12	23	0	53
Sept. 20.....	3.5	13	03	10	2.7	1.6	6	46	0	3.2	1.0	.0	.2	.2	51	.07	.48	36	0	79

PART 13. SNAKE RIVER BASIN

FLAT CREEK BASIN

13-0183. CACHE CREEK NEAR JACKSON, WYO.

(Hydrologic bench-mark station)

LOCATION.--Lat 43°26'50", long 110°41'50", at gaging station, 1.8 miles upstream from town of Jackson water-supply intakes, 4.5 miles southeast of Jackson, Teton County, and 5 miles upstream from mouth.
 DRAINAGE AREA.--10 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: July 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl sulfate (SO ₄) (CO ₃)	Chloride (Cl)	Fluoride (F) (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH				
												Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium, Sulfate	Non-carbonate						
Oct. 3, 1966.....	6.0	5.4	0.23	46	15	2.6	0.5	214	0	4.3	7.1	0.1	0.1	0.02	198	0.27	3.19	178	2	0.1	332	8.2
Oct. 31.....	5.0	5.1	0.00	55	7.7	2.9	3	188	7	0	4.6	1.1	0.3	0.03	194	0.26	2.60	169	3	0.1	319	8.3
May 2, 1967.....	3.8	5.7	0.00	47	16	4.0	0.2	221	0	6.7	2.8	2.4	0.2	0.1	202	0.27	2.06	182	0	0.1	353	8.2
June 10.....	60	4.8	0.01	43	12	2.2	3.7	181	7	4.8	0.1	1.5	0.4	0.1	180	0.24	29.1	158	0	0.1	297	8.4
July 14.....	34	5.0	0.05	46	10	1.9	2.2	190	0	7.8	0.1	0.1	0.01	0.1	162	0.22	14.8	156	0	0.1	295	8.0
Aug. 7.....	17	4.9	0.13	42	14	2.0	4	198	0	5.8	7	1	0.1	0.02	160	0.22	7.33	164	1	0.1	314	7.8
Sept. 12.....	11	4.8	0.02	44	14	1.9	4	204	0	4.4	5	0	0.01	0.01	176	0.24	5.21	166	0	0.1	308	8.1

SNAKE RIVER MAIN STEM

13-0225. SNAKE RIVER ABOVE RESERVOIR, NEAR ALPINE, WYO.

LOCATION.--Lat 43°18'06", long 110°46'33", at bridge at Astoria Springs, Teton County, 3 miles downstream from Hoback River, 13 miles upstream from gaging station, 15 miles northeast of Alpine, Lincoln County.

DRAINAGE AREA.--3,463 square miles, Hoback River gaging station.

RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

Water temperatures: October 1965 to September 1966.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Chemical analyses, in parts per million, water year October 1966 to September 1967																						
Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl sulfide (SO ₄)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Specific conductance (micro-mhos at 25°C)	pH			
														Parts per million	Tons per acre-foot	Tons per day						
Oct. 3, 1966.....	4060	14	0.02	33	5.4	11	1.3	98	0	35	9.9	0.7	0.8	0.10	162	0.22	1780	104	23	0.5	257	7.4
Oct. 31.....	1440	12	0.07	46	7.9	8.4	1.3	154	0	61	11	0.4	0.2	0.03	244	0.33	949	180	54	0.3	376	8.1
Dec. 2, 1967.....	1230	17	0.03	46	10	8.2	2.0	143	0	54	3.5	0.4	0.04	0.04	208	0.28	955	157	40	0.3	346	8.1
Feb. 6.....	1450	14	0.16	46	8.5	8.4	1.3	137	3	46	5.3	0.5	0.04	0.04	202	0.27	725	152	35	0.3	338	8.3
Mar. 6.....	1300	14	0.02	46	9.6	9.3	1.8	141	0	49	3.2	0.5	0.04	0.04	214	0.29	838	150	34	0.3	343	8.0
Apr. 3.....	1800	13	0.07	51	7.8	8.6	1.9	146	0	51	4.3	0.5	0.04	0.04	212	0.29	744	154	37	0.3	344	7.8
May 2.....	3740	15	0.00	36	8.9	12	1.4	117	0	37	8.5	0.8	0.10	0.10	222	0.30	959	158	38	0.3	341	8.0
June 10.....	12100	12	0.13	36	3.6	5.2	1.3	110	0	23	4.3	0.3	0.02	0.02	150	0.20	4900	104	14	0.2	238	7.8
July 11.....	12200	11	0.17	27	6.1	5.1	1.3	98	0	19	2.1	0.4	0.01	0.01	126	0.17	4150	94	16	0.2	206	7.3
Aug. 7.....	7220	13	0.08	26	6.1	7.4	1.4	98	0	25	3.5	0.5	0.06	0.06	150	0.20	2820	90	9	0.3	222	7.4
Sept. 12.....	44560	13	0.09	29	6.3	7.4	2.2	103	0	29	3.7	0.6	0.04	0.04	164	0.22	2020	99	15	0.3	239	7.8

A Daily mean discharge.

HENRYS FORK BASIN

13-0550. TETON RIVER NEAR ST. ANTHONY, IDAHO

LOCATION --lat 43°54'40", long 111°36'45", temperature recorder at gaging station on right bank, 0.5 mile upstream from railroad bridge, 4 miles southeast of St. Anthony, Fremont County, and 6.5 miles from St. Anthony, Idaho.

DRAINAGE AREA --890 square miles; approximately.

RECORDS AVAILABLE --Water temperatures: April 1964 to September 1967.

EXTREMES, 1966-67 --Water temperatures: Maximum, 68°F August 18-20; minimum, freezing point on many days during December and January.

EXTREMES, 1964-67 --Water temperatures: Maximum, 71°F July 18, 19, 24, Aug. 2, 1966; minimum, freezing point on many days during winter months.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Soil adsorption ratio	Specific conductance (microhmhos at 25°C)			
														Parts per million	Tons per acre-foot	Tons per day						
June 5, 1967,	1960	10		22	5.6	2.3	1.2	92	0	4.8	1.0	0.2	0.5	0.04	95	0.13	503	78	2	0.1	157	7.9

Temperature (°F) of water, water year October 1966 to September 1967

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	51	49	48	50	51	51	51	49	48	48	46	43	42	42	42	43	43	42	42	42	42	44	45	45	46	46	45	44	45	46	
Minimum	49	49	46	45	46	48	49	49	48	46	46	46	43	40	40	40	41	41	40	42	42	39	39	42	43	44	44	43	44	43	44	43	
November	Maximum	45	42	40	39	39	40	41	41	38	36	36	39	41	42	42	41	41	39	39	40	40	38	37	37	37	36	36	38	40	---	39	
Minimum	42	40	39	38	39	39	40	38	36	36	36	36	39	41	41	41	39	39	39	39	39	40	38	37	37	36	36	36	38	---	38		
December	Maximum	40	40	40	39	37	35	35	33	33	33	33	33	34	35	35	35	33	32	32	33	33	33	33	33	33	33	32	32	33	33	34	
Minimum	40	40	40	39	37	35	35	33	33	33	33	33	33	34	35	35	35	33	32	32	33	33	33	33	33	33	33	32	32	32	33	33	
January	Maximum	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	
February	Maximum	36	36	36	37	37	36	34	33	33	35	35	37	38	38	36	33	36	36	34	34	34	36	36	36	36	36	36	38	37	---	35	
Minimum	35	36	36	36	36	36	34	33	33	33	33	35	34	37	36	33	33	36	34	33	33	33	34	35	36	36	36	36	36	---	---	34	
March	Maximum	36	36	36	36	35	35	34	35	35	39	40	38	38	40	43	42	42	41	42	45	45	43	43	43	43	43	44	44	41	40	39	
Minimum	36	36	36	34	33	34	33	33	33	35	39	38	37	37	37	39	39	39	39	39	42	43	41	39	41	40	42	41	38	37	37	37	
April	Maximum	43	43	46	48	48	45	45	47	47	47	47	48	51	51	47	46	48	52	52	46	45	48	48	48	49	49	49	49	46	44	---	47
Minimum	39	40	40	44	43	41	43	45	45	45	44	45	44	45	44	44	43	44	46	46	43	41	42	45	45	46	47	46	43	41	---	43	
May	Maximum	46	48	48	50	51	54	57	60	59	57	51	48	50	52	55	60	60	59	57	54	55	55	55	54	53	53	52	50	47	48	53	
Minimum	42	45	45	45	45	47	50	53	54	51	45	44	44	46	49	51	54	55	54	51	52	54	51	50	48	47	50	49	47	46	47	48	
June	Maximum	49	50	51	51	51	49	49	50	50	50	50	50	53	53	54	56	56	57	57	57	54	54	53	57	57	56	59	56	59	---	53	
Minimum	48	49	49	51	48	48	49	49	50	49	49	50	50	50	51	52	53	54	55	55	52	52	52	50	53	56	55	53	56	56	---	51	

PORTNEUF RIVER BASIN

13-0755. PORTNEUF RIVER AT POCATELLO, IDAHO

LOCATION.--Lat 42°51'40", long 112°27'25", at Fremont Street Bridge at Pocatello, Bannock County, 30 feet downstream from gaging station, 2.5 miles upstream from Pocatello Creek, and at mile 16.8.
DRAINAGE AREA.--1,250 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (microhmhos at 25 °C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Dec. 9, 1966.....	223	23		70	35	43	9.0	372	0	51	44	0.3	3.6	0.09	457	0.62	275	318	14	1.0	775	8.1
Jan. 13, 1967.....	235	24		71	32	45	8.5	356	0	43	52	3.4	2.0	0.03	453	.62	287	308	17	1.1	746	7.9
Feb. 14, 1967.....	261	26	0.18	77	34	44	8.5	366	0	43	43	2.2	3.7	0.06	445	.61	307	307	17	1.1	742	8.2
Mar. 16, 1967.....	277	28		74	32	36	9.2	352	6	42	41		3.7	0.04	449	.61	336	316	18	.9	731	8.3
Apr. 2, 1967.....	A368	24		64	29	29	7.8	314	0	39	36	3.3	3.4	.09	376	.51	365	279	22	.8	692	8.1
June 14, 1967.....	452	19		53	16	21	8.1	233	0	24	24	3.3	2.7	.07	292	.46	336	198	7	.6	483	7.5
June 28, 1967.....	545	21		62	21	24	7.1	238	0	27	26	3.3	2.7	.04	338	.46	497	241	5	.7	567	8.0
July 27, 1967.....	A 76	32		60	28	41	8.2	295	12	38	43	4.4	3.2	.15	404	.55	82.9	364	2	1.1	671	8.0
Aug. 31, 1967.....	79	30		63	31	43	19	350	4	45	41	4.4	2.1	.18	436	.59	93.0	284	0	1.1	716	8.3

A Daily mean discharge.

RAFT RIVER BASIN

13-0780. RAFT RIVER AT PETERSON RANCH, NEAR BRIDGE, IDAHO

LOCATION.--Lat 42°04'00", long 113°27'00", at gaging station 100 feet upstream from Onemile Creek, 7.5 miles southwest of Bridge Post Office, Cassia County, 16 miles south of Malia, and at mile 45.6.
DRAINAGE AREA.--412 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (microhm-cm at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Nov. 7, 1966.....	6.3	30	--	122	29	96	6.5	240	0	95	245	0.7	0.6	0.10	758	1.03	12.9	424	228	2.0	1300	8.0
Dec. 10.....	6.7	31	--	121	26	92	8.0	254	0	86	222	.7	2.2	.09	734	1.00	13.3	409	201	2.0	1210	7.9
Feb. 11, 1967.....	8.8	36	--	102	21	75	6.1	242	0	70	170	.5	2.8	.12	643	.87	15.3	341	142	1.8	1020	8.2
Mar. 28.....	6.5	33	--	120	27	81	7.7	235	0	89	220	.8	2.6	.10	704	.96	12.4	410	218	1.7	1200	8.2
Apr. 29.....	12	34	--	112	26	110	8.2	265	0	91	232	.7	3.9	.14	749	1.02	24.3	386	170	2.4	1280	8.1
May 24.....	8.1	33	0.24	116	26	94	7.5	252	0	82	225	.7	3.3	.13	729	1.01	23.9	396	190	2.1	1230	8.0
June 1.....	A12	33	.14	111	25	111	8.7	276	0	92	220	.8	.6	.16	737	1.00	23.9	380	154	2.5	1270	8.0
June 20.....	15	39	--	105	25	118	9.4	321	0	77	200	1.0	5.4	.14	746	1.01	30.2	365	102	2.7	1230	8.0
July 21.....	A8.0	34	--	117	27	95	7.9	256	3	85	228	1.0	1.5	.19	727	.99	15.7	403	188	2.1	1250	8.3

A Daily mean discharge.

13-0799. RAFT RIVER AT YALE, IDAHO

LOCATION.--Lat 42°34'11", long 113°13'42", at county road bridge 0.5 mile south of Yale, Cassia County, 1.5 miles downstream from Calder Creek, and at approximately mile 2.
DRAINAGE AREA.--1,510 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bi-car-bon-ate (HCO ₃)	Car-bon-ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific con-duct-ance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Cal-cium, Mag-nese-sium	Non-car-bon-ate			
Nov. 5, 1966.....	1.5	49	--	75	41	142	18	458	0	66	168	0.6	1.2	0.28	780	1.06	3.16	356	0	3.3	1310	7.9
Dec. 12.....	2.8	47	--	81	35	133	14	368	0	79	185	.6	4.9	.12	756	1.03	5.72	346	44	3.1	1250	7.7
Jan. 13, 1967....	3.6	45	--	74	35	132	16	344	0	77	185	.5	4.1	.21	739	1.01	6.18	328	46	3.2	1180	7.9
Feb. 11.....	3.2	50	--	73	35	130	15	342	0	80	190	.5	2.4	.24	747	1.02	6.43	326	46	3.1	1220	8.0
Mar. 24.....	2.0	50	--	76	37	142	20	420	0	64	180	.6	3.4	.12	777	1.10	4.20	342	0	3.3	1280	7.9
Apr. 29.....	2.6	54	--	75	40	159	19	442	0	77	202	.6	3.9	.28	829	1.13	5.82	352	0	3.7	1400	7.9
June 3.....	1.8	50	0.04	70	34	125	18	387	0	65	152	.6	3.4	.25	706	.96	3.43	314	0	3.1	1180	8.0
June 18.....	.7	51	.03	61	37	152	20	402	0	75	173	.6	4.1	.35	775	1.05	1.46	304	0	3.8	1290	8.2
July 21.....	.7	47	--	70	34	106	17	365	0	57	145	.5	3.9	.23	668	.91	1.26	314	16	2.6	1120	7.7

SALMON FALLS CREEK BASIN

13-1081.5. SALMON FALLS CREEK NEAR BANBURY HOT SPRINGS, IDAHO

LOCATION.--Lat 42°41'47", long 114°51'14", at bridge on new U.S. Highway 30, 1.5 miles northwest of Banbury Hot Springs, Twin Falls County, 2.1 miles upstream from mouth, and 8 miles northwest of Buhl.
DRAINAGE AREA.--1,510 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Chemical analyses, in parts per million, water from October 1966 to September 1967																						
Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)				
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium	Non-carbonate					
Oct. 31, 1966.....	--	44	--	78	29	75	8.8	276	0	164	58	0.9	11	0.14	616	0.84	--	314	88	1.8	917	8.0
Dec. 5.....	A 100	45	86	86	29	79	9.6	294	0	172	58	0.9	13	--	B 638	--	172	334	93	1.9	946	7.9
Jan. 9, 1967.....	A 100	47	85	31	30	80	9.3	280	0	187	60	0.9	13	--	666	91	180	340	110	1.9	944	7.9
Feb. 6.....	--	55	85	30	82	9.0	272	0	184	66	63	0.8	13	--	677	92	173	336	112	1.9	966	8.2
Mar. 20.....	A 100	50	85	30	76	9.8	264	0	182	63	63	0.9	12	--	642	87	173	336	119	1.8	959	8.0
Apr. 24.....	A 125	41	74	26	62	62	8.4	264	0	131	53	1.0	8.6	14	542	74	183	292	75	1.6	831	8.2
June 15.....	--	43	79	26	65	9.1	268	0	148	56	56	1.3	7.6	16	581	79	--	304	84	1.6	878	8.1
July 15.....	--	34	72	23	55	7.8	232	10	120	44	44	1.2	6.2	16	499	68	--	274	68	1.4	759	8.5
July 17.....	--	30	78	29	74	9.9	267	5	155	58	58	1.3	11	14	605	82	--	314	86	1.8	931	8.4
Aug. 22.....	--	47	77	29	69	8.5	249	10	153	58	58	1.1	9.7	20	605	82	--	312	91	1.7	867	8.4

A Estimated.

B Calculated from determined constituents.

MUD LAKE-LOST RIVER BASIN

13-1325. BIG LOST RIVER NEAR ARCO, IDAHO

LOCATION.--Lat 43°35'16", long 113°16'13", at bridge on county road, 4 (revised) miles southeast of Arco, Butte County.
DRAINAGE AREA.--1,410 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbocationate (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 (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Nov. 1, 1966.....	8.4	14	0.05	62	12	12	1.5	270	0	25	7.0	0	3	0.1	0.00	0.38	6.26	232	11	0.3	471	7.7
Dec. 5, 1966.....	A13	13	10	52	12	11	1.5	255	0	24	6.0	0	3	0.8	0.03	0.34	8.72	213	8	0.3	440	7.7
Jan. 4, 1967.....	A11	14	07	70	16	11	1.6	285	0	24	5.5	3	1.5	0.06	0.270	0.37	8.02	240	7	0.3	481	7.9
Feb. 6, 1967.....	A12	15	12	64	16	11	1.5	268	0	24	6.0	3	1.2	0.06	0.264	0.36	8.55	226	6	0.3	447	8.0
Mar. 15, 1967.....	6.4	13	11	70	17	10	1.8	282	0	22	6.5	3	1.8	0.06	0.285	0.39	4.92	244	14	0.3	488	8.1
Apr. 17, 1967.....	7.0	14	--	68	17	11	1.9	277	0	28	8.5	3	1.6	0.04	0.286	0.39	5.41	240	12	0.3	485	8.1
May 25, 1967.....	37	13	--	52	14	8.9	1.9	214	0	23	5.5	3	1.5	0.02	0.229	0.31	22.9	187	12	0.3	393	8.1
June 7, 1967.....	306	13	--	44	10	6.7	2.2	170	0	18	3.0	3	1.8	0.08	0.192	0.26	90	151	4	0.2	323	8.0
July 14, 1967.....	150	13	--	44	10	6.7	2.2	170	0	18	3.0	3	1.8	0.08	0.192	0.26	90	151	4	0.2	323	8.0
Aug. 24, 1967.....	134	16	--	64	15	9.5	2.1	255	0	19	6.0	4	1.1	0.03	0.259	0.35	93.7	221	12	0.3	420	8.1
Sept. 26, 1967.....	280	14	--	55	15	8.6	1.5	230	0	19	6.0	3	1.8	0.06	0.239	0.33	181	198	10	0.3	393	8.2

A Daily mean discharge.

BIG WOOD RIVER BASIN

13-1525. BIG WOOD RIVER NEAR GOODING, IDAHO

LOCATION --lat 42°53'10", long 114°48'10", at gaging station at Hudson Ranch, 3.1 miles downstream from bridge on Bliss-Gooding highway, 4.2 miles downstream from Little Wood River, 5.5 miles upstream from diversion dam from King Hill project, 6 miles southwest of Gooding, Gooding County, and at mile 7.8. DRAINAGE AREA --2,990 square miles, approximately. RECORDS AVAILABLE. --Chemical analyses: September 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 2, 1966.....	162	19		58	16	23	4.6	222	0	49	20	0.8	1.2	0.09	285	0.39	125	210	28	0.7	494	8.2
Nov. 2.....	A73	15		52	20	29	3.6	239	0	47	22	.7	2.2	.10	311	.42	61.3	212	16	.9	529	7.5
Dec. 13.....	137	10		54	15	7.4	1.7	212	6	23	3.5	.4	3.5	.05	240	.33	88.8	196	12	.2	377	8.3
Jan. 4, 1967.....	146	13	0.06	61	19	6.1	1.9	248	0	21	2.0	.3	4.8	.00	245	.33	31.8	218	14	.2	419	7.2
Feb. 1.....	180	14		53	14	6.1	1.6	222	0	16	2.0	.3	2.1	.03	216	.29	70.6	180	8	.2	383	8.1
Mar. 16.....	89	9		53	14	6.1	1.6	222	0	16	2.0	.3	2.1	.03	216	.29	70.6	180	8	.2	383	8.1
Apr. 18.....	207	19		50	16	18	3.9	206	0	36	20	.6	1.8	.08	266	.36	149	191	22	.6	453	7.9
May 28.....	162	17		55	17	26	5.3	229	0	45	24	1.4	1.0	.09	311	.42	136	207	20	.8	520	7.9
June 16.....	A1820	12		38	19	16	3.2	152	0	23	8.5	.7	.9	.20	185	.25	909	134	9	.4	309	8.1
July 16.....	44	9		49	15	20	4.1	202	0	40	18	.9	1.7	.25	287	.35	30.5	184	18	.6	448	8.2
Aug. 24.....	113	16		48	15	19	4.0	197	0	37	18	.9	1.7	.05	287	.36	81.5	182	20	.6	436	7.9
Sept. 26.....	72	13		48	17	23	4.8	208	0	40	21	.8	1.5	.08	273	.37	53.5	190	20	.7	463	7.8

A Daily mean discharge.

Nutrient analyses, in milligrams per liter,
July to September 1967

Date of Collection	Total Nitrogen as NO ₃	Total Phosphorous as PO ₄
July 1, 1967.....	4.3	0.40
Aug. 1,.....	5.0	.12
Sept. 1,.....	5.0	.20

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	557	557	571	544	511	522	522	517	514	486	526	526
2.....	557	557	549	544	511	522	522	517	514	486	526	526
3.....	561	536	560	549	512	519	522	522	506	496	527	530
4.....	562	557	560	546	512	527	538	518	511	496	524	527
5.....	564	560	571	546	520	512	530	520	500	489	525	527
6.....	561	563	571	545	520	516	524	518	485	483	526	532
7.....	532	553	566	548	524	514	524	517	496	467	500	524
8.....	562	561	563	550	521	512	524	515	493	501	527	524
9.....	563	563	563	548	517	509	524	516	509	504	527	530
10.....	553	563	562	545	526	510	526	513	504	518	531	531
11.....	547	564	561	546	525	509	527	515	495	519	530	529
12.....	546	559	561	553	523	516	525	519	506	517	525	542
13.....	558	560	559	551	520	514	519	515	501	506	531	535
14.....	555	559	559	551	519	512	517	508	498	478	529	537
15.....	553	557	553	549	516	513	519	520	500	489	528	530
16.....	560	557	549	542	514	514	520	510	499	486	521	536
17.....	555	560	554	547	511	521	518	517	504	498	520	538
18.....	560	560	557	547	511	517	517	512	504	501	519	538
19.....	569	557	553	545	511	508	522	519	550	504	525	533
20.....	567	551	551	543	519	492	520	510	502	494	528	525
21.....	564	552	550	540	522	508	509	514	498	517	527	533
22.....	564	550	547	546	515	503	514	506	487	517	529	530
23.....	564	550	547	546	515	503	514	506	487	517	529	530
24.....	569	567	547	547	515	490	514	516	483	517	529	542
25.....	568	559	548	531	519	506	514	536	459	495	518	534
26.....	563	558	546	532	518	510	513	535	481	522	519	542
27.....	559	559	547	530	519	505	512	541	487	511	520	542
28.....	561	560	551	530	520	502	498	515	493	527	530	544
29.....	559	560	548	485	---	508	511	519	497	529	537	536
30.....	556	556	546	483	---	513	519	515	500	515	534	541
31.....	563	550	550	508	---	521	---	524	---	518	---	---
Average	557	557	556	535	517	504	519	518	498	504	525	534

BIG WOOD RIVER BASIN--Continued
13-1545. SNAKE RIVER AT KING HILL, IDAHO--Continued

Temperature (°F) of water, water year October 1966 to September 1967

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.....	62	63	64	63	63	62	60	59	57	58	57	56	54	54	54	54	54	55	55	54	53	54	54	56	56	56	55	56	55	56	55	56
November.....	56	55	56	55	53	54	53	52	52	51	52	53	53	54	54	55	54	55	55	54	55	56	53	53	52	51	51	51	50	52	53	53
December.....	53	53	53	52	51	50	52	50	49	48	50	49	49	51	50	51	52	50	51	50	49	47	48	49	48	46	44	42	42	43	46	48
January.....	46	47	48	49	49	50	49	47	47	47	49	49	51	51	51	50	49	49	50	51	50	49	50	49	47	48	49	50	51	50	51	49
February.....	51	52	52	52	51	51	52	51	52	49	52	53	51	49	51	52	51	52	51	53	51	52	52	53	53	53	53	53	53	53	53	51
March.....	54	53	54	52	52	52	53	54	53	52	53	53	52	54	53	52	54	55	55	54	55	56	55	56	56	55	57	56	54	53	50	53
April.....	51	49	51	53	52	54	55	54	55	53	53	54	55	52	51	51	52	51	50	51	53	53	54	53	54	53	54	52	51	50	52	52
May.....	51	52	54	53	55	55	57	58	58	58	55	54	56	55	57	58	58	59	59	60	58	61	53	62	63	63	63	60	60	58	57	54
June.....	60	59	60	61	62	61	61	62	64	63	61	63	64	64	63	65	67	68	67	68	67	62	65	64	66	67	68	67	68	67	67	66
July.....	--	68	69	67	68	70	70	69	67	69	68	70	68	68	68	66	68	66	68	66	67	66	67	66	67	68	68	69	68	69	68	68
August.....	--	70	69	67	68	67	66	64	65	64	66	65	64	66	65	66	65	67	68	66	67	67	67	67	67	67	67	66	--	65	66	55
September.....	--	66	67	67	66	65	64	65	64	65	63	61	60	59	60	61	62	61	62	63	62	63	63	64	63	64	63	63	61	60	--	63

BOISE RIVER BASIN--Continued

13-2020. BOISE RIVER NEAR BOISE, IDAHO

LOCATION--Lat 43°31'33", long 116°04'02", at cableway below gaging station, 0.3 mile downstream from Lydie Gulch, 1.5 miles upstream from diversion dam for New York Canal, and 9 miles southeast of Boise, Ada County.

DRAINAGE AREA--2,680 square miles, approximately, Ada County.

RECORDS AVAILABLE--Chemical analyses: October 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 25, 1966....	A166	12		12	2.1	5.2	0.9	56	0	3.6	0.0	0.4	1.2	0.05	67	0.09	30.0	38	0	0.4	103	7.4
Dec. 2, 1966....	163	13		14	2.8	5.8	.9	66	0	4.2	.0	.4	1.3	.05	82	.11	36.1	46	0	.4	117	7.4
Jan. 27, 1967....	1230	13		12	1.7	5.0	.8	54	0	4.0	.0	.4	.5	.02	66	.09	219	37	0	.4	97	7.7
Mar. 7, 1967....	143	11	0.07	12	2.0	5.2	1.0	53	0	4.0	.0	.4	.6	.00	64	.09	24.7	38	0	.4	99	7.7
Apr. 12, 1967....	2390	14		13	2.0	5.5	1.0	54	0	5.4	.5	.3	.6	.01	76	.10	490	40	0	.4	104	7.6
May 17, 1967....	5040	13		11	1.4	5.0	1.0	50	0	3.6	.0	.4	.6	.02	56	.08	762	34	0	.4	93	7.5
June 30, 1967....	5110	9.3		7.5	.9	3.0	1.4	33	0	2.0	.0	.3	.5	.00	43	.06	593	22	0	.3	60	7.5
Aug. 10, 1967....	4550	9.2		8.3	1.0	3.1	.9	35	0	2.4	.5	.3	.5	.03	49	.07	602	24	0	.3	65	7.5

A Daily mean discharge.

13-2125. BOISE RIVER AT NOTUS, IDAHO
(irrigation network station)

LOCATION.--Lat. 43°43'21", long 116°47'34" at highway bridge 1,100 feet downstream from gaging station, 0.2 mile southeast of Notus, Canyon County, and 7 miles northwest of Caldwell, and at mile 14.0.

DRAINAGE AREA.--3,820 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1939 to January 1940, November 1950 to September 1967.

Water temperatures: November 1950 to September 1967.

Sediment records: January 1939 to June 1940.

EXTREMES 1906-67.--Dissolved solids: Maximum, 384 ppm Oct. 17 to Nov. 15; minimum, 210 ppm June 22-28.

Water temperatures: Maximum, 84°F July 3, Aug. 17; minimum, 38°F Dec. 27, 28.

Specific conductance: Maximum daily, 630 micromhos Oct. 20; minimum daily, 330 micromhos Apr. 20.

Water temperatures: Maximum, 79°F July 3, Aug. 17; minimum, 38°F Dec. 27, 28.

EXTREMES, 1939-40, 1950-67.--Dissolved solids: Maximum, 914 ppm Aug. 21-31, 1939; minimum, 77 ppm May 1-10, 1952, June 11-20, 1953.

Hardness: Maximum, 284 ppm July 21-31, 1939; minimum, 35 ppm June 11-26, 1953.

Specific conductance: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 82 micromhos Apr. 27, 1952.

Water temperatures: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 82 micromhos Apr. 27, 1952.

Water temperatures: Maximum, 85°F on several days during summer months in 1951, 1952, 1954; minimum (1939-40, 1950-64, 1966-67), freezing point Jan. 31, 1956, Jan. 11-14, 1963.

REMARKS.--No appreciable inflow between gaging station and sampling point except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
														Parts per million	Tons per acre-foot	Calcium, Magnesium	Non-carbonate			
Oct. 1-16, 1966..	532	29		40	12	60	4.4	240	0	60	0.6	6.1	0.08	362	0.49	520	150	0	2.1	547
Oct. 17-Nov. 15..	848			44	13	62		252	0	--	--	--	--	384	.52	879	164	0	2.1	579
Nov. 16-Dec. 31..	868			43	12	60		244	0	--	--	--	--	371	.50	869	157	0	2.1	565
Dec. 4-28.....	795			43	12	60		234	0	--	--	--	--	361	.49	775	157	0	2.1	554
Dec. 29-Jan. 28, 1967.....	743	32		44	11	57	4.6	230	0	61	17	5	6.9	348	.47	698	155	0	2.0	530
Jan. 29-Feb. 11..	770			42	11	56		220	0	--	--	--	--	337	.46	701	150	0	2.0	519
Feb. 12-Mar. 13..	646			46	13	62		244	0	--	--	--	--	366	.50	638	168	0	2.1	565
Mar. 14-Apr. 6...	450			41	10	62		232	0	--	--	--	--	336	.46	408	144	0	2.3	552
Apr. 7-19.....	260	25		34	8.8	48	4.9	190	0	50	15	6	4.7	288	.39	202	121	0	1.9	459
Apr. 20-30.....	733			27	6.3	32		136	0	--	--	--	--	211	.29	418	94	0	1.4	330
Apr. 21-May 2....	516			30	7.4	38		162	0	--	--	--	--	249	.34	347	106	0	1.6	390
May 3-5.....	218			34	8.9	49		208	0	--	--	--	--	282	.38	166	122	0	1.9	476
May 6-10.....	72			38	10	60		216	0	--	--	--	--	314	.43	61.0	136	0	2.2	577
May 11-19.....	445			31	7.5	41		168	0	--	--	--	--	233	.32	280	108	0	1.7	403
May 20-26.....	261			33	8.8	47		182	0	--	--	--	--	257	.35	181	118	0	1.9	451
May 27-June 14...	854			30	8.0	38		162	0	--	--	--	--	233	.30	514	108	0	1.6	390
June 15-21.....	194			36	10	49		196	0	--	--	--	--	280	.39	152	131	0	1.9	487
June 22-28.....	840			29	7.6	35		154	0	--	--	--	--	210	.29	476	104	0	1.5	369
June 29-Jul 6....																				778

BOISE RIVER BASIN--Continued
13-2125. BOISE RIVER AT NOTUS, IDAHO--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	Sodium (Na)	Potas-sium (K)	Bi-car-bon-ate (HCO ₃)	Car-bon-ate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific con-duct-ance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Cal-cium, Mag-ne-sium	Non-car-bon-ate			
June 28-July 11..	272	--	--	33	9.0	46	--	184	0	--	--	--	--	--	265	.36	195	120	0	1.8	444	8.0
July 12-Aug. 1...	357	30	--	36	10	52	4.2	192	4	53	15	.6	4.6	.08	298	.41	287	131	0	2.0	475	8.3
Aug. 2-11.....	415	41	--	41	12	62	--	212	6	--	--	--	--	--	330	.45	346	152	0	2.1	530	8.3
Aug. 25-Sept. 9..	504	--	--	40	11	62	--	220	2	--	--	--	--	--	330	.45	445	152	0	2.1	530	8.3
Sept. 10-20.....	774	--	--	37	11	52	--	210	2	--	--	--	--	--	307	.42	642	138	0	1.9	477	8.3
Sept. 21-30.....	501	--	--	40	12	62	--	230	4	--	--	--	--	--	349	.47	472	150	0	2.2	536	8.3
Weighted average.....	--	--	--	40	11	55	--	220	--	--	--	--	--	--	329	0.44	516	145	0	2.0	516	7.8
Time-weighted average.....	580	--	--	39	11	55	--	216	--	--	--	--	--	--	324	--	--	143	0	2.0	512	7.8
Tons per day...	--	--	--	63	17	87	--	344	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1966 to September 1967

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.....	63	61	60	59	60	60	58	57	57	59	56	51	52	52	51	52	52	54	51	50	52	52	54	54	54	52	52	53	53	54		
November.....	53	51	50	53	50	51	43	45	49	--	52	52	51	58	52	49	48	48	52	50	48	47	43	43	43	46	46	47	49	--	48	
December.....	50	47	47	46	45	44	43	40	43	44	44	44	44	45	44	45	42	43	43	43	41	39	40	40	38	36	40	40	42	42		
January.....	43	41	42	43	41	41	42	41	41	40	43	43	45	46	47	45	43	42	43	46	47	46	42	39	41	41	46	45	46	47	43	
February.....	45	46	46	47	44	43	45	44	47	45	47	47	44	42	42	47	46	48	45	45	44	48	49	48	47	48	--	--	--	45		
March.....	49	50	46	46	44	45	47	48	47	46	46	46	48	47	51	53	52	52	54	55	54	55	51	51	53	52	53	49	47	46	49	
April.....	48	55	57	59	55	50	55	56	54	56	55	58	55	50	51	51	48	46	49	49	48	53	52	50	54	54	51	53	52	--	52	
May.....	50	57	60	61	61	63	66	69	63	59	53	55	60	61	65	66	70	70	66	66	71	70	65	60	62	63	64	64	60	55	62	
June.....	59	62	61	63	63	55	60	67	66	68	69	66	65	66	67	65	72	76	75	72	67	68	69	76	71	67	70	75	--	67		
July.....	74	75	79	78	76	72	71	71	76	72	76	73	73	72	74	73	71	73	74	70	71	71	73	72	72	71	74	72	76	73	73	
August.....	74	72	73	72	72	74	66	68	72	69	70	75	68	67	75	77	79	75	75	75	76	74	75	74	71	75	74	70	72	71	72	
September.....	71	71	70	68	71	70	70	71	69	68	63	65	64	64	66	64	67	67	69	66	70	69	65	66	68	68	69	66	67	62	--	67

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	557	568	560	531	507	573	566	378	346	495	512	546
2.....	555	574	563	525	517	571	555	495	345	495	512	546
3.....	543	573	566	531	525	570	561	445	357	437	538	545
4.....	542	570	549	530	515	577	575	473	373	447	537	544
5.....	534	568	558	528	520	561	574	510	377	447	559	539
6.....	536	572	556	525	523	554	512	570	372	440	545	495
7.....	546	563	556	530	524	565	429	571	358	444	538	493
8.....	546	563	556	530	524	565	429	571	358	444	538	493
9.....	582	580	561	521	516	573	491	426	491	426	520	534
10.....	574	565	557	524	524	569	454	567	440	426	524	494
11.....	600	--	550	523	523	566	457	417	394	428	529	503
12.....	582	573	547	541	549	568	471	361	357	469	533	459
13.....	569	572	553	527	608	571	504	377	394	473	546	469
14.....	543	562	535	560	551	576	523	373	450	485	541	515
15.....	481	568	541	526	546	577	497	388	450	452	543	484
16.....	507	576	543	518	560	583	487	416	499	475	535	483
17.....	590	575	551	528	575	569	449	429	490	468	546	487
18.....	613	576	555	538	570	560	442	427	463	451	557	516
19.....	617	573	545	551	570	541	443	417	459	466	562	513
20.....	630	583	569	545	570	535	330	440	553	455	568	500
21.....	623	576	553	547	571	544	373	442	492	457	545	521
22.....	585	573	554	544	571	544	402	447	345	466	551	524
23.....	573	573	559	513	571	540	402	448	345	466	551	524
24.....	582	567	564	527	577	539	414	465	344	465	546	556
25.....	581	558	554	526	574	534	423	450	356	458	547	554
26.....	582	563	553	533	576	519	407	430	369	480	553	555
27.....	581	564	554	534	577	523	394	412	391	501	532	550
28.....	586	551	545	530	577	539	362	406	405	480	506	551
29.....	576	564	554	526	577	539	362	406	405	480	506	551
30.....	576	564	554	526	577	539	362	406	405	480	506	551
31.....	578	--	527	520	--	563	--	366	--	466	552	--
Average	570	569	552	530	551	556	451	444	407	463	539	520

Snake River Main Stem

13-2690. Snake River at Weiser, Idaho

LOCATION.--Lat 44°14'35", long 116°58'35", temperature recorder at gaging station on left bank, in Malheur County, Ore., at Weiser, 1,200 feet upstream from U. S. Highway 30N bridge, 2,300 feet downstream from Weiser River, and at mile 351.5.
 READING DATA.--8,200 square miles, approximately.
 RECORDING PERIOD.--June to September 1967.
 EXTREMES.--June to September 1967.--Water temperatures: Maximum, 78°F July 12, 26, Aug. 5.
 REMARKS.--Temperature observations are made at approximately 0800 and 1700 each day.

Month	Temperature (°F) of water, June to September 1967																															Average
	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	
June	---	---	---	---	---	---	---	---	---	---	---	---	63	64	64	66	68	70	70	70	66	64	65	66	68	70	69	69	71	---	---	
A.M.	---	---	---	---	---	---	---	---	---	---	---	---	65	65	66	67	70	71	71	72	70	68	67	69	70	72	71	71	72	74	---	---
P.M.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
July	72	72	72	73	74	73	71	72	71	71	73	74	76	74	73	75	---	74	73	73	73	72	73	73	75	75	75	74	73	73	75	73
A.M.	74	74	74	76	77	76	75	74	74	76	76	79	78	78	78	77	77	77	77	78	77	77	77	78	78	79	78	77	78	77	78	76
P.M.	74	74	74	76	77	76	75	74	74	76	76	79	78	78	78	77	77	77	78	77	77	77	78	78	79	78	77	78	77	78	76	
August	75	74	74	75	74	73	70	69	70	70	72	72	73	74	74	74	75	74	75	74	72	71	72	71	70	70	70	71	72	72	71	72
A.M.	78	77	78	78	79	78	76	73	74	75	74	76	77	78	78	78	78	78	78	78	75	75	75	76	74	74	74	74	75	75	76	76
P.M.	78	77	78	78	79	78	76	73	74	75	74	76	77	78	78	78	78	78	78	78	75	75	75	76	74	74	74	74	75	75	76	76
September	72	71	70	71	69	70	70	69	68	67	63	62	61	62	63	64	64	64	64	65	65	64	64	64	64	63	63	63	63	63	65	65
A.M.	73	74	74	73	72	73	73	72	72	70	67	63	64	64	65	66	67	67	67	68	69	68	67	67	67	66	66	66	66	66	68	68
P.M.	73	74	74	73	72	73	73	72	72	70	67	63	64	64	65	66	67	67	67	68	69	68	67	67	67	66	66	66	66	66	68	68

SALMON RIVER BASIN

13-3170. SALMON RIVER AT WHITE BIRD, IDAHO

LOCATION.--Lat 45°45'04", long 116°19'22", temperature recorder at gaging station, on left bank just upstream from White Bird Creek, 0.5 mile downstream from Canfield-Joseph highway bridge, 1 mile southwest of White Bird, Idaho County, and at mile 53.7.
 DRAINAGE AREA.--13,550 square miles, approximately, including White Bird Creek basin.
 RECORDS AVAILABLE.--Water temperatures: October 1966 to September 1967.
 RECORDS, 1966.--Water temperatures: Oct. 1, 21; Nov. 1, 21; Dec. 1, 21; minimum, 34°F Dec. 23, 25, 31.
 REMARKS.--Observations made at approximately 0800 and 1700 on alternate days.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate	
May 22, 1967.....	54700	12		7.3	1.2	2.8	1.2	30	0	3.2	0.5	0.2	0.8	46	0.06	6790	23	0	62
July 26.....	9410	14	15	2.8	5.5	5.9	63	0	7.4	1.0	.3	.4	.09	74	.10	1880	49	0	122
Sept. 30.....	A3860	14	23	3.7	8.9	1.5	94	0	14	2.0	.4	.3	.06	111	.15	1160	72	0	182

A Discharge at time of sampling.

GRANDE RONDE RIVER BASIN

13-3315. MINAM RIVER AT MINAM, OREG.
(Hydrologic bench-mark station)

LOCATION (revised) --Lat 45°37'12", long 117°43'32", at gaging station on left bank, 2.3 miles downstream from Squaw Creek, 0.3 mile west of Minam, Mallova County and mile 0.3.

DRAINAGE AREA --240 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: January 1966 to September 1967.

Water temperatures: October 1965 to September 1967.

EXTREMES, 1966-67. --Water temperatures: Maximum, 79°F Aug. 17, 18; minimum, freezing point on many days from December to March.

EXTREMES, 1965-67. --Water temperatures: Maximum, 79°F Aug. 17, 18, 1967; minimum, freezing point on many days during winter months.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate			
Dec. 1, 1966.....	177	16		6.8	1.4	2.4	0.9	32	0	0.8	0.5	0.1	0.2		40	0.05	19.1	23	0		55	7.0
Jan. 24, 1967....	120	24		7.6	2.0	2.9	1.3	39	0	1.4	0	0	1.1	1.1	59	.08	19.1	27	0		68	7.0
Apr. 12.....	271	23		6.4	1.7	2.6	1.3	36	0	.4	1.0	1.1	.1	1.1	55	.07	40.2	23	0		59	7.6
July 6.....	1140	9.1		2.7	.6	1.2	.6	15	0	.0	.0	.0	.1	22	.03	67.7	9	0		26	7.3	
Aug. 31.....	172	17	0.03	5.7	1.3	2.5	1.4	34	0	.0	1.0	.1	.2	44	.06	8.55	20	0		55	8.1	
Sept. 21.....	58	17		6.4	1.7	2.6	1.2	34	0	.4	1.0	.0	.2	50	.07	7.83	23	0		58	7.7	

Temperature (°F) of water, water year October 1966 to September 1967

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	54	56	57	58	59	59	57	53	53	48	50	47	47	49	46	48	46	46	45	43	41	44	49	49	48	48	47	44	51	50	50
	Maximum	46	48	46	44	44	46	45	40	39	41	42	39	38	38	35	39	36	35	41	39	37	41	44	42	41	42	38	38	44	41	41
November	46	46	44	42	40	45	40	41	37	44	37	43	41	46	46	44	42	40	41	46	44	40	39	38	38	39	37	37	40	41	41	41
	Maximum	39	38	36	34	36	37	37	34	34	33	33	37	40	41	43	39	38	36	41	40	36	35	34	34	34	34	34	37	40	--	36
December	42	38	38	39	38	38	35	35	33	33	34	37	40	41	38	37	37	39	39	39	39	34	33	33	33	33	33	32	33	32	34	34
	Maximum	36	36	36	36	35	33	33	33	33	33	34	37	38	36	35	35	35	37	37	33	33	33	33	33	33	32	32	32	32	34	34
January	35	35	38	37	34	33	35	35	35	34	36	37	39	39	39	38	38	35	38	39	38	36	32	32	32	33	33	38	39	40	38	39
	Maximum	53	52	34	35	33	33	33	33	33	33	33	34	37	38	37	36	34	35	38	35	35	32	32	32	32	32	33	36	36	33	32
February	36	38	39	41	40	38	38	37	38	42	37	38	38	36	35	36	38	37	37	39	37	42	39	39	41	43	42	--	--	--	33	38
	Maximum	34	37	36	37	35	33	33	33	35	36	34	34	35	33	32	34	33	32	32	32	32	33	32	35	32	35	32	35	--	--	33
March	41	39	40	39	40	41	40	41	39	38	37	36	37	40	43	44	47	44	45	45	44	42	45	44	42	45	44	42	41	43	41	41
	Maximum	38	36	32	32	32	32	34	34	34	33	32	32	32	33	37	39	39	39	39	38	39	40	38	36	37	36	39	36	34	37	35
April	45	49	46	47	48	51	51	49	49	45	50	46	43	45	45	45	48	42	43	45	51	49	48	45	47	44	43	46	42	--	46	46
	Maximum	38	37	37	39	41	40	39	40	40	43	42	39	39	37	35	36	36	40	39	37	37	38	40	41	40	39	40	38	38	37	--
May	53	53	52	53	57	55	54	53	46	44	45	45	50	51	52	53	50	48	49	49	50	49	48	47	46	47	48	45	44	43	48	49
	Maximum	37	40	42	41	44	46	44	43	41	40	41	41	43	43	43	43	42	41	42	42	42	42	41	40	42	43	45	41	41	41	41
June	47	50	48	49	49	47	50	49	52	51	49	47	50	51	52	52	51	53	51	52	49	49	50	52	53	53	53	54	55	55	55	55
	Maximum	45	43	43	44	43	45	43	45	45	45	45	44	44	45	45	45	45	46	45	46	46	47	48	48	47	48	45	44	43	48	49
July	45	50	48	49	49	47	50	49	52	51	49	47	50	51	52	52	51	53	51	52	49	49	50	52	53	53	53	54	55	55	55	55
	Maximum	47	50	48	49	49	47	50	49	52	51	49	47	50	51	52	52	51	53	51	52	49	49	50	52	53	53	54	55	55	55	55
August	54	57	57	56	55	56	57	56	58	60	62	63	62	63	63	61	65	65	65	67	67	69	71	70	70	69	63	70	71	63	63	
	Maximum	48	49	51	50	51	51	50	52	52	54	57	58	55	54	56	58	56	56	55	55	55	57	60	59	59	58	57	56	58	59	54
September	72	72	73	73	71	70	72	72	73	71	75	77	77	77	77	78	79	79	76	74	76	74	75	72	72	71	75	75	77	77	74	74
	Maximum	59	59	59	60	60	60	59	56	57	58	61	60	63	62	60	62	64	64	64	63	63	59	60	58	57	58	63	61	62	62	60
October	75	76	75	75	72	75	74	72	72	68	61	63	63	65	67	68	68	68	68	70	70	70	70	66	66	65	64	65	60	58	--	58
	Maximum	63	63	60	62	64	62	61	62	60	57	57	53	49	49	52	54	54	54	54	56	57	59	51	51	51	52	51	51	53	53	--

13-3353. SNAKE RIVER ABOVE CLEARWATER RIVER AT CLARKSTON, WASH.

LOCATION.--Lat 46°25'15", long 117°02'05", at bridge on U.S. Highway 410 at Clarkston, Asotin County, 0.2 mile upstream from Clearwater River, and 4.2 miles downstream from Clearwater River, Asotin County, Washington.

DRAINAGE AREA.--93 400 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1967.

REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium-silum	Non-carbonate			
Nov. 1, 1966..		19		33	16	36	3.8	176	0	58	17	0.6	1.0	271	0.37		148	4	437		7.9
Dec. 14.....		25		34	14	32	3.8	173	0	46	15	.5	2.6	263	.36		141	0	419		8.0
Jan. 5, 1967..		25		35	13	31	3.5	175	0	46	12	.5	2.6	266	.36		141	0	419		8.0
Jan. 25.....		27		35	14	32	3.9	172	0	48	12	.5	2.1	266	.37		145	4	428		8.1
Mar. 7.....		25		22	16	25	3.1	148	0	38	12	.4	2.8	223	.30		122	0	350		8.0
Apr. 18.....		21		18	6.4	16	2.4	90	0	21	8.0	.4	1.0	142	.19		72	0	214		7.6
May 25.....		11		9.8	2.9	6.4	1.4	46	0	9.6	3.0	.3	1.6	75	.10		36	0	103		7.2
June 22.....		11		10	1.9	8.4	1.9	43	0	13	3.5	.3	.4	74	.10		33	0	134		7.7
July 10.....		12		10	7.5	10	1.6	72	0	15	4.2	.3	.2	97	.13		56	0	160		7.8
Aug. 30.....		14		25	11	25	3.9	136	0	35	12	.6	.7	198	.27		107	0	323		8.0

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Jan. 5, 1967..	11.4	0	--	--	--	--	May 25, 1967..	--	--	0.00	0.00	0.00	--
Feb. 20.....	12.6	70	--	--	--	--	June 22.....	8.8	210	--	--	--	--
Apr. 18.....	--	--	0.00	0.01	0.01	--	Aug. 24.....	7.5	210	--	--	--	--

CLEARWATER RIVER BASIN--Continued

13-3410. NORTH FORK CLEARWATER RIVER AT AHSARKA, IDAHO--Continued

DAILY SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

DAY	OCTOBER			NOVEMBER			DECEMBER		
	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)
1	850	3	7	1350	9	33	3320	58	520
2	1000	6	16	1230	6	20	4210	87	989
3	1720	29 S	145	1170	5	16	3910	36	380
4	1310	21	74	1120	4	12	3720	22	221
5	1050	20	57	1110	4	12	3440	55	511
6	910	C	15	1320	6	21	3420	69	637
7	880	C	15	1520	8	33	3060	47	388
8	900	C	15	1390	10	38	2770	11	82
9	890	C	15	1330	4	14	2440	6	40
10	890	C	15	1230	9	30	2190	5	30
11	840	C	15	1300	8	28	2130	5	29
12	1000	C	15	1320	10	36	2170	6	35
13	1340	C	15	2070	22	123	4170	147 S	2080
14	1170	C	15	2750	42	312	7680	223	4620
15	1000	C	15	3010	41	333	6130	63	1040
16	950	C	15	3900	100	1050	4650	19	239
17	960	C	15	5440	115	1890	4050	12	131
18	950	C	15	3530	64	610	3530	9	86
19	930	C	15	2600	20	140	3400	6	55
20	930	C	15	2240	10	60	3240	3	26
21	1080	C	15	2350	12	76	3610	10	97
22	1300	22	77	2720	28	206	3080	7	64
23	1530	23	95	2260	18	40	2930	5	40
24	2300	56	348	2050	8	44	2480	C	4
25	2110	28	160	1960	7	37	2560	C	4
26	1780	20	96	2420	19	124	2430	C	4
27	1620	9	39	2220	14	84	2360	C	4
28	1780	14	67	1870	8	40	2220	C	4
29	1540	8	33	2010	6	33	2250	C	4
30	1330	7	25	2320	15	94	2320	C	4
31	1350	4	15	--	--	--	2250	C	4
TOTAL	38190	--	1887	63110	--	5459	102420	--	12543
DAY	JANUARY			FEBRUARY			MARCH		
	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)
1	2330	C	4	25	7910	38	812	3450	6
2	2380	C	4	26	6700	26	470	3820	7
3	2210	C	4	24	6050	19	310	3760	11
4	2210	C	4	24	5920	17	272	3480	6
5	2390	C	4	26	6200	15	251	3190	5
6	2350	C	4	25	5850	11	174	3220	5
7	2180	C	4	24	5310	12	172	3040	4
8	2030	C	4	22	4990	10	133	2970	13
9	1970	C	4	21	4620	10	125	3630	6
10	1980	C	4	21	4510	6	73	3690	9
11	2010	C	4	22	4380	6	71	3520	13
12	2290	C	4	25	4130	4	45	3270	5
13	2820	110	838	4200	5	57	3020	4	33
14	3640	56	570	4630	10	125	3130	4	34
15	6020	187	3040	4250	6	69	3040	4	33
16	10900	180	5300	4090	5	55	3140	5	42
17	7560	74	1510	4030	7	76	4800	40 A	520
18	5490	25	371	3920	8	85	5980	37	597
19	4960	23	308	3760	7	71	6210	27	453
20	6330	87	1490	3320	5	45	5490	14	208
21	6770	45	823	3210	3	26	5170	10	140
22	5760	21	327	3150	7	60	5490	15	222
23	4810	12	156	3110	6	50	7510	50	1010
24	4010	12	130	3090	3	25	8600	50	1160
25	3590	6	58	3060	4	33	7560	25	510
26	3730	12	121	3070	3	25	6470	15	270
27	3960	38	406	3060	5	41	6050	12	196
28	6490	124 S	2890	3120	4	34	5990	11	178
29	11700	165	5210	--	--	--	5990	29	469
30	12800	159	5500	--	--	--	5540	10	150
31	10200	51	1400	--	--	--	5200	8	112
TOTAL	147870	--	30733	123640	--	3787	145620	--	7173

S Computed by subdividing day.

A Computed from partly estimated-concentration graph.

C Composite period.

CLEARWATER RIVER BASIN--Continued

13-3410. NORTH FORK CLEARWATER RIVER AT AHSARKA, IDAHO--Continued
DAILY SUSPENDED SEDIMENT, WATER YEAR OCTOBER 1966 TO SEPTEMBER 1967

DAY	APRIL			MAY			JUNE				
	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)		
1	4910	7	93	6900	10	186	18300	25	1240		
2	4740	6	77	6540	17	300	21000	37	2100		
3	4820	7	91	6370	19	327	21700	31	1820		
4	5600	12	181	7170	19	368	20700	22	1230		
5	6500	14	246	7500	19	385	19500	18	948		
6	6430	12	208	8900	45	1080	19200	26	1350		
7	6450	14	244	10400	82	2300	21200	34	1950		
8	7220	21	409	13900	178	6680	20400	23	1270		
9	7270	16	314	17100	235	10800	20000	18	972		
10	7570	20	409	18600	143	7180	18900	15	765		
11	8140	30	659	19100	126	6500	18700	17	858		
12	7910	20	427	17800	86	4130	17400	16	752		
13	8410	32	727	15700	64	2710	17100	25	1150		
14	8840	32	764	13700	42	1550	16000	24	1040		
15	8080	18	393	13300	28	1010	16100	18	782		
16	7300	12	237	15000	45	1820	16100	16	696		
17	6740	10	182	17730	85	4060	17200	20	929		
18	6800	10	184	21100	156	8890	17100	15	693		
19	7380	18	359	22700	106	6500	16600	15	672		
20	7700	20	416	23200	84	5260	15900	18	773		
21	6970	15	282	24300	89	5840	15800	15	640		
22	6440	6	104	26400	149	10600	15100	14	571		
23	6240	2	34	27300	169	12500	14200	24	920		
24	6910	2	37	25400	100	6860	12700	22	754		
25	7470	6	121	23200	59	3700	11500	22	683		
26	8400	18	408	20800	39	2190	10700	16	462		
27	8700	18	423	19500	34	1790	10300	18	501		
28	8700	18	423	19100	30	1550	9600	18	467		
29	8300	34 A	760	20500	34	1880	9200	22	546		
30	7900	18	384	20600	27	1500	8700	26	611		
31	--	--	--	18500	23	1150	--	--	--		
TOTAL	214840	--	9596	528280	--	121596	486900	--	28145		
DAY	JULY			AUGUST			SEPTEMBER				
	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (ppm)	LOAD (TONS)		
1	8200	21	465	2030	C	5	27	1120	C	3	9
2	7700	28	592	2010	C	5	27	1090	C	3	9
3	7200	56	1090	1870	C	5	25	1060	C	3	9
4	6900	20	373	1860	C	5	25	1080	C	3	9
5	6200	28	469	1790	C	5	24	1080	C	3	9
6	6100	20	329	1760	C	5	24	1080	C	3	9
7	5700	14	215	1700	C	5	23	1100	C	3	9
8	5110	15	207	1670	C	5	23	1110	C	3	9
9	4740	9	115	1690	C	5	23	1110	C	3	9
10	4490	8	97	1590	C	4	17	1070	C	3	9
11	4190	4	45	1550	C	4	17	1250	C	3	10
12	4030	5	54	1490	C	4	16	2120		8	46
13	3940	C	64	1470	C	4	16	1790		12	58
14	3700	C	50	1430	C	4	15	1300		3	11
15	3600	C	49	1420	C	4	15	1160	C	2	6
16	3350	C	45	1410	C	4	15	1180	C	2	6
17	3370	C	45	1400	C	4	15	1120	C	2	6
18	3220	C	43	1310	C	3	11	1120	C	2	6
19	3290	C	44	1300	C	3	11	1110	C	2	6
20	3030	C	41	1260	C	3	10	1070	C	2	6
21	2920	C	39	1260	C	3	10	1060	C	2	6
22	2950	C	40	1250	C	3	10	1050	C	2	6
23	2850	C	38	1280	C	3	10	1030	C	2	6
24	2710	C	37	1280	C	3	10	995	C	2	5
25	2560	C	35	1260	C	3	10	1010	C	2	5
26	2400	C	32	1250	C	3	10	996	C	2	5
27	2320	C	31	1230	C	3	10	992	C	2	5
28	2270	C	31	1230	C	3	10	997	C	2	5
29	2200	C	30	1220	C	3	10	967	C	2	5
30	2140	C	29	1190	C	3	10	1010	C	2	5
31	2040	C	28	1150	C	3	9	--	--	--	--
TOTAL	125420	--	4792	45610	--	488	34227	--	--	304	

TOTAL DISCHARGE FOR YEAR (CFS-DAYS)

TOTAL LOAD FOR YEAR (TONS)

2056127

226503

A Computed from partly estimated-concentration graph.

C Composite period.

CLEARWATER RIVER BASIN--Continued
13-3410.5. CLEARWATER RIVER NEAR PECK, IDAHO

LOCATION.--Lat 46°30'00", long 116°23'30", temperature recorder at gaging station on left bank, 2 miles upstream from Big Canyon Creek, 15.2 miles northeast of Peck, Nez Perce County, 3 miles downstream from North Fork Clearwater River, and at mile 37.4. PEAK FLOW 1966--164 cfs, 10:00 a.m., October 1966. RECORDS AVAILABLE.--Water temperatures: October 1964 to September 1967. EXTREMES, 1966-67.--Water temperatures: Maximum, 76°F on several days during August; minimum, 34°F Jan. 25, 26. EXTREMES, 1964-67.--Water temperatures: Maximum, 77°F Aug. 1, 2, 1965; minimum, freezing point on many days during January and February 1966.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
Day																																	
Month																																	
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	59	58	57	57	56	57	57	54	53	52	52	50	49	48	48	47	46	45	45	45	44	44	43	44	45	45	46	46	47	50		
Maximum	58	58	56	54	55	54	56	54	52	50	51	50	50	49	48	47	47	45	44	45	44	44	43	44	45	45	46	46	47	48	48		
Minimum	46	46	44	43	43	42	42	42	40	40	39	39	40	42	42	42	42	41	41	41	41	41	41	41	41	41	40	40	39	39	--		
November	45	44	43	43	42	42	42	40	40	38	38	39	39	40	42	42	42	42	41	41	41	41	41	41	41	40	40	39	38	38	--		
Maximum	39	40	40	40	40	40	39	39	39	37	37	36	37	38	38	38	38	38	39	39	39	39	38	37	36	36	36	36	36	36	37		
Minimum	39	39	40	40	40	39	39	37	37	36	36	36	37	38	38	38	38	38	38	38	38	37	36	36	36	36	36	36	36	36	37		
December	38	38	37	37	37	37	37	37	37	38	39	39	39	39	38	38	38	38	38	38	38	38	37	35	35	36	37	38	38	38	37		
Maximum	36	37	37	37	37	37	37	37	37	37	38	39	39	39	38	38	38	38	38	38	38	38	37	35	34	35	36	37	38	38	37		
Minimum	38	37	37	38	38	37	37	37	36	36	37	37	37	37	37	36	36	36	36	35	36	37	37	38	41	41	--	--	--	--	37		
January	40	40	39	39	39	39	38	37	37	37	38	39	40	42	42	42	43	43	42	42	42	42	43	43	43	43	43	44	43	42	40		
Maximum	40	40	39	38	38	38	37	37	37	37	38	39	40	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	42	40		
Minimum	43	45	46	46	46	45	45	45	45	45	44	44	44	45	44	44	44	45	44	44	44	44	45	46	47	47	47	46	45	44	--		
April	42	42	44	45	44	44	45	45	45	45	44	44	44	44	44	44	44	44	44	44	44	44	46	47	47	47	46	45	44	--	44		
Maximum	44	46	48	50	50	50	49	48	46	46	47	47	48	48	46	47	48	48	47	47	47	47	47	46	46	45	45	47	46	48	47		
Minimum	44	44	46	48	48	49	49	48	48	46	45	45	46	46	47	48	48	47	46	47	47	47	46	45	45	45	47	46	46	46	46		
June	49	49	48	48	48	49	48	48	49	49	49	50	51	52	52	52	53	53	53	53	52	52	53	54	56	56	58	58	--	51			
Maximum	48	48	48	48	48	48	48	48	48	48	48	49	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50		
Minimum	58	58	60	60	62	62	62	63	64	65	67	68	69	70	68	69	70	69	70	70	70	72	73	72	73	73	73	73	73	67	67		
July	58	58	60	60	62	62	62	63	64	65	67	68	69	70	68	69	70	69	70	70	70	72	73	72	73	73	73	73	73	67	67		
Maximum	58	58	59	60	60	61	62	62	62	62	64	66	67	67	68	68	67	67	67	67	68	69	70	71	70	71	71	70	70	70	65		
Minimum	73	74	74	74	74	73	72	72	72	73	74	75	76	76	76	76	74	74	73	72	71	71	71	71	70	69	67	68	69	70	72		
August	70	70	70	71	71	70	69	68	69	70	71	71	71	71	71	71	71	71	70	72	70	69	67	65	64	65	65	67	67	69	69		
September	69	70	70	70	71	70	69	69	66	64	63	63	62	63	64	64	63	63	64	63	64	63	63	63	63	63	62	61	--	--	62		
Maximum	68	68	68	68	68	68	66	67	66	63	62	60	60	60	61	61	61	61	61	63	63	63	61	61	61	61	60	59	--	--	65		
Minimum	69	70	70	70	71	70	69	69	66	64	63	63	62	63	64	64	63	63	64	63	64	63	63	63	63	62	61	--	--	65	65		

CLEARWATER RIVER BASIN--Continued

13-3425. CLEARWATER RIVER AT SPALDING, IDAHO--Continued

Temperature (°F) of water, water year October 1966 to September 1967--Continued

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		
July																																	
Maximum	59	59	60	61	62	62	62	62	63	63	64	65	66	67	68	68	68	68	68	69	68	69	68	69	70	71	71	72	71	72	73	72	66
Minimum	58	58	58	59	60	60	60	60	60	60	61	62	63	65	66	66	66	66	67	66	67	68	69	68	69	69	69	70	70	70	70	70	64
August																																	
Maximum	72	73	73	73	74	73	72	73	73	73	74	75	75	76	75	76	76	76	76	77	75	75	74	74	72	72	73	74	74	74	74	74	74
Minimum	70	70	70	70	71	71	70	70	70	69	71	72	72	73	73	73	73	74	74	74	74	73	72	72	70	70	70	71	71	72	71	71	71
September																																	
Maximum	74	74	74	74	74	74	74	73	71	71	71	68	65	64	63	63	64	65	66	67	65	64	67	65	64	64	64	64	63	63	63	63	67
Minimum	72	72	70	70	71	71	70	70	69	68	65	63	61	60	61	61	63	63	64	64	65	62	61	61	62	61	61	62	61	62	61	61	64

SNAKE RIVER MAIN STEM

13-3435. SNAKE RIVER NEAR CLARKSTON, WASH.

(International Hydrological Decade River Station)

LOCATION.--Lat 46°25'15", long 117°10'50", at left bank 8 miles downstream from Clarkston, Asotin County, and 1 mile downstream from gaging station.
 DRAINAGE AREA.--103,200 square miles, approximately, upstream from gaging station.
 RECORDS AVAILABLE.--Chemical analyses: November 1951 to February 1956, October 1961 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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)	Borates (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio at 25°C	Specific conductance (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-boron			
Nov. 2, 1966..	24400	30			13	33	3.5	171	0	48	17	0.5	1.1		A 265	0.33	17460	141	1		408	7.7
Dec. 13.....	28000	21			12	28	3.4	170	0	40	14	.2	2.0		222	222	22040	117	0		378	7.9
Jan. 24, 1967.	28800	22			12	28	3.5	149	0	40	14	.2	2.0		222	30	22040	117	0		363	8.0
Mar. 7.....	27000	22			13	20	2.6	116	0	26	9.5	.3	2.1		174	---	13880	93	0		277	7.8
Apr. 18.....	42000	25			8.7	21	2.8	121	0	29	10	.5	1.2		182	---	20640	98	0		289	7.6
May 26.....	166000	9.7			6.8	2.0	4.8	1.2	32	0	6.6	1.5	.2		52	.08	23310	25	0		271	7.0
July 11.....	51900	12			12	3.6	8.8	1.4	59	0	12	3.8	.2	.1	83	---	11630	45	0		131	7.7
Aug. 30.....	17600	13	0.09		23	8.4	3.8	118	0	31	12	.5	.7		175	---	8310	92	0		281	7.9

A Calculated from determined constituents.

TUCANWON RIVER BASIN

13-3445. TUCANWON RIVER NEAR STARBUCK, WASH.

LOCATION.--Lat 46°30'20", long 118°03'55", at county road bridge 180 feet upstream from gaging station, 3 miles east of Starbuck, Columbia County, and 3.5 miles downstream from Patsha Creek.

DRAINAGE AREA.--431 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Minimum, 36°F Feb. 19.

Maximum daily, 74°F Aug. 20; minimum daily, 7 ppm during September.

Sediment concentrations: Maximum daily, 2,400 ppm Jan. 20; minimum daily, 1 ppm during September.

Sediment loads: Maximum daily, 99,800 tons Dec. 22, 1964; minimum daily, 4 ppm Oct. 29, 30, 1965.

EXTREMES, 1962-67.--Water temperatures: Maximum (1962-65), 82°F Aug. 1, 1965; minimum, freezing point Dec. 11, 12, 1963.

Sediment concentrations: Maximum daily, 99,800 ppm Dec. 22, 1964; minimum daily, 4 ppm Oct. 29, 30, 1965.

Sediment loads: Maximum daily, 1,600,000 tons Dec. 22, 1964; minimum daily, 1 ton on many days in 1966 and 1967.

REMARKS.--Maximum observed during water year: Sediment concentration, 4,460 ppm Jan. 20.

