Quality of Surface Waters of the United States, 1964

Parts 12–15. Pacific Slope Basins in Washington and Upper Columbia River Basin to Alaska

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GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1959

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

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PREFACE

This report was prepared by the Geological Survey in cooperation with the States of Alaska, Idaho, Montana, Oregon, Washington, Bureau of Reclamation, and with other agencies, by personnel of the Water Resources Division, E. L. Hendricks, chief hydrologist, G. W. Whetstone, assistant chief for Reports and Data Processing, under the general direction of S. M. Lang, chief, Reports Section, and B. A. Anderson, chief, Data Reports Unit.

The data were collected under supervision of district chiefs, district chemists, or engineers of the Water Resources Division, as follows:

T. F. Hanly.....Worland, Wyo.
L. B. Laird and G. L. Bodhaine.....Portland, Oreg.
R. E. Marsh.....Anchorage, Alaska
W. T. Travis.....Boise, Idaho

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QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1964

PARTS 12-15

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 record 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 varicus 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 low flow. 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, suspended sediment, and water temperature 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 1949. From 1950 to 1958, the records were published in four volumes and from 1959 to 1963 in five volumes. Beginning with the 1964 water year, water quality records obtained by the Geological Survey were published in a new series of annual releases on a state-boundary basis. These records are then published in six volumes in the Geological Survey water-supply paper series. The drainage basins covered in the six volumes are shown in Figure 1. The data given in this report were collected during the water year October 1, 1963 to September 30, 1964. The records are

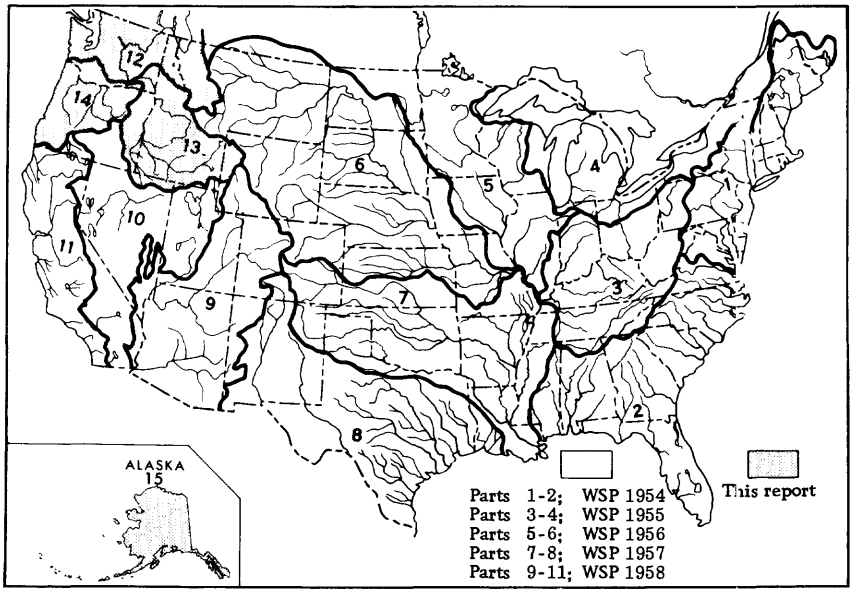

Figure 1.--Map of the United States showing basins covered by the six water-supply papers on quality of surface waters in 1964. The shaded part represents the section of the country covered by this volume; the unshaded part represents the section of the country covered by other water-supply papers.

arranged by drainage basins in downstream order according to the Geological Survey method of reporting streamflow. Stations on tributary streams are listed between stations on the main stem in the order in which those tributaries enter the main stem.

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 15 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 4-100 for a station whose complete identification number is 04-0100.00.

Descriptive statements are given for each sampling station where chemical analyses, temperature measurements, or sediment determinations have been made. These statements include 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, 1964, the Geological Survey maintained 183 stations on 132 streams for the study of chemical and physical characteristics of surface water. Samples were collected daily and monthly at 74 of these locations for chemical-quality studies. Samples also were collected less frequently at many other points. Water temperatures were measured continuously at 110 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. The specific conductance of almost all daily samples was determined, and as noted in the table headings this information is available for reference at the district offices listed under Division of Work, on page 28.

Quantities of suspended sediment are reported for 26 stations during the year ending September 30, 1964. 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 19 of the stations.

COLLECTION AND EXAMINATION OF SAMPLES

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 different rates of water discharge depending on the source of the material and the turbulence and mixing of the stream. In general, the distribution of sediment in a stream section is much more variable than the distribution of solutes. It is necessary to sample some streams at several verticals across the channel and especially for sediment, to uniformly traverse the depth of flow. These measurements require special sampling equipment to adequately integrate the vertical and lateral variability of the concentration in the section. These procedures yield a velocity-weighted mean 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 in order that the data would be relatively unaffected by diurnal variations in temperature. Most large streams have a small diurnal variation in water temperature; small, shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. The thermometers used for determining water temperature were accurate to plus or minus 0.5°F.

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

SEDIMENT

In general, suspended-sediment samples were collected daily with depth-integrating cable-suspended samples (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 were taken two or more times a day at most sampling stations.

Sediment concentrations were determined by filtration-evaporation method. At many stations the daily mean concentration for some days was obtained by plotting the velocity-weighted instantaneous concentrations on the gage-height chart. The plotted concentrations, adjusted if necessary, for cross-sectional distribution were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated velocity-weighted concentration at any time, and for most periods daily mean concentrations were determined from the

graph. The days were divided into shorter intervals when the concentration and water discharge were changing rapidly. During some periods of minor variation in concentration, the average concentration of the samples was used as the daily mean concentration. During extended periods of relatively uniform concentration and flow, samples for a number of days were composited to obtain average concentrations and average daily loads for each period.

For some periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately 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 following table lists the reciprocals of the combining weights of cations and anions generally reported in water analyses.

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

Conversion factors: Parts per million to equivalents per million

Ion	Multiply by	Ion	Multiply by
Aluminum (Al^{+3})	0.11119	Iron (Fe^{+3})	0.05372
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
Fluoride (F^{-1})	.05264	Sodium (Na^{+1})	.04350
Hydrogen (H^{+1})	.99209	Strontium (Sr^{+2})	.02283
Hydroxide (OH^{-1})	.05880	Sulfate (SO_4^{-2})	.02082
Iodide (I^{-1})	.00788	Zinc (Zn^{+2})	.03060

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

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

The value usually reported as dissolved solids is the residue on evaporation after drying at 180°C for 1 hour. For some waters, particularly those containing moderately large quantities of soluble salts, the value reported is calculated from the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. The calculated sum of the constituents may be given instead of, or in addition to the residue. In the analyses of most waters used for irrigation, the quantity of dissolved solids is given in tons per acre-foot as well as in parts per million.

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

The discharge of the streams is reported in cubic feet per second (see Streamflow, p. 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 on an electronic digital computer was instituted in the 1962 water year. This program extended computations to include averages for pH values expressed in terms of hydrogen ion and averages for the concentration of individual constituents expressed in tons per day. Concentrations in tons per day are computed the same as daily sediment loads.

The concentration of sediment in parts per million is computed as 1,000,000 times the ratio of the weight of sediment to the weight of water-sediment mixture. Daily sediment loads are expressed in tons per day and except for subdivided days, are usually obtained by multiplying daily mean sediment 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 potassium have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 or 100 parts per million of the two may require careful operation of steam boilers to prevent foaming. More highly mineralized waters that contain a large proportion of sodium salts may be unsatisfactory for irrigation.

In this report, 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 quan-

tities 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 in Illinois indicate that nitrates in excess of 70 parts per million (as NO_3) may contribute to methemoglobinemia ("blue babies") (Faucett and Miller, 1946), and more recent investigations conducted in Ohio show that drinking water containing nitrates in the range of 44 to 88 ppm (as NO_3) may cause methemoglobinemia (Waring, 1949). A report published by the National Research Council, Maxcy (1950) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding. U.S. Public Health Service (1962) sets 45 ppm as the upper limit.

Phosphate (PO_4)

Phosphorus is an essential element in the growth of plants and animals. 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 contain 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

For public use, water with hardness above 200 parts per million generally requires softening treatment (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:

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

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

Waters are divided into four classes with respect to sodium or alkali hazard: low, medium, high, and very high, depending upon the SAR and the specific conductance. At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are SAR values of approximately 2.5, 6.5, and 11. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Specific conductance (micromhos per centimeter at 25°C)

Specific conductance is a convenient, rapid determination used to estimate the amount of dissolved solids in water. It is a measure of the ability of water to transmit a small electrical current (see p. 8). The more dissolved solids in water 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. 8). The values of pH often are used as a measure of the solvent power of water or as an indicator of the chemical behavior certain solutions may have toward rock minerals.

The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, expressed as pH, is related to the corrosive properties of water and is useful in determining the proper treatment for coagulation that may be necessary at water-treatment plants. A pH of 7.0 indicates that the water is neither acid nor alkaline. pH readings progressively lower than 7.0 denote increasing acidity and those progressively higher than 7.0 denote increasing alkalinity. The pH of most natural surface waters ranges between 6 and 8. Some alkaline surface waters have pH values greater than 8.0 and waters containing free mineral acid or organic matter usually have pH values less than 4.5.

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

Color

In water analysis the term "color" refers to the appearance of water that is free from suspended solids. Many turbid waters that appear yellow, red, or brown when viewed in the stream show very little color after the suspended matter has been removed. The yellow-to-brown color of some waters is usually caused by organic matter extracted from leaves, roots, and other organic substances in the ground. In some areas objectionable color in water results from industrial wastes and sewage. Clear deep water may appear blue as the result of a scattering of sunlight by the water molecules. Water for domestic use and some industrial uses should be free from any perceptible color. A color less than 15 units generally passes unnoticed (U.S. Public Health Service, 1962). Some swamp waters have natural color in excess of 300 units.

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

Oxygen consumed

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

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

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.

Most probable number (MPN).--An index for determining the extent of pollution in water is the most probable number which is 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 property determining the quality of water. This is very evident for such a direct use as an industrial coolant. Temperature is also important, but perhaps not so evident, for its indirect influence upon aquatic biota, concentrations of dissolved gases, and distribution of chemical solutes in lakes and reservoirs as a consequence of thermal stratification and variation.

Surface water temperatures tend to change seasonally and daily with air temperatures, except for the outflow of large springs. Superimposed upon the annual temperature cycle is a daily fluctuation of temperature which is greater in warm seasons than in cold and greater in sunny periods than with a cloud cover. Natural warming is due mainly to absorption of a solar radiation by the water and secondarily to transfer of heat from the air. 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 streambed. 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 noncirculating lower portion. Separating the two is a stratum of water of variable vertical thickness in which the temperature

decreases rapidly with increasing depth. This physical division of the water mass into a circulating and a stagnant portion is the result of density differences in the water column associated with the temperature distribution. Knowledge of the stratification in a body of water may result in increased utility by locating strata of more suitable characteristics. For example, the elevation of an intake pipe may be changed to obtain water of lower temperature, higher pH, less dissolved iron, or other desirable properties.

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

Turbidity

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

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

Sediment

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended

sediment is that part 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, 1961-65." 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.

The water-supply papers and numbers which contain more complete records of stream discharge for this report are listed below:

Part	WSP	Part	WSP
Part 12		Part 13	1934
Volume 1	1932	Part 14	1935
Volume 2	1933	Part 15	1937

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 1941-64, are listed below:

Numbers of water-supply papers containing records for Parts 1 and 2, 1941-64

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1949	1163	1955	1403	*1959	1640
1942	950	1950	1189	1956	1453	1960	1745
1943	970	*1948-50	1372	*1954-56	1486	*1960	1720
1944	1022	1951	1200	1957	1523	1961	1885
1945	1030	1952	1253	*1957	1500	1962	1945
1946	1050	1953	1293	1958	1574	1963	1951
1947	1102	*1951-53	1466	*1958	1570	*1961-63	1953
1948	1133	1954	1353	1959	1645	1964	1959

*Part 15, Alaska.

Geological Survey reports containing chemical quality, temperature, and sediment data obtained before 1941 are listed below. Publications dealing largely with the quality of groundwater 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 libaries. 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

The Bureau of Reclamation, U.S. Department of the Interior, continued financial assistance for the operation of some chemical-quality of sediment investigations in the Pacific slope basins in Oregon and lower Columbia River basin and in Alaska by the Alaska Power Commission, U.S. Department of the Interior, formerly the Bureau of Reclamation.

Assistance in the form of funds and services was provided by: Corps of Engineers, U.S. Army for some stations in the Snake River basin in Idaho and Pacific slope basins in Washington and Oregon; by the Fish and Wildlife Service, U.S. Department of the Interior and the Forest Service, U.S. Department of Agriculture for some stations in the Snake River basin in Idaho; and by the U.S. Atomic Energy Commission for some stations on the Columbia River in Oregon.

Many Municipal, State, and Federal agencies assisted in collecting records for these quality-of-water investigations. In addition to the cooperative programs, many stations were operated from funds appropriated directly to the Geological Survey. The table on page 29 lists State and local agencies that cooperated in quality-of-water investigations included in this volume, and the locations of district offices responsible for the data collected.

DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, E. L. Hendricks, chief hydrologist, and G. W. Whetstone, assistant chief for Reports and Data Processing, under the general direction of S. M. Lang, chief, Reports Section, and B. A. Anderson, chief, Data Reports Unit. The data were collected and prepared for publication under the supervision of district chiefs, district chemists, or engineers as follows: In Alaska, R. E. Marsh; Idoho, Oregon, Washington,

State	Cooperating agency	Drainage basin	District office
Alaska	Alaska Department of Health and Welfare City of Anchorage.	Alaska	P. O. Box 2480 316 Skyline Bldg. Second and E Sts. Anchorage, Alaska 99501
Idaho	Idaho Department of Reclamation, C. E. Tappan, State reclamation engineer.	Pacific slope basins in Washington and upper Columbia River Snake River	Room 215 914 Jefferson St. Boise, Idaho 83702
Montana	Montana Fish and Game Commission, A. N. Whitney, chief of Fisheries Division.	Pacific slope basins in Washington and upper Columbia River	P. O. Box 1696 Room 421 Federal Bldg. Helena, Mont. 59601
Oregon	Oregon Board of Higher Education. Cities of Coos Bay and North Bend, Water Board.	Snake River Pacific slope basins in Oregon and lower Columbia River	P. O. Box 3202 830 NE Holladay Portland, Oreg. 97208
Washington	Washington Department of Conservation, Earl Coe, director. Washington State Pollution Control Commission, R. M. Harris, director.	Pacific slope basins in Washington and upper Columbia River Snake River	1305 Tacoma Ave., South Tacoma, Wash. 98402

and the Kootenai River basin in Montana, L. B. Laird, G. L. Bodhaine, and W. T. Travis; and in Montana, T. F. Hanly.

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 offices indicated in the table on page 29. Because of reorganization in recent years, the offices now administering water-quality programs in most of the States differ from those that were administering the programs in 1964.

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PART 12. PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

BEAR RIVER BASIN

12-95. BEAR RIVER NEAR NASELLE, WASH.

LOCATION.--Temperature recorder at gaging station, 3 miles upstream from U.S. Highway 101 crossing, and 5 miles southwest of Naselle, Pacific County.
DRAINAGE AREA.--11.7 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 59°F on several days during July and August; minimum, 40°F Dec. 11-14, Feb. 25, 26.
EXTREMES, July 1963 to September 1964.--Water temperatures: Maximum, 61°F Aug. 16, 1963; minimum, 40°F Dec. 11-14, 1963, Feb. 25, 26, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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	56	55	55	55	55	55	54	55	55	55	55	55	55	55	54	54	53	51	50	52	52	51	51	51	49	49	48	48	48	48	53
Minimum	55	54	55	55	55	54	54	54	54	55	55	55	55	55	54	54	53	51	49	49	50	51	51	51	49	49	48	48	48	48	48	52
November																																
Maximum	48	48	48	48	48	48	48	48	48	49	49	49	49	50	50	49	49	49	48	48	47	47	47	48	48	48	48	47	46	45	--	48
Minimum	48	48	48	48	48	48	48	48	48	48	48	48	49	49	49	49	49	48	48	47	47	47	47	47	47	48	47	46	45	45	--	48
December																																
Maximum	45	44	44	43	44	44	44	44	43	43	41	40	40	41	42	43	44	44	45	45	45	45	46	46	46	46	46	46	46	46	47	44
Minimum	44	44	42	43	43	44	44	43	43	41	40	40	40	40	41	42	43	44	44	45	45	45	45	46	46	46	46	46	45	46	46	44
January																																
Maximum	47	47	47	47	46	46	46	45	45	44	44	44	44	44	44	44	44	44	44	44	43	43	43	43	44	44	44	44	44	45	45	45
Minimum	47	47	47	46	46	46	45	45	44	44	44	44	44	44	44	44	44	44	44	43	43	43	42	42	43	44	44	44	44	44	45	44
February																																
Maximum	45	45	45	45	45	44	43	43	42	43	43	43	43	42	42	43	43	44	44	44	43	42	42	42	42	42	41	42	42	--	--	43
Minimum	45	45	44	44	44	43	42	42	42	42	43	43	42	42	42	42	43	43	44	43	42	42	42	42	40	40	41	41	41	--	--	42
March																																
Maximum	42	42	42	43	43	43	43	42	42	43	43	43	42	43	44	44	44	44	44	43	43	44	43	43	42	43	44	44	45	45	45	43
Minimum	41	42	42	42	43	43	42	42	42	42	43	42	42	42	43	44	44	44	43	43	43	43	43	41	42	42	43	44	44	45	45	43
April																																
Maximum	45	45	44	44	44	45	46	46	46	46	46	46	46	46	45	44	44	45	46	46	46	45	46	47	47	47	46	47	47	46	--	46
Minimum	44	44	43	44	44	44	44	46	46	46	45	45	45	45	44	43	43	43	44	46	45	45	45	46	47	46	46	45	46	44	--	45
May																																
Maximum	46	46	46	46	46	45	45	46	47	48	49	49	48	49	48	48	49	52	53	52	50	49	50	50	51	52	53	52	52	54	54	49
Minimum	44	44	45	46	44	44	45	45	46	47	47	47	47	46	47	48	48	49	51	50	49	49	48	49	47	49	52	52	52	51	53	48
June																																
Maximum	53	54	54	52	52	52	52	51	54	54	53	52	53	52	52	52	51	51	51	51	51	54	55	55	55	54	53	52	54	55	--	53
Minimum	52	52	52	52	52	52	51	51	51	53	52	52	52	52	52	51	51	51	51	50	50	50	53	53	52	53	52	51	51	53	--	52
July																																
Maximum	54	53	52	52	51	53	54	54	54	55	57	58	57	56	56	56	56	56	57	56	56	56	58	58	59	59	59	59	59	58	57	56
Minimum	53	52	52	51	51	51	53	53	53	53	54	56	56	55	56	56	56	56	54	55	55	56	54	56	57	57	58	58	58	57	57	55
August																																
Maximum	57	56	56	56	57	57	56	56	57	58	57	57	56	56	56	55	56	56	56	57	58	59	59	59	58	57	57	56	55	55	55	57
Minimum	56	56	56	56	55	55	56	55	56	55	57	56	55	54	54	54	55	56	55	55	56	57	57	57	57	57	56	55	55	54	54	56
September																																
Maximum	55	55	56	56	56	55	55	55	55	54	54	54	54	54	54	54	54	54	54	55	54	55	55	55	55	54	53	52	53	52	--	54
Minimum	55	55	55	55	55	55	55	55	53	53	53	53	54	53	54	54	54	53	54	54	53	54	54	54	54	52	52	52	52	52	--	54

NASELLE RIVER BASIN

12-100. NASELLE RIVER NEAR NASELLE, WASH.

LOCATION.--Temperature recorder 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.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 69°F July 12; minimum, 39°F Dec. 11, 12.
EXTREMES, July 1963 to September 1964.--Water temperatures: Maximum, 69°F July 12, 1964; minimum, 39°F Dec. 11, 12, 1963.
REMARKS.--Recorder stopped Dec. 9-11, Dec. 16 to Jan. 15; temperature range for Dec. 9-11, 39°F to 43°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAPA RIVER BASIN

12-115. WILLAPA RIVER AT LEBAM, WASH.

LOCATION.--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.
Water temperatures: March 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 12, 13, 27-29; minimum, 38°F Dec. 11, 12, Feb. 25.
EXTREMES, 1952-64.--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 1963 to September 1964

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

NORTH RIVER BASIN

12-170. NORTH RIVER NEAR RAYMOND, WASH.

LOCATION.--Temperature recorder at gaging station, 1.2 miles upstream from Salmon Creek, and 10 miles northwest of Raymond, Pacific County.
DRAINAGE AREA.--219 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 68°F Aug. 24; minimum, 40°F Dec. 12-15.
EXTREMES, July 1963 to September 1964.--Water temperatures: Maximum, 69°F Aug. 16, 1963; minimum, 40°F Dec. 12-15, 1963.