Temperature (°F) of water, water year October 1966 to September 1967

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	--	68	--	44	--	56	--	61	48	47	--	55	--	--	55	--	--	--	--	--	50	--	55	50	--	--	--	--	53	--	
November.....	--	53	--	51	--	44	--	46	--	45	50	48	50	45	43	49	48	46	46	43	46	40	43	45	47	51	--	--	44	42	42	--	
December.....	--	48	48	--	48	--	42	41	42	41	--	45	48	45	41	44	--	46	--	46	42	41	--	--	41	--	41	--	--	--	--	--	
January.....	41	--	43	38	37	41	--	--	43	43	41	47	--	44	42	42	44	43	38	41	40	41	40	41	44	46	47	48	43	44	42	--	
February.....	42	45	44	42	39	44	46	47	42	45	44	43	44	45	44	43	44	43	44	43	44	43	44	43	44	43	44	43	44	43	44	42	--
March.....	50	--	40	--	40	--	47	45	--	47	--	49	49	50	--	53	--	53	54	51	51	52	51	46	--	49	51	46	51	46	51	46	--
April.....	--	47	58	56	59	61	60	--	--	49	55	47	57	56	53	--	58	54	46	46	54	45	62	56	56	59	49	50	50	45	--	53	--
May.....	--	60	--	64	--	65	55	--	53	50	50	57	53	58	68	72	65	64	--	55	55	67	61	62	60	66	65	57	61	53	66	60	--
June.....	64	--	64	71	69	--	71	70	65	--	--	--	75	--	75	--	77	--	70	--	68	68	--	--	--	67	--	74	--	69	--	--	--
July.....	--	81	--	76	--	76	--	70	--	85	--	80	--	--	--	--	80	--	78	--	--	--	82	--	78	--	82	--	--	--	--	--	--
August.....	--	82	82	--	76	74	80	--	79	--	79	--	--	--	--	--	78	--	--	--	--	80	--	83	--	73	66	--	--	--	--	--	--
September.....	73	--	69	74	--	78	77	--	--	82	--	72	--	--	75	--	--	72	79	--	--	76	--	75	--	74	--	--	--	--	--	--	--

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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 per- ature (°F)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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		
Jan. 29, 1967.....	0920	46		289	513	400	17	25		64	88	95	98	100			VPWC	
May 23.....	1335	61		494	847	1130	12	19	26	41	74	90	96	100			VPWC	

TUCANNON RIVER BASIN--Continued

13-3445. TUCANNON RIVER NEAR STARBUCK, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

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..	70	C 17	3	81	C 10	2	102	C 26	7
2..	76	C 17	3	79	C 10	2	106	C 26	7
3..	85	C 17	4	79	C 10	2	112	C 26	8
4..	81	C 17	4	79	C 10	2	83	C 26	8
5..	81	C 17	4	79	C 10	2	121	C 26	8
6..	77	C 17	4	83	C 10	2	114	C 26	8
7..	74	C 17	3	81	C 10	2	114	C 26	8
8..	72	C 17	3	79	C 10	2	110	C 26	8
9..	72	C 17	3	79	C 10	2	104	C 26	7
10..	72	C 17	3	79	-- E	3	106	C 26	7
11..	74	C 17	3	81	-- E	3	104	C 26	7
12..	72	C 17	3	86	-- E	3	106	120 A	34
13..	76	C 17	3	88	-- E	3	132	273	97
14..	72	C 17	3	92	20	5	185	270	135
15..	70	C 17	3	106	280 A	80	177	135	65
16..	70	C 17	3	154	610 A	250	163	90	40
17..	72	C 17	3	137	270 A	100	152	52	21
18..	70	C 17	3	112	50	15	142	49	19
19..	70	C 17	3	102	37	10	132	40 B	14
20..	70	C 17	3	106	40	11	130	35	12
21..	80	C 17	4	106	40	11	130	C 20	7
22..	80	C 17	4	100	32	9	123	C 20	7
23..	90	C 17	4	96	25	6	114	C 20	6
24..	90	C 17	4	92	23	6	112	C 20	6
25..	86	C 17	4	94	72 A	18	112	C 20	6
26..	85	C 17	4	119	100 A	32	108	C 20	6
27..	88	C 17	4	106	25	7	104	C 20	6
28..	85	C 17	4	102	28	8	102	C 20	6
29..	81	C 17	4	100	23	6	100	C 20	5
30..	79	C 17	4	98	100 A	26	104	C 20	6
31..	81	C 17	4	--	--	--	98	C 20	5
Total	2403	--	102	2875	--	630	3733	--	586
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..	104	C 16	4	337	250	227	128	C 10	3
2..	102	C 16	4	282	170	129	132	C 10	4
3..	100	C 16	4	250	120	81	132	C 10	4
4..	108	68 A	20	229	97	60	128	C 10	3
5..	110	48	14	212	50	29	125	C 10	3
6..	114	33	10	200	41	22	128	C 10	3
7..	114	17	5	191	31	16	125	C 10	3
8..	112	34	10	179	36	17	130	C 10	4
9..	112	-- E	8	174	31	15	130	C 10	4
10..	117	-- E	8	163	34	15	128	C 10	3
11..	119	24	8	163	28	12	130	C 10	4
12..	121	24	8	154	C 21	9	120	C 10	3
13..	128	37	13	150	C 21	9	123	C 10	3
14..	140	72	27	147	C 21	8	123	C 10	3
15..	171	200 B	92	140	C 21	8	121	C 10	3
16..	212	300 A	170	140	C 21	8	130	C 10	4
17..	215	170	99	134	C 21	8	177	86	41
18..	203	92	50	142	C 21	8	206	43 B	24
19..	191	90	46	134	C 21	8	215	66	38
20..	287	2200 A	1700	132	C 21	7	215	58	34
21..	274	870	644	130	C 21	7	206	34	19
22..	257	200	139	128	C 21	7	200	28	15
23..	236	100	64	125	85 A	29	218	44	26
24..	215	68	39	125	C 14	5	222	45	27
25..	209	55	31	125	C 14	5	212	34	19
26..	215	63 A	37	125	C 14	5	203	33 B	18
27..	218	100 A	59	125	C 14	5	191	90 A	46
28..	246	210 A	140	123	C 14	5	188	140 B	71
29..	307	700	580	--	--	--	203	550 A	300
30..	420	1700	1930	--	--	--	177	90	43
31..	392	530	561	--	--	--	168	24	11
Total	5869	--	6524	4659	--	764	5034	--	786

E Estimated.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

TUCANNON RIVER BASIN--Continued

13-3445. TUCANNON RIVER NEAR STARBUCK, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	163	C 26	11	177	C 27	13	254	56	38
2..	157	C 26	11	165	C 27	12	254	53	36
3..	152	C 26	11	163	C 27	12	257	53 B	37
4..	150	C 26	11	165	C 27	12	250	53	36
5..	157	C 26	11	168	C 27	12	243	46	30
6..	152	C 26	11	174	C 27	13	243	36	24
7..	150	C 26	11	197	110 A	59	246	C 48	32
8..	152	C 26	11	240	180 B	120	243	C 48	31
9..	152	C 26	11	288	250 A	190	240	C 48	31
10..	154	C 26	11	315	270 A	230	222	C 48	29
11..	160	C 26	11	311	170 A	140	215	C 48	28
12..	157	C 26	11	289	240 A	190	215	C 48	28
13..	160	C 26	11	260	80	56	215	C 48	28
14..	171	C 26	12	240	58	38	200	C 48	26
15..	160	C 26	11	236	55	35	194	C 42	22
16..	154	C 26	11	257	130 A	90	185	C 42	21
17..	150	C 26	11	315	210 A	180	179	C 42	20
18..	154	C 26	11	388	410 A	430	174	C 42	20
19..	157	C 26	11	384	420 B	440	165	C 42	19
20..	174	C 26	12	372	380 A	380	154	C 42	17
21..	168	C 26	12	404	460 A	500	179	C 42	20
22..	157	C 26	11	458	640 A	790	185	C 42	21
23..	154	C 26	11	485	780	1020	165	C 42	19
24..	154	C 26	11	449	620	752	150	C 42	17
25..	165	C 26	12	400	370	400	134	C 22	8
26..	174	C 26	12	349	210	198	123	C 22	7
27..	182	C 26	13	322	140	122	114	C 22	7
28..	188	C 26	13	315	120	102	106	C 22	6
29..	188	C 26	13	307	110	91	100	C 22	6
30..	182	C 26	13	289	73	57	94	C 22	6
31..	--	--	--	274	66	49	--	--	--
Total	4848	--	343	9156	--	6733	5698	--	670
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	92	C 12	3	53	C 12	2	42	C 7	1
2..	88	C 12	3	55	C 12	2	42	C 7	1
3..	86	C 12	3	53	C 12	2	46	C 7	1
4..	81	C 12	3	52	C 12	2	48	C 7	1
5..	76	C 12	2	50	C 12	2	48	C 7	1
6..	74	C 12	2	55	C 12	2	46	C 7	1
7..	74	C 12	2	58	C 12	2	49	C 7	1
8..	72	C 12	2	56	C 12	2	48	C 7	1
9..	74	C 12	2	52	C 12	2	46	C 7	1
10..	74	C 12	2	50	C 12	2	48	C 7	1
11..	69	C 12	2	49	C 12	2	55	C 7	1
12..	64	C 12	2	53	C 12	2	64	C 7	1
13..	62	C 12	2	52	C 12	2	64	C 7	1
14..	61	C 12	2	52	C 12	2	61	C 7	1
15..	59	C 12	2	49	C 12	2	59	C 7	1
16..	59	C 12	2	48	C 12	2	58	C 7	1
17..	62	C 12	2	46	C 12	1	56	C 7	1
18..	59	C 12	2	46	C 12	1	56	C 7	1
19..	59	C 12	2	46	C 12	1	53	C 7	1
20..	61	C 12	2	48	C 12	2	56	C 7	1
21..	62	C 12	2	48	C 12	2	55	C 7	1
22..	62	C 12	2	46	C 12	1	53	C 7	1
23..	61	C 12	2	45	C 12	1	55	C 7	1
24..	59	C 12	2	42	C 12	1	53	C 7	1
25..	58	C 12	2	45	C 12	1	53	C 7	1
26..	56	C 12	2	42	C 12	1	56	C 7	1
27..	56	C 12	2	43	C 12	1	55	C 7	1
28..	56	C 12	2	46	C 12	1	56	C 7	1
29..	53	C 12	2	43	C 12	1	59	C 7	1
30..	53	C 12	2	42	C 12	1	61	C 7	1
31..	56	C 12	2	42	C 12	1	--	--	--
Total	2038	--	66	1507	--	49	1601	--	30
Total discharge for year (cfs-days).....									49421
Total load for year (tons).....									17289

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

PALOUSE RIVER BASIN

13-3510, PALOUSE RIVER AT HOOPER, WASH.

LOCATION.--Lat 46°45'30", long 118°08'50", at bridge on State Highway 26 at Hooper, Whitman County, 150 feet upstream from gaging station, and 0.4 mile upstream from Cow Creek.

DRAINAGE AREA.--2,500 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

Water temperatures: October 1961 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Minimum, 34°F Dec. 30, Jan. 25.

Sediment concentrations: Maximum daily, 2,400 ppm Jan. 29; minimum daily, 6 ppm on several days during November.

Sediment loads: Maximum daily, 24,300 tons Jan. 29; minimum daily, less than 0.50 ton on many days during October, August, and September.

EXTREMES, 1961-67.--Water temperatures (1961-64, 1965-67): Maximum (1962-64), 86°F July 12, 1964; minimum (1961-64, 1965-67), freezing point on several days during December 1961, January 1962, January and February 1963, December 1964.

Sediment concentrations: Maximum daily, 45,100 ppm Feb. 5, 1963; minimum daily, 6 ppm on several days during November 1961 and November 1966.

Sediment loads: Maximum daily, 2,110,000 tons Feb. 5, 1963; minimum daily, less than 0.50 ton on many days during July, August, September, and October 1966, and September 1967.

REMARKS.--Maximum observed during water year: Sediment concentration, 3,580 ppm Jan. 29.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	Col or pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium-Magnesium	Non-carbonate		
Oct. 31, 1966..	49	9.0	31	14	32	4.6	209	0	12	16	0.4	0.9	A 223	0.30	99.5	135	0	390	8.2
Nov. 1, 1966..	785	9.4	16	5.0	11	3.3	75	0	9.2	5	2	8.5	156	0.21	366	67	6	202	20
Dec. 25, 1967..	574	25	16	6.6	11	3.3	75	0	9.2	3.2	2	2.1	156	0.21	242	67	6	192	7.6
Jan. 25, 1967..	475	25	17	6.7	13	2.8	95	0	7.6	3.8	2	9.1	134	0.18	172	70	0	195	7.7
Mar. 8, 1967..	475	25	17	6.7	13	2.8	95	0	7.6	3.8	2	9.1	134	0.18	172	70	0	195	7.7
Apr. 19, 1967..	556	21	14	4.7	9.6	2.6	80	0	6.2	3.0	2	3.1	105	0.14	158	54	0	153	7.4
May 23, 1967..	650	23	13	3.8	8.6	2.8	72	0	5.2	2.0	2	3.0	102	0.14	179	48	0	134	7.5
July 13, 1967..	45	22	27	9.1	19	4.6	156	4	9.6	5.0	3	2	186	0.25	22.6	105	0	281	8.4
July 13, 1967..	45	22	27	9.1	19	4.6	156	4	9.6	5.0	3	2	186	0.25	22.6	105	0	281	8.4

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
		Hexavalent (Cr ⁶⁺)	Total (Cr)				
Apr. 19, 1967...		0.00	0.00	0.00	0.00		
May 23, 1967...		.00	.00	.00	.02		

Month			Temperature (°F) of water, water year October 1966 to September 1967																																Average	
			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			
October	59	--	57	--	--	58	--	--	--	64	--	51	--	--	51	--	51	--	50	--	49	--	--	--	55	--	56	--	--	52	--	--	--			
November	51	--	46	--	--	--	44	--	--	--	41	--	--	46	46	43	41	46	47	45	--	--	--	--	43	--	--	41	--	42	--	--	--			
December	--	--	43	--	41	--	36	--	--	36	--	--	41	--	40	38	--	41	43	--	43	--	38	--	--	39	37	--	--	--	34	--	--	--		
January	--	--	--	--	35	--	--	37	--	--	--	39	41	--	38	38	36	39	--	37	36	39	--	37	36	36	--	34	36	37	43	43	39	39		
February	39	40	41	42	41	37	--	40	--	39	--	--	--	36	--	37	--	37	--	40	--	42	--	--	42	--	--	42	--	42	--	--	--	--		
March	43	--	--	--	--	42	--	37	41	--	--	42	--	--	43	--	45	46	48	45	45	46	43	46	43	46	43	45	43	42	--	41	--	--		
April	--	--	--	--	--	--	50	--	--	--	51	--	52	--	56	--	--	50	39	--	--	--	52	55	54	55	--	--	--	45	48	--	--	--		
May	42	--	51	--	50	--	56	--	--	54	51	52	55	57	61	66	85	--	59	--	--	--	70	66	--	58	--	69	--	--	59	--	--	--		
June	--	--	64	--	--	71	--	--	67	--	66	65	70	65	68	--	72	--	--	--	80	66	--	68	--	--	69	--	71	--	--	--	--	--		
July	--	80	--	--	78	--	--	74	--	--	--	--	60	--	78	--	78	--	72	--	--	--	--	73	--	--	75	--	--	74	--	--	--	--		
August	--	73	--	78	--	--	--	--	--	74	--	74	--	73	--	--	--	74	--	--	--	--	--	--	69	--	--	--	--	--	--	--	--	--		
September	--	68	--	--	75	--	75	--	--	--	76	--	--	--	58	--	--	--	--	--	--	--	66	--	--	--	--	--	--	63	--	--	--	--	--	

QUALITY OF SURFACE WATERS, 1967

PALOUSE RIVER BASIN--Continued

13-3510. PALOUSE RIVER AT HOOPER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967
(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..	9.3	C	8	T	44	C	6	1	110	C	11	3
2..	9.8	C	8	T	43	C	6	1	110	C	11	3
3..	9.8	C	8	T	42	C	6	1	108	C	11	3
4..	10	C	8	T	42	C	6	1	111	C	11	3
5..	9.8	C	8	T	41	C	6	1	139	C	11	4
6..	12	C	8	T	40	C	6	1	154	C	11	5
7..	12	C	8	T	42	C	6	1	152	C	11	5
8..	13	C	8	T	41	C	6	1	134	C	11	4
9..	13	C	8	T	40	C	6	1	129	C	11	4
10..	13	C	8	T	42	C	6	1	122	C	11	4
11..	14	C	8	T	43	C	6	1	115	C	11	3
12..	17	C	8	T	47	C	6	1	118	C	11	4
13..	20	C	8	T	48	C	6	1	130	C	11	4
14..	20	C	8	T	54	C	6	1	200	--	--	24
15..	22	C	8	T	70		10	2	765		191	395
16..	22	C	8	T	77		10	2	570		436	671
17..	24	C	8	1	79		8	2	375		228	231
18..	24	C	8	1	105		9	3	303		160	130
19..	25	C	8	1	130		8	3	250		92	62
20..	26	C	8	1	154		8	3	220		230	140
21..	26	C	8	1	122		8	3	200		70	38
22..	32	C	8	1	103	C	6	2	209		38	21
23..	34	C	8	1	99	C	6	2	286		38	29
24..	34	C	8	1	82	C	6	1	273		32	18
25..	35	C	8	1	74	C	6	1	227		--	18
26..	36	C	8	1	81	C	6	1	204		30	17
27..	36	C	8	1	99	C	6	2	200		--	15
28..	37	C	8	1	86	C	6	1	182		--	13
29..	42	C	8	1	88		10	2	176		--	12
30..	42	C	8	1	116		14	4	166		22	10
31..	49	C	8	1	--	--	--	--	184		--	13
Total	728.7	--	--	20	2174	--	--	48	6622	--	--	1912
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..	182	--	--	13	2020	440		2400	460	C	40	50
2..	200	--	--	15	1520	173		710	479	C	40	52
3..	265	--	--	19	1340	120		434	560	C	40	60
4..	273	--	--	19	1140	110		339	610	C	40	66
5..	312	28		24	1070	89		257	556	C	40	60
6..	414	50	B	56	1030	72	B	200	512	C	40	55
7..	306	27	B	22	978	56		148	483	C	40	52
8..	281	50	A	38	892	--		130	475	C	40	51
9..	262	44	B	31	814	54		119	460	C	40	50
10..	234	54	B	34	714	--		95	460	C	40	50
11..	213	62	B	36	710	47		90	495	C	40	53
12..	240	57		37	655	C	40	71	516	C	40	56
13..	270	62		45	625	C	40	68	512	C	40	55
14..	352	110	B	100	625	C	40	68	491	C	40	53
15..	467	120	B	150	630	C	40	68	512	C	40	55
16..	792	246	S	615	625	C	40	68	495	C	40	53
17..	1110	490		1470	565	39	B	59	520		40	56
18..	765	260		537	583	46		72	1240	260	J	900
19..	574	115		178	809	78	B	170	1390	332		1250
20..	841	--	--	1500	754	90	B	180	1440	292		1140
21..	2010	1870		10100	665	150	A	270	1180	168		535
22..	1530	790		3260	578	98	B	150	1050	126		357
23..	1040	238		668	560	77		116	1076	118		341
24..	738	110	B	220	520	64	B	90	1550	260		1090
25..	574	64		99	524	59	B	83	1390	187		702
26..	565	56		85	504	57	B	78	1170	110		347
27..	570	44		68	491	56		74	1020	81		223
28..	1570	673	S	4780	471	56	B	71	892	62		149
29..	3750	2400		24300	--	--		--	856	50	B	113
30..	3540	1340		12800	--	--		--	809	50		109
31..	2810	680		5160	--	--		--	853	72	B	170
Total	27050	--	--	66479	22412	--	--	6678	24486	--	--	8350

S Computed by subdividing day.

T Less than 0.50 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

J Computed from partly estimated-concentration graph and subdividing day.

PALOUSE RIVER BASIN--Continued

13-3510. PALOUSE RIVER AT HOOPER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	978	80	211	1270	102	350	315	C 34	29
2..	892	90 B	220	1030	86	239	292	C 34	27
3..	826	120 A	270	902	120 A	290	260	C 34	24
4..	870	83 B	190	826	90	201	281	C 34	26
5..	760	80 B	160	804	60	130	300	C 34	28
6..	765	76	157	782	92	194	281	C 34	26
7..	738	68 B	140	738	110 B	220	265	C 34	24
8..	680	62 B	110	680	114	209	398	--	210
9..	675	57 B	100	700	120 B	230	407	102	112
10..	670	54	98	738	106	211	330	100 B	89
11..	660	--	85	892	100	241	339	350	320
12..	670	C 41	74	2400	665 S	4720	318	453	389
13..	680	C 41	75	2790	660	4970	289	175	137
14..	685	C 41	76	2030	242	1330	372	230 A	230
15..	754	C 41	83	1590	160	687	318	145	124
16..	704	C 41	78	1350	122	445	278	160 B	120
17..	625	C 41	69	1190	102	328	240	390 A	250
18..	570	32	49	1080	100 B	290	211	140 B	80
19..	556	34	51	1010	72	196	193	120 B	63
20..	864	48 B	110	919	50 B	120	180	180 B	87
21..	1170	58 B	180	836	80 B	180	174	255	120
22..	1100	140 A	420	710	100	192	172	158	73
23..	908	118	289	650	68	119	184	110 B	53
24..	765	88	182	596	60 B	97	232	110	69
25..	660	70	125	592	74	118	202	80 B	44
26..	625	61 B	100	436	60 B	71	174	80 B	38
27..	700	60 B	110	429	44 A	51	145	65	25
28..	776	64 B	130	392	27 B	29	127	--	18
29..	908	88	142	362	30 B	29	115	42	13
30..	1090	88	259	339	32	29	103	--	13
31..	--	--	--	333	--	29	--	--	--
Total	23324	--	4343	29396	--	16545	7495	--	2863
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	100	C 47	13	10	C 17	T	2.7	--	T
2..	92	C 47	12	8.4	C 17	T	2.7	--	T
3..	86	C 47	11	7.0	C 17	T	2.9	28	T
4..	79	C 47	10	6.3	C 17	T	3.1	--	T
5..	74	C 47	9	5.9	C 17	T	3.6	--	T
6..	66	C 47	8	6.3	C 17	T	4.4	24	T
7..	58	C 47	7	6.6	C 17	T	4.9	--	T
8..	54	C 47	7	8.1	C 17	T	4.6	--	T
9..	49	C 47	6	6.3	C 17	T	5.2	--	T
10..	52	C 47	7	4.1	C 17	T	4.9	--	T
11..	51	C 47	6	4.9	80 A	1	5.2	--	T
12..	47	C 47	6	5.6	80 B	1	4.9	--	T
13..	45	C 47	6	4.6	C 33	T	5.2	--	T
14..	47	C 47	6	3.6	C 33	T	5.6	--	T
15..	40	C 47	5	4.4	C 33	T	5.2	18	T
16..	36	C 28	3	2.5	C 33	T	4.6	--	T
17..	35	C 28	3	1.9	C 33	T	3.3	--	T
18..	30	C 28	2	1.6	C 33	T	2.5	--	T
19..	31	C 28	2	1.5	C 33	T	2.3	--	T
20..	30	C 28	2	1.5	C 33	T	2.3	--	T
21..	28	C 28	2	1.5	C 33	T	2.7	--	T
22..	29	C 28	2	1.5	C 33	T	2.5	38	T
23..	27	C 28	2	1.9	C 33	T	2.1	--	T
24..	26	C 28	2	2.3	160 A	1	2.3	--	T
25..	26	C 28	2	2.1	100 B	1	2.5	--	T
26..	24	C 28	2	2.3	--	T	3.1	--	T
27..	21	C 28	2	3.1	--	T	3.8	--	T
28..	20	C 28	2	3.1	--	T	4.6	27	T
29..	17	C 28	1	3.1	--	T	5.6	--	T
30..	13	C 28	1	3.3	--	T	7.7	--	T
31..	11	C 28	1	3.3	--	T	--	--	--
Total	1344	--	150	128.6	--	12	117.0	--	8
Total discharge for year (cfs-days).....									145277.3
Total load for year (tons).....									107408

S Computed by subdividing day.

T Less than 0.50 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

SNAKE RIVER MAIN STEM

13-3530. SNAKE RIVER BELOW ICE HARBOR DAM, WASH.

LOCATION.--Lat 46°14'45", long 118°52'40", at south fishladder at Ice Harbor Dam, 1.1 mile upstream from gaging station, 10.5 miles east of Pasco, Franklin County, and at river mile 9.7.
 DRAINAGE AREA.--108,500 square miles, approximately, upstream from gaging station.
 RECORDS AVAILABLE.--Chemical analyses: July 1960 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Col-pH or
													Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 12, 1966..	24400	16	29	13	35	3.8	156	0	49	17	0.5	1.3	242	0.33	15940	126	0	394	8.0	5
Nov. 1.....	28100	19	33	16	36	3.8	176	0	58	17	0.5	1.0	274	0.37	20560	148	4	437	7.9	10
Nov. 15.....	26600	17	30	13	35	4.0	162	0	48	17	0.4	0.9	245	0.33	17870	128	0	406	8.0	5
Dec. 8.....	32500	20	29	12	29	3.3	150	0	40	13	0.3	1.5	222	0.30	19480	122	0	369	7.9	10
Dec. 29.....	25300	22	26	11	24	2.8	129	0	34	12	0.2	2.5	A 198	0.27	13530	109	4	328	8.0	10
Jan. 9, 1967...	32600	24	31	12	28	3.5	153	0	42	14	0.2	2.8	238	0.32	20950	127	2	385	8.0	10
Feb. 25.....	30600	23	24	9.6	21	2.7	118	0	29	11	0.4	2.3	185	0.25	15280	100	3	287	7.9	10
Mar. 30.....	44800	25	21	6.6	16	2.3	98	0	24	8.5	0.4	1.8	155	0.21	18790	80	0	241	7.6	10
Mar. 30.....	45500	25	18	6.3	14	2.3	80	0	20	7.0	0.3	1.7	136	0.16	17230	71	0	223	7.5	5
May 20.....	18500	12	6.3	1.8	4.3	1.3	31	0	5.8	2.0	0.2	0.3	56	0.07	27260	23	0	269	7.2	5
June 17.....	139000	11	6.5	2.4	4.4	1.9	34	0	5.6	2.0	0.2	0.3	A 100	0.08	21020	26	0	72	7.5	5
July 21.....	35000	12	14	4.9	11	2.5	71	0	15	5.2	0.3	0.0	A 100	0.14	9450	55	0	163	7.8	5
Aug. 18.....	21300	13	18	6.8	16	2.8	94	0	20	7.8	0.4	0.5	134	0.18	7710	73	0	216	8.0	5
Sept. 21.....	22400	13	25	9.7	25	3.4	128	0	34	12	0.5	0.3	196	0.27	6230	103	0	315	8.1	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Feb. 25, 1967.	13.3	230	0.01	0.10	0.01		June 17, 1967.	10.8	2400				
Mar. 30.....	11.4	91					July 21.....	9.0					
Apr. 20.....	11.8	230					Aug. 18.....	10.6	0				
May 25.....	11.9	2400					Sept. 21.....	10.3	36				

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN
IN WYOMING

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Discharge (cfs)	Silica (SiO ₂) (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Boron (B)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃ Calcium magnesium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Col- or pH
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FLAT CREEK BASIN

13-0180. FLAT CREEK NEAR JACKSON, WYO. (Lat 42°23', long 110°37')

Oct. 31, 1966	66	10	0.10	69	1.5	3.3	0.9	200	0	13	6.4	0.2	0.2	0.02	216	178	14	0.1	354	7.8
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IN IDAHO

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃) (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Boron (B)	Parts per million	Tons per acre-foot	Tons per day	Hardness as CaCO ₃ Calcium magnesium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
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PORTRAIT RIVER BASIN

13-0739.5. BIRCH CREEK ABOVE DIVERSION, NEAR DOWNEY, IDAHO (Lat 42°21'00", long 112°16'30")

Aug. 7, 1967.....	A	6.0	6.4	0.00	42	20	4.0	224	0	6.2	4.4	0.7	200	0.27	3.24	188	4	0.1	348	7.7
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RAFT RIVER BASIN

13-0790. CLEAR CREEK NEAR NAF, IDAHO (Lat 41°58'00", long 113°17'05")

May 31, 1967.....	63	8.0	0.42	11	2.9	8.9	1.4	38	0	6.8	15	0.2	1.5	0.02	71	0.10	12.1	40	8	0.6	125	7.4
July 25.....	19	9.0	.10	17	4.5	1.6	1.4	68	0	9.2	24	2.7	.02	120	.16	6.16	61	6	0.9	208	7.8	

13-0792, CASSIA CREEK NEAR ELBA, IDAHO (Lat 43°17', long 113°31',

13-0792. CASSIA CREEK NEAR ELBA, IDAHO (Lat 42°17', long 113°31')

Nov. 8, 1966.....	5.9	29	43	12	25	5.0	188	0	16	30	0.5	1.4	0.00	252	0.34	4.01	157	3	0.9	420	7.5
June 2, 1967.....	110	17	21	5.0	9.6	2.3	90	0	5.2	10	3.1	0.4	112	0.15	33.3	73	0	0.5	184	7.6	
July 27, 1967.....	13	30	40	9.6	19	4.3	178	0	8.8	20	4.1	0.7	215	0.29	7.55	140	0	0.7	361	8.0	

13-0796. SUBLET CREEK AT SUBLET CAMPGROUND. NEAR SUBLET. IDAHO (Lat 42°19'36", Long 113°00'13")

13-0796. SUBLETT CREEK AT SUBLETT CAMPGROUND, NEAR SUBLETT, IDAHO (Lat 42°19'36", long 113°00'13")

May 30, 1967.....	18	0.01	53	26	20	2.1	276	0	16	28	0.3	0.6	0.06	282	0.38	239	13	0.6	523	8.0
July 21, 1967.....	15	0.04	47	26	16	1.7	258	0	14	26	0.2	0.8	0.04	273	0.37	224	13	0.5	495	8.2

ROCK CREEK BASIN

13-0927. ROCK CREEK AT TWIN FALLS, IDAHO (Lat 42°32'57", long 114°28'27")

Aug. 20, 1967.....	43	82	29	51	5.8	306	0	126	35	1.0	5.7	0.38	530	0.72	324	73	1.2	802	8.2
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A Estimated.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN—Continued
IN IDAHO—Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967—Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (microhm-cm at 25°C)				
												Parts per million	Tons per acre-foot	Calcium, Magnesium, Sodium	Non-carbonate						
SALMON FALLS CREEK BASIN																					
13-0935. CEDAR DRAW NEAR FILER, IDAHO (Lat 42°37'25", long 114°39'05")																					
Aug. 17, 1967....	45	38	74	31	63	5.5	326	0	117	42	1.1	9.4	0.19	555	0.75	67.4	312	45	1.0	824	8.2
13-0950. DEEP CREEK NEAR BUHL, IDAHO (Lat 42°37'05", long 114°50'40")																					
Aug. 17, 1967....	A 40	33	75.	26	46	5.3	305	0	90	36	1.0	7.3	0.12	482	0.66	52.1	294	44	1.2	733	8.0
MUD LAKE-LOST RIVER BASINS																					
13-1190. LITTLE LOST RIVER NEAR HOWE, IDAHO (Lat 43°53', long 113°06')																					
Sept. 28, 1967...	72	13	42	16	8.5	1.1	194	0	18	10	0.1	0.8	0.04	202	0.27	39.2	171	12	0.3	352	8.0
13-1210. BIG LOST RIVER BELOW CHILLY CANAL, NEAR CHILLY, IDAHO (Lat 44°02'45", long 113°55'07")																					
Sept. 20, 1967...	112	11	27	5.5	3.8	0.8	101	0	12	2.0	0.2	0.1	0.00	116	0.16	35.1	90	7	0.2	190	7.9
13-1220 THOUSAND SPRINGS CREEK NEAR CHILLY, IDAHO (Lat 44°04'00", long 113°50'15")																					
Aug. 9, 1967....	32	13	58	20	5.8	1.3	266	0	15	1.0	0.6	0.6	0.00	250	0.34	21.6	227	9	0.2	424	7.9
13-1270. BIG LOST RIVER BELOW MACKAY RESERVOIR, NEAR MACKAY, IDAHO (Lat 43°56'20", long 113°38'50")																					
July 17, 1967....	1100	9.9	28	7.2	3.7	1.2	114	0	11	3.0	0.3	0.2	0.04	121	0.16	359	100	6	0.2	212	7.8
Sept. 21, 1967....	513	12	39	10	5.2	1.3	160	0	16	4.0	0.2	0.5	0.08	163	0.22	226	138	8	0.2	283	8.0
13-1308. BIG LOST RIVER BELOW BLAINE CANAL, NEAR LESLIE, IDAHO (Lat 43°15', long 113°25')																					
Sept. 19, 1967...	282	13	43	10	5.6	1.5	172	0	16	4.0	0.3	0.9	0.06	181	0.25	138	148	8	0.2	302	8.0
13-1310. ANTELOPE CREEK BELOW CHERRY CREEK, NEAR DARLINGTON, IDAHO (Lat 43°44'01", long 113°26'45")																					
Sept. 18, 1967...	39	15	32	7.1	5.3	1.2	123	0	17	2.0	0.3	0.2	0.06	144	0.20	15.2	109	8	0.2	233	8.2
13-1315. PASS CREEK NEAR LESLIE, IDAHO (Lat 43°56'00", long 113°26'45")																					
Sept. 22, 1967...	8.1	12	50	6.2	5.6	0.6	180	0	9.2	3.0	0.2	0.4	0.04	173	0.24	3.78	150	3	0.2	294	8.1
BIG WOOD RIVER BASIN																					
13-1410. BIG WOOD RIVER NEAR BELLEVUE, IDAHO (Lat 43°19'40", long 114°20'25")																					
Aug. 21, 1967....	114	18	57	10	5.0	1.6	210	3	14	1.5	0.4	0.3	0.04	224	0.30	68.9	183	6	0.2	362	8.3
BRUNEAU RIVER BASIN																					
13-1695. WICKAHONEY CREEK NEAR BRUNEAU, IDAHO (Lat 42°47'06", long 115°59'00")																					
Jan. 31, 1967....	0.15	33	11	3.1	12	4.4	58	0	11	5.5	0.6	3.2	0.02	132	0.17	0.05	40	0	0.8	142	7.4
June 22, 1967....	2.7	36	13	2.5	12	6.2	77	0	7.2	3.5	0.7	0.5	0.12	122	0.17	.89	43	0	152	7.5	

A Estimated.

PAYETTE RIVER BASIN																						
13-2510. PAYETTE RIVER NEAR PAYETTE, IDAHO (Lat 44°02'30", long 116°55'30")																						
Oct. 24, 1966....	1970	15	0.25	13	2.8	16	1.0	80	0	8.2	2.0	0.5	0.8	0.08	99	0.13	527	44	0	1.1	155	7.2
May 26, 1967....	7450	13	6.3	1.1	5.2	1.2	34	0	3.0	0	0	0	.6	0.4	47	.06	945	20	0	.5	67	7.2
July 27.....	1670	17	15	3.2	18	1.7	92	0	10	3.5	.5	.9	.8	116	.16	523	50	0	1.1	181	7.6	
Aug. 23.....	1650	18	15	3.4	20	2.2	99	0	11	4.0	.5	.8	.3	126	.17		52	0	1.2	190	7.6	

WEISER RIVER BASIN																				
13-2674, WEISER RIVER AT WEISER, IDAHO (Lat 44°14'35", Long 116°57'26")																				
May 22, 1967.....	24	6.3	2.5	3.3	1.4	39	0	1.0	0.0	0.1	0.8	0.04	62	0.08	561	26	0	0.3	69	7.1
July 27.....	26	23	8.8	25	4.9	144	5	22	5.0	4.3	1.3	190	0.26			94	0	1.1	296	8.6
Aug. 21.....	26	12	5.2	8.2	3.8	75	0	6.2	1.0	0.3	2.2	0.06	96	0.13		52	0	0.5	139	7.9

SALMON CREEK BASIN																					
13-3020. PAHSIMEROI RIVER NEAR MAY, IDAHO (Lat 44°41'31", long 114°02'52")																					
June 3, 1967.....	18	0.11	45	16	13	2.4	210	0	24	10	0.4	1.2	0.02	224	0.30		178	6	0.4	391	8.2
July 12.....	21	47	17	13	2.2	204	8	22	9.0	0.3	0.4	0.06	241	0.33		188	7	0.4	399	8.5	
Sept. 25.....	22	50	17	14	2.1	226	0	24	10	0.2	1.2	0.10	246	0.33		195	10	0.4	411	7.9	

13-3053. LEWIS RIVER NEAR SALMON, IDAHO (lat 45°07'47", long 113°47'47")																				
June 1, 1967.....	18	28	9.3	18	3.1	130	0	32	7.0	0.4	0.8	0.06	183	0.25		108	2	0.7	288	7.6
July 13.....	22	44	15	26	3.4	210	0	43	10	0.4	0.2	0.10	271	0.37		172	0	0.9	438	8.1
Sept. 25.....	28	64	22	45	4.8	298	0	77	17	0.3	0.7	0.14	402	0.55		250	6	1.2	627	8.2

IN UTAH

RAFT RIVER BASIN																						
13-0777. GEORGE CREEK NEAR YOST, UTAH (Lat 41°55'10", long 113°28'50")																						
Nov. 6, 1966.....	2.2	12	0.11	34	9.1	23	1.8	150	0	14	26	0.2	0.2	0.07	191	0.26	1.13	122	0	0.9	336	7.8
June 1, 1967.....	37	7.9	.65	11	2.8	6.8	1.2	40	0	6.8	10	0.2	2.1	0.00	63	0.09	6.29	39	6	.5	113	7.4
July 26.....	8.9	8.7	--	17	4.0	9.9	1.1	69	0	6.4	12	0.1	1.1	0.05	88	0.12	2.11	59	2	.6	161	7.4

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

DEADMAN CREEK BASIN

13-3436.8. DEADMAN CREEK NEAR CENTRAL FERRY, WASH.

Monthly and annual summary of suspended-sediment discharge,
water year October 1966 to September 1967

Month	Suspended sediment (tons)	
October 1966.....	A	1
November.....	E	40
December.....	A	140
January 1967.....	E	2,100
February.....	E	30
March.....	E	370
April.....	E	20
May.....	E	10
June.....	A	1
July.....	T	--
August.....	T	--
September.....	T	--
Total for year.....	E	2,700

E Estimated.

A Partly estimated.

T Less than 0.50 ton.

Drainage area 135 square miles.

Discharge weighted mean concentration for year (ppm), 1,000 (estimated).

Sediment yield (tons/square mile), 20.

Maximum daily load, 900 tons (estimated) Jan. 26.

Minimum daily load, less than 0.50 ton on many days.

Maximum daily concentration not determined.

Maximum observed concentration, 3,180 ppm Dec. 13.

Minimum observed concentration, 4 ppm Apr. 4, Sept. 6.

Estimated runoff, 2,000 acre-feet.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

DEADMAN CREEK BASIN--Continued

13-3436.8. DEADMAN CREEK NEAR CENTRAL FERRY, WASH.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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. 11, 1966.....	1430	50		1.1	8	T												
Nov. 14.....	1400	45		2.2	7	T												
Dec. 13.....	1430	46		27	1620	118												
Dec. 13.....	2010	43		16	3180	137												
Dec. 14.....	1010	39		5.4	2220	32												
Dec. 15.....	0835	34		4.3	103	1												
Jan. 18, 1967.....	1600	38		2.8	58	T												
Feb. 21.....	1230	45		5.9	64	1												
Mar. 23.....	1550	51		5.9	82	1												
Apr. 24.....	1505	63		3.2	4	T												
June 2.....	0830	64		2.0	6	T												
June 28.....	1500	86		.2	12	T												
Sept. 6.....	1310	81		.2	4	T												

T Less than 0.50 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

DEADMAN CREEK BASIN--Continued

13-3438. MEADOW CREEK NEAR CENTRAL FERRY, WASH.

Monthly and yearly summary of water and suspended-sediment
discharge, water year October 1966 to September 1967

Month	Total discharge (cfs)	Total suspended sediment (tons)	
October 1966.....	56.2	E	1
November.....	71.8	E	30
December.....	80.0	A	270
January 1967.....	118.5	E	1,600
February.....	84.2	A	7
March.....	82.3	E	250
April.....	79.1	E	7
May.....	64.2	E	6
June.....	37.00	T	--
July.....	18.50	T	--
August.....	14.30	T	--
September.....	12.50	T	--
Total for year.....	718.60	E	2,200

E Estimated.

A Partly estimated.

T Less than 0.50 ton.

Drainage area 66.2 square miles.

Discharge weighted mean concentration for year (ppm), 1,100.

Sediment yield (tons/square mile), 33.

Maximum daily load, 800 tons (estimated) Jan. 26.

Minimum daily load, less than 0.50 ton on many days.

Maximum daily concentration not determined.

Maximum observed concentration, 10,800 ppm Dec. 13.

Minimum observed concentration, 2 ppm June 28.

Runoff, 1,420 acre-feet.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

DEADMAN CREEK BASIN--Continued

13-3438. MEADOW CREEK NEAR CENTRAL FERRY, WASH.--Continued

Periodic determinations of suspended-sediment discharge and particle-size, water year October 1966 to September 1967

(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis	
							Percent finer than size indicated, in millimeters											
							0.002	0.004		68	96	100	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Oct. 11, 1966.....	1545	48		1.7	4	T												PWC
Nov. 14.....	1555	45		2.3	4	T												
Nov. 30.....	1210	39		2.3	16	T												
Dec. 13.....	1450	48		20.3	8330	450												
Dec. 13.....	2020	44			10800	262												
Dec. 14.....	1030	39		4.1	3880	44												
Dec. 15.....	0820	34		2.3	966	7												
Jan. 18, 1967.....	1645	39		2.1	1080	7												
Feb. 21.....	1135	40		2.8	24	T												
Mar. 23.....	1400	53		2.3	318	2												
Apr. 24.....	1455	64		2.2	16	T												
June 2.....	1100	68		1.8	6	T												
June 26.....	1315	87		.6	2	T												
Aug. 2.....	1330	76		.6	4	T												
Sept. 6.....	1255	76		.2	14	T												

T Less than 0.50 ton.

PART 14. PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

WALLA WALLA RIVER BASIN

14-0136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.

LOCATION --lat 46°04'55", long 118°11'25", at county road bridge 2 miles downstream from Blue Creek, 6.0 miles downstream from gaging station near Walla Walla, and 5.5 miles east of Walla Walla, Walla Walla County.

DRAINAGE AREA --91 square miles, approximately.

RECORDS AVAILABLE --Water temperatures: October 1962 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67 --Water temperatures: Maximum, 80°F Aug. 17; minimum, 34°F Mar. 11.

Sediment concentrations: Maximum daily, 1,340 ppm Jan. 28; minimum daily, 2 ppm on several days during October.

Sediment loads: Maximum daily, 2,460 tons Jan. 28; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1966-67 --Water temperatures: Maximum, 80°F Aug. 17; minimum, 34°F Mar. 11. Sediment concentrations: Maximum daily, 1,340 ppm Jan. 28; minimum daily, 2 ppm on many days during October.

Sediment loads: Maximum daily, 2,460 tons Jan. 28; minimum daily, less than 0.50 ton on many days during October.

Sediment concentrations: Maximum daily, 1,340 ppm Jan. 28; minimum daily, 2 ppm on many days during October.

Sediment loads: Maximum daily, 2,460 tons Jan. 28; minimum daily, less than 0.50 ton on many days during October.

REMARKS --Maximum observed during water year: Sediment concentration, 2,550 ppm Jan. 28. Records of discharge given are the combined discharge of Blue Creek near Walla Walla and Mill Creek near Walla Walla. No appreciable inflow between gaging stations and sampling point except during periods of high flows.

Temperature (°F) of water, water year October 1966 to September 1967

		Temperature (°F) at various places, 1880 to September, 1887																															Average
		Day																															
Month		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	51	51	51	51	51	51	55	55	55	52	53	54	54	48	46	46	51	48	49	48	49	48	48	56	54	48	48	44	52	44	52	44
November.....	49	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
December.....	45	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
January.....	40	38	42	38	38	38	38	40	40	40	39	42	40	43	44	44	40	39	38	43	41	40	39	38	38	38	40	43	40	43	45	43	40
February.....	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
March.....	42	40	42	35	37	39	38	40	40	39	36	38	40	40	40	40	40	43	42	39	43	42	45	45	40	42	42	40	41	37	39	40	40
April.....	42	47	42	43	44	43	46	53	45	44	43	42	44	41	42	43	41	45	42	41	41	43	46	42	44	42	43	46	43	43	43	43	43
May.....	39	42	45	44	45	48	51	47	47	43	43	42	45	46	46	48	49	46	47	50	47	45	45	45	45	45	45	45	45	45	45	45	45
June.....	50	57	57	57	57	57	57	57	57	57	52	52	53	53	53	56	60	60	60	60	60	57	62	62	62	62	62	62	62	62	62	62	62
July.....	72	73	68	68	68	68	68	61	61	58	58	64	64	62	62	62	62	60	60	63	63	64	63	63	63	63	63	63	63	63	63	63	63
August.....	74	76	76	76	76	76	76	77	77	77	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
September.....	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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)	Water tem- per- ature point (°F)	Sum- pling per- son point	Discharge (cfs)	Sediment concen- tration (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	0.063	0.125	0.250	0.500	1.000	2.000	
Jan. 28, 1967.....	2145	44		765	774	1600	7	11	19	31	46	79	88	94	98	99	VPWC	

WALLA WALLA RIVER BASIN--Continued

14-0136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

Day	OCTOBER			NOVEMBER			DECEMBER		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1..	27	C 2	T	29	C 4	T	70	26 A	5
2..	38	C 2	T	28	C 4	T	82	16	4
3..	28	C 2	T	28	C 4	T	101	18	5
4..	28	C 2	T	29	C 4	T	108	12	3
5..	28	C 2	T	33	C 4	T	105	13	4
6..	28	C 2	T	34	C 4	T	93	C 8	2
7..	28	C 2	T	32	C 4	T	88	C 8	2
8..	28	C 2	T	30	C 4	T	76	C 8	2
9..	28	C 2	T	29	C 4	T	64	C 8	1
10..	28	C 2	T	29	C 4	T	59	C 8	1
11..	28	C 2	T	30	C 4	T	60	C 8	1
12..	29	C 2	T	51	20 A	3	89	20	5
13..	31	C 2	T	44	6	1	405	768 A	840
14..	29	C 2	T	43	4	7	376	90 A	91
15..	29	C 2	T	67	36	7	233	23	14
16..	29	C 2	T	141	81 S	35	167	12	5
17..	29	C 2	T	95	16	4	136	C 4	1
18..	29	C 2	T	64	7	1	112	C 4	1
19..	29	C 2	T	50	5	1	99	C 4	1
20..	36	C 10	1	61	20 A	3	97	C 4	1
21..	33	C 10	1	57	C 6	1	91	C 4	1
22..	56	C 10	2	53	C 6	1	81	C 4	1
23..	43	C 10	1	44	C 6	1	76	C 4	1
24..	34	C 4	T	42	C 6	1	72	C 4	1
25..	30	C 4	T	46	18 A	2	67	C 4	1
26..	30	C 4	T	95	15	4	62	C 4	1
27..	33	C 4	T	82	C 8	2	58	C 4	1
28..	30	C 4	T	76	C 8	1	56	C 4	1
29..	28	C 4	T	64	C 8	1	62	C 4	1
30..	32	C 4	T	54	C 8	1	57	C 4	1
31..	30	C 4	T	--	--	--	55	C 4	1
Total	966	--	11	1560	--	75	3357	--	1000
Day	JANUARY			FEBRUARY			MARCH		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1..	68	C 5	1	228	C 15	9	91	C 6	1
2..	67	C 5	1	180	C 15	7	97	C 6	2
3..	72	C 5	1	153	C 15	6	90	C 6	1
4..	81	C 5	1	137	C 15	6	87	C 6	1
5..	94	C 5	1	125	C 6	2	88	C 6	1
6..	92	C 5	1	114	C 6	2	93	C 6	2
7..	84	C 5	1	106	C 6	2	93	C 6	2
8..	76	C 5	1	99	C 6	2	94	C 6	2
9..	76	C 5	1	93	C 6	2	107	C 11	3
10..	78	C 5	1	87	C 6	1	106	C 11	3
11..	108	12	3	84	C 6	1	105	C 11	3
12..	139	25	9	78	C 6	1	102	C 11	3
13..	198	18	10	83	C 6	1	104	C 11	3
14..	265	44	31	77	C 6	1	100	C 11	3
15..	386	69	72	75	C 6	1	98	C 11	3
16..	353	30	29	73	C 6	1	138	46	17
17..	250	22	15	83	C 6	1	229	82 A	51
18..	198	8	4	102	C 6	2	243	50	33
19..	184	10	5	104	C 6	2	214	21	12
20..	332	74	66	100	C 6	2	193	23	12
21..	348	34	32	98	C 6	2	168	17	8
22..	261	15	11	96	C 6	2	160	34	15
23..	209	14	8	94	C 6	2	168	18	8
24..	175	15	7	93	C 6	2	161	10	4
25..	152	18	7	95	C 6	2	142	8	3
26..	156	239 S	107	92	C 6	1	124	6	2
27..	321	794	688	88	C 6	1	108	6	2
28..	679	1340	2480	87	C 6	1	104	10	3
29..	682	500	921	--	--	--	105	26	7
30..	476	104	134	--	--	--	103	42 A	12
31..	308	32	27	--	--	--	107	16	5
Total	6968	--	4656	2924	--	65	3922	--	227

S Computed by subdividing day.

T Less than 0.50 ton.

A Computed by partly-estimated concentration graph.

C Composite period.

WALLA WALLA RIVER BASIN--Continued

14-0136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	110	13	4	138	12	4	81	C	7	2
2..	109	7	2	133	10	4	80	C	7	2
3..	110	8	2	133	16	6	78	C	7	1
4..	118	13	4	136	18	7	73	C	7	1
5..	126	15	5	160	30	13	70	C	7	1
6..	124	12	4	160	22	10	70	C	7	1
7..	117	10	3	182	35	17	69	C	7	1
8..	116	12	4	196	52	28	67	C	7	1
9..	112	7	2	199	93	50	63	C	7	1
10..	109	14	4	173	35	16	62	C	7	1
11..	108	6	2	150	38	15	60	C	7	1
12..	102	6	2	221	372	222	60	C	7	1
13..	109	17	5	287	176	136	58	C	7	1
14..	107	11	3	290	58	45	54	C	7	1
15..	100	8	2	257	51	35	52	C	7	1
16..	95	6	2	250	46	31	51	C	7	1
17..	90	6	1	269	47	34	51	C	7	1
18..	98	180 A	48	245	43	28	48	C	7	1
19..	106	872	250	210	27	15	47	C	7	1
20..	154	172	72	202	30 B	16	45	C	7	1
21..	152	118 A	48	203	34	19	50	C	7	1
22..	181	130 A	64	198	24 B	13	48	C	7	1
23..	212	144 A	82	173	18	8	45	C	7	1
24..	229	54	33	146	15	6	41	C	7	1
25..	224	42	25	125	16	5	39	C	7	1
26..	207	27	15	112	C	10	38	C	7	1
27..	194	22	12	105	C	10	36	C	7	1
28..	167	19	9	108	C	10	34	C	7	1
29..	159	14	6	101	C	10	33	C	7	1
30..	145	12	5	90	C	10	33	C	7	1
31..	--	--	--	82	C	10	--	--	--	--
Total	4090	--	720	5434	--	799	1636	--	--	32
	JULY			AUGUST			SEPTEMBER			
1..	32	C	5	23	C	5	25	C	5	
2..	31	C	5	22	C	5	26	C	5	
3..	31	C	5	22	C	5	28	C	5	
4..	29	C	5	22	C	5	28	C	5	
5..	29	C	5	22	C	5	28	C	5	
6..	28	C	5	24	C	5	29	C	5	
7..	29	C	5	24	C	5	29	C	5	
8..	29	C	5	24	C	5	29	C	5	
9..	28	C	5	24	C	5	28	C	5	
10..	28	C	5	23	C	5	29	C	5	
11..	28	C	5	23	C	5	36	C	5	
12..	27	C	5	23	C	5	32	C	5	
13..	26	C	5	24	C	5	29	C	5	
14..	26	C	5	24	C	5	28	C	5	
15..	25	C	5	24	C	5	28	C	5	
16..	26	C	5	24	C	5	28	C	5	
17..	26	C	5	23	C	5	28	C	5	
18..	25	C	5	24	C	5	28	C	5	
19..	25	C	5	24	C	5	28	C	5	
20..	25	C	5	24	C	5	27	C	5	
21..	25	C	5							
22..	24	C	5	24	C	5	27	C	5	
23..	24	C	5	25	C	5	27	C	5	
24..	24	C	5	25	C	5	27	C	5	
25..	24	C	5	25	C	5	27	C	5	
26..	23	C	5	25	C	5	27	C	5	
27..	24	C	5	26	C	5	27	C	5	
28..	24	C	5	26	C	5	27	C	5	
29..	24	C	5	26	C	5	27	C	5	
30..	24	C	5	26	C	5	28	C	5	
31..	24	C	5	26	C	5	--	--	--	
Total	817	--	11	746	--	10	842	--	--	11
Total discharge for year (cfs-days).....										33262
Total load for year (tons).....										7617

A Computed by partly-estimated concentration graph.

B Computed from estimated concentration graph.

C Composite period.

WALLA WALLA RIVER BASIN--Continued

14-0185. WALLA WALLA RIVER NEAR TOUCHET, WASH.

LOCATION.--Lat 46°02'15", long 118°45'55", at county road bridge, 0.9 mile downstream from Warm Springs Canyon, 2.5 miles downstream from gaging station, and 3.7 miles west of Touchet, Walla Walla County.

DRAWING.--None.

RECORDS AVAILABLE.--Records: July 1959 to September 1967.

Water temperatures: July 1959 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 84°F July 12; minimum, 37°F Dec. 9, Jan. 23, 24.

Sediment concentrations: Maximum daily, 4,760 ppm Jan. 28; minimum daily, 6 ppm on several days during November.

Sediment loads: Maximum daily, 44,900 tons Jan. 29; minimum daily, less than 0.50 ton on several days during October, August, and September.

EXTREMES, 1958-67.--Water temperatures: Maximum (1958-65), 94°F Aug. 5, 1961; minimum (1958-61, 1962-67), freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 3,800 ppm Jan. 23, 1963; minimum daily, 6 ppm during November 1963.

Sediment loads: Maximum daily, 323,000 tons Jan. 23, 1964; minimum daily, less than 0.50 ton on many days.

REMARKS.--No appreciable inflow between gaging station and sampling point.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (microhmhos at 25°C)	Color	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 11, 1966.	33	15		54	19	46	7.2	271	0	52	28	0.3	1.4		356	0.48	31.7	212	0	0	575	8.2	5
Nov. 9.	56	30		38	14	31	5.2	198	0	34	18	.5	1.1		269	.37	40.7	152	0	269	425	7.7	10
Dec. 8.	399	33		16	5.7	11	3.4	88	0	8.2	6.2	.2	2.6		132	.18	142	64	0	186	7.5	10	10
Dec. 29.	396	33		18	6.8	12	3.2	96	0	8.0	8.0	.1	3.6		147	.20	157	73	0	209	7.9	5	5
Jan. 10, 1967.	460	33		14	7.1	11	2.9	86	0	10.2	6.0	.2	2.7		133	.18	165	64	0	182	7.6	15	15
Feb. 23.	612	35		15	5.2	8.5	2.8	76	0	7.6	6.0	.2	2.5		122	.17	202	57	0	136	7.3	13	13
Mar. 30.	640	31		13	5.2	9.4	3.9	72	0	7.4	6.0	.2	2.7		122	.17	211	54	0	155	7.3	25	25
Apr. 20.	584	31		15	5.5	9.9	3.2	80	0	8.6	5.5	.2	1.5		122	.17	192	60	0	166	7.6	15	15
May 26.	572	30		12	4.4	8.7	3.0	66	0	6.8	5.0	.2	2.4		103	.14	159	48	0	143	7.6	5	5
June 17.	80	25		28	10	25	4.2	144	0	24	19	.2	.3		A	.28	44.7	113	0	207	7.8	10	10
July 21.	17	35		59	23	58	9.0	290	0	77	44	.3	.1		A	.61	20.6	243	5	338	7.8	10	10
Aug. 18.	8.7	38		47	29	70	9.9	238	0	120	55	.4	2.9	0.09	493	.57	11.6	238	42	767	7.4	10	10
Sept. 21.	4.6	35		53	18	44	18	222	0	66	40	.3	3.0		396	.84	4.92	206	24	618	7.3	40	40

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Feb. 25, 1967.	11.9	430					June 17, 1967.	8.5	930				
Mar. 30.	11.5	11000					July 21.	8.9	91				
Apr. 20.	10.8	210					Aug. 18.	8.8	91	0.00	0.00	0.00	
May 26.	9.5	11000					Sept. 21.	7.5	230				

WALLA WALLA RIVER BASIN--Continued

14-0185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

Day	OCTOBER				NOVEMBER				DECEMBER			
	Suspended sediment			Mean dis- charge (cfs)	Suspended sediment			Mean dis- charge (cfs)	Suspended sediment			
	Mean con- cen- tra- tion (ppm)	Tons per day			Mean con- cen- tra- tion (ppm)	Tons per day			Mean con- cen- tra- tion (ppm)	Tons per day		
1..	11	C 14	T	43	C 6	1		223	32	19		
2..	12	C 14	T	41	C 6	1		284	37	28		
3..	17	C 14	1	41	C 6	1		335	43	39		
4..	22	C 14	1	40	C 6	1		399	82	88		
5..	26	C 14	1	41	C 6	1		508	114	156		
6..	26	C 14	1	44	C 6	1		460	59	73		
7..	26	C 14	1	54	C 8	1		452	78	95		
8..	26	C 14	1	61	C 8	1		399	45	48		
9..	26	C 14	1	56	C 8	1		364	28	28		
10..	28	C 14	1	54	C 8	1		344	23	21		
11..	33	C 14	1	60	C 8	1		338	24	22		
12..	36	C 14	1	74	--	E 2		347	22	21		
13..	37	C 14	1	100	--	E 4		870	950	A 2200		
14..	37	C 14	1	121	17	6		1940	1820	9530		
15..	44	C 14	2	136	21	8		1330	520	1870		
16..	40	C 9	1	198	43	23		948	250	640		
17..	38	C 9	1	432	149	174		760	170	349		
18..	28	C 9	1	287	76	59		620	123	206		
19..	24	C 9	1	205	46	25		552	98	146		
20..	15	C 9	T	200	33	18		528	87	124		
21..	14	C 9	T	217	39	23		556	85	128		
22..	29	C 9	1	200	26	B 14		532	72	103		
23..	39	C 9	1	174	21	10		492	102	135		
24..	55	C 9	1	157	17	7		488	72	95		
25..	48	C 9	1	179	35	B 17		460	49	61		
26..	42	C 9	1	200	64	A 35		432	C 54	63		
27..	40	C 9	1	323	110	A 96		416	C 54	61		
28..	43	C 9	1	264	83	59		392	C 54	57		
29..	48	C 9	1	244	51	34		396	C 54	58		
30..	46	C 9	1	239	38	25		399	C 54	58		
31..	41	C 9	1	--	--	--		392	C 54	57		
Total	997	--	30	4485	--	650		16956	--	16579		
Day	JANUARY				FEBRUARY				MARCH			
				Mean dis- charge (cfs)				Mean dis- charge (cfs)				
	Mean con- cen- tra- tion (ppm)	Tons per day			Mean con- cen- tra- tion (ppm)	Tons per day			Mean con- cen- tra- tion (ppm)	Tons per day		
1..	385	C 64	67	1680	820	3720		572	150	A 230		
2..	416	C 64	72	1380	510	1900		580	111	174		
3..	416	C 64	72	1160	430	1350		576	98	152		
4..	452	C 64	78	1040	310	870		540	75	109		
5..	500	C 64	86	948	270	691		524	63	89		
6..	540	C 64	93	876	202	478		520	64	90		
7..	524	C 64	91	815	212	466		508	67	92		
8..	492	C 64	85	765	177	366		496	120	161		
9..	472	C 64	82	715	147	284		500	84	113		
10..	460	C 64	79	665	176	316		560	88	133		
11..	484	C 64	84	630	126	214		564	92	140		
12..	576	105	163	612	109	180		564	61	93		
13..	725	275	538	588	108	171		540	47	69		
14..	930	420	1050	588	104	165		532	57	82		
15..	1320	726	2590	572	84	130		516	63	88		
16..	1630	845	3720	564	81	123		520	51	72		
17..	1360	395	1450	560	95	144		1210	1350	S 4990		
18..	1060	225	644	675	320	A 580		1340	1060	3840		
19..	936	185	468	720	320	622		1320	710	2530		
20..	1260	675	S 2800	655	115	203		1120	360	1090		
21..	1750	970	4580	630	99	168		990	265	708		
22..	1550	500	2090	625	91	154		882	287	683		
23..	1260	255	868	616	90	150		972	275	722		
24..	1070	155	448	616	90	150		960	205	531		
25..	936	130	329	612	93	154		865	155	362		
26..	860	125	290	604	76	124		775	125	262		
27..	1210	2030	S 7620	576	77	120		680	100	184		
28..	2740	4760	35200	564	78	119		592	93	149		
29..	3940	4220	44900	--	--	--		710	390	A 750		
30..	3240	2330	20400	--	--	--		640	510	881		
31..	2230	1400	8430	--	--	--		608	425	698		
Total	35724	--	139667	21051	--	14112		22276	--	20267		

E Estimated.

S Computed by subdividing day.

T Less than 0.50 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated concentration graph.

C Composite period.

WALLA WALLA RIVER BASIN--Continued

14-0185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1..	600	195	316	775	120	251	305	28	23
2..	612	130	215	725	112	219	276	47	35
3..	612	117	193	705	140	266	210	1300	737
4..	588	108	171	685	111	205	205	470	260
5..	620	110	184	765	170	351	181	99	48
6..	640	117	202	785	187	396	161	60	26
7..	584	97	153	815	190	418	149	60	24
8..	572	94	145	954	273	703	141	70	27
9..	552	62	92	1040	310	870	128	32	11
10..	536	48	69	1060	220	630	120	32	10
11..	540	38	55	966	129	336	105	32	9
12..	520	57	80	1190	1100 A	3500	105	32	9
13..	500	47	63	1820	1700	8350	124	32	11
14..	544	52	76	1770	960	4590	105	500 A	140
15..	500	130 A	180	1560	560	2360	92	43	11
16..	456	54	66	1430	467	1800	85	30	7
17..	420	36	41	1400	460	1740	80	30	6
18..	399	44	47	1420	430	1650	75	30	6
19..	456	57	70	1280	345	1190	69	30	6
20..	584	202	318	1180	290	924	65	53	9
21..	775	440	921	1130	290	885	72	142 A	28
22..	870	400	940	1120	255	771	86	49	11
23..	1130	730	2230	1030	190	528	77	36	7
24..	1230	500	1660	860	150	348	77	36	7
25..	1140	430	1320	705	127	242	67	36	7
26..	1060	280	801	572	131	202	58	36	6
27..	966	225	587	488	92	121	55	36	5
28..	954	195	502	448	78	94	52	36	5
29..	860	160	372	476	82	105	42	36	4
30..	825	128	285	413	52	58	37	36	4
31..	--	--	--	382	36	37	--	--	--
Total	20645	--	12354	29949	--	34140	3404	--	1499
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..	37	C 43	4	5.8	C 54	1	7.2	C 28	1
2..	36	C 43	4	6.5	C 54	1	7.6	C 28	1
3..	36	C 43	4	5.5	C 54	1	6.8	C 28	1
4..	33	C 43	4	5.2	C 54	1	5.5	C 28	T
5..	28	C 43	3	4.1	C 54	1	5.2	C 28	T
6..	26	C 43	3	3.6	C 54	1	5.2	C 28	T
7..	27	C 43	3	3.6	C 54	1	6.2	C 28	T
8..	26	C 43	3	4.9	C 54	1	7.6	C 28	1
9..	26	C 43	3	4.6	C 54	1	7.6	C 28	1
10..	26	C 43	3	5.8	C 54	1	7.9	C 28	1
11..	31	C 43	4	5.5	C 54	1	9.5	C 28	1
12..	34	C 43	4	5.8	C 54	1	122	-- E	580
13..	28	C 43	3	5.8	C 35	1	62	9500 A	1600
14..	26	C 43	3	5.5	C 35	1	40	3000	324
15..	26	C 43	3	6.5	C 35	1	26	1800	126
16..	26	C 43	3	5.8	C 35	1	19	1000	51
17..	23	C 43	3	5.5	C 35	1	15	645	26
18..	22	C 43	3	8.7	C 35	1	13	560	20
19..	21	C 43	2	6.8	C 35	1	7.9	325	7
20..	19	C 43	2	7.9	C 35	1	4.6	220	3
21..	17	C 43	2	7.2	C 35	1	4.6	188	2
22..	16	C 43	2	6.5	C 35	1	2.7	180 B	1
23..	15	C 43	2	6.2	C 35	1	3.2	175	2
24..	13	C 43	2	5.2	C 35	T	4.1	167 B	2
25..	11	C 40	1	4.9	C 35	T	6.8	148	3
26..	9.5	C 40	1	5.2	C 35	T	4.9	126 B	2
27..	7.6	C 40	1	6.5	C 35	1	4.9	110	1
28..	6.8	C 40	1	7.6	C 35	1	3.6	95 B	1
29..	6.8	C 40	1	7.6	C 35	1	2.9	80	1
30..	5.8	C 40	1	7.6	C 35	1	5.2	76 B	1
31..	6.5	C 40	1	7.6	C 35	1	--	--	--
Total	672.0	--	79	185.5	--	29	428.7	--	2762

Total discharge for year (cfs-days)..... 156773.2

Total load for year (tons)..... 242168

E Estimated.

B Computed from estimated concentration

T Less than 0.50 ton.

C Composite period.

A Computed from partly estimated-concentration graph.

COLUMBIA RIVER MAIN STEM

14-0192. COLUMBIA RIVER AT McNARY DAM, NEAR UMATILLA, OREG.

(Formerly published as Columbia River below McNary Dam, near Umatilla, Oreg.)

LOCATION (revised).--Lat 45°56'05", long 119°17'45", at gaging station at McNary Dam, Benton County, 2.5 miles northeast of Umatilla, 3.0 miles upstream from Umatilla River, and at mile 292.0.

DRAINAGE AREA.--214,000 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1967.

Water temperatures: October 1962 to September 1967.

Sediment samples collected at former gaging station site, lat 45°56'15", long 119°17'48", 1.2 miles downstream from McNary Dam, 2 miles northeast of Umatilla, 2.3 miles upstream from Umatilla River, and at mile 290.8.

REMARKS.--Sediment samples collected at former gaging station site, lat 45°56'15", long 119°17'48", 1.2 miles downstream from McNary Dam, 2 miles northeast of Umatilla, 2.3 miles upstream from Umatilla River, and at mile 290.8.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color
													Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.			
Nov. 9, 1966.....	86.6	6.5	24	6.2	9.3	1.3	92	0	22	3.5	0.3	0.9	125	0.17	29.2	86	10	204	7.9	10
Dec. 7.....	123	9.2	24	6.4	10	1.6	98	0	21	4.5	.2	1.9	128	.17	42.5	87	6	220	7.8	5
Dec. 29.....	115	9.4	22	6.1	7.9	1.5	89	0	18	3.2	.1	1.4	118	.16	36.6	80	7	196	7.8	5
Jan 11, 1967.....	112	8.9	22	6.1	6.5	1.3	91	0	18	2.8	.2	1.1	117	.16	35.4	80	6	193	7.9	5
Feb. 1.....	116	11.7	23	6.2	9.4	1.4	86	0	21	3.5	.3	1.2	135	.18	40.1	92	12	216	7.9	5
Mar. 30.....	126	17	22	6.2	11	1.9	89	0	22	6.0	.3	1.8	134	.18	45.6	80	8	205	8.0	5
Apr. 20.....	165	14	21	5.8	9.3	1.7	84	0	20	4.5	.3	.9	118	.16	52.6	76	8	194	7.6	5
May 26.....	434	5.2	12	3.1	4.1	1.0	50	0	8.0	2.0	.2	.4	61	.08	71.5	43	2	107	7.3	5
June 17.....	583	9.1	11	2.2	3.7	.9	46	0	8.2	1.2	.2	.4	63	.09	99.2	37	0	94	7.5	10
July 21.....	262	5.2	18	4.3	3.0	1.5	69	0	12	1.0	.2	.1	78	.11	55.2	63	6	136	7.9	5
Aug. 18.....	151	4.3	20	4.0	4.1	1.0	74	0	12	1.5	.1	.4	85	.12	34.7	67	6	150	7.9	5
Sept. 21.....	139	4.8	20	5.4	6.8	1.4	86	0	16	2.5	.2	.2	105	.14	39.4	72	2	180	7.9	5

A. Calculated from determined constituents.

Additional determinations

Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dissolved oxygen (DO)	MPN (coliform colonies 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Feb. 25, 1967.	12.2	390	0.00	0.00	0.08		June 17, 1967.	12.3	2100	0.00	--	--	--
Mar. 30.....	11.8	0	--	--	--		July 21.....	10.8	0	--	--	--	--
Apr. 20.....	11.9	0	--	--	--		Aug. 18.....	11.3	0	--	--	--	--
May 26.....	--	430	--	--	--		Sept. 21.....	9.9	36	--	--	--	--

UMATILLA RIVER BASIN

14--0200. UMATILLA RIVER ABOVE MEACHAM CREEK, NEAR GIBBON, ORGO.