Temperature (°F) of water, July to September 1963

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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64	64	64	67	66	65	65	65	65	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	62	63	63	64	65	65	65	65	64	--
August																																
Maximum	65	67	66	65	65	65	67	68	68	67	7	66	66	66	67	69	68	68	67	67	67	67	66	66	64	63	64	64	66	66	65	66
Minimum	64	64	65	65	65	64	64	65	67	66	66	66	66	65	66	66	67	67	67	66	66	66	66	64	63	62	62	63	64	65	64	65
September																																
Maximum	64	65	66	67	67	68	67	66	68	67	67	66	66	65	65	62	61	60	60	59	59	59	59	59	59	59	58	58	59	59	--	63
Minimum	64	64	63	65	66	66	65	65	66	66	66	66	65	65	62	61	60	59	59	59	59	59	59	58	58	57	58	58	58	59	--	62

NORTH RIVER BASIN--Continued

12-170. NORTH RIVER NEAR RAYMOND, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

CHEHALIS RIVER BASIN

12-275. CHEHALIS RIVER NEAR GRAND MOUND, WASH.

LOCATION.--Temperature recorder at gaging station, at highway bridge at Meadows, 1.5 miles southwest of Grand Mound, Thurston County, and 6 miles downstream from Skookumchuck River.
DRAINAGE AREA.--895 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 12; minimum, 38°F Dec. 12-16.
EXTREMES, 1952-64.--Water temperatures: Maximum, 80°F July 22, 23, 1959; minimum, freezing point Jan. 29 to Feb. 4, 1957.

Temperature (°F) of water, water year October 1963 to September 1964

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

CHEHALIS RIVER BASIN--Continued

12-275. CHEHALIS RIVER NEAR GRAND MOUND, WASH.--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
Oct. 13, 1961	1445	55	1480	15	60
Dec. 19	1520	--	8200	26	576
Dec. 20	1015	42	10790	59	1720
Dec. 20	1810	--	11250	84	2550
Dec. 21	0540	42	12930	90	3140
Dec. 24	0800	46	11690	42	1330
Feb. 28, 1962	1315	35	1550	5	21
Mar. 28	1605	46	5740	22	341
Apr. 7	1620	50	5910	51	814
Apr. 27	1915	51	4840	54	706
Apr. 28	1230	46	8360	70	1580
May 24	0935	54	1350	7	26
June 22	1015	72	535	0	T
July 19	1230	66	268	17	12
Aug. 22	1850	74	250	9	6.1
Sept. 27	0910	63	192	0	T
Oct. 8	2230	52	1800	14	68
Oct. 12	1430	49	2600	14	98
Oct. 13	1600	50	4520	34	415
Oct. 14	0940	51	4890	28	370
Nov. 11	2000	48	5640	35	533
Nov. 12	1610	47	6490	45	789
Nov. 13	0900	--	6350	20	343
Nov. 15	1545	48	4060	8	88
Nov. 20	1705	50	20100	319	17300
Nov. 21	0820	48	29700	180	14400
Nov. 21	1850	47	27600	94	7000
Nov. 22	0855	47	20800	63	3540
Nov. 22	1750	47	17500	56	2650
Nov. 26	1330	48	24500	210	13900
Nov. 27	0900	45	28000	97	7330
Dec. 14	1410	48	3730	20	201
Dec. 14	2050	47	4880	40	527
Dec. 15	0845	47	5080	29	398
Dec. 15	1255	49	5480	33	488
Dec. 15	1850	48	6520	46	810
Dec. 16	0900	47	7390	46	918
Dec. 16	1130	48	7330	43	851
Dec. 16	1530	48	7150	36	695
Dec. 17	0910	48	6200	19	318
Dec. 30	1335	46	3620	24	235
Dec. 30	2100	45	5440	50	734
Dec. 31	0840	45	6900	81	1510
Dec. 31	1055	45	6950	76	1430
Dec. 31	1220	45	6900	76	1420
Jan. 2, 1963	0400	45	8690	88	2060
Jan. 2	1100	46	10500	140	3970
Jan. 2	1715	46	10800	122	3560
Jan. 2	2145	46	10500	88	2490
Jan. 3	1110	48	9620	53	1380
Jan. 3	1445	47	9370	52	1320
Jan. 3	1750	47	9100	41	1010
Feb. 1	1300	35	4690	63	798
Feb. 1	1650	35	5320	90	1290
Feb. 1	1915	35	5460	102	1500
Feb. 2	0750	36	5450	54	795
Feb. 2	1000	36	5380	47	683
Feb. 2	1225	36	5320	44	632
Feb. 2	1640	36	5380	42	610
Feb. 2	2125	37	6280	55	933
Feb. 3	0630	42	12100	307	10000
Feb. 3	1215	43	15500	424	17700
Feb. 3	1750	43	18200	434	21300
Feb. 4	0810	45	23500	197	12500
Feb. 4	0940	45	23500	164	10400
Feb. 4	1545	48	23100	142	8860

T Less than 0.05 ton.

CHEHALIS RIVER BASIN--Continued

12-275. CHEHALIS RIVER NEAR GRAND MOUND, WASH.--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
Feb. 5, 1963	1150	46	19400	114	5970
Feb. 5	2005	48	18500	102	5100
Feb. 6	0830	47	16200	78	3410
Feb. 27	1145	49	4000	26	281
Mar. 28	1420	47	4450	43	517
Mar. 29	2055	43	13500	168	6120
Mar. 30	1100	43	15400	106	4410
Mar. 30	1835	43	15300	86	3550
Mar. 31	1150	45	14000	52	1970
Mar. 31	1640	44	13400	52	1880
Mar. 31	2020	43	13000	48	1680
Apr. 1	1345	49	9490	40	1020
Apr. 22	1135	50	3090	11	92
May 5	1530	49	3340	11	99
May 5	2005	49	4210	22	250
May 6	0650	49	5190	30	420
May 6	1225	50	5200	26	365
May 6	1840	50	5130	20	277
May 25	1445	66	808	3	6.5
June 20	0950	69	358	5	4.8
July 17	0730	66	349	5	4.7
Aug. 27	1120	66	465	5	6.3
Oct. 2	0845	58	236	2	1.3
Oct. 22	1110	54	1740	42	197
Oct. 23	0915	51	3860	70	730
Nov. 13	1620	48	5340	24	346
Dec. 26	1055	43	4190	12	136
Jan. 1, 1964	1500	49	6080	36	591
Jan. 1	1750	48	7960	62	1330
Jan. 1	2230	46	11100	130	3900
Jan. 2	0930	45	15000	146	5910
Jan. 2	1155	46	15100	134	5460
Jan. 2	1400	46	15000	110	4460
Jan. 2	1800	46	14500	75	2940
Jan. 2	2250	46	13600	54	1980
Jan. 3	0900	45	11600	49	1530
Jan. 3	1240	45	10700	38	1100
Jan. 14	1225	44	6100	15	247
Jan. 17	1930	42	15400	113	4700
Jan. 18	0930	42	17800	88	4230
Jan. 18	1200	42	18100	86	4200
Jan. 18	1655	45	18400	81	4020
Jan. 19	1335	41	15500	57	2390
Jan. 19	1920	40	18300	52	2570
Jan. 20	1255	42	19500	118	6210
Jan. 20	1620	42	19700	100	5320
Jan. 21	0750	42	19000	50	2570
Jan. 21	1345	41	18100	38	1860
Jan. 21	1625	41	17600	41	1950
Jan. 24	2140	43	7780	21	441
Jan. 25	1125	43	16800	228	10400
Jan. 25	1955	--	22500	420	25500
Jan. 26	0830	--	35500	240	23000
Jan. 26	1035	--	36200	237	23200
Jan. 26	1530	44	35100	159	15100
Jan. 26	2035	43	32000	137	11800
Jan. 27	0825	44	24600	88	5850
Jan. 27	1335	44	22000	88	5230
Jan. 28	1020	43	16400	70	3100
Jan. 28	1450	43	15400	78	3240
Jan. 28	1735	42	14800	77	3100
Jan. 29	1345	45	12200	57	1880
Jan. 29	1720	44	12400	64	2140
Jan. 31	1000	44	10900	39	1150
Feb. 28	0925	42	1620	4	17
Mar. 30	1020	53	2000	10	54
Apr. 27	0745	49	1780	6	29
May 25	0920	53	1040	3	8.4
June 23	0910	61	948	4	10
July 28	0845	66	304	3	2.5
Aug. 24	0720	64	247	6	4.0
Sept. 23	1030	60	331	5	4.5

12-310. CHEHALIS RIVER AT PORTER, WASH.

LOCATION.--At gaging station at County Highway bridge, at mouth of Porter Creek, 700 feet west of Porter, Grays Harbor County.
DRAINAGE AREA.--1,294 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: July 1959 to September 1960, October 1961 to September 1964.
Sediment records: October 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 75°F July 11; minimum, 38°F Dec. 13.
Sediment concentrations: Maximum daily, 157 ppm Mar. 12; minimum daily, 1 ppm Aug. 21, Sept. 9, 11, 14.
Sediment loads: Maximum daily, 10,400 tons Jan. 26; minimum daily, 1 ton Aug. 21, Sept. 9, 11, 14.
EXTREMES, 1959-60, 1961-64.--Water temperatures: Maximum, 78°F July 27, 1962; minimum, 34°F Dec. 30, 1959, Jan. 13, 1963.
Sediment concentrations (1961-64).--Maximum daily, 190 ppm Nov. 20, 1962; minimum daily, 0 ppm on many days most years.
Sediment loads (1961-64).--Maximum daily, 10,400 tons Jan. 26, 1964; minimum daily, less than 0.50 ton on many days most years.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	3870	16		--		5.0	1.9	4.4	0.8		24		3.6	4.0	0.1	1.7	0.05	58	20	1		62	7.1	20	10.4	2400
Nov. 14.....	7980	14		--		4.5	1.7	4.1	.7		22		3.2	3.5	.1	1.9	.07	45	18	0		57	6.7	30	9.8	2400
Dec. 30.....	5410	15		--		4.5	1.8	3.9	.5		24		3.2	2.8	.1	1.3	.02	51	18	0		58	6.9	10	10.5	230
Jan. 28, 1964	28400	13		--		3.5	1.0	3.6	.7		16		2.8	2.8	.1	1.8	.03	47	12	0		44	6.7	15	10.8	930
Feb. 19.....	5490	15		--		4.5	1.8	4.0	.3		24		3.0	3.2	.1	1.1	.05	49	18	0		57	6.8	15	10.8	430
Mar. 9.....	6920	15		--		5.0	1.3	3.9	.8		23		3.0	3.5	.0	1.3	.05	52	18	0		55	6.9	15	11.4	930
Apr. 14.....	3320	13																								
Apr. 14.....	3320	13		0.19		3.5	1.3	2.7	.4		20		1.8	2.8	.0	.6	.00	35	14	0		42	7.0	5	12.1	930
May 25.....	1600	14		.40		6.0	2.1	4.8	.3		32		2.4	3.8	.1	.4	.06	54	24	0		68	6.8	10	10.5	230
June 16.....	1140	15		.38		6.5	2.4	5.1	.3		36		2.6	4.2	.1	.3	.04	62	26	0		74	7.4	10	9.6	91
July 13.....	574	15		--		7.5	2.8	5.5	.7		41		2.8	4.5	.1	.4	.07	63	30	0		87	7.1	5	9.3	230
Aug. 11.....	534	15		.40		4.5	2.2	3.5	.3		30		.0	2.5	.1	.4	.01	47	20	0		57	7.2	10	9.7	930
Sept. 16.....	420	14		.23		8.0	2.5	6.1	1.3		40		2.8	6.0	.0	.4	.09	61	30	0		91	7.0	5	9.6	230

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 30, 1963....	0.00	0.00	0.00	0.1	0.00	0.02
June 16, 1964....	.00	.00	.02	.05	.00	.00

CHEHALIS RIVER BASIN--Continued

12-310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

CHEHALIS RIVER BASIN--Continued

12-310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

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	414	C 5	6	3160	C 19	162	5780	C 11	172
2	404	C 5	5	3320	C 19	170	4970	C 11	148
3	400	C 5	5	4040	C 19	207	4340	C 11	129
4	404	C 5	5	3770	C 19	193	3850	C 11	114
5	411	C 5	6	4090	C 19	210	3580	C 11	106
6	422	C 5	6	4010	C 19	206	4380	C 16	189
7	428	C 5	6	4180	C 19	214	5450	C 16	235
8	428	C 5	6	5630	49	B 790	5370	C 16	232
9	414	C 5	6	7320	42	A 830	5140	C 16	222
10	400	C 5	5	6410	11	B 190	4630	C 16	200
11	394	C 5	5	6290	26	442	4070	C 10	110
12	390	C 5	5	5710	28	432	3640	C 10	98
13	422	C 5	6	6200	37	619	3330	C 10	90
14	468	C 5	6	7980	35	754	3080	C 10	83
15	512	C 5	7	11100	59	1770	2920	C 10	79
16	520	C 5	7	13000	13	B 460	2850	C 10	77
17	472	C 5	6	13400	16	B 580	3170	C 10	86
18	436	C 5	6	15800	42	A 1800	3360	C 10	91
19	418	C 5	6	16300	23	1010	3390	C 10	92
20	425	C 5	6	15400	29	1210	5200	31	B 470
21	606	8	J 14	14300	24	927	8950	64	B 1600
22	1690	56	J 260	11000	21	624	9400	37	A 940
23	4370	73	861	10300	21	B 580	7820	26	549
24	3730	33	A 330	12500	37	1250	6470	18	A 310
25	5110	48	A 660	12400	28	937	5890	16	254
26	5220	43	A 610	10100	21	573	6160	C 10	166
27	3920	C 22	233	9610	19	493	6180	C 10	167
28	3500	C 22	208	9530	22	566	6260	C 10	169
29	3870	C 22	230	8050	15	326	5980	C 10	161
30	3970	C 22	236	6780	14	256	5410	C 10	146
31	3640	C 22	216	--	--	--	5070	C 10	137
Total	48208	--	3974	261680	--	18781	156090	--	7622
	JANUARY			FEBRUARY			MARCH		
1	7790	45	S 1030	17000	46	2110	4000	19	205
2	14400	107	4160	16900	54	2460	5660	36	A 550
3	17200	54	2510	14600	46	1810	5430	19	279
4	13500	18	656	11400	34	1050	5720	24	A 370
5	10200	16	441	9130	22	542	8220	94	A 2100
6	10400	16	S 485	7760	21	440	9850	67	1780
7	14100	46	1750	6710	20	362	8480	39	893
8	13100	26	920	5940	20	321	7160	23	445
9	10100	20	545	5320	15	215	6920	18	336
10	10200	15	413	4910	22	292	7700	27	561
11	11100	16	480	4760	20	257	11100	63	S 1990
12	10100	17	464	4570	22	271	16100	157	A 6800
13	8500	14	321	4310	24	279	17600	88	A 4200
14	7880	16	340	4120	20	222	14900	40	1610
15	7720	24	500	4090	22	243	12800	31	1070
16	8950	33	797	4670	26	328	12200	33	1090
17	14600	94	A 3700	5020	28	380	10000	26	702
18	20300	76	4170	5360	29	420	8770	33	781
19	23700	62	3970	5490	25	371	7690	23	478
20	25100	50	3390	5240	20	283	6750	26	474
21	24800	48	3210	4730	17	217	6200	25	418
22	23100	40	2490	4310	15	175	5640	19	289
23	18000	30	1460	3930	19	202	5050	18	245
24	14000	36	1360	3620	14	137	4570	16	197
25	20000	101	5450	3360	16	145	4140	15	168
26	26800	144	10400	3130	14	118	3970	12	129
27	36700	82	8130	2930	18	142	3920	10	106
28	28400	47	3600	2810	6	46	3590	13	126
29	22600	40	2440	2840	8	61	3340	15	135
30	19400	43	2250	--	--	--	3160	10	85
31	17800	40	1920	--	--	--	3110	10	84
Total	510540	--	73752	178960	--	13899	234740	--	28696

S Computed by subdividing day.
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.

CHEHALIS RIVER BASIN--Continued

12-310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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	3110	8	67	2300	6	37	1100	4	12
2	3120	12	101	2330	4	25	1090	4	12
3	2960	13	104	2310	2	12	1060	6	17
4	2770	9	67	2200	4	24	1100	4	12
5	2720	7	51	2090	4	23	1180	2	6
6	2650	11	79	2010	2	11	1410	4	15
7	2510	7	47	1920	C 2	10	1510	3	12
8	2380	12	77	1840	C 2	10	1530	9	37
9	2360	8	51	1800	C 2	10	1510	10	41
10	2470	12	80	1760	C 2	10	1420	14	54
11	2650	9	64	1740	4	19	1280	12	41
12	3000	14	113	1720	4	19	1210	12	39
13	3310	16	143	1660	4	18	1150	8	25
14	3320	14	125	1660	4	18	1090	12	35
15	3360	8	73	1580	4	17	1040	6	17
16	4100	17	188	1480	8	32	1140	8	25
17	4110	21	233	1420	4	15	1440	9	35
18	3800	18	185	1390	4	15	2210	13	78
19	3410	17	157	1370	4	15	2810	19	144
20	3050	10	82	1380	4	15	2230	15	90
21	2780	15	113	1490	6	24	1890	11	56
22	2800	10	76	1900	8	41	1610	7	30
23	3060	14	116	1940	6	31	1420	8	31
24	2810	11	83	1810	6	29	1270	C 4	14
25	2590	10	70	1600	4	17	1140	C 4	12
26	2470	14	93	1450	15	59	1040	C 4	11
27	2520	4	27	1320	13	46	1000	C 4	11
28	2550	2	14	1250	10	34	985	C 4	11
29	2460	2	13	1210	8	26	965	C 4	10
30	2350	4	25	1170	6	19	900	C 4	10
31	--	--	--	1120	6	18	--	--	--
Total	87550	--	2717	52220	--	699	40730	--	943

Day	JULY			AUGUST			SEPTEMBER		
1	845	6	14	614	2	3	530	3	4
2	812	2	4	794	4	9	514	3	4
3	798	4	9	816	5	11	498	2	3
4	790	5	11	816	4	9	510	2	3
5	772	8	17	808	5	11	494	2	3
6	749	6	12	758	3	6	469	2	3
7	736	6	12	686	4	7	469	2	3
8	700	4	8	626	2	3	480	2	3
9	668	6	11	590	2	3	490	1	1
10	654	4	7	558	2	3	538	2	3
11	630	6	10	534	2	3	510	1	1
12	602	6	10	514	2	3	472	2	3
13	574	6	9	510	2	3	444	2	2
14	594	4	6	490	2	3	430	1	1
15	700	4	8	480	2	3	420	3	3
16	860	6	14	462	2	2	420	2	2
17	890	8	19	444	2	2	480	4	5
18	785	8	17	444	4	5	486	4	5
19	713	8	15	452	2	2	562	6	9
20	677	C 2	4	466	2	3	542	4	6
21	677	C 2	4	458	1	1	510	2	3
22	677	C 2	4	434	2	2	526	5	7
23	690	C 2	4	416	3	3	510	2	3
24	646	C 2	3	402	3	3	494	4	5
25	602	C 2	3	388	3	3	472	3	4
26	570	C 2	3	396	3	3	448	3	4
27	546	4	6	406	3	3	434	4	5
28	518	2	3	458	2	2	427	2	2
29	498	3	4	472	2	3	420	3	3
30	490	4	5	514	3	4	554	2	3
31	518	4	6	510	2	3	--	--	--
Total	20981	--	262	16716	--	124	14553	--	106

Total discharge for year (cfs-days)..... 1,622,970
Total load for year (tons)..... 151,575

C Composite period.

CHEHALIS RIVER BASIN--Continued

12-310. CHEHALIS RIVER AT PORTER, WASH.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
Jan. 3, 1964.....	1000	45		17800	56		35	50	55	64	68	74	81	97	100			VBWC
Jan. 26.....	1810	44		28800	126		64	75	86	92	92	94	97	99	99	100		VPWC

12-325. CLOQUALLUM RIVER AT ELMA, WASH.

LOCATION.--At gaging station on U.S. Highway 410, 0.5 mile east of Elma, Grays Harbor County, and 1.8 miles downstream from Wildcat Creek.
DRAINAGE AREA.--64.9 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	600	15		--		5.0	1.7	3.7	0.6		21		2.8	3.2	0.1	3.7	0.01	53	20	2		57	6.9	20	10.1	2400
Nov. 14.....	806	13		--		4.0	1.7	3.1	.4		19		3.2	3.2	.1	2.9	.02	40	17	2		50	6.6	20	9.8	2400
Dec. 30.....	483	14		--		4.0	1.9	3.1	.3		22		2.2	3.2	.0	2.1	.01	43	18	0		52	6.8	5	10.9	210
Jan. 28, 1964	818	13		--		3.0	1.9	2.9	.3		18		2.2	3.2	.0	1.7	.00	40	15	0		46	6.8	10	11.7	430
Feb. 19.....	300	13		0.22		4.5	1.8	3.2	.3		22		2.8	3.0	.1	1.6	.03	44	18	0		55	7.1	10	11.2	36
Mar. 9.....	477	13		.21		4.0	1.8	3.1	.6		20		2.2	3.0	.0	1.6	.02	44	18	1		50	6.9	10	11.7	230
Apr. 14.....	180	15		.21		5.0	2.0	3.3	.6		26		2.0	3.0	.0	1.0	.02	46	20	0		58	7.0	5	12.2	91
May 25.....	102	14		.30		5.5	2.4	3.7	.2		31		2.2	3.2	.1	.9	.04	52	24	0		66	7.1	10	11.2	390
June 16.....	120	14		--		5.5	2.5	3.9	.3		30		2.0	2.8	.1	.8	.03	A 56	24	0		63	7.3	20	10.1	2400
July 13.....	41	17		.36		6.0	2.7	4.0	.3		34		2.2	3.0	.1	1.1	.02	54	26	0		71	7.2	5	9.3	930
Aug. 11.....	38	16		.37		6.5	2.7	4.0	.6		36		2.2	3.2	.1	.8	.04	54	27	0		73	7.3	5	9.9	1500
Sept. 16.....	35	16		.37		6.5	2.8	4.3	.5		36		2.2	2.0	.1	.8	.04	58	28	0		76	7.1	10	9.9	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 30, 1963....	0.00	0.20	0.20	0.1	0.00	0.00
June 16, 1964....	.00	.00	.05	.05	.00	.02