LOCATION --lat 45°43'11", long 118°19'20", temperature recorder at gaging station on right bank, 0.8 mile downstream from Ryan Creek, 2.2 miles upstream from Meacham Creek, 2.5 miles northeast of Gibbon, Umatilla County, and at mile 83.1.

DRAINAGE AREA (revised).--131 square miles.

RECORDS AVAILABLE.--Water temperatures: June 1959 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 74°F July 11, 12; minimum, 37°F Feb. 15, 20, Mar. 4, 5, 12.

EXTREMES, 1959-67.--Water temperatures: Maximum, 77°F July 13, 15, 21, 1961; minimum, freezing point on several days during winter months of most years.

Temperature (°F) of water, water year October 1966 to September 1967

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	56	54	56	56	56	56	55	52	53	51	51	49	49	50	49	50	49	50	50	48	47	51	52	53	52	52	50	50	52	51	51		
Minimum	50	53	48	49	50	50	52	52	46	40	40	49	48	45	47	44	47	44	45	48	46	46	47	48	49	49	50	46	46	50	48	47	
November																																	
Maximum	49	48	47	46	46	46	46	45	44	45	44	46	47	47	47	46	46	46	46	45	45	46	45	45	43	43	44	45	45	45	44		
Minimum	40	40	44	44	45	45	45	43	42	43	42	44	45	47	46	46	45	46	45	46	45	45	44	44	43	42	43	43	43	43	---	45	
December																																	
Maximum	42	44	44	44	42	42	42	42	41	42	42	42	42	42	42	42	42	42	42	42	41	40	42	42	41	41	41	41	41	41	43	42	
Minimum	43	43	43	41	41	42	41	41	40	33	40	41	42	42	42	42	41	41	42	42	41	40	40	40	41	41	41	40	40	41	41	41	41
January																																	
Maximum	43	42	43	43	42	42	42	42	41	42	41	41	41	41	41	41	41	41	41	41	41	41	40	39	39	39	39	41	41	41	41	41	
Minimum	42	41	42	41	41	39	40	41	41	41	41	41	41	41	41	40	40	40	40	40	40	39	39	39	39	39	41	41	41	41	41	41	
February																																	
Maximum	41	41	41	42	41	40	40	41	41	41	41	41	40	40	39	37	38	39	40	40	39	41	42	41	42	42	43	43	43	---	---	40	
Minimum	40	43	40	40	40	39	39	39	40	40	40	39	40	39	40	39	38	39	38	37	38	38	39	40	42	41	42	43	41	---	---	39	
March																																	
Maximum	42	41	41	40	41	41	41	41	41	41	41	41	42	42	43	43	44	43	43	44	43	42	43	42	42	43	42	43	40	44	43	42	
Minimum	41	39	38	37	37	38	38	39	40	39	39	37	39	39	40	42	41	41	41	41	41	42	41	40	40	39	40	38	39	40	39	40	
April																																	
Maximum	43	46	46	46	45	47	47	46	45	46	43	45	44	44	45	46	47	44	43	42	46	47	46	45	44	47	46	44	43	43	---	44	
Minimum	41	39	40	41	42	40	40	41	40	42	42	40	41	40	39	39	40	42	41	41	40	40	40	42	42	42	42	41	41	---	---	40	
May																																	
Maximum	49	51	50	51	46	52	50	51	46	45	45	44	45	44	45	49	52	53	50	52	53	53	52	51	52	54	55	51	50	48	49	50	
Minimum	41	41	43	43	44	43	43	44	44	44	44	41	43	43	44	45	45	44	44	44	45	45	44	44	44	44	46	45	45	44	45	44	
June																																	
Maximum	54	55	52	57	58	59	58	60	56	55	56	57	61	63	64	65	66	66	66	66	66	61	63	66	69	67	64	70	71	70	---	61	
Minimum	46	47	46	47	49	48	48	48	47	48	49	48	49	48	49	50	51	52	53	54	53	53	53	53	54	54	55	55	55	55	---	50	
July																																	
Maximum	71	70	72	72	70	71	67	71	72	74	74	71	72	72	70	72	70	70	70	70	70	71	72	73	72	70	71	66	70	71	71	70	
Minimum	54	56	58	57	57	56	57	56	55	58	60	60	57	55	57	58	56	56	57	56	55	55	57	58	58	57	57	56	56	56	58	56	
August																																	
Maximum	72	72	71	70	70	68	68	70	70	70	72	72	72	71	72	72	72	72	70	69	69	69	65	64	62	66	65	66	67	68	68	66	
Minimum	57	57	57	57	57	57	56	55	56	57	58	58	58	58	58	58	58	58	59	59	59	56	53	53	53	53	57	55	56	56	57	56	
September															</																		

Periodic determinations of suspended-sediment discharge, water year October 1966 to September 1967
(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (ppm)	Sediment discharge (tons per day)	Suspended sediment						Method of analysis
							Percent finer than size indicated, in millimeters						
Oct. 18, 1966.....	0615	40		43	4	T							
Dec. 17.....	0935	40		247	4	3							
Jan. 24, 1967.....	1120	37		241	2	1							
Jan. 29.....	0935	42		1250	122	412							
Feb. 17.....	1150	42		175	2	1							
Mar. 24.....	1300	43		348	3	3							
Apr. 21.....	0900	41		268	2	1							
May 14.....	0955	45		708	11	21							
May 23.....	1620	54		550	11	16							
June 23.....	0820	52		136	2	1							
Aug. 23.....	1630	69		41	6	1							
Sept. 26.....	0845	--		46	< 1	T							

T Less than 0.50 ton.

UMATILLA RIVER BASIN—Continued

14-0335, UMATILLA RIVER NEAR UMATILLA, OREG.

LOCATION (revised).--Lat 45°54'11", long 119°19'33", at gaging station on left bank, 1.6 miles downstream from West Division main canal of Umatilla project, 1.2 miles southeast of Umatilla, Umatilla County, and at mile 2.1.

DRAINAGE AREA.--2,290 square miles, approximately.

REMARKS AVAILABLE.--Chemical analyses: August 1911, to August 1912, August 1960 to July 1962.

REMARKS AVAILABLE.--Sediment records: October 1962 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Sediment concentrations: Maximum daily, 4,720 ppm Dec. 14; minimum daily, 5 ppm June 1.

Sediment loads: Maximum daily, 47,100 tons Dec. 14; minimum daily, less than 0.05 ton on several days during October and September.

EXTREMES, 1962-67.--Water temperatures (1962-65): Minimum, freezing point Jan. 29, 1963, Dec. 16-20, 1964.

Sediment concentrations: Maximum daily, 39,000 ppm July 27, 1965; minimum daily, 2 ppm Aug. 16, Dec. 17, 1963.

Sediment loads: Maximum daily, 438,000 tons Jan. 30, 1966; minimum daily, less than 0.05 ton on several days in 1964-67.

Temperature (°F) of water, water year October 1966 to September 1967

Temperature (at 7 ft. of water), water, wind, October, 1900 to September, 1901.																																				
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.....	--	--	66	--	--	65	--	--	60	--	55	--	54	--	55	54	--	--	50	--	55	--	--	--	--	--	59	--	--	--	--	--	--	--		
November.....	56	--	55	--	--	54	55	--	55	--	54	--	52	--	54	52	--	--	48	--	58	--	54	--	--	--	--	52	43	--	--	--	--	--		
December.....	--	54	--	52	--	--	53	--	--	--	53	46	45	--	53	46	45	--	47	48	45	--	--	--	--	--	41	--	47	45	--	--	--	--		
January.....	--	--	47	--	42	--	46	--	--	44	--	--	44	42	--	44	42	--	45	--	--	--	--	--	41	40	43	42	48	47	45	45	--	--	--	
February.....	64	45	46	--	--	--	--	--	--	45	--	44	45	44	--	45	44	--	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
March.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54	--	--	--	--	--	--	53	50	52	48	--	--	--	
April.....	49	50	51	50	48	51	52	52	51	53	50	52	52	51	52	50	53	52	54	51	50	54	53	53	53	52	50	50	49	49	49	49	51	--	--	
May.....	46	52	55	55	57	60	57	55	53	51	50	56	59	61	66	64	62	66	61	62	63	61	62	58	57	61	64	63	59	59	58	58	58	58	58	
June.....	63	61	60	64	61	63	68	61	62	61	62	63	64	--	--	--	68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
July.....	--	--	67	--	--	64	--	63	--	--	68	--	--	65	--	--	64	--	--	--	--	--	--	67	--	--	67	--	--	--	--	--	--	--	--	--
August.....	--	65	--	--	--	64	--	62	--	65	--	--	--	66	--	--	68	--	--	65	--	--	65	62	--	--	--	--	--	--	--	--	--	--	--	
September.....	65	--	--	67	--	--	--	62	--	60	--	--	--	57	--	--	61	--	--	64	--	59	--	--	--	58	--	--	58	--	62	--	--	--	--	

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis	
							Percent finer than size indicated, in millimeters										1.000	2.000
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		
Dec. 14, 1966.....	1545	45		3900	2720	28600	17	30	41	60	83	89	97	100	--	--	VPWC	
Dec. 15, 1966.....	2055	43		3430	1780	16500	13	22	33	55	77	88	95	99	100	--	VPWC	
Dec. 16, 1966.....	1040	47		3460	2240	20700	17	34	56	80	87	96	99	100	--	--	VPWC	
Jan. 29, 1967.....	1500	50		3420	1820	17000	15	25	29	49	70	85	92	98	100	--	VPWC	
Jan. 29.....	1040	50		3460	1820	17000	15	25	29	49	70	85	92	98	100	--	VPWC	
Jan. 31.....	1020	43		2340	602	3800	12	15	25	41	53	82	93	99	100	--	VPWC	

UMATILLA RIVER BASIN--Continued

14-0335. UMATILLA RIVER NEAR UMATILLA, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

Suspended sediment, water year October 1966 to September 1967										
Day	OCTOBER			NOVEMBER			DECEMBER			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1..	1.2	C 17	0.1	42	25	A 2.8	148	C 11	4.4	
2..	1.0	C 17	T	129	46	B 16	180	13	6.3	
3..	1.8	C 17	.1	140	C 11	4.2	389	51	B 54	
4..	2.4	C 17	.1	135	C 11	4.0	417	C 17	19	
5..	2.2	C 17	.1	135	C 11	4.0	466	C 17	21	
6..	1.9	C 17	.1	140	C 11	4.2	431	C 17	20	
7..	1.3	C 17	.1	144	C 11	4.3	375	C 17	17	
8..	1.2	C 17	.1	102	C 11	3.0	340	C 17	16	
9..	1.2	C 17	.1	95	C 11	2.8	304	C 17	14	
10..	1.2	C 17	.1	90	C 11	2.7	270	C 17	12	
11..	1.3	C 17	.1	88	C 11	2.6	245	C 17	11	
12..	1.1	C 17	.1	88	C 11	2.6	220	C 17	10	
13..	1.0	C 17	T	90	C 11	2.7	389	--	E 1200	
14..	.9	C 17	T	95	C 11	2.8	3630	4720	S 47100	
15..	.9	C 17	T	100	C 11	3.0	2070	719	S 4510	
16..	.9	C 17	T	100	C 11	3.0	1270	200	686	
17..	.9	C 17	T	105	C 11	3.1	932	120	B 300	
18..	1.1	C 17	.1	148	C 11	4.4	738	71	B 140	
19..	2.2	C 17	.1	129	C 11	3.8	585	C 12	19	
20..	1.2	C 17	.1	123	C 11	3.7	484	C 12	16	
21..	1.8	C 17	.1	114	C 11	3.4	439	C 12	14	
22..	3.3	C 17	.2	108	C 11	3.2	390	C 12	13	
23..	5.8	22	.3	105	C 11	3.1	341	C 12	11	
24..	27	C 20	1.5	105	C 11	3.1	296	C 12	9.6	
25..	39	C 20	2.1	105	C 11	3.1	266	C 12	8.6	
26..	39	C 20	2.1	105	C 11	3.1	240	C 12	7.8	
27..	36	C 20	1.9	105	C 11	3.1	215	C 12	7.0	
28..	32	C 20	1.7	129	C 11	3.8	174	C 12	5.6	
29..	33	C 20	1.8	132	C 11	3.9	162	C 12	5.2	
30..	43	C 20	2.3	135	C 11	4.0	158	C 12	5.1	
31..	47	C 20	2.5	--	--	--	158	C 12	5.1	
Total	333.8	--	18.2	3361	--	113.5	16722	--	54267.7	
JANUARY			FEBRUARY			MARCH				
1..	151	C 12	4.9	1640	320	1420	278	--	E 17	
2..	154	C 12	5.0	1290	147	512	296	--	E 18	
3..	165	C 12	5.3	1040	105	295	302	--	E 18	
4..	178	C 12	5.8	880	--	140	201	--	E 12	
5..	255	C 12	8.3	830	--	120	165	--	E 9.8	
6..	320	C 12	10	820	--	100	148	--	E 8.8	
7..	314	C 12	10	783	C 23	49	124	--	E 7.4	
8..	266	C 12	8.6	738	C 23	46	100	--	E 5.9	
9..	235	C 12	7.6	702	C 23	44	94	--	E 5.6	
10..	220	C 12	7.1	648	C 23	40	91	--	E 5.4	
11..	215	C 12	7.0	594	C 23	37	93	--	E 5.5	
12..	225	C 12	7.3	558	C 23	35	91	--	E 5.4	
13..	320	42	36	508	C 23	32	93	--	E 5.5	
14..	666	140	250	484	C 23	30	84	--	E 5.0	
15..	1300	--	2400	432	C 23	27	77	15	B 3.1	
16..	1650	690	3100	453	C 23	28	130	26	B 9.1	
17..	1430	290	1100	418	C 23	26	92	17	B 4.2	
18..	1080	140	410	439	C 23	27	296	52	B 42	
19..	880	--	180	567	C 23	35	516	52	B 72	
20..	783	C 31	66	576	C 23	36	524	27	B 38	
21..	921	C 31	77	612	C 23	38	411	19	B 27	
22..	987	C 31	83	630	C 23	39	278	12	B 9.0	
23..	860	C 31	72	594	C 23	37	286	17	A 13	
24..	738	C 31	62	524	C 23	33	621	28	B 47	
25..	639	C 31	53	508	C 23	32	648	--	E 40	
26..	558	C 31	47	500	C 23	31	500	--	E 25	
27..	585	C 31	49	432	C 23	27	390	--	E 18	
28..	1540	1200	6500	290	--	E 17	284	13	10	
29..	3280	2320	20500	--	--	--	210	19	11	
30..	3390	1390	12700	--	--	--	151	14	5.7	
31..	2340	630	3980	--	--	--	127	14	4.8	
Total	26645	--	51751.9	18490	--	3333	7703	--	508.2	

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

J Computed from partly estimated-concentration graph and subdividing day.

UMATILLA RIVER BASIN--Continued

14-0335. UMATILLA RIVER NEAR UMATILLA, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Suspended sediment, water year October 1966 to September 1967—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..	137	7	2.6	397	12	13	44	5	0.6		
2..	109	10	2.9	341	12	11	21	7	.4		
3..	95	12	3.1	334	12	11	10	C	.2		
4..	61	12	2.0	341	18	17	7.9	C	.2		
5..	59	7	1.1	397	16	17	7.6	C	.2		
6..	112	14	4.2	404	12	13	7.2	C	.2		
7..	118	10	3.2	508	20	27	9.0	C	.2		
8..	115	6	1.9	774	47	98	7.2	C	.2		
9..	250	12	8.1	900	82	199	6.8	C	.2		
10..	230	8	5.0	932	86	216	7.6	C	.2		
11..	225	12	7.3	792	57	122	7.2	C	.2		
12..	245	12	7.9	630	31	53	7.2	C	.2		
13..	225	8	4.9	976	127	356	8.6	C	.2		
14..	230	10	6.2	1220	226	744	9.3	C	.2		
15..	154	6	2.5	1260	201	684	7.6	C	.2		
16..	121	6	2.0	1140	149	459	8.7	C	.2		
17..	109	6	1.8	1180	163	519	8.6	C	.2		
18..	59	6	1.0	1250	172	581	6.8	C	.2		
19..	42	8	.9	1090	128	377	6.8	C	.2		
20..	11	36	1.1	870	78	183	6.8	C	.2		
21..	44	14	1.7	783	67	142	7.6	C	.2		
22..	121	14	4.6	756	60	122	6.2	C	.2		
23..	178	20	9.6	639	44	76	6.0	C	.1		
24..	278	22	17	484	35	46	5.8	C	.1		
25..	272	17	12	314	28	24	5.0	C	.1		
26..	334	31	28	174	13	6.1	5.0	C	.1		
27..	460	27	34	95	11	2.8	5.2	C	.1		
28..	468	19	24	63	7	1.2	7.9	C	.2		
29..	376	14	14	33	12	1.1	7.9	C	.2		
30..	390	12	13	56	8	1.2	7.9	C	.2		
31..	--	--	--	48	6	.8	--	--	--		
Total	5628	--	227.6	19181	--	5123.2	270.4	--	6.1		
Day	JULY			AUGUST			SEPTEMBER				
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1..	12	C	9	5.5	C	15	0.2	6.2	C	11	0.2
2..	7.9	C	9	5.8	C	15	.2	6.0	C	11	.2
3..	7.2	C	.2	5.8	C	15	.2	5.8	C	11	.2
4..	16	23	B	6.0	C	15	.2	5.8	C	11	.2
5..	12	14	B	6.2	C	15	.3	5.8	C	11	.2
6..	8.6	C	15	6.2	C	15	.3	5.8	C	11	.2
7..	6.5	C	15	26	23	A	1.6	5.8	C	11	.2
8..	6.5	C	15	7.6	12	B	.2	5.8	C	11	.2
9..	6.2	C	15	6.0	C	11	.2	4.8	C	11	.1
10..	6.5	C	15	5.2	C	11	.2	2.6	C	11	.1
11..	6.2	C	15	5.5	C	11	.2	2.8	C	11	.1
12..	6.2	C	15	5.2	C	11	.2	2.2	C	11	.1
13..	5.8	C	15	5.2	C	11	.2	2.2	C	11	.1
14..	6.0	C	15	5.2	C	11	.2	5.8	C	11	.2
15..	6.5	C	15	5.2	C	11	.2	5.8	C	11	.2
16..	5.8	C	15	5.5	C	11	.2	5.8	C	11	.2
17..	5.0	C	15	5.2	C	11	.2	5.8	C	11	.2
18..	4.2	C	15	5.5	C	11	.2	5.8	C	11	.2
19..	5.0	C	15	5.8	C	11	.2	5.8	C	11	.2
20..	3.2	C	15	5.2	C	11	.2	5.8	C	11	.2
21..	3.0	C	15	4.8	C	11	.1	5.8	C	11	.2
22..	3.2	C	15	5.5	C	11	.2	5.8	C	11	.2
23..	3.2	C	15	5.5	C	11	.2	5.8	C	11	.2
24..	4.0	C	15	5.2	C	11	.2	5.8	C	11	.2
25..	3.8	C	15	5.8	C	11	.2	5.8	C	11	.2
26..	3.8	C	15	6.2	C	11	.2	5.8	C	11	.2
27..	3.4	C	15	5.8	C	11	.2	5.8	C	11	.2
28..	4.5	C	15	5.8	C	11	.2	5.8	C	11	.2
29..	5.8	C	15	7.2	C	11	.2	3.0	C	11	.1
30..	5.5	C	15	8.6	C	11	.3	5.8	C	11	T
31..	5.8	C	15	6.2	C	11	.2	--	--	--	--
Total	189.3	--	7.7	200.4	--	7.8	152.1	--	5.2		

Total discharge for year (cfs-days)..... 98876.05
 Total load for year (tons)..... 115370.1

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

ALDER CREEK BASIN

14-0343.5, ALDER CREEK AT ALDERDALE, WASH.

LOCATION.--Lat 45°51'27", long 119°55'15", at county road bridge 1 mile upstream from gaging station, 0.8 mile downstream from Six Prong Creek, and 1.8 miles north of Alderdale, Klickitat County.

DRAINAGE AREA.--196 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1966.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Sediment concentrations: Maximum daily, 361 ppm Dec. 13; minimum daily, 1 ppm Jan. 12, Aug. 14.

Sediment loads: Maximum daily, 94 tons Jan. 28; minimum daily, less than 0.05 ton on many days. EXTREMES, 1962-67.--Water temperatures (1962-66): Minimum, freezing point on several days during January and December 1963, Dec. 23, 1965.

Sediment concentrations: Maximum daily, (revised) not determined. minimum daily, 0 ppm on many days.

Sediment loads: Maximum daily, (estimated) 180,000 tons Dec. 22, 1964; minimum daily, less than 0.05 ton on many days.

REMARKS.--Maximum observed during water year: Sediment concentration, 2,900 ppm Dec. 13.

Suspended sediment, water year October 1966 to September 1967
(Where no daily 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..	0.80			0.80	--		1.0	--	T
2..	.80			.80	--		1.0	--	T
3..	.80			.80	--		1.0	--	T
4..	.80	4	T	.80	--		1.0	--	T
5..	.80			.80	--		1.0	--	T
6..	.80			.90	--		1.0	--	T
7..	.80			.90	--		.90	2	T
8..	.80			.90	--		.90	--	T
9..	.80			.90	3		.90	--	T
10..	.80			.90	--		1.2	--	T
11..	.80			.90	--		1.2	--	T
12..	.80			.90	--		1.2	--	T
13..	.90			1.0	--		59	361	84
14..	.90			1.2	--		40	33	3.6
15..	.90			1.0	2		13	10	.4
16..	.90			1.0	--		7.4	8	.2
17..	.90			.90	--		6.5	--	.2
18..	.90			.80	--		6.0	--	.1
19..	.90			.90	--		5.5	4	.1
20..	.90			1.5	3		5.0	--	.1
21..	.90			1.2	--		4.4	--	T
22..	.90			1.0	--		3.8	--	T
23..	.90			.90	--		3.4	--	T
24..	.90			.90	--		3.0	--	T
25..	.90			.90	--		2.8	--	T
26..	.90			.90	--		2.6	--	T
27..	.80			.90	--		2.4	--	T
28..	.80			.90	--		2.2	--	T
29..	.80			.90	--		2.2	--	T
30..	.80			.90	--		2.2	--	T
31..	.80			--	--	--	2.2	--	T
Total	26.20	--	0.3	28.00	--	0.2	185.90	--	89.1

T Less than 0.05 ton.

ALDER CREEK BASIN--Continued

14-0343.5. ALDER CREEK AT ALDERDALE, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	2.2	--	T	15	6	0.2	3.4		0.1
2..	2.2	--	T	12	--	.2	3.4		.1
3..	2.2	--	T	11	--	.2	3.0		.1
4..	2.4	--	T	9.1	--	.1	2.8		.1
5..	2.6	--	T	8.0	--	.1	2.8		.1
6..	2.4	--	T	6.5	--	.1	2.5		.1
7..	2.2	--	T	5.6	--	.1	2.5		.1
8..	2.2	--	T	5.2	--	.1	2.8		.1
9..	2.4	--	T	4.8	--	.1	3.0		.1
10..	2.4	--	T	4.8	--	.1	2.8		.1
11..	2.5	4	T	4.0	--	T	2.8		.1
12..	2.5	1	T	3.7	--	T	2.5		.1
13..	2.5	--	T	3.7	--	T	2.5		.1
14..	2.3	--	T	3.7	--	T	2.5		.1
15..	2.3	--	T	4.0	--	T	2.5		.1
16..	2.0	--	T	4.0	--	T	2.5		.1
17..	2.0	--	T	4.0	4	T	2.5		.1
18..	2.0	--	T	4.0	--	T	2.5		.1
19..	1.8	--	T	3.7	--	T	2.3		T
20..	1.8	--	T	3.7	--	T	2.3		T
21..	2.0	--	T	3.7	--	T	2.3		T
22..	2.2	--	T	3.7	--	T	2.3		T
23..	2.2	--	T	3.7	--	T	2.8	8	.1
24..	2.2	--	T	3.7	--	T	2.5		.1
25..	2.0	--	T	3.7	--	T	2.5		.1
26..	2.0	--	T	3.4	--	T	2.5		.1
27..	2.0	2	T	3.4	--	T	2.5		.1
28..	33	290 J	94	3.4	--	T	2.5		.1
29..	58	280 J	72	--	--	--	2.5		.1
30..	44	--	27	--	--	--	2.5		.1
31..	21	15 B	.9	--	--	--	2.5		.1
Total	215.5	--	194.2	149.2	--	2.0	81.3	--	2.9
Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	2.3			1.8			0.90		
2..	2.0			1.7			.80		
3..	2.0			1.7			.90		
4..	2.0			1.7			.90		
5..	2.0			1.7			.90		
6..	2.0			1.5			.90		
7..	2.0			1.5			.90		
8..	2.0			1.5			.90		
9..	2.0			1.5			.80		
10..	2.0			1.7			.80		
11..	2.3			1.7			.80		
12..	2.3			1.7			.80		
13..	2.3			1.7			.90		
14..	2.3			1.5			.90		
15..	2.3			1.3			.80		
16..	2.0			1.3			.70		
17..	2.3			1.3			.70		
18..	2.5			1.3			.70		
19..	2.5			1.3			.60		
20..	2.3	4	T	1.2			.80		
21..	2.3			1.0			1.2		
22..	2.0			1.0			1.2		
23..	2.0			1.0			1.0		
24..	1.8			1.0			1.0		
25..	1.8			1.0			.90		
26..	1.8			1.0			.90		
27..	1.7			1.0			.90		
28..	1.8			1.0			.60		
29..	1.8			.90	4	T	.60	2	T
30..	1.8			.90			.60		
31..	--	--	--	.90			--		
Total	62.2	--	0.7	41.30	--	0.4	25.30	--	0.1

T Less than 0.05 ton.

B Computed from estimated concentration graph.

J Computed from partly estimated-concentration graph and subdividing day.

ALDER CREEK BASIN--Continued

14-0343.5. ALDER CREEK AT ALDERDALE, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0.60			0.50			0.50		
2..	.70			.50			.50		
3..	.60			.50			.60		
4..	.60			.40			.60		
5..	.60			.40			.60		
6..	.60			.50			.70		
7..	.60			.40			.70		
8..	.60			.40			.70		
9..	.70			.40			.70		
10..	.70			.40			.70		
11..	.60			.40			.90		
12..	.50			.40			.90		
13..	.50			.40			.90		
14..	.50			.40	1	T	.80		
15..	.50			.40			.70		
16..	.50			.40			.60		
17..	.50			.50			.60		
18..	.50			.50			.60		
19..	.50			.50			.60		
20..	.50			.60			.60		
21..	.50			.60			.60		
22..	.50			.70			.60		
23..	.50			.70			.60		
24..	.60			.70			.60		
25..	.60	2	T	.70			.70		
26..	.60			.70			.70		
27..	.60			.70			.70		
28..	.50			.60			.70		
29..	.50			.60			.70		
30..	.50			.50			.80		
31..	.50			.50			--		
Total	17.30	--	0.1	15.90	--	T	20.20	--	0.1
Total discharge for year (cfs-days).....									868.3
Total load for year (tons).....									290.1

T Less than 0.05 ton.

WILLOW CREEK BASIN--Continued

14-0345. WILLOW CREEK AT HEPPNER, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0.04	C 30	T	0.58	27	T	17	310	J 15
2..	.07	C 30	T	.58	66	A 0.1	24	290	A 19
3..	.04	C 30	T	.58	17	T	23	110	6.8
4..	.04	C 30	T	.58	18	T	20	100	5.4
5..	.04	C 30	T	.69	14	T	20	68	3.7
6..	.04	C 30	T	1.2	30	.1	16	39	1.7
7..	.04	C 30	T	1.5	44	.2	15	41	1.7
8..	.04	C 30	T	1.4	25	.1	13	26	.9
9..	.04	C 30	T	1.4	34	.1	11	15	.4
10..	.04	C 30	T	1.8	10	T	17	95	J 4.8
11..	.04	C 30	T	2.0	37	.2	28	193	15
12..	.04	C 30	T	3.0	40	.3	32	214	18
13..	.07	C 30	T	3.0	22	.2	45	683	83
14..	.04	C 30	T	2.8	130	1.0	48	341	44
15..	.04	C 30	T	7.5	680	A J 16	40	147	16
16..	.02	C 30	T	14	370	14	32	116	10
17..	.02	C 30	T	11	120	3.6	27	74	5.4
18..	.02	C 30	T	7.9	40	.9	27	64	4.7
19..	.02	C 30	T	9.1	535	S 14	23	60	3.7
20..	.04	C 30	T	19	2000	A 103	21	50	2.8
21..	.17	35	T	17	228	S 11	19	37	1.9
22..	.48	63	A 0.1	13	72	2.5	15	C 36	1.5
23..	.81	120	A .3	11	46	1.4	14	C 36	1.4
24..	.81	140	B .3	9.9	33	.9	14	C 36	1.4
25..	.69	95	B .2	9.5	34	.9	12	C 36	1.2
26..	.48	54	.1	12	59	1.9	11	C 36	1.1
27..	.39	--	E .1	10	42	1.1	10	C 36	1.0
28..	.39	42	T	9.9	46	1.2	9.9	C 36	1.0
29..	.39	36	T	12	54	1.7	12	C 36	1.2
30..	.39	32	T	12	--	E 1.8	12	C 36	1.2
31..	.58	28	T	--	--	--	12	C 36	1.2
Total	6.36	--	1.3	205.91	--	178.4	639.9	--	276.1
JANUARY			FEBRUARY			MARCH			
1..	11	22	0.7	56	230	35	14	18	0.7
2..	11	22	.7	48	152	20	15	14	.6
3..	11	22	.7	42	115	13	15	14	.6
4..	12	28	.9	39	100	11	12	12	.4
5..	17	64	2.9	36	78	7.6	14	12	.5
6..	17	45	2.1	32	64	5.5	14	16	.6
7..	17	34	1.6	30	66	5.3	14	20	.8
8..	16	26	1.1	28	59	4.5	14	10	.4
9..	14	23	.9	26	51	3.6	13	16	.6
10..	14	35	1.3	24	45	2.9	13	12	.4
11..	22	140	A 8.3	23	44	2.7	12	11	.4
12..	27	164	12	22	34	2.0	11	22	A .7
13..	29	115	9.0	21	35	2.0	14	29	1.1
14..	36	187	18	19	28	1.4	12	17	.6
15..	38	194	20	18	30	1.5	13	23	.8
16..	38	140	14	18	24	1.2	14	32	1.2
17..	36	87	8.5	18	30	1.5	22	150	8.9
18..	32	69	6.0	19	27	1.4	24	111	7.2
19..	28	66	5.0	16	26	1.1	25	66	4.5
20..	29	172	13	13	24	.8	26	73	5.1
21..	29	78	6.1	16	28	1.2	26	63	4.4
22..	23	48	3.0	16	18	.8	26	58	4.1
23..	20	35	1.9	15	20	.8	27	64	4.7
24..	18	32	1.6	15	18	.7	28	67	5.1
25..	20	29	1.6	15	17	.7	28	44	3.3
26..	19	75	3.8	15	14	.6	26	38	2.7
27..	32	511	S 53	15	18	.7	24	30	1.9
28..	64	1340	232	14	20	.8	23	44	2.7
29..	79	1150	245	--	--	--	24	32	2.1
30..	78	470	99	--	--	--	22	26	1.5
31..	66	290	52	--	--	--	22	46	2.7
Total	903	--	825.7	669	--	130.3	587	--	71.3

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period

J Computed from partly estimated-concentration graph and subdividing day.

WILLOW CREEK BASIN--Continued

14-0345. WILLOW CREEK AT HEPPNER, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	23	62	3.9	54	470	J 76	28	55	4.2
2..	23	34	2.1	65	380	67	24	49	3.2
3..	24	53	3.4	61	230	38	21	41	2.3
4..	23	90	5.6	58	156	24	19	31	1.6
5..	32	200	17	56	140	21	17	32	1.5
6..	41	290	32	52	124	17	14	24	.9
7..	51	350	48	53	156	22	13	24	.8
8..	52	206	29	58	300	47	11	26	.8
9..	48	134	17	68	420	77	9.8	13	.3
10..	47	111	14	73	390	77	8.6	10	A .2
11..	46	107	13	64	210	36	8.3	12	.3
12..	43	88	10	60	170	28	9.8	12	.3
13..	40	88	9.5	59	180	B 29	12	20	.6
14..	38	52	5.3	58	182	29	9.5	15	.4
15..	35	44	4.2	58	150	23	7.7	12	.2
16..	32	32	2.8	59	900	A 140	7.1	8	.2
17..	33	42	3.7	72	1820	354	4.7	8	.1
18..	32	40	3.5	84	790	179	4.9	13	.2
19..	30	28	2.3	81	570	125	4.4	12	.1
20..	28	25	1.9	76	440	90	4.4	10	.1
21..	26	26	1.8	73	388	76	5.5	12	.2
22..	24	22	1.4	70	391	74	7.1	18	.3
23..	19	33	1.7	64	270	47	6.3	24	.4
24..	20	80	4.3	51	224	31	6.0	14	.2
25..	26	42	2.9	43	190	22	5.2	C 13	.2
26..	31	120	A 10	37	144	14	4.9	C 13	.2
27..	35	62	B 5.9	32	109	9.4	4.4	C 13	.2
28..	38	--	E 5.1	33	114	10	4.0	C 13	.1
29..	40	--	E 6.5	37	146	15	3.4	C 13	.1
30..	44	--	E 9.5	32	68	5.9	2.9	C 13	.1
31..	--	--	--	31	57	4.8	--	--	--
Total	1024	--	277.3	1772	--	1808.1	287.9	--	20.3
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	2.7	C 13	0.1	0.13	C 31		0.06	C 12	
2..	2.3	C 13	.1	.12	C 31		.06	C 12	
3..	2.0	C 13	.1	.10	C 31		.07	C 12	
4..	1.4	C 13	T	.09	C 12		.06	C 12	
5..	1.4	C 13	T	.08	C 12		.08	C 12	
6..	1.3	C 13	T	.09	C 12		.06	C 12	
7..	1.3	C 13	T	.08	C 12		.10	C 12	
8..	1.4	C 13	T	.10	C 12		.03	C 12	
9..	.91	C 13	T	.08	C 12		.03	C 12	
10..	.81	C 13	T	.10	C 12		.03	C 12	
11..	.76	C 13	T	.08	C 12		.08	C 12	
12..	.75	C 13	T	.08	C 12		.08	C 12	
13..	.55	C 13	T	.08	C 12		.13	C 12	
14..	.44	C 13	T	.08	C 12		.13	C 12	
15..	.35	C 13	T	.08	C 12		.13	C 12	
16..	.42	C 13	T	.08	C 12		.08	C 12	
17..	.19	C 31	T	.07	C 12		.09	C 12	
18..	.24	C 31	T	.06	C 12		.13	C 12	
19..	.27	C 31	T	.06	C 12		.08	C 12	
20..	.29	C 31	T	.06	C 12		.08	C 12	
21..	.29	C 31	T	.05	C 12		.08	C 12	
22..	.30	C 31	T	.06	C 12		.08	C 12	
23..	.24	C 31	T	.07	C 12		.08	C 12	
24..	.21	C 31	T	.06	C 12		.08	C 12	
25..	.17	C 31	T	.06	C 12		.08	C 12	
26..	.17	C 31	T	.06	C 12		.08	C 12	
27..	.18	C 31	T	.07	C 12		.08	C 12	
28..	.14	C 31	T	.07	C 12		.08	C 12	
29..	.13	C 31	T	.07	C 12		.08	C 12	
30..	.12	C 31	T	.07	C 12		.08	C 12	
31..	.12	C 31	T	.07	C 12		--	--	
Total	21.85	--	1.0	2.41	--	0.1	2.36	--	0.1

Total discharge for year (cfs-days)..... 6121.69
 Total load for year (tons)..... 3590.0

E Estimated.
 T Less than 0.05 ton.
 A Computed from partly estimated-concentration graph.
 B Computed from estimated-concentration graph.
 C Composite period.
 J Computed from partly estimated-concentration graph and subdividing day.

WILLOW CREEK BASIN--Continued

14-0360. WILLOW CREEK NEAR ARLINGTON, ORRG.

LOCATION (revised).--Lat 45°45'12", long 120°00'35", at gaging station on right bank at bridge on discontinued highway, 3.8 miles downstream from Eighthmile Canyon, 10 miles east of Arlington, Gilliam County, and at mile 3.7.

DRAINAGE AREA.--850 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 84°F June 19; minimum, 34°F Dec. 10, 24.

Sediment concentrations: Maximum daily, 18,900 ppm June 2; minimum daily, no flow on many days.

EXTREMES, 1962-67.--Water temperatures: Maximum, 84°F June 4, 1967; minimum (1962-64, 1966-67), freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 67,000 ppm Aug. 23, 1965; minimum daily, no flow on many days.

Sediment loads: Maximum daily, (estimated) 980,000 tons Dec. 22, 1964; minimum daily, 0 tons on many days.

REMARKS.--No flow Oct. 1 to Nov. 1, Nov. 4, June 17, 18, July 26, 29-31, Aug. 1, 2, 5-11, 14-31, Sept. 1, 2, 5-11, 14-31.

Temperature (°F) of water, water year October 1966 to September 1967

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	51	--	--	--	48	51	47	--	--	48	47	45	47	47	46	44	48	46	46	46	46	46	46	46	46	46	46	46	46	46	46	--
November.....	46	45	43	43	43	43	41	39	37	34	36	39	43	44	41	42	41	41	44	50	43	39	37	34	--	43	45	44	41	42	43	44	45	--
December.....	41	--	42	44	40	39	37	40	38	41	45	42	47	48	47	43	42	44	43	42	41	40	37	38	42	43	49	44	43	42	43	44	45	--
January.....	42	44	43	51	41	41	42	44	47	46	47	46	45	45	45	45	45	44	46	49	49	46	46	49	47	49	50	49	48	49	48	50	49	--
February.....	49	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	--
March.....	55	51	57	53	50	53	50	55	49	59	52	48	45	45	52	47	47	46	48	53	46	58	50	49	47	48	52	50	52	50	52	50	50	50
April.....	53	52	58	55	64	59	60	61	58	52	51	55	53	59	60	62	69	60	61	62	65	67	61	54	53	53	58	60	56	55	55	58	58	58
May.....	59	61	61	64	70	64	64	71	73	69	71	68	73	80	80	83	--	--	84	74	69	71	77	--	87	75	76	76	83	82	--	72	72	72
June.....	82	80	82	83	77	76	77	73	65	79	83	81	77	79	79	77	74	74	73	75	79	80	--	79	77	--	76	--	--	--	--	--	--	--
July.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
Nov. 21, 1966.....	0830	46		80	11500	2480	66	89	96	99	100	--	--	--	--	--	PWC	
Nov. 21.....	0930	46		90	1780	433	--	62	--	90	--	100	--	--	--	--	PWC	
Nov. 21.....	1200	46		83	2160	484	--	63	--	96	--	100	--	--	--	--	PWC	
Nov. 21.....	1530	47		75	5520	1120	52	75	96	100	--	--	--	--	--	--	PWC	
Nov. 21.....	1710	--		70	7710	1460	48	75	93	99	100	--	--	--	--	--	PWC	
Jan. 29, 1967.....	1655	48		137	3470	1280	26	43	67	90	100	--	--	--	--	--	PWC	
Jan. 30.....	0730	43		186	4540	2280	19	26	49	77	94	100	--	--	--	--	PWC	
Jan. 31.....	1230	43		120	366	366	41	42	52	79	93	100	--	--	--	--	PWC	
June 2.....	0045	59		260	39800	27900	14	30	50	75	97	100	--	--	--	--	PWC	

WILLOW CREEK BASIN--Continued

14-0360. WILLOW CREEK NEAR ARLINGTON, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

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	3.4	40	0.4
2..				.13	11	T	2.3	34	.2
3..				.05	26	T	4.5	34	.4
4..				--	--	0	11	93	3.9
5..				.03	42	T	24	1260	90
6..				.47	C 41	.1	22	288	S 19
7..				.31	C 41	T	23	430	27
8..				.47	C 41	.1	23	138	8.6
9..				.86	C 41	.1	19	90	4.6
10..				.31	C 41	T	21	77	4.4
11..				.47	C 41	.1	33	163	S 17
12..				.74	C 41	.1	67	616	111
13..				.86	C 41	.1	85	810	186
14..				2.1	C 28	.2	122	1550	511
15..				2.8	C 28	.2	98	810	214
16..				2.8	C 28	.2	75	360	73
17..				1.8	C 28	.1	56	248	37
18..				1.4	C 28	.1	45	187	23
19..				1.8	C 28	.1	41	123	14
20..				4.1	409	S 7.4	34	92	8.4
21..				48	3200	S 527	36	84	8.2
22..				39	1550	S 183	36	74	7.2
23..				22	240	14	33	54	4.8
24..				14	205	7.7	32	55	4.8
25..				11	97	2.9	29	--	E 3.4
26..				8.5	70	1.6	29	38	3.0
27..				11	62	1.8	28	36	2.7
28..				9.1	42	1.0	26	34	2.4
29..				7.3	44	.9	27	41	3.0
30..				3.1	35	.3	28	45	3.4
31..				--	--	--	27	52	3.8
Total	0	--	0	194.5	--	749.2	1140.2	--	1399.6
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	23	145	9.0	93	690	173	3.7	C 22	0.2
2..	22	--		78	580	122	4.5	C 22	.3
3..	21	40	2.3	56	350	93	4.5	C 22	.3
4..	23	67	4.2	42	252	29	3.4	C 22	.2
5..	29	110	J 10	46	152	19	3.4	C 22	.2
6..	46	251	31	38	100	10	4.1	C 22	.2
7..	42	236	27	28	75	5.7	3.4	C 22	.2
8..	39	94	9.9	30	90	7.3	3.1	C 22	.2
9..	36	70	6.8	19	103	5.3	.86	C 29	.1
10..	29	55	4.3	16	62	2.7	1.6	C 29	.1
11..	28	60	4.5	6.7	C 45	.8	1.6	C 29	.1
12..	28	58	4.4	6.2	C 45	.8	1.8	C 29	.1
13..	30	130	A 11	6.2	C 45	.8	2.8	C 29	.2
14..	7.9	93	2.0	7.3	C 45	.9	2.1	C 29	.2
15..	24	130	J 9.2	6.2	C 45	.8	2.1	C 29	.2
16..	66	296	53	6.7	C 45	.8	1.8	C 29	.1
17..	45	240	29	6.2	C 45	.8	2.8	C 29	.2
18..	17	140	A 6.4	7.3	C 45	.9	2.6	C 29	.2
19..	4.9	105	1.4	8.5	C 45	1.0	7.3	57	1.1
20..	6.7	83	1.5	7.3	C 45	.9	12	34	1.1
21..	9.4	50	1.3	6.2	C 45	.8	5.8	24	.4
22..	6.7	48	.9	6.2	C 45	.8	5.1	42	1.0
23..	2.8	37	.3	6.2	C 45	.8	12	65	3.0
24..	3.7	40	.4	6.7	C 45	.8	18	42	2.0
25..	2.3	62	.4	7.3	C 45	.9	15	44	1.8
26..	2.6	46	.3	4.9	C 22	.3	14	34	1.3
27..	4.9	31	.4	5.4	C 22	.3	16	47	2.0
28..	28	234	S 40	4.5	C 22	.3	15	29	1.2
29..	129	3530	1230	--	--	--	12	62	1.4
30..	166	3510	1570	--	--	--	13	54	1.9
31..	124	1250	419	--	--	--	16	41	1.8
Total	1046.9	--	3494.4	562	--	440.5	220.36	--	23.3

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

C Composite period.

J Computed from partly estimated-concentration graph and subdividing day.

WILLOW CREEK BASIN--Continued

14-0360. WILLOW CREEK NEAR ARLINGTON, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	19	50	2.6	122	1110	S 425	43	3400	S 2720
2..	27	50	3.6	180	2650	1290	99	18900	S 7960
3..	28	25	1.9	195	2550	1340	30	11400	S 1070
4..	35	58	5.5	167	1460	658	19	1120	S 64
5..	41	73	8.1	144	1140	443	9.6	269	S 8.2
6..	54	183	27	126	830	282	6.8	200	3.7
7..	68	252	46	114	610	188	5.8	154	2.4
8..	79	421	90	105	480	136	6.8	103	1.9
9..	87	466	109	99	475	127	7.4	89	1.8
10..	79	285	61	107	560	162	5.8	80	1.3
11..	79	263	56	116	680	213	4.4	56	.7
12..	74	240	48	103	520	145	2.6	47	.3
13..	63	154	26	103	495	138	2.6	36	.3
14..	57	131	20	108	525	153	3.2	45	.4
15..	53	98	14	90	410	100	2.6	36	.3
16..	56	121	18	84	446	101	.51	42	S .1
17..	56	91	14	82	437	97	0	--	0
18..	54	84	12	85	576	132	0	--	0
19..	54	68	9.9	75	686	139	.41	49	S .1
20..	48	67	8.7	80	679	147	.41	C 40	T
21..	45	40	4.9	75	597	121	.27	C 40	T
22..	45	50	6.1	70	544	103	.46	C 40	T
23..	48	48	6.2	62	398	67	.63	C 40	.1
24..	46	43	5.3	49	256	34	.39	C 40	T
25..	49	58	7.7	42	160	18	.45	C 40	T
26..	57	62	9.5	42	152	17	.50	C 40	.1
27..	73	128	25	42	130	15	.38	C 40	T
28..	85	214	49	38	126	13	.33	C 40	T
29..	89	340	82	38	103	11	.75	C 40	.1
30..	92	290	72	40	119	13	.68	C 40	.1
31..	--	--	--	30	76	6.2	--	--	--
Total	1740	--	849.0	2813	--	6834.2	254.77	--	11835.9
	JULY			AUGUST			SEPTEMBER		
1..	0.30	C 40	T	0	--	0			
2..	.46	C 40	T	0	--	0			
3..	.88	C 40	0.1	.01	6	T			
4..	1.0	C 40	.1	.04	17	T			
5..	1.8	C 40	.2	0	--	0			
6..	.63	C 40	.1	0	--	0			
7..	.56	C 40	.1	0	--	0			
8..	.61	C 40	.1	0	--	0			
9..	.56	C 40	.1	0	--	0			
10..	.56	C 40	.1	0	--	0			
11..	.44	C 40	T	0	--	0			
12..	.25	C 40	T	.63	17	T			
13..	.16	C 40	T	.19	26	T			
14..	.06	C 40	T	0	--	0			
15..	.20	C 40	T	0	--	0			
16..	.53	C 40	.1	0	--	0			
17..	.29	C 40	T	0	--	0			
18..	.11	C 40	T	0	--	0			
19..	.32	C 40	T	0	--	0			
20..	.31	C 40	T	0	--	0			
21..	.15	C 40	T	0	--	0			
22..	.08	C 40	T	0	--	0			
23..	.17	C 40	T	0	--	0			
24..	.11	C 40	T	0	--	0			
25..	.01	10	T	0	--	0			
26..	0	--	0	0	--	0			
27..	.08	10	T	0	--	0			
28..	.09	24	T	0	--	0			
29..	0	--	0	0	--	0			
30..	0	--	0	0	--	0			
31..	0	--	0	0	--	0			
Total	10.72	--	1.4	0.87	--	T	0	--	0

Total discharge for year (cfs-days)..... 7983.32
 Total load for year (tons)..... 25627.5

S Computed by subdividing day.

C Composite period.

T Less than 0.05 ton.

ROCK CREEK BASIN
14-0366. ROCK CREEK NEAR ROOSEVELT, WASH.

LOCATION.--Lat 48°44'55", long 120°26'05", at gaging station at bridge on State Highway 122, 3.8 miles downstream from Harrison Creek, 4.4 miles from mouth, and 14 miles west of Roosevelt, Klickitat County.

DRAINAGE AREA.--213 square miles.

RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1967.

Sediment records: October 1962 to September 1967.

EXTREMES, 1966-67.--Sediment concentrations: Maximum daily, 303 ppm Jan. 28; minimum daily, no flow on many days during October, and July to September.

Sediment loads: Maximum daily, 1,030 tons Jan. 28; minimum daily, 0 tons on many days during October and July to September.

EXTREMES, 1962-67.--Water temperatures (1962-64, 1965-66): Minimum, freezing point Jan. 19, 20, 23, 24, 1963.

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

Sediment concentrations: Maximum daily, estimated 280,000 tons Dec. 22, 1964; minimum daily, 0 ton on many days.

Sediment loads: Maximum daily, estimated 280,000 tons Dec. 22, 1964; minimum daily, 0 ton on many days.

REMARKS.--Maximum observed during water year: Sediment concentration, 629 ppm Dec. 12. No flow Oct. 1-3, July 19 to Sept. 30.

Temperature (°F) of water, water year October 1966 to September 1967

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.....	--	--	--	--	--	--	69	--	--	--	--	--	62	--	--	--	--	56	--	--	--	--	58	--	59	--	61	--	56	--	60	--
November.....	--	60	--	--	55	--	--	54	--	--	--	56	55	54	--	--	--	--	49	50	48	--	--	--	51	--	--	43	--	41	44	--
December.....	43	--	--	--	--	--	45	--	--	--	--	42	44	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January.....	--	--	--	--	--	--	--	--	--	48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February.....	44	41	43	44	43	44	43	44	45	--	--	--	41	44	45	47	49	46	47	46	--	--	--	--	43	47	50	--	50	--	48	--
March.....	--	50	--	50	--	46	--	49	--	45	--	--	49	--	48	45	--	--	--	--	--	52	53	--	--	--	52	--	--	53	--	--
April.....	--	53	--	--	59	--	--	53	--	60	--	--	--	--	52	--	48	49	48	54	56	--	61	--	--	--	54	--	56	--	53	--
May.....	--	--	59	--	--	64	--	62	--	--	63	--	56	66	70	--	58	--	--	74	--	--	--	--	69	--	--	68	--	68	63	--
June.....	--	--	--	72	--	--	72	--	--	--	--	--	--	70	--	--	74	--	--	--	--	66	--	--	--	--	73	--	--	--	--	--
July.....	72	--	--	--	--	--	--	68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Particle-size analyses of suspended sediment, water year October 1966 to September 1967
(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	0.350	0.500		1.000	
Dec. 12, 1966.....	2015	42		801	170	368	32	48	52	65	76	--	--	--	--	--	PWC	98	
Dec. 12.....	2310	43		1220	629	2070	20	35	37	48	61	74	83	92	96	98	99	VPWC	98
Dec. 13.....	1440	45		1150	263	817	23	39	44	52	64	74	80	90	95	98	99	VPWC	98

ROCK CREEK BASIN--Continued

14-0366. ROCK CREEK NEAR ROOSEVELT, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

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	1.0	C	3	58	16	4.5
2..	0	--	0	1.1	C	3	58	2	.3
3..	0	--	0	1.1	C	3	34	1	.1
4..	.1	C	4	1.3	C	3	27	--	T
5..	.1	C	4	1.5	C	3	25	5	.3
6..	.1	C	4	1.3	C	3	25	4	.3
7..	.1	C	4	1.5	C	3	25	4	.3
8..	.1	C	4	1.5	C	3	24	2	.1
9..	.1	C	4	1.6	C	3	22	1	.1
10..	.1	C	4	1.6	C	3	23	1	.1
11..	.1	C	4	1.8	C	3	41	3 S	.5
12..	.1	C	4	2.2	C	3	403	126 S	288
13..	.1	C	4	2.3	C	3	970	227 S	656
14..	.1	C	4	5.4	C	2	338	16 S	16
15..	.1	C	4	7.7	C	2	180	5	2.4
16..	.1	C	4	8.9	C	2	130	4	1.5
17..	.1	C	4	8.1	C	2	100	4	1.1
18..	.2	C	4	7.7	C	2	86	2	.5
19..	.2	C	4	7.7	C	2	77	1	.2
20..	.2	C	4	38	10 S	1.3	67	2	.2
21..	.3	C	4	38	5	.5	59	2	.3
22..	.4	C	4	24	C	2	51	1	.1
23..	.4	C	4	20	C	2	46	1	.1
24..	.5	C	4	18	C	2	41	--	T
25..	.6	C	4	16	C	2	42	--	T
26..	.6	C	4	18	C	2	39	--	T
27..	.7	C	4	18	C	2	36	1	.1
28..	.9	C	4	16	C	2	33	--	T
29..	.9	C	4	16	C	2	32	2	.2
30..	1.0	C	4	16	C	2	33	--	T
31..	1.0	C	4	--	--	--	31	--	T
Total	9.3	--	0.1	303.3	--	3.1	3156	--	973.4
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1..	32	C	--	221	9	5.4	41	C	2
2..	31	C	--	185	6	3.0	41	C	2
3..	31	C	--	153	4	1.7	39	C	2
4..	35	C	--	136	4	1.5	37	C	2
5..	38	C	--	119	3	1.0	35	C	2
6..	34	C	--	105	2	.6	33	C	2
7..	32	C	--	94	2	.5	33	C	2
8..	32	C	--	86	2	.5	33	C	2
9..	34	C	--	78	4	.8	34	C	2
10..	33	C	--	71	2	.4	34	C	2
11..	33	C	--	65	2	.4	33	C	2
12..	34	C	--	61	C	1	32	C	2
13..	37	C	--	71	C	1	31	C	2
14..	38	C	--	71	C	1	30	C	2
15..	37	C	--	61	C	1	30	C	2
16..	37	C	--	59	C	1	30	C	2
17..	36	C	--	57	C	1	30	C	2
18..	35	C	--	69	C	1	29	C	2
19..	35	C	--	61	C	1	28	C	2
20..	81	12 B	2.6	55	C	1	29	C	2
21..	90	1	.2	52	C	1	28	C	2
22..	71	--	T	51	C	1	28	C	2
23..	60	--	T	50	C	1	32	C	2
24..	56	--	T	49	C	1	30	C	2
25..	54	--	T	47	C	1	30	C	2
26..	55	--	T	44	C	1	30	C	2
27..	299	92 S	192	43	C	1	24	C	2
28..	1150	303 S	1030	42	C	1	28	C	2
29..	739	62	124	--	--	--	27	C	2
30..	436	23	27	--	--	--	27	C	2
31..	294	12	9.5	--	--	--	28	C	2
Total	4039	--	1385.3	2256	--	18.3	974	--	5.9

S Computed by subdividing day.

T Less than 0.05 ton.

B Computed from estimated concentration graph.

C Composite period.

ROCK CREEK BASIN--Continued

14-0366. ROCK CREEK NEAR ROOSEVELT, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	27	C 3	0.2	28	C 3	0.2	8.6	C 2	T
2..	26	C 3	.2	27	C 3	.2	8.2	C 2	T
3..	26	C 3	.2	26	C 3	.2	7.8	C 2	T
4..	26	C 3	.2	25	C 3	.2	7.4	C 2	T
5..	26	C 3	.2	25	C 3	.2	6.8	C 2	T
6..	26	C 3	.2	23	C 3	.2	6.2	C 2	T
7..	25	C 3	.2	22	C 3	.2	5.6	C 2	T
8..	25	C 3	.2	21	C 3	.2	5.3	C 2	T
9..	25	C 3	.2	21	C 3	.2	5.3	C 2	T
10..	26	C 3	.2	21	C 3	.2	4.7	C 2	T
11..	25	C 3	.2	20	C 3	.2	4.7	C 2	T
12..	24	C 3	.2	19	C 3	.2	5.3	C 2	T
13..	24	C 3	.2	18	C 3	.1	5.3	C 2	T
14..	24	C 3	.2	17	C 3	.1	4.5	C 2	T
15..	23	C 3	.2	16	C 3	.1	3.5	C 2	T
16..	23	C 3	.2	15	C 3	.1	3.1	C 2	T
17..	24	C 3	.2	15	C 3	.1	2.4	C 2	T
18..	26	C 3	.2	14	C 3	.1	2.1	C 2	T
19..	28	C 3	.2	13	C 3	.1	1.8	C 2	T
20..	27	C 3	.2	13	C 3	.1	1.6	C 2	T
21..	29	C 3	.2	11	C 3	.1	1.8	C 2	T
22..	30	C 3	.2	11	C 3	.1	2.1	C 2	T
23..	29	C 3	.2	11	C 3	.1	2.1	C 2	T
24..	29	C 3	.2	10	C 3	.1	1.8	C 2	T
25..	29	C 3	.2	10	C 3	.1	1.6	C 2	T
26..	28	C 3	.2	9.7	C 3	.1	1.3	C 2	T
27..	30	C 3	.2	9.3	C 3	.1	1.2	C 2	T
28..	30	C 3	.2	9.3	C 3	.1	1.1	C 2	T
29..	29	C 3	.2	9.3	C 3	.1	.9	C 2	T
30..	28	C 3	.2	8.9	C 3	.1	.8	C 2	T
31..	--	--	--	8.9	C 3	.1	--	--	--
Total	797	--	6.0	507.4	--	4.3	114.9	--	0.6
	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0.7	C 2	T						
2..	.6	C 2	T						
3..	.4	C 2	T						
4..	.3	C 2	T						
5..	.3	C 2	T						
6..	.2	C 2	T						
7..	.2	C 2	T						
8..	.1	C 2	T						
9..	.1	C 2	T						
10..	.1	C 2	T						
11..	.1	C 2	T						
12..	.1	C 2	T						
13..	.1	C 2	T						
14..	.1	C 2	T						
15..	.1	C 2	T						
16..	.1	C 2	T						
17..	.1	C 2	T						
18..	.1	C 2	T						
19..	0	--	0						
20..	0	--	0						
21..	0	--	0						
22..	0	--	0						
23..	0	--	0						
24..	0	--	0						
25..	0	--	0						
26..	0	--	0						
27..	0	--	0						
28..	0	--	0						
29..	0	--	0						
30..	0	--	0						
31..	0	--	0						
Total	3.8	--	T	0	--	0	0	--	0
Total discharge for year (cfs-days).....								12160.7	
Total load for year (tons).....								2397.0	

T Less than 0.05 ton.

C Composite period.

JOHN DAY RIVER BASIN--Continued

14-0440. MIDDLE FORK JOHN DAY RIVER AT RITTER, OREG.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (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. 18, 1966.....	1920	--		34	5	T												
Dec. 15.....	1155	37		300	28	23												
Jan. 29, 1967.....	1335	38		1150	602	1870												
Jan. 31.....	1355	37		576	39	61												
Feb. 20.....	1000	33		142	9	3												
Mar. 23.....	1200	41		460	30	37												
Apr. 19.....	1020	43		289	11	9												
May 8.....	1210	54		814	190	418												
May 19.....	1135	48		1080	72	210												
June 29.....	1300	68		185	10	5												

T Less than 0.50 ton.

14-0460. NORTH FORK JOHN DAY RIVER AT MONUMENT, OREG.

LOCATION.--Lat 44°48'50", long 119°25'50", temperature recorder at gaging station on right bank, 0.7 mile downstream from Cottonwood Creek, 0.8 mile west of Monument, Grant County, and at mile 15.3.

DRAINAGE AREA.--2,520 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: July 1966 to September 1967.
 EXTREMES.--Water temperatures: Maximum, 83°F Aug. 19; minimum, freezing point on several days during December and January.

EXTREMES, July 1966 to September 1967.--Water temperatures: Maximum, 84°F Aug. 2, 1966; minimum, freezing point on several days during December 1966 and January 1967.

REMARKS.--Recorder stopped Feb. 4-28, June 27-29; temperature ranges, 34°F to 39°F and 67°F to 69°F, respectively.

Temperature (°F) of water, water year October 1966 to September 1967																																Average		
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				
October	65	62	62	64	63	64	65	63	59	59	54	53	52	51	56	52	53	52	50	49	46	48	54	55	56	51	50	48	53	53				
Maximum	67	58	53	54	55	56	57	55	51	50	50	46	44	47	45	47	45	44	45	44	44	47	49	49	50	48	45	45	47	48				
Minimum																																		
November																																		
Maximum	51	49	47	45	42	44	42	42	39	43	40	44	46	48	46	47	44	43	46	45	42	41	38	37	36	38	39	42	42	--	42			
Minimum	46	44	42	40	40	41	40	38	38	38	39	40	42	44	45	44	42	40	43	42	40	38	36	34	34	34	37	39	40	--	40			
December																																		
Maximum	43	42	41	42	40	38	36	34	35	36	39	41	39	38	36	36	37	38	37	38	37	34	32	32	33	34	34	35	34	34	36			
Minimum	42	40	39	40	38	36	34	33	32	34	36	37	37	38	39	39	38	37	38	39	39	38	36	34	34	36	38	40	39	38				
January	55	56	56	58	57	57	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56				
Maximum	52	53	54	56	55	54	54	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53				
Minimum																																		
February	37	38	38																															
Maximum	36	36	37																															
Minimum																																		
March																																		
Maximum	42	40	39	38	38	40	40	40	41	40	41	40	40	38	41	45	43	43	44	44	44	44	43	42	42	42	43	42	40	42	41			
Minimum	40	37	35	34	34	35	37	39	38	38	36	37	35	36	41	40	41	40	41	42	42	40	38	38	40	39	37	38	38	38				
April																																		
Maximum	43	43	46	47	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	47	47	46	46	45	43	45	45			
Minimum	40	39	41	43	44	43	43	44	43	42	40	43	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40			
May																																		
Maximum	54	52	53	53	55	54	54	54	53	47	45	44	51	53	56	56	53	53	54	55	54	54	52	54	57	56	54	52	50	52	52			
Minimum	43	45	47	48	49	50	50	49	47	43	42	43	43	49	50	52	53	50	52	53	53	52	51	49	48	52	54	51	49	48	48			
June																																		
Maximum	53	58	57	59	59	60	61	62	62	60	58	57	58	62	65	67	68	67	66	60	61	64	68	69	--	--	--	--	--	--	62			
Minimum	46	51	53	54	54	54	55	56	56	50	54	53	54	55	58	60	62	62	64	63	60	57	56	58	61	64	--	--	--	--	57			
July																																		
Maximum	73	76	74	75	76	75	75	75	74	75	76	79	81	79	78	77	77	77	76	79	78	80	82	80	78	79	74	77	78	80	77			
Minimum	66	68	71	69	70	68	67	68	68	68	70	73	71	69	70	68	68	68	69	69	70	70	73	72	71	70	69	67	69	71	69			
August																																		
Maximum	79	77	78	78	78	76	75	76	78	75	77	80	80	80	80	82	83	82	81	80	78	75	75	75	74	73	78	77	77	77	77			
Minimum	71	68	69	68	60	68	66	65	67	70	68	69	69	69	70	69	70	71	71	71	71	71	71	71	71	71	71	71	71	71	71			
September																																		
Maximum	76	77	76	78	71	76	77	76	74	68	65	68	66	69	71	70	71	72	74	73	73	69	67	68	68	68	69	65	63	--	70	70		
Minimum	66	65	64	65	68	65	65	65	64	63	60	58	57	58	60	61	62	63	64	65	60	58	58	58	58	58	59	60	60	--	61	61		

JOHN DAY RIVER BASIN--Continued

14-0480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

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..	67	C 24	4.3	299	C 24	19	742	59	118	
2..	67	C 24	4.3	299	C 24	19	920	70	174	
3..	77	C 24	5.0	299	C 24	19	1000	—	260	
4..	82	C 24	5.3	292	C 24	19	1580	690	2900	E
5..	114	C 24	7.4	285	C 24	18	1560	432	1820	B
6..	114	C 24	7.4	292	C 24	19	1510	142	579	
7..	111	C 24	7.2	306	C 24	20	1480	119	476	
8..	98	C 24	6.4	313	C 24	20	1580	106	452	
9..	104	C 24	6.7	327	C 24	21	1350	71	259	
10..	126	C 24	8.2	334	C 24	22	1290	64	223	
11..	126	C 24	8.2	342	C 24	22	1240	49	164	
12..	130	C 24	8.4	364	C 24	24	1290	42	146	
13..	130	C 24	8.4	372	C 24	24	1410	84	320	
14..	169	C 24	11	410	C 24	27	2220	850	8260	S
15..	169	C 24	11	499	28	38	6820	1740	34100	S
16..	174	C 24	11	589	40	64	4380	642	7590	
17..	184	C 24	12	580	40	63	3180	240	2060	
18..	222	C 24	14	598	42	68	2600	120	842	
19..	246	C 24	16	751	69	140	2200	70	416	
20..	252	C 24	16	880	110	261	1960	51	270	
21..	240	C 24	16	860	339	787	1800	43	209	
22..	264	C 24	17	778	48	101	1690	31	141	
23..	264	C 24	17	1180	166	559	1610	24	104	
24..	264	C 24	17	1100	242	719	1410	20	76	
25..	264	C 24	17	930	105	264	1290	C 16	56	
26..	292	C 24	19	832	112	252	1190	C 16	51	
27..	313	C 24	20	787	106	225	1230	C 16	53	
28..	313	C 24	20	733	79	156	1220	C 16	53	
29..	327	C 24	21	733	83	164	1170	C 16	51	
30..	327	C 24	21	733	66	131	1090	C 16	47	
31..	313	C 24	20	—	—	—	1070	C 16	46	
Total	5943	—	383.2	17097	—	4285	55082	—	62316	
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..	1090	C 16	47	6650	515	9250	1500	C 13	53	
2..	1050	C 16	45	5250	155	2200	1600	C 13	56	
3..	1040	C 16	45	4360	100	1180	1700	C 13	60	
4..	1030	C 16	44	3820	69	712	1600	C 13	56	
5..	990	C 16	43	3420	50	462	1500	C 13	53	
6..	1020	C 16	44	3140	39	331	1500	C 13	53	
7..	1030	C 16	44	2900	34	266	1410	C 13	49	
8..	1020	C 16	44	2580	30	209	1450	C 13	51	
9..	960	C 16	41	2490	27	182	1470	C 13	52	
10..	950	C 16	41	2280	26	160	1440	C 13	51	
11..	940	C 16	41	2230	21	126	1480	C 13	52	
12..	950	C 16	41	2120	22	126	1550	C 13	54	
13..	990	C 16	43	1970	C 13	69	1560	C 13	55	
14..	1000	C 16	43	1850	C 13	65	1450	C 13	51	
15..	1110	C 16	48	1820	C 13	64	1390	C 13	49	
16..	1390	— E	83	1750	C 13	61	1370	C 13	48	
17..	1800	31 B	150	1630	C 13	57	1310	C 13	46	
18..	2280	127	782	1560	C 13	55	2640	86	1020	S
19..	1940	48	251	1630	C 13	57	3640	163	1600	
20..	1690	34	155	1800	C 13	63	3400	182	1670	
21..	1630	32	141	1600	C 13	56	3050	76	626	
22..	1910	26	134	1400	C 13	49	3030	45	368	
23..	2020	30	164	1400	C 13	49	3090	40	334	
24..	1830	30	148	1500	C 13	53	3340	48	433	
25..	1540	22	91	1480	C 13	52	3670	56	555	
26..	1340	17	62	1600	C 13	56	3560	49	471	
27..	1520	16	66	1600	C 13	56	3160	34	290	
28..	2360	190	1210	1500	C 13	53	2880	25	194	
29..	4280	1900 J	33000	—	—	—	2690	26	189	
30..	10300	2630	73100	—	—	—	2650	19	136	
31..	9460	1470 S	40400	—	—	—	2650	16	114	
Total	62460	—	150591	67330	—	16119	68730	—	8889	

E Estimated.

S Computed by subdividing day.

B Computed from estimated-concentration graph.

C Composite period.

J Computed from partly estimated-concentration graph and subdividing day.