CHEHALIS RIVER BASIN--Continued

12-325. CLOQUALLUM RIVER AT ELMA, WASH.--Continued

Periodic determinations of suspended-sediment discharge, January 1962 to January 1964

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
Jan. 29, 1962	1205	42	285	14	11
Apr. 27	2120	45	639	60	104
Apr. 28	1100	47	625	24	40
July 19	1620	66	39	3	.3
Oct. 8, 1962	1630	52	350	25	24
Oct. 9	0120	50	551	79	118
Oct. 9	0845	50	653	73	129
Oct. 9	1930	51	575	42	65
Oct. 10	0735	49	380	20	21
Nov. 11	1535	49	530	11	16
Nov. 12	0945	46	446	8	9.6
Nov. 13	0800	47	458	2	2.5
Nov. 15	1440	49	380	3	3.1
Nov. 21	1040	49	1610	75	326
Nov. 26	1540	47	1480	59	236
Nov. 26	2040	47	1330	55	198
Dec. 14	1530	48	896	41	99
Feb. 4, 1963	1650	49	1060	80	229
Mar. 31	1045	44	868	52	122
May 5	1655	51	418	14	16
Dec. 23	1130	47	940	17	43
Jan. 1, 1964	1915	47	2250	214	1300
Jan. 1	2325	47	1920	142	736
Jan. 2	1100	45	1340	52	188
Jan. 2	1440	46	1230	47	156
Jan. 2	1900	--	1110	42	126
Jan. 3	1045	45	810	30	66
Jan. 25	1015	43	2920	226	1780
Jan. 26	1155	47	1630	86	378
Jan. 28	1340	43	774	34	71
Jan. 29	1455	46	1000	45	122

CHEHALIS RIVER BASIN--Continued

12-381. WISHKAH RIVER NEAR WISHKAH, WASH.

LOCATION.--At county 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 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		12		--		4.0	1.7	3.4	0.3		19		2.8	3.8	0.1	1.6	0.01	40	17	2		52	7.2	10	10.5	750
Nov. 14.....		11		--		4.0	1.0	3.0	.3		17		2.4	2.5	.0	1.4	.02	39	14	0		43	6.5	15	10.7	230
Dec. 23.....		8.1		--		2.5	.9	2.6	.3		12		2.8	3.0	.1	1.5	.06	29	10	0		33	6.7	10	11.4	91
Jan. 28, 1964		12		0.45		3.5	1.3	2.9	.3		17		1.4	3.5	.0	.6	.02	35	14	0		42	6.8	5	11.8	36
Feb. 19.....		12		.20		3.5	1.6	3.1	.2		19		1.8	3.0	.1	.7	.02	37	15	0		46	6.9	5	11.9	36
Mar. 9.....		12		.13		3.5	1.6	3.0	.0		20		1.6	3.5	.0	.8	.01	39	15	0		45	7.0	10	12.1	91
Apr. 14.....		13		.15		4.5	1.7	3.2	.3		24		1.4	3.5	.0	.4	.01	40	18	0		52	7.0	5	11.0	23
May 25.....		13		.27		5.0	2.4	3.6	.1		30		2.2	3.2	.1	.4	.02	46	22	0		61	7.0	5	11.1	36
June 16.....		12		.27		5.5	2.6	3.8	.2		32		1.8	3.0	.1	.3	.01	47	24	0		66	7.2	5	10.2	91
July 13.....		16		.21		6.5	2.9	4.5	.3		38		1.8	3.8	.1	.2	.04	55	28	0		77	7.5	5	9.6	57
Aug. 13.....		14		.22		6.5	2.1	4.1	.4		34		2.2	3.5	.1	.3	.02	53	24	0		70	7.2	5	10.4	230
Sept. 16.....		15		.37		7.0	2.6	4.4	.7		36		2.4	3.2	.0	.4	.04	55	28	0		75	7.0	10	10.5	230

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 23, 1963....	0.01	0.01	0.25	0.05	0.00	0.02
June 16, 1964....	.00	.00	.01	.05	.00	.01

CHEHALIS RIVER BASIN--Continued

12-381. WISHKAH RIVER NEAR WISHKAH, WASH.--Continued

Periodic determinations of suspended-sediment discharge, September 1961 to December 1963

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
Sept. 19, 1961	0840	57	--	4	--
Jan. 29, 1962	1455	45	245	12	7.9
Apr. 28	0900	45	835	24	54
Apr. 28	1700	47	690	17	32
July 20	0710	57	66	1	.2
Aug. 23	0930	60	67	2	.4
Oct. 9	1645	52	840	48	109
Nov. 26	1830	49	2250	57	346
Nov. 27	1445	46	1830	32	158
Mar. 29, 1963	1150	44	700	22	42
Dec. 23	0210	46	3550	154	1480
Dec. 23	1540	47	3700	210	2100
Dec. 26	1730	44	1140	22	68

HOQUIAM RIVER BASIN

12-385. WEST FORK HOQUIAM RIVER NEAR HOQUIAM, WASH.

LOCATION.--At bridge on U.S. Highway 101, 0.5 mile downstream from Poison Creek, 0.8 mile downstream from Hoover Creek, and 4.2 miles northwest of Hoquiam, Grays Harbor County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		12		--		3.5	1.6	3.9	0.3		19		2.0	6.0	0.1	0.7	0.00	42	15	0		51	6.9	10	10.3	430
Nov. 14.....		10		--		3.5	.6	3.6	.3		13		1.6	4.5	.0	.7	.02	36	11	0		41	6.5	10	10.2	750
Dec. 23.....		8.0		--		2.0	1.0	3.7	.2		11		1.6	4.2	.1	.6	.01	31	9	0		35	6.7	15	11.0	36
Jan. 28, 1964		11		0.12		3.0	.9	3.5	.3		14		.2	5.2	.1	.2	.01	33	11	0		41	6.8	5	11.6	36
Feb. 19.....		11		.16		3.0	1.3	3.7	.2		16		1.0	5.0	.1	.4	.02	36	13	0		45	6.9	5	11.6	430
Mar. 9.....		11		.15		3.0	1.3	3.7	.6		16		1.2	5.2	.0	.4	.01	39	13	0		45	6.8	5	12.0	230
Apr. 14.....		14		.20		4.0	1.7	4.0	.3		22		.8	5.5	.0	.3	.01	41	17	0		53	7.0	5	8.8	36
May 25.....		14		.26		4.5	2.2	4.1	.0		27		.2	5.5	.0	.3	.02	46	20	0		61	7.1	5	10.8	4600
June 16.....		15		.38		5.0	2.4	4.5	.2		30		1.8	5.0	.1	.2	.05	52	22	0		64	7.1	5	10.5	430
July 13.....		16		--		5.0	3.3	5.0	.0		34		.2	5.8	.1	.3	.03	54	26	0		75	7.0	10	10.1	230
Aug. 13.....		16		.43		6.0	2.2	4.5	.4		32		.2	5.0	.1	.2	.02	52	24	0		70	7.0	5	10.3	36
Sept. 16.....		16		.43		6.0	2.7	4.8	.6		34		.0	5.2	.1	.3	.03	58	26	0		74	7.0	15	10.0	230

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 23, 1963....	0.01	0.01	0.27	0.05	0.00	0.02
June 16, 1964....	.00	.00	.01	.05	.00	.01

SKOKOMISH RIVER BASIN

12-600. SOUTH FORK SKOKOMISH RIVER NEAR POTLATCH, WASH.

LOCATION.--Temperature recorder at gaging station, 1 mile upstream from Rock Creek, 3 miles downstream from Brown Creek, and 7.5 miles west of Potlatch, Mason County.
DRAINAGE AREA.--63.4 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1955 to September 1964 (discontinued).
EXTREMES, 1963-64.--Water temperatures: Maximum, 61°F on several days during July and August; minimum, 38°F Mar. 11, 12.
EXTREMES, 1955-64.--Water temperatures: Maximum (1955-62, 1963-64), 66°F July 22, 1959, Aug. 8, 9, 1960, July 13, 1961, July 24-26, 1962; minimum, freezing point Mar. 7, 1956.

Temperature (°F) of water, water year October 1963 to September 1964

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

SKOKOMISH RIVER BASIN--Continued

12-615. SKOKOMISH RIVER NEAR POTLATCH, WASH.

LOCATION (revised).--Temperature recorder at gaging station on upstream side of right pier of bridge on U.S. Highway 101, 3.4 miles downstream from confluence of North and South Forks, 4.7 miles southwest of Potlatch, Mason County, and 4.9 miles upstream from mouth.
DRAINAGE AREA.--227 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1960 to June 1964.
Water temperatures: May 1955 to September 1962, October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 59°F July 27, 28.
EXTREMES, 1955-62, 1963-64.--Water temperatures: Maximum, 69°F July 13, 1961; minimum (1955-62), 38°F Dec. 16, 1961.
REMARKS.--Prior to May 27, 1964, gaging station located 0.6 mile upstream. Recorder not working properly Jan. 21 to Feb. 18. Clock was stopped as follows: June 14, 15, temperature range not determined; temperature range, Aug. 6-20, 52°F to 58°F; Aug. 24 to Sept. 30, 50°F to 57°F.