JOHN DAY RIVER BASIN--Continued

14-0480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Suspended sediment, water year October 1966 to September 1967--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..	2470	15	100	2850	27	208	4960	72	964	
2..	2410	14	91	2880	28	218	4450	1920	23100	
3..	2360	14	89	2970	29	233	4260	1760	20200	
4..	2440	15	99	2870	31	240	3930	23	244	
5..	2290	16	99	2880	32	249	3670	25	248	
6..	2390	16	103	3050	40	329	3620	42	411	
7..	2540	19	130	3280	46	407	3580	22	213	
8..	2610	21	148	4000	75	810	3560	20	192	
9..	2700	26	190	5150	188	2610	3380	23	210	
10..	2970	28	225	6540	382	6750	3280	18	159	
11..	3100	32	268	9040	893	21800	3200	14	121	
12..	3200	34	294	8570	584	13500	3030	15	123	
13..	3220	29	252	7220	246	4800	2940	14	111	
14..	3120	30	253	6740	145	2640	2790	13	98	
15..	3030	23	188	6210	117	1960	2650	12	86	
16..	3030	22	180	5950	102	1640	2600	10	70	
17..	2850	20	154	6290	110	1870	2500	10	68	
18..	2690	16	116	7700	185	3850	2440	11	72	
19..	2520	14	95	9500	351	9000	2420	11	72	
20..	2420	13	85	9640	371	9660	2470	16	107	
21..	2310	11	69	9250	319	7970	2810	35	266	
22..	2170	14	82	9320	283	7120	2810	5600	42500	
23..	2090	12	68	10100	338	9220	4080	1200	13200	
24..	2010	10	54	10200	350	9640	3600	700	6800	
25..	2120	10	57	9040	262	6390	3010	250	2030	
26..	2560	19	131	7640	160	3300	2560	123	850	
27..	2970	49	417	6400	125	2160	2210	77	459	
28..	3120	121	1020	5660	91	1390	1990	51	274	
29..	3030	56	458	5270	105	1490	1790	29	140	
30..	2960	37	296	5450	91	1340	1830	17	75	
31..	--	--	--	5320	76	1090	--	--	--	
Total	79700	--	5811	196980	--	133884	92220	--	113463	
JULY			AUGUST			SEPTEMBER				
1..	1440	13	51	161	C 8	3.5	66	C 8	1.4	
2..	1310	13	46	153	C 8	3.3	62	C 8	1.3	
3..	1180	17	54	145	C 8	3.1	58	C 8	1.3	
4..	1050	16	45	141	C 8	3.0	62	C 8	1.3	
5..	960	C 12	31	137	C 8	3.0	55	C 8	1.2	
6..	900	C 12	29	123	C 8	2.7	55	C 8	1.2	
7..	841	C 12	27	113	C 8	2.4	55	C 8	1.2	
8..	787	C 12	25	110	C 8	2.4	58	C 8	1.3	
9..	733	C 12	24	103	C 8	2.2	55	C 8	1.2	
10..	670	C 12	22	110	C 8	2.4	58	C 8	1.3	
11..	625	C 12	20	107	C 8	2.3	58	C 8	1.3	
12..	589	C 12	19	103	C 8	2.2	62	C 8	1.3	
13..	562	C 12	18	100	C 8	2.2	62	C 8	1.3	
14..	517	C 12	17	97	C 8	2.1	58	C 8	1.3	
15..	474	C 12	15	97	C 8	2.1	53	C 8	1.1	
16..	418	C 12	14	95	C 8	2.1	71	C 8	1.5	
17..	403	C 12	13	81	C 8	1.7	71	C 8	1.5	
18..	375	C 12	12	76	C 8	1.6	88	C 8	1.9	
19..	347	C 8	7.5	76	C 8	1.6	103	C 8	2.2	
20..	340	C 8	7.3	71	C 8	1.5	120	C 8	2.6	
21..	327	C 8	7.1	69	C 8	1.5	110	C 8	2.4	
22..	334	C 8	7.2	73	C 8	1.6	100	C 8	2.2	
23..	301	C 8	6.5	69	C 8	1.5	95	C 8	2.1	
24..	275	C 8	5.9	66	C 8	1.4	97	C 8	2.1	
25..	242	C 8	5.2	58	C 8	1.3	89	C 8	1.9	
26..	226	C 8	4.9	47	C 8	1.0	89	C 8	1.9	
27..	220	C 8	4.8	51	C 8	1.1	89	C 8	1.9	
28..	206	C 8	4.4	53	C 8	1.1	97	C 8	2.1	
29..	182	C 8	3.9	44	C 8	1.0	97	C 8	2.1	
30..	169	C 8	3.7	47	C 8	1.0	97	C 8	2.1	
31..	169	C 8	3.7	53	C 8	1.1	--	--	--	
Total	17172	--	554.1	2829	--	61.0	2290	--	49.5	
Total discharge for year (cfs-days).....										667833
Total load for year (tons).....										496405.8

S Computed by subdividing day.

C Composite period.

JOHN DAY RIVER BASIN--Continued

14-0480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1966 to September 1967
 (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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (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	
Dec. 14, 1966.....	1620	44		1770	756	3610	27	29	43	59	87	93	98	100	--			VPWC
Jan. 30, 1967.....	0930	43		10100	1910	52100	19	22	31	43	58	76	88	97	100			VPWC
Jan. 31.....	0930	43		8350	1830	29500	23	26	38	49	64	78	88	98	100			VPWC
Mar. 1.....	0930	53		8420	892	27900	23	26	38	49	64	78	88	98	100			VPWC
May 12.....	1120	52		8630	569	11900	22	30	32	51	64	69	75	93	100			VPWC

DESCUTES RIVER BASIN--Continued
 14-1030. DESCUTES RIVER AT WOODY, NEAR BIGGS, OREG.

LOCATION.--Lat 45°37'20"; long 120°54'05", temperature recorder at gaging station on right bank, 4.0 miles southwest of Biggs, Sherman County, and at mile 1.4.
 DRAINAGE AREA.--10,500 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: August 1911 to July 1912, December 1932 to February 1954.
 Prior temperatures: December 1952 to February 1954, November 1954 to September 1958, June 1962 to September 1967.
 EXTREMES.--Water temperatures: Maximum, 68°F; minimum, 33°F several days during December and January.
 EXTREMES, 1952-58, 1962-67.--Water temperatures: Maximum, 72°F July 12, 13, 1964; minimum, 33°F Dec. 30, 1955.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
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	59	59	59	59	59	60	60	58	56	56	54	54	54	55	54	54	53	53	52	52	55	57	55	55	55	53	53	53	54	55	55	
Maximum	57	57	57	56	56	57	58	58	56	54	54	53	52	53	53	52	52	52	50	50	50	52	55	54	55	53	52	52	52	54	53	53	
Minimum	56	53	52	51	51	52	51	50	50	50	50	49	49	49	50	51	50	49	50	49	49	49	47	47	47	47	47	47	47	48	49	49	
November	52	52	51	50	51	51	50	50	50	49	49	48	49	49	49	50	49	49	49	49	49	48	47	46	47	46	47	46	47	48	—	—	
December	49	49	48	48	47	46	46	45	45	44	45	45	47	47	45	45	45	46	46	46	46	45	44	44	44	44	44	44	44	44	45	45	
Maximum	49	48	48	47	46	46	45	45	44	44	44	45	45	45	45	45	45	46	46	46	46	45	44	44	44	44	43	43	43	42	44	44	
Minimum	43	43	44	44	42	43	44	44	44	44	45	45	46	46	46	45	43	42	43	43	45	45	44	44	44	45	46	46	46	44	44	44	
January	43	43	44	44	44	42	43	44	44	44	44	44	45	46	46	45	43	42	43	45	45	44	44	44	45	46	46	46	44	44	44	44	
February	43	43	44	44	44	42	43	44	44	44	44	44	45	46	46	45	43	42	43	45	45	44	44	44	45	46	46	46	44	44	44	44	
Maximum	45	45	45	46	46	45	45	44	44	44	44	44	45	45	44	44	44	44	44	44	44	45	45	46	46	46	47	47	47	47	47	47	
Minimum	44	45	45	45	45	44	44	44	44	44	44	44	44	45	43	43	44	44	44	43	43	44	45	45	45	45	45	45	46	—	—	—	
March	47	46	45	45	46	46	46	46	46	46	45	46	46	46	46	46	47	48	48	47	49	50	49	50	49	48	48	48	48	47	46	46	
Maximum	45	45	43	43	44	44	45	45	45	45	44	44	44	44	45	44	44	46	46	46	46	48	48	47	46	46	47	46	45	45	45	45	
Minimum	40	40	39	39	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
April	50	51	52	52	52	52	53	52	53	51	53	52	52	51	52	51	49	50	52	51	54	55	54	53	53	52	53	53	54	54	55	52	
Maximum	45	47	48	49	50	49	49	49	50	49	48	50	48	49	48	49	48	48	48	48	49	49	50	51	51	50	50	48	50	50	50	48	
Minimum	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
May	56	58	57	57	58	57	58	59	58	56	53	55	55	56	56	58	59	58	60	61	60	58	57	57	58	58	57	58	57	56	55	57	
Maximum	51	52	52	53	54	55	55	55	55	55	52	51	50	51	53	54	55	54	55	56	56	55	54	53	53	54	55	54	55	54	55	53	
Minimum	45	47	48	49	50	49	49	49	50	49	48	50	48	49	48	49	48	48	48	48	49	49	50	51	51	50	50	48	50	50	50	48	
June	56	58	59	60	59	59	59	59	60	59	59	58	61	63	64	65	66	66	66	66	64	58	60	63	65	65	65	66	67	67	67	67	
Maximum	53	54	55	55	56	55	55	55	55	55	55	55	56	58	59	60	61	61	62	62	61	62	62	63	63	63	63	63	63	63	63	61	
Minimum	48	49	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
July	60	61	62	63	62	61	59	60	59	60	61	63	62	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
Maximum	60	61	62	63	62	61	59	60	59	60	61	63	62	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
Minimum	53	54	55	55	56	55	55	55	55	55	55	55	56	58	59	60	61	61	62	62	61	62	62	63	63	63	63	63	63	63	63	61	
August	66	65	65	65	65	65	65	65	65	66	67	67	67	66	66	64	65	65	65	66	66	67	68	69	68	67	67	65	66	67	66	66	
Maximum	67	66	66	65	65	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
Minimum	62	61	61	61	61	60	60	60	61	62	61	62	62	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	61	
September	65	66	66	65	65	65	64	63	61	60	61	62	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	
Maximum	62	61	62	63	61	61	62	61	61	59	57	57	57	58	59	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Minimum	59	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	

COLUMBIA RIVER MAIN STEM--Continued

14-1057. COLUMBIA RIVER AT THE DALLES, OREG.--Continued

Nutrient analyses, in parts per million

Date of collection	Total Nitrogen as NO ₃	Total Phosphorous as PO ₄
July 1, 1967...	1.0	0.16
Aug. 1.....	1.7	.10
Sept. 1.....	1.4	.08

Pesticide analyses, in parts per billion

Date of collection	Insecticide									Herbicide		
	Aldrin	DDD	DDE	DDT	Dieldrin	Endrin	Heptachlor	Heptachlor Epoxide	Lindane	2, 4-D	2, 4, 5-T	Silvex
Oct. 16, 1966.	a	0.01	a	a	a	a	a	a	a	a	a	0.03
Nov. 21.....	a	a	a	a	a	a	a	a	a	a	a	a
Dec. 19.....	a	a	a	a	a	a	a	a	a	a	a	a
Jan. 26, 1967.	a	a	a	a	a	a	a	a	a	a	a	a
Feb. 8.....	0.01	a	a	a	a	a	a	a	a	a	a	a
Mar. 21.....	a	a	a	a	a	a	0.02	a	a	a	a	a
May 3.....	a	a	a	a	a	a	a	a	a	a	a	a
June 14.....	a	a	a	0.01	a	a	.01	a	a	a	a	a
Aug. 29.....	a	a	a	a	a	a	a	a	a	a	a	a
Sept. 19.....	a	a	a	a	a	a	a	a	a	a	a	a

a Not detected.

COLUMBIA RIVER MAIN STEM--Continued
14-1057. COLUMBIA RIVER AT THE DALLES, OREG.--Continued
Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	207	216	206	198	--	200	191	178	--	132	143	156
2.....	206	216	208	206	195	198	190	177	131	132	145	156
3.....	205	220	218	201	202	198	192	178	130	131	147	156
4.....	194	217	216	193	215	208	188	179	130	129	144	157
5.....	196	214	214	191	226	205	184	180	128	133	144	157
6.....	188	214	212	195	224	204	184	180	127	133	148	155
7.....	188	214	206	198	230	201	184	176	126	136	144	156
8.....	188	214	211	202	227	197	193	176	121	131	145	156
9.....	189	220	211	204	227	197	193	176	121	131	145	156
10.....	196	213	216	200	218	201	187	174	118	130	145	165
11.....	204	210	223	194	202	209	189	173	117	134	146	170
12.....	198	211	221	195	204	203	189	170	121	135	147	171
13.....	207	201	211	200	198	196	195	174	119	136	148	170
14.....	202	202	204	204	198	198	200	171	--	140	148	167
15.....	206	212	207	219	201	192	201	170	122	138	152	164
16.....	203	210	216	224	204	189	194	163	123	139	152	163
17.....	198	203	216	214	207	195	189	158	123	141	152	171
18.....	198	202	214	212	214	201	190	153	123	149	156	173
19.....	200	204	214	211	214	200	188	149	122	140	162	173
20.....	206	211	206	210	204	191	190	153	124	137	155	174
21.....	195	218	200	216	204	190	189	159	118	140	153	172
22.....	195	224	207	220	204	189	187	158	118	141	156	173
23.....	204	223	219	230	218	193	184	150	120	141	156	173
24.....	219	215	225	230	210	195	184	135	122	141	155	188
25.....	224	220	228	233	209	206	184	127	119	143	154	182
26.....	214	218	226	223	210	200	186	123	126	145	159	177
27.....	209	221	212	217	206	199	187	120	119	142	156	181
28.....	208	228	206	205	202	206	186	122	124	144	156	175
29.....	208	212	212	212	--	202	184	122	124	144	156	175
30.....	207	212	189	192	--	193	182	127	122	143	154	182
31.....	212	--	188	188	--	193	--	127	--	146	153	--
Average	202	214	211	207	209	198	188	157	123	138	150	168

CLICKITAT RIVER BASIN

14-1130. CLICKITAT RIVER NEAR PITT, WASH.

LOCATION.--Lat 45°45'30", long 121°12'30", temperature recorder at gaging station 3.5 miles south of Pitt, Klickitat County, 5 miles upstream from Silvias Creek, and at mile 7.0.

DRAINAGE AREA.--1,297 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959, October 1966 to September 1967.

Water temperature: September 1967 to August 1968 to September 1969. Maximum, 85°F July 13, 24; minimum, 37°F Dec. 9, 10.

EXTREMES, 1966-67.--Water temperatures: Maximum, 85°F July 28, 29, 1958, July 18, 1960; minimum, freezing point Jan. 31 to Feb. 4, 1956, Jan. 3-7, 1959, Dec. 11, 12, 1961, Dec. 21, 22, 1964.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl sulfide (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium carbonate ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
															Parts per million	Tons per acre-foot	Tons per day						
Oct. 26, 1966.	726	26	7.8	4.3	4.5	1.5	48	0	5.2	1.0	0.1	0.6	--	--	75	0.10	147	37	0	0	83	7.2	5
Nov. 18.....	844	39	7.0	3.6	4.2	1.2	48	0	2.0	1.0	0.1	0.2	--	--	A 82	0.11	187	32	0	0	78	7.3	0
Dec. 29.....	1210	26	7.0	3.5	3.9	1.3	45	0	1.6	1.5	0.0	0.9	--	--	71	0.10	263	32	0	0	78	7.5	10
Jan. 25, 1967.	1390	29	6.8	3.5	3.8	1.2	44	0	1.8	1.0	0.1	0.4	0.00	70	10	262	32	0	0	79	7.5	13	
Feb. 25.....	1310	28	6.8	3.4	3.8	1.4	45	0	1.0	1.0	0.1	0.2	--	--	A 68	0.09	241	21	0	0	76	7.7	5
Mar. 30.....	1400	28	5.7	3.0	3.8	1.3	44	0	1.4	1.0	0.0	0.1	--	--	A 66	0.09	249	26	0	0	76	7.8	5
Apr. 20.....	1180	29	6.6	3.4	2.9	1.5	48	0	0	0	1.0	0.1	0.2	--	73	0.10	233	30	0	0	78	7.5	5
May 26.....	2700	22	4.3	2.0	2.9	1.2	30	0	1.0	0.0	0.3	--	--	--	A 49	0.07	357	18	0	0	52	7.4	5
June 17.....	2760	19	3.5	2.1	2.5	0.9	28	0	1.6	0.2	0.1	0.1	--	--	A 44	0.06	328	17	0	0	46	7.3	10
July 21.....	1020	26	5.5	2.8	3.6	2.2	39	0	2.4	0.5	0.1	0.0	0.02	70	62	0.08	171	25	0	0	68	7.8	5
Aug. 18.....	804	27	6.0	2.7	4.0	1.5	39	0	3.2	0.2	0.1	0.4	--	--	70	0.10	152	26	0	0	72	7.7	5
Sept. 21.....	698	28	6.3	3.4	4.1	1.8	46	0	2.6	0.8	0.1	0.1	--	--	74	0.10	139	30	0	0	78	7.6	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis- solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa- valent chromi- um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis- solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa- valent chromi- um (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 26, 1966.	11.7	36	--	--	--	--	May 26, 1967..	11.8	430	--	--	--	--
Nov. 18.....	13.4	930	0.01	--	--	--	June 17.....	11.4	230	--	--	--	--
Feb. 25.....	12.4	930	--	0.01	0.00	--	July 21.....	13.4	0	0.00	0.00	0.00	0.00
Mar. 30.....	12.2	36	--	--	--	--	Aug. 18.....	10.8	36	--	--	--	--
Apr. 20.....	11.9	0	--	--	--	--	Sept. 21.....	10.8	36	--	--	--	--

WHITE SALMON RIVER BASIN

14-1235. WHITE SALMON RIVER NEAR UNDERWOOD, WASH.

LOCATION --Lat 45°45'10", long 121°31'35", at gaging station 1,000 feet downstream from Pacific Power and Light Co.'s. conduit powerplant, 2 miles north of Underwood, Shumania County, and at mile 1.9.
DRAINAGE AREA.--386 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1966 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (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		Specific conductance (micro-mhos at 25° C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
Dec. 29, 1966.	921	25	5.5	1.8	3.3	1.1	33	0	2.2	0.5	0.1	0.3	--	57	0.08	142	21	0	60	7.4	5
Jan. 25, 1967.	1410	27	5.1	2.3	3.2	1.4	34	0	2.0	.5	.1	.2	0.08	61	.08	232	22	0	60	7.5	5
Feb. 25.....	1290	32	5.8	2.6	3.4	1.1	34	0	2.8	1.0	.1	.1	--	A 66	.09	230	25	0	61	7.8	5
Mar. 30.....	1280	25	4.5	2.6	3.4	1.1	35	0	1.4	1.0	.0	.2	--	A 56	.08	194	22	0	60	7.5	5
Apr. 20.....	1040	27	4.9	2.4	3.4	1.4	35	0	2.2	.5	.2	.1	--	A 59	.08	166	22	0	62	7.3	0
May 26.....	1360	27	4.0	1.8	2.7	1.0	28	0	1.6	1.0	.1	.1	--	47	.06	173	18	0	49	7.3	5
July 21.....	783	27	5.0	2.7	3.3	1.5	36	0	2.6	.8	.1	.1	.02	67	.09	138	24	0	65	7.7	5
Sept. 21.....	573	26	5.1	2.8	3.7	1.8	38	0	4.2	.5	.1	.1	--	64	.09	99.0	24	0	70	7.3	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Jan. 25, 1967.	--	--	0.00	0.02	0.00		May 26, 1967..	12.3	210	--	--	--	--
Feb. 23.....	12.2	0	--	--	--		June 17.....	11.2	430	--	--	--	--
Mar. 30.....	11.9	36	--	--	--		July 21.....	10.4	36	0.00	0.00	0.00	--
Apr. 20.....	11.6	91	--	--	--		Sept. 21.....	11.5	--	--	--	--	--

SANDY RIVER BASIN

14-1388.5. BULL RUN RIVER NEAR MULTNOMAH FALLS, OREG.

LOCATION.--Lat 45°29'50", long 122°00'50", at gaging station on right bank, 1.2 miles above North Fork, 7.0 miles southeast of Multnomah Falls, and at mile 14.8.

DRAINAGE AREA.--47.9 square miles.

RECORDS AVAILABLE.--Sediment records: October 1966 to September 1967.

EXTREMES, 1966-67.--Sediment concentrations: Maximum daily, (estimated) 56 ppm Jan. 13; minimum daily, less than 1 ppm on several days during December.

Sediment loads: Maximum daily, (estimated) 510 tons Jan. 13; minimum daily, less than 0.05 ton on several days during December.

Suspended sediment, water year October 1966 to September 1967

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..	81	C 1	0.2	232	C 2	1.3	360	C 1	1.0
2..	116	C 1	.3	197	C 2	1.1	329	C 1	.9
3..	89	C 1	.2	173	C 2	.9	305	C 1	.8
4..	82	C 1	.2	151	C 2	.8	413	C 1	1.1
5..	76	C 1	.2	191	C 2	1.0	447	C 1	1.2
6..	75	C 1	.2	228	C 2	1.2	472	C 1	1.3
7..	110	C 1	.3	189	C 2	1.0	403	C 1	1.1
8..	148	C 1	.4	173	C 2	.9	320	C 1	.9
9..	110	C 1	.3	240	C 2	1.3	274	C 1	.7
10..	94	C 1	.3	444	5 B	6.0	716	4 B	7.7
11..	88	C 1	.2	880	9 A	21	930	5 B	13
12..	140	C 1	.4	1520	9 A	37	1790	13	63
13..	150	C 1	.4	1000	2 A	5.4	3420	44 A	410
14..	130	C 1	.4	2050	15 A	83	1810	10	49
15..	110	C 1	.3	1460	3 B	12	880	-- E	2.4
16..	100	C 1	.3	1220	3	9.9	605	-- E	1.6
17..	95	C 1	.3	930	1	2.5	469	C 1	T
18..	90	C 1	.2	553	-- E	1.5	412	C 1	T
19..	95	C 1	.3	442	-- E	1.2	396	C 1	T
20..	400	5 B	5.4	390	-- E	1.1	508	C 1	T
21..	700	1	1.9	329	1	.9	407	C 1	T
22..	2000	2 B	11	268	1	.7	343	C 1	T
23..	1200	2 B	6.5	232	5	3.1	301	C 1	T
24..	700	2 B	3.8	203	-- E	.5	297	C 1	T
25..	500	3 B	4.1	582	4 A	6.3	294	C 1	T
26..	420	C 2	2.3	551	C 1	1.5	252	C 1	T
27..	360	C 2	1.9	407	C 1	1.1	225	C 1	T
28..	286	C 2	1.5	332	C 1	.9	218	C 1	T
29..	265	C 2	1.4	282	C 1	.8	385	3 B	3.1
30..	367	C 2	2.0	316	C 1	.9	403	3 B	3.3
31..	274	C 2	1.5	--	--	--	549	4 B	5.9
Total	9451	--	48.7	16165	--	206.8	18933	--	568.0

E Estimated.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

SANDY RIVER BASIN--Continued

14-1388.5. BULL RUN RIVER NEAR MULTNOMAH FALLS, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--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..	1040	7 B	20	519	-- E	2.8	438	-- E	3.5
2..	637	2 B	3.4	579	-- E	4.7	388	-- E	2.1
3..	1570	10	42	507	-- E	2.7	326	-- E	1.8
4..	1080	-- E	5.8	517	-- E	2.8	288	-- E	1.6
5..	726	-- E	2.0	496	-- E	2.7	262	-- E	1.4
6..	497	-- E	1.3	422	-- E	2.3	245	-- E	1.3
7..	393	-- E	1.1	363	-- E	2.0	228	-- E	2.5
8..	343	-- E	.9	321	-- E	1.7	232	-- E	3.1
9..	322	-- E	.9	300	-- E	1.6	372	11 A	11
10..	325	4	3.5	339	4	3.7	289	-- E	3.9
11..	639	4 B	6.9	327	-- E	1.8	245	C 2	1.3
12..	940	7 B	18	323	-- E	1.7	217	C 2	1.2
13..	3340	56 B	510	437	-- E	3.5	205	C 2	1.1
14..	2080	18 B	100	367	-- E	2.0	189	C 2	1.0
15..	1760	10 B	48	328	-- E	1.8	206	C 2	1.1
16..	1210	4 B	13	493	2 B	2.7	286	C 2	1.5
17..	758	7 A	14	2020	13 A	71	391	C 2	2.1
18..	523	-- E	4.2	1390	11 B	41	465	C 2	2.5
19..	872	4 A	9.4	694	-- E	13	375	C 2	2.0
20..	1120	2	6.0	493	-- E	8.0	443	C 2	2.4
21..	676	-- E	1.8	405	5	5.5	449	C 2	2.4
22..	482	1	1.3	348	-- E	1.9	525	C 2	2.8
23..	397	-- E	1.1	312	-- E	1.7	735	C 2	4.0
24..	337	-- E	.9	290	-- E	1.6	561	C 2	3.0
25..	302	-- E	.8	313	-- E	1.7	452	C 2	2.4
26..	894	9 B	22	295	-- E	1.6	392	C 2	2.1
27..	2680	21 A	150	280	-- E	1.5	343	C 2	1.9
28..	2670	19 B	140	358	4	3.8	313	C 2	1.7
29..	1670	11 B	50	--	--	--	283	C 2	1.5
30..	1100	6	18	--	--	--	253	C 2	1.4
31..	668	-- E	5.4	--	--	--	230	C 2	1.2
Total	32051	--	1201.7	13836	--	192.9	10626	--	72.8
	APRIL			MAY			JUNE		
1..	218	C 2	1.2	203	C 2	1.1	325	C 2	1.8
2..	215	C 2	1.2	199	C 2	1.1	328	C 2	1.8
3..	225	C 2	1.2	211	C 2	1.1	304	C 2	1.6
4..	245	C 2	1.3	230	C 2	1.2	292	C 2	1.6
5..	250	C 2	1.3	253	C 2	1.4	284	C 2	1.5
6..	238	C 2	1.3	310	C 2	1.7	261	C 2	1.4
7..	252	C 2	1.4	376	C 2	2.0	233	C 2	1.3
8..	271	C 2	1.5	455	C 2	2.5	213	C 2	1.2
9..	258	C 2	1.4	487	C 2	2.6	196	C 2	1.1
10..	248	C 2	1.3	396	C 2	2.1	185	C 2	1.0
11..	240	C 2	1.3	369	C 2	2.0	180	C 2	1.0
12..	245	C 2	1.3	350	C 2	1.8	173	C 2	.9
13..	399	C 2	2.2	300	C 2	1.6	165	C 2	.9
14..	337	C 2	1.8	310	C 2	1.7	163	C 2	.9
15..	286	C 2	1.5	373	C 2	2.0	163	C 2	.9
16..	258	C 2	1.4	483	C 2	2.6	163	C 2	.9
17..	235	C 2	1.3	544	C 2	2.9	161	C 2	.9
18..	240	C 2	1.3	498	C 2	2.7	153	C 2	.8
19..	220	C 2	1.2	486	C 2	2.6	146	C 2	.8
20..	207	C 2	1.1	528	C 2	2.9	163	C 2	.9
21..	195	C 2	1.1	538	C 2	2.9	160	C 2	.9
22..	193	C 2	1.0	501	C 2	2.7	283	C 2	1.5
23..	197	C 2	1.1	425	C 2	2.3	203	C 2	1.1
24..	209	C 2	1.1	346	C 2	1.9	170	C 2	.9
25..	242	C 2	1.3	293	C 2	1.6	150	C 2	.8
26..	250	C 2	1.3	277	C 2	1.5	137	C 2	.7
27..	252	C 2	1.4	268	C 2	1.4	128	C 2	.7
28..	230	C 2	1.2	295	C 2	1.6	118	C 2	.6
29..	209	C 2	1.1	362	C 2	2.0	110	C 2	.6
30..	207	C 2	1.1	434	C 2	2.3	104	C 2	.6
31..	--	--	--	353	C 2	1.9	--	--	--
Total	7271	--	39.2	11433	--	61.7	5814	--	31.6

E Estimated.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

SANDY RIVER BASIN--Continued

14-1388.5. BULL RUN RIVER NEAR MULTNOMAH FALLS, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

[illegible]

WASHOUGAL RIVER BASIN

14-1435. WASHOUGAL RIVER NEAR WASHOUGAL, WASH.

LOCATION --Lat 45°37'30", long 122°16'55", at county road bridge, 4.4 miles northeast of Washougal, Clark County, and 0.5 miles downstream from gage.
 DRAINAGE AREA.--108 square miles, approximately, upstream from gaging station.
 RECORDS AVAILABLE.--Chemical analyses: October 1966 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate		
Nov. 18, 1966.	1360	9.4		2.0	0.4	1.6	0.2	11	0	0.2	1.0	0.0	0.3	20	0.03	73.4	7	0	22	7.0
Dec. 28, 1966.	1170	7.9		2.0	.6	1.6	.2	11	0	.0	1.0	.0	.3	24	.03	75.8	8	0	23	7.1
Jan. 25, 1967.	975	11		2.7	.8	1.6	.6	12	0	.8	1.0	.0	.6	24	.03	63.2	10	0	25	7.1
Feb. 25, 1967.	664	9.5		2.7	1.0	1.5	.3	12	0	.0	2.0	.0	.2	A 23	.03	47.4	16	0	24	7.1
Mar. 30, 1967.	777	8.8		2.0	.7	1.8	.2	13	0	.2	1.0	.0	.3	A 21	.03	44.1	8	0	24	7.1
Apr. 20, 1967.	785	10		2.2	.6	1.7	.4	12	0	.2	1.0	.1	.3	21	.03	44.5	8	0	24	7.0
May 26, 1967.	244	9.5		2.0	.7	1.8	.4	14	0	.4	1.0	.0	.1	27	.04	17.8	8	0	25	7.1
July 21, 1967.	77	13		3.5	1.1	2.4	.7	21	0	.2	1.2	.0	.1	A 38	.05	7.90	13	0	42	7.6
Aug. 18, 1967.	53	13		3.5	.9	2.6	.6	20	0	.2	1.0	.0	.4	A 32	.04	4.58	12	0	39	7.3
Sept. 21, 1967.	47	11		3.3	1.0	2.6	.6	22	0	.2	1.2	.1	.2	31	.04	3.93	12	0	40	7.1

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexavalent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Jan. 25, 1967.	--	--	0.01	0.01	0.00		June 17, 1967.	9.2	930	--	--	--	--
Feb. 28, 1967.	12.2	91	--	--	--		July 21, 1967.	8.6	0	0.00	0.00	0.01	0.01
Mar. 30, 1967.	12.7	430	--	--	--		Aug. 18, 1967.	11.4	--	--	--	--	--
Apr. 20, 1967.	12.3	91	--	--	--		Sept. 21, 1967.	10.0	230	--	--	--	--
May 26, 1967.	6.4	930	--	--	--								

COLUMBIA RIVER MAIN STEM--Continued

14-1447. COLUMBIA RIVER AT VANCOUVER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	102	17	4680	99.0	10	2670	107	6	1730
2..	104	16	4490	96.9	10	2620	105	6	1700
3..	96.1	16	4150	97.9	10	2640	105	6	1700
4..	92.3	15	3740	106	10	2860	107	7	2020
5..	87.1	15	3530	103	8	2220	121	7	2290
6..	98.4	14	3720	109	8	2350	134	7	2530
7..	104	14	3930	103	6	1670	137	7	2590
8..	102	13	3580	105	6	1700	141	7	2660
9..	111	13	3900	101	6	1640	136	7	2570
10..	107	12	3470	104	6	1680	115	8	2480
11..	105	12	3400	99.6	9	2420	117	10	3160
12..	109	12	3530	110	7	2080	123	12	3990
13..	117	12	3790	107	8	2310	128	12	4150
14..	129	12	4180	112	10	3020	156	12	5050
15..	125	10	3370	126	10	3400	155	12	5020
16..	109	10	2940	125	10	3370	158	12	5120
17..	102	8	2200	118	10	3190	142	13	4980
18..	101	8	2180	136	10	3670	138	14	5220
19..	99.7	8	2150	123	9	2990	128	15	5180
20..	89.7	8	1940	124	9	3010	130	17	5970
21..	106	8	2290	109	8	2350	133	17	6100
22..	102	8	2200	107	8	2310	131	17	6010
23..	113	8	2440	114	8	2460	128	17	5880
24..	105	8	2270	125	8	2700	140	15	5670
25..	96.6	8	2090	115	8	2480	136	13	4770
26..	95.1	8	2050	109	7	2060	119	11	3530
27..	96.6	8	2090	97.8	7	1850	105	10	2830
28..	97.1	8	2100	93.3	6	1510	111	10	3000
29..	93.1	9	2260	96.9	6	1570	110	10	2970
30..	94.6	9	2300	96.5	6	1560	127	10	3430
31..	100	10	2700	--	--	--	125	9	3040
Total	3189.4	--	93660	3268.9	--	72360	3948	--	117340
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	114	9	2770	215	20	11600	146	8	3150
2..	115	9	2790	194	20	10500	144	8	3110
3..	113	8	2440	170	20	9180	155	8	3350
4..	138	8	2980	160	21	9070	154	8	3330
5..	150	8	3240	160	21	9070	149	9	3620
6..	154	8	3330	160	22	9500	135	9	3280
7..	152	10	4100	160	22	9500	136	9	3300
8..	149	12	4830	160	22	9500	136	9	3300
9..	149	14	5630	144	22	8550	147	9	3570
10..	138	14	5220	148	22	8790	148	9	3600
11..	132	14	4990	154	20	8320	153	9	3720
12..	137	14	5180	147	20	7940	118	8	2550
13..	155	14	5860	146	18	7100	138	8	2980
14..	150	12	4860	147	18	7140	130	8	2810
15..	150	10	4050	150	18	7290	148	8	3200
16..	164	9	3990	160	18	7780	145	8	3130
17..	162	9	3940	160	18	7780	149	8	3220
18..	158	9	3840	155	16	6700	152	8	3280
19..	148	9	3600	145	14	5480	138	9	3350
20..	168	9	4080	147	12	4760	140	9	3400
21..	158	9	3840	137	12	4440	145	9	3520
22..	149	8	3220	136	12	4410	143	9	3470
23..	148	8	3200	138	12	4470	147	9	3570
24..	139	8	3000	140	11	4160	167	9	4060
25..	148	8	3200	146	10	3940	179	9	4350
26..	146	8	3150	148	9	3600	161	10	4350
27..	155	8	3350	132	8	2850	159	10	4290
28..	168	12	5440	133	8	2870	156	10	4210
29..	165	16	7130	--	--	--	157	10	4240
30..	185	20	9990	--	--	--	164	10	4430
31..	212	20	11400	--	--	--	162	10	4370
Total	4669	--	138640	4292	--	196290	4601	--	110110

C Composite period.

K Expressed in thousands.

COLUMBIA RIVER MAIN STEM--Continued

14-1447. COLUMBIA RIVER AT VANCOUVER, WASH.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	173	12	5610	145	C 15	5870	463	85	106000
2..	171	12	5540	145	C 15	5870	487	94	119000
3..	154	C 14	5820	148	C 15	5990	483	95	124000
4..	150	C 14	5670	142	16	6130	517	96	134000
5..	148	C 14	5590	146	17	6700	539	96	140000
6..	145	C 14	5480	137	17	6290	551	97	144000
7..	149	C 14	5650	147	18	7140	572	109	188000
8..	153	15	6200	142	C 19	7280	608	120	197000
9..	162	15	6560	152	C 19	7800	620	132	221000
10..	151	C 15	6120	175	C 19	8980	640	138	238000
11..	155	C 15	6280	182	C 19	9340	640	144	249000
12..	146	C 15	5910	230	C 19	11800	630	150	255000
13..	164	C 15	6640	222	22	13200	630	118	201000
14..	171	C 15	6930	217	25	14600	630	85	145000
15..	154	16	6650	199	28	15000	637	102	175000
16..	135	17	6200	189	27	13800	638	118	203000
17..	144	C 18	7000	212	26	14900	630	105	179000
18..	146	C 18	7100	227	30	18400	630	92	156000
19..	190	C 18	9230	239	34	21900	630	80	136000
20..	186	C 18	9040	252	44	29900	640	84	145000
21..	181	C 18	8800	288	56	43500	640	86	149000
22..	166	18	8070	311	66	55400	630	90	153000
23..	136	19	6980	340	74	67900	630	90	153000
24..	143	C 19	7340	400	82	88600	620	90	151000
25..	163	C 19	8360	456	93	115000	620	90	151000
26..	189	C 19	9700	467	104	131000	630	91	155000
27..	164	C 19	8410	464	91	114000	630	91	155000
28..	169	C 19	8670	422	78	88900	630	91	155000
29..	166	17	7620	445	65	78100	620	91	152000
30..	159	17	7300	453	70	85600	610	93	153000
31..	--	--	--	462	76	94800	--	--	--
Total	4783	--	210450	8156	--	1193690	18055	--	4962000
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment		Mean discharge (K cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	590	83	132000	198	C 17	9090	151	8	3260
2..	577	73	114000	224	C 17	10300	128	8	2760
3..	563	62	94200	242	C 17	11100	117	8	2530
4..	537	51	73900	237	C 17	10900	110	C 8	2380
5..	529	40	57100	248	15	10000	116	C 8	2510
6..	495	44	58800	235	14	8880	120	C 8	2590
7..	488	48	63200	210	13	7370	108	C 8	2330
8..	494	40	53400	201	C 12	6510	108	C 8	2330
9..	461	32	39800	201	C 12	6510	129	9	3130
10..	448	24	29000	194	C 12	6290	126	9	3060
11..	431	24	27900	177	C 12	5730	130	C 10	3510
12..	408	25	27500	153	12	4960	118	C 10	3190
13..	385	25	26000	152	12	4920	130	C 10	3510
14..	370	25	25000	160	12	5180	129	C 10	3480
15..	360	25	24300	171	11	5080	128	C 10	3460
16..	362	24	23500	158	C 10	4270	131	10	3540
17..	344	C 23	21400	180	C 10	4860	130	10	3510
18..	324	C 23	20100	176	C 10	4750	114	C 10	3080
19..	314	C 23	19500	192	10	5180	111	C 10	3000
20..	319	C 23	19800	158	10	4270	139	C 10	3750
21..	306	C 23	19000	172	C 10	4640	134	C 10	3620
22..	293	21	16600	184	C 10	4970	139	C 10	3750
23..	286	19	14700	177	C 10	4780	140	10	3780
24..	272	C 18	13200	161	C 10	4350	120	10	3240
25..	269	C 18	13100	119	C 10	3210	123	C 10	3320
26..	265	C 18	12900	140	10	3780	126	C 10	3400
27..	277	18	13500	140	10	3780	134	C 10	3620
28..	267	C 18	13000	150	C 10	4050	99.0	C 10	2670
29..	270	18	13100	150	C 10	4050	120	C 10	3240
30..	265	17	12200	174	C 10	4700	120	10	3240
31..	231	C 17	10600	177	C 10	4780	--	--	--
Total	11800	--	1102300	5611	--	183240	3728	--	94790
Total discharge for year (K cfs-days).....									76101.3
Total load for year (tons).....									8474870

C Composite period.
K Expressed in thousands.

WILLAMETTE RIVER BASIN

14-1448. MIDDLE FORK WILLAMETTE RIVER NEAR OAKRIDGE, OREG.

LOCATION (revised).--Lat 43°35'50", long 122°27'20", temperature recorder at gaging station on right bank, 0.2 mile upstream from Windfall Creek, 8.3 miles upstream from Hills Creek Dam, 10 miles south of Oakridge, Lane County, and at mile 240.8. Prior to June 1967, at site 0.5 mile upstream.

DRAINAGE AREA.--258 square miles, including those of Gold and Buck Creeks.

RECORDS AVAILABLE.--Water temperatures: October 1958 to January 1959, September 1959 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 70°f on several days during July and August; minimum, 36°f Jan. 5, Mar. 4, 12.

EXTREMES, 1960-64.--Water temperatures: Maximum, 70°f Aug. 1-3, 1960, on several days during July and August 1967; minimum, 36°f Jan. 5, Mar. 4, 12, 1960, on several days during January and February 1961. During January and February 1961, temperature range, 39°f to 55°f.

REMARKS.--Recorder stopped May 1-19; temperature range, 39°f to 55°f.

Month	Temperature (°F) of water, water year October 1966 to September 1967																												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	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	
Maximum	63	60	58	59	57	58	57	57	56	55	49	48	51	47	50	50	50	47	48	45	45	48	52	51	50	50	50	50	50	52	52	
Minimum	48	48	46	46	47	48	50	49	47	44	45	45	43	42	42	40	43	40	40	42	41	43	46	43	43	45	45	44	43	46	44	
November	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	
Maximum	51	49	49	48	46	48	44	46	42	44	45	46	48	47	--	--	--	47	46	46	47	47	45	45	44	41	42	44	43	44	--	
Minimum	43	42	42	40	42	44	41	39	38	41	44	45	46	47	--	--	--	45	44	43	46	45	42	42	40	40	41	40	42	--	42	
December	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	
Maximum	45	45	46	45	45	43	43	43	40	42	42	43	44	46	43	44	43	43	43	42	42	42	41	42	42	41	40	40	40	40	42	
Minimum	42	44	43	43	43	40	41	40	39	40	41	41	42	43	40	41	40	40	40	39	42	39	37	38	40	40	38	37	37	38	38	40
January	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	
Maximum	40	41	41	42	42	38	39	40	42	41	42	42	45	44	45	44	43	42	42	42	41	41	41	41	41	41	41	42	43	42	44	41
Minimum	38	37	38	40	36	37	37	37	37	38	40	39	41	41	41	40	39	39	42	42	40	39	39	38	38	41	42	41	42	41	41	39
February	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	
Maximum	44	45	45	45	45	45	45	45	44	45	44	46	41	41	41	42	43	43	45	45	45	46	46	44	45	46	46	46	--	--	--	44
Minimum	41	42	41	40	40	39	38	39	40	40	39	39	38	38	37	39	40	41	40	37	38	39	38	39	41	39	38	40	--	--	--	39
March	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	
Maximum	46	42	45	45	47	48	47	48	47	48	43	39	46	41	44	42	44	45	45	43	47	50	46	46	47	49	49	45	45	42	45	45
Minimum	42	39	38	36	37	38	38	38	39	37	38	36	37	37	38	40	40	40	40	42	43	44	41	41	42	40	40	39	38	38	38	39
April	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	
Maximum	49	50	48	50	46	50	52	50	52	49	51	52	46	48	48	43	44	48	46	47	51	50	50	49	49	46	47	48	48	48	48	48
Minimum	38	39	42	42	42	42	42	44	44	44	43	44	44	41	40	38	38	39	39	41	41	41	41	41	42	42	40	40	39	39	41	41
May	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	
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June	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	
Maximum	48	52	54	57	57	54	57	55	57	55	55	54	57	59	60	60	61	61	58	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	42	41	42	44	44	45	46	46	46	47	47	46	44	45	46	47	48	48	49	--	--	--	--	--	--	--	--	--	--	--	--	--
July	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	
Maximum	59	70	70	69	68	67	67	67	67	68	69	70	68	68	67	66	67	66	64	64	66	67	66	64	65	66	66	65	66	68	67	67
Minimum	54	55	56	54	54	53	53	53	53	53	53	54	55	54	53	53	53	52	51	52	51	52	51	52	51	52	53	53	53	53	53	53
August	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	
Maximum	68	68	67	67	66	65	65	67	64	68	70	68	69	68	69	70	70	69	69	68	67	68	67	66	67	67	66	66	69	68	66	67
Minimum	53	53	52	53	52	51	52	55	53	54	55	54	55	54	55	55	56	56	55	54	55	54	55	54	55	54	53	52	54	53	54	53
September	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	
Maximum	65	66	62	65	65	66	65	64	62	58	59	61	61	62	62	62	62	62	63	64	64	61	61	61	60	61	61	61	57	54	51	51
Minimum	53	54	52	53	53	54	53	53	50	51	53	50	47	48	48	49	50	51	52	51	52	54	49	49	49	49	49	49	50	50	51	50

14-1503. FALL CREEK NEAR LOWELL, OREG.

LOCATION.--Lat 43°58'15", long 122°38'15", temperature recorder at gaging station on right bank, 0.1 mile downstream from North Fork, 8 miles upstream from the site of the dam at Lowell, Lane County, and at mile 14.4.
 DRAINAGE AREA.--118 square miles.
 RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1967.
 EXTREMES, 1966-67.--Water temperatures: Maximum, 73°F July 3; minimum, 40°F Mar. 10.
 EXTREMES, 1963-67.--Water temperatures: Maximum, 73°F July 3, 1967; minimum, 33°F Dec. 17-21, 1965.

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	53	54	52	52	52	52	53	54	54	51	49	49	48	48	46	46	46	46	46	46	46	48	48	48	48	48	49	49	49	49	49	49		
Minimum	54	54	52	51	51	51	52	52	51	49	49	47	47	46	46	46	46	46	45	45	46	46	48	48	48	49	49	49	48	48	49	48		
November																																		
Maximum	49	49	48	48	47	47	47	45	46	46	48	48	48	48	48	48	48	48	48	48	48	46	46	43	44	44	44	46	46	47	--	46		
Minimum	49	48	48	47	47	47	45	44	44	46	48	48	48	48	48	48	48	48	48	48	46	46	43	42	42	44	44	44	46	46	--	46		
December																																		
Maximum	47	47	47	44	44	44	44	44	44	45	45	46	46	46	46	46	46	46	46	46	46	44	44	44	44	44	44	43	43	43	44	44		
Minimum	47	47	44	44	44	44	44	44	44	44	44	45	46	46	46	46	46	46	46	46	43	43	44	44	44	44	44	42	42	43	43	44		
January																																		
Maximum	43	44	44	43	43	43	43	43	44	44	44	44	45	45	46	46	46	46	46	46	46	44	44	44	44	44	44	45	46	46	46	44		
Minimum	43	43	43	43	43	43	43	43	43	44	44	44	44	45	45	46	46	46	46	46	44	44	44	44	44	44	44	44	45	46	46	44		
February																																		
Maximum	44	44	44	45	45	44	43	44	44	44	44	44	44	44	43	42	42	44	44	43	42	42	42	44	44	44	44	44	44	44	44	44	43	
Minimum	44	44	44	44	44	43	43	44	44	44	44	44	44	43	42	42	42	44	43	42	42	42	42	42	44	44	44	44	44	44	44	44	43	
March																																		
Maximum	44	44	44	42	42	43	43	44	44	42	42	42	42	42	42	44	45	45	44	46	46	47	47	46	45	45	46	46	44	44	44	44	44	
Minimum	44	44	42	41	41	42	43	42	40	41	42	42	42	42	42	44	44	44	44	44	46	46	46	46	45	45	45	44	44	43	43	43	43	
April																																		
Maximum	45	46	47	47	47	46	46	48	47	47	47	47	47	45	44	44	44	44	44	44	46	46	46	46	46	46	46	46	46	46	46	46	46	
Minimum	43	44	45	47	46	45	46	47	47	46	47	45	44	44	43	44	42	43	43	44	44	45	45	46	46	45	45	44	44	45	--	44		
May																																		
Maximum	47	48	49	49	50	51	53	53	49	48	48	51	53	55	56	57	57	57	57	57	59	59	57	55	56	56	53	53	52	50	53	53		
Minimum	44	44	46	48	47	48	49	50	49	47	47	47	48	50	52	53	53	55	56	56	55	55	53	51	53	52	52	52	50	48	50	48		
June																																		
Maximum	50	52	55	57	57	57	56	54	54	54	55	56	61	63	64	65	67	65	66	65	60	61	65	68	67	68	68	69	68	--	60	--		
Minimum	46	50	51	54	54	55	54	53	53	53	55	58	59	61	61	62	60	59	58	57	59	62	64	64	63	64	63	63	63	63	63	63		
July																																		
Maximum	70	72	73	72	70	69	68	68	68	70	71	69	67	67	67	67	67	66	66	67	68	68	68	68	66	66	66	67	67	68	68	68		
Minimum	64	66	67	66	65	63	63	63	63	63	64	65	65	62	62	62	62	61	62	62	62	62	62	63	63	61	61	62	62	62	63	63		
August																																		
Maximum	68	67	67	66	65	66	66	66	68	68	69	69	69	70	70	70	70	70	69	68	68	67	65	64	64	66	67	66	66	67	66	66		
Minimum	62	62	62	62	62	61	61	62	64	64	64	64	64	64	64	64	64	65	65	64	63	62	61	62	62	61	62	62	63	63	63	63		
September																																		
Maximum	65	66	65	65	64	65	64	63	61	60	59	58	58	58	60	60	60	59	60	61	62	61	58	58	58	58	58	58	57	--	60	--		
Minimum	64	63	62	62	61	62	62	61	58	59	58	57	56	57	56	57	58	58	58	59	60	61	58	57	56	57	56	57	57	57	57	58		

WILLAMETTE RIVER BASIN--Continued

14-1508. WINBERRY CREEK NEAR LOWELL, OREG.

LOCATION.--Lat 43°54'50", long 122°41'15", temperature recorder at gaging station on right bank, 0.9 mile upstream from Nelson Creek, 4.6 miles east of Lowell, Lane County, and at mile 4.4.

DRAINAGE AREA.--43.9 square miles.

WATER TEMPERATURES.--August 1963 to September 1967. 38°F Mar. 10.

EXTREMES, 1963-67.--Water temperatures: Maximum, 80°F July 3, 1967; minimum, freezing point on several days during December 1965.

EXTREMES, 1963-67.--Water temperatures: Maximum, 80°F July 3, 1967; minimum, freezing point on several days during December 1965.

REMARKS.--Recorder stopped Oct. 27 to Nov. 21, Dec. 2 to Jan. 11; temperature ranges, 49°F to 50°F and 40°F to 47°F, respectively.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
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		
October	54	59	55	55	55	55	56	56	54	52	51	49	47	45	46	46	47	46	44	45	44	46	47	47	47	47	48	--	--	--	--	50	
Minimum	55	55	51	51	51	52	54	54	52	48	48	45	42	44	42	45	42	40	43	42	43	46	46	46	47	--	--	--	--	--	--	47	
November																																	
Maximum																																	
Minimum																																	
December																																	
Maximum	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Minimum	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
January																																	
Maximum	--	--	--	--	--	--	--	--	--	--	--	44	46	46	46	46	46	44	44	44	44	44	44	44	44	44	46	46	46	46	44	--	
Minimum	--	--	--	--	--	--	--	--	--	--	--	43	44	44	44	44	42	42	44	44	44	44	44	44	44	44	43	44	46	45	44	--	
February																																	
Maximum	45	45	45	45	45	44	43	44	45	45	45	44	44	42	42	42	44	44	44	43	43	43	43	44	44	44	44	45	--	--	--	43	
Minimum	44	44	44	44	44	42	42	42	43	43	42	43	42	41	41	41	42	44	42	42	42	42	42	42	42	41	42	43	--	--	--	42	
March																																	
Maximum	45	44	42	42	43	44	44	44	43	41	42	41	43	42	44	45	45	44	44	46	47	48	47	45	45	46	46	45	42	43	44	44	
Minimum	44	42	41	40	40	41	42	41	40	38	40	39	40	42	43	43	43	42	44	45	46	45	44	44	43	44	41	40	41	41	41	41	
April																																	
Maximum	45	47	47	47	46	47	49	47	46	47	47	47	46	45	47	46	44	43	45	45	47	47	45	48	46	45	44	45	46	46	--	45	
Minimum	40	41	42	44	44	43	44	45	44	44	44	45	42	42	40	42	41	41	42	42	42	42	42	43	44	42	43	42	44	--	--	42	
May																																	
Maximum	48	51	52	48	53	54	56	56	52	46	48	48	52	55	57	59	58	56	59	60	61	61	58	56	57	58	55	54	53	51	48	54	
Minimum	43	43	44	45	44	46	47	48	46	45	44	45	44	46	46	50	51	50	50	52	53	53	52	51	48	50	53	51	48	47	47		
June																																	
Maximum	51	55	58	61	62	58	56	55	50	58	60	61	66	68	70	71	74	73	68	62	61	67	65	71	73	71	71	74	75	75	--	64	
Minimum	47	48	49	52	53	55	54	53	53	53	54	53	54	57	58	60	61	63	61	59	58	55	59	62	63	61	63	62	--	--	56		
July																																	
Maximum	77	79	80	79	76	74	75	74	74	76	77	77	75	74	73	74	74	70	72	74	74	74	74	73	70	71	72	72	73	73	72	74	
Minimum	63	66	67	66	65	63	63	63	63	63	64	67	66	62	62	62	63	64	62	64	63	64	65	64	63	61	60	62	62	64	63	63	
August																																	
Maximum	73	72	72	71	68	70	71	72	74	74	73	73	74	74	74	74	74	74	73	72	71	71	69	67	65	69	71	70	69	69	71	71	
Minimum	62	61	62	62	62	62	61	61	63	66	65	64	63	64	64	65	65	64	62	61	61	61	59	61	60	62	63	62	62	62	62	62	
September																																	
Maximum	69	72	69	69	69	70	68	66	64	62	61	60	61	62	63	62	62	64	65	65	66	63	61	61	62	63	61	61	58	--	--	64	
Minimum	61	64	62	61	61	63	61	61	61	59	57	54	53	54	56	57	57	58	59	60	63	57	57	55	56	55	57	57	57	57	57	57	

WILLAMETTE RIVER BASIN--Continued

14-1622. BLUE RIVER AT BLUE RIVER, OREG.

LOCATION.--Lat 44°09'45", long 122°19'45", temperature recorder at gaging station on right bank, 0.3 mile upstream from Simmonds Creek, 0.7 mile north of town of Blue River, Lane County, and at mile 0.9.

DRAINAGE AREA.--87.7 square miles.

WATER TEMPERATURES.--Water temperatures: August 1966 to September 1967.

EXTREMES, 1966-67.--Maximum temperature, 73°F, July 12, 13, 1967; minimum, 36°F Feb. 15.

EXTREMES, August 1966 to September 1967.--Water temperatures: Maximum, 73°F July 12, 13, 1967; minimum, 36°F Feb. 15, 1967.

REMARKS.--Recorder stopped July 17 to Aug 25; temperature range, 65°F to 73°F.

Temperature (°F) of water, water year October 1966 to September 1967

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			
65	65	63	63	61	61	61	62	60	58	58	55	52	51	50	51	52	51	49	49	47	48	51	51	51	51	51	52	52	52	53	53	54	
63	63	61	60	58	58	59	60	58	56	55	52	50	49	48	50	50	49	48	46	46	46	46	48	48	49	49	49	48	51	50	52	54	
52	51	49	48	48	48	47	46	45	47	48	47	48	47	48	47	46	46	47	46	46	45	44	43	44	44	44	45	46	47	--	46		
49	49	46	47	47	46	45	44	45	47	47	47	47	47	47	46	44	44	46	45	44	42	42	43	44	44	44	44	44	44	46	--	45	
47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
46	46	45	43	43	43	43	42	43	42	43	43	44	43	42	41	41	42	41	40	39	40	41	40	40	40	40	40	40	40	40	40	41	
42	42	43	43	40	41	40	41	40	41	42	42	43	43	43	42	41	42	42	42	41	42	42	41	41	41	42	42	43	42	42	41	41	
41	41	42	40	39	40	40	39	40	40	41	40	40	42	41	40	40	40	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	
41	41	40	40	40	40	40	39	40	40	40	40	40	39	38	39	40	39	40	38	39	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	
41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40</	

114-1735. CALAPOOIA RIVER AT ALBANY, OREG.

LOCATION.--Lat 44°37'15", long 123°07'40", temperature recorder at gaging station near right bank, on downstream side of bridge on Riverside Drive in Albany, Linn County, 0.6 mile downstream from Oak Creek, and at mile 3.0.

DRAINAGE AREA.--372 square miles.

RECORDS AVAILABLE, --Water temperatures: January 1964 to September 1967.

EXTREMES, 1966-67. --Water temperatures: Maximum, 83°F Aug. 16, 17, 19-21; minimum, 41°F on several days during January.

EXTREMES. 1964-67.--Water temperatures: maximum, 83°F Aug. 16, 17, 19-21, 1967; minimum, 34°F Dec. 20, 21, 1965.
1966-67.--Water temperatures: maximum, 83°F Aug. 16, 17, 19-21, 1967; minimum, 34°F Dec. 20, 21, 1965.

[illegible]

WILLAMETTE RIVER BASIN--Continued

14--1780. NORTH SANTIAM RIVER BELOW BOULDER CREEK, NEAR DETROIT, OREG.

LOCATION.--Lat 44°42'25", long 122°06'00", temperature recorder at gaging station on right bank, 0.5 mile downstream from Boulder Creek, 3.0 miles southeast of Detroit, Marion County, and at mile 70.7.

DRAINAGE AREA.--216 square miles.

RECORDS AVAILABLE.--Water temperatures: April 1951 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 62°F on several days during July; minimum, 35°F Jan. 6, Mar. 12.

EXTREMES, 1951-67.--Water temperatures: Maximum (1951-65, 1966-67), 64°F July 28, 1958; minimum, freezing point Dec. 1, 1954,

Mar. 5, 1955, Feb. 16, 17, 1956.

Temperature (°F) of water, water year October 1966 to September 1967

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	51	49	49	49	49	50	51	48	47	47	46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	47	49	46	46	46	46	48	48	44	44	46	43	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
November	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
December	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
January	38	38	38	38	37	36	37	37	37	38	38	38	38	39	39	39	38	38	38	38	38	39	39	38	38	39	38	37	37	38	38	38
Maximum	38	38	38	37	36	35	36	37	37	37	37	38	38	39	39	38	39	38	37	38	37	38	38	38	38	39	38	38	38	39	39	39
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
February	39	40	39	39	39	39	40	40	40	41	40	41	41	39	39	38	39	38	38	39	38	38	39	39	40	40	40	41	41	---	---	---
Maximum	39	40	39	39	39	39	39	40	40	40	40	40	41	39	39	38	39	38	38	39	38	38	39	39	40	40	40	41	41	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
March	40	39	39	40	41	41	41	41	37	38	37	39	38	40	40	40	40	40	40	40	40	40	42	41	40	40	40	41	41	---	---	---
Maximum	40	39	39	40	41	41	41	41	37	38	37	39	38	40	40	40	40	40	40	40	40	42	41	40	40	40	40	41	41	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
April	41	43	43	41	41	42	44	42	42	41	43	41	41	39	41	40	39	42	41	40	40	42	41	41	41	41	40	40	42	41	---	---
Maximum	41	43	43	41	41	42	44	42	42	41	43	41	41	39	41	40	39	42	41	40	40	42	41	41	41	41	41	40	40	42	41	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May	38	37	38	39	39	38	39	38	39	39	39	38	37	37	37	38	37	38	37	38	38	38	38	39	39	37	37	38	38	39	---	---
Maximum	38	37	38	39	39	38	39	38	39	39	39	38	37	37	37	38	37	38	37	38	38	38	38	39	39	37	37	38	38	39	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
June	46	48	50	50	50	50	50	47	46	49	48	50	52	55	55	56	57	57	58	54	51	56	58	59	58	59	60	60	60	---	---	---
Maximum	46	48	50	50	50	50	50	47	46	49	48	50	52	55	55	56	57	57	58	54	51	56	58	59	58	59	60	60	60	---	---	---
Minimum	42	42	43	44	44	45	45	45	45	46	46	47	47	47	48	48	49	49	50	51	49	48	49	50	51	50	51	51	51	---	---	---
July	61	61	61	60	59	60	58	59	60	62	62	62	61	61	60	60	60	57	59	60	61	62	61	62	61	61	61	61	61	61	61	60
Maximum	61	61	61	60	59	60	58	59	60	62	62	62	61	61	60	60	60	57	59	60	61	62	61	62	61	61	61	61	61	61	61	60
Minimum	51	52	53	53	52	51	51	52	51	51	54	54	52	53	52	53	52	53	52	52	53	54	54	54	54	55	53	53	53	53	53	52
August	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
September	58	59	57	56	58	57	57	57	55	54	52	53	53	53	54	53	54	53	55	54	55	55	55	52	52	52	53	53	52	50	---	---
Maximum	58	59	57	56	58	57	57	57	55	54	52	53	53	53	54	53	54	53	55	54	55	55	55	52	52	52	53	53	52	50	---	---
Minimum	53	53	52	52	53	53	52	52	50	50	51	49	47	48	48	49	50	50	50	50	50	52	48	46	48	48	49	49	49	49	---	---

WILLAMETTE RIVER BASIN--Continued

14-1900. LUCKIAMUTE RIVER AT PEDEE, OREG.

LOCATION.--Lat 44°44'35", long 123°25'25", temperature recorder at gaging station on left bank, 0.5 mile downstream from Pedee Creek, 1.0 mile southwest of Pedee, Polk County, and at mile 29.7.

DRAINAGE AREA.--115 square miles.

RECORDS AVAILABLE.--Water temperatures: March 1964 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Minimum, 40°F Mar. 11.

EXTREMES, 1964-67.--Water temperatures: Maximum (1964-66), 73°F July 29, Aug. 1-3, 1966; minimum, 38°F Dec. 20, 21, 1965.

Temperature (°F) of water, water year October 1966 to September 1967

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	61	60	59	57	57	57	58	59	58	54	53	53	52	50	50	50	48	49	47	47	48	48	51	53	53	54	54	53	52	52	53	54	53
Maximum	57	58	56	55	56	56	56	58	53	52	53	52	50	49	49	48	49	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Minimum	54	52	51	48	48	48	48	48	45	46	47	48	48	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	
November	52	51	48	47	47	48	48	45	45	45	46	47	48	48	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	
Maximum	52	51	48	47	47	48	48	45	45	45	46	47	48	48	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	
Minimum	46	46	46	46	46	46	46	46	45	45	46	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
December	46	46	46	46	46	46	46	46	45	45	46	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
Maximum	45	45	46	46	46	46	46	46	44	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
Minimum	45	45	46	46	46	46	46	44	44	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
January	45	45	45	45	45	44	43	43	44	45	45	45	45	46	44	45	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
Maximum	45	45	44	45	44	43	43	44	45	45	45	45	45	46	44	45	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
Minimum	45	45	44	45	44	43	43	44	45	45	45	45	45	46	44	45	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
February	44	44	43	42	42	43	43	43	43	42	41	41	42	42	42	43	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45
Maximum	44	43	42	41	41	42	42	42	42	41	40	41	41	42	42	43	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45
Minimum	44	43	42	41	41	42	42	42	42	41	40	41	41	42	42	43	44	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
March	45	45	45	45	45	46	48	48	48	48	48	48	48	47	45	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	43	43	44	45	45	44	46	48	47	46	47	47	47	45	44	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	56	59	60	62	63	63	61	59	58	57	57	59	63	66	68	69	70	71	69	65	65	66	67	68	69	70	71	72	72	72	72	72	72
Minimum	55	55	56	58	59	61	59	58	56	55	56	57	58	61	63	64	65	66	67	64	63	62	63	63	63	63	63	65	67	66	66	66	66
June	72	74	76	75	73	72	71	68	70	71	70	70	69	69	70	69	67	66	70	71	71	71	71	71	71	71	71	71	73	73	73	73	70
Maximum	65	68	68	67	66	64	66	63	64	63	65	62	62	62	62	63	62	61	64	63	63	63	63	64	61	62	62	62	63	66	63	63	63
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	66	68	67	68	70	68	66	66	63	64	63	62	62	63	63	62	64	63	65	65	62	61	61	61	62	61	62	60	59	--	63	--	63
Maximum	62	63	62	61	60	64	59	59	58	61	61	58	58	56	58	58	60	59	60	60	60	60	58	55	57	56	56	58	58	58	58	58	58
Minimum	62	63	62	61	60	64	59	59	58	61	61	58	58	56	58	58	60	59	60	60	60	58	55	57	56	56	58	58	58	58	58	58	58

14-1910. WILLAMETTE RIVER AT SALEM, OREG.
(Irrigation network station)

LOCATION --Lat 44°56'40", long 123°02'30", at bridge on State Highway 22, 300 feet downstream from gaging station at Salem, Marion County.
 REACH --28 sq. miles, approximately 12 miles, approximately December 1910, August 1911 to August 1912, February 1951 to September 1967.
 RECORDS --VILLAGE Chemical analyses, February 1951 to September 1967.

Water temperatures: February 1951 to September 1967.
 EXTREMES 1956-67. --Dissolved solids: Maximum, 78 ppm Dec. 29-31; minimum, 38 ppm May 18 to June 2.

Hardness: Maximum, 24 ppm Dec. 28-31, Feb. 7-17, June 3; minimum, 16 ppm Nov. 12-21.
 Specific conductance: Maximum daily, 116 micromhos June 3; minimum daily, 44 micromhos Nov. 16.

Water temperatures: Maximum, 75°F July 3, 4, Aug. 16, 17; minimum, 43°F Jan. 8-10, 24, 25.
 EXTREMES 1951-67. --Dissolved solids: Maximum, 124 ppm Dec. 10, 1963; minimum, 36 ppm Sept. 15, 1966.

Hardness: Maximum, 36 ppm Dec. 10, 1963; minimum, 12 ppm Dec. 1966-67.
 Specific conductance: Maximum, 116 micromhos daily, 30 micromhos Jan. 29, 1965.

Water temperatures: Maximum, 78°F July 22, 1959; minimum, freezing point on several days during February 1956.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbocationate (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 (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 1-31, 1966.	11010	14		5.4	1.8	4.4	0.7	30	0	3.2	3.0	0.2	1.6	0.01	56	0.08	21	0	0.4	64	6.9
Nov. 1-11, 1966.	11090	--		5.7	1.9	4.3	--	22	0	--	--	--	--	--	65	.09	22	0	.4	68	6.9
Nov. 12-21, 1966.	50220	--		4.3	1.4	3.0	--	28	0	--	--	--	--	--	59	.08	16	0	.3	49	6.6
Nov. 22-Dec. 4, 1966.	34160	--		5.1	1.7	3.4	--	20	0	--	--	--	--	--	51	.07	20	3	.3	58	6.6
Dec. 5-15, 1966.	66640	--		4.7	1.7	3.1	--	20	0	--	--	--	--	--	53	.07	18	1	.3	55	6.7
Dec. 16-28, 1966.	36820	--		5.8	2.0	3.5	--	18	0	--	--	--	--	--	54	.07	22	7	.3	63	6.4
Dec. 29-31, 1966.	19630	--		6.0	2.1	3.7	--	23	0	--	--	--	--	--	78	.11	24	5	.3	73	6.3
Jan. 1-11, 1967.	26590	--		5.4	1.8	3.6	--	18	0	--	--	--	--	--	63	.09	21	6	.3	64	6.5
Jan. 12-31, 1967.	60930	12		4.7	1.6	3.1	.7	20	0	4.8	3.0	.1	1.0	.01	46	.06	18	1	.3	53	6.8
Feb. 1-6, 1967.	63030	--		4.6	1.6	3.1	--	20	0	--	--	--	--	--	41	.06	18	1	.3	52	6.8
Feb. 7-17, 1967.	23040	--		5.9	2.2	3.8	--	18	0	--	--	--	--	--	65	.09	24	9	.3	70	6.3
Feb. 18-30, 1967.	40830	--		4.5	1.5	3.2	--	18	0	--	--	--	--	--	42	.06	17	2	.3	53	6.4
Feb. 21-Mar. 20, 1967.	19560	--		5.7	2.0	3.7	--	18	0	--	--	--	--	--	52	.07	27	7	.3	68	6.2
Mar. 21-Apr. 17, 1967.	17160	14		5.5	1.8	3.9	.9	18	0	6.0	4.0	.1	1.6	.00	45	.06	20	6	.4	69	6.3
Apr. 18-May 8, 1967.	15200	--		5.7	1.9	4.0	--	20	0	--	--	--	--	--	58	.08	22	5	.4	67	6.6
May 9-17, 1967.	13800	--		5.8	1.9	4.0	--	12	0	--	--	--	--	--	76	.10	28	30	.4	89	6.5
May 10-17, 1967.	14250	--		5.3	1.8	3.9	--	22	0	--	--	--	--	--	66	.09	20	2	.4	67	6.5
May 18-June 2, 1967.	14040	--		4.9	1.6	3.6	--	26	0	--	--	--	--	--	73	.05	14	0	.4	56	7.2
June 3-10, 1967.	12600	--		6.5	2.0	4.0	--	50	0	--	--	--	--	--	73	.03	24	0	.4	113	6.3
June 4-28, 1967.	8775	--		5.8	1.9	4.3	--	26	0	--	--	--	--	--	47	.06	22	0	.4	69	7.0
Sept. 22-30, 1967.	7247	--		5.7	1.9	4.4	--	28	0	--	--	--	--	--	45	.06	22	0	.4	66	7.1
Weighted average.....	--	--		5.1	1.8	3.5	--	21	--	--	--	--	--	--	52	0.07	20	3	0.3	60	6.6
Time-weighted average.....	A20450	--		5.4	1.8	3.8	--	22	--	--	--	--	--	--	53	--	21	3	0.4	64	6.6
Tons per day...	--	--		344	117	234	--	1380	--	--	--	--	--	--	--	--	--	--	--	--	--

A Mean discharge based on 365 days; mean discharge for 281 days of chemical analyses, 24,737 cfs.