Chemical analyses of water, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 1, 1961.	638	12		0.02		8.5	1.7	2.0	0.2		36		2.0	1.5	0.0	0.1	0.02	49	28	0		67	7.2	5	12.0	91
Feb. 14, 1962	1360	11		--		7.5	.9	1.7	.3		30		1.0	1.5	.1	.0	.00	45	22	0		54	7.2	5	11.0	23
May 14.....	882	12		--		8.0	1.4	1.9	.4		33		1.0	1.2	.1	.1	.03	48	26	0		62	7.1	0	11.1	23
Aug. 14.....	278	13		.03		9.0	2.1	2.4	.3		40		.6	1.5	.1	.2	.03	50	31	0		74	7.3	0	9.6	150
Dec. 13.....	1440	11		.22		8.0	1.4	2.3	.2		34		1.8	1.8	.0	.0	.01	44	26	0		60	6.7	5	15.0	230
June 17, 1963	322	12		.06		9.0	1.8	1.9	.1		40		.0	1.5	.0	.1	.03	50	30	0		70	7.3	0	10.0	23
Dec. 23.....	6840	8.3		--		5.0	1.2	1.8	.3		24		1.2	1.0	.1	.3	.02	31	18	0		43	7.1	10	11.8	23
June 15, 1964	624	9.9		.04		8.0	2.0	2.0	.2		36		1.2	1.0	.1	.0	.04	45	28	0		62	7.3	0	10.7	36

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1000	0.00	0.00	0.04	0.1	0.00	0.01
May 14, 1962.....	0715	.00	.00	.00	.05	.00	.00
Dec. 13.....	0845	.00	.00	.00	.05	.00	.00
June 17, 1963....	1040	.00	.00	.00	.05	.00	.00
Dec. 23.....	0700	.00	.01	.15	.05	.00	.00
June 15, 1964....	0900	.00	.00	.00	.05	.00	.02

SKOKOMISH RIVER BASIN--Continued

12-615. SKOKOMISH RIVER NEAR POTLATCH, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	51	51	50	50	50	50	50	50	50	50	50	50	51	51	51	51	50	49	49	49	49	49	49	49	49	48	48	48	48	48	48	50
Minimum	49	49	50	49	49	49	49	50	50	50	50	50	50	51	51	50	49	49	49	49	49	49	49	49	48	48	48	48	48	48	48	49
November																																
Maximum	48	48	47	47	46	45	45	45	45	45	46	46	46	46	46	45	45	45	45	44	44	44	44	44	44	44	45	45	45	44	--	45
Minimum	48	47	47	46	45	45	44	44	45	45	44	46	46	46	45	45	45	45	44	44	44	44	44	44	44	44	44	45	44	44	--	45
December																																
Maximum	44	44	45	45	45	45	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	43	43	44	45	44
Minimum	44	44	44	45	45	44	44	44	44	43	43	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	43	43	43	43	44	44
January																																
Maximum	45	46	44	43	43	43	43	42	42	42	42	42	42	42	42	41	41	40	40	40	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	45	44	43	43	43	43	42	42	42	42	42	42	42	42	41	41	40	40	40	40	--	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	45	44	44	43	43	43	43	43	44	44	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	44	44	43	43	43	43	43	43	43	43	--	--	--
March																																
Maximum	44	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	47	46	45	45	46	47	47	46	45	45	46	46	48	47	46	45
Minimum	43	44	44	44	44	44	45	45	45	45	44	44	45	45	44	45	45	45	45	45	45	46	46	45	45	45	45	45	46	46	46	45
April																																
Maximum	46	45	46	48	46	48	48	47	46	46	46	47	47	47	47	49	47	49	49	49	49	48	49	49	49	49	49	49	49	48	--	48
Minimum	44	44	44	46	44	45	45	46	46	46	44	46	46	47	46	45	45	45	45	47	47	47	47	47	47	47	47	47	47	47	--	46
May																																
Maximum	48	49	49	49	49	54	50	49	48	48	53	50	48	48	48	48	48	48	53	51	48	48	51	51	51	52	53	52	52	53	53	50
Minimum	47	47	47	48	48	48	49	47	47	47	47	48	47	45	47	47	48	47	47	47	47	47	46	46	46	47	48	49	49	49	49	47
June																																
Maximum	50	49	48	48	47	47	46	46	52	52	51	49	49	--	--	48	48	49	52	49	52	52	53	53	53	54	52	50	55	56	--	50
Minimum	49	47	46	47	46	46	46	46	46	48	48	48	48	--	--	48	48	48	48	48	48	48	50	50	50	51	50	49	49	52	--	48
July																																
Maximum	54	54	53	53	53	52	55	53	55	57	58	58	58	55	54	53	54	55	56	54	53	53	56	57	58	58	59	59	57	55	55	55
Minimum	51	51	52	51	51	51	51	52	52	52	53	54	55	53	52	51	51	51	52	53	52	52	52	52	54	55	54	55	55	55	53	53
August																																
Maximum	54	54	56	55	57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	56	57	57	--	--	--	--	--	--	--	--	--
Minimum	53	53	53	53	53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53	53	53	--	--	--	--	--	--	--	--	--

12-8325. NISQUALLY RIVER NEAR NATIONAL, WASH.

LOCATION.--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 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 56°F Aug. 11, 21.
EXTREMES, 1951-64.--Water temperatures: Maximum, 65°F July 13, 1961; minimum (1951-63), freezing point on many days during winter months.
REMARKS.--Recorder not operating properly Oct. 26 to Dec. 11; thermograph tube buried in streambed Dec. 12 to Jan. 28; no temperature range determined.

Temperature (°F) of water, water year October 1963 to September 1964

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

CHAMBERS CREEK BASIN

12-903. CLOVER CREEK NEAR PARKLAND, WASH.

LOCATION.--At Waller Road Bridge, approximately 2.5 miles southeast of Parkland, Pierce County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		20		--		9.5	3.4	4.7	1.1		46		4.4	3.0	0.0	2.4	0.05	76	38	0		97	7.4	5	13.4	430
Nov. 15.....		22		0.07		9.0	3.8	4.6	1.3		45		4.2	3.0	.1	3.3	.07	81	38	1		99	7.1	20	11.6	430
Dec. 4.....		23		.02		9.0	3.5	4.8	1.0		46		4.0	2.5	.1	3.2	.04	76	37	0		97	7.0	5	11.7	280
Jan. 27, 1964		20		--		8.5	2.7	4.3	1.4		34		6.4	3.5	.1	4.2	.06	73	32	4		88	6.9	10	10.5	23
Feb. 25.....		21		.02		9.0	3.5	4.3	.9		41		5.8	3.0	.1	3.1	.03	77	37	4		95	7.0	5	10.3	36
Mar. 16.....		20		.01		9.0	3.2	4.4	1.0		42		5.2	3.5	.1	3.1	.02	74	36	2		96	7.0	5	11.6	23
Apr. 15.....		19		--		9.0	3.5	4.1	1.2		42		5.4	3.0	.1	3.0	.02	68	37	2		96	6.9	5	10.9	36
May 20.....		18		.04		8.5	4.0	4.3	.5		43		4.8	4.0	.1	2.6	.02	70	38	2		95	7.1	0	10.9	230
June 8.....		18		.03		9.0	3.5	4.4	.7		44		5.0	3.0	.1	3.9	.05	72	37	1		96	7.3	5	12.2	91
July 7.....		18		.02		8.5	3.9	4.5	1.4		45		4.6	3.0	.1	2.6	.03	73	37	0		97	7.4	5	13.3	91
Aug. 28.....		19		.03		9.0	3.7	4.6	1.3		47		3.4	3.0	.1	3.0	.04	70	38	0		99	7.0	5	10.6	36
Sept. 15.....		19		.04		9.5	3.4	4.6	1.5		46		3.4	3.0	.0	3.0	.03	74	38	0		98	7.2	5	11.6	430

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)	Total phosphate as PO_4
Nov. 15, 1963....	0.01	0.01	0.03	0.1	0.01	0.03	0.06
May 20, 1964.....	.00	.00	.00	.05	.00	.00	.07

CHAMBERS CREEK BASIN--Continued

12-906. CLOVER CREEK ABOVE STEILACOOM LAKE, NEAR TACOMA, WASH.

LOCATION.--At Clover Crest Drive Bridge, 0.4 mile upstream from Steilacoom Lake, and 2.2 miles southwest of Tacoma, Pierce County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^+	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		13		--		9.5	2.7	4.5	1.0		42		5.6	3.5	0.0	2.0	0.05	75	34	0		90	6.9	10	10.2	750
Nov. 15.....		16		0.26		10	2.9	4.4	1.0		40		5.6	3.2	.0	3.7	.05	75	37	4		95	7.1	20	9.1	4600
Dec. 4.....		18		.18		9.5	3.7	5.0	1.1		42		6.2	3.8	.0	4.5	.05	77	38	4		104	6.8	5	10.6	430
Jan. 27, 1964		14		--		7.5	2.5	4.4	1.5		30		7.2	3.2	.1	3.7	.07	62	29	4		82	6.8	15	10.0	73
Feb. 25.....		14		--		9.0	2.8	4.3	.7		35		6.0	4.0	.1	4.0	.03	69	34	6		91	6.8	10	10.9	23
Mar. 16.....		14		.09		8.0	3.1	4.6	.8		36		5.6	3.5	.1	3.5	.03	67	33	3		90	6.9	5	12.0	36
Apr. 15.....		12		--		8.5	2.8	4.2	1.1		36		6.0	4.0	.1	2.5	.03	60	32	3		89	6.9	5	12.8	23
May 20.....		9.8		.07		8.5	3.3	4.5	.7		40		5.8	3.5	.0	2.9	.02	58	34	2		92	7.0	5	9.9	930
June 8.....		9.6		.12		8.0	3.5	4.3	.6		39		5.2	3.5	.0	3.1	.03	59	34	2		90	7.0	5	11.1	390
July 7.....		9.6		.09		8.0	3.4	4.5	.6		40		5.2	3.5	.1	2.4	.03	A 57	34	1		91	7.4	5	12.3	230
Aug. 28.....		9.2		.16		9.5	3.4	4.9	.9		40		6.0	3.5	.0	5.2	.18	64	38	4		104	6.5	5	12.0	4600
Sept. 15.....		8.0		.09		10	4.0	5.0	1.5		46		6.6	4.0	.0	2.9	.04	65	42	4		109	7.0	5	11.4	430

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1963....	0.02	0.02	0.07	0.05	0.00	0.02
May 20, 1964.....	.00	.00	.02	.05	.00	.00

CHAMBERS CREEK BASIN--Continued

12-910. CHAMBERS CREEK BELOW STEILACOOM LAKE, NEAR STEILACOOM, WASH.

LOCATION.--At outlet of Steilacoom Lake at Steilacoom Drive, 1.4 miles upstream from Flett Creek, and 3 miles northeast of Steilacoom, Pierce County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		17				12	3.6	5.4	0.9		52		7.2	4.2	0.1	1.5	0.39	81	44	2		112	6.8	5	10.3	230
Nov. 15.....		17				10	4.1	5.2	1.0		50		7.2	4.0	.1	1.0	.21	79	42	1		108	7.1	5	10.4	390
Dec. 4.....		17				10	3.9	5.1	1.0		46		7.8	3.8	.1	1.5	.14	74	41	4		109	6.7	5	10.2	91
Jan. 27, 1964		15				9.5	2.8	4.8	1.3		38		7.2	4.0	.1	4.3	.07	71	35	4		96	6.9	5	10.5	72
Feb. 25.....		16				10	3.5	4.8	.8		39		8.0	4.2	.1	3.9	.06	75	39	7		102	6.8	5	11.6	23
Mar. 16.....		14				9.5	3.9	4.9	1.0		40		7.6	3.8	.1	3.2	.05	72	40	6		102	7.0	5	13.3	23
Apr. 15.....		9.7				10	3.4	4.7	1.3		43		7.6	4.0	.1	2.7	.05	A 65	39	4		103	7.1	5	11.3	36
May 20.....		2.5				9.5	3.9	4.9	.7		46		7.0	2.8	.1	1.8	.04	58	40	2		104	7.3	5	13.2	230
June 8.....		1.2				9.5	3.9	4.7	.9		46		6.8	4.2	.0	1.6	.07	A 56	40	2		102	7.2	5	10.3	36
July 7.....		5.9				10	3.9	5.0	1.4		49		6.6	4.0	.1	1.2	.30	62	41	1		108	7.2	0	11.5	36
Aug. 28.....		10				11	3.9	5.2	1.1		52		7.2	4.0	.1	.3	.61	70	44	1		114	7.2	0	10.1	270
Sept. 15.....		12				11	3.9	5.3	1.6		53		7.4	4.0	.1	.2	.49	74	44	0		115	7.1	5	12.2	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1963....	0.01	0.01	0.00	0.05	0.07	0.05
May 20, 1964.....	.00	.00	.01	.05	.01	.00

CHAMBERS CREEK BASIN--Continued

12-911. FLETT CREEK AT TACOMA, WASH.