WILLAMETTE RIVER BASIN—Continued
 14-1910. WILLAMETTE RIVER AT SALEM, OREG.—Continued

Specific conductance (micromhos at 25°C), water Year October 1965 to September 1966

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	70	66	63	64	50	70	68	65	57			--
2.....	69	65	63	74	49	70	--	65	56			--
3.....	66	67	66	74	50	69	70	70	116			--
4.....	63	68	65	62	52	68	68	71	66			--
5.....	63	80	57	60	55	69	70	73	66			--
6.....	64											--
7.....	64	71	56	58	57	70	67	68	64			--
8.....	64	68	59	61	61	61	67	67	63			--
9.....	63	68	57	61	62	73	69	66	62			--
10.....	62	67	62	54	67	77	69	89	63			--
11.....	63	67	62	63	72	68	69	61	63			--
12.....	64	65	55	63	75	67	72	61	69			--
13.....	66	50	55	56	72	71	73	65	69			--
14.....	65	48	49	56	76	75	84	65	69			--
15.....	64	47	48	49	76	73	70	66	70			--
16.....	64	47	48	48	75	68	75	70	72			--
17.....	65	44	--	49	78	71	77	75	71			--
18.....	60	44	62	44	71	71	76	63	72			--
19.....	65	51	61	54	56	65	68	58	72			--
20.....	66	53	61	58	48	63	66	66	72			--
21.....	64	53	61	56	57	63	66	56	72			--
22.....	64	55	61	52	63	64	72	56	72			--
23.....	65	57	65	51	64	64	69	56	75			65
24.....	56	57	67	54	55	68	71	55	65			67
25.....	57	56	69	55	66	64	63	53	63			67
26.....	58	54	61	63	66	80	66	63	63			65
27.....	66	55	61	59	65	65	66	54	66			65
28.....	63	52	65	27	49	67	65	62	69			67
29.....	66	53	69	50	71	66	62	58	71			72
30.....	61	58	82	48	--	71	64	58	72			67
31.....	65	--	73	49	--	69	67	57	--			71
31.....	66	--	80	50	--	69	--	57	--			--
Average	64	58	62	56	63	68	69	62	68			--

WILLAMETTE RIVER BASIN--Continued
14-1970. NORTH YAMHILL RIVER AT PIKE, OREG.

LOCATION.--Lat 45°22'10", long 123°15'15", temperature recorder at gaging station on right bank, 500 feet downstream from Turner Creek, 0.5 mile southeast of Pike, Yamhill County, and at mile 20.5.

DRAINAGE AREA.--66.8 square miles.

RECORDS AVAILABLE.--February 1964 to September 1967.

EXTREMES, 1964-67.--Water temperatures: Maximum, 75°F Aug. 13-16; minimum, 39°F Mar. 12.

EXTREMES, 1964-67.--Water temperatures: Maximum, 77°F July 30, 31, 1965; minimum, 33°F Dec. 17-20, 1964.

Temperature (°F) of water, water year October 1966 to September 1967

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	61	60	58	58	57	56	59	59	56	54	53	52	50	48	50	50	48	47	47	46	46	51	52	52	51	52	52	51	50	51	54	52	
Maximum	56	56	54	54	53	52	55	56	51	50	51	50	46	46	47	46	46	45	44	46	45	46	50	51	50	51	49	49	49	49	51	49	
Minimum	52	50	49	47	47	48	47	46	43	45	45	47	48	49	49	48	48	48	48	49	47	46	46	46	46	45	46	45	46	46	47	45	
November	49	48	45	45	46	47	45	42	42	43	45	47	48	48	48	47	48	48	47	48	48	43	45	46	46	45	44	45	45	46	46	47	
Maximum	48	48	48	47	46	45	42	44	44	46	46	48	48	48	48	48	48	48	48	47	45	43	43	44	44	43	43	42	43	44	45	45	
Minimum	46	47	47	45	45	45	44	44	44	44	46	46	48	47	47	47	47	48	47	45	43	42	43	43	43	42	42	42	43	44	44	44	
December	45	44	45	45	43	43	44	44	44	44	44	43	45	46	46	44	43	42	43	44	43	42	43	43	43	45	45	46	46	45	45	44	
Maximum	44	43	43	43	41	42	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	43	45	45	45	45	45	43	
Minimum	43	43	43	43	41	42	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	43	45	45	45	45	45	43	
January	45	46	46	45	45	44	44	44	44	44	44	43	45	46	46	44	43	42	43	44	43	42	42	42	42	44	44	44	44	44	44	43	
Maximum	44	45	44	44	42	43	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	44	44	44	44	44	44	43	
Minimum	43	43	43	43	41	42	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	44	44	44	44	44	44	43	
February	44	45	44	44	44	44	44	44	44	44	44	43	45	46	46	44	43	42	43	44	43	42	42	42	42	44	44	44	44	44	44	43	
Maximum	43	44	44	44	42	43	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	44	44	44	44	44	44	43	
Minimum	43	43	43	43	41	42	43	43	43	43	43	43	43	45	44	44	43	41	42	42	43	42	42	42	42	44	44	44	44	44	44	43	
March	44	45	44	44	44	44	44	44	44	44	44	43	45	46	46	44	43	42	43	44	43	42	42	42	42	44	44	44	44	44	44	43	
Maximum	44	45	44	44	44	44	44	44	44	44	44	43	45	46	46	44	43	42	43	44	43	42	42	42	42	44	44	44	44	44	44	43	
Minimum	42	42	41	40	41	42	41	42	43	40	40	39	41	41	41	43	44	43	42	43	44	45	44	43	43	43	43	43	42	41	41	42	
April	48	49	50	47	46	49	51	48	47	50	49	47	45	45	45	47	45	49	50	49	49	49	51	49	48	47	48	48	47	48	47		
Maximum	41	42	43	45	43	42	43	44	45	45	45	45	45	46	46	44	43	42	43	44	43	42	43	44	45	44	43	43	43	43	43	42	
Minimum	49	49	49	51	55	57	56	55	55	49	51	50	54	56	59	61	60	59	60	62	63	62	59	54	55	55	54	57	54	53	54	55	
Maximum	43	44	47	46	45	49	48	49	49	46	47	47	47	49	51	53	54	53	55	57	57	53	51	49	51	52	53	52	50	49	50		
Minimum	58	60	59	63	66	61	58	58	56	55	55	60	62	66	68	69	70	71	72	68	61	60	64	68	71	67	68	70	70	70	70	64	
Maximum	51	56	54	55	57	58	54	54	53	54	54	54	54	54	56	59	61	62	62	61	59	56	55	59	62	63	62	61	63	62	62	57	
Minimum	72	74	74	73	71	69	69	67	65	69	72	71	71	69	69	71	68	66	64	66	69	71	72	72	69	68	70	71	71	71	71	69	
Maximum	61	64	66	65	63	62	60	61	59	62	63	62	61	61	61	62	61	60	61	62	61	61	61	61	61	61	61	61	62	63	66	62	
Minimum	72	73	72	71	69	67	65	63	63	73	73	74	75	75	74	74	73	73	73	73	73	73	73	73	73	72	72	70	72	70	71	71	
Maximum	63	63	64	63	62	62	60	59	63	67	65	66	67	66	67	67	67	65	65	66	65	65	65	65	60	62	63	64	64	65	63	63	
Minimum	71	69	69	69	68	68	68	67	64	63	63	62	63	66	66	65	64	66	67	66	67	67	67	67	64	63	64	64	61	58	55	59	
Maximum	64	65	64	62	62	63	61	59	61	60	56	56	57	59	60	60	59	60	61	62	61	58	57	58	59	59	58	57	54	56	51	55	65

14-2040. GALES CREEK NEAR GALES CREEK, OREG.

LOCATION.--Lat 45°38'30", long 123°15'55", temperature recorder at gaging station on right bank, 0.5 mile downstream from Beaver Creek, 4.6 miles northwest of town of Gales Creek, Washington County, and at mile 17.5.
 DRAINAGE AREA.--33.2 square miles.
 RECORDING PERIOD.--Water temperatures: October 1963 to September 1967.
 EXTREMES, 1963-67.--Water temperatures: Maximum, 69°F Aug. 15, 16; minimum, 38°F Mar. 10-13, Apr. 15.
 EXTREMES, 1963-67.--Water temperatures: Maximum, 69°F Aug. 15, 16, 1967; minimum, 36°F Nov. 20, 21, Dec. 17, 19, 20, 1964, Dec. 17, 23, 24, 1965.

Temperature (°F) of water, water year October 1966 to September 1967																															Average		
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		
October	55	56	54	54	54	53	55	55	52	50	50	50	47	47	48	46	46	46	46	46	46	48	50	50	50	50	50	48	48	49	49		
Maximum	52	54	50	50	50	51	53	52	47	47	50	47	45	45	46	44	44	42	44	45	46	48	49	48	49	48	47	46	48	48	47		
Minimum																																	
November																																	
Maximum	48	47	46	46	47	47	45	44	45	45	47	48	48	48	48	48	47	46	47	48	48	45	45	46	46	45	46	46	46	46	46		
Minimum	45	46	44	44	44	45	44	42	42	44	44	45	46	48	48	47	46	47	48	48	45	43	44	45	45	43	44	46	45	--	45		
December																																	
Maximum	47	47	47	47	46	46	46	45	45	46	46	47	47	47	47	47	47	47	47	47	45	44	44	45	44	44	44	44	45	46	45		
Minimum	46	46	46	46	46	46	45	45	45	45	46	46	46	46	46	47	47	46	45	44	43	44	44	44	44	44	44	44	45	45	45		
January																																	
Maximum	46	45	45	45	44	44	44	45	44	44	44	44	46	46	46	45	45	44	45	45	45	44	44	44	44	44	45	46	45	45	44		
Minimum	44	44	45	44	44	44	44	44	44	44	43	44	44	46	45	44	44	43	44	45	44	43	43	43	43	43	43	43	45	45	44		
February																																	
Maximum	45	45	46	46	46	46	46	46	44	44	44	44	44	43	42	43	44	43	43	43	43	43	43	43	43	43	43	44	43	--	43		
Minimum	44	45	45	44	43	42	42	42	43	43	43	44	42	42	40	41	42	42	42	41	41	41	41	41	41	42	40	41	42	--	42		
March																																	
Maximum	42	42	42	42	42	43	42	42	40	40	40	40	39	40	40	39	40	41	41	40	41	42	42	42	42	42	42	43	44	43	--	41	
Minimum	40	40	40	39	39	39	39	40	39	38	38	38	38	39	40	41	40	41	40	41	40	41	40	41	40	41	40	41	40	40	40		
April																																	
Maximum	44	45	45	43	44	46	45	43	44	43	45	44	43	43	44	42	44	46	45	44	43	46	46	46	46	45	43	45	46	45	--	44	
Minimum	40	40	41	42	41	40	41	42	41	41	40	41	40	38	40	41	40	40	40	40	40	40	41	40	42	41	40	41	40	40	--	40	
May																																	
Maximum	45	47	46	47	51	52	56	51	48	46	47	46	50	52	56	56	54	53	54	56	55	55	51	51	51	52	49	53	52	49	50		
Minimum	40	41	44	44	44	46	45	46	46	43	42	42	44	46	47	48	47	48	49	49	49	47	46	46	46	47	49	48	47	46	45		
June																																	
Maximum	50	55	56	58	59	56	53	52	51	52	54	58	59	60	62	63	63	65	67	67	66	63	64	62	62	63	63	63	63	--	58		
Minimum	50	53	51	50	51	52	51	48	49	50	50	50	51	52	54	55	54	56	57	56	54	53	54	56	56	56	54	56	55	--	52		
July																																	
Maximum	65	67	67	66	65	63	63	62	60	63	65	65	65	63	63	65	64	62	60	62	63	64	65	64	62	64	64	65	66	66	63		
Minimum	55	58	59	58	58	56	55	56	54	57	59	57	56	56	57	56	57	56	57	57	56	58	58	58	57	57	58	59	60	59	56		
August																																	
Maximum	65	65	66	64	64	62	60	64	66	67	67	67	68	68	69	68	68	68	68	67	66	66	66	66	66	66	67	65	65	65	65		
Minimum	58	58	59	58	58	58	58	56	59	63	61	60	62	62	62	62	63	60	61	61	63	60	62	58	59	60	62	61	61	60	60		
September																																	
Maximum	65	62	62	62	63	61	60	59	59	57	57	57	57	57	59	59	58	59	58	59	61	61	58	57	59	59	58	58	56	55	--	55	
Minimum	60	61	57	57	59	55	56	55	57	57	51	52	53	55	56	54	55	55	56	55	57	56	53	53	55	55	54	54	53	--	55		

WILLAMETTE RIVER BASIN--Continued

14-2075. TUALATIN RIVER AT WEST LINN, OREG.

LOCATION.--Lat 45°21'03", long 122°40'30", temperature recorder at gaging station on left bank, 300 feet upstream from bridge on State Highway 242, 0.4 mile west of West Linn, Clackamas County, and at mile 1.8.

DATA AVAILABLE.--Water temperatures: October 1963 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 86°F Aug. 16; minimum, 43°F Jan. 7-11.

EXTREMES, 1963-67.--Water temperatures: Maximum, 86°F Aug. 16, 1967; minimum, 34°F Dec. 20, 21, 1964.

Month	Temperature (°F) of water, water year October 1966 to September 1967																															Average	
	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		
October	66	64	65	67	64	63	63	63	63	63	60	59	59	58	57	56	56	56	54	53	53	53	53	53	53	53	53	52	52	52	52	57	
Maximum	63	63	61	61	61	61	62	61	59	59	59	57	56	55	55	54	55	54	53	53	53	53	53	53	53	53	53	52	52	52	52	56	
Minimum	52	52	52	51	51	50	50	50	50	49	49	49	49	49	49	49	49	48	48	48	48	48	48	48	48	48	47	47	47	46	48		
November	52	52	51	51	50	50	50	50	50	49	49	49	49	49	49	49	48	48	48	48	48	48	48	48	48	47	47	47	46	46	48		
December	46	46	47	48	48	47	46	45	44	44	44	45	46	47	47	47	47	47	47	47	47	47	46	46	45	44	44	44	44	44	45		
Maximum	46	46	46	47	47	46	45	44	44	44	44	44	45	46	47	47	47	47	47	47	47	47	46	46	45	44	44	44	44	44	45		
Minimum	44	44	44	45	45	44	44	43	43	43	44	44	45	46	47	48	48	47	46	46	46	46	45	44	44	44	44	46	47	48	48	45	
January	44	44	44	44	44	44	43	43	43	43	43	44	45	46	47	48	48	47	46	46	46	46	45	44	44	44	44	46	47	48	48	45	
February	48	47	47	46	46	46	46	46	46	45	45	45	46	46	46	45	45	45	45	45	45	45	44	44	44	44	44	46	47	48	48	45	
Maximum	47	47	46	46	46	46	46	46	45	45	45	45	46	46	46	45	45	45	45	45	45	45	44	44	44	44	44	45	46	47	48	45	
Minimum	46	46	46	46	46	45	45	45	45	45	45	45	45	45	45	44	44	44	44	44	44	44	43	43	43	43	43	44	45	46	47	46	
March	45	45	46	46	45	45	45	45	45	45	45	45	45	45	45	44	44	44	44	44	44	44	43	43	43	43	43	44	45	46	47	46	
Maximum	47	47	48	49	50	50	50	50	50	51	51	51	50	50	50	50	50	49	48	48	48	50	51	51	52	52	52	52	52	51	--	49	
Minimum	46	46	46	48	48	49	50	50	50	50	50	50	50	50	50	49	48	48	48	48	48	50	50	51	51	52	52	52	52	51	--	49	
April	51	51	52	53	54	56	57	57	57	57	57	58	59	61	62	62	62	62	62	63	64	65	66	66	66	66	65	65	64	64	60	60	
Maximum	51	51	51	52	53	54	55	56	56	56	57	57	58	59	60	62	62	62	63	64	65	65	65	65	65	65	64	65	65	64	64	63	
Minimum	51	51	51	52	53	54	55	56	56	56	57	57	58	59	60	62	62	62	63	64	65	65	65	65	65	64	65	65	64	64	63	58	
May	64	64	67	67	67	66	66	65	65	64	65	66	66	68	70	73	74	75	75	75	71	69	72	72	72	73	74	76	76	77	--	69	
Maximum	63	63	64	64	66	65	65	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
Minimum	78	78	80	79	78	78	76	78	82	86	81	81	80	80	81	79	77	76	77	79	82	83	82	78	79	82	82	83	81	82	79	79	
June	73	74	75	75	74	73	70	69	69	70	72	69	68	67	66	67	69	66	66	66	65	67	66	67	67	65	65	67	67	68	68	68	
Maximum	68	69	70	67	67	66	68	71	74	71	72	73	74	74	74	73	73	73	73	73	72	72	69	69	70	70	70	71	71	70	71	70	
Minimum	75	74	80	77	76	75	74	72	70	69	69	69	73	73	73	68	70	72	74	71	71	74	73	72	73	72	73	72	73	72	65	--	72
July	71	71	69	70	71	69	69	67	68	66	66	66	64	63	65	63	64	68	66	66	66	66	64	65	66	66	65	66	65	64	65	--	66
August	68	69	70	67	67	66	68	71	74	71	72	73	74	74	74	73	73	73	73	73	72	72	69	69	70	70	70	71	71	70	71	70	70
Maximum	71	71	69	70	71	69	69	67	68	66	66	66	64	63	65	63	64	68	66	66	66	66	64	65	66	66	65	66	65	64	65	--	66
Minimum	71	71	69	70	71	69	69	67	68	66	66	66	64	63	65	63	64	68	66	66	66	66	64	65	66	66	65	66	65	64	65	--	66

14-2077. WILLAMETTE RIVER AT OREGON CITY, OREG.

LOCATION. --Lat 45°20'25", long 122°38'15", temperature recorder on right bank at Oregon City Marina, 0.6 mile downstream from Tualatin River, 10.7 miles downstream from gaging station at Wilsonville, Clackamas County, and at mile 27.8.

RECORDS AVAILABLE. --Water temperatures: March 1963 to September 1967.

EXTREMES, 1963-67. --Water temperatures: Maximum, 78°F July 7, Aug. 19; minimum, 42°F Jan. 10.

REMARKS. 1963-67. --Water temperatures: Maximum, 78°F July 7, Aug. 19, 1967; minimum, 35°F Dec. 19, 20, 1964.

REMARKS. --Records furnished by Federal Water Pollution Control Administration.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average
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	
October	64	65	65	64	63	63	62	62	62	62	61	60	59	58	56	55	54	55	55	--	--	--	--	--	--	--	--	55	55	55	55	55	59
Maximum	63	64	64	63	63	62	62	61	61	61	60	58	58	56	55	54	54	54	54	--	--	--	--	--	--	--	--	54	55	55	54	54	58
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	--	--	--	--	--	--	53	52	51	50	50	49	49	50	50	50	49	50	50	50	50	50	50	50	50	50	50	49	49	49	49	49	--
Minimum	--	--	--	--	--	--	52	50	50	49	49	49	50	50	50	50	49	49	50	50	50	50	50	50	50	50	50	48	49	49	49	49	--
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	50	50	50	48	47	46	45	45	45	46	47	49	48	48	47	47	47	47	47	48	47	47	46	45	45	45	46	45	45	45	46	46	45
Minimum	49	50	49	48	47	46	45	44	44	45	46	47	48	47	47	47	47	47	46	46	47	45	45	44	44	44	44	44	44	44	44	45	46
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	46	45	45	48	45	45	44	43	43	44	44	45	46	46	46	46	46	46	46	45	45	45	45	44	--	--	--	--	--	--	--	--	--
Minimum	45	45	45	44	44	43	43	43	43	43	43	43	44	45	46	46	46	44	44	43	44	44	44	44	43	--	--	--	--	--	--	--	--
February	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	--	--	--	--	--	--	46	46	46	46	47	47	47	47	47	46	46	45	46	46	45	45	45	44	44	44	44	45	46	47	47	47	47
Minimum	--	--	--	--	--	--	45	45	45	45	45	46	47	47	46	45	45	45	45	45	45	45	44	44	44	44	44	45	46	47	47	47	47
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	47	47	47	46	46	47	47	47	47	47	47	46	46	46	46	46	46	46	46	49	49	48	49	49	49	49	49	49	49	49	48	--	48
Minimum	47	46	45	45	45	46	47	47	47	46	46	45	45	45	45	46	46	47	48	47	48	49	49	49	48	47	49	48	47	48	47	47	46
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	48	48	50	52	52	52	52	53	53	53	53	53	53	52	51	50	48	48	49	50	51	53	54	56	56	55	55	54	52	53	--	51	50
Minimum	46	46	48	50	51	51	51	52	52	52	52	52	52	51	50	48	48	47	49	50	51	53	54	55	54	53	52	51	51	51	--	50	50
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	54	54	54	55	56	57	59	--	61	60	60	--	57	58	60	62	64	65	66	67	67	67	66	66	65	64	62	61	61	60	59	60	59
Minimum	52	52	53	54	54	55	56	--	60	58	--	56	56	57	59	61	63	64	65	65	65	65	65	64	63	62	61	60	60	59	58	59	59
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	59	60	61	63	65	66	67	67	66	65	64	64	64	65	67	69	72	73	--	74	73	73	73	71	70	70	70	72	73	73	--	67	67
Minimum	57	58	59	60	61	63	65	66	65	64	63	62	62	63	64	66	68	70	--	73	72	71	70	68	68	69	68	70	71	--	65	65	65
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	75	75	76	77	77	77	77	76	75	75	74	74	74	74	75	75	75	74	73	74	76	74	74	75	74	75	74	75	75	75	75	--	75
Minimum	72	73	74	75	75	75	76	75	74	73	73	72	73	73	73	73	73	73	72	72	72	72	72	72	72	72	73	73	73	73	--	73	73
August	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	74	75	75	75	74	74	74	75	73	74	75	76	76	76	77	78	77	77	78	77	77	76	75	75	75	74	74	73	72	72	75	73	73
Minimum	72	73	74	74	74	73	73	72	71	72	73	73	73	73	73	73	74	75	75	76	75	75	73	73	73	73	72	71	70	70	71	70	71
September	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum	72	72	73	--	71	71	70	71	70	69	68	67	67	67	67	67	67	67	67	67	68	67	67	68	68	67	68	67	68	66	--	68	67
Minimum	71	71	71	--	70	70	69	70	70	69	68	67	66	66	65	65	65	65	65	65	65	65	65	65	66	67	66	65	65	65	--	67	66

LEWIS RIVER BASIN

14-2217. LEWIS RIVER AT WOODLAND, WASH.

LOCATION.--Lat 45°33'25", long 122°44'00", at bridge on U.S. Highway 99, 1 mile southeast of Woodland, Cowlitz County, and 2 miles upstream from East Fork.
 RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1967.
 REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (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-sulfate ratio	Specific conductance (micro-mhos at 25°C)	Color	pH
														Parts per million	Tons per acre-foot	Calcium, Magnesium, Sodium	Non-carbonate				
Oct. 27, 1966.		13	4.0	1.0	3.1	0.4	22	0	0.4	1.8	0.1	0.1	--	38	0.05	14	0		42	7.1	5
Nov. 23.....		12	3.5	.9	2.5	.6	21	0	.4	1.5	.1	.2	--	39	.05	12	0		43	7.2	5
Dec. 30.....		13	3.0	1.6	2.7	.5	20	0	.6	1.5	.0	.2	--	36	.05	14	0		38	7.3	5
Jan. 26, 1967.		14	3.7	1.0	2.6	.3	20	0	1.2	2.0	.0	.3	0.00	38	.05	13	0		38	7.1	5
Feb. 18.....		14	3.8	1.0	3.1	.5	18	0	1.2	2.0	.0	.2	--	36	.05	14	0		36	7.1	0
Mar. 31.....		14	3.8	.8	2.9	.5	18	0	.8	1.5	.1	.2	--	A 33	.04	13	0		37	7.5	5
Apr. 21.....		14	3.5	.9	2.7	1.0	20	0	.6	2.5	.1	.2	--	A 35	.05	12	0		39	7.0	0
May 27.....		14	3.0	1.2	3.0	.5	20	0	1.8	1.8	.0	.2	--	39	.05	13	0		39	7.4	5
June 17.....		14	3.5	1.1	2.7	.6	21	0	.2	1.5	.0	.0	--	35	.05	13	0		39	7.2	5
July 22.....		14	4.0	.7	2.8	.7	21	0	.4	1.8	.1	.1	.02	38	.05	13	0		41	7.3	5
Aug. 19.....		14	4.0	.7	2.9	.6	21	0	.2	1.8	.0	.0	--	35	.05	13	0		40	7.2	5
Sept. 22.....		12	3.5	1.0	2.8	.7	22	0	.2	1.8	.0	.2	--	34	.05	13	0		42	7.1	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966.	9.7	430	--	--	--	--	May 27, 1967..	12.5	36	--	--	--	--
Nov. 23.....	10.2	36	--	--	--	--	June 17.....	11.5	430	--	--	--	--
Jan. 26, 1967.	--	--	0.01	0.02	0.00	--	July 22.....	10.2	36	0.00	0.00	0.00	--
Feb. 26.....	12.4	230	--	--	--	--	Aug. 19.....	10.8	30	--	--	--	--
Mar. 31.....	11.9	0	--	--	--	--	Sept. 22.....	10.6	36	--	--	--	--
Apr. 21.....	11.7	0	--	--	--	--							

LEWIS RIVER BASIN--Continued

14--2225. EAST FORK LEWIS RIVER NEAR HEISSON, WASH.

LOCATION. --Lat 45°50'10", long 122°27'50", temperature recorder at gaging station 60 feet downstream from Basket Creek, 1.5 miles northeast of Heisson, Clark County, and at mile 20.2.

DATE. --25 water miles; June 1950 to September 1967.

RECORDS AVAILABLE. --Water temperatures: Maximum, 73°F Aug. 15-19; minimum, 37°F Mar. 12.

EXTREMES, 1950-67. --Water temperatures: Maximum (1950-60, 1962-67), 74°F Aug. 4, 1952, July 31, 1965; minimum, freezing point Jan. 24 to Feb. 1, 1957, Jan. 11-14, 1963.

Month	Temperature (°F) of water, water year October 1966 to September 1967																															Average
	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	
October	57	56	55	55	55	54	54	56	54	50	50	50	48	46	47	47	48	47	46	47	46	48	50	50	49	50	50	49	48	49	49	
Maximum	54	54	53	52	53	53	53	54	50	49	49	48	46	45	46	46	46	45	46	45	46	45	48	48	49	49	47	48	48	48	48	
Minimum	48	46	47	46	47	46	45	44	45	45	46	47	47	47	47	47	47	47	46	46	45	44	44	44	44	44	45	45	45	47	45	
November	48	47	46	45	46	46	45	44	43	44	44	45	46	47	47	47	46	46	46	45	44	42	43	44	44	44	44	45	45	45	45	
Maximum	47	47	46	45	44	44	43	42	42	43	44	44	44	44	44	45	45	45	45	44	42	42	43	43	41	41	42	42	43	43	43	
Minimum	47	46	45	44	44	43	42	42	42	42	42	43	44	44	44	44	45	44	44	44	43	41	41	42	41	41	40	41	41	42	42	
December	43	43	43	43	41	41	42	42	42	43	43	43	43	44	44	44	44	44	44	44	42	41	41	42	41	41	42	43	43	42	42	
Maximum	43	43	43	41	41	41	41	42	41	42	43	43	43	44	44	44	44	44	44	44	42	41	41	40	40	41	42	43	43	42	42	
Minimum	43	43	43	41	41	41	41	42	41	42	43	43	43	44	44	44	44	44	44	44	42	41	41	40	40	41	42	43	43	42	42	
January	43	43	43	43	42	42	43	43	43	43	43	43	43	41	41	42	42	42	41	42	42	42	43	43	43	44	44	44	44	44	44	
Maximum	43	43	43	40	40	40	40	41	43	43	42	41	41	41	41	41	41	40	40	40	40	40	40	41	41	41	41	41	41	41	41	
Minimum	41	40	40	38	39	40	39	41	40	39	38	37	36	39	39	41	42	41	41	43	43	42	42	42	42	42	42	41	40	40	40	
February	45	46	46	47	45	47	47	47	45	45	47	47	44	43	44	44	44	43	43	45	45	46	48	47	47	47	45	44	45	45	45	
Maximum	40	41	42	45	43	42	43	44	44	43	43	46	42	41	41	42	41	42	42	41	43	43	44	44	44	45	43	42	41	44	44	
Minimum	46	46	47	51	51	51	51	50	46	46	46	49	51	53	54	53	54	54	54	53	54	53	51	51	54	54	52	50	51	50	50	
March	45	45	45	44	45	48	46	46	45	45	45	46	48	48	48	48	48	48	48	48	47	48	49	50	48	47	50	51	50	48	49	
Maximum	53	57	57	58	58	56	54	54	53	54	55	55	59	61	62	63	64	65	65	65	65	65	65	63	65	65	65	64	65	66	66	
Minimum	50	53	54	54	53	53	53	53	53	53	54	55	59	61	62	63	64	65	65	65	65	65	65	63	65	65	65	64	65	66	66	
April	66	68	70	69	68	66	65	64	63	65	67	67	68	68	69	69	69	69	69	69	69	69	69	67	67	67	67	66	67	68	69	
Maximum	63	64	66	66	65	63	62	60	60	60	63	65	64	65	65	65	65	65	65	65	65	65	65	63	62	63	64	64	66	63	63	
Minimum	69	69	69	68	67	65	63	64	68	70	71	72	72	73	73	73	73	73	73	73	72	72	70	68	68	69	70	70	70	69	69	
May	65	64	64	64	63	62	60	62	66	65	66	66	66	66	67	67	68	68	68	67	67	66	63	62	63	64	65	66	66	66	65	
June	68	68	67	68	68	67	65	63	61	60	59	59	60	63	64	63	64	63	62	63	63	63	60	58	57	56	57	56	57	58	58	
Maximum	66	66	63	63	64	63	62	61	60	59	58	57	58	59	60	61	62	63	64	63	63	63	61	59	60	62	62	62	62	62	62	
Minimum	66	66	63	63	64	63	62	61	60	59	58	57	58	59	60	61	62	63	64	63	63	63	61	59	60	62	62	62	62	62	62	

KALAMA RIVER BASIN

14-2235. KALAMA RIVER BELOW ITALIAN CREEK, NEAR KALAMA, WASH.

LOCATION.--Lat 46°02'40", long 122°48'50"; temperature recorder at gaging station 2.5 miles northeast of Kalama, Cowlitz County, 4.2 miles (revised) upstream from mouth, and 5 miles downstream from Italian Creek.

DATA AVAILABLE.--Chemical analyses: July 1960 to September 1962.

Water temperatures: October 1954 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 62°F June 30 to July 3; minimum, 39°F Mar. 12.

EXTREMES, 1954-67.--Water temperatures: Maximum, 69°F July 28, 1958; minimum, freezing point Nov. 19, 20, 1958.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Chemical analyses, in parts per million, water year OCTOBER 1966 to SEPTEMBER 1967.																							
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		Specific conductance (micro-mhos at 25°C)	Color or pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 27, 1966.	800	13		4.5	0.7	3.0	0.3	21	0	0.6	2.5	0.0	0.5	--	40	0.05	86.4	14	0	0	44	7.1	10
Jan. 26, 1967.	200	15		4.0	1.1	2.7	.4	19	0	.8	1.5	.1	.8	0.02	38	.05	207	14	0	0	40	7.2	5
Apr. 21, 1967.	1400	15		3.8	1.1	2.7	.6	22	0	1.2	1.5	.1	.8	--	A	.38	144	14	0	0	43	7.6	0
July 22, 1967.	315	19		4.5	1.5	3.8	.6	27	0	.2	3.2	.1	.1	.02	47	.06	40.0	17	0	0	66	7.5	5

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chromium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966.	11.2	--	91	--	--	--	Apr. 21, 1967.	12.2	30	--	--	--	--
Jan. 26, 1967.	--	--	--	0.01	0.00	--	July 22, 1967.	5.6	36	0.00	0.00	0.00	0.00

COWLITZ RIVER BASIN
14-2325. CISPUS RIVER NEAR RANDLE, WASH.

LOCATION--Lat 46°26'50", long 121°51'13"; temperature recorder at gaging station, 60 feet upstream from bridge to Tower Rock ranger station, 4 miles downstream from North Fork, and 8 miles southeast of Händlé, Lewis County.

DRAINAGE AREA--321 square miles.

RECORDS AVAILABLE--Water temperatures: May 1950 to September 1967.

EXTREMES, 1966-67--Water temperatures: Maximum, 59°F on several days during August; minimum, 37°F Mar. 12, 13.

EXTREMES, 1960-67--Water temperatures: Maximum, 62°F July 27-29, 1958; minimum, freezing point Jan. 20, 1954, on several days during January and February 1963.

Temperature (°F) of water, water year October 1966 to September 1967																																	
	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	50	51	50	50	50	50	50	50	48	48	48	47	46	45	46	45	45	45	46	46	44	44	44	44	45	46	46	45	45	44	45	44	46
Minimum	48	50	48	48	48	48	48	47	47	47	46	47	46	45	44	44	44	44	44	44	44	44	44	44	44	44	45	44	44	44	44	45	44
November Maximum	45	44	43	43	43	43	42	42	42	42	42	41	42	43	43	43	42	43	43	43	43	41	41	41	41	41	41	41	41	41	42	--	42
Minimum	44	43	42	43	43	42	42	42	42	42	41	42	43	42	43	42	42	42	42	43	41	41	41	41	41	41	41	41	41	41	41	--	41
December Maximum	42	42	42	41	41	40	39	39	39	39	39	40	41	40	40	41	41	41	41	41	41	40	39	39	39	39	39	39	39	39	40	40	41
Minimum	42	42	42	41	41	40	39	39	39	39	39	39	39	39	40	41	41	41	41	41	40	39	39	39	39	39	39	39	39	39	39	39	39
January Maximum	40	39	39	39	38	38	38	39	39	39	40	40	40	40	40	39	39	39	39	39	39	39	39	38	39	39	39	39	39	39	39	39	38
Minimum	39	39	39	38	38	38	38	38	39	39	39	40	40	40	40	39	39	39	39	39	39	38	38	39	39	39	39	39	39	39	39	39	38
February Maximum	39	39	39	40	39	40	40	40	40	40	41	40	40	39	39	39	39	39	39	39	39	39	39	40	41	42	41	42	41	--	--	40	
Minimum	39	39	39	39	39	39	39	39	40	40	40	40	39	39	39	39	39	39	38	39	39	39	39	40	40	40	40	39	40	39	39	39	39
March Maximum	40	41	40	40	40	40	40	40	40	40	40	39	39	39	39	40	40	40	40	41	41	40	39	40	39	40	39	40	39	39	39	39	39
Minimum	39	39	38	38	38	38	38	38	38	38	37	37	37	38	39	40	39	39	39	39	40	40	38	38	38	38	39	38	38	38	38	38	38
April Maximum	42	43	44	42	43	43	44	42	42	44	44	42	40	41	43	40	40	40	42	42	45	46	43	42	45	46	43	42	43	42	43	--	42
Minimum	38	38	39	41	40	39	40	41	40	39	40	40	40	39	40	39	39	38	40	41	40	42	41	42	41	42	41	38	40	41	--	39	
May Maximum	43	43	47	44	45	47	44	44	42	42	42	42	42	42	45	47	46	45	44	45	46	45	43	44	45	44	45	44	44	44	44	44	44
Minimum	42	42	43	42	43	43	41	42	41	41	41	41	42	42	42	42	42	41	42	42	42	42	42	41	42	41	43	43	43	42	42	42	42
June Maximum	46	46	45	46	46	46	44	44	45	45	47	49	49	49	49	49	50	51	52	51	48	47	51	51	52	52	52	52	53	53	--	48	
Minimum	44	44	43	43	43	43	44	44	44	44	44	44	44	44	45	45	45	45	47	47	48	47	46	46	48	48	49	49	50	50	--	45	
July Maximum	54	55	55	54	54	54	52	54	55	57	54	56	56	56	56	56	56	56	54	53	52	56	57	58	57	57	57	57	58	56	55	55	
Minimum	50	51	51	51	51	50	49	50	51	52	51	51	51	51	51	51	51	50	50	50	50	50	50	52	52	52	52	51	51	52	52	51	51
August Maximum	58	58	58	57	56	56	58	59	59	59	59	59	59	59	59	59	59	59	59	57	58	57	56	56	56	56	56	56	57	57	57	57	57
Minimum	52	52	52	53	53	52	52	52	54	53	53	53	53	53	53	53	53	53	53	53	53	51	51	50	50	50	52	51	51	51	52	52	52
September Maximum	56	54	55	56	53	56	55	54	52	51	50	52	53	55	54	54	54	54	55	55	53	52	52	53	52	53	53	53	53	50	48	--	53
Minimum	51	52	50	51	51	50	50	50	49	48	47	48	50	51	50	51	50	51	50	50	50	50	48	47	48	48	48	48	48	48	48	48	48

COMLITZ RIVER BASIN--Continued

14-2335. COMLITZ RIVER NEAR KOSMOS, WASH.

LOCATION --Lat 46°28'00", long 123°07'20", temperature recorder at gaging station 0.5 mile downstream from Tumwater Creek, 1.5 miles downstream from Cispus River, 4 miles southeast of Kosmos, Lewis County, and at mile 87.9.

DRAINAGE AREA --1,042 square miles.

RECORDS AVAILABLE --Chemical analyses: July 1959 to June 1960, November 1966 to September 1967.

Water temperatures: November 1952 to September 1967.

EXTREMES, 1966-67 --Water temperatures: Maximum, 61°F Aug. 30 to Sept. 2; minimum, 39°F on several days during February.

EXTREMES, 1962-67 --Water temperatures: Maximum (1962-64, 1962-67), 65°F July 11, 12, 1958; minimum, freezing point Jan. 20, 1962.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate magnesium				
Nov. 16, 1966.	5730	11	5.0	1.1	2.4	0.5	24	0	0.2	1.2	0.1	0.3		40	0.05	619	17	0		45	7.3	5
Jan. 5, 1967..	6260	12	6.5	1.7	3.0	.3	29	0	1.8	1.0	.1	.1		44	.06	744	19	0		55	7.3	5
Feb. 7,	7130	13	5.5	1.5	2.8	.3	28	0	1.6	1.0	.1	.1		49	.07	943	20	0		49	7.2	10
Mar. 16,	2800	15	6.5	1.7	3.3	.4	34	0	2.8	1.2	.0	.2		A	.07	363	23	0		62	7.5	5
May 12,	5700	12	5.5	1.3	2.6	.3	26	0	1.8	.8	.0	.2		A	.05	585	19	0		45	7.2	5
June 16,	11600	8.6	3.5	.6	2.1	.6	19	0	1.0	.5	.0	.0		28	.04	877	11	0		31	7.2	5
Aug. 4,	2930	14	5.5	1.2	3.0	.6	28	0	2.8	1.5	.0	.1		44	.06	247	29	0		52	7.2	5
Sept. 20,	1240	15	7.5	1.3	3.3	.7	31	0	3.8	1.5	.1	.1		52	.07	174	24	0		72	7.6	5

A Calculated from determined constituents.

COWLITZ RIVER BASIN--Continued

14-2355. WEST FORK TILTON RIVER NEAR MORTON, WASH.

LOCATION.--Lat 46°39'45" long 122°14'45", temperature recorder at gaging station 0.9 mile upstream from mouth, and 4 miles north-east of Morton, Lewis County.

DRAINAGE AREA.--16.4 square miles.

RECORDS AVAILABLE.--Water temperatures: August 1950 to May 1956, July 1957 to September 1959, October 1960 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 74°F Aug. 15-17; minimum, 37°F Apr. 18.

EXTREMES, 1950-59, 1960-67.--Water temperatures: Maximum (1950-59, 1960-62, 1963-67), 74°F Aug. 15-17, 1967; minimum (1950-59, 1960-63, 1964-67), freezing point on several days during February and March 1962, Jan. 27 to Feb. 1, 1963.

Temperature (°F) of water, water year October 1966 to September 1967

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	57	58	57	58	56	56	56	55	51	52	51	48	48	48	49	46	48	48	47	45	46	44	46	48	49	50	49	49	49	49	48	50
Maximum	53	53	51	51	52	52	54	50	47	47	48	47	47	47	45	44	44	44	44	44	44	44	46	47	47	49	47	47	48	47	46	47
Minimum	48	43	47	47	47	47	45	44	45	45	45	46	46	46	46	45	46	46	46	46	46	44	44	45	44	43	44	43	44	45	45	45
November	48	46	45	45	47	45	44	43	43	43	43	45	45	45	45	45	45	45	46	46	46	44	44	44	44	43	42	43	44	45	45	44
December	45	45	45	44	43	43	40	40	40	40	41	42	42	42	42	42	43	43	43	43	43	42	41	41	41	41	41	41	40	40	41	42
Maximum	45	45	44	43	42	40	40	40	40	40	40	41	42	42	42	42	43	43	43	43	43	42	41	41	41	40	41	41	40	40	40	41
Minimum	45	45	44	43	42	40	40	40	40	40	40	41	42	42	42	42	43	43	43	43	43	42	41	41	41	40	41	41	40	40	40	41
January	42	42	42	42	41	40	39	40	40	40	41	41	41	42	43	43	43	42	41	41	41	41	41	41	41	41	41	41	42	42	41	41
Maximum	42	41	41	41	40	39	39	40	40	40	41	41	41	42	42	42	42	40	40	41	41	41	41	41	41	41	41	41	41	41	41	40
Minimum	41	41	41	41	40	39	39	40	40	40	41	41	41	42	42	42	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	40
February	41	41	42	42	42	42	41	42	42	42	42	41	40	39	39	38	39	39	39	39	39	40	40	40	40	41	42	43	43	43	43	40
Maximum	40	40	41	42	41	40	41	42	40	40	40	40	39	39	38	38	38	38	38	38	39	39	39	39	40	41	41	41	42	42	42	39
Minimum	42	41	40	39	40	41	42	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
March	42	41	40	39	40	41	41	41	41	41	41	41	41	40	40	40	40	41	41	41	41	42	42	42	41	41	41	41	41	41	41	41
Maximum	41	41	40	39	40	41	41	41	41	41	41	41	41	40	40	40	40	40	41	41	41	42	42	42	41	41	41	41	41	41	41	41
Minimum	43	44	45	44	42	45	45	43	42	43	46	43	41	40	42	41	41	41	41	41	41	43	45	44	43	44	41	44	42	44	44	43
April	39	40	40	42	41	39	41	42	41	40	41	41	41	41	39	39	38	39	37	38	39	41	42	40	39	40	39	40	41	41	41	39
Maximum	43	42	42	43	48	45	48	43	43	42	43	43	46	48	50	49	49	50	49	52	52	51	52	47	52	50	49	48	47	50	47	47
Minimum	41	41	41	41	41	41	41	42	41	40	41	41	42	41	43	43	44	44	44	45	45	45	46	44	44	43	45	47	45	46	46	43
May	53	51	53	56	56	52	51	52	51	51	53	58	64	65	66	67	68	69	70	64	57	56	64	66	69	65	64	68	69	68	68	68
Maximum	47	50	49	48	49	50	50	50	50	50	50	50	52	52	53	54	56	56	58	57	54	53	54	55	56	58	58	56	58	55	55	52
Minimum	70	73	72	69	66	66	68	62	66	68	70	68	69	69	68	70	70	70	70	64	63	66	65	69	70	68	61	69	70	70	64	67
June	56	59	60	60	60	58	57	58	55	56	59	59	58	58	57	60	60	60	60	58	58	58	58	57	59	58	56	56	59	58	57	56
Maximum	68	68	71	69	66	61	62	60	72	68	72	73	73	73	74	74	74	73	72	70	73	72	67	68	69	68	71	71	70	72	72	70
Minimum	54	54	55	57	59	59	57	58	62	60	60	60	60	60	60	61	62	61	60	60	60	60	60	59	60	57	61	59	60	60	62	59
July	68	67	69	70	70	67	66	60	59	60	58	56	53	52	53	55	57	56	57	57	56	57	56	53	54	53	53	54	54	54	55	55
August	61	61	58	58	59	60	56	58	56	58	56	53	52	52	53	55	57	56	57	57	56	53	54	53	54	53	53	54	54	54	54	55
Maximum	61	61	58	58	59	60	56	58	56	58	56	53	52	52	53	55	57	56	57	57	56	53	54	53	54	53	53	54	54	54	54	55
Minimum	61	61	58	58	59	60	56	58	56	58	56	53	52	52	53	55	57	56	57	57	56	53	54	53	54	53	53	54	54	54	54	55

COWLITZ RIVER BASIN--Continued
14--2375. WINSTON CREEK NEAR SILVER CREEK, WASH.

LOCATION.--Lat 46°29'00", long 122°31'15", temperature recorder at gaging station 100 feet downstream from bridge, 3.2 miles upstream from mouth, and 4.5 miles southeast of town of Silver Creek, Lewis County.
DRAINAGE AREA.--77.8 square miles.
BASE FLOW.--1.5 cfs, 1966-67.
EXTREMES, 1966-67.--Water temperatures: Maximum, 72°F on several days during June to August; minimum, 38°F Mar. 12, 13.
EXTREMES, 1965-67.--Water temperatures: Maximum, 72°F July 30, 1965, and on several days during June to August 1967; minimum, 36°F on several days during December 1965 and January 1966.

		Temperature (°F) of water, water year October 1966 to September 1967																															Average	
		Day																																
Month		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	58	56	56	56	55	56	56	53	52	52	51	50	49	49	48	49	48	49	49	48	49	51	51	50	51	51	48	48	49	48	51	
	Minimum	55	56	53	53	53	54	55	53	50	49	51	50	49	47	47	46	48	47	47	46	48	47	47	49	49	48	50	47	47	46	46	49	
November	Maximum	47	47	45	44	45	45	44	44	43	43	44	45	47	47	47	47	46	48	48	47	46	45	44	45	45	45	45	46	46	48	—	45	
	Minimum	45	45	44	43	44	44	43	42	42	43	42	44	45	47	47	47	46	46	46	47	45	43	43	44	45	45	45	45	46	46	—	44	
December	Maximum	48	48	48	47	46	46	45	44	44	44	45	46	46	46	46	47	47	47	47	47	46	44	43	43	43	42	42	42	42	42	44	45	
	Minimum	48	48	47	46	46	45	44	44	44	44	44	44	46	46	46	46	47	47	47	46	44	43	42	43	43	42	42	42	42	42	42	44	
January	Maximum	43	43	43	43	41	41	41	42	42	42	42	42	43	44	44	44	44	43	42	42	42	42	42	42	42	41	42	43	44	44	44	42	
	Minimum	43	42	42	41	41	41	41	41	42	42	42	42	42	43	44	44	43	42	42	42	42	42	42	42	41	41	41	42	43	44	42	42	
February	Maximum	42	43	43	44	43	42	41	41	42	43	43	42	42	40	40	41	42	42	41	40	42	42	42	42	42	42	43	42	43	44	42	42	
	Minimum	42	42	43	43	42	41	40	40	41	42	42	42	39	40	40	41	41	40	40	40	40	40	40	41	40	41	40	41	43	—	—	40	
March	Maximum	43	42	41	41	42	42	42	42	41	40	41	39	40	41	44	43	43	42	44	44	44	44	44	44	43	43	43	42	42	41	41	40	
	Minimum	41	40	39	39	39	39	42	40	40	39	39	38	38	39	40	41	42	42	42	42	42	42	44	44	44	43	43	43	42	42	41	41	
April	Maximum	46	47	48	47	46	49	49	47	46	46	49	46	45	45	46	44	44	45	46	46	46	48	50	50	48	48	47	49	46	49	—	46	
	Minimum	41	42	43	45	44	42	44	46	45	44	43	45	43	42	43	42	42	42	42	42	42	44	46	45	45	45	45	45	44	45	—	43	
May	Maximum	46	49	48	49	55	54	57	55	52	50	50	51	54	57	59	61	60	62	64	62	64	62	60	58	57	56	57	56	56	56	55	55	
	Minimum	47	47	47	47	48	51	51	52	49	48	49	50	50	51	53	54	56	56	57	58	58	58	55	55	55	52	53	54	55	54	53	52	
June	Maximum	58	58	59	64	65	62	60	58	58	58	59	60	64	66	68	70	72	68	62	59	64	66	69	66	64	67	68	68	68	68	68	63	
	Minimum	53	57	57	56	58	58	58	57	57	57	57	57	57	57	58	60	61	62	63	62	59	58	58	59	61	60	59	61	60	59	61	58	
July	Maximum	65	72	72	71	70	67	69	65	65	68	70	69	67	69	69	70	67	64	63	65	69	70	71	69	67	63	69	68	69	69	68	68	
	Minimum	60	62	63	63	62	60	61	62	60	59	61	62	60	60	61	63	63	61	62	60	62	61	60	61	60	61	61	60	60	60	63	61	
August	Maximum	69	68	69	67	64	63	62	66	72	70	72	72	71	71	72	72	71	71	69	70	70	68	65	66	68	69	67	67	67	68	68	68	
	Minimum	60	60	60	61	61	61	59	60	64	64	64	64	64	63	63	64	64	62	63	63	65	63	64	61	60	60	63	61	63	63	62	62	
September	Maximum	67	67	66	66	65	66	64	64	61	61	61	60	61	62	61	62	61	61	62	62	60	58	58	58	58	58	58	58	56	56	56	56	57
	Minimum	63	63	60	61	61	62	59	59	59	60	59	57	55	54	55	57	58	58	56	59	58	55	54	55	54	54	55	55	55	55	55	55	57

14-2430. COWLITZ RIVER AT CASTLE ROCK, WASH.

LOCATION.--Lat 46°16'30", long 122°54'50", at gaging station 15 feet downstream from highway bridge in Castle Rock, Cowlitz County, 2.5 miles downstream from Toule River, and at mile 17.3.

DRAINAGE AREA.--2,238 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959, August 1966 to September 1967.

Water temperatures: August 1950 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 72°F Aug. 16, 17; minimum, 41°F on several days during March.

EXTREMES, 1950-67.--Water temperatures: Maximum (1950-62, 1963-67), 75°F July 28-30, 1958; minimum, freezing point Jan. 29, 30, 1951.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbocationate (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 (25°C)	Specific conductance (micro-mhos at 25°C)	pH or Col.	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate magnesium				
Nov. 3, 1966..	2730	13		7.0	1.6	4.3	0.7	31	0	2.6	3.5	0.1	0.3		53	0.07	391	24	0		64	7.2	5
Jan. 3, 1967..	14900	14		5.5	1.9	3.3	.4	25	0	1.6	1.8	.1	.4		46	.06	180	17	0		50	7.3	10
Feb. 1, 1967..	11700	14		4.0	1.3	3.0	.4	26	0	1.2	1.5	.0	.3		47	.06	180	17	0		50	7.3	10
Mar. 22, 1967..	8940	14		3.0	1.0	3.3	.5	28	0	1.4	2.2	.0	.3		49	.07	1180	19	0		56	7.3	5
May 16, 1967..	9990	13		6.0	1.0	3.7	.4	26	0	2.0	2.0	.0	.2		43	.06	1160	19	0		55	7.2	5
June 27, 1967..	12200	10		3.5	1.2	2.4	.7	20	0	.8	2.0	.0	.1		32	.04	1050	14	0		40	7.3	5
Aug. 17, 1967..	2470	15	0.02	8.0	1.1	5.5	1.3	29	0	1.6	8.8	.0	.1		58	.08	387	25	1		81	7.3	5
Sept. 26, 1967..	1600	16		10	2.1	9.7	1.7	34	0	3.0	18	.1	.1		77	.10	324	34	6		124	7.4	5

14-2450. COWEMAN RIVER NEAR KELSO, WASH.

LOCATION--Lat 46°08'15", long 122°53'45", at bridge on U.S. Highway 99, 0.3 mile east of Kelso, Cowlitz County, 2.6 miles upstream from mouth, and 4.6 miles downstream from gaging station.
 DATE OF COLLECTION--July 1950 to September 1967.
 RECORDS AVAILABLE--Chemical analyses: October 1961 to September 1967.
 WATER TEMPERATURES--July 1950 to September 1967.
 EXTREMES, 1966-67.--Water temperatures: Maximum, 77°F Aug. 12-15, 17; minimum, 39°F Mar. 4, 5, 12, 13.
 REMARKS.--Temperature recorder located at gaging station. Clock stopped Dec. 14-19, Dec. 30 to Jan. 16, Jan. 20-26; temperature ranges, 45°F to 46°F, 42°F to 45°F, and 40°F to 43°F, respectively. Some inflow between gaging station and sampling point.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Calcium 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		Specific conductance (micro-mhos at 25°C)	Col or pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-sorp-tion ratio		
Oct. 27, 1966..	184	14		6.0	1.7	3.8	0.4	28	0	0.0	4.2	0.1	0.9	--	54	0.07	26.8	22	0	61	7.1
Nov. 23.....	220	14		5.0	1.6	3.2	.6	25	0	.2	2.8	.2	.9	--	45	.06	25.7	19	0	42	7.2
Dec. 30.....	650	14		5.0	1.7	3.0	.2	20	0	1.0	2.2	.1	1.2	--	40	.05	21.8	16	0	40	7.1
Jan. 26, 1967..	850	13		3.9	1.4	3.0	.3	20	0	1.4	2.5	.0	1.5	--	A	.05	64.4	15	0	46	7.3
Mar. 31.....	650	13		3.9	1.3	3.0	.3	20	0	.4	2.5	.0	1.5	--	A	.05	64.4	15	0	48	7.1
Apr. 21.....	645	15		4.4	1.2	3.2	.8	27	0	1.0	3.0	.1	1.8	--	A	.06	73.1	16	0	49	7.1
May 27.....	145	14		5.5	1.3	3.5	.4	22	0	.4	3.0	.0	.4	--	49	.07	19.2	19	0	55	7.3
June 17.....	92	14		6.0	1.7	3.9	.7	32	0	.2	3.5	.1	.5	--	51	.07	12.7	22	0	63	6.9
July 22.....	48	17		7.5	2.3	4.6	.5	38	0	.4	5.8	.0	.1	-.01	61	.08	7.91	28	0	81	7.1
Aug. 19.....	30	15		8.8	2.6	5.6	.9	40	0	.4	8.0	.0	.5	--	64	.09	5.18	33	0	82	6.9
Sept. 22.....	28	15		8.1	2.6	6.2	1.0	40	0	.0	9.0	.0	.1	--	69	.09	5.22	31	0	100	6.9

A Calculated from determined constituents.

Additional determinations

Date of collection	Dis-solved oxygen (DO)	MPN (coliform colonies per 100 ml)	Hexa-valent chrom-ium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Date of collection	Dis-solved solids (DS)	MPN (coliform colonies per 100 ml)	Hexa-valent chrom-ium (Cr ⁶⁺)	Copper (Cu)	Zinc (Zn)	Arsenic (As)
Oct. 27, 1966.	10.4	4600	--	--	--	--	May 27, 1967..	10.3	4600	--	--	--	--
Nov. 23.....	11.8	91	--	--	--	--	June 17.....	9.0	230	--	--	--	--
Jan. 26, 1967.	--	--	0.00	0.00	0.00	--	July 22.....	7.7	24000	0.00	0.00	0.00	--
Mar. 31.....	12.0	91	--	--	--	--	Aug. 19.....	7.3	24000	--	--	--	--
Apr. 21.....	11.5	91	--	--	--	--	Sept. 22.....	7.0	11000	--	--	--	--

COLUMBIA RIVER MAIN STEM--Continued

LOCATION.--Lat 46°06'22", long 122°57'34", temperature recorder located on right pier of Longview bridge, 1.0 mile south of Longview, Clark County, 2.0 miles downstream from Corlitz River, 40.5 miles downstream from gaging station at Vancouver, Wash., Clark County, and at mile 66.0.

DRAINAGE AREA.--236,700 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: August to September 1967.

Temperature (°F) of water, August to September 1967																																			
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	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
November	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
December	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
January	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
February	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
March	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
April	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
May	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
June	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
July	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
August	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
September	Maximum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Minimum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	
Maximum	...	72	72	72	72	72	72	71	71	71	70	69	69	68	67	67	67	67	68	68	67	67	68	67	67	67	67	67	67	67	67	67	67	67	67
	Minimum	...	72	72	72	71	71	72	71	71	69	69	69	68	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
	Average	...	...	...	...	...	...	...	...	...	69	70	70	70	71	72	72	73	72	72	72	72	73	73	72	72	71	72	71	71	71	72	72	72	72

ELOCHOMAN RIVER BASIN

14--2475. ELOCHOMAN RIVER NEAR CATHLAMET, WASH.

LOCATION.--Lat 46°13'10", long 123°20'30", temperature recorder at gaging station 125 feet upstream from railroad bridge, 2.5 miles northeast of Cathlamet, Whatcom County, and 4.5 miles upstream from mouth.

DRAINAGE AREA.--65.8 square miles.

RECORDS AVAILABLE.--Water temperatures: June 1950 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 72°F Aug. 12, 15; minimum, 40°F Mar. 3-5, 12, 13.

EXTREMES, 1960-67.--Water temperatures: Maximum, 75°F July 11, 12, 1961; minimum, freezing point Feb. 17, 1966.

REMARKS.--Clock stopped Dec. 8 to Jan. 8; temperature range, 43°F to 47°F.

Temperature (°F) of water, water year October 1966 to September 1967

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	58	50	57	58	58	58	57	54	53	53	52	50	49	50	49	50	48	48	46	48	50	50	50	50	50	49	48	48	48	48	51		
Maximum	56	56	53	53	56	56	56	54	51	50	52	50	47	47	48	47	48	47	46	45	46	48	49	48	49	48	47	47	48	48	49	49		
November	48	48	47	47	48	47	46	45	44	45	44	46	47	47	47	47	47	48	48	47	45	45	46	45	46	45	45	46	47	46	45	46		
Maximum	47	46	45	46	47	46	45	43	43	44	44	44	46	47	46	46	46	47	47	45	43	44	45	44	45	44	45	46	46	45	46	45		
Minimum	47	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46		
December	47	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46		
Minimum	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46		
January	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Maximum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Minimum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
February	44	45	46	45	44	44	44	44	45	46	45	44	44	43	42	43	44	44	43	44	44	44	44	44	45	44	45	45	45	44	43	44		
Maximum	44	44	45	45	42	42	43	42	44	44	44	44	43	42	41	42	43	43	42	43	44	44	44	44	44	45	44	45	45	45	44	43	44	
Minimum	44	43	43	42	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	
Maximum	43	43	40	40	40	43	42	44	42	41	41	40	41	42	42	42	42	44	43	44	44	44	44	44	44	44	44	44	44	44	44	44	43	
Minimum	46	47	46	46	46	48	48	46	47	49	48	46	45	45	46	46	44	44	44	47	48	50	50	49	47	47	46	47	46	48	47	47	47	
Maximum	62	62	63	65	64	63	64	66	65	65	64	66	65	63	62	64	64	64	63	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
Minimum	50	50	48	50	53	53	56	54	51	50	52	50	50	54	58	60	61	60	62	63	61	60	57	55	56	54	55	54	54	55	54	54	54	
Maximum	46	43	47	48	50	51	51	50	48	48	48	47	48	49	50	53	55	55	56	57	56	57	56	53	51	49	51	52	52	50	50	50	50	
Minimum	60	59	59	63	65	63	58	56	57	56	57	61	63	65	66	66	67	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	
Maximum	52	51	55	55	56	57	54	54	53	54	54	54	56	57	58	59	60	60	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
Minimum	69	70	71	70	69	67	67	67	65	66	68	66	68	67	65	67	66	64	63	62	66	69	69	69	69	69	69	69	69	69	69	69	69	
Maximum	59	62	64	64	63	61	60	61	60	58	60	63	62	60	61	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	
Minimum	70	70	70	68	67	65	64	68	71	70	70	72	71	71	72	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	
Maximum	64	65	65	64	64	63	62	61	63	66	66	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	
Minimum	67	67	66	66	65	66	63	63	62	61	61	60	60	61	62	62	61	62	64	66	65	62	60	60	61	63	62	62	62	62	62	62	62	
Maximum	65	64	62	63	61	63	59	60	60	60	58	56	56	56	58	60	60	58	60	61	62	59	57	56	58	59	59	60	59	58	59	58	59	59

TRASK RIVER BASIN

14-3025. TRASK RIVER NEAR TILLAMOOK, OREG.

LOCATION.—Lat 45°26'25", Long 123°43'00". Temperature recorder at gaging station on right bank, 0.6 mile upstream from Gold Creek, and 6.2 miles east of Tillamook, Tillamook County.

DRAINAGE AREA.—145 square miles.

RECORDS AVAILABLE.—Water temperatures: April 1962 to September 1967.

EXTREMES, 1966-67.—Water temperatures: Maximum, 72°F July 31; minimum, 40°F Mar. 10-13.

EXTREMES, 1962-67.—Water temperatures: Maximum (1962-64, 1965-67), 72°F July 31, 1967; minimum, 33°F Jan. 11-13, 30, 31, 1963.

Temperature (°F) of water, water year October 1966 to September 1967																																	Average			
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	57	57	55	55	54	56	56	54	52	51	50	49	48	50	49	49	49	47	50	51	51	51	50	50	50	49	48	48	51	51	51				
Maximum	53	54	52	52	53	53	54	54	50	49	49	49	46	45	47	47	48	46	46	47	50	51	51	50	50	50	49	48	48	49	48	49				
Minimum	57	48	45	46	46	45	44	44	46	46	48	48	48	48	48	48	48	48	48	46	46	46	44	45	46	46	45	45	46	46	48	--	47			
November	49	49	48	47	47	46	46	46	46	46	48	49	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48			
Maximum	47	48	45	46	45	44	44	44	46	46	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48			
Minimum	48	47	46	47	46	45	44	44	45	45	47	46	48	48	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48			
December	47	47	46	46	46	45	44	44	45	45	47	46	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
Maximum	46	46	46	46	46	45	44	44	45	45	47	46	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
Minimum	45	44	43	44	43	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
January	46	46	46	46	46	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
Maximum	45	44	43	44	43	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
Minimum	46	46	46	46	46	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
February	45	45	45	46	44	43	43	43	44	45	44	45	44	42	41	42	44	43	43	42	42	42	43	44	44	44	44	44	44	44	44	44	44			
Maximum	44	43	43	43	44	44	44	44	44	44	42	43	43	42	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44			
Minimum	42	42	41	41	42	42	43	42	43	42	43	40	40	42	41	43	43	42	43	44	45	46	46	44	44	45	45	44	44	44	44	44	44			
March	47	47	47	46	47	48	48	46	47	49	49	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46			
Maximum	43	43	43	45	44	43	44	45	45	45	44	46	45	43	43	42	44	43	44	44	44	44	45	45	46	46	44	43	45	45	45	45	45			
Minimum	50	49	52	54	55	50	56	54	52	51	51	53	53	56	58	58	57	59	60	60	60	60	60	58	55	56	56	54	54	54	54	54	54			
Maximum	46	47	48	48	49	52	52	48	48	49	49	50	51	53	55	54	54	55	56	56	56	56	56	54	53	51	52	53	54	53	51	51	51			
Minimum	58	58	56	62	62	60	55	55	54	53	57	61	63	65	65	66	67	67	67	65	62	59	65	66	67	65	68	69	70	70	--	--	62			
Maximum	53	56	54	55	58	55	54	54	52	54	56	58	59	61	61	62	63	62	63	62	59	51	58	63	63	63	63	63	65	63	65	63	58			
July	71	71	71	70	69	68	67	66	69	69	67	70	69	69	69	69	69	68	67	65	65	69	70	70	69	68	67	70	69	70	71	72	68			
Maximum	63	65	65	65	64	63	62	63	61	61	62	64	63	63	62	64	64	63	61	62	63	64	64	63	64	63	64	63	64	63	65	67	63			
Minimum	71	71	70	69	67	66	68	69	69	70	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69			
August	66	65	65	65	64	64	64	61	63	65	65	64	65	64	64	65	66	64	63	65	65	63	65	65	63	62	62	63	62	63	62	63	63			
September	66	65	65	64	66	67	65	64	62	62	63	62	62	62	63	62	63	62	64	64	65	66	65	63	62	61	62	62	62	60	--	63	60			
Maximum	64	63	61	61	61	63	62	61	61	62	60	59	57	59	60	61	61	60	61	60	61	62	64	63	59	58	59	59	60	60	59	--	60			
Minimum	66	65	65	65	64	64	64	61	63	65	65	64	65	64	64	65	66	64	63	65	65	63	65	65	63	62	62	63	62	63	62	63	63			

BEAVER CREEK BASIN

14-3060.4. NORTH FORK BEAVER CREEK NEAR SEAL ROCK, OREG.

LOCATION.--Lat 44°31'40", long 124°00'10", temperature recorder at gaging station at bridge 1,100 feet upstream from Peterson
 DRAINAGE AREA.--10.0 square miles.
 RECORDS AVAILABLE.--Water temperatures: July 1965 to September 1967 (discontinued).

EXTREMES, 1965-67.--Water temperatures: Maximum, 63°F on several days during August; minimum, 43°F Mar. 4, 5, 12.

EXTREMES, 1965-67.--Water temperatures: Maximum, 66°F June 15, 1966; minimum, 40°F Dec. 17-20, 1965, Mar. 2, 1966.

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	57	57	55	55	56	57	57	56	52	52	52	50	48	49	48	48	48	46	48	46	48	50	52	52	52	51	51	50	50	52	52	52	
Minimum	56	56	53	53	54	55	56	56	51	50	51	50	48	46	47	46	47	45	46	48	46	47	47	50	52	50	51	50	48	49	50	51	50	
November																																		
Maximum	51	51	50	48	49	49	48	48	47	48	51	51	51	51	51	51	50	51	51	50	51	51	48	47	49	49	48	49	49	51	--	49		
Minimum	50	50	47	47	48	48	47	46	45	47	48	51	51	51	51	50	49	50	51	50	48	46	46	47	47	47	47	46	47	49	--	48		
December																																		
Maximum	51	50	49	49	49	49	48	48	48	49	49	50	50	49	50	50	49	49	49	48	46	47	47	47	47	47	46	47	46	47	48	48	48	
Minimum	50	49	49	49	49	48	48	47	47	48	49	49	50	49	49	49	49	49	49	48	46	45	46	47	47	47	46	45	46	47	47	47	47	
January																																		
Maximum	48	47	48	48	47	47	47	47	47	48	48	48	48	48	49	49	49	48	47	48	48	47	47	47	47	47	48	49	49	49	49	48	47	
Minimum	47	47	47	47	46	46	47	47	46	47	47	47	47	47	47	47	47	47	46	47	46	46	47	47	47	47	47	48	49	49	48	47	47	
February																																		
Maximum	48	49	48	49	49	49	47	47	47	48	48	47	47	46	46	47	48	48	47	47	47	47	47	47	47	47	47	48	49	49	49	48	47	
Minimum	47	48	48	48	47	45	45	47	47	46	46	46	46	46	46	46	46	46	45	47	46	45	45	45	45	45	45	47	47	47	47	47	47	
March																																		
Maximum	47	46	46	46	46	47	47	47	47	45	45	45	46	46	48	48	48	48	47	49	49	50	50	48	48	48	48	47	46	46	46	46	45	45
Minimum	45	44	44	43	43	44	44	46	45	44	44	45	44	44	44	44	44	48	48	47	46	47	47	49	47	46	46	46	46	46	46	46	45	45
April																																		
Maximum	50	50	49	48	47	49	45	49	49	49	51	49	48	47	49	49	47	47	49	49	50	49	51	49	51	49	47	47	49	48	48	--	48	
Minimum	45	45	46	47	46	45	46	47	47	47	46	45	46	47	46	45	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
May																																		
Maximum	50	49	49	49	53	54	55	54	53	49	50	51	53	53	56	57	57	55	58	58	57	55	53	54	53	53	53	53	52	51	52	53	53	
Minimum	44	45	46	46	47	48	47	49	49	47	46	47	46	47	49	50	52	51	52	52	53	54	50	50	48	50	50	52	50	49	48	48	48	
June																																		
Maximum	55	50	55	59	58	54	54	53	53	54	54	56	58	58	59	60	60	60	60	57	57	56	59	58	57	59	60	61	62	61	--	57	57	
Minimum	50	52	53	54	53	54	53	52	52	50	53	54	55	56	55	56	56	55	55	55	54	56	56	55	54	56	55	57	56	58	57	--	54	
July																																		
Maximum	62	61	61	60	60	60	59	59	59	60	60	61	60	60	60	60	60	61	61	60	60	60	60	60	60	60	60	60	60	61	61	62	60	
Minimum	57	58	58	57	57	57	55	55	55	55	56	56	56	56	56	56	56	56	57	57	56	58	57	58	58	57	56	56	57	56	57	56	56	
August																																		
Maximum	62	61	62	62	60	62	62	62	62	63	63	62	63	63	63	63	63	62	61	63	63	62	61	60	60	60	60	60	60	59	59	59	61	
Minimum	57	57	58	57	59	59	59	58	58	61	60	59	60	58	60	61	59	58	57	60	59	58	56	55	57	57	55	56	57	55	56	57	59	
September																																		
Maximum	59	60	60	59	59	60	60	58	57	57	57	56	58	58	57	58	58	59	59	59	58	56	56	56	56	56	57	57	57	57	57	57	57	
Minimum	58	58	56	57	56	58	56	55	54	55	56	54	55	56	54	53	54	55	56	57	58	55	53	53	54	53	54	56	57	54	56	57	55	

ALSEA RIVER BASIN--Continued
14-3067. NEEDLE BRANCH NEAR SALADO, OREG.

LOCATION.--Lat 44°30'35", long 123°51'20", at gaging station on right bank, 500 feet upstream from mouth, 4.6 miles southwest of Salado, Lincoln County, and 8.5 miles southeast of Toledo.

DRAINAGE AREA.--0.27 square mile (computed as 174.64 acres on basis of field survey by Oregon State University).

RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1967.

Sediment records: November 1958 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 79°F July 1; minimum, 40°F Feb. 15, Mar. 2.

Sediment loadings: Maximum daily, 802 ppm Jan. 27, 1967; minimum daily, 27 ppm Jan. 27, 1967; maximum daily, 802 ppm Jan. 27, 1967; minimum daily, 27 ppm Jan. 27, 1967.

Sediment loadings: Maximum daily, 41 tons Jan. 27, 1967; minimum daily, less than 0.05 ton on many days.

EXTREMES, 1958-67.--Water temperatures: Maximum, 79°F July 1, 1967; minimum, 35°F Jan. 30, 1963.

Sediment concentrations: Maximum daily, 802 ppm Jan. 27, 1967; minimum daily, less than 1 ppm on many days during 1958-63, 1965.

Sediment loads: Maximum daily, 41 tons Jan. 27, 1967; minimum daily, less than 0.05 ton on many days during each year.

REMARKS.--Temperature recorder stopped Oct. 31 to Nov. 1, May 27-29; temperature range, 49°F to 58°F and 50°F to 62°F, respectively. Temperature probe buried Mar. 14-21.

Temperature (°F) of water, water year October 1966 to September 1967

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	64	61	62	63	60	61	61	58	56	53	56	53	57	55	56	54	54	51	52	53	57	53	57	56	56	54	56	56	55	58	58	56	
Minimum	52	57	51	50	55	55	57	56	49	48	51	50	48	47	49	47	51	45	45	48	46	49	52	51	51	52	51	50	49	53	50	50	
November																																	
Maximum	57	56	55	53	53	52	53	50	50	52	52	52	51	51	51	51	51	52	51	50	49	48	48	49	49	48	49	49	49	51	51	51	
Minimum	51	47	47	48	49	48	47	46	48	49	51	51	51	50	50	50	50	50	50	50	48	47	46	46	47	48	47	48	46	49	48	48	
December																																	
Maximum	51	49	49	48	48	48	47	47	47	48	49	50	50	50	49	49	49	49	49	49	50	49	47	48	48	47	48	49	49	50	48	48	
Minimum	48	48	48	47	47	47	47	47	47	48	49	50	49	49	49	49	49	49	49	49	49	49	46	46	46	46	46	47	47	48	47	48	
January																																	
Maximum	49	48	49	49	48	48	48	48	48	49	51	48	49	49	49	48	48	48	47	47	47	47	47	48	48	47	48	47	48	47	48	48	
Minimum	47	47	48	47	46	46	47	46	47	46	47	47	48	48	47	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	45	46	
February																																	
Maximum	48	49	51	49	49	49	49	48	48	50	49	49	47	45	46	47	47	48	49	49	49	49	49	50	48	50	51	46	46	46	46	48	
Minimum	46	47	46	47	44	43	43	43	45	45	44	44	43	42	40	45	45	43	42	43	42	42	42	42	42	43	41	42	43	41	42	43	
March																																	
Maximum	47	44	49	49	51	50	51	49	45	47	50	48	49	49	49	49	49	49	49	49	49	49	49	50	48	50	51	46	46	46	46	48	
Minimum	42	40	42	41	41	42	42	41	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	
April																																	
Maximum	55	56	55	50	50	54	50	53	51	57	54	50	49	49	49	49	49	53	54	53	57	53	54	53	53	53	53	54	53	57	53	53	
Minimum	44	44	44	46	44	43	44	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
May																																	
Maximum	56	57	55	55	63	65	67	65	54	53	55	58	65	67	70	71	70	72	73	72	73	72	68	62	63	65	66	66	66	66	66	63	
Minimum	44	46	46	46	57	59	57	49	48	47	46	48	49	50	52	53	53	53	53	53	53	55	49	49	46	48	48	48	48	48	48	50	
June																																	
Maximum	70	69	72	74	74	61	60	58	61	59	61	66	72	76	75	76	77	78	74	83	83	80	75	74	75	74	76	78	77	77	77	70	
Minimum	52	55	53	56	54	58	55	54	53	54	54	57	57	57	57	58	59	60	60	60	60	59	57	56	59	60	61	57	61	58	58	56	
July																																	
Maximum	79	78	78	77	75	74	70	74	75	76	73	77	76	74	75	75	73	73	73	73	73	73	75	75	75	75	75	75	75	75	75	74	
Minimum	60	60	60	60	59	61	57	61	57	58	61	61	59	57	61	61	61	61	61	61	61	61	62	63	61	61	61	61	61	61	61	61	
August																																	
Maximum	75	74	74	72	68	68	68	72	74	68	74	74	74	74	74	73	73	72	72	72	72	72	72	69	68	68	67	66	69	68	69	70	
Minimum	60	59	61	57	62	60	60	67	59	65	62	58	58	60	60	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	59	
September																																	
Maximum	65	66	68	66	66	67	67	64	66	62	65	63	64	64	64	62	65	65	65	65	65	65	66	66	64	62	61	62	62	61	60	63	
Minimum	60	62	58	57	56	61	58	55	55	59	58	54	54	54	54	55	58	57	58	56	58	59	58	54	52	53	53	53	53	53	53	56	

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

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..	0.04	C 2	T	0.57	C 3	T	1.9	15	0.1
2..	.06	C 2	T	.53	C 3	T	5.6	53	.8
3..	.05	C 2	T	.50	C 3	T	6.1	65	1.1
4..	.04	C 2	T	.47	C 3	T	20	615	33
5..	.04	C 2	T	.51	C 3	T	13	220	7.7
6..	.04	C 2	T	.53	C 3	T	5.6	140	3.6
7..	.05	C 2	T	.46	C 3	T	8.3	88	2.0
8..	.05	C 2	T	.42	C 3	T	5.9	39	.6
9..	.04	C 2	T	.59	C 3	T	4.5	33	.4
10..	.04	C 2	T	.95	9	T	4.0	21	.2
11..	.04	C 2	T	10	532	14	3.8	48	.6
12..	.16	C 2	T	9.6	190	5.8	5.2	98	1.8
13..	.11	C 2	T	5.5	36	.5	13	671	24
14..	.08	C 2	T	6.7	68	1.2	7.4	70	1.4
15..	.07	C 2	T	4.9	22	.3	4.5	49	.6
16..	.06	C 2	T	4.1	17	.2	3.1	25	.2
17..	.05	C 2	T	3.5	12	.1	2.2	11	.1
18..	.05	C 2	T	2.8	--	E .1	1.7	6	T
19..	.17	C 2	T	2.7	6	T	1.5	4	T
20..	1.1	34	0.1	2.5	3	T	1.3	C 3	T
21..	1.1	37	S .2	2.8	5	T	1.1	C 3	T
22..	4.5	205	2.5	2.5	4	T	1.0	C 3	T
23..	2.8	14	.1	2.1	4	T	1.1	C 3	T
24..	1.8	6	T	1.7	4	T	1.1	C 3	T
25..	1.3	4	T	2.0	25	.1	1.5	C 3	T
26..	1.1	4	T	1.9	5	T	1.7	C 3	T
27..	.89	C 3	T	1.7	5	T	1.4	C 3	T
28..	.78	C 3	T	1.5	3	T	1.3	C 3	T
29..	.74	C 3	T	1.3	2	T	1.3	C 3	T
30..	.69	C 3	T	1.3	3	T	1.2	C 3	T
31..	.61	C 3	T	--	--	--	1.3	C 3	T
Total	18.65	--	3.0	76.63	--	22.6	136.6	--	78.4
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	2.1	10	0.1	3.4	9	0.1	1.1	17	A 0.1
2..	2.2	4	T	2.6	4	T	2.0	8	T
3..	3.4	25	A .2	2.2	4	T	2.2	8	T
4..	4.7	134	S 1.9	1.8	4	T	1.7	8	T
5..	5.9	50	A .8	1.4	4	T	1.4	3	T
6..	5.0	40	A .5	1.2	2	T	1.2	2	T
7..	4.1	14	.2	1.1	--	T	1.0	2	T
8..	3.0	13	.1	.95	1	T	.98	2	T
9..	2.3	9	.1	.87	1	T	1.3	2	T
10..	2.0	15	A .1	.77	2	T	2.2	2	T
11..	1.8	6	T	.71	2	T	2.1	3	T
12..	3.1	141	S 2.0	.65	1	T	1.8	3	T
13..	7.6	170	3.5	2.1	58	J .5	1.7	3	T
14..	5.3	36	.5	2.3	23	J .2	5.7	380	S 12
15..	4.0	31	.3	5.9	110	J 1.7	18	458	S 25
16..	3.1	10	.1	6.0	53	.9	7.6	45	.9
17..	2.6	6	T	7.9	89	1.9	6.0	24	.4
18..	2.2	6	T	6.0	50	.8	5.5	19	.3
19..	2.7	242	S 2.7	4.1	9	.1	4.2	10	.1
20..	3.7	55	.5	2.9	20	.2	3.4	4	T
21..	4.5	52	.6	2.2	16	.1	2.6	2	T
22..	4.4	46	.5	1.7	12	.1	2.4	6	T
23..	4.2	18	.2	1.3	7	T	3.2	13	.1
24..	3.6	13	.1	1.1	3	T	4.4	12	.1
25..	3.7	25	.2	.98	3	T	3.7	4	T
26..	5.7	130	J 2.4	.84	3	T	2.9	4	T
27..	19	802	41	.74	5	T	2.2	C 3	T
28..	16	290	13	.98	24	A .1	1.8	C 3	T
29..	15	396	16	--	--	--	1.8	C 3	T
30..	9.3	145	3.6	--	--	--	1.7	C 3	T
31..	4.6	26	.3	--	--	--	1.6	C 3	T
Total	160.8	--	91.6	64.69	--	6.9	99.38	--	39.5

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

J Computed from partly estimated-concentration graph and subdividing day.

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	1.5	C 3	T	0.74	C 1		0.27	C 2	
2..	1.3	C 3	T	.71	C 1		.24	C 2	
3..	1.1	C 3	T	.65	C 1		.24	C 2	
4..	1.2	C 3	T	.62	C 1		.22	C 2	
5..	1.3	C 3	T	.56	C 1		.22	C 2	
6..	1.2	C 3	T	.54	C 1		.22	C 2	
7..	1.2	C 3	T	.51	C 1		.24	C 2	
8..	1.1	C 3	T	.48	C 1		.22	C 2	
9..	1.2	C 3	T	.51	C 1		.22	C 2	
10..	1.0	C 3	T	.46	C 1		.22	C 2	
11..	.98	C 3	T	.43	C 1		.22	C 2	
12..	1.1	18 A	0.1	.41	C 1		.20	C 2	
13..	5.2	78 A	1.1	.39	C 1		.19	C 2	
14..	4.4	13	.2	.37	C 1		.17	C 2	
15..	3.5	4	T	.37	C 1		.17	C 2	
16..	3.7	14 A	.1	.37	C 1		.16	C 2	
17..	3.6	6	.1	.35	C 1		.16	C 2	
18..	2.9	4	T	.35	C 1		.16	C 2	
19..	2.2	2	T	.33	C 1		.16	C 2	
20..	1.8	4	T	.31	C 1		.16	C 2	
21..	1.4	C 3	T	.31	C 1		.19	C 2	
22..	1.2	C 3	T	.29	C 2		.27	C 2	
23..	1.1	C 3	T	.29	C 2		.17	C 2	
24..	.91	C 3	T	.27	C 2		.16	C 2	
25..	1.1	C 3	T	.25	C 2		.14	C 2	
26..	.91	C 3	T	.25	C 2		.14	C 2	
27..	.87	C 3	T	.25	C 2		.14	C 2	
28..	.84	C 3	T	.29	C 2		.13	C 2	
29..	.80	C 3	T	.35	C 2		.12	C 2	
30..	.77	C 1	T	.46	C 2		.12	C 2	
31..	--	--	--	.29	C 2		--	--	
Total	51.36	--	1.9	12.76	--	T	5.64	--	T
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..	0.10	C 2		0.05	C 2		0.03	C 2	T
2..	.10	C 2		.05	C 2		.04	C 2	T
3..	.10	C 2		.05	C 2		.03	C 2	T
4..	.10	C 2		.05	C 2		.03	C 2	T
5..	.09	C 2		.05	C 2		.03	C 2	T
6..	.09	C 2		.05	C 2		.03	C 2	T
7..	.09	C 2		.05	C 2		.03	C 2	T
8..	.09	C 2		.04	C 2		.03	C 2	T
9..	.09	C 2		.04	C 2		.03	C 2	T
10..	.09	C 2		.04	C 2		.06	C 2	T
11..	.09	C 2		.05	C 2		.06	C 2	T
12..	.09	C 2		.04	C 2		.04	C 2	T
13..	.09	C 2		.04	C 2		.03	C 2	T
14..	.08	C 2		.04	C 2		.02	C 2	T
15..	.08	C 2		.03	C 2		.02	C 2	T
16..	.08	C 2		.03	C 2		.03	C 2	T
17..	.08	C 2		.03	C 2		.04	C 2	T
18..	.08	C 2		.03	C 2		.03	C 2	T
19..	.08	C 2		.03	C 2		.03	C 2	T
20..	.08	C 2		.03	C 2		.03	C 2	T
21..	.07	C 2		.03	C 2		.03	C 2	T
22..	.07	C 2		.03	C 2		.03	C 2	T
23..	.07	C 2		.03	C 2		.02	C 2	T
24..	.07	C 2		.03	C 2		.02	C 2	T
25..	.07	C 2		.03	C 2		.02	C 2	T
26..	.08	C 2		.03	C 2		.02	C 2	T
27..	.07	C 2		.03	C 2		.02	C 2	T
28..	.06	C 2		.03	C 2		.02	C 2	T
29..	.06	C 2		.03	C 2		.09	16	T
30..	.06	C 2		.03	C 2		.39	220 B	0.2
31..	.05	C 2		.03	C 2		--	--	--
Total	2.50	--	T	1.15	--	T	1.33	--	0.2
Total discharge for year (cfs-days).....									631.51
Total load for year (tons).....									244.1

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.--Continued

particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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 of day (24 hour)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (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	4.000		8.000
Nov. 11, 1966.....	1640	51		12	588	19	27	39	46	66	76	81	91	97	98	98	98	100	--	SVPMC
Nov. 12.....	0715	49		11	200	5.9	21	26	37	46	57	67	84	95	100	--	--	--	--	SVPMC
Dec. 4.....	1350	47		24	508	33	18	25	35	45	56	65	81	88	92	94	100	--	--	SVPMC
Dec. 6.....	0905	48		8.3	114	2.6	--	--	--	15	--	22	28	34	48	48	54	72	100	SVPMC
Dec. 13.....	1550	49		15	266	11	13	18	25	33	39	45	57	70	85	86	91	100	--	SVPMC
Jan. 19, 1967.....	2140	47		4.7	2390	30	31	35	61	88	93	96	96	97	100	--	--	--	--	SVPMC
Jan. 27.....	1855	49		26	1200	84	9	12	20	28	34	41	48	55	64	71	79	92	100	SVPMC
Jan. 29.....	0915	48		12	342	11	3	3	5	6	8	11	15	25	55	63	75	100	--	SVPMC
Mar. 15.....	1020	46		20	432	23	4	6	9	12	15	23	41	71	95	97	98	100	--	SVPMC

ALSEA RIVER BASIN--Continued

14-3068. FLYNN CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

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..	0.11	C 2	T	0.38	C 4	T	3.1	2	T
2..	.18	C 2	T	.36	C 4	T	7.1	8	0.2
3..	.12	C 2	T	.34	C 4	T	8.7	11	.3
4..	.11	C 2	T	.32	C 4	T	28	125	9.4
5..	.10	C 2	T	.40	C 4	T	29	48	3.8
6..	.11	C 2	T	.55	C 4	T	24	22	1.4
7..	.15	C 2	T	.41	C 4	T	23	18	1.1
8..	.14	C 2	T	.38	C 4	T	17	12	.6
9..	.11	C 2	T	.52	C 4	T	13	--	.4
10..	.11	C 2	T	.93	C 4	T	11	12	.4
11..	.10	C 2	T	11	40	1.2	9.7	10	.3
12..	.32	C 2	T	12	16	.6	12	12	.4
13..	.22	C 2	T	6.2	6	.1	27	34	2.5
14..	.16	C 2	T	8.7	6	.1	25	24	1.5
15..	.15	C 2	T	7.2	2	T	15	10	.4
16..	.13	C 2	T	6.8	4	.1	11	9	.3
17..	.12	C 2	T	6.1	4	.1	8.5	9	.2
18..	.11	C 2	T	4.9	C 3	T	6.8	4	.1
19..	.24	5	T	4.7	C 3	T	5.8	4	.1
20..	1.3	8	T	4.1	C 3	T	5.2	4	.1
21..	.95	4	T	4.0	C 3	T	4.3	4	T
22..	2.6	10	0.1	3.5	C 3	T	3.9	C 2	T
23..	1.5	--	T	3.2	C 3	T	3.7	C 2	T
24..	.83	9	T	3.0	C 3	T	3.6	C 2	T
25..	.59	C 4	T	3.2	C 3	T	3.7	C 2	T
26..	.66	C 4	T	3.0	C 3	T	3.5	C 2	T
27..	.59	C 4	T	2.9	C 3	T	3.4	C 2	T
28..	.50	C 4	T	2.7	C 3	T	3.2	C 2	T
29..	.48	C 4	T	2.5	C 3	T	3.4	C 2	T
30..	.50	C 4	T	2.6	C 3	T	3.1	C 2	T
31..	.43	C 4	T	--	--	--	3.2	C 2	T
Total	13.72	--	0.2	106.89	--	2.6	326.9	--	23.8
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..	3.7	C 2	T	14	6	0.2	4.0	C 2	T
2..	3.8	C 2	T	11	4	.1	4.9	C 2	T
3..	5.7	8	0.1	8.9	C 3	.1	5.2	C 2	T
4..	9.2	11	.3	7.6	C 3	.1	5.0	C 2	T
5..	13	10	.4	6.5	C 3	.1	4.6	C 2	T
6..	12	--	E .3	5.6	C 3	T	4.2	C 2	T
7..	10	6	.2	4.9	C 3	T	3.9	C 2	T
8..	8.8	7	.2	4.3	C 3	T	3.8	C 2	T
9..	7.4	4	.1	3.9	C 3	T	4.4	C 2	T
10..	6.5	6	.1	3.6	C 3	T	5.2	C 2	T
11..	5.6	5	.1	3.2	C 3	T	5.2	C 2	T
12..	6.8	21	.4	3.0	C 3	T	5.1	C 2	T
13..	17	35	1.6	4.6	C 3	T	5.0	C 2	T
14..	16	13	.6	5.0	C 3	T	7.6	13	0.4
15..	13	8	.3	13	15	.5	28	77	5.8
16..	10	6	.2	16	10	.4	19	22	1.1
17..	8.5	5	.1	22	27	1.6	15	4	.2
18..	7.5	10	.2	20	49	2.6	13	4	.1
19..	8.1	12	.3	15	6	.2	12	10	.3
20..	9.8	10	.3	11	2	.1	9.9	C 3	.1
21..	11	8	.2	8.8	C 2	T	8.1	C 3	.1
22..	11	6	.1	7.4	C 2	T	7.2	C 3	.1
23..	11	5	.1	6.4	C 2	T	7.8	C 3	.1
24..	9.7	4	.1	5.5	C 2	T	8.8	C 3	.1
25..	9.2	4	.1	4.9	C 2	T	8.8	C 3	.1
26..	11	8	.2	4.1	C 2	T	8.1	C 3	.1
27..	43	219	29	3.7	C 2	T	7.1	C 3	.1
28..	51	116	18	4.2	C 2	T	6.3	C 3	.1
29..	39	46	4.8	--	--	--	5.8	C 3	T
30..	32	27	2.3	--	--	--	5.2	C 3	T
31..	19	14	.7	--	--	--	4.9	C 3	T
Total	429.3	--	61.5	228.1	--	6.6	243.1	--	9.3

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration graph.

C Composite period.

ALSEA RIVER BASIN--Continued

11-3068. FLYNN CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	4.5	C 3	T	2.6	C 4		0.91	C 2	
2..	4.1	C 3	T	2.6	C 4		.82	C 2	
3..	3.8	C 3	T	2.4	C 4		.80	C 2	
4..	3.8	C 3	T	2.3	C 4		.78	C 2	
5..	4.1	C 3	T	2.2	C 4		.74	C 2	
6..	3.8	C 3	T	2.1	C 4		.73	C 2	
7..	3.7	C 3	T	2.0	C 4		.74	C 2	
8..	3.6	C 3	T	2.0	C 4		.72	C 2	
9..	3.7	C 3	T	1.9	C 2		.69	C 2	
10..	3.4	C 3	T	1.8	C 2		.69	C 2	
11..	3.3	C 3	T	1.7	C 2		.69	C 2	
12..	3.3	C 3	T	1.7	C 2		.66	C 2	
13..	10	9 A	0.2	1.6	C 2		.63	C 2	
14..	11	10	.3	1.5	C 2		.62	C 2	
15..	9.7	4	.1	1.4	C 2		.60	C 2	
16..	9.9	3	.1	1.4	C 2		.57	C 2	
17..	9.7	5	.1	1.3	C 2		.56	C 2	
18..	8.6	2	T	1.3	C 2		.54	C 2	
19..	7.4	2	T	1.2	C 2		.54	C 2	
20..	6.3	2	T	1.2	C 2		.54	C 2	
21..	5.5	C 4	.1	1.1	C 2		.61	C 2	
22..	4.7	C 4	1	1.1	C 2		.86	C 1	
23..	4.2	C 4	T	1.1	C 2		.63	C 1	
24..	3.7	C 4	T	1.0	C 2		.56	C 1	
25..	3.9	C 4	T	.99	C 2		.53	C 1	
26..	3.5	C 4	T	.96	C 2		.50	C 1	
27..	3.2	C 4	T	.94	C 2		.49	C 1	
28..	3.1	C 4	T	.98	C 2		.47	C 1	
29..	3.0	C 4	T	1.0	C 2		.46	C 1	
30..	2.8	C 4	T	1.3	C 2		.44	C 1	
31..	--	--	--	1.0	C 2		--	--	
Total	155.3	--	1.8	47.67	--	0.4	19.12	--	0.1
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0.42	C 1		0.21	C 1		0.12	C 1	
2..	.41	C 1		.20	C 1		.14	C 1	
3..	.40	C 1		.20	C 1		.12	C 1	
4..	.38	C 1		.20	C 1		.12	C 1	
5..	.37	C 1		.19	C 1		.11	C 1	
6..	.36	C 1		.19	C 1		.12	C 1	
7..	.36	C 1		.19	C 1		.11	C 1	
8..	.36	C 1		.18	C 1		.11	C 1	
9..	.35	C 1		.17	C 1		.11	C 1	
10..	.34	C 1		.17	C 1		.23	6	
11..	.33	C 1		.17	C 1		.21	4	
12..	.33	C 1		.15	C 1		.14	C 2	
13..	.33	C 1		.15	C 1		.12	C 2	
14..	.31	C 1		.14	C 1		.11	C 2	
15..	.30	C 1		.14	C 1		.11	C 2	
16..	.30	C 1		.14	C 1		.11	C 2	
17..	.30	C 1		.14	C 1		.12	C 2	
18..	.29	C 1		.14	C 1		.12	C 2	
19..	.29	C 1		.12	C 1		.11	C 2	
20..	.29	C 1		.12	C 1		.11	C 2	
21..	.28	C 1		.12	C 1		.11	C 2	
22..	.26	C 1		.12	C 1		.11	C 2	
23..	.26	C 1		.12	C 1		.10	C 2	
24..	.26	C 1		.12	C 1		.09	C 2	
25..	.25	C 1		.12	C 1		.09	C 2	
26..	.26	C 1		.12	C 1		.09	C 2	
27..	.24	C 1		.13	C 1		.09	C 2	
28..	.23	C 1		.12	C 1		.09	C 2	
29..	.23	C 1		.12	C 1		.21	6	
30..	.22	C 1		.12	C 1		.65	13	
31..	.22	C 1		.12	C 1		--	--	
Total	9.53	--	T	4.64	--	T	4.18	--	T
Total discharge for year (cfs-days).....									1588.45
Total load for year (tons).....									106.3

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

C Composite period.

ALSEA RIVER BASIN--Continued

14-3068. FLYNN CREEK NEAR SALADO, OREG. --Continued

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (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	4.000	
Dec. 4, 1966.....	1540	48		35	166	16						10	16	32	63	65	81	100	
Jan. 27, 1967.....	2000	48		66	371	66	9	12	15	20	26	30	47	75	94	95	100	100	

ALSEA RIVER BASIN--Continued

14-30688.1. DEER CREEK NEAR SALADO, OREG.

LOCATION.--Lat 44°32'05", long 123°52'35", at gaging station on right bank, 1,000 feet upstream from mouth, 4.6 miles west of Salado, Lincoln County, and 6.5 miles southeast of Toledo.
 DEPTH.--11 square miles computed as 49.1 acres on basis of field survey by Oregon State University).
 RECORDS AVAILABLE.--Water temperature, 1958 to September 1967.

Sediment records: November 1958 to September 1967

EXTREMES, 1966-67.--Water temperatures: Maximum, 64°F Aug. 12-15, 17; minimum, 41°F on several days during February and March. Sediment concentrations: Maximum daily, 327 ppm Jan. 27; minimum daily, 2 ppm on many days during October and March. Sediment loads: Maximum daily, 68 tons Jan. 27; minimum daily, less than 0.05 ton on many days.

EXTREMES, 1968-67.--Water temperatures: Maximum, 64°F Aug. 12-15, 17, 1967; minimum, 34°F Jan. 30, 1963.

Sediment concentrations: Maximum daily, 1,220 ppm Jan. 28, 1968; minimum daily, less than 1 ppm on many days during 1959-62. Sediment loads: Maximum daily, 583 tons Jan. 28, 1968; minimum daily, less than 0.05 ton on many days each year.

Temperature (°F) of water, water year October 1966 to September 1967

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	55	56	56	56	55	54	55	56	54	53	52	49	48	47	50	47	49	48	48	47	50	53	53	52	51	51	51	51	51	53	53	51
Maximum	52	53	50	50	52	53	54	53	48	48	49	48	45	44	47	43	46	43	44	46	44	47	50	50	49	50	49	48	48	51	50	48
November	52	51	51	51	50	50	48	47	48	48	51	51	51	50	50	49	50	50	51	50	48	47	48	48	49	48	49	49	50	51	--	49
Maximum	49	48	47	47	48	48	46	45	45	47	47	50	50	50	49	48	48	49	49	48	46	45	46	46	47	46	47	48	46	50	--	47
December	51	49	48	48	48	47	47	48	49	49	49	50	50	49	49	50	50	49	49	48	47	47	47	47	47	46	46	47	47	47	48	
Maximum	47	48	48	47	47	46	46	47	48	48	48	48	47	48	48	48	48	47	48	48	45	45	46	45	44	44	43	45	46	45	46	46
January	47	46	47	47	47	47	47	47	47	47	47	48	48	48	47	47	45	44	45	46	46	46	46	46	46	48	49	49	47	47	47	
Maximum	46	45	46	45	44	45	45	45	45	46	46	47	47	47	45	44	45	46	46	46	46	45	45	45	46	46	48	49	47	47	46	45
February	47	48	49	48	48	48	48	47	47	49	48	47	47	44	45	46	46	46	46	46	46	47	45	46	47	48	46	--	--	--	--	46
Maximum	46	47	46	47	45	44	45	44	45	44	41	41	43	45	45	43	45	45	43	42	43	42	43	42	43	43	42	43	44	--	--	43
March	45	43	45	47	48	46	47	46	45	44	45	46	46	46	47	47	47	48	48	48	49	49	48	48	48	48	46	48	46	49	46	46
Maximum	43	42	41	41	41	42	41	42	41	42	42	42	43	42	42	46	45	44	45	46	45	47	46	45	45	45	45	45	42	44	44	43
April	50	51	50	49	48	50	50	48	49	48	51	50	49	46	48	47	46	48	47	50	52	50	52	53	50	49	49	51	49	52	--	49
Maximum	44	43	44	45	44	43	44	45	45	45	44	46	45	44	44	44	44	45	44	44	44	44	44	44	45	46	44	45	44	45	44	44
Minimum	52	52	51	51	56	57	59	57	50	53	51	52	55	57	60	61	59	58	60	61	60	56	55	53	56	55	55	53	52	53	55	
May	44	45	45	46	46	46	47	48	46	46	46	46	46	46	47	50	51	50	51	52	52	50	50	52	52	52	53	50	53	52	--	50
June	49	51	49	50	52	50	50	51	49	50	47	50	50	50	50	51	52	51	52	51	52	50	50	52	52	52	53	50	53	52	--	50
July	63	62	62	62	60	60	59	58	57	58	59	60	57	62	61	61	61	60	59	62	61	62	62	58	59	62	63	62	63	60	--	60
Maximum	54	54	54	52	52	53	50	53	51	50	50	54	53	52	52	52	54	55	55	53	55	54	56	55	55	55	53	55	54	57	53	53
Minimum	63	62	63	60	60	60	60	62	63	58	63	64	64	64	64	63	64	63	63	59	63	63	61	59	60	57	61	58	59	60	--	61
August	54	54	55	52	55	54	55	54	53	53	53	54	57	56	55	54	56	57	54	56	55	55	53	54	55	55	53	54	55	54	55	54
September	58	60	60	59	59	61	59	58	57	57	59	61	59	59	59	57	59	59	60	59	58	58	56	57	60	59	58	56	55	--	58	
Maximum	55	57	53	54	53	56	53	52	51	55	55	50	52	53	53	54	52	53	52	53	54	53	51	51	51	52	53	54	54	--	52	

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0.26	C 2	T	1.4	C 4	T	5.2	18	A	0.3		
2..	.34	C 2	T	1.2	C 4	T	12	20		.6		
3..	.28	C 2	T	1.2	C 4	T	14	18		.7		
4..	.26	C 2	T	1.1	C 4	T	42	125	S	15		
5..	.24	C 2	T	1.2	C 4	T	41	39		4.3		
6..	.24	C 2	T	1.5	C 4	T	34	27		2.5		
7..	.30	C 2	T	1.2	C 4	T	31	15		1.3		
8..	.30	C 2	T	1.1	C 4	T	22	18		1.1		
9..	.26	C 2	T	1.3	C 4	T	17	20		.9		
10..	.26	C 2	T	2.1	C 4	T	15	17		.7		
11..	.24	C 2	T	22	196	S	11	25		1.0		
12..	.45	C 2	T	31	54	4.5	18	25		1.2		
13..	.40	C 2	T	15	12	.5	43	127		15		
14..	.34	C 2	T	17	11	.5	30	36		2.9		
15..	.34	C 2	T	14	7	.3	19	13		.7		
16..	.30	C 2	T	11	11	.3	13	--	E	.9		
17..	.28	C 2	T	9.6	C 5	.1	10	36		1.0		
18..	.28	C 2	T	7.8	C 5	.1	8.7	42		1.0		
19..	.40	C 2	T	7.4	C 5	.1	7.6	40		.8		
20..	2.0	16	0.1	6.5	C 5	.1	7.1	38		.7		
21..	1.9	9	T	6.6	C 5	.1	6.2	44		.7		
22..	5.7	37	.6	5.9	C 5	.1	5.7	42		.6		
23..	4.9	5	.1	5.3	C 5	.1	5.6	42		.6		
24..	3.4	C 4	T	4.6	C 5	.1	5.5	38		.6		
25..	2.5	C 4	T	5.1	C 5	.1	5.9	42		.7		
26..	2.4	C 4	T	4.9	C 5	.1	5.8	52		.8		
27..	2.3	C 4	T	4.7	C 5	.1	5.5	37		.5		
28..	1.9	C 4	T	4.4	C 5	.1	5.2	50		.7		
29..	1.7	C 4	T	3.9	C 5	.1	5.3	--	E	.6		
30..	1.7	C 4	T	4.1	C 5	.1	4.8	35		.5		
31..	1.5	C 4	T	--	--	--	4.8	10		.1		
Total	37.67	--	1.1	204.1	--	18.6	464.9	--		59.0		
	JANUARY				FEBRUARY				MARCH			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	6.0	9	0.1	18	14	0.7	5.7	C 4		0.1		
2..	6.2	6	.1	14	8	.3	6.9	C 4		.1		
3..	9.9	10	.3	11	14	.4	7.4	C 4		.1		
4..	16	22	1.0	9.7	C 8	.2	7.0	C 4		.1		
5..	20	18	1.0	8.2	C 8	.2	6.2	C 4		.1		
6..	16	12	.5	7.2	C 8	.2	5.6	C 4		.1		
7..	13	8	.3	6.4	C 8	.1	4.8	C 4		.1		
8..	11	7	.2	5.7	C 8	.1	4.6	C 4		T		
9..	8.8	5	.1	5.1	C 8	.1	5.4	C 4		.1		
10..	8.0	5	.1	4.6	C 8	.1	7.0	C 4		.1		
11..	7.4	3	.1	4.2	C 8	.1	7.5	C 4		.1		
12..	9.4	15	S	3.8	C 8	.1	7.1	C 4		.1		
13..	29	54	4.2	5.8	C 8	.1	6.8	C 4		.1		
14..	24	27	1.7	7.7	C 8	.2	10	35	S	1.8		
15..	17	14	.6	20	39	2.1	47	124		16		
16..	14	6	.2	25	39	2.6	26	17		1.2		
17..	12	5	.2	34	33	3.0	19	8		.4		
18..	9.9	9	.2	26	26	1.8	18	11		.5		
19..	11	14	A	17	14	.6	15	7		.3		
20..	15	13	.5	13	9	.3	12	8		.3		
21..	16	13	.6	10	6	.2	10	5		.1		
22..	16	7	.3	8.6	C 4	.1	9.4	8		.2		
23..	15	9	.4	7.5	C 4	.1	11	--	E	.2		
24..	13	14	.5	6.6	C 4	.1	12	9		.3		
25..	12	7	.2	6.0	C 4	.1	12	14		.5		
26..	15	14	.6	5.2	C 4	.1	10	2		.1		
27..	69	327	S	4.7	C 4	.1	8.8	C 4		.1		
28..	66	119	S	5.5	C 4	.1	7.8	C 4		.1		
29..	53	71	10	--	--	--	7.6	C 4		.1		
30..	39	46	4.8	--	--	--	7.2	C 4		.1		
31..	23	35	2.2	--	--	--	6.9	C 4		.1		
Total	600.6	--	124.1	301.5	--	14.2	331.7	--		23.6		

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly estimated-concentration graph.

B Computed from estimated-concentration

graph.

C Composite period.

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	6.5	C 4	0.1	3.9	C 5	0.1	1.3	C 3	
2..	5.9	C 4	.1	3.8	C 5	.1	1.2	C 3	
3..	5.4	C 4	.1	3.5	C 5	T	1.2	C 3	
4..	5.4	C 4	.1	3.4	C 5	T	1.1	C 3	
5..	6.1	C 4	.1	3.1	C 5	T	1.1	C 3	
6..	6.1	C 4	.1	3.0	C 5	T	1.1	C 3	
7..	6.0	C 4	.1	2.9	C 5	T	1.1	C 3	
8..	5.7	C 4	.1	2.7	C 5	T	1.1	C 3	
9..	5.9	C 4	.1	2.7	C 5	T	1.0	C 3	
10..	5.2	C 4	.1	2.4	C 5	T	1.0	C 3	
11..	4.9	C 4	.1	2.4	C 5	T	1.0	C 3	
12..	4.9	C 4	.1	2.3	C 5	T	.96	C 3	
13..	16	31 A	1.3	2.1	C 5	T	.92	C 3	
14..	17	22	1.0	2.1	C 5	T	.88	C 3	
15..	14	12	.5	2.0	C 5	T	.84	C 3	
16..	14	18	.7	1.9	C 3	T	.84	C 3	
17..	13	6	.2	1.8	C 3	T	.81	C 3	
18..	11	7	.2	1.7	C 3	T	.78	C 3	
19..	9.4	5	.1	1.7	C 3	T	.78	C 3	
20..	8.0	10	.2	1.6	C 3	T	.81	C 3	
21..	7.0	9	.2	1.6	C 3	T	.88	C 3	
22..	6.1	4	.1	1.5	C 3	T	1.3	--	
23..	5.3	22 A	.3	1.5	C 3	T	1.0	C 3	
24..	4.9	21 A	.3	1.4	C 3	T	.88	C 3	
25..	5.5	28 A	.4	1.4	C 3	T	.81	C 3	
26..	4.9	C 5	.1	1.3	C 3	T	.78	C 3	
27..	4.7	C 5	.1	1.3	C 3	T	.78	C 3	
28..	4.5	C 5	.1	1.4	C 3	T	.72	C 3	
29..	4.4	C 5	.1	1.5	C 3	T	.72	C 3	
30..	4.2	C 5	.1	1.8	C 3	T	.68	C 3	
31..	--	--	--	1.4	C 3	T	--	--	
Total	222.1	--	7.2	67.1	--	0.9	28.37	--	0.2
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..	0.65	C 3		0.36	C 6		0.26	C 4	
2..	.62	C 3		.36	C 6		.28	C 4	
3..	.62	C 3		.34	C 6		.26	C 4	
4..	.59	C 3		.34	C 6		.24	C 4	
5..	.59	C 3		.34	C 6		.24	C 4	
6..	.56	C 3		.34	C 6		.26	C 4	
7..	.56	C 3		.34	C 6		.24	C 4	
8..	.56	C 3		.34	C 6		.22	C 4	
9..	.56	C 3		.32	C 6		.24	C 4	
10..	.53	C 3		.34	C 6		.36	C 4	
11..	.51	C 3		.32	C 6		.36	C 4	
12..	.53	C 3		.30	C 6		.28	C 4	
13..	.51	C 3		.30	C 6		.26	C 4	
14..	.48	C 6		.30	C 6		.24	C 4	
15..	.48	C 6		.28	C 4		.22	C 4	
16..	.48	C 6		.28	C 4		.24	C 4	
17..	.48	C 6		.28	C 4		.26	C 4	
18..	.45	C 6		.28	C 4		.24	C 4	
19..	.45	C 6		.26	C 4		.22	C 4	
20..	.45	C 6		.26	C 4		.21	C 4	
21..	.45	C 6		.28	C 4		.21	C 4	
22..	.43	C 6		.26	C 4		.21	C 4	
23..	.43	C 6		.26	C 4		.21	C 4	
24..	.43	C 6		.26	C 4		.19	C 4	
25..	.45	C 6		.24	C 4		.19	C 4	
26..	.43	C 6		.24	C 4		.18	C 4	
27..	.40	C 6		.26	C 4		.18	C 4	
28..	.40	C 6		.24	C 4		.18	C 4	
29..	.38	C 6		.24	C 4		.32	8	
30..	.38	C 6		.24	C 4		.75	18	
31..	.36	C 6		.26	C 4		--	--	
Total	15.20	--	0.2	9.06	--	0.1	7.75	--	0.1
Total discharge for year (cfs-days).....									2290.0
Total load for year (tons).....									249.3

T Less than 0.05 ton.

C Composite period.

A Computed from partly estimated-concentration graph.

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (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	
Dec. 4, 1966.....	1320	46		55	263	39	8	10	14	19	26	32	44	64	95	100	--	YPMC
Dec. 5.....	0040	46		44	56	6.7	--	9	--	--	--	44	58	77	100	92	100	YPMC
Dec. 13.....	1520	49		51	183	25	--	6	--	17	20	33	44	82	91	94	96	100
Jan. 27, 1967....	1915	48		97	416	109	--	6	10	15	26	37	61	85	93	94	96	100

UMPUQUA RIVER BASIN

14-3100. COW CREEK NEAR RIDDLE, OREG.

LOCATION.--Lat 42°55'25", long 123°25'40", at gaging station 1,500 feet upstream from Council Creek, and 3.8 miles southwest of Riddle, Douglas County.
 DRAINAGE AREA.--456 square miles.
 RECORDS AVAILABLE.--Chemical analyses: August to September 1967.

Chemical analyses, in parts per million, August to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbinate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°)			Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
AUG. 15, 1967....	29	9.6	0.04	12	8.0	7.8	1.1	66	3	5.8	11	0.1	0.3	0.01	95	0.13	7.44	63	4	0.4	160	8.6

14-3195. NORTH UMPQUA RIVER AT WINCHESTER, OREG.

LOCATION.--Lat 43°16'20", long 123°24'40", at gaging station 400 feet downstream from Brown's Bridge, 1.8 miles downstream from confluence with South Umpqua River, and 3 miles west of Winchester, Douglas County.
DRAINAGE AREA.--1,344 square miles.
RECORDS AVAILABLE.--Chemical analyses: August to September 1967.

Chemical analyses, in parts per million, August to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄) (CO ₃)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio (micro-mhos at 25°C)	pH		
												Parts per million	Tons per acre-foot	Tons per day					
Aug. 16, 1967....	854	23	0.06	5.3	1.9	5.0	1.2	37	0	1.8	0.1	0.2	58	0.08	134	21	0	69	7.5
Sept. 13, 1967....	953	24	.02	6.7	2.4	3.9	1.0	38	0	2.4	.1	.2	58	.08	149	26	0	72	7.7

14-3209.5. UMPQUA RIVER NEAR TYEE, OREG.

LOCATION.--Lat 43°25'55", long 123°33'55", on Tyee access road bridge, southeast of Tyee, Douglas County.
RECORDS AVAILABLE.--Chemical analyses: August to September 1967.

Chemical analyses, in parts per million, August to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
												Parts per million	Tons per acre-foot	Tons per day				
Aug. 17, 1967....			6.1	2.6	5.4		39	0				62	0.08		26	0	79	7.1
Sept. 20, 1967....	846		6.8	3.0	5.7		42	0				68	.09	155	30	0	84	7.7

UMPUQUA RIVER BASIN--Continued
14-3210. UMPQUA RIVER NEAR ELKTON, OREG.

LOCATION.--Lat 43°35'10", long 123°33'30", at gaging station on right bank, 3.5 miles south of Elkton, 8.2 miles (revised) upstream from Elk Creek, Douglas County, and at mile 56.8.
DRAINAGE AREA.--3,683 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1965 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl sulfide (CO ₂)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Phosphate (PO ₄)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate sum				
Oct. 27, 1966....	1990	14		10	3.6	5.3	1.0	44	0	6.0	8.0	0.1	0.5	0.16	73	0.10	392	40	4		105	7.0	10
Nov. 29, 1966....	2220	16		7.8	2.9	3.9	1.0	38	0	6.0	4.0				63	0.10	132	32	2		70	7.0	5
Dec. 29, 1966....	5110	16		7.1	3.1	4.1	1.4	40	0	4.0	2.0				60	0.08	128	30	0		80	7.0	10
Jan. 29, 1967....	33900	14		6.1	2.9	3.8	1.3	34	0	3.2	3.0				50	0.07	4580	27	0		68	7.3	25
Feb. 27, 1967....	7730	17		7.1	2.8	3.9	1.6	38	0	3.0	3.0				60	0.08	1250	29	0		74	7.5	15
Mar. 29, 1967....	8140	17		6.7	2.7	3.8	.9	36	0	2.8	4.0				58	0.08	1270	28	0		74	7.5	5
Apr. 27, 1967....	7920	17		6.9	2.7	4.0	.9	38	0	3.2	3.0				60	0.08	1280	28	0		77	7.5	5
May 29, 1967....	4720	16		5.5	2.0	3.1	1.8	32	0	2.2	1.5				52	0.07	663	22	0		61	7.5	0
June 29, 1967....	2280	16		6.9	2.1	4.0	1.1	38	0	2.4	3.0				52	0.07	320	24	0		72	7.4	0
July 29, 1967....	4200	16		6.0	2.4	5.1	1.4	34	0	2.4	3.0				60	0.08	146	26	0	0.5	78	7.0	5
Aug. 29, 1967....	504	16		6.0	2.5	5.5	1.4	39	0	2.4	3.0				61	0.08	146	26	0		78	7.0	5
Sept. 20, 1967....	1000	19		6.7	2.7	5.6	1.4	41	0	4.0	4.0				61	0.08	165	28	0		81	7.9	5

COOS RIVER BASIN

14-3245. WEST FORK MILLICOMA RIVER NEAR ALLEGANY, OREG.

LOCATION.--Lat 43°28'35", long 124°03'20", at gaging station on left bank at highway bridge, 40 feet upstream from Daggett Creek, and 3.8 miles north of Allegany, Coos County.

DRAINAGE AREA.--46.5 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1963 to September 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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		Specific conductance (micro-mhos at 25°C)	pH	Color
															Parts per million	Tons acre-foot	Tons per day	Calcium, magnesium	Sodium carbonate			
Oct. 19, 1966....	8.0	5.7	0.16	4.0	1.4	5.3	0.7	25	0	0.2	6.5	0.2	0.2		35	0.05	0.76	16	0	57	7.0	15
Nov. 16.....	1040	6.4	--	2.5	.9	3.7	.5	19	0	1.2	2.0	.1	2.3		27	.04	92.7	10	2	43	6.8	10
Dec. 1.....	146	6.4	--	2.5	.9	3.7	.5	19	0	1.2	2.0	.1	2.3		27	.04	92.7	10	2	43	6.8	10
Jan. 25, 1967....	720	7.5	--	1.7	.9	3.6	.8	11	0	1.6	4.0	.0	2.2		30	.04	58.3	8	0	37	6.9	10
Feb. 15.....	521	7.7	--	2.9	.9	3.3	.4	11	0	1.2	4.0	.0	1.3		31	.04	43.6	10	2	36	6.9	10
Mar. 15.....	935	7.4	--	2.2	1.0	3.1	.7	11	0	.6	3.0	.1	1.6		23	.03	58.1	10	0	35	6.8	10
Apr. 21.....	251	8.1	.03	2.2	.8	3.6	.4	12	0	1.6	4.0	.1	1.1		26	.04	17.6	9	0	39	7.0	5
May 18.....	67	8.9	.11	2.4	.9	4.4	1.0	16	0	1.2	4.0	.1	1.8		36	.05	6.51	10	0	44	7.0	5
June 22.....	23	7.2	--	2.8	1.0	4.3	.8	18	0	.0	3.0	.7	.3		32	.04	1.29	11	0	53	7.0	5
July 18.....	4.5	4.9	.11	3.6	1.1	4.8	1.1	22	0	.8	6.5	.1	1.4		38	.05	.43	12	0	58	6.9	5
Aug. 18.....	4.2	4.9	.11	3.6	1.3	5.8	1.1	22	0	1.6	6.0	.1	1.4		32	.04	.26	15	0	59	6.9	5
Sept. 22.....	3.0	4.5	.04	3.7	1.5	5.5	.8	22	0	1.6	6.0	.1	1.4		32	.04	.26	15	0	59	6.9	5

COOS RIVER BASIN--Continued

14-3245. WEST FORK MILLICOMA RIVER NEAR ALLEGANY, OREG.

Water temperature, turbidity, and color, water year October 1966 to September 1967

Date	Time	Water temperature (°F)	Discharge (cfs)	Turbidity	Color
Oct. 5, 1966.....	1500	58		0	10
Oct. 13.....	1630	52		0	15
Oct. 19.....	1300	47		0	15
Oct. 26.....	0945	53		0	15
Nov. 2.....	1630	54		0	15
Nov. 11.....	1330	51		0	30
Nov. 16.....	1610	50		0	10
Nov. 23.....	1450	47		0	5
Nov. 30.....	1625	53		15	20
Dec. 7.....	1330	46		5	10
Dec. 14.....	1645	--		5	5
Dec. 21.....	1500	45		0	5
Dec. 28.....	1525	43		0	10
Jan. 4, 1967.....	1515	48		0	10
Jan. 12.....	1530	45		0	10
Jan. 18.....	1215	44		0	10
Jan. 25.....	1725	46		70	10
Feb. 1.....	1800	47		0	5
Feb. 9.....	--	44		0	5
Feb. 15.....	1340	42		0	10
Feb. 22.....	1500	47		0	5
Mar. 2.....	1430	45		0	10
Mar. 8.....	1340	47		0	5
Mar. 15.....	1620	45		0	10
Mar. 22.....	1025	49		0	5
Mar. 29.....	1300	42		0	5
Apr. 5.....	1700	47		0	5
Apr. 14.....	1645	44		0	20
Apr. 21.....	1030	47		0	5
Apr. 27.....	1600	47		5	15
May 4.....	1545	52		0	5
May 9.....	1315	50		0	5
May 18.....	1620	62		0	5
May 25.....	1030	54		0	5
June 1.....	1530	62		0	15
June 8.....	1615	62		0	10
June 15.....	1630	65		0	10
June 22.....	1200	60		0	5
June 30.....	2115	76		0	10
July 12.....	1510	66		0	5
July 20.....	1540	69		0	5
July 27.....	1600	68		0	5
Aug. 4.....	1500	70		0	5
Aug. 10.....	1645	68		0	5
Aug. 18.....	1700	70		0	5
Aug. 24.....	1500	68		0	5
Aug. 30.....	1930	67		0	5
Sept. 7.....	1530	68		0	10
Sept. 13.....	1400	62		0	15
Sept. 22.....	1700	66		0	10

COQUILLE RIVER BASIN

14-3249. SOUTH FORK COQUILLE RIVER NEAR POWERS, OREG.

LOCATION.--Lat 42°47'05", long 124°02'25", temperature recorder at gaging station on right bank, 0.8 mile upstream from Hall Creek, and 7 miles southeast of Powers, Coos County.

DRAINAGE AREA.--59.2 square miles.

RECORDS AVAILABLE.--Water temperatures: November 1956 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 77°F July 2; minimum, 36°F Mar. 10.

EXTREMES, 1956-67.--Water temperatures: Maximum, 77°F July 2, 1967; minimum, 34°F Jan. 12, 13, 1963.

Temperature (°F) of water, water year October 1966 to September 1967

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	63	62	63	62	61	63	62	61	59	58	57	56	55	52	53	53	53	53	52	51	50	50	56	55	55	53	55	54	55	55	55	56	
Minimum	59	60	56	55	56	58	59	58	55	52	53	51	51	49	51	49	49	47	47	49	48	49	50	51	51	51	52	50	50	51	51	52	
November																																	
Maximum	54	53	53	52	50	50	50	47	49	50	51	52	51	51	49	49	49	48	48	49	50	48	46	45	45	45	46	47	48	49	49	49	
Minimum	50	51	50	48	49	48	48	47	46	47	49	50	51	49	50	49	48	48	49	48	46	46	45	44	44	45	45	45	46	48	48	47	
December																																	
Maximum	49	48	48	47	47	46	46	46	47	47	48	48	48	47	47	47	46	46	46	46	46	44	45	45	45	45	44	44	43	44	44	46	
Minimum	48	48	47	47	46	45	45	46	47	47	47	47	47	47	47	45	45	45	46	44	43	44	45	45	44	44	42	42	43	43	42	45	
January																																	
Maximum	46	43	45	45	42	42	41	42	44	44	44	44	45	45	45	44	43	43	44	44	44	43	42	43	43	44	45	45	45	45	44	43	
Minimum	43	42	43	42	41	41	41	40	41	42	44	43	44	44	44	43	41	41	42	44	43	42	42	42	43	43	44	45	44	44	44	42	
February																																	
Maximum	45	45	45	45	45	44	44	45	45	45	45	44	43	40	41	42	43	43	42	42	42	42	43	43	44	44	44	44	45	45	44	43	
Minimum	44	44	44	44	44	43	43	43	43	44	43	43	42	38	37	39	40	42	42	41	40	40	40	41	42	41	42	43	44	45	44	44	
March																																	
Maximum	45	43	42	42	43	44	45	45	43	40	41	41	41	40	42	42	42	42	41	42	44	44	44	44	43	43	44	44	42	41	42	42	
Minimum	43	41	40	39	40	41	42	40	36	37	38	39	40	41	41	41	41	41	41	41	41	41	42	43	43	42	42	43	42	40	40	40	
April																																	
Maximum	46	45	46	46	45	45	45	45	45	45	45	46	45	43	44	43	43	43	45	45	45	45	45	45	45	45	44	43	44	45	47	44	
Minimum	41	42	42	43	43	43	44	44	44	44	44	44	43	44	43	42	41	41	42	43	43	44	44	44	44	44	43	42	42	43	44	42	
May																																	
Maximum	49	49	48	48	51	52	53	53	51	47	47	50	52	54	56	57	57	57	59	60	60	61	59	58	59	60	57	56	55	53	53	54	
Minimum	45	45	46	47	47	47	48	49	47	45	45	45	47	49	50	51	51	51	53	54	53	51	53	53	51	53	53	54	53	51	50	49	
June																																	
Maximum	57	59	62	64	64	62	60	58	60	62	64	65	67	67	67	67	68	69	66	64	63	62	69	70	71	72	73	74	75	75	75	75	
Minimum	52	53	54	56	57	59	57	56	57	58	59	60	61	62	61	62	62	62	61	61	61	61	61	61	61	62	63	64	64	64	64	64	
July																																	
Maximum	77	76	74	73	71	71	70	72	73	72	71	70	69	69	69	69	69	68	68	68	68	68	68	67	67	67	68	68	68	70	70	70	
Minimum	65	67	67	65	65	64	62	63	63	63	63	65	65	65	63	63	64	65	63	64	63	64	64	64	63	64	64	65	65	67	64	64	
August																																	
Maximum	70	69	69	68	68	67	68	69	69	69	69	69	68	69	69	68	68	68	68	68	67	68	68	67	66	67	67	67	67	67	68	68	
Minimum	66	65	65	64	65	66	65	64	66	67	67	67	67	67	67	67	67	67	67	67	67	67	67	66	66	66	66	66	65	65	65	65	
September																																	
Maximum	67	67	67	66	65	66	67	66	64	66	67	66	64	64	63	63	64	64	64	64	64	65	64	62	61	61	62	62	62	60	60	64	
Minimum	64	66	65	64	64	64	66	63	61	64	65	63	61	62	61	62	63	62	62	62	63	63	63	63	63	63	63	64	65	65	65	65	

ROGUE RIVER BASIN

14-3723. ROGUE RIVER NEAR AGNESS, OREG.

LOCATION.--Lat 42°34'50", long 124°03'30", temperature recorder at gaging station on left bank, 0.8 mile upstream from Shasta Costa Creek, 1.5 miles north of Agness, Curry County, 2.6 miles upstream from Illinois River, and at mile 29.7.

DRAINAGE AREA.--3,939 square miles.

RECORDING INSTRUMENTS.--Gaging station: January 1966 to September 1967.

Water temperatures: October 1960 to September 1967.

EXTREMES, 1960-67.--Water temperatures: Maximum, 78°F on several days during August; minimum, 43°F on several days during January.

EXTREMES, 1960-67.--Water temperatures: Maximum, 80°F on several days during July 1962; minimum (1960-64, 1965-67), 34°F Jan. 22-25, 1962.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonyl Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)			Hardness as CaCO ₃		Specific conductance (microhmhos at 25°C)	pH	Color
												Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Non-carbonate			
Oct. 15, 1966....	1300	23	11	4.4	5.0	1.2	63	0	3.2	0.0	0.2	82	0.11	288	46	0	112	7.2	5
Oct. 15, 1967....	1400	25	11	4.4	5.0	1.2	63	0	3.2	0.0	0.2	82	0.11	288	46	0	112	7.2	5
Nov. 13, 1967....	1650	19	12	6.7	4.4	1.0	68	0	7.2	0.1	0.6	87	0.08	2340	58	1	127	7.2	20
Dec. 13, 1967....	5650	21	13	7.3	4.4	1.1	74	0	6.8	0.1	0.4	91	0.12	1390	62	2	138	7.8	25
Feb. 28, 1967....	7650	20	10	4.6	3.9	1.1	58	0	3.2	0.1	0.3	76	0.10	1570	44	0	108	7.9	5
Mar. 29, 1967....	7300	20	12	5.2	4.4	1.1	66	0	4.8	0.1	0.3	76	0.10	1500	52	0	120	7.5	5
Apr. 20, 1967....	8650	18	8.1	3.9	3.2	1.0	48	0	2.8	0.0	0.2	71	0.09	1660	36	0	89	7.4	5
May 24, 1967....	3790	21	12	4.8	4.4	1.2	64	0	4.4	0.1	0.2	80	0.10	1320	50	0	102	7.6	5
June 22, 1967....	1520	23	13	6.6	4.4	1.2	72	0	5.2	0.1	0.3	81	0.11	286	52	0	131	7.5	5
July 16, 1967....	1320	25	10	4.1	6.2	1.5	59	1	3.4	0.0	0.1	81	0.11	289	42	0	112	8.3	5
Aug. 19, 1967....	1320	25	10	4.1	6.2	1.5	59	1	3.4	0.0	0.1	81	0.11	289	42	0	112	8.3	5
Sept. 19, 1967....	1320	25	10	4.1	6.2	1.5	59	1	3.4	0.0	0.1	81	0.11	289	42	0	112	8.3	5

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN
IN WASHINGTON

Chemical analyses, in parts per million, water year October 1966 to September 1967

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	Specific conductance (microhm-cm at 25°C)	Color or pH		
															Parts per million	Tons per acre-foot				Tons per day	
COWLITZ RIVER BASIN																					
14-2427. TOUTLE RIVER NEAR CASTLE ROCK, WASH. (Lat 46°19'10", long 122°54'30")																					
Oct. 27, 1966.	15			5.0	1.1	4.7	0.5	28	0	0.6	3.5	0.1	0.3	--		A 45	0.06	17	0	57	7.3
Jan. 26, 1967.	15			4.3	1.3	3.3	.9	20	0	1.4	2.5	.1	.4	0.02		43	.06	16	0	43	7.1
Apr. 21.....	16			3.6	1.3	3.7	.7	22	0	1.6	3.0	.1	.3	--		41	.06	15	0	48	7.2
July 22.....	16			5.0	1.2	5.2	1.5	29	0	2.0	3.5	.1	.0	.04		48	.07	18	0	59	7.5

Additional determinations

Date of collection	Cross section (24 hr)	Temperature (°F)	Turbidity (ppm)	Color	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M. P. N. (most probable number coliform groups per 100 ml)	P. B. I. (Pearlman-Benson Index)	Slime solids			Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO ₄	Total ammonium as N (NH ₄)
									Settleable (ml/l)	Total (mg/l)	Vol- ume (ml/l)	Hexa- valent (Cr ⁶⁺)	Total (Cr)						
Oct. 27, 1966....				11.5			0					--	--	--	--	--			
Jan. 26, 1967....				11.6			10					0.00		0.01	0.01				
Apr. 21.....				9.4			530					.00		.00	.00				
July 22.....																			

A Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

IN OREGON

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	Specific conductance (microhmhos at 25°C)					
														Parts per million	Tons per acre-foot			Tons per day				
UMPUQUA RIVER BASIN																						
14-3080. SOUTH UMPQUA RIVER AT TILLER, OREG. (Lat 42°55'50", long 122°56'50")																						
Aug. 16, 1967.....	59	13	0.05	14	2.9	7.6	0.9	49	0	10	9.0	0.1	0.21	0.06	84	0.11	13.4	47	7	0.5	134	7.7
14-3085. ELK CREEK NEAR DREW, OREG. (Lat 42°53'25", long 122°55'00")																						
Aug. 16, 1967.....	0.4		0.06	11	7.2	23		112	0	44				193	0.26	0.21	57	0		326	7.4	
SOUTH UMPQUA RIVER AT DAYS CREEK, OREG. (Lat 42°58'23", long 123°10'13")																						
Aug. 16, 1967.....				14	3.9	8.2		57	0					92	0.13		51	4		151	7.3	
14-3090. COW CREEK NEAR AZALIA, OREG. (Lat 42°49'30", long 123°10'40")																						
Aug. 15, 1967.....	8.5			11	6.8	6.2		77	0					85	0.12	1.95	56	0		136	8.0	
14-3095. WEST FORK COW CREEK NEAR GLENDALE, OREG. (Lat 42°48'15", long 123°36'35")																						
Aug. 15, 1967.....	11			10	3.7	6.3		53	1					77	0.10	2.29	40	0		114	8.3	
14-3107. SOUTH MYRTLE CREEK NEAR MYRTLE, OREG. (Lat 43°01'55", long 123°11'30")																						
Aug. 15, 1967.....	1.7			28	8.4	8.1		126	0		11			153	0.21	0.70	104	1		248	7.8	
14-3110. NORTH MYRTLE CREEK NEAR MYRTLE CREEK, OREG. (Lat 43°02'30", long 123°15'30")																						
Aug. 15, 1967.....	1.9			22	9.8	11		95	0		26			158	0.21	0.81	96	18		253	7.9	
SOUTH UMPQUA RIVER NEAR DILLARD, OREG. (Lat 43°04'52", long 123°23'08")																						
Aug. 15, 1967.....				14	6.4	8.4		70	0					93	0.13		62	4		168	7.4	
GLALLA CREEK NEAR BROCKWAY, OREG. (Lat 43°06'48", long 123°30'24")																						
Aug. 15, 1967.....				11	7.1	7.2		77	0					86	0.12		56	0		148	7.0	
SOUTH UMPQUA RIVER NEAR ROSEBURG, OREG. (Lat 43°09'38", long 123°23'40")																						
Aug. 15, 1967.....				15	6.8	9.3		72	0					102	0.14		66	6		179	7.3	
14-3176. ROCK CREEK NEAR GLIDE, OREG. (Lat 43°20'35", long 122°59'30")																						
Aug. 16, 1967.....	22	14	0.04	7.8	2.1	3.7	0.5	36	0	7.2	1.0	0.1	0.2	0.00	59	0.08	3.50	28	0	0.3	78	7.9
NORTH UMPQUA RIVER NEAR GLIDE, OREG. (Lat 43°18'35", long 123°04'21")																						
Aug. 16, 1967.....				5.5	2.0	4.9		36	0					64	0.09		22	0		68	7.4	
CALAPOOYA CREEK NEAR UMPQUA, OREG. (Lat 43°22'02", long 123°27'35")																						
Aug. 17, 1967.....				8.2	4.4	8.4		54	0					76	0.10		38	0		117	7.5	

14-3209. UMPQUA RIVER AT UMPQUA, OREG. (Lat 43°21'58", long 123°28'03")																				
Aug. 17, 1967.....	22	0.04	5.9	2.4	5.2	1.1	40	0	2.2	2.0	0.1	0.2 0.04	68	0.09	24	0	0.5	77	7.7	
14-3220. ELK CREEK AT DRAIN, OREG. (Lat 43°38'30", long 123°17'50")																				
Aug. 14, 1967.....	1.5		32	6.4	20		72	0	46		178	0.24	0.64	106	48		271	7.8		
ELK CREEK ON STATE HIGHWAY 38, EAST OF ELKTON, OREG. (Lat 43°38'48", long 123°31'22")																				
Aug. 14, 1967A....	2.6		8.3	3.2	9.4	1.7	40	0	1.2	16	0.1	0.3 0.02	68	0.09	34	0	0.7	123	7.5	
14-3229. UMPQUA RIVER AT SCOTTSBURG, OREG. (Lat 43°39'15", long 123°49'25")																				
Aug. 14, 1967.....	1050		5.8	2.6	5.3		38	0			60	0.08	170	25	0		77	7.8		
SMITH RIVER NEAR SCOTTSBURG, OREG. (Lat 43°47'36", long 123°46'32")																				
Aug. 14, 1967A....		9.4	0.12	4.1	1.6	5.8	1.1	25	0	0.2	6.0	0.1	0.3 0.05	44	0.06	16	0	0.6	66	7.5

A Includes 5 units of color.

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967

(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)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment					Method of analysis
							Percent finer than size indicated, in millimeters					
							0.002	0.002	0.008	0.016	0.031		0.062	0.125	0.250	0.500	1.000	2.000

WALLA WALLA RIVER BASIN

14-0120. WALLA WALLA RIVER AT MILTON, OREG. (Lat 45°55'25", long 118°22'40")

Oct. 18, 1966.....	0700	41	130		6	2													
Dec. 17.....	1'25	44	370		20	20													
Jan. 29, 1967.....	131	45	966		1090	2840													
Mar. 24.....	1045	44	363		6	6													
Apr. 18.....																			
May 22.....	1625	49	360		5	5													
May 22.....	1800	59	604		44	72													
June 21.....	1735	--	152		48	20													
Aug. 22.....	1830	68	50		2	T													
Sept. 25.....	1740	--	64		4	1													

UMATILLA RIVER BASIN

14-0203. MEACHAM CREEK NEAR GIBSON, OREG. (Lat 45°42'15", long 118°21'20")

Oct. 18, 1966.....	0740	38	16		5	T													
Dec. 17.....	0950	41	302		4	3													
Jan. 25, 1967.....	1271	40	1461		103	432													
Feb. 17.....	1205	42	152		3	7													
Mar. 24.....	1405	44	438		6														
Apr. 21.....	0915	41	221		2	1													
May 14.....	1020	48	670		14	25													
May 23.....	1750	59	323		6	5													
June 23.....	1335	59	47		2	T													
Aug. 23.....	1720	76	6.8		2	T													
Sept. 26.....	0945	--	9.0		1	T													

E Estimated.

T Less than 0.50 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

IN OREGON--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967--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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (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
JOHN DAY RIVER BASIN																	
14-0385. JOHN DAY RIVER AT PRAIRIE CITY, OREG. (Lat 44°27'15", long 118°43'00")																	
Oct. 19, 1966.....	0645	--		64	4	0.7											
Dec. 15.....	1805	36		120	12	3.9											
Jan. 30, 1967.....	0940	35		228	32	20											
Feb. 20.....	1405	34		91	16	3.9											
Mar. 21.....	0930	42		143	13	5.0											
Apr. 19.....	1805	43		112	10	3.0											
May 8.....	1940	53		205	130	72											
May 15.....	1335	51		358	120	116											
June 26.....	1510	68		171	14	6.5											
14-0395. SOUTH FORK JOHN DAY RIVER NEAR DAYVILLE, OREG. (Lat 44°25'40", long 119°32'20")																	
Oct. 19, 1966.....	0815	--		56	3	0.5											
Dec. 15.....	1635	41		294	99	79											
Jan. 29, 1967.....	1730	41		1300	484	1700											
Jan. 30.....	1220	37		558	330	497											
Feb. 20.....	1520	41		121	28	9.1											
Mar. 21.....	1215	44		318	68	58											
Apr. 19.....	1405	47		268	44	32											
May 8.....	1730	51		730	658	1300											
May 9.....	0835	52		766	219	1000											
May 20.....	1025	52		786	211	436											
June 27.....	0845	62		100	57	15											
14-0405. JOHN DAY RIVER AT PICTURE GORGE, NEAR DAYVILLE, OREG. (Lat 44°31'15", long 119°37'30")																	
Oct. 19, 1966.....	1000	--		133	24	9											
Dec. 16.....	0825	38		813	72	158											
Jan. 29, 1967.....	1650	41		2490	672	4520											
Jan. 30.....	1450	39		1780	303	1460											
Feb. 20.....	1650	42		404	16	17											
Mar. 21.....	1450	44		825	51	114											
Apr. 19.....	1320	47		648	38	66											
May 8.....	1640	61		1390	407	1530											
May 9.....	0915	52		1590	507	2180											
May 20.....	1250	53		2240	280	1690											
June 27.....	1040	64		500	76	103											

VPWC

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967--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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (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
JOHN DAY RIVER BASIN--Continued																	
14-0425. CAMAS CREEK NEAR UKIAH, OREG. (Lat 45°09'00", Long 118°49'00")																	
Oct. 18, 1966.....	1750	--		4.1	1	T											
Dec. 15.....	1010	34		145	5	2.0											
Jan. 29, 1967.....	1040	35		385	64	67											
Jan. 31.....	1530	37		238	8	5.1											
Feb. 20.....	0750	32		23	2	.1											
Mar. 23.....	1420	42		305	22	18											
Apr. 19.....	0900	36		129	9	3.1											
May 8.....	1040	47		341	29	27											
May 20.....	1605	54		390	31	33											
June 29.....	1635	78		22	4	.2											

T Less than 0.05 ton.