LOCATION.--At Custer Road Bridge, 0.3 mile upstream from gage, 0.5 mile west of Tacoma, Pierce County, and 0.9 mile upstream from mouth.
DRAINAGE AREA.--8.01 square miles upstream from gaging station, not including some urban storm drainage outside the basin.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
Remarks.--No inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	2.7	20				18	6.9	7.8	4.3		62		22	9.5	0.1	10	0.28	137	74	22		192	7.8	25	9.2	4600
Nov. 15.....	8.6	19				18	7.4	8.0	4.8		50		31	9.0	.2	10	.47	156	76	34		198	6.3	80	5.4	24000
Dec. 4.....	12	20				16	5.7	7.2	1.9		49		19	7.8	.1	12	.13	115	63	23		168	6.5	15	7.4	230
Jan. 27, 1964	51	14				12	4.2	5.6	2.8		33		18	5.2	.2	8.5	.27	98	47	20		131	6.4	40	7.4	4600
Feb. 25.....	18	18				14	4.9	6.0	1.6		40		18	7.2	.1	9.5	.15	105	55	22		147	6.6	25	8.4	430
Mar. 16.....	13	18				14	6.1	6.6	1.9		46		18	7.0	.1	11	.18	109	60	22		162	7.0	25	9.2	930
Apr. 15.....	9.5	18				15	6.2	7.0	1.8		50		18	7.8	.1	11	.14	113	63	22		168	6.6	20	10.8	210
May 20.....	3.5	13				14	6.1	6.4	2.2		48		17	7.2	.1	10	.16	102	60	20		161	6.6	10	8.3	4600
June 8.....	2.4	14				14	6.6	6.9	2.3		46		18	8.0	.1	12	.18	108	62	24		168	7.3	30	8.9	24000
July 7.....	2.5	13				16	6.7	7.0	2.5		56		19	7.5	.1	12	.11	A 112	68	22		178	7.1	5	13.2	11000
Aug. 28.....	2.4	16				16	8.5	7.5	2.8		67		19	8.2	.1	10	.14	A 121	75	20		196	7.0	10	10.8	11000
Sept. 15.....	2.6	19				17	8.3	7.5	3.2		70		18	8.2	.0	9.4	.18	128	76	19		197	7.0	5	9.7	4600

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1963....	0.00	0.01	0.01	0.05	0.00	0.00
May 20, 1964.....	.00	.00	.11	.05	.00	.01

CHAMBERS CREEK BASIN--Continued

12-913. LEACH CREEK NEAR STEILACOOM, WASH.

LOCATION.--At gaging station at bridge on Bridgeport Way Road, 0.3 mile upstream from mouth, and 4 miles northeast of Steilacoom, Pierce County.
DRAINAGE AREA.--5.88 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	16	24				11	6.9	5.4	1.4		51		17	4.8	0.1	3.6	0.11	110	56	14		136	7.2	40	10.4	930
Nov. 15.....	21	19				9.0	5.1	4.3	1.4		36		14	4.0	.2	3.3	.10	93	44	14		108	6.4	70	10.4	4600
Dec. 4.....	9.7	30				12	7.6	5.8	1.4		63		13	4.8	.1	3.8	.11	109	61	10		148	7.2	10	11.2	430
Jan. 27, 1964	24	21				9.5	5.0	4.7	1.6		41		14	3.8	.2	3.3	.12	89	44	10		113	7.0	35	10.9	930
Feb. 25.....	9.7	28				12	7.8	5.6	1.2		60		13	5.2	.1	4.1	.12	109	62	13		149	7.2	10	11.1	91
Mar. 16.....	9.6	27				11	7.5	5.6	1.4		58		12	4.8	.1	5.1	.09	106	58	10		146	7.1	10	11.8	230
Apr. 15.....	11	26				10	7.5	5.4	1.1		58		12	4.5	.1	4.4	.09	105	57	10		141	7.3	15	11.9	430
May 20.....	9.3	25				11	8.2	5.9	1.2		64		13	4.5	.1	3.7	.13	105	62	9		152	7.3	5	10.5	2400
June 8.....	11	25				11	8.1	5.4	1.2		62		12	4.5	.1	4.6	.16	104	61	10		147	7.4	25	10.5	930
July 7.....	7.1	27				11	8.8	5.8	1.3		65		13	4.8	.1	4.6	.12	108	64	10		156	7.4	5	10.0	430
Aug. 28.....	6.2	26				11	8.5	5.8	1.5		64		12	4.8	.0	4.7	.13	A 105	62	10		157	7.2	5	10.3	430
Sept. 15.....	7.2	27				12	8.6	5.8	2.1		69		12	4.8	.1	3.9	.13	113	65	8		159	7.4	5	10.5	430

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1963....	0.00	0.00	0.01	0.05	0.01	0.00
May 20, 1964.....	.00	.00	.02	.05	.00	.03

CHAMBERS CREEK BASIN--Continued

12-915. CHAMBERS CREEK NEAR STEILACOOM, WASH.

LOCATION.--At Chambers Creek Road Bridge, 0.9 mile upstream from mouth, 1.5 miles northeast of Steilacoom, Pierce County.
DRAINAGE AREA.--104 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963		21				10	5.7	5.7	1.4		50		11	4.8	0.1	3.9	0.24	94	48	8		124	7.1	15	9.4	930
Nov. 15.....		18				10	4.7	5.5	1.7		44		11	3.8	.1	3.9	.24	86	44	8		114	6.9	35	9.7	4600
Dec. 4.....		20				10	5.5	5.5	1.2		49		9.8	4.2	.0	4.2	.16	90	48	8		124	7.0	5	10.7	75
Jan. 27, 1964		16				10	3.3	5.1	1.6		38		9.4	4.2	.1	4.9	.11	78	38	8		104	7.0	10	11.2	930
Feb. 25.....		17				10	4.5	5.1	1.0		43		9.6	4.5	.1	5.6	.09	84	44	8		114	7.0	5	10.5	36
Mar. 16.....		18				10	4.4	5.3	1.2		44		9.2	4.5	.1	4.3	.09	82	43	7		115	7.5	5	11.8	36
Apr. 15.....		15				10	4.9	5.2	1.4		47		10	5.0	.1	3.6	.11	A 78	45	6		119	7.1	5	10.4	91
May 20.....		11				11	4.6	5.5	.9		50		9.2	4.5	.1	3.8	.10	77	46	6		121	7.1	5	8.8	140
June 8.....		12				10	5.3	5.3	1.0		50		9.0	4.8	.1	4.2	.10	77	47	6		120	7.3	5	9.3	200
July 7.....		19				11	5.6	5.7	1.8		54		9.8	5.0	.1	4.5	.15	92	50	6		133	7.2	0	9.3	36
Aug. 28.....		19				12	5.1	5.8	1.5		54		9.8	4.8	.1	3.9	.24	92	51	6		134	7.3	0	9.6	430
Sept. 15.....		21				12	5.5	5.7	2.0		54		11	4.5	.1	4.6	.18	96	53	8		136	7.3	5	9.2	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1963....	0.00	0.00	0.02	0.05	0.01	0.04
May 20, 1964.....	.00	.00	.01	.05	.02	.00

PUYALLUP RIVER BASIN

12-1005. WHITE RIVER NEAR SUMNER, WASH.

LOCATION.--At bridge on Washington Highway 5, 1.7 miles upstream from gaging station, 2.8 miles upstream from White River Power Plant outlet canal, and 4 miles north of Sumner, Pierce County.
DRAINAGE AREA.--470 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1964.
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 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963	129	16				10	2.8	4.5	1.4		40		11	2.5	0.2	0.3	0.16	70	36	2		96	7.3	15	11.2	930
Nov. 15.....	226	19				10	2.6	4.3	1.8		36		10	2.5	.0	2.6	.12	76	36	6		96	7.0	25	11.2	2900
Dec. 9.....	249	18				10	2.5	4.1	1.7		35		9.6	3.0	.1	3.3	.14	79	35	6		95	7.0	25	9.7	11000
Jan. 14, 1964	319	17				9.0	2.5	4.2	1.9		35		7.4	3.0	.2	3.0	.21	71	33	4		90	6.7	20	11.4	2400
Feb. 25.....	170	19				9.0	3.0	4.1	1.4		38		8.4	2.2	.1	1.2	.11	A 68	35	4		90	7.1	5	12.1	23
Mar. 27.....	139	19				10	2.7	4.0	1.1		40		9.4	2.5	.1	1.2	.12	73	36	3		95	7.1	15	11.8	73
Apr. 24.....	145	17				9.5	2.8	4.1	1.0		41		8.2	2.0	.1	.5	.28	66	35	2		92	7.6	10	11.6	91
May 20.....	3320	12				5.0	1.2	2.7	.3		20		6.8	.8	.1	.1	.02	45	18	1		49	7.0	5	11.2	2400
June 30.....	2240	12				5.5	1.0	3.0	.5		22		6.4	.5	.1	.1	.02	42	18	0		51	7.1	5	10.3	36
July 14.....	2310	10				4.5	1.1	2.8	.4		19		5.8	1.0	.1	.1	.02	37	16	0		46	7.3	5	12.3	2400
Aug. 27.....	118	11				6.0	1.1	3.5	1.3		22		7.4	1.0	.1	.2	.02	45	20	2		58	7.0	5	9.1	91
Sept. 28.....	77	13				9.5	2.7	4.2	1.0		41		9.0	1.8	.1	.2	.10	67	34	1		93	7.1	5	10.8	930

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.02	0.05	0.00	0.01
Sept. 29.....	.00	.00	.07	.05	.00	.02