SOUTHEASTERN ALASKA--Continued
15-0540. AUNE CREEK AT AUNE BAY--Continued
Temperature (°F) of water, water year October 1966 to September 1967--Continued

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	
April	—	—	—	36	36	35	36	36	36	36	36	36	36	37	37	37	37	37	37	37	36	36	36	36	37	37	37	37	37	37	—	36
Maximum	—	—	—	36	36	35	35	36	36	36	36	36	36	37	37	37	37	37	37	37	36	36	36	36	37	37	37	37	37	37	—	36
Minimum	—	—	—	36	36	35	35	36	36	36	36	36	36	37	37	37	37	37	37	37	36	36	36	36	37	37	37	37	37	37	—	36
May	37	37	38	38	38	38	38	39	39	40	40	39	40	40	40	41	40	40	40	40	41	42	45	45	47	47	47	49	50	51	51	41
Maximum	37	37	38	38	38	38	38	39	39	40	40	39	39	40	41	40	40	40	40	40	41	42	45	45	47	47	47	49	50	51	51	41
Minimum	37	37	38	38	38	38	38	39	39	40	40	39	39	40	41	40	40	40	40	40	41	42	45	45	47	47	47	49	50	51	51	41
June	—	—	—	50	49	50	51	51	52	54	54	56	56	55	55	55	59	61	62	61	64	64	64	64	64	63	64	63	59	57	—	56
Maximum	—	—	—	50	49	50	51	51	52	54	54	56	56	55	55	55	59	61	62	61	64	64	64	64	64	63	64	63	59	57	—	56
Minimum	—	—	—	47	46	47	50	50	49	51	54	51	54	55	55	52	52	55	58	61	61	61	61	61	61	63	64	63	59	57	—	55
July	—	—	—	57	58	60	59	59	59	58	59	59	60	61	61	61	61	61	61	61	60	60	60	60	63	63	63	60	60	60	60	60
Maximum	—	—	—	57	58	60	59	59	59	58	59	59	60	61	61	61	61	61	61	61	60	60	60	60	63	63	63	60	60	60	60	60
Minimum	—	—	—	57	58	58	59	59	58	58	58	59	60	61	61	61	60	60	60	60	59	59	60	62	63	63	60	59	59	60	60	59
August	—	—	—	60	60	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Maximum	—	—	—	60	60	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Minimum	—	—	—	60	60	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
September	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Maximum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Minimum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Periodic determinations of suspended-sediment discharge, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (ppm)	Sediment discharge (tons per day)	Suspended sediment					Method of analysis
							Percent finer than size indicated, in millimeters					
Apr. 18, 1967.....	1500	37		4.1	4	T						

T Less than 0.50 ton.

[illegible]

15-0805. TRAITORS RIVER NEAR BELL ISLAND

LOCATION.--Lat 55°43'59", long 131°30'00", temperature recorder at gaging station, on Revillagigedo Island, 0.5 mile upstream from mouth at east end of Traitors Cove, and 14 miles south of Bell Island.

DRAINAGE AREA, --20.8 square miles.

RECORDS AVAILABLE.--Water temperatures: April to September 1965, October 1966 to September 1967.

EXTREMES, April to September 1965.--Water temperatures: Maximum, 62°F Aug. 1, 4, 6, 7, 19, 1965.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved residue at 180°C	Hardness as CaCO ₃	Specific conductance (micro-mhos at 25°C)	pH	Color
Apr. 12, 1967.....	43.8														28	6.9	

[illegible]

[illegible]

15-0866. BIG CREEK NEAR POINT BAKER

LOCATION.--Lat 56°07'54", long 133°08'36", temperature recorder at gaging station on Prince of Wales Island, 1 mile upstream from mouth at Whale Passage, 2.5 miles downstream from small unnamed lake and 24 miles southeast of Point Baker.

DRAINAGE AREA, --11.2 square miles. August 1963 to September 1967

RECORDS AVAILABLE, --Water temperatures: August 1963 to September 1967, extremes, 1966-67, --Water temperatures: Maximum, 70°F June 22, 23; minimum, freezing point on many days during winter months.

EXTREMES, 1963-67. ---Water temperatures: Maximum, 70°F June 22, 1967; minimum, freezing point on several days during winter months of most years. ---Water temperatures: Maximum, 70°F June 22, 1967; minimum, freezing point on many days during winter months of most years.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃	Specific conductance (micro-mhos at 25°C)	pH	Color
Apr. 18, 1967.....	51	2.8	23	0.5	3.7	70	1.0	6.4	0.0	72	59	2	125	7.7			

Temperature ($^{\circ}\text{F}$) of water, water year October 1966 to September 1967

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	48	48	48	48	48	48	48	47	47	47	46	45	45	45	45	45	44	44	44	44	44	43	42	42	42	42	42	41	40	41	41	44
Minimum	48	48	48	48	48	47	47	47	47	46	45	45	45	45	45	45	44	44	44	44	44	43	42	42	42	41	40	40	40	40	41	44
November																																
Maximum	42	42	41	41	41	41	40	38	38	38	37	36	36	36	36	35	34	34	34	34	34	34	35	36	35	35	35	35	34	--	37	37
Minimum	41	41	41	41	41	40	38	38	38	37	36	36	36	36	35	34	34	34	34	34	34	34	34	35	35	35	35	35	34	--	36	36
December																																
Maximum	34	34	33	32	32	32	32	32	32	32	32	33	33	33	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	35	34	33
Minimum	34	34	33	32	32	32	32	32	32	32	32	33	33	33	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33
January																																
Maximum	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Minimum	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
February																																
Maximum	32	32	32	32	33	33	34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35	36	36	--	--	--	33
Minimum	32	32	32	32	33	33	34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35	35	35	36	36	--	--	--	33
March																																
Maximum	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34
Minimum	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34
April																																

15-2480. TRAIL RIVER NEAR LAWING

LOCATION --Lat 60°26'00", long 149°22'20", at gaging station near center of stream on downstream end of pier at bridge site on Seward-Anchorage Highway, 0.2 mile upstream from Falls Creek, 0.2 mile downstream from Lower Trail Lake, 1.9 miles upstream from mouth, and 2.1 miles north of Lawing.

DRAINAGE AREA --181 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1949 to September 1967.

Water temperatures: April 1959 to September 1967.

Sediment records: August and September 1967 (periodic).

EXTREMES, 1959-66 --Water temperatures: Maximum, 55°F July 22, 1965, July 23-25, 1966.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-magnesium			
Oct. 1-11, 1966.....	1180	3.9	0.00	12	0.9	1.8	0.1	32	11	0.0	0.0	0.2	46	35	9	77	6.6	10
Oct. 12-22.....	726	4.3	0.00	13	.9	1.5	.6	34	11	.7	.0	.0	50	37	9	84	7.5	7
Oct. 23-31.....	432	3.8	.00	14	.9	1.5	.7	34	12	.4	.0	.9	51	39	10	82	7.4	7
Nov. 1-11.....	513	4.1	.00	14	1.0	1.5	.8	34	14	.4	.0	.3	53	40	12	91	7.3	6
Nov. 12-21.....	316	4.5	.00	15	1.1	1.7	.7	39	13	.4	.1	.3	56	42	10	97	7.5	8
Nov. 22-30.....	280	4.8	.00	17	1.1	2.1	.5	44	16	.0	.0	.3	66	47	11	102	7.4	5
Dec. 1-11.....	197	5.4	.00	20	1.2	2.2	.6	48	16	.4	.0	.9	75	55	16	110	7.6	5
Jan. 1-16, 1967.....	137	5.2	.00	19	1.2	2.4	.2	52	15	.4	.0	.6	70	53	11	115	7.6	5
Jan. 17-23.....	100	5.2	.00	19	1.2	2.4	.2	52	15	.4	.0	.6	70	53	11	115	7.6	5
Feb. 4-15.....	100	5.3	.00	20	1.3	2.3	.4	52	14	.4	.1	.3	70	55	12	122	7.6	0
Feb. 16-28.....	95	5.4	.00	20	1.3	2.1	.3	53	16	.7	.0	.2	72	54	11	123	7.3	0
Mar. 1-18.....	90	4.8	.04	19	1.3	2.0	.3	53	16	.0	.3	.5	70	54	11	123	7.2	5
Mar. 19-31.....	85	4.6	.00	16	1.3	2.1	.4	54	14	.0	.0	.4	66	42	10	124	7.1	5
June 15.....	1810	4.0	.00	14	1.0	.8	.1	56	12	.0	.0	.0	38	28	16	66	7.1	10
Aug. 4.....	1700	4.0	.31	19	1.3	.9	.9	27	9.0	.7	.1	.4	41	32	10	67	7.0	0
Sept. 8.....	4100	4.1	.38	9.5	1.3	.9	.9	27	9.0	.7	.1	.4	41	32	10	67	7.0	0

Periodic determinations of suspended-sediment discharge, water year October 1966 to September 1967

(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)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Percent finer than size indicated, in millimeters				Method of analysis
Aug. 4, 1967.....	1056	54		1700	16	73					
Sept. 8.....	1230	47		4100	40	440					

15-2751. CHESTER CREEK AT ARCTIC BOULEVARD, AT ANCHORAGE

LOCATION.--Lat 61°12'20", long 149°53'45", at gaging station on right bank at downstream end of bridge at Arctic Boulevard., and 1 mile upstream from mouth.

DRAINAGE AREA.--29.3 square miles.

RECORDS AVAILABLE.--Chemical analyses: May to September 1967 (periodic).

Sediment records: June to September 1967.

EXTREMES, June to September 1967.--Sediment concentrations: Maximum daily, 882 ppm Aug. 13.

Sediment loads: Maximum daily, 155 tons Aug. 13.

REMARKS.--periodic fluctuation in sediment concentration and discharge relation due to washing of streets and road construction near the stream.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-magnesium			
May 3, 1967.....	22.4	10	0.98	26	4.6	4.8	0.9	88	19	1.8	0.1	1.7	113	84	12	195	7.6	20
May 13.....	20.4	8.5	1.13	25	6.2	5.8	1.0	97	16	5.3	1.1	2.5	120	88	8	204	7.3	10
May 31.....	20.4	8.5	1.13	26	6.8	5.0	1.5	99	19	5.3	1.1	1.1	123	93	12	208	7.4	17
Aug. 16.....	23.2	12	1.68	23	5.3	4.4	1.7	93	18	3.9	0	2.2	119	88	12	187	7.2	25
Sept. 6.....	66.2	11	.42	21	5.3	4.4	1.0	63	21	5.7	1	.8	102	78	26	159	6.9	60

Periodic determinations of suspended-sediment discharge and particle-size, water year October 1966 to September 1967
(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
May 3, 1967.....	1130	45		22.4	44	3	--	--	--	--	--	--	--	--	--	--	
May 15.....	0850	44		20.4	13	.7	--	--	--	--	--	--	--	--	--	--	
May 31.....	1200	46		16.4	18	.8	--	--	--	--	--	--	--	--	--	--	
July 20.....	1415	52		25.6	368	25	60	76	88	94	96	97					BMC
Aug. 16.....	1100	32		23.2	17	6	35	43	53	66	75	79	86	94	98	100	BMC
Sept. 6.....	1300	45		66.2	94	17	35	41	53	66	75	79					VBMC

ALASKA WEST OF LONGITUDE 141°--Continued

15-2751. CHESTER CREEK AT ARCTIC BOULEVARD, AT ANCHORAGE--Continued

Suspended sediment, June to September 1967

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..							--	--	--
2..							--	--	--
3..							--	--	--
4..							--	--	--
5..							--	--	--
6..							--	--	--
7..							--	--	--
8..							--	--	--
9..							--	--	--
10..							--	--	--
11..							--	--	--
12..							--	--	--
13..							--	--	--
14..							--	--	--
15..							19	140	7
16..							18	55	3
17..							18	110	5
18..							18	58	3
19..							19	68	3
20..							20	200	11
21..							20	200	11
22..							19	150	8
23..							19	190	10
24..							19	130	7
25..							20	420	23
26..							20	380	20
27..							19	510	26
28..							19	180	9
29..							19	210	11
30..							20	290	16
31..							--	--	--
Total							306	--	173
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..	19	130	7	24	88	6	25	190	13
2..	18	51	2	23	80	5	25	300	20
3..	18	80	4	22	220	13	31	280	23
4..	18	60	3	21	390	22	45	490	60
5..	18	230	11	30	360	29	67	380	69
6..	18	100	5	26	114	S 5	65	160	28
7..	19	67	3	22	352	S 20	55	85	13
8..	22	80	5	22	210	S 12	47	68	9
9..	21	78	4	22	470	28	40	62	7
10..	19	70	4	23	470	29	36	37	4
11..	18	74	4	26	220	15	36	40	4
12..	17	100	4	25	350	24	34	110	10
13..	17	150	7	41	882	S 155	37	220	22
14..	17	190	9	41	380	S 61	35	160	15
15..	17	210	10	26	140	10	34	140	13
16..	18	80	4	23	120	7	31	160	13
17..	19	80	4	30	84	7	34	110	10
18..	19	90	5	26	220	15	34	330	30
19..	20	290	16	24	390	25	34	320	29
20..	24	410	26	23	150	9	32	590	51
21..	23	410	25	23	75	5	30	480	39
22..	24	190	12	23	40	2	29	640	50
23..	24	88	6	22	120	7	31	470	39
24..	21	300	17	22	120	7	32	140	12
25..	21	250	14	25	180	12	32	250	22
26..	21	590	33	26	280	20	31	310	26
27..	22	280	17	23	110	7	31	410	34
28..	22	55	3	23	65	4	30	430	35
29..	21	40	2	27	180	13	29	410	32
30..	21	34	2	27	120	9	29	270	21
31..	23	100	6	25	60	4	--	--	--
Total	619	--	274	786	--	587	1081	--	753
Total discharge for period June 15 to Sept. 30, 1967 (cfs-days).....									2792
Total load for period June 15 to Sept. 30, 1967 (tons).....									1787

S Computed by subdividing day.

ALASKA WEST OF LONGITUDE 141°--Continued
 15-3040. KUSKOKWIM RIVER AT CROOKED CREEK--Continued

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	200							--	110	194		
2.....	200							--	138	198		
3.....	197							--	137	198		
4.....	--							--	134	194		
5.....	--							--	134	--		
6.....	161							--	129	189		
7.....	161							--	127	185		
8.....	163							--	130	184		
9.....	161							--	133	186		
10.....	161							108	136	--		
11.....	161							105	138	--		
12.....	164							101	136	--		
13.....	164							99	135	--		
14.....	162							100	142	--		
15.....	165							100	153	--		
16.....	160							95	185	--		
17.....	163							95	206	--		
18.....	--							100	182	--		
19.....	--							104	184	--		
20.....	--							104	193	--		
21.....	--							103	194	--		
22.....	--							104	--	--		
23.....	--							108	194	--		
24.....	--							107	202	--		
25.....	--							110	200	--		
26.....	--							113	201	--		
27.....	--							115	206	--		
28.....	--							124	203	--		
29.....	--							127	197	--		
30.....	--							131	203	--		
31.....	--							129	--	--		
Average	--							--	165	--		

15-5140. CHENA RIVER AT FAIRBANKS

LOCATION: --Lat 64°50'50" Long 147°42'20" at gaging station near center on downstream side of bridge on Steese Highway (U.S. Highway 97) in Fairbanks, 0.15 mile upstream from Yena Slough, 11 miles upstream from mouth, and 11 miles downstream from Chena Slough.

DRAINAGE AREA --1,980 square miles; approximately 1,500 square miles upstream from mouth, and 480 square miles downstream from mouth.

RECORDS AVAILABLE --Chemical analyses: May to September 1953, January 1954 to September 1955, October 1957 to May 1958, June to September 1964, September 1967 (periodic).

Water temperatures: May to September 1953, May 1962 to September 1963, October 1964 to November 1965.

Sediment records: January 1954 to September 1955, May 1962 to September 1967.

EXTREMES, 1966-67. --Sediment concentrations: Maximum daily, 549 ppm May 24.

Sediment loads: Maximum daily, 160,000 (estimated) tons Aug. 15.

EXTREMES, 1968-69. --Sediment concentrations: Maximum daily, 549 ppm May 24; Maximum, 66°F June 17, 1962.

Sediment concentrations: Maximum daily, 549 ppm May 24; Maximum, 66°F June 17, 1962.

Sediment loads: Maximum daily, 160,000 (estimated) tons Aug. 15, 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
													Calcium	Non-magnesium			
Sept. 8, 1967.....	3770	10	0.78	31	0.8	18	1.1	83	14	1.1	0.0	0.9	80	12	155	7.2	10

Periodic determinations of suspended-sediment discharge and particle-size, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
Mar. 21, 1967.....	1130	32		212	21	12	--	--	--	--	--	--	--	--	--	--	--
Apr. 4.....	1430	32		206	10	6	--	--	--	--	--	--	--	--	--	--	--
Apr. 22.....	1500	34		295	6	5	--	--	--	--	--	--	--	--	--	--	--
May 4.....	1330	36		1830	49	240	--	--	--	--	--	--	--	--	--	--	--
May 29.....	1300	46		9530	316	8100	4	8	15	26	50	70	--	--	--	--	--
June 15.....	1645	56		2990	32	260	--	--	--	--	--	--	--	--	--	--	--
July 28.....	1130	45		10390	161	4500	--	--	--	--	--	--	--	--	--	--	--
Aug. 1.....	1630	50		21400	510	29000	8	11	16	23	38	57	82	99	100	--	--
Aug. 23.....	1900	--		8260	102	2300	--	--	--	--	--	--	--	--	--	--	--
Sept. 1.....	1400	43		5080	46	630	--	--	--	--	--	--	--	--	--	--	--
Sept. 8.....	1730	41		3770	15	130	--	--	--	--	--	--	--	--	--	--	--

SBWC

VWSC

VW

VW

ALASKA WEST OF LONGITUDE 141°--Continued

15-5140. CHENA RIVER AT FAIRBANKS--Continued

Suspended sediment, water year October 1966 to September 1967
(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..	604	39	64	310		25	310		25
2..	597	32	52	320		26	310		25
3..	590	24	38	330		27	310		25
4..	597	24	39	330		27	310		25
5..	597	56	90	330		27	310		25
6..	597	40	A 64	340		28	300		24
7..	604	27	44	340		28	300		24
8..	604	47	77	330		27	300		24
9..	590	40	A 64	320		26	300		24
10..	590	30	48	320		26	300		24
11..	576	50	78	310		25	300		24
12..	562	48	73	300		24	300		24
13..	548	24	36	300		24	300		24
14..	555	23	34	290		23	290		23
15..	541	18	26	290		23	290		23
16..	500	50	A 68	290		23	290		23
17..	480	26	34	300		24	280		23
18..	460	32	40	300		24	280		23
19..	440	22	26	300		24	270		22
20..	410	28	31	300		24	270		22
21..	380	60	A 62	300		24	270		22
22..	359	70	A 68	300		24	270		22
23..	326	54	48	310		25	260		21
24..	272	20	15	310		25	260		21
25..	260	29	20	310		25	260		21
26..	260	60	A 42	310		25	250		17
27..	260	--	21	310		25	250		17
28..	270	--	22	310		25	250		17
29..	280	--	23	310		25	250		17
30..	290	--	23	310		25	250		17
31..	300	--	24	--	--	--	250		17
Total	14299	--	1394	9330	--	753	8740	--	685
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..	250		17	230		12	210		11
2..	250		17	230		12	210		11
3..	250		17	230		12	200		11
4..	250		17	230		12	200		11
5..	250		17	230		12	200		11
6..	250		17	230		12	200		11
7..	250		17	230		12	200		11
8..	250		17	230		12	200		11
9..	250		17	230		12	200		11
10..	250		17	230		12	200		11
11..	250		17	230		12	200		11
12..	250		17	230		12	200		11
13..	250		17	230		12	200		11
14..	250		17	220		12	200		11
15..	260		21	220		12	200		11
16..	260		21	220		12	200		11
17..	260		21	220		12	210		11
18..	260		21	220		12	210		11
19..	260		21	220		12	210		11
20..	250		17	220		12	210		11
21..	250		17	220		12	210		11
22..	250		17	220		12	210		11
23..	250		17	220		12	210		11
24..	240		16	220		12	210		11
25..	240		16	220		12	210		11
26..	240		16	210		11	210		11
27..	240		16	210		11	210		11
28..	240		16	210		11	210		11
29..	240		16	--	--	--	200		11
30..	240		16	--	--	--	200		11
31..	240		16	--	--	--	200		11
Total	7720	--	539	6260	--	333	6340	--	341

A Computed from partly estimated-concentration graph.

ALASKA WEST OF LONGITUDE 141°--Continued
15-5140. CHENA RIVER AT FAIRBANKS--Continued

Suspended sediment, water year October 1966 to September 1967--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..	200	--	11	572	21	32	8060	274	6000
2..	200	--	11	760	24	49	7750	201	4200
3..	200	--	11	1140	42	130	6670	206	3700
4..	210	49	28	1900	77	400	5830	171	2700
5..	210	40	23	4180	435	5300	5360	126	1800
6..	210	34	19	7910	450	9600	5560	150	2200
7..	210	71	40	5690	138	2100	5660	157	2400
8..	210	45	26	4240	105	1200	5000	107	1400
9..	220	28	17	3790	100	1000	4330	94	1100
10..	220	48	28	4120	112	1200	3990	95	1000
11..	220	37	22	4610	136	1700	3900	91	1000
12..	230	40	25	5300	288	4100	3400	67	620
13..	230	40	25	5270	141	2000	3040	50	410
14..	240	40	26	4410	94	1100	2830	51	390
15..	240	40	26	4330	80	940	2730	42	310
16..	250	30	20	4020	60	650	2610	33	230
17..	250	29	20	3620	57	560	2520	46	310
18..	260	40	28	3120	29	240	2410	44	290
19..	270	27	20	2840	21	160	2290	30	180
20..	280	22	17	2910	38	300	2130	23	130
21..	280	40	30	4210	176	2000	2080	30	170
22..	291	26	20	5270	215	3000	2080	26	150
23..	304	23	19	6390	309	5300	2060	33	180
24..	324	20	17	8280	549	12000	2080	50	280
25..	330	50	44	9490	390	10000	2030	20	110
26..	364	23	23	8470	294	6700	1880	15	76
27..	399	64	69	9280	362	9100	1820	19	93
28..	413	28	31	9700	433	11000	1800	22	110
29..	469	47	60	9130	349	8600	1770	27	130
30..	535	17	24	8700	313	7400	1720	16	74
31..	--	--	--	8020	272	5900	--	--	--
Total	8269	--	780	161672	--	108941	105390	--	31743
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..	1700	17	78	4680	62	780	5040	42	570
2..	1720	17	79	4210	51	580	4820	42	550
3..	1750	18	85	3920	47	500	4610	35	440
4..	1780	20	96	3640	43	420	4410	37	440
5..	1760	18	86	3360	40	360	4260	29	330
6..	1680	18	82	3120	37	310	4140	30	340
7..	1640	20	88	2950	41	330	4020	15	160
8..	1630	17	75	2790	22	140	3900	14	150
9..	1760	16	76	2740	25	180	3740	19	190
10..	2000	24	130	3020	46	380	3610	18	180
11..	2060	23	130	3780	83	850	3520	18	170
12..	1940	15	78	5170	198	2800	3490	14	130
13..	1810	19	93	10700	518	15000	3450	15	140
14..	1680	13	59	20500	--	43000	3340	10	90
15..	1580	14	60	64600	--	160000	3250	13	110
16..	1530	14	58	57600	--	130000	3170	14	120
17..	1470	13	52	46600	--	97000	3100	15	120
18..	1420	16	61	36100	--	78000	3040	16	130
19..	1390	11	41	25500	--	54000	2980	21	170
20..	1380	26	97	18000	--	27000	2920	16	130
21..	1440	16	62	12800	--	10000	2890	17	130
22..	1700	22	100	10300	--	6700	2840	19	140
23..	3400	152	1807	8940	--	5400	2800	30	230
24..	6310	352	6000	8120	--	3800	2750	20	150
25..	5680	220	3400	7550	112	2300	2690	24	170
26..	7890	349	7400	7030	95	1800	2660	30	220
27..	9780	282	7400	6470	61	1100	2610	17	120
28..	9880	154	4100	5990	65	1000	2560	40	280
29..	7940	98	2100	5720	76	1200	2520	13	88
30..	6280	101	1700	5480	49	720	2480	15	100
31..	5330	85	1200	5270	43	610	--	--	--
Total	99310	--	36873	406650	--	646280	101610	--	6288
Total discharge for year (cfs-days).....									935590
Total load for year (tons).....									834950

A Computed from partly estimated-concentration graph.

S Computed by subdividing day.

ALASKA WEST OF LONGITUDE 141°--Continued

15-5648. YUKON RIVER AT RUBY

LOCATION.--Lat 64°44'25", long 155°29'55", at gaging station on left bank at Ruby, 300 feet downstream from Ruby Creek, 2 miles downstream from Melozitna River, and 2.2 miles upstream from Ruby Slough.
 DRAINAGE AREA.--259,000 square miles, approximately.
 RECORDS AVAILABLE.--Chemical analyses: June 1966 to September 1967.

Water temperatures: June 1966 to September 1967.

EXTREMES, 1966-67.--Water temperatures: Maximum, 64°F June 24, July 11, 13.

EXTREMES, June 1966 to September 1967.--Water temperatures: Maximum, 64°F July 24, 26, 1966, June 24, July 11, 13, 1967.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-magnesium			
Oct. 1-15, 1966.....	140000	8.5	0.00	39	8.4	4.1	1.9	140	24	0.4	0.1	1.1	157	131	16	260	7.9	10
Oct. 16-30, 1966.....	125000	8.4	0.00	33	8.4	3.1	2.4	114	23	0.4	0.1	1.1	132	108	15	218	7.2	20
Nov. 1-15, 1966.....	125000	8.4	0.00	33	8.4	3.1	2.4	114	23	0.4	0.1	1.1	132	108	15	218	7.2	20
May 22-31, 1967.....	415000	4.7	1.13	23	4.3	1.9	1.2	78	12	0.0	0.5	1.4	187	75	11	151	7.4	100
May 25.....	405500	5.1	3.1	30	3.8	1.8	1.6	88	20	0.7	0.3	2.2	106	88	16	172	7.3	40
June 1-5.....	498000	4.9	1.15	25	4.4	1.9	1.2	83	13	0.0	0.5	1.0	93	80	12	157	7.6	100
June 6-18.....	666000	4.9	1.1	24	4.0	1.7	2.0	90	16	0.4	0.1	0.7	98	83	9	165	7.4	20
June 19-30.....	506000	6.2	0.08	30	5.0	2.3	2.2	100	18	0.0	0.0	0.8	114	96	14	190	7.3	15
July 1-15.....	391000	6.9	0.08	33	6.0	3.1	2.4	114	23	0.4	0.1	1.1	132	108	15	218	7.2	20
July 16-31.....	373000	6.7	0.06	34	5.3	2.9	2.4	120	26	0.0	0.0	1.0	121	108	13	202	7.7	15
Aug. 1-16.....	397000	7.2	0.04	41	4.0	2.1	1.5	124	26	2.1	0.2	0.5	146	119	17	315	7.8	15
Aug. 17.....	564000	7.0	0.14	28	5.5	2.1	1.7	99	20	0.0	0.1	1.5	115	92	11	182	7.5	35
Aug. 17-31.....	553000	7.0	0.13	36	1.7	1.5	1.3	74	14	1.4	0.2	0.4	99	97	36	194	7.5	15
Sept. 1-5.....	371000	7.2	0.08	42	2.7	1.8	1.4	104	30	1.4	0.2	0.4	136	108	23	207	7.6	15
Sept. 6-17.....	318000	7.6	0.04	40	2.4	2.8	1.4	117	21	0.0	0.1	0.7	135	110	14	206	7.7	15
Sept. 18-27.....	237000	7.9	0.04	36	4.4	2.8	1.3	114	24	0.0	0.1	0.6	135	108	15	204	7.7	20
Sept. 28-30.....	257000	8.2	0.04	39	4.0	3.1	1.6	120	23	0.4	0.1	0.7	140	113	13	207	7.7	20

Specific conductance (micromhos at 25°C), water year October 1966 to September 1967

Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.	Day	May	June	July	Aug.	Sept.
1..	--	155	229	218	197	12..	--	--	211	226	214	23..	173	181	286	161	217
2..	--	157	221	218	199	13..	--	164	220	222	215	24..	147	186	228	162	210
3..	--	164	210	222	193	14..	--	156	212	207	212	25..	138	188	222	166	209
4..	--	154	212	215	196	15..	--	148	237	194	213	26..	143	188	218	174	207
5..	--	157	217	--	199	16..	--	153	185	200	214	27..	143	197	214	189	207
6..	--	165	208	227	212	17..	--	165	207	188	214	28..	142	211	214	191	223
7..	--	171	213	225	209	18..	--	161	210	182	229	29..	163	213	204	197	226
8..	--	171	213	225	209	19..	--	175	227	193	223	30..	158	211	208	195	215
9..	--	181	218	229	212	20..	--	176	227	184	223	31..	155	--	204	193	--
10..	--	169	232	227	216	21..	--	175	238	180	219						
11..	--	168	229	228	215	22..	--	184									
Aver-																	
age														174	218	200	212

Temperature (°F) of water, water year October 1966 to September 1967

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.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June.....	50	50	50	51	50	51	51	51	52	52	--	50	55	56	56	55	57	58	60	60	62	61	64	62	61	60	61	60	61	60	57	57	55
July.....	61	58	58	58	57	59	57	60	60	62	64	63	64	63	63	62	63	62	63	60	58	60	58	58	57	57	56	54	57	57	57	59	54
August.....	56	50	58	61	--	--	58	60	62	60	59	53	53	55	52	51	51	50	52	52	53	54	55	56	55	56	52	52	54	54	53	54	55
September.....	52	50	43	41	45	42	42	45	45	45	46	46	47	45	47	46	47	46	45	47	47	45	45	46	44	43	43	42	42	42	43	--	

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Noncalcium			
SOUTHEASTERN ALASKA																		
15-0080. SALMON RIVER NEAR HYDER (lat 56°01'34", long 130°03'55")																		
Apr. 13, 1967.....	A33.7	2.6	0.03	30	1.2	0.8	1.0	60	26	0.0	0.6	0.0	92	80	31	171	7.8	
15-0105. HALIBUT BAY TRIBUTARY NEAR HYDER (lat 55°15'00", long 130°06'00")																		
Apr. 13, 1967.....	A18.8															23	6.9	
15-0115. RED RIVER NEAR METLAKATLA (lat 55°25'00", long 130°52'05")																		
Apr. 14, 1967.....	121															23	6.9	
15-0119. CABIN CREEK NEAR KETCHIKAN (lat 55°19'19", long 130°47'00")																		
Apr. 15, 1967.....	23.0															29	7.0	
15-0120. WINSTANLEY CREEK NEAR KETCHIKAN (lat 55°25'00", long 130°52'05")																		
Apr. 15, 1967.....	A29.5															17	6.8	
15-0201. TYEE CREEK AT MOUTH, NEAR WRANGELL (lat 56°12'54", long 131°30'25")																		
Apr. 10, 1967.....	13.8															12	6.7	
15-0220. HARDING RIVER NEAR WRANGELL (lat 56°12'50", long 131°38'15")																		
Apr. 10, 1967.....	98	6.2	3.8	0.4	3.2	15	1.0	3.5	0.1	25	11	0	34	6.7				
15-0260. CASCADE CREEK NEAR PETERSBURG (lat 57°00'21", long 132°46'45")																		
Apr. 9, 1967.....	A35.3															25	7.2	
15-0400. DOROTHY CREEK NEAR JUNEAU (lat 58°13'40", long 134°02'25")																		
Mar. 31, 1967.....	A13	1.3	1.8	0.6	1.4	6	2.0	2.1	0.3	12	7	2	19	6.9				
15-0479. RHINE CREEK NEAR JUNEAU (lat 58°12'27", long 134°09'54")																		
Mar. 29, 1967.....	20	2.7	0.04	9.8	1.6	26	15	41	104	31	18	182	7.1					
15-0479.2. DUPONT CREEK NEAR DOUGLAS (lat 58°13'44", long 134°15'49")																		
Mar. 30, 1967.....	0.1	3.7	0.03	11	0.5	3.2	7.2	2.4	0.1	44	30	4	77	7.4				

A Discharge at time of sampling.

15-0480.1. SHEEP CREEK AT MOUTH, NEAR DOUGLAS (lat 58°15'40", long 134°19'23")

Nov. 22, 1966.....	20.9	3.1	0.04	15	1.0	1.2	37	12	1.6	0.1	52	42	12	92	7.7
15-0480.4. CROSS BAY CREEK NEAR JUNEAU (lat 58°16'32", long 134°21'17")															
Nov. 22, 1966.....	3.4	2.7	0.04	17	0.7	1.6	43	12	1.6	0.2	57	46	11	100	7.7
15-0480.5. SNOWSLIDE CREEK NEAR JUNEAU (lat 58°16'57", long 134°22'16")															
Nov. 22, 1966.....	1.4	3.7	0.06	22	0.7	1.4	52	15	2.0	0.2	71	58	15	128	7.7
15-0510. SALMON CREEK AT FLUME NEAR JUNEAU (lat 58°19'55", long 134°28'03")															
Nov. 22, 1966.....		2.0	0.04	7.2	1.2	0.9	20	6.7	1.4	0.1	30	23	7	48	7.4
15-0519.5. UNNAMED CREEK AT 5.2 MILE, NEAR JUNEAU (lat 58°20'43", long 134°29'48")															
Mar. 10, 1967.....	1.1	5.9	0.13	9.4	0.8	6.0	29	11	4.0	0.2	52	27	3	75	7.3
15-0520.2. LEMON CREEK AT BRIDGE, NEAR JUNEAU (lat 58°21'28", long 134°29'56")															
Nov. 22, 1966.....	54.6	6.3	0.03	10	1.0	3.0	27	9.6	3.2	0.1	47	30	8	75	7.3
15-0521.9. SWITZER CREEK NEAR JUNEAU (lat 58°21'45", long 134°30'10")															
Nov. 22, 1966.....	1.1	4.3	0.02	29	2.8	5.1	89	12	7.4		105	85	12	190	8.0
15-0524.8. JORDAN CREEK NEAR AUKE BAY (lat 58°21'47", long 134°34'42")															
Nov. 28, 1966.....	4.0	4.2	0.05	14	1.3	8.5	40	8.2	12	0.0	68	40	7	120	7.7
15-0524.9. DUCK CREEK NEAR AUKE BAY (lat 58°21'47", long 134°34'42")															
Dec. 2, 1966.....	0.5	2.2	0.01	26	2.2	4.1	83	9.6	5.0	0.1	91	75	7	162	8.1
15-0525. MENDENHALL RIVER NEAR AUKE BAY (lat 58°25'05", long 134°32'40")															
Mar. 15, 1967.....	33	2.5		8.8	1.1	1.4	28	3.8	1.8	0.1	34	27	4	65	7.4
15-0525.1. MENDENHALL RIVER TRIBUTARY NEAR AUKE BAY (lat 58°25'44", long 134°33'28")															
Nov. 28, 1966.....	2.0	2.7	0.08	2.6	0.2	3.4	9	4.3	2.5	0.2	20	8	1	25	7.1
15-0525.21. MENDENHALL RIVER TRIBUTARY NEAR AUKE BAY (lat 58°26'03", long 134°34'00")															
Nov. 28, 1966.....	0.1	4.5	0.02	40	3.8	2.1	A112	10	3.2	0.5	125	115	15	235	8.5
15-0525.31. MENDENHALL RIVER TRIBUTARY NEAR AUKE BAY (lat 58°25'54", long 134°34'01")															
Nov. 28, 1966.....	0.5	6.8	0.01	25	2.2	3.2	67	13	4.2	0.7	88	72	17	160	8.1
15-0525.41. MENDENHALL RIVER TRIBUTARY NEAR AUKE BAY (lat 58°25'41", long 134°34'35")															
Nov. 28, 1966.....	0.4	3.0	0.06	22	1.5	1.4	56	12	5.3	0.1	73	62	16	135	7.8

A Includes 5 ppm of carbonate (CO₂).

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
SOUTHEASTERN ALASKA--Continued																		
15-0525.5. STEEP CREEK NEAR AUKE BAY (lat 58°24'53", long 134°32'37")																		
Dec. 2, 1966.....	2.6	2.2	0.04	12	0.4	1.8		35	3.8	2.1		0.0	40	32	3	70	7.5	
15-0525.51. MENDENHALL RIVER TRIBUTARY NEAR AUKE BAY (lat 58°25'21", long 134°35'05")																		
Mar. 10, 1967.....	0.6	3.2		23	1.0	1.8		70	4.8	2.1		0.1	70	61	4	135	8.0	
15-0525.8. MENDENHALL RIVER ABOVE MONTANA CREEK NEAR AUKE BAY (lat 58°23'32", long 134°35'00")																		
Mar. 15, 1967.....	42	3.8		11	1.6	3.9		38	3.8	6.0		0.1	49	35	4	93	7.3	
15-0525.9. MENDENHALL RIVER AT MONTANA CREEK NEAR AUKE BAY (lat 58°22'53", long 134°35'45")																		
Mar. 15, 1967.....	48	4.3		14	2.4	15		50	4.8	22		0.2	88	46	5	165	7.4	
15-0528.1. MCGINNIS CREEK NEAR AUKE BAY (lat 58°26'28", long 134°38'39")																		
Nov. 17, 1966.....	12.9	1.5	0.04	9.8	0.7	1.6		20	12	21		0.0	37	28	12	63	7.3	
15-0540.1. BAY CREEK AT AUKE BAY (lat 58°23'16", long 134°38'50")																		
Mar. 10, 1967.....	0.8	3.5	0.16	4.0	0.5	3.7		11	8.2	2.0		0.1	27	12	3	35	7.0	
15-0540.2. WAYDELICH CREEK NEAR AUKE BAY (lat 58°23'09", long 134°39'16")																		
Nov. 17, 1966.....	0.4	2.8	0.10	3.2	2.4	36		7	9.6	56		0.6	114	18	12	195	6.9	
15-0540.3. AUKE NU CREEK AT AUKE BAY (lat 58°23'00", long 134°39'57")																		
Nov. 17, 1966.....	0.6	2.8	0.10	3.2	2.4	36		7	8.6	21			56	9	2	95	6.6	
15-0540.5. LENA CREEK NEAR AUKE BAY (lat 58°23'45", long 134°44'48")																		
Nov. 17, 1966.....	0.3	0.2	0.11	5.4	0.9	3.9		15	6.2	4.6		0.0	29	17	5	50	7.3	
15-0540.7. INSPIRATION CREEK NEAR AUKE BAY (lat 58°25'13", long 135°45'20")																		
Mar. 10, 1967.....	0.8	3.3		2.0	0.4	1.4		7	0.5	2.1		0.2	13	7	1	22	6.6	

15-0540.8. SHRINE CREEK NEAR AUKE BAY (lat 58°28'16", long 134°46'58")																	
Nov. 17, 1966.....	0.6	2.7	0.24	2.0	0.5	2.8		11	30	1.5		0.7	19	8	0	25	6.8
15-0541. PETERSON CREEK NEAR AUKE BAY (lat 58°29'41", long 134°46'46")																	
Nov. 16, 1966.....	5.6	1.5	0.03	2.4	0.5	5.3		10	2.5	6.0	0.1	0.1	23	8	0	38	7.8
15-0541.5. EAGLE RIVER NEAR AUKE BAY (lat 58°31'36", long 134°48'10")																	
Nov. 16, 1966.....	70.4	3.4	0.02	6.8	1.7	3.9		23	7.2	5.0	0.1	0.1	40	24	5	60	7.3
15-0541.9. UNNAMED CREEK AT MILE 27, NEAR AUKE BAY (lat 58°31'12", long 134°47'50")																	
Nov. 17, 1966.....	0.8	2.2	0.45	7.8	1.5	31		28	3.8	4.6		0.6	107	26	2	182	7.9
15-0542. HERBERT RIVER NEAR AUKE BAY (lat 58°31'26", long 134°47'40")																	
Nov. 16, 1966.....	80	2.5	0.15	7.8	0.6	3.4		18	7.2	5.0	0.1	0.1	36	22	7	60	7.4
15-0543.9. UNNAMED CREEK AT MILE 29.5, NEAR AUKE BAY (lat 58°32'10", long 134°49'53")																	
Nov. 16, 1966.....	0.1	3.5	0.01	2.4	2.2	2.5		11	5.8	4.6	0.1	0.1	26	15	6	40	7.2
15-0544. UNNAMED CREEK AT MILE 30.2, NEAR AUKE BAY (lat 58°32'26", long 134°50'48")																	
Nov. 16, 1966.....	1.3	2.8	0.01	14	0.7	1.6		35	8.6	2.5	0.1	0.1	47	38	9	85	7.7
15-0544.1. DEAD END CREEK AT MILE 33, NEAR AUKE BAY (lat 58°34'30", long 134°53'19")																	
Nov. 16, 1966.....	1.5	3.8	0.01	18	2.7	0.9		40	19	4.2	0.2	0.2	69	56	23	110	8.1
15-0563.3. SAWMILL CREEK NEAR HAINES (lat 59°14', long 135°29')																	
Apr. 13, 1967.....	12	6.0	0.47	18	2.4	4.6		40	19	8.0	0.2	0.2	79	55	22	140	6.9
15-0563.9. JOHNSON CREEK NEAR HAINES (lat 59°15'39", long 135°26'26")																	
Apr. 21, 1967.....		5.5	0.02	24	2.4	2.3		65	14	5.0	0.1	1.1	86	70	17	160	7.6
15-0565. HASKA CREEK NEAR HAINES (lat 59°12'56", long 135°32'00")																	
Apr. 21, 1967.....	3.1	7.6	0.03	22	3.6	6.2		63	28	2.0	0.1	0.2	101	70	18	170	7.3
15-0577.1. SANDY COVE CREEK NEAR GUSTAVUS (lat 58°42'25", long 135°58'35")																	
Sept. 16, 1967.....	0.1	4.8		36	2.9	2.8		113	6.0	6.4	0.1	0.1	115	102	9	202	8.0
15-0600. PERSEVERANCE CREEK NEAR KETCHIKAN (lat 55°24'40", long 131°40'05")																	
Apr. 17, 1967.....	8.8															13	5.8
15-0640. KETCHIKAN CREEK AT KETCHIKAN (lat 55°20'40", long 131°38'05")																	
Apr. 17, 1967.....	A104															15	6.4

A Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃ Calcium-magnesium salt	Specific conductance (micro-mhos at 25°C)	pH	Color
SOUTHEASTERN ALASKA--Continued																	
15-0722. SEA LEVEL CREEK NEAR KETCHIKAN (lat 55°22'05", long 131°11'03")																	
Apr. 13, 1967.....	82.8															21	6.8
15-0760. MANZANITA CREEK NEAR KETCHIKAN (lat 55°35'45", long 130°58'49")																	
Apr. 15, 1967.....	A135															15	6.8
15-0798. KIU CREEK NEAR BELL ISLAND (lat 55°50'30", long 131°25'20")																	
Apr. 16, 1967.....	8.1															15	6.7
15-0852. DOG SALMON CREEK NEAR HOLLIS (lat 55°20'42", long 132°30'24")																	
Apr. 12, 1967.....	57.2															27	6.9
15-0865. NECK CREEK NEAR POINT BAKER (lat 56°05'55", long 133°08'20")																	
Apr. 18, 1967.....	A66	2.5		13	1.2	7.1		38	5.0	11		0.1	59	36	5	106	7.6
15-0940. DEER LAKE OUTLET NEAR PORT ALEXANDER (lat 56°31'10", long 134°40'10")																	
Aug. 6, 1967.....	A111			1.6	0.2	3.0		5	1.5	4		0.1	14	5	1	19	6.6
15-0980. BARANOF RIVER AT BARANOF (lat 57°05'15", long 134°50'30")																	
Apr. 20, 1967.....	59	3.0		1.6	0.2	3.0		5	3.0	3.2		0.1	16	5	1	23	6.7
15-1000. TAKATZ CREEK NEAR BARANOF (lat 57°08'35", long 134°51'50")																	
Aug. 4, 1967.....	A375	1.9		1.6	0.7	2.5		4	1.5	5.7		0.1	14	7	4	21	6.6
15-1020. HASSELBOEG CREEK NEAR ANGOON (lat 57°39'40", long 134°14'55")																	
May 26, 1967.....	A525	2.9		4.6	1.9	2.1		16	3.0	3.5		0.3	26	20	7	40	7.3
15-1069.2. KADASHAN RIVER ABOVE HOOK CREEK NEAR TENAKEE (lat 57°40'07", long 135°11'37")																	
Apr. 6, 1967.....		7.1		8.6	1.5	5.5		26	6.2	8.5			51	28	7	85	7.4
15-1069.4. HOOK CREEK ABOVE TRIBUTARY, NEAR TENAKEE (lat 57°40'32", long 135°10'05")																	
Apr. 6, 1967.....				12	1.0	2.8		37	3.4	4.3			49	34	4	78	7.6

15-1070. KADASHAN RIVER NEAR TENAKEE (lat 57°41'43", long 135°12'59")

Apr. 21, 1967.....	A143	6.1	8.0	0.7	3.7	24	2.5	5.7	0.1	39	22	2	61	7.4	
15-1080. PAVLOF RIVER NEAR TENAKEE (lat 57°50'30", long 135°02'10")															
Apr. 21, 1967.....	A108	4.5	9.8	1.2	4.4	30	3.0	7.1	0.2	45	30	5	78	7.4	
Aug. 3.....	A63	6.1	17	1.2	2.5	50	2.5	6.4	.2	61	47	6	105	7.5	
15-1085.5. MIDDLE POINT CREEK NEAR JUNEAU (lat 58°14'59", long 134°37'30")															
Mar. 29, 1967.....	0.9	0.04	9.6	1.5	1.6	28	7.7	2.6	0.1	42	30	7	64	7.5	
15-1086. HILDA CREEK NEAR DOUGLAS (lat 58°13'36", long 134°29'51")															
Apr. 22, 1967.....	A10.3	4.4	0.07	4.6	0.8	2.5	12	6.2	3.0	0.2	28	15	5	41	7.1
Aug. 2.....	A67.0	3.5	.12	3.2	.7	1.8	10	6.2	1.6	.1	22	11	3	30	6.7
15-1087. NEVADA CREEK NEAR DOUGLAS (lat 58°13'49", long 134°18'15")															
Mar. 30, 1967.....	1.8	8.6	0.06	49	3.2	4.6	46	101	9.2	0.0	199	148	110	325	7.9
15-1087.1. BULLION CREEK NEAR DOUGLAS (lat 58°14'49", long 134°20'07")															
Mar. 30, 1967.....	1.2	7.6	0.03	16	0.5	3.9	33	13	6.0	0.1	63	41	41	99	7.8
15-1087.2. READY BULLION CREEK NEAR DOUGLAS (lat 58°15'08", long 134°20'39")															
Mar. 30, 1967.....	1.7	4.0	0.01	18	1.1	3.4	39	16	5.3	0.1	67	49	17	116	7.4
15-1087.9. BEAR CREEK AT DOUGLAS (lat 58°16'45", long 134°23'37")															
Dec. 9, 1966.....	3.0	4.2	0.04	12	0.7	5.3	32	9.6	8.2	0.1	56	36	10	97	7.4
15-1088. LAWSON CREEK AT DOUGLAS (lat 58°17'07", long 134°24'32")															
Dec. 9, 1966.....	2.1	5.0	0.03	7.0	0.6	2.5	20	4.8	3.9	0.0	34	20	4	50	7.0
15-1089. NIELSON CREEK NEAR JUNEAU (lat 58°19'53", long 134°28'51")															
Nov. 23, 1966.....	2.0	2.9	0.13	4.8	1.0	1.8	15	4.8	2.0	0.1	25	16	4	37	7.2
15-1090. FISH CREEK NEAR AUKE BAY (lat 58°19'50", long 134°33'30")															
Dec. 8, 1966.....	A109	2.4	0.03	5.2	3.4	1.6	16	11	4.2	0.1	36	27	14	62	7.4
15-1090.1. COVE CREEK NEAR AUKE BAY (lat 58°19'42", long 134°36'56")															
Mar. 10, 1967.....	0.2	3.9	0.05	9.8	1.1	3.2	29	9.1	2.0	0.0	44	29	5	70	7.6
15-1091.2. ELEVEN MILE CREEK NEAR AUKE BAY (lat 58°19'11", long 134°38'35")															
Mar. 10, 1967.....	0.4	4.7	0.21	5.2	1.9	1.6	16	5.8	2.4	0.1	30	21	8	46	7.3

A Discharge at time of sampling.

A Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
ALASKA WEST OF LONGITUDE 141°																		
15-2000. GAKONA RIVER AT GAKONA (lat 62°18'05", long 145°18'20")																		
Aug. 22, 1967.....	A2730	5.6	2.2	28	4.0	2.7	1.8	87	20	1.8	0.0	0.5	110	87	16	182	7.9	5
Sept. 17.....	A832	8.3	.10	31	5.4	5.7	1.0	110	17	5.0	.1	.8	129	100	10	211	7.8	10
15-2020. TAZLINA RIVER NEAR GLENDALE (lat 62°03'20", long 145°25'35")																		
Aug. 24, 1967.....	A14600	2.9	0.85	21	2.1	2.6	0.2	59	14	0.0	0.0	1.0	74	61	13	121	7.6	5
Sept. 17.....	6200	3.0	.12	18	2.9	2.7	.3	56	11	4.3	.0	.4	71	58	12	116	7.6	10
15-2080. TONSINA RIVER AT TONSINA (lat 61°39'50", long 145°10'50")																		
Oct. 9-21, 1966.....	500	5.4	0.04	9.4	1.5	2.4	0.5	40	7.0	0.4	0.0	2.1	49	24	0	83	7.5	5
Oct. 23-31.....	400	5.3	.00	13	1.8	2.5	.3	44	8.0	1.1	.1	.9	55	41	5	93	7.6	8
Nov. 1-12.....	260	5.5	.04	13	1.8	2.4	.7	45	8.0	1.4	.0	.7	56	41	4	93	7.7	5
Aug. 23, 1967.....	A2290	3.8	.57	9.2	1.2	1.8	.2	29	6.5	.7	.0	1.1	39	28	4	66	7.3	5
Sept. 18.....	A947	4.2	1.1	10	1.4	1.4	.3	34	6.0	.7	.0	.7	43	32	4	69	7.0	20
15-2081. SQUIRREL CREEK AT TONSINA (lat 61°40'05", long 145°10'30")																		
July 23, 1967.....	18.0	13	0.11	27	5.4	5.5	0.1	114	6.0	3.2	0.0	0.3	117	90	0	192	7.0	10
Sept. 18.....	20.6	13	.06	27	6.1	5.0	.7	114	5.0	5.0	.1	.8	69	93	0	187	8.0	10
15-2120. COPPER RIVER NEAR CHITNA (lat 61°28'00", long 144°27'20")																		
Aug. 2, 1967.....	125000	6.4	0.94	25	2.9	4.6	0.8	71	17	3.5	0.1	1.1	97	75	17	150	7.8	5
15-2160. POWER CREEK NEAR CORDOVA (lat 60°35'15", long 145°37'05")																		
Sept. 2, 1967.....	A507	2.9	0.45	3.6	1.2	1.0	0.0	14	0.0	0.4	0.1	0.8	17	13	2	34	6.6	10
15-2383. RESURRECTION RIVER NEAR SEWARD (lat 60°08'30", long 149°25'00")																		
Aug. 3, 1967.....	2650	2.2	0.53	14	1.0	1.5	0.3	38	8.0	0.4	0.1	1.4	49	38	7	83	7.2	0
Sept. 9.....	2800	4.0	.26	17	1.3	1.5	.7	49	9.0	2.5	.1	.7	52	50	10	101	7.2	0
15-2388. SELDOVIA LAGOON TRIBUTARY NEAR SELDOVIA (lat 59°26'30", long 151°41'05")																		
Mar. 28, 1967.....	0.72	11	0.21	5.7	2.3	3.8	0.4	20	5.0	5.3	0.0	6.0	50	23	7	71	6.7	5
July 26.....	.38	11	.00	5.6	1.9	3.8	.0	24	4.0	3.9	.3	4.9	47	22	2	64	6.5	10

15-2388.5. FISH CREEK NEAR SELDOVIA (lat 59°26'10", long 151°42'05")

Mar. 28, 1967.....	2.68	9.8	0.13	5.8	1.5	4.5	0.4	21	6.0	6.0	0.0	2.5	48	23	6	73	7.0	5
July 26.....	1.49	8.9	.00	8.0	1.4	4.2	.0	22	5.0	3.9	.3	.4	46	26	8	68	6.8	5

15-2399. ANCHOR RIVER NEAR ANCHOR POINT (lat 59°44'50", long 151°45'10")

Oct. 1-12, 1966.....	309	25	0.05	5.5	2.1	3.6	0.9	25	1.0	2.5	0.0	2.1	56	22	1	56	7.4	20
Oct. 16-29.....	214	25	.00	4.8	2.0	3.3	.8	22	1.0	2.8	.0	2.5	53	20	2	51	7.2	15
Nov. 2-8.....	140	22	.03	3.9	2.1	4.3	.1	24	1.5	3.2	.0	.7	50	18	0	57	6.8	5

15-2400. ANCHOR RIVER AT ANCHOR POINT (lat 59°46'10", long 151°50'00")

Mar. 27, 1967.....	54.5	36	1.0	8.8	6.1	6.0	2.4	66	5.0	3.2	0.3	1.5	102	5	0	124	7.3	10
June 1.....	280.3	27	.32	3.0	4.9	4.8	1.3	73	1.5	2.1	.3	.6	68	25	0	107	6.6	25
July 23.....	180.0	52	.15	1.5	4.9	5.6	1.7	79	1.5	2.1	.3	.6	97	52	0	105	6.6	25
Sept. 3.....	184	25	.78	6.4	4.4	4.9	1.0	44	.0	4.6	.0	.8	70	34	0	82	7.3	10

15-2416. NINILCHIK RIVER AT NINILCHIK (lat 60°02'56", long 151°39'48")

Mar. 29, 1967.....	51.4	36	0.80	10	4.6	9.7	2.7	80	0.0	2.1	0.1	0.6	106	44	0	131	6.8	10
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15-2420. KASLOP RIVER NEAR KASLOP (lat 60°19'08", long 151°15'33")

Sept. 3, 1967.....	10300	4.7	0.49	4.0	1.9	1.3	1.0	16	5.0	2.1	0.1	1.3	30	18	5	41	6.9	10
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15-2580. KENAI RIVER AT COOPER LANDING (lat 60°29'35", long 149°48'25")

Mar. 30, 1967.....	4354	3.9	0.30	13	1.0	0.9	0.7	33	11	0.0	0.6	0.0	47	33	6	84	7.1	5
June 1.....	4560	3.5	.04	11	.9	.8	.3	33	19.0	.0	.0	.0	44	34	8	78	6.7	10
Sept. 19.....	10800	4.8	.10	11	2.3	.9	.7	30	10	1.7	.1	.9	48	37	12	71	7.0	0

15-2663. KENAI RIVER AT SOLDOTNA (lat 60°28'50", long 151°05'15")

Mar. 29, 1967.....	A1080	7.0	0.30	11	2.3	1.7	1.1	38	6.0	2.5	0.4	0.0	51	37	6	40	7.2	5
June 4.....	A7350	3.9	--	7.7	.9	.8	.6	26	1.5	.4	.0	1.3	31	22	1	63	6.7	10
July 2.....	16000	3.7	.13	11	1.9	1.3	.6	28	7.0	.4	.2	.5	40	51	8	65	6.7	5
Sept. 2.....	A21300	3.3	.38	9.6	1.4	1.2	.3	30	4.0	3.5	.0	.5	39	50	3	63	7.0	10

15-2725.5. GLACIER CREEK NEAR GIRWOOD (lat 60°56'29", long 149°09'44")

May 4, 1967.....	A228	4.4	0.21	16	1.9	2.2	0.3	46	10	0.7	0.4	0.0	62	48	10	103	7.5	5
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A Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
ALASKA WEST OF LONGITUDE 141°--Continued																		
15-2731. LITTLE RABBIT CREEK NEAR ANCHORAGE (lat 61°04'40", long 149°48'40")																		
May 15, 1967.....	210	8.3	0.79	14	2.5	1.7	0.5	40	12	0.0	0.5	4.6	65	45	12	95	7.1	10
15-2739. SOUTH FORK CAMPBELL CREEK AT CANYON MOUTH, NEAR ANCHORAGE (lat 60°08'55", long 149°43'10")																		
May 1, 1967.....	11.5	8.3	0.04	14	3.6	1.6	0.4	48	12	1.4	0.1	0.0	66	50	11	106	7.5	5
May 5.....	79.9	4.5	.11	7.1	1.8	.9	.4	20	7.0	.0	.0	.4	32	25	9	58	7.1	5
Aug. 15.....	108	5.1	.08	9.4	1.2	1.0	.0	23	10	1.4	.0	.5	38	28	9	66	7.2	5
Sept. 6.....	179	3.0	.06	11	1.3	.4	.3	19	16	1.4	.1	.1	45	28	12	65	7.1	10
15-2740. SOUTH FORK CAMPBELL CREEK NEAR ANCHORAGE (lat 61°10'00", long 149°46'30")																		
May 1, 1967.....	8.21	7.7	0.00	14	2.4	1.4	0.4	45	11	0.0	0.1	1.2	60	45	8	100	7.5	10
May 15.....	38	5.9	.26	10	1.8	1.2	.5	30	8.0	.0	.6	1.8	45	32	7	76	7.4	10
July 10.....	A73.4	4.8	.00	8.6	1.2	1.7	.0	11	14	.0	.0	1.0	36	26	17	62	6.8	15
Aug. 15.....	91.5	4.5	.04	10	1.2	1.0	.0	24	12	.8	.0	.6	42	30	10	64	7.0	0
15-2743. NORTH FORK CAMPBELL CREEK NEAR ANCHORAGE (lat 61°10'10", long 149°45'40")																		
May 1, 1967.....	7.56	8.9	0.09	17	4.2	1.8	0.7	60	15	0.0	0.1	1.3	79	60	11	129	7.3	15
15-2746. CAMPBELL CREEK NEAR SPENARD (lat 61°08'20", long 149°55'20")																		
May 1, 1967.....	48.7	7.5	0.08	15	2.8	1.9	0.8	50	11	1.1	0.1	1.2	66	49	8	109	7.1	15
May 15.....	95.9	7.1	.70	15	3.0	1.9	1.6	50	10	.0	.1	1.6	63	50	9	105	7.6	10
June 11.....	123.0	5.6	.05	12	2.0	1.2	.2	32	10	.0	.0	1.0	49	38	12	88	6.9	15
Aug. 15.....	A165	5.7	.06	12	1.9	1.3	.0	33	13	.0	.0	.9	51	38	11	82	7.0	5
Sept. 7.....	A232	8.0	.34	12	2.9	1.9	.6	34	13	2.1	.2	.4	43	40	12	89	7.1	100
15-2748. CHESTER CREEK AT MULDOON ROAD, NEAR ANCHORAGE (lat 61°12'22", long 149°44'02")																		
May 31, 1967.....	6.32	9.3	0.00	18	3.6	1.8	0.7	64	12	0.8	0.5	0.8	78	60	8	130	7.1	15
Sept. 6.....	26.5	10	.50	14	2.9	1.4	.4	35	18	.7	.3	.3	66	50	21	79	6.8	120
15-2749. RUSSIAN JACK SPRINGS AT ANCHORAGE (lat 61°12'25", long 149°46'55")																		
May 3, 1967.....	4.51	11	0.08	31	6.2	4.1	0.4	112	14	3.2	0.1	5.1	130	103	11	217	7.6	5
June 6.....	3.93	11	.00	28	6.8	4.3	.7	114	16	3.5	.0	5.0	131	103	15	213	7.8	3
Sept. 20.....	-- 12	-- 12	.19	45	1.8	3.8	.7	133	14	3.5	.1	7.4	153	120	11	248	7.1	5

15-2750. CHESTER CREEK AT ANCHORAGE (lat 61°12'00", long 149°50'10")

May 3, 1967.....	17.6	9.8	0.22	23	5.5	3.1	0.8	82	15	1.8	0.1	1.9	101	80	13	173	7.4	15
May 31.....	14.5	9.3	.05	24	5.6	3.1	1.4	86	21	1.1	0.1	6.2	114	83	12	183	8.0	10
Sept. 7.....	A50.2	10	.31	27	.4	2.0	1.2	60	21	.4	.2	1.1	94	69	20	152	7.5	40

15-2760. SHIP CREEK NEAR ANCHORAGE (lat 61°13'25", long 149°38'00")

May 3, 1967.....	A38.1	7.7	0.09	19	3.2	2.0	0.6	60	16	0.0	0.0	0.8	79	60	11	133	7.4	10
May 31.....	332	5.1	.02	16	1.9	1.6	1.0	42	13	.7	.1	.6	61	48	14	100	7.4	5
July 1.....	A389	4.7	.83	16	2.4	2.1	.4	46	16	1.1	.0	1.0	95	50	12	114	7.5	5
Aug. 16.....	A387	5.1	.00	17	2.5	1.9	.0	49	19	.0	.0	1.1	71	58	18	113	7.3	0

15-2762. SHIP CREEK AT GLENN HIGHWAY, NEAR ANCHORAGE (lat 61°14'20", long 149°41'45")

May 16, 1967.....	172	6.2	0.12	16	2.7	1.8	0.6	46	16	0.0	0.1	1.4	68	5	13	105	7.6	10
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15-2763. SHIP CREEK BELOW POWER PLANT DIVERSION, AT FORT RICHARDSON (lat 61°14'35", long 149°42'30")

May 16, 1967.....	133	6.2	0.12	16	2.5	1.7	0.2	46	12	0.0	0.5	3.0	65	50	12	104	7.3	15
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15-2765. SHIP CREEK AT ELMENDORF AIR FORCE BASE (lat 61°14'20", long 149°47'25")

May 3, 1967.....	A26.7	7.3	0.17	20	2.7	4.3	0.7	58	14	5.0	0.1	0.8	84	61	13	145	7.4	10
June 1.....	285	5.4	.02	15	2.3	1.7	1.3	44	14	.0	.1	1.4	63	47	11	104	7.3	10
July 5.....	297	4.9	.92	17	2.5	2.1	.6	48	19	.4	.0	.7	72	52	13	118	7.2	10
Aug. 16.....	A348	5.3	.00	17	2.5	1.9	.0	49	19	.0	.0	.5	70	58	18	118	7.2	0

15-2767. SHIP CREEK AT RAILROAD BRIDGE AT MOUTH, AT ANCHORAGE (lat 61°13'25", long 149°53'25")

May 16, 1967.....	191	7.4	0.25	23	5.0	12	1.0	66	24	18	0.2	1.2	124	78	24	203	7.2	10
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15-2771. EAGLE RIVER AT EAGLE RIVER (lat 61°18'30", long 149°33'35")

Mar. 20, 1967.....	A53.5	7.2	0.32	45	5.2	3.1	0.8	114	31	17	0.0	1.1	167	134	41	286	7.5	5
May 4.....	A155	4.4	1.3	32	3.4	3.2	.5	90	26	1.4	.3	1.0	118	54	0	197	7.6	5
May 12.....	A193	4.5	1.40	31	5.2	3.8	.3	100	25	1.1	.4	1.1	122	99	17	206	7.7	5
June 1.....	A42	3.2	2.2	19	2.8	2.4	.6	68	16	.4	.0	1.3	80	63	7	151	7.7	5
Aug. 26.....	A456	3.2	2.3	19	2.0	1.4	.4	58	14	.7	.0	1.0	77	54	11	144	7.4	5
Sept. 19.....	A4090	7.3	1.7	17	3.5	1.6	1.4	59	14	.7	.0	1.0	77	58	10	124	7.2	10

A Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-magnesium			
ALASKA WEST OF LONGITUDE 141°--Continued																		
15-2810. KNIK RIVER NEAR PALMER (lat 61°30'15", long 149°01'50")																		
May 29, 1967.....	A6900	2.5	1.63	24	3.1	1.7	1.2	61	18	0.4	0.1	3.2	87	73	21	133	7.8	5
15-2820. CARIBOU CREEK NEAR SUTTON (lat 61°48'10", long 147°41'00")																		
July 25, 1967.....	278	8.4	0.20	36	5.1	17	0.0	104	54	3.5	0.1	0.6	176	111	26	299	7.7	20
Sept. 23.....	A329	8.4	.45	43	6.6	19	.3	120	66	4.3	.1	.5	208	150	37	342	8.1	10
15-2840. MATANUSKA RIVER AT PALMER (lat 61°36'35", long 149°04'15")																		
Oct. 3-17, 1966.....	1888	5.8	0.00	36	3.4	5.9	0.6	83	40	4.3	0.0	0.3	137	104	36	236	8.0	5
May 29, 1967.....	5380	5.0	3.4	26	2.6	3.4	1.4	68	23	2.8	.0	.2	111	76	6	170	7.4	5
June 30.....	A8180	5.1	2.4	24	2.6	3.3	1.3	63	23	2.1	.0	.2	95	70	22	154	7.7	5
Aug. 24.....	A10100	4.9	.26	24	2.8	4.1	1.2	66	25	1.8	.1	.8	97	72	18	160	7.8	5
15-2912. MACLAREN RIVER NEAR PAXSON (lat 63°07'10", long 146°31'45")																		
July 22, 1967.....	4030	4.2	5.39	4.0	2.3	1.7	2.2	41	17	0.4	0.0	1.5	69	44	10	101	7.7	10
Aug. 17.....	A5320	4.8	.12	11	2.2	1.1	1.7	34	13	3.7	.1	.9	53	36	8	84	7.6	5
Sept. 20.....	936	5.3	1.4	19	3.4	2.1	1.4	54	20	3.2	.0	.7	82	62	18	141	7.8	10
15-2915. SUSITNA RIVER NEAR CANTWELL (lat 62°42'00", long 147°32'50")																		
Aug. 23, 1967.....	A16100	6.1	0.10	20	2.6	3.2	2.8	63	16	2.5	0.2	0.7	85	61	9	142	7.7	10
Sept. 21.....	A7480	6.8	.87	20	3.2	4.8	1.4	64	10	7.4	.0	1.1	87	63	10	147	7.6	10
Sept. 29.....	A5750	7.6	.90	27	1.1	5.7	1.8	67	16	8.5	.3	3.9	106	70	15	174	7.2	10
15-2920. SUSITNA RIVER AT GOLD CREEK (lat 62°46'10", long 149°41'40")																		
Aug. 22, 1967.....	A29400	7.1	0.06	19	3.5	3.4	2.4	67	15	2.8	0.1	0.9	87	63	8	147	7.6	5
15-2924. CHULITNA RIVER NEAR TALKKEETNA (lat 62°34'40", long 150°14'30")																		
July 24, 1967.....	A32000	4.3	0.00	18	2.5	1.3	1.8	58	14	0.0	0.2	0.7	72	56	8	118	7.6	10
Aug. 22.....	A30400	5.4	4.3	18	3.1	1.6	1.8	59	14	.0	.0	.8	78	58	10	123	7.5	10
Sept. 19.....	10500	4.9	.59	17	4.1	1.5	.7	56	10	2.5	.1	1.4	71	59	13	121	7.5	10
15-2927. TALKKEETNA RIVER NEAR TALKKEETNA (lat 62°20'50", long 150°00'45")																		
Aug. 21, 1967.....	A25200	6.9	0.16	9.0	1.1	2.7	1.2	28	10	1.4	0.2	2.0	49	27	4	67	7.3	15
Sept. 20.....	4920	7.5	.05	10	3.9	5.1	.7	44	6.0	9.2	.1	1.5	66	42	6	110	7.6	10

15-3020. NUYAKUK RIVER NEAR DILLINGHAM (lat 59°56', long 158°12')

June 16, 1967.....	A13700	3.0	0.16	8.2	1.5	1.0	0.2	23	8.0	0.0	0.5	0.8	34	26	7	56	7.1	5
Sept. 30.....	A8070	4.1	.50	9.2	1.4	1.0	.1	29	4.0	.7	.0	.5	36	29	3	64	7.1	5

15-3030. WOOD RIVER NEAR ALEKNAGIK (lat 59°17', long 158°35')

June 16, 1967.....	12600	3.4	0.23	5.0	0.7	1.1	0.1	13	6.0	0.0	0.0	0.9	23	16	5	41	7.3	0
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15-3036. KUSKOWIM RIVER AT McGRATH (lat 62°57'10", long 156°35'10")

May 28, 1967.....	A30300	6.2	0.31	35	6.6	1.5	1.2	114	22	0.4	0.3	1.0	130	112	19	218	7.6	25
Sept. 26.....	A15600	9.7	1.36	47	11	2.4	1.1	166	32	1.1	.1	6.0	194	163	27	308	7.7	5

15-3560. YUKON RIVER AT EAGLE (lat 64°47'30", long 141°12'00")

Sept. 22, 1967.....	A126000	6.2	0.16	33	4.4	2.0	0.7	100	22	0.3	0.1	0.7	119	100	18	202	7.7	10
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15-3890. PORCUPINE RIVER NEAR FORT YUKON (lat 66°59'35", long 143°07'45")

May 24, 1967.....	20600	2.4	0.23	16	2.8	1.0	1.5	56	7.0	0.0	0.3	0.2	59	52	6	106	7.1	50
Sept. 23.....	30200	4.4	.74	21	4.0	1.5	.3	72	10	.7	.1	.9	79	69	10	141	7.2	35

15-3895. CHANDALAR RIVER NEAR VENETIE (lat 67°06'00", long 147°10'30")

May 24, 1967.....	6100	2.4	0.11	23	4.5	0.7	1.2	78	15	0.0	0.3	1.0	86	76	12	151	7.7	30
Sept. 23.....	4800	27	.02	53	1.4	.9	.4	146	22	.0	.1	1.0	177	138	18	244	7.8	20

15-4680. YUKON RIVER AT RAMPART (lat 65°30'25", long 150°10'15")

May 25, 1967.....	280000	4.8	0.52	30	5.2	1.7	1.6	98	25	0.4	0.4	0.9	119	97	17	188	7.4	40
Sept. 24.....	A207000	6.2	.24	27	6.3	2.0	.7	93	20	1.1	.0	.8	110	95	19	188	7.7	10

15-4700. CHISANA RIVER AT NORTHWAY JUNCTION (lat 63°00'25", long 141°48'20")

Sept. 16, 1967.....	3370	10	0.57	24	10	3.6	0.5	118	20	0.7	0.1	1.4	113	106	9	206	7.9	10
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15-4760. TANANA RIVER NEAR TANACROSS (lat 63°23'20", long 143°44'45")

Oct. 2-7, 1966.....	5143	12	0.06	50	2.4	6.7	1.3	151	26	3.2	0.0	3.4	187	147	15	296	8.2	8
Apr. 15, 1967.....	2250	11	.04	59	1.6	5.1	1.3	178	24	1.1	.4	.4	201	169	20	329	8.0	0
Aug. 20.....	27600	8.5	.04	22	4.2	5.1	1.3	89	12	1.1	.2	.8	98	72	0	162	7.8	5

A Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Chemical analyses, in parts per million, water year October 1966 to September 1967--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (residue at 180°C)	Hardness as CaCO ₃		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-magnesium			
ALASKA WEST OF LONGITUDE 141°—Continued																		
15-4840. SALCHA RIVER NEAR SALCHET (lat 64°28'15", long 146°55'45")																		
Aug. 19, 1967.....	9870	8.1	0.08	11	3.5	1.3	0.8	40	11	0.7	0.1	1.0	58	42	9	95	7.0	25
Sept. 9.....	3070	8.5	.26	15	4.5	1.5	.7	57	13	.7	.0	.9	72	60	13	124	7.2	5
15-5110. LITTLE CHENA RIVER NEAR FAIRBANKS (lat 64°53'10", long 147°14'25")																		
Sept. 18, 1967.....	A413	8.7	1.72	15	3.4	1.8	0.7	52	13	0.4	0.0	0.5	71	53	10	117	6.9	5
15-5155. TANANA RIVER AT NENANA (lat 64°34'05", long 149°04'45")																		
Sept. 11, 1967.....	43600	10	9.2	34	6.5	3.7	1.8	117	22	0.7	0.0	0.6	146	111	15	231	7.4	5
15-5158. SEATTLE CREEK NEAR CANTWELL (lat 63°20'00", long 148°14'30")																		
July 21, 1967.....	94.5	8.0	0.24	10	1.6	1.8	0.0	38	5.5	0.0	0.0	0.0	47	32	1	73	7.5	25
Aug. 17.....	A111	8.3	.06	11	1.9	1.9	.6	40	6.0	.0	.1	.1	57	36	3	77	7.6	10
Sept. 20.....	40.7	9.5	.90	11	2.7	2.3	.3	48	2.0	1.8	.1	.9	56	39	0	86	7.6	20
15-5160. NENANA RIVER NEAR WINDY (lat 63°27'15", long 148°48'10")																		
July 21, 1967.....	5330	4.4	1.4	13	2.3	1.6	1.2	40	13	0.4	0.1	0.8	58	42	9	96	6.7	10
Sept. 21.....	1320	6.8	.41	25	4.9	2.4	.5	80	14	2.8	.1	1.0	98	84	18	154	7.8	10
15-5180. NENANA RIVER NEAR HEALY (lat 63°50'40", long 148°56'35")																		
Oct. 6-18, 1966.....	2897	6.7	0.00	33	7.2	3.7	0.6	86	40	1.4	0.0	0.8	140	111	32	235	7.6	10
Sept. 11, 1967.....	A5010	6.2	.54	30	7.3	3.0	1.2	89	35	.4	.0	.6	128	104	31	219	7.5	10
15-5183.5. TEKLANICA RIVER NEAR LIGNITE (lat 64°55'10", long 149°29'50")																		
Aug. 9, 1967.....	2480	5.5		44	6.4	4.2	0.7	128	48	0.0	0.1	1.4	133	138	35	276	7.6	10
15-5646. MELOZITNA RIVER NEAR RUBY (lat 64°47'35", long 155°33'20")																		
July 19, 1967.....	A1400	6.5	0.32	9.0	2.5	0.8	0.0	35	8.0	0.0	0.1	1.4	46	33	4	74	7.3	15
Aug. 17.....	A25500	5.7	.80	4.8	.0	9.0	.0	6	.0	3.9	.2	1.8	22	12	0	33	6.5	10

15-5649. KOYUKUK RIVER AT HUGHES (lat 66°02'50", long 154°15'30")

May 26, 1967.....	A87000	6.7	0.47	11	2.0	0.5	1.2	32	4.0	1.1	0.2	0.2	37	36	10	66	6.7	55
July 10.....	A5100	3.3	.44	12	8.0	1.6	1.4	14	27	4.3	.0	1.3	32	19	19	136	7.6	20
Sept. 10.....	A8700	3.3	.44	22	8.0	1.6	.3	98	22	4.3	.0	1.3	100	13	22	135	7.7	-
Sept. 24.....	A6300	3.9	1.3	32	8.3	1.6	.3	114	22	1.1	.0	1.0	128	115	22	218	7.7	5

15-6210. SNAKE RIVER NEAR NOME (lat 64°33'50", long 165°30'15")

Sept. 26, 1967.....	111	4.4	0.30	31	5.0	2.9	0.3	98	13	5.7	0.0	0.9	112	97	17	198	7.9	10
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15-7120. KUZITRIN RIVER NEAR NOME (lat 65°13'15", long 164°37'15")

May 27, 1967.....	A9840	2.5	0.17	8.0	1.3	1.8	1.2	27	4.0	1.4	0.1	0.2	34	26	4	62	6.7	50
July 11.....	1870	6.4	.19	8.6	1.5	2.3	2.2	28	5.0	1.4	.0	.9	40	28	5	62	7.2	15
Sept. 27.....	587	9.7	.30	16	3.8	4.7	.5	68	4.0	3.9	.0	.6	77	56	0	133	7.3	5

15-7430. JUNE CREEK NEAR KOTzebue (lat 66°51'37", long 162°36'13")

May 26, 1967.....	A50	0.8	0.56	5.8	1.0	1.8	1.6	8	11	2.1	0.2	0.7	30	18	11	36	6.2	55
Sept. 26.....	A1.0	.7	.34	8.6	2.1	1.9	.4	34	.0	3.5	.0	1.6	36	30	2	69	7.0	30

15-7440. KOBUK RIVER AT AMBLER (lat 67°05'30", long 157°50'30")

Sept. 25, 1967.....	9060	4.0	0.26	22	3.3	0.8	0.3	76	6.0	0.7	0.0	1.1	74	69	7	135	7.7	10
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15-7460. NOATAK RIVER AT NOATAK (lat 67°34'20", long 162°56'40")

July 10, 1967.....	A31200	1.9	0.06	32	7.4	1.4	0.0	124	12	0.4	0.1	1.2	117	110	8	210	7.8	5
Sept. 25.....	A8930	3.1	.22	39	6.3	1.3	.3	121	30	.7	.1	.8	142	123	24	236	7.7	5

A Discharge at time of sampling.

15-0562. WEST CREEK NEAR SKAGWAY (Lat 59°31'35", long 135°21'10")														
Oct. 7, 1966.....	1330	38			607	6	10							
Apr. 22, 1967.....	1315	35			21.1	6	T							
15-0564. CHILKAT RIVER AT GORGE, NEAR KLUWAN (Lat 59°37'40", long 135°55'55")														
Apr. 21, 1967.....					49.1	10	1.3							
Aug. 30.....					6690	1130	20400	8	13	19	29	38	53	100
15-0940. DEER LAKE OUTLET NEAR PORT ALEXANDER (Lat 56°31'10", long 134°40'10")														
Aug. 6, 1967.....	0900	55			111	1	T							
15-1000. TAKATZ CREEK NEAR BARANOF (Lat 57°08'35", long 134°51'50")														
Aug. 4, 1967.....	1930	44			375	1	1							
15-1080. PAULOF RIVER NEAR TENAKEE (Lat 57°50'30", long 135°02'10")														
Aug. 3, 1967.....	1915	54			63.2	7	1							
15-1086. HILDA CREEK NEAR DOUGLAS (Lat 58°13'38", long 134°29'50")														
Aug. 2, 1967.....	1330	50			63.6	7	1							
15-1088. LAWSON CREEK AT DOUGLAS (Lat 58°17'05", long 134°24'40")														
Apr. 18, 1967.....	1450	32			1.9	8	T							
15-1090. FISH CREEK NEAR AUKE BAY (Lat 58°19'50", long 134°35'20")														
Apr. 18, 1967.....	0945	33			7.54	2	T							
ALASKA WEST OF LONGITUDE 141°														
15-2000. GAKONA RIVER AT GAKONA (Lat 62°18'05", long 145°18'20")														
June 16, 1966.....	1430	58			2190	1830	11000	14	26	35	47	62	72	
July 22.....	1970	48			2730	4090	30000	17	26	37	53	64	75	
15-2020. TAZLINA RIVER NEAR GLENNALLEN (Lat 62°03'20", long 145°25'35")														
Oct. 2, 1966.....	1500	44			3610	61	590							
May 18, 1967.....	1230	--			3520	428	4100							
June 16.....	1100	50			6170	166	2800							
July 25.....	1100	53			14600	210	8300							
15-2080. TONSINA RIVER AT TONSINA (Lat 61°39'50", long 145°10'50")														
Oct. 4, 1966.....	1300	43			708	52	99							
May 16, 1967.....	1500	--			490	31	41							
July 23.....	1430	53			2290	33	200							
Sept. 18.....	0930	55			947	60	150							
15-2081. SQUIRREL CREEK AT TONSINA (Lat 61°40'05", long 145°10'30")														
July 23, 1967.....	1590	55			18	14	0.7							
Sept. 18.....	1130	44			20.6	13	.7							

T Less than 0.50 ton.

15-3036. KUSKOWIN RIVER AT McGRATH (Lat 62°57'10", Long 155°35'10")

May 28, 1967.....	1830	53	30300	270	22000					66	96	100	98	100		VW
Sept. 29.....	1740	40	15800	334	14000					12	31					VW

15-3560. YUKON RIVER AT EAGLE (Lat 64°47'30", Long 141°12'00")

Oct. 2, 1966.....	--	44	79600	37	8000					--	--	--	--	--		
June 19, 1967.....	1300	54	250000	538	360000	16	22	30	39	45	53	74	99	100		VBWC
Sept. 22.....	1230	47	126000	75	26000						56	75	98	100		VW

15-3890. PORCUPINE RIVER NEAR FORT YUKON (Lat 66°59'35", Long 143°07'45")

May 24, 1967.....	1730	36	20600	27	1500											
July 7.....	1645	55	32900	69	6100											
Aug. 15.....	1030	49	59800	442	71000	21	38	52	66	78	84	93	96	100		VBWC
Sept. 23.....	0630	34	30200	33	2700											

15-3895. CHANDALAR RIVER NEAR VENETIE (Lat 67°06'00", Long 147°10'30")

May 29, 1967.....	2090	36	6100	174	2900						57	75	90	100		VW
Sept. 23.....	1410	35	4500	13	170											

15-4398. BOULDER CREEK NEAR CENTRAL (Lat 65°34'10", Long 144°52'50")

July 27, 1967.....	1030	45	20.6	9	0.5											
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15-4680. YUKON RIVER AT RAMPART (Lat 65°30'25", Long 150°10'15")

May 25, 1967.....	1330	42	280000	520	390000	11	17	27	41	60	69	83	99	100		VBWC
July 8.....	1600	56	300000	344	280000						72	87	100			VW
Aug. 16.....	1300	41	283000	446	340000	24	37	49	64	72	80	89	100			VBWC

15-4700. CHISANA RIVER AT NORTHWAY JUNCTION (Lat 63°00'25", Long 141°48'20")

Oct. 4, 1966.....	1330	37	1490	113	450	--	--	--	--	--	67	92	100			VW
May 19, 1967.....	1125	41	5350	844	12000	5	8	12	17	25	42	64	90	99	100	VBWC
June 17.....	1700	61	5210	1920	27000	28	36	48	65	76	84	91	98	100		VBWC
July 21.....	1400	55	6430	2290	40000	28	44	58	72	82	89	94	98	100		VBWC

15-4760. TANANA RIVER NEAR TANACROSS (Lat 63°23'20", Long 143°44'45")

Oct. 1, 1966.....	1700	40	5580	318	4600	--	--	--	--	--	--	--	--	--		
Oct. 2.....	1700	36	5260	192	2400	--	--	--	--	--	--	--	--	--		
Oct. 3.....	1700	39	5230	199	2400	--	--	--	--	--	--	--	--	--		
Oct. 4.....	1600	39	5160	139	1900	--	--	--	--	--	--	--	--	--		
Oct. 6.....	1600	36	5140	197	2700	--	--	--	--	--	--	--	--	--		

A Daily mean discharge.

B Sample taken at outlet of Tikchik Lake when lake was calm.

C Sample taken at outlet of Tikchik Lake during 30-40 mph winds.

[illegible]

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA--Continued

Periodic determinations of suspended-sediment discharge and particle-size, water year October 1966 to September 1967--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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
ALASKA WEST OF LONGITUDE 141°--Continued																	
15-5649. KOTUKUK RIVER AT HUGHES (Lat 66°02'50", long 154°15'30")																	
May 26, 1967.....	1700	41		87700	126	30000											VW
July 10.....	1030	61		16100	22	960											VWVC
Aug. 18.....	1030	48		34000	73	6700	3	11	23	36	56	66	87	99	100		
Sept. 24.....	1615	39		16300	23	1010											
15-6210. SNAKE RIVER NEAR NOME (Lat 64°33'50", long 165°30'15")																	
July 12, 1967.....	1130	53		300	5	4											
Aug. 20.....	1200	44		371	4	3											
Sept. 26.....	1615	40		111	10	3											
15-7120. KUZITRIN RIVER NEAR NOME (Lat 65°13'15", long 164°37'15")																	
May 27, 1967.....	1700	37		9840	74	2000											
July 11.....	1200	53		1870	3	15											
Aug. 19.....	1330	48		2680	6	43											
Sept. 27.....	1130	38		587	8	13											
15-7430. JUNE CREEK NEAR KOTZERUE (Lat 66°51'37", long 162°36'13")																	
May 26, 1967.....	2100	59		50	7	0.9											
Sept. 26.....	1040	39		1	9	7											
15-7440. KOBUK RIVER AT AMELER (Lat 67°05'30", long 157°50'30")																	
Sept. 25, 1967....	1300	36		9060	11	270											
15-7460. NONTAK RIVER AT NONTAK (Lat 67°34'20", long 162°56'40")																	
July 10, 1967.....	1830	53		31200	7	590											
Aug. 18.....	2000	50		25100	64	4300											
Sept. 25.....	1700	35		8930	12	290											
T Less than 0.05 ton.																	

T Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN HAWAII

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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
ISLAND OF OAHU															
16-2129. KIPAPA STREAM NEAR WAIPAHU (Lat 21°24'33", long 158°01'14")															
Feb. 17, 1967.....	1030	68		14	8	0.3									
Mar. 18.....	1400	78		5.3	16	.2									
June 30.....	1045	76		7.1	13	.2									
July 31.....	0945	76		4.3	11	.1									
Aug. 8.....	1145	76		39	24	2.5									
16-2130. WAIKELE STREAM AT WAIPAHU (Lat 21°23'09", long 158°00'48")															
Jan. 4, 1967.....	1290	72		67	18	3.3									
Feb. 1.....	0945	72		31	52	4.4									
Feb. 17.....	1335	73		49	17	2.2									
Mar. 21.....	1030	71		38	183	19	80	91	100						
Mar. 22.....	1010	70		41	37	4.1					99	100			
Mar. 22.....	1250	73		116	150	47									
Mar. 22.....	1340	71		204	801	454	59	71	83	94	98	99	100		
Mar. 22.....	1410	71		280	1300	983	48	61	75	92	97	100			
Mar. 22.....	1445	71		620	2430	4070	38	49	64	81	92	96	100		
Mar. 23.....	1100	68		357	418	403	48	61	77	90	94	98	99	100	
Mar. 24.....	0925	70		86	55	13									
Apr. 4.....	1300	71		52	21	2.9									
May 16.....	1105	75		27	25	1.8									
June 17.....	1119	75	D	9	9	1.8									
July 27.....	1345	77		26	25										
Aug. 8.....	0940	75		64	47	8.1									
Aug. 9.....	1030	72		606	952	1560	40	52							
Aug. 9.....	1045	72		690	2050	3820	24	30	39	49	54	57	62	75	96
Aug. 9.....	1130	72		1800	3430	16700	29	38	49	62	76	84	93	98	100
Aug. 9.....	1345	73		2070	2530	14100	30	40	52	68	80	87	93	97	100
Aug. 9.....	1500	73		1220	2050	6750	35	47	61	77	88	93	96	98	100
D Daily mean discharge.															

D Daily mean discharge.

16-2705. KAMOALII STREAM BELOW KUOU STREAM, NEAR KANEHE (Lat 21°23'42", long 157°48'26")

Date	1350	75	11	50	5	0.1	--	72	--	87	94	99	100	--	--	--	--	--	VPWC
May 15, 1967.....	1230	74	10	431	21	58	41	55	--	--	--	--	--	--	--	--	--	--	VPWC
June 30.....	1345	74	18	10	21	1.0	--	--	--	--	--	--	--	--	--	--	--	--	VPWC
Aug. 7.....	1200	75	10	1	3	.1	--	--	--	--	--	--	--	--	--	--	--	--	VPWC
Aug. 8.....	1005	73	50	344	46	22	35	68	--	95	99	100	99	99	99	99	99	99	VPWC
Aug. 8.....	1025	73	56	189	29	29	--	--	--	84	87	91	97	100	100	100	100	100	S
Aug. 8.....	1100	73	62	240	40	40	--	--	--	85	88	94	98	100	100	100	100	100	S
Aug. 8.....	1255	73	34	97	2	8.9	--	--	--	86	91	96	100	100	100	100	100	100	S
Sept. 11.....	1300	76	10	2	2	.1	--	--	--	--	--	--	--	--	--	--	--	--	S

16-2739. KAMOALII STREAM AT KANEHE (Lat 21°24'51", long 157°48'12")

Date	1325	72	14	2	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Jan. 5, 1967.....	1325	72	14	2	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Feb. 10.....	1085	70	16	345	127	55	62	91	--	--	--	--	--	--	--	--	--	--	SPWC
Mar. 10.....	0985	71	15	4	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Mar. 13.....	1010	71	16	43	147	46	62	80	--	98	--	--	--	--	--	--	--	--	S
Mar. 17.....	1210	71	93	584	147	8.0	--	--	--	93	99	100	100	100	100	100	100	100	S
Mar. 17.....	1410	71	25	118	8.0	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Apr. 5.....	1345	73	20	3	5	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Apr. 5.....	1410	73	20	5	5	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
May 18.....	1255	74	14	2	71	1.1	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
May 18.....	1345	74	14	385	71	1.1	--	--	--	92	99	100	100	100	100	100	100	100	SPWC
June 30.....	1430	80	24	15	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Aug. 7.....	1385	80	14	4	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Aug. 8.....	0945	--	69	97	18	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Sept. 11.....	1385	84	14	6	.2	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC

16-2835. KAHALUU STREAM AT KAHALU (Lat 21°27'23", long 157°50'15")

Date	1200	70	77	117	24	--	--	--	--	--	--	87	91	94	97	98	100	--	S
Feb. 10, 1967.....	1200	70	77	117	24	--	--	--	--	--	--	--	--	--	--	--	--	--	S
Mar. 10.....	1100	72	10	7	.2	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Mar. 10.....	1100	73	10	59	2.9	--	--	--	--	50	63	77	87	94	95	97	100	100	SPWC
Mar. 17.....	1130	72	57	543	259	50	63	77	90	97	98	98	98	98	98	98	98	98	SPWC
Mar. 17.....	1255	72	105	912	259	50	63	77	90	97	98	98	98	98	98	98	98	98	SPWC
Mar. 17.....	1255	72	34	256	24	59	71	--	--	95	--	99	100	--	--	--	--	--	SPWC
Mar. 17.....	1450	72	16	58	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
Apr. 5.....	1250	72	12	18	.6	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
May 15.....	0940	73	8.3	11	2	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
May 18.....	1400	75	28	127	9.6	--	--	--	--	--	--	--	--	--	--	--	--	--	SPWC
May 18.....	1635	74	250	477	322	48	59	--	--	80	--	89	91	93	98	100	100	100	VPWC
June 30.....	1030	74	23	130	8.1	--	--	--	--	--	--	86	91	95	100	100	100	100	S
Aug. 7.....	0930	73	7.4	14	.3	--	--	--	--	--	--	--	--	--	--	--	--	--	VPWC
Aug. 8.....	1400	72	51	211	29	--	--	--	--	--	--	--	--	--	--	--	--	--	S
Sept. 11.....	1010	75	6.6	9	.2	--	--	--	--	--	--	--	--	--	--	--	--	--	S

T Less than 0.05 ton.
D Daily mean discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN HAWAII--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967--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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (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	
ISLAND OF OAHU--Continued																	
16-2845. WAIHEE STREAM AT KAHALU (Lat 21°27'31", long 157°50'26")																	
Jan. 5, 1967.....	1300	72		20	22	1.2	--	--	--	--	--	--	--	--	--	--	--
Feb. 7.....	1250	73		13	15	.5	--	--	--	--	--	--	--	--	--	--	--
Feb. 10.....	1145	70		60	310	50	--	--	--	--	--	87	88	92	97	98	100
Mar. 10.....	1040	70		14	26	1.0	--	--	--	--	--	--	--	--	--	--	--
Mar. 17.....	1145	72		21	785	45	46	58	72	89	97	98	99	100	--	--	--
Apr. 5.....	1050	70		17	484	22	49	60	--	93	--	98	99	100	--	--	--
Apr. 15.....	1055	73		11	30	.9	--	--	--	--	--	--	--	--	--	--	--
May 18.....	1345	75		32	204	18	--	--	--	--	--	--	--	--	--	--	--
May 18.....	1445	75		46	1420	176	32	40	51	62	74	83	91	94	97	100	--
May 18.....	1455	75		176	6540	3110	40	49	61	75	86	92	96	98	100	--	--
May 18.....	1515	75		320	3670	3170	38	46	58	72	82	88	94	97	99	100	--
May 18.....	1540	74		541	1660	2420	35	45	58	69	79	86	93	97	99	100	--
May 18.....	1560	74		217	694	389	42	52	--	76	--	89	95	98	100	--	--
May 30.....	1200	75		14	33	1.2	--	--	--	--	--	--	--	--	--	--	--
Aug. 7.....	1045	73		90	6580	1600	44	54	67	82	93	97	99	99	100	--	--
Aug. 8.....	1005	73		101	3980	1090	44	53	66	81	92	96	98	99	99	100	--
Aug. 8.....	1015	73		117	2440	771	--	--	--	--	--	--	--	--	--	--	--
Aug. 8.....	1030	73		140	2530	956	42	51	63	77	89	94	97	98	100	--	--
Aug. 8.....	1050	73		208	1650	927	--	--	--	--	--	--	--	--	--	--	--
Aug. 8.....	1110	73		255	725	499	33	41	--	64	--	80	87	91	96	100	--
Aug. 8.....	1135	73					--	--	--	--	--	--	--	--	--	--	--
Aug. 8.....	181	72		181	527	258	--	--	--	--	--	--	--	--	--	--	--
Aug. 8.....	1320	72		132	326	116	--	--	--	--	--	--	--	--	--	--	--
Aug. 8.....	1325	72		100	1140	308	42	52	--	79	--	91	93	94	96	99	100
Sept. 11.....	1130	75		15	30	1.2	--	--	--	--	--	--	--	--	--	--	--

Particle-size analyses of bed material, water year October 1966 to September 1967

(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (ppm)	Sediment discharge (tons per day)	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	64.000	
16-2605. MAUNAWILI STREAM AT HIGHWAY 61, NEAR KAILUA (Lat 21°22'51", long 157°45'48")																		
Mar. 10, 1967	1225		3	24			1	2	5	18	43	69	87	95	100		S	
Aug. 8	1410		3	70			1	2	5	13	30	47	61	75	91	100	S	

ISLAND OF OKINAWA--Continued

16-8755. YONA-GAWA AT YONA, OKINAWA--Continued

Suspended sediment, October 1966 to June 1967

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	8.3	C 2	T	4.3	2	T	3.4	C 1	T
2..	7.6	C 2	T	3.4	C 1	T	3.2	C 1	T
3..	6.8	C 2	T	2.8	C 1	T	3.2	C 1	T
4..	6.5	C 2	T	2.8	C 1	T	3.0	C 1	T
5..	6.2	C 2	T	5.0	4	0.1	13	23	S 1.7
6..	6.2	C 3	0.1	25	15	S 3.0	10	14	.4
7..	5.6	C 3	T	9.3	4	.1	7.2	7	.1
8..	5.4	C 2	T	4.1	2	T	13	11	.4
9..	5.4	C 2	T	3.6	1	T	9.1	3	.1
10..	5.1	C 2	T	4.8	4	.1	7.6	3	.1
11..	4.8	C 2	T	3.6	C 1	T	6.2	2	T
12..	4.6	C 2	T	3.4	C 1	T	18	16	S 1.4
13..	4.4	C 2	T	3.2	C 1	T	8.7	2	T
14..	4.4	C 2	T	3.6	3	T	7.2	C 1	T
15..	4.6	C 2	T	3.0	C 1	T	6.2	C 1	T
16..	4.1	C 2	T	3.0	C 1	T	8.3	8	.2
17..	3.8	C 2	T	3.4	4	T	5.9	2	T
18..	3.6	C 1	T	3.0	C 2	T	5.9	C 1	T
19..	3.6	C 1	T	3.0	C 2	T	5.6	C 1	T
20..	3.6	C 1	T	3.6	C 2	T	5.4	C 2	T
21..	3.4	C 1	T	3.2	C 2	T	5.6	C 2	T
22..	3.4	C 1	T	2.8	C 1	T	4.8	C 2	T
23..	3.2	C 1	T	2.6	C 1	T	5.4	3	T
24..	3.2	C 1	T	2.6	3	T	5.4	2	T
25..	3.2	C 1	T	24	17	S 1.9	42	38	S 7.3
26..	3.0	C 1	T	7.6	3	.1	21	4	.2
27..	3.0	C 1	T	4.6	C 1	T	13	2	.1
28..	3.0	C 1	T	4.1	C 1	T	10	C 1	T
29..	3.0	C 1	T	3.6	C 1	T	9.1	C 1	T
30..	3.0	C 1	T	4.1	2	T	7.9	C 1	T
31..	2.8	C 1	T	--	--	--	7.9	2	T
Total	138.8	--	0.7	157.1	--	5.7	282.2	--	12.5
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	56	36	S 10	3.2	C 1	T	2.8	C 1	T
2..	16	3	.1	23	25	S 7.1	2.8	C 1	T
3..	12	2	.1	11	8	.2	2.6	C 1	T
4..	10	C 1	T	5.1	2	T	2.6	C 1	T
5..	9.1	C 1	T	4.4	C 1	T	12	15	0.5
6..	7.9	C 1	T	4.1	C 1	T	6.5	4	.1
7..	7.9	C 1	T	3.8	C 1	T	4.4	C 2	T
8..	6.8	C 1	T	4.1	2	T	3.8	C 2	T
9..	6.2	C 1	T	3.6	1	T	3.6	C 2	T
10..	5.9	C 1	T	3.6	1	T	3.4	C 2	T
11..	6.4	6	.1	4.4	2	T	3.4	C 2	T
12..	10	7	.2	3.6	C 1	T	3.2	C 1	T
13..	6.2	C 1	T	3.4	C 1	T	3.2	C 1	T
14..	5.6	C 1	T	6.4	6	.1	3.0	C 1	T
15..	5.4	C 1	T	4.8	2	T	3.0	C 1	T
16..	5.1	C 1	T	3.8	C 1	T	2.8	C 1	T
17..	4.8	C 1	T	3.6	C 1	T	2.8	C 1	T
18..	4.6	C 1	T	3.4	C 1	T	3.4	2	T
19..	4.6	C 1	T	3.4	C 1	T	2.8	C 1	T
20..	4.4	C 1	T	3.2	C 1	T	2.8	C 1	T
21..	4.4	C 1	T	3.2	C 1	T	3.3	2	T
22..	4.1	C 1	T	3.2	C 1	T	2.8	C 1	T
23..	4.1	C 1	T	3.4	2	T	2.6	C 1	T
24..	3.8	C 1	T	3.4	2	T	2.4	C 1	T
25..	3.8	C 1	T	4.4	3	T	2.4	C 1	T
26..	3.6	C 1	T	3.4	2	T	2.4	C 1	T
27..	3.6	C 1	T	3.2	C 1	T	2.4	C 1	T
28..	3.4	C 1	T	3.0	C 1	T	2.6	2	T
29..	3.8	2	T	--	--	--	2.6	C 1	T
30..	3.4	C 1	T	--	--	--	2.4	C 1	T
31..	3.2	C 1	T	--	--	--	2.2	C 1	T
Total	236.1	--	10.9	133.1	--	7.8	103.0	--	1.0

S Computed by subdividing day.

T Less than 0.05 ton.

C Composite period.

ISLAND OF OKINAWA--Continued

16-8755. YONA-GAWA AT YONA, OKINAWA--Continued

Suspended sediment, October 1966 to June 1967--Continued

Day	APRIL				MAY				JUNE			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	2.2	C 1	T	3.6	3	T	11	7	0.2			
2..	2.2	C 1	T	3.2	C 2	T	8.3	5	.1			
3..	2.1	C 1	T	3.4	C 2	T	10	6	.2			
4..	2.4	2	T	3.4	C 2	T	49	87	S 24			
5..	2.2	C 1	T	2.8	C 2	T	117	75	S 42			
6..	2.4	C 1	T	2.8	C 2	T	112	130	B 40			
7..	2.4	C 1	T	2.8	3	T	85	12	S 3.6			
8..	4.4	3	T	3.8	7	0.1	52	29	S 7.3			
9..	6.2	5	0.1	3.4	4	T	36	4	.4			
10..	3.0	C 2	T	2.8	2	T	22	2	.1			
11..	2.6	C 2	T	2.6	2	T	17	2	.1			
12..	2.4	C 2	T	2.4	2	T	20	6	S .5			
13..	2.8	C 2	T	2.4	3	T	126	470	S 960			
14..	2.6	C 1	T	3.4	5	T	30	4	.3			
15..	2.4	C 1	T	10	33	S 2.2	21	2	.1			
16..	2.4	C 1	T	3.8	5	.1	50	300	B 40			
17..	2.2	C 1	T	3.0	3	T	27	3	.2			
18	2.2	C 1	T	2.6	2	T	20	2	.1			
19..	3.2	4	T	2.6	2	T	16	1	T			
20..	13	10	.4	5.6	6	S .2	14	1	T			
21..	4.1	2	T	39	51	S 17	12	1	T			
22..	3.2	C 1	T	12	4	.1	11	1	T			
23..	3.0	C 1	T	7.9	2	T	10	C 2	.1			
24..	3.2	C 2	T	6.8	2	T	9.1	C 2	T			
25..	3.6	C 2	T	15	15	S .7	8.3	C 2	T			
26..	2.8	C 2	T	10	5	.1	7.6	C 2	T			
27..	2.6	C 2	T	8.3	3	.1	7.2	C 1	T			
28..	2.8	4	T	6.8	C 2	T	6.8	C 1	T			
29..	12	18	S 1.6	6.2	C 2	T	6.5	C 1	T			
30..	4.1	3	T	5.6	3	T	6.2	C 1	T			
31..	--	--	--	16	90	B 4	--	--	--			
Total	106.7	--	2.5	204.0	--	25.1	928.0	--	1119.6			

Total discharge for period Oct. 1, 1966 to June 30, 1967 (cfs-days)..... 2289.0

Total load for period Oct. 1, 1966 to June 30, 1967 (tons)..... 1185.8

S Computed by subdividing day.

T Less than 0.05 ton.

B Computed from estimated-concentration graph.

C Composite period.

ISLAND OF OKINAWA--Continued

16-8755. YOKA-GAWA AT YOKA, OKINAWA--Continued

Particle-size analyses of suspended sediment, October 1966 to June 1967

(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (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 13, 1967.....	1510	71		358	1690	1630	13	22		54		69	75	82	90	100		VPWC

Particle-size analyses of bed material, October 1966 to June 1967

(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concen- tration (ppm)	Sediment discharge (tons per day)	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	16.000	32.000	64.000	
June 23, 1967.....	1100		3	10				3	5	8	11	19	32	56	79	84	100	S

16-8782. HANECHI-OKAWA AT KAWAKAMI, OKINAWA

LOCATION.--Lat 26°36'28" N., long 128°01'16" E., at gaging station 0.4 mile south of Kawakami, 0.7 mile southeast of Taira School, and 1.0 mile southwest of Nakaoshi.

DRAINAGE AREA.--4.4 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1966 to September 1967.

Sediment records: October 1966 to September 1967; 9°F Aug. 14; minimum, 53°F Jan. 16, Mar. 7.

Extremes: Maximum temperature, 86°F; minimum, 53°F.

Sediment concentrations: Maximum daily, 718 ppm June 13; minimum daily, 1 ppm on many days.

Sediment loads: Maximum daily, 1,950 tons June 4; minimum daily, less than 0.05 ton on many days.

Chemical analyses, in parts per million, water year October 1966 to September 1967

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Carbonate (CO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved solids (calculated)			Hardness as CaCO ₃	Sodium carbonate ratio	Specific conductance (microhmhos at 25°C)	pH or Col
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 10, 1966..	8.4	14	0.60	4.8	3.2	14	0.0	24	0	5.8	21	0.0	0.2	80	0.11	1.81	20	5	95	7.0
Jan. 20, 1967..	7.6	15	.04	6.8	3.8	15	.3	27	0	9.5	24	.0	.0	99	.13	2.03	22	11	120	8.0
Mar. 17.....	3.6	14	.04	7.2	4.4	16	.7	32	0	11	24	.1	.2	88	.12	.86	26	10	122	8.0
June 23.....	24	14	.10	5.2	2.9	16	--	24	0	9.0	24	.0	.4	94	.13	6.09	20	5	110	7.8

Temperature (°F) of water, water year October 1966 to September 1967

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.....	76	78	70	79	76	78	73	75	80	80	73	80	72	73	--	--	--	--	--	--	--	--	--	--	--	89	78	76	66	85	71	--	
November.....	68	70	71	71	71	71	73	75	76	75	73	75	73	75	73	71	74	72	70	68	70	72	68	71	62	75	73	65	72	65	69	--	
December.....	60	63	67	67	72	67	68	67	70	66	68	63	62	65	64	67	70	71	69	70	68	70	64	64	64	63	55	62	64	65	64	65	
January.....	64	61	54	62	58	63	57	57	58	62	60	58	63	60	53	56	60	63	64	64	65	64	65	64	64	65	65	68	68	62	58	62	
February.....	64	61	58	60	65	60	57	68	67	68	59	62	64	58	55	56	64	58	63	67	65	66	65	63	58	57	59	58	--	--	61	--	
March.....	64	64	65	65	62	58	53	62	62	61	59	71	71	61	65	69	71	58	59	67	64	65	58	56	67	72	69	67	75	69	67	64	
April.....	74	78	79	64	74	76	72	74	74	74	73	73	77	81	76	79	79	65	71	68	61	81	78	75	64	65	66	73	70	78	--	73	
May.....	77	82	78	78	82	80	82	80	80	81	75	75	75	75	75	75	70	68	67	70	71	73	71	73	75	78	75	73	78	75	--	75	
June.....	74	71	81	78	72	70	73	70	71	76	73	75	73	73	73	73	70	71	72	75	76	78	77	84	83	78	71	79	78	80	--	75	
July.....	80	82	80	82	85	88	83	83	82	85	85	82	84	86	86	82	82	83	83	86	83	84	83	83	82	85	86	82	83	80	83	83	
August.....	83	83	84	83	79	78	75	80	80	78	78	77	75	89	85	85	82	86	83	85	83	85	83	86	87	85	85	86	85	82	75	82	
September.....	--	--	--	--	--	--	77	82	87	86	86	83	78	73	75	75	73	83	78	73	78	75	76	75	76	75	78	75	73	75	74	76	--

ISLAND OF OKINAWA--Continued

16-8782. HANECHI-OKAWA AT KAWAKAMI OKINAWA--Continued

Suspended sediment, water year October 1966 to September 1967

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	C 3	0.1	9.3	13		7.1	C 3	0.1
2..	11	C 3	.1	7.2	4	.1	6.9	C 3	.1
3..	10	C 3	.1	5.0	2	T	6.5	C 3	.1
4..	9.7	C 3	.1	4.3	2	T	6.2	C 3	.1
5..	9.4	C 2	.1	6.1	7	.1	16	11	S .8
6..	9.2	C 2	T	64	170	B 30	25	11	.7
7..	9.0	C 2	T	38	8	.8	14	7	.3
8..	8.7	C 2	T	12	4	.1	54	52	S 8.4
9..	8.7	C 2	T	9.0	3	.1	35	10	.9
10..	8.4	C 2	T	19	9	S .5	25	5	.3
11..	8.2	C 2	T	12	3	.1	16	4	.2
12..	8.2	C 2	T	9.7	2	.1	14	4	.2
13..	8.0	C 2	T	8.4	2	T	12	C 3	.1
14..	7.6	C 2	T	9.2	2	T	12	C 3	.1
15..	8.7	4	.1	7.6	C 1	T	11	C 3	.1
16..	7.2	C 3	.1	7.1	C 1	T	16	7	.3
17..	6.9	C 3	.1	7.6	2	T	12	2	.1
18..	6.7	C 3	.1	7.1	C 1	T	11	1	T
19..	6.3	C 2	T	6.5	C 1	T	10	1	T
20..	6.2	C 2	T	10	3	.1	10	2	.1
21..	5.8	C 2	T	9.8	2	.1	11	3	.1
22..	5.6	C 2	T	7.1	C 1	T	10	2	.1
23..	5.4	C 2	T	6.5	C 1	T	10	2	.1
24..	6.8	C 8	.1	6.2	C 1	T	9.7	1	T
25..	5.7	4	.1	52	70	B 10	65	100	S 22
26..	5.1	C 2	T	16	4	.2	46	11	1.4
27..	4.8	C 2	T	11	C 3	.1	24	5	.3
28..	4.7	C 2	T	9.0	C 3	.1	16	C 2	.1
29..	4.4	C 1	T	8.0	C 3	.1	14	C 2	.1
30..	4.2	C 1	T	8.7	4	.1	12	C 2	.1
31..	4.2	C 1	T	--	--	--	12	C 2	.1
Total	226.8	--	1.8	393.4	--	43.3	549.4	--	37.5
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	97	228	S 118	5.4	C 2	T	4.6	C 1	T
2..	44	14	1.7	18	24	S 2.6	4.4	C 1	T
3..	31	5	.4	21	11	S 1.0	4.3	C 1	T
4..	24	3	.2	8.2	4	.1	4.2	C 1	T
5..	20	2	.1	6.9	3	.1	12	9	0.3
6..	18	C 2	.1	6.0	2	T	9.2	5	.1
7..	15	C 2	.1	5.8	C 1	T	6.0	2	T
8..	14	C 2	.1	5.8	C 1	T	5.1	C 2	T
9..	12	C 2	.1	5.6	C 1	T	4.6	C 2	T
10..	12	C 2	.1	5.4	C 1	T	4.3	C 2	T
11..	12	C 3	.1	7.6	4	.1	4.2	C 2	T
12..	15	C 3	.1	5.6	2	T	4.1	C 2	T
13..	12	C 3	.1	5.2	2	T	3.8	C 1	T
14..	10	C 3	.1	7.6	6	.1	3.7	C 1	T
15..	9.4	C 3	.1	8.0	3	.1	3.7	C 1	T
16..	9.2	C 3	.1	5.8	1	T	3.6	C 1	T
17..	8.7	C 3	.1	5.4	1	T	3.6	C 1	T
18..	8.4	C 2	T	5.7	2	T	4.0	C 1	T
19..	8.0	C 2	T	5.2	C 1	T	3.6	C 1	T
20..	7.6	C 2	T	5.0	C 1	T	3.5	C 1	T
21..	7.4	C 2	T	5.0	C 1	T	4.9	4	.1
22..	7.2	C 2	T	4.8	C 1	T	4.2	3	T
23..	7.1	C 2	T	5.1	2	T	3.5	C 2	T
24..	6.9	C 2	T	5.2	1	T	3.2	C 2	T
25..	6.7	C 2	T	6.8	2	T	3.2	C 2	T
26..	6.3	C 2	T	5.4	C 1	T	3.2	C 2	T
27..	6.0	C 2	T	4.8	C 1	T	3.2	C 2	T
28..	5.8	C 2	T	4.6	C 1	T	3.5	3	T
29..	6.9	3	.1	--	--	--	4.1	5	.1
30..	5.7	C 2	T	--	--	--	3.2	4	T
31..	5.4	C 2	T	--	--	--	3.1	3	T
Total	458.7	--	122.2	190.9	--	4.5	135.8	--	1.1

S Computed by subdividing day.

T Less than 0.05 ton.

B Computed from estimated-concentration graph.

C Composite period.

ISLAND OF OKINAWA--Continued

16-8782. HANECHI-OKAWA AT KAWAKAMI, OKINAWA--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	3.1	3	T	5.8	5	0.1	39	9	1.0
2..	3.0	C 2	T	5.1	4	.1	24	3	.2
3..	2.9	C 2	T	7.5	10	.2	18	2	.1
4..	4.1	4	T	9.0	8	.2	298	522	S 1950
5..	3.3	C 2	T	5.8	4	.1	271	338	S 354
6..	3.2	C 2	T	5.1	3	T	311	380	S 553
7..	3.0	C 2	T	4.7	3	T	270	224	S 218
8..	3.4	3	T	4.8	4	.1	100	50	S 14
9..	4.7	3	T	4.6	4	T	73	25	4.9
10..	3.5	2	T	4.1	C 3	T	55	20	3.0
11..	4.2	4	T	4.0	C 3	T	46	12	1.5
12..	7.7	7	0.1	3.7	C 3	T	44	10	1.2
13..	5.7	3	T	28	106	S 17	261	718	S 1820
14..	4.0	2	T	48	51	S 8.2	79	25	5.3
15..	3.4	C 1	T	24	12	.8	55	16	2.4
16..	3.0	C 1	T	10	7	.2	180	340	S 512
17..	2.7	C 1	T	10	5	.1	98	75	20
18..	2.7	2	T	8.2	3	.1	58	15	2.3
19..	4.6	11	S .4	7.2	2	T	46	5	.6
20..	29	24	S 2.6	22	34	S 4.8	37	4	.4
21..	6.2	3	.1	227	615	S 991	31	C 3	.3
22..	4.7	3	T	74	20	S 3.8	27	C 3	.2
23..	4.1	2	T	35	8	.8	24	C 3	.2
24..	5.3	7	.1	25	5	.3	20	C 3	.2
25..	7.8	10	.2	22	3	.2	18	C 3	.1
26..	4.7	4	.1	28	9	.7	15	C 2	.1
27..	4.1	3	T	20	4	.2	14	C 2	.1
28..	4.4	14	S 1.2	14	3	.1	12	C 2	.1
29..	30	44	S 6.6	12	2	.1	12	C 2	.1
30..	7.8	6	.1	12	2	.1	11	C 2	.1
31..	--	--	--	42	18	S 4.3	--	--	--
Total	180.3	--	12.0	732.6	--	1033.9	2547	--	5465.4
	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..	10	C 2	0.1	3.6	3	T	11	49	S 1.9
2..	9.7	C 2	.1	3.4	2	T	32	63	S 13
3..	9.0	C 2	T	3.2	C 2	T	9.5	8	.2
4..	8.7	C 2	T	3.0	C 2	T	5.4	4	.1
5..	8.2	C 2	T	2.8	C 2	T	4.3	3	T
6..	7.8	C 2	T	2.7	C 2	T	4.0	2	T
7..	7.4	2	T	2.7	C 2	T	3.8	2	T
8..	7.8	4	.1	2.6	C 2	T	4.5	5	.1
9..	7.1	2	T	2.5	C 2	T	3.8	3	T
10..	6.5	2	T	2.8	2	T	3.3	2	T
11..	6.3	C 1	T	7.5	60	S 2.2	3.3	2	T
12..	6.0	C 1	T	56	139	S 33	3.5	4	T
13..	6.0	1	T	9.8	8	.2	3.0	2	T
14..	5.2	C 1	T	5.4	4	.1	2.5	1	T
15..	5.1	C 1	T	4.3	4	T	2.3	1	T
16..	5.0	C 1	T	3.7	C 3	T	2.3	2	T
17..	4.8	C 1	T	3.4	C 3	T	2.2	2	T
18..	5.1	2	T	3.2	C 3	T	2.1	2	T
19..	5.7	5	.1	3.1	C 3	T	2.0	2	T
20..	5.6	4	.1	3.0	C 2	T	1.9	2	T
21..	4.8	2	T	2.9	C 2	T	1.8	1	T
22..	4.4	2	T	2.8	C 2	T	1.6	C 1	T
23..	5.1	8	.1	2.7	2	T	1.5	C 1	T
24..	4.2	C 2	T	2.5	2	T	1.4	C 1	T
25..	4.1	C 2	T	2.3	2	T	1.4	C 1	T
26..	4.0	C 2	T	2.2	C 2	T	2.0	1	T
27..	4.1	4	T	2.6	C 2	T	2.7	1	T
28..	3.8	C 2	T	2.6	2	T	2.4	1	T
29..	3.6	C 2	T	5.1	20	S .5	2.1	1	T
30..	9.3	55	S 1.8	6.7	10	.2	2.6	2	T
31..	4.3	5	.1	9.7	47	S 2.0	--	--	--
Total	188.7	--	3.1	170.8	--	38.7	126.2	--	15.7
Total discharge for year (cfs-days).....									5900.6
Total load for year (tons).....									6779.2

S Computed by subdividing day.

T Less than 0.05 ton.

C Composite period.

ISLAND OF OKINAWA--Continued

16-8782. HANECHI-OKAWA AT KAWAKAMI, OKINAWA--Continued

Particle-size analyses of suspended sediment, water year October 1966 to September 1967
 (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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (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	
June 6, 1967.....	1707	70		562	835	1270	--	--	--	--	79	89	99	100			
June 10, 1967.....	1905	72		1030	2910	8080	11	24		50		69	81	91	97	99	VPWC
June 16, 1967.....	1920	72		1130	2750	8380	18	28		55		75	88	97	100		VPWC

Particle-size analyses of bed material, water year October 1966 to September 1967
 (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)	Water- tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment con- cen- tration (ppm)	Sediment discharge (tons per day)	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	16.000	32.000		64.000
June 12, 1967.....	1300		3	34			1	4	11	17	19	29	52	82	95	96	100	S
June 29.....	1300		3	12				3	5	20	39	57	72	81	90	100		S

16-3842. FUKUJI-GAWA AT FUKUJI, OKINAWA

LOCATION.--Lat 26°38'16" N, long 128°10'13" E., at gaging station at Fukuji, 0.9 mile north of Kawata, and 1.3 miles northeast of Taira.

DRAINAGE AREA.--12 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: May 1964 to September 1967.

Sediment records: May 1964 to September 1967.

EXTREMES, 1960-67.--Water temperatures: Maximum, 88°F Aug. 16; minimum, 51°F Feb. 17.

Sediment loads: Maximum daily, 84,000 tons Aug. 12; minimum daily, 1 ppm on many days.

Sediment loads: Maximum daily (estimated) 20,000 tons Aug. 12; minimum daily, less than 0.05 ton on many days.

EXTREMES, 1964-67.--Water temperatures: Maximum, 88°F Aug. 16, 1967; minimum, 51°F Jan. 16, 1965, Feb. 17, 1967.

Sediment concentrations: Maximum daily, 4,500 ppm June 23, 1965; minimum daily, 1 ppm on many days each year.

Sediment loads: Maximum daily, 64,000 tons Aug. 5, 1965; minimum daily, less than 0.05 ton on many days each year.

Chemical analyses, in parts per million, water year October 1966 to September 1967

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 (calculated)			Hardness as CaCO ₃	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
															Parts per million	Tons per acre-foot	Tons per day				
Jan. 20, 1967..	17	18	0.04	5.6	3.3	19	0.5	23	0	6.5	29	0.0	0.0		94	0.13	4.31	19	9	120	7.7
Mar. 28.....	10	14	.04	5.2	3.2	20	1.0	29	0	8.0	29	.0	.0		96	.13	2.59	24	3	130	7.9
June 23.....	42	16	.10	3.6	2.7	18	--	17	0	7.5	28	.0	.2		91	.12	10.3	14	6	110	7.6

Temperature (°F) of water, water year October 1966 to September 1967

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.....	70	70	70	70	71	71	70	72	73	73	73	71	70	71	71	69	67	67	66	67	68	68	70	69	70	69	70	68	67	68	69
November.....	71	68	66	68	68	69	69	69	70	71	70	71	73	72	69	69	69	69	69	63	63	63	62	62	63	62	62	62	63	63	63
December.....	61	60	61	61	66	65	64	66	63	63	62	63	62	61	61	62	63	65	67	67	68	68	68	68	64	61	60	58	66	67	60
January.....	63	60	58	56	58	59	57	57	57	57	58	57	57	57	52	52	53	53	53	52	54	58	58	59	57	58	61	63	58	57	56
February.....	56	58	58	55	52	54	56	57	61	61	60	63	57	54	52	51	56	54	56	57	60	63	64	61	63	62	61	59	67	69	70
March.....	66	55	68	70	62	58	56	57	58	58	57	56	57	58	60	60	61	65	64	63	64	63	61	58	62	67	69	70	70	62	61
April.....	71	72	72	74	66	66	69	69	72	73	73	73	73	73	73	72	70	68	72	72	67	67	67	64	66	69	71	69	71	69	69
May.....	71	75	75	71	70	73	78	74	75	74	72	72	73	73	73	72	73	72	74	72	72	72	72	75	73	72	73	73	74	73	74
June.....	72	73	73	73	73	72	71	70	70	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71
July.....	82	82	81	79	79	81	82	82	83	83	82	82	81	82	82	82	83	81	79	80	80	80	78	79	81	80	81	81	81	81	81
August.....	80	79	79	80	79	78	79	80	82	82	82	82	81	80	80	81	80	81	82	82	82	81	80	81	81	82	82	82	82	82	82
September.....	80	79	80	82	82	80	80	80	80	81	81	79	77	76	76	76	76	75	74	74	74	75	74	74	75	74	74	73	74	75	77

ISLAND OF OKINAWA--Continued

16-8842. FUKUJI-GAWA AT FUKUJI, OKINAWA--Continued

Suspended sediment, water year October 1966 to September 1967

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..	38	C 1	0.1	17	5	0.2	14	C 1	T
2..	34	C 1	.1	19	2	.1	13	C 1	T
3..	30	C 1	.1	12	C 1	T	12	C 1	T
4..	28	C 1	.1	12	C 1	T	12	C 1	T
5..	26	C 1	.1	19	4	.2	12	2	.1
6..	25	C 1	.1	178	390	A 190	26	2	.1
7..	24	C 1	.1	95	16	S 7.2	19	2	.1
8..	23	C 1	.1	24	3	.2	115	19	S 9.1
9..	22	C 1	.1	19	2	.1	55	5	.7
10..	21	C 1	.1	52	13	S 2.2	30	3	.2
11..	20	C 1	.1	27	3	.2	22	2	.1
12..	19	C 1	.1	20	2	.1	23	2	.1
13..	18	C 1	T	18	C 1	T	20	C 1	T
14..	18	C 1	T	19	C 1	.1	17	C 1	T
15..	21	C 1	.1	18	C 1	T	16	C 1	T
16..	19	C 1	.1	15	C 1	T	37	9	S 1.3
17..	18	C 1	T	14	C 1	T	23	2	.1
18..	17	C 1	T	14	C 1	T	19	C 1	.1
19..	17	C 1	T	13	C 1	T	19	C 1	.1
20..	16	C 1	T	18	2	.1	18	C 1	T
21..	16	C 1	T	15	C 1	T	21	1	.1
22..	15	C 1	T	13	C 1	T	16	1	T
23..	15	C 1	T	12	C 1	T	19	C 1	.1
24..	18	C 1	T	12	C 1	T	19	C 1	.1
25..	16	C 1	T	88	26	S 12	249	94	S 135
26..	15	C 1	T	39	11	1.2	79	6	1.3
27..	14	C 1	T	18	3	.1	43	2	.2
28..	14	C 1	T	14	C 1	T	34	1	.1
29..	13	C 1	T	13	C 1	T	26	1	.1
30..	12	C 1	T	16	C 1	T	22	1	.1
31..	12	C 1	T	--	--	--	22	1	.1
Total	614	--	2.1	863	--	214.6	1072	--	149.7
Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	510	284	S 877	13	1	T	10	C 2	0.1
2..	93	6	1.5	47	470	A 60	9.2	C 2	T
3..	56	3	.5	67	43	S 15	9.2	C 2	T
4..	44	2	.2	19	4	.2	9.2	C 2	T
5..	39	C 1	.1	15	2	.1	44	9	1.1
6..	32	C 1	.1	13	C 1	T	31	4	.3
7..	28	C 1	.1	12	C 1	T	20	2	.1
8..	25	1	.1	14	1	T	16	C 1	T
9..	24	C 2	.1	14	1	T	15	C 1	T
10..	24	C 2	.1	12	1	T	14	C 1	T
11..	24	C 2	.1	15	3	.1	13	C 1	T
12..	34	C 2	.2	13	2	.1	13	C 1	T
13..	25	C 1	.1	11	2	.1	12	C 1	T
14..	22	C 1	.1	39	16	S 3.1	12	C 1	T
15..	21	C 1	.1	43	5	.6	11	C 1	T
16..	21	C 1	.1	18	2	.1	11	C 1	T
17..	20	C 1	.1	14	2	.1	11	C 1	T
18..	19	C 1	.1	13	C 2	.1	12	1	T
19..	18	C 1	T	13	C 2	.1	11	1	T
20..	17	C 1	T	12	C 2	.1	11	1	T
21..	17	C 1	T	12	C 1	T	12	2	.1
22..	16	C 1	T	11	C 1	T	13	2	.1
23..	16	C 1	T	11	C 1	T	11	2	.1
24..	16	C 1	T	11	C 1	T	11	1	T
25..	15	C 1	T	13	3	.1	10	1	T
26..	15	C 2	.1	12	2	.1	10	2	.1
27..	15	C 2	.1	11	2	.1	10	1	T
28..	15	C 2	.1	10	2	.1	10	C 1	T
29..	16	2	.1	--	--	--	10	C 1	T
30..	14	2	.1	--	--	--	9.8	C 1	T
31..	13	1	T	--	--	--	9.5	C 1	T
Total	1264	--	881.6	508	--	80.5	410.9	--	2.8

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly-estimated concentration graph.

C Composite period.

ISLAND OF OKINAWA--Continued

16-8842. FUKUJI-GAWA AT FUKUJI, OKINAWA--Continued

Suspended sediment, water year October 1966 to September 1967--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1..	9.5	C 1	T	15	4	0.2	103	20	5.6
2..	10	C 1	T	13	3	.1	42	3	.3
3..	11	C 1	T	28	10	S 2.0	89	330	A 80
4..	10	C 1	T	47	12	S 2.2	236	227	S 290
5..	10	C 1	T	17	3	.1	700	281	S 1540
6..	9.7	C 1	T	14	C 2	.1	1020	453	S 3130
7..	10	1	T	13	C 2	.1	621	86	S 315
8..	11	1	T	23	7	S .7	171	13	S 9.6
9..	12	1	T	26	5	.4	129	7	2.4
10..	11	1	T	15	2	.1	85	2	.5
11..	13	1	T	13	C 2	.1	69	2	.4
12..	14	1	T	13	C 2	.1	71	55	S 13
13..	11	1	T	17	5	.2	926	858	S 9130
14..	9.4	C 1	T	21	3	.2	101	6	1.6
15..	8.2	C 1	T	15	2	.1	61	3	.5
16..	7.8	C 1	T	13	2	.1	563	483	S 2260
17..	7.6	C 1	T	12	C 2	.1	187	18	9.1
18..	7.6	C 1	T	10	C 2	.1	99	5	1.3
19..	8.6	2	T	10	C 2	.1	75	3	.6
20..	53	7	1.0	19	10	S 1.1	61	3	.5
21..	15	2	.1	377	310	S 570	53	3	.4
22..	10	C 1	T	92	12	3.0	48	2	.3
23..	9.8	C 1	T	39	4	.4	44	2	.2
24..	9.8	2	.1	29	3	.2	40	2	.2
25..	16	2	.1	35	5	.5	39	2	.2
26..	10	C 1	T	74	21	6.4	36	2	.2
27..	9.2	C 1	T	45	6	.7	33	2	.2
28..	10	7	.2	28	3	.2	31	2	.2
29..	112	300	90	24	3	.2	29	C 2	.2
30..	18	6	.3	23	3	.2	28	C 2	.2
31..	--	--	--	190	780	A 400	--	--	--
Total	464.2	--	92.5	1310	--	990.0	5790	--	16792.7
Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1..	26	C 2	0.1	12	2	0.1	22	6	0.4
2..	25	C 2	.1	12	2	.1	14	5	.2
3..	24	C 2	.1	11	2	.1	11	4	.1
4..	23	2	.1	11	2	.1	11	3	.1
5..	22	2	.1	11	2	.1	10	2	.1
6..	21	2	.1	10	2	.1	9.8	2	.1
7..	21	C 2	.1	10	2	.1	9.2	2	T
8..	20	C 2	.1	9.8	1	T	9.2	2	T
9..	20	C 2	.1	9.8	1	T	10	4	.1
10..	19	C 1	.1	9.2	1	T	8.6	4	.1
11..	18	C 1	T	41	89	S 18	8.6	3	.1
12..	17	C 1	T	1750	--	E 20000	16	15	.6
13..	17	C 1	T	116	16	5.0	9.8	5	.1
14..	16	C 1	T	38	10	1.0	8.6	4	.1
15..	16	C 1	T	23	7	.4	8.1	C 3	.1
16..	15	C 1	T	21	4	.2	7.6	C 3	.1
17..	15	C 1	T	18	C 3	.1	7.6	C 3	.1
18..	16	2	.1	19	C 3	.2	7.2	2	T
19..	66	86	S 31	16	2	.1	7.2	2	T
20..	24	7	.5	16	2	.1	7.2	2	T
21..	16	2	.1	14	2	.1	7.2	2	T
22..	23	32	S 3.4	13	2	.1	7.2	2	T
23..	28	62	S 5.6	13	C 2	.1	6.7	2	T
24..	16	4	.2	13	C 2	.1	6.7	2	T
25..	15	3	.1	12	C 2	.1	6.2	2	T
26..	14	C 2	.1	12	C 2	.1	6.7	2	T
27..	13	C 2	.1	12	C 2	.1	7.6	2	T
28..	14	C 2	.1	11	C 2	.1	8.1	2	T
29..	13	C 2	.1	12	4	.1	8.6	2	T
30..	14	C 2	.1	21	8	.5	10	4	.1
31..	13	C 2	.1	18	8	.4	--	--	--
Total	620	--	42.9	2314.8	--	20027.7	277.7	--	3.1

Total discharge for year (cfs-days)..... 15508.6
 Total load for year (tons)..... 39280.2

E Estimated.

S Computed by subdividing day.

T Less than 0.05 ton.

A Computed from partly-estimated concentration graph.

C Composite period.

ISLAND OF OKINAWA--Continued
16-8842. FUKUJI-GAWA AT FUKUJI, OKINAWA--Continued

Particle-size analyses of suspended sediment, water year October 1966 to September 1967
(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)	Water tem- per- ature (° F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (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 31, 1967.....	1515	76		172	661	1380	48	67		96		98	99	100	--			SPWC
June 13.....	1050	73		8340	3700	83320	15	23	43			60	76	90	100			VPWC
June 13.....	1140	73		8620	2500	56180	14	24	43			61	80	97	100			VPWC

Particle-size analyses of bed material, water year October 1966 to September 1967
(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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (ppm)	Sediment discharge (tons per day)	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	16.000	32.000	64.000	
June 7, 1967.....	1400		3	290			2	14	25	36	54	76	91	97	100	S		
June 14.....	1130		3	96			2	6	16	29	50	77	93	98	100	S		
June 21.....	1100		3	53			1	2	6	14	29	49	60	76	94	100	S	

MISCELLANEOUS ANALYSES OF STREAMS IN RYUKYU ISLANDS

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967.—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)	Water tem- per- ature (°F)	Sam- pling point	Discharge (cfs)	Sediment concentra- tion (ppm)	Sediment discharge (tons per day)	Suspended sediment				Method of analysis
							Percent finer than size indicated, in millimeters				
ISLAND OF OKINAWA											
16-8752. BENOKI-GAWA AT BENOKI (Lat 26°47'06"N., long 128°14'59"E.)											
Feb. 15, 1967.....	1440	53		13	1	T					
Apr. 12.....	1230	70		5.7	2	T					
June 1.....	1310	72		16	1	T					
16-8755. YONA-GAWA AT YONA (Lat 26°45'10"N., long 128°13'18"E.)											
July 6, 1967.....	0915	78		4.6	1	T					
July 7.....	0850	79		4.6	1	T					
July 8.....	0900	80		4.6	1	T					
July 9.....	0940	80		4.6	1	T					
July 10.....	0920	80		4.4	1	T					
July 11.....	0930	79		4.1	1	T					
July 12.....	1700	90		3.8	1	T					
July 13.....	0920	79		3.8	1	T					
July 25.....	1635	79		2.8	3	T					
Aug. 2.....	1655	82		2.2	2	T					
Aug. 3.....	1020	81		2.4	2	T					
Aug. 9.....	1600	82		1.9	2	T					
Aug. 12.....	0630	--		358	G 2120	2050					
Aug. 29.....	1615	80		3.6	4	T					
Aug. 31.....	1325	78		27	48	3.5					
Aug. 31.....	1330	78		31	15	1.3					
Aug. 31.....	1340	78		30	58	4.7					
Aug. 31.....	1400	78		28	35	2.6					
Aug. 31.....	1420	78		21	124	7.0					
Sept. 22.....	1030	73		1.7	1	T					
16-8762. TAKAZATO-GAWA NEAR HAMA (Lat 26°41'10"N., long 128°10'48"E.)											
Jan. 18, 1967.....	1500	54		2.5	2	T					
Feb. 15.....	0845	63		2.8	1	T					
Feb. 15.....	0915	66		1.6	2	T					
June 20.....	1155	--		7.6	2	T					
16-8765. TAIHO-OKAWA AT TAIHO (Lat 26°39'01"N., long 128°08'37"E.)											
Apr. 14, 1967.....	1010	70		5.2	5	0.1					
16-8770. RIGHT BRANCH OF SOUTH FORK HENAN-GAWA NEAR TSUHA (Lat 26°37'42"N., long 128°05'52"E.)											
Feb. 20, 1967.....	1305	58		0.88	4	T					
Apr. 6.....	1120	64		.78	3	T					
May 23.....	1410	73		2.4	2	T					
June 9.....	1210	71		6.2	3	.1					
G Sample collected with single-stage sampler.											
T Less than 0.05 ton.											

T Less than 0.05 ton.

G Sample collected with single-stage sampler.

MISCELLANEOUS ANALYSES OF STREAMS IN RYUKYU ISLANDS--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1966 to September 1967--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)	Water tem- per- ature (°F)	Sam- ple point	Discharge (cfs)	Sediment concen- tration (ppm)	Sediment discharge (tons per day)	Suspended sediment		Method of analysis
							Percent finer than size indicated, in millimeters		
ISLAND OF OKINAWA--Continued									
Jan. 5, 1967.....	1140	51		18	2	0.1			
16-8775. GENKA-KAWA NEAR GENKA (Lat 26°36'43"N., long 128°03'47"E.)									
16-8785. OI-KAWA AT JINGUSUKU (Lat 26°39'07"N., long 127°57'24"E.)									
Feb. 21, 1967.....	1125	58		0.76	12	T			
June 9.....	1505	72		26	103	7.2			
16-8805. NAGATA-GAWA AT KADENA (Lat 26°22'23"N., long 127°45'50"E.)									
Feb. 20, 1967.....	1655	62		3.9	21	0.2			
16-8809. MACHINATO-GAWA NEAR OJANA (Lat 26°14'43"N., long 127°44'16"E.)									
Apr. 20, 1967.....	1410			6.5	145	2.5			
16-8824. TENGAN-GAWA AT TENGAN (Lat 26°22'54"N., long 127°51'39"E.)									
Feb. 20, 1967.....	1510	63		5.8	25	0.4			
16-8828. KANNA-GAWA NEAR KANNA (Lat 26°29'20"N., long 127°56'46"E.)									
Feb. 18, 1967.....	1100	54		1.6	2	T			
May 27.....	1110	77		1.6	16	T			
June 3.....	1025	73		1.9	7	T			
Aug. 13.....	1100	76		26	57	4.0			
16-8830. UFU-KAWA NEAR GINOZA (Lat 26°29'36"N., long 127°58'08"E.)									
Feb. 18, 1967.....	1210	52		1.4	42	0.2			
May 27.....	1210	79		5.2	275	3.9			
June 3.....	1205	73		2.3	164	1.0			
16-8833. LEFT FORK O-KAWA NEAR KUSHI (Lat 26°31'18"N., long 127°59'50"E.)									
Feb. 18, 1967.....	1400	55		0.39	4	T			
May 27.....	1425	72		.43	3	T			
June 3.....	1500	73		.55	3	T			
Aug. 13.....	1610	76		2.3	13	.1			
16-8835. S. OURA-GAWA AT OKAWA (Lat 26°34'10"N., long 128°02'23"E.)									
Feb. 20, 1967.....	1120	58		0.65	1	T			
May 23.....	1115	72		16	2	.1			

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