DUWAMISH RIVER BASIN

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

LOCATION.--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 1964.
REMARKS.--Minor inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963	45	19		--		10	4.1	4.9	1.6		46		8.4	3.0	0.1	1.7	0.05	76	42	4		104	7.4	40	10.6	430
Nov. 15.....	113	17		0.28		9.0	3.2	4.4	1.8		36		9.8	3.5	.2	3.0	.09	76	36	6		93	6.8	60	10.6	430
Dec. 9.....	235	13		.16		9.0	2.8	5.6	1.1		38		11	1.8	.1	2.9	.05	74	34	3		95	7.0	30	11.5	230
Jan. 14, 1964	313	12		.15		7.5	3.2	5.2	1.0		36		9.2	2.5	.1	2.9	.04	64	32	2		91	7.1	25	11.5	30
Feb. 25.....	146	14		--		8.5	3.3	5.4	.9		39		10	2.5	.1	2.1	.04	70	34	2		94	7.2	10	11.8	23
Mar. 27.....	158	13		.12		9.0	3.0	5.5	.7		40		11	2.0	.1	2.0	.04	68	35	2		97	7.3	5	11.2	36
Apr. 24.....	98	13		.11		10	3.0	5.7	.7		44		10	2.2	.1	1.2	.06	A 68	37	1		99	6.9	10	11.1	23
May 20.....	60	12		.10		9.5	3.4	5.6	.6		46		8.6	2.0	.1	1.1	.03	73	38	0		101	7.2	10	10.7	36
June 30.....	73	12		.09		10	3.9	6.1	.9		50		9.4	2.0	.1	.9	.02	72	41	0		109	7.3	5	10.5	91
July 14.....	48	13		.10		9.5	3.8	5.5	.7		49		8.2	2.0	.1	1.1	.03	70	39	0		105	7.3	5	12.1	23
Aug. 27.....	23	16		.11		9.5	3.7	4.9	.9		50		6.2	2.0	.1	1.2	.07	71	38	0		101	7.5	5	10.3	430
Sept. 28.....	23	17		.14		10	3.9	5.2	1.2		51		7.0	2.0	.0	1.4	.10	79	41	0		106	7.7	5	10.7	930

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.02	0.05	0.00	0.03
Sept. 28.....	.00	.00	.07	.05	.00	.02

12-1130. GREEN RIVER NEAR AUBURN, WASH.

LOCATION.--At bridge on State Highway 5B, 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 1959 to September 1964.
Water temperatures: March 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 63°F July 28, 29, and on several days during August; minimum, 40°F Feb. 26.
EXTREMES, 1952-64.--Water temperatures: Maximum, 75°F July 28, 1958; minimum (1952-62, 1963-64), 33°F Feb. 16, 17, 1956.
REMARKS.--Temperature recorder located at gaging station. Minor inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963	1650	14		--		7.0	1.1	3.6	0.6		29		3.6	1.5	0.0	0.9	0.02	53	22	0		60	7.2	10	10.5	430
Nov. 15.....	1310	14		--		6.5	1.9	3.7	.7		29		4.4	2.0	.1	1.5	.06	A 49	24	0		65	6.9	10	10.2	1600
Dec. 9.....	1480	14		0.09		7.0	1.4	3.6	.4		29		3.8	1.8	.1	1.4	.03	52	24	0		62	7.1	5	11.6	430
Jan. 14, 1964	1760	14		--		7.0	1.3	3.4	.6		29		4.2	1.5	.0	1.7	.03	49	23	0		63	7.1	5	11.9	91
Feb. 25.....	1560	14		.12		6.0	1.3	3.4	.5		28		3.6	1.8	.1	.7	.02	50	20	0		56	7.0	5	12.0	36
Mar. 27.....	1260	14		--		7.0	1.7	3.6	.6		32		4.2	1.8	.1	1.1	.03	53	24	0		68	7.3	5	11.5	430
Apr. 24.....	1760	13		--		5.5	1.3	3.0	.5		26		2.8	1.5	.0	.5	.03	42	19	0		54	6.9	5	11.5	430
May 20.....	3360	11		--		4.0	.9	3.8	.0		20		2.0	3.8	.1	.3	.01	43	14	0		38	7.5	5	11.5	2300
June 30.....	764	11		.07		7.0	2.1	3.5	.5		33		3.2	1.5	.1	.6	.02	46	26	0		65	7.2	0	10.3	36
July 14.....	1080	12		--		6.0	1.4	3.1	.2		29		2.8	1.5	.1	.4	.02	43	21	0		57	7.7	5	13.2	2400
Aug. 27.....	332	13		--		9.0	2.7	4.4	.5		43		4.2	2.0	.0	1.2	.04	59	34	0		90	7.0	5	9.7	2400
Sept. 28.....	932	12		.06		6.5	1.0	3.3	.7		29		2.4	.5	.6	.6	.03	A 41	20	0		57	7.0	5	10.9	390

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.03	0.00	0.05	0.00	0.01
Sept. 28.....	.00	.00	.07	.05	.00	.03

DUWAMISH RIVER BASIN--Continued

12-1130. GREEN RIVER NEAR AUBURN, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

DUWAMISH RIVER BASIN--Continued

12-1133.5. GREEN RIVER AT TUKWILA, WASH.

LOCATION.--At gaging station at highway bridge, 0.8 mile southeast of Tukwila, King County, and 1 mile upstream from Black River.
DRAINAGE AREA.--440 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
Sediment records: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F Aug. 24; minimum, 37°F Dec. 12, 13.
Sediment concentrations: Maximum daily, 530 ppm Jan. 28; minimum daily, 9 ppm Oct. 18, 19.
Sediment loads: Maximum daily, 5,700 tons Jan. 2; minimum daily, 7 tons Oct. 3, 5-7.

Temperature (°F) of water, water year October 1963 to September 1964

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	60	59	57	58	59	60	57	60	59	59	60	--	--	--	56	55	51	51	56	55	53	52	50	50	49	51	51	--	50	56
November	49	50	53	48	--	48	46	--	48	48	48	50	49	50	47	48	47	46	44	42	44	45	46	47	49	48	46	42	41	39	--	47
December	40	42	39	43	45	44	43	42	--	40	38	37	37	40	44	45	43	43	44	45	44	44	45	43	--	--	44	45	44	43	47	43
January	47	44	44	44	43	--	40	43	42	42	43	43	42	--	--	45	--	--	42	41	41	42	41	--	41	42	42	43	46	46	--	--
February	--	43	44	45	43	--	--	43	45	45	44	42	43	44	43	43	44	47	45	--	41	43	43	43	--	--	42	--	42	--	--	--
March	44	--	44	--	43	--	43	44	--	--	--	42	--	45	47	--	45	--	--	--	--	--	--	43	44	44	45	48	51	50	48	--
April	47	46	45	47	42	46	52	49	49	46	46	47	46	47	46	44	45	47	49	48	45	47	48	50	47	47	47	49	50	48	--	47
May	49	49	48	48	48	49	50	51	50	48	49	48	49	48	49	52	54	54	55	49	50	48	50	51	51	53	54	55	53	55	--	51
June	55	52	52	52	51	53	50	52	52	--	50	52	54	56	55	52	50	52	50	51	54	58	59	57	59	56	55	57	58	61	--	54
July	58	57	56	59	--	61	62	58	62	--	63	63	63	59	58	60	62	59	62	60	61	61	62	64	66	66	66	71	68	63	62	62
August	61	61	60	61	66	66	65	66	64	65	--	64	61	66	64	66	65	64	65	66	64	--	--	72	64	65	59	62	60	60	60	64
September	58	--	60	63	58	59	58	59	59	59	59	59	60	61	59	59	59	59	58	58	57	58	58	58	56	55	55	55	54	55	--	58

DUWAMISH RIVER BASIN--Continued

12-1133.5. GREEN RIVER AT TUKWILA, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	269	12	9	1560	50	210	1920	34	180
2	251	12	8	1350	40	150	1680	32	150
3	253	10	7	1070	24	69	1500	26	110
4	260	12	8	1020	16	44	1370	13	48
5	258	10	7	1480	--	160	1320	67	240
6	262	10	7	1390	48	180	1760	90	430
7	258	10	7	1120	28	85	2090	64	360
8	264	14	10	2000	--	490	1880	39	200
9	302	16	13	2080	92	520	1820	--	160
10	274	17	13	1690	56	260	1640	23	100
11	271	19	14	1480	32	130	1470	22	87
12	306	15	12	1300	86	300	1350	19	69
13	370	24	24	1290	48	170	1260	18	61
14	388	--	22	1500	95	380	1190	21	68
15	340	--	18	1580	56	240	1200	21	68
16	292	--	16	1450	43	170	1410	36	140
17	285	21	16	1610	39	170	1840	50	250
18	280	9	7	2080	44	250	2080	42	240
19	280	9	7	2140	67	390	2040	35	190
20	287	18	14	2340	47	300	2180	59	350
21	321	40	35	1880	31	160	2340	41	260
22	528	88	130	1650	29	130	2130	35	200
23	713	77	150	1620	28	120	2100	45	260
24	722	77	150	1660	37	170	2400	45	290
25	731	62	120	1740	33	160	2600	62	440
26	737	52	100	2410	69	450	2800	58	440
27	713	37	71	4320	230	2700	2400	48	310
28	752	40	81	3930	110	1200	2200	40	240
29	1520	140	570	2900	63	490	2000	38	210
30	1600	94	410	2290	46	280	1900	30	150
31	1670	69	310	--	--	--	1800	31	150
Total	15757	--	2366	55930	--	10528	57670	--	6451
	JANUARY			FEBRUARY			MARCH		
1	3500	160	1500	3550	120	1200	1500	57	230
2	6000	350	5700	3390	93	850	1470	24	95
3	4500	140	1700	2960	86	690	1390	20	75
4	3500	82	770	2660	100	720	1460	31	120
5	3000	74	600	2570	94	650	2180	87	510
6	3500	140	1300	2360	100	640	1990	77	410
7	4000	98	1100	2130	--	580	1730	46	210
8	3500	68	640	1970	110	580	1570	45	190
9	3000	73	590	1830	92	450	1490	40	160
10	2600	--	530	1750	92	430	1460	--	190
11	2300	56	350	1850	83	410	1520	--	190
12	2100	48	270	1790	86	420	1490	41	160
13	2000	53	290	1690	72	330	1410	30	110
14	2000	--	290	1630	50	220	1330	44	160
15	1970	--	390	1580	30	130	1520	40	160
16	2520	90	610	1600	42	180	1750	20	94
17	2860	95	730	1730	50	230	1880	40	200
18	2880	--	640	1860	33	170	3230	--	800
19	2770	66	490	2570	24	170	2940	--	500
20	2920	97	760	2580	42	290	2440	--	300
21	2650	51	360	2240	30	180	2160	--	200
22	2340	46	290	2000	35	190	1920	--	170
23	2110	38	220	1840	40	200	1750	--	150
24	2140	40	230	1780	64	310	1590	34	150
25	4650	340	4300	1710	46	210	1470	48	190
26	5500	230	3400	1650	40	180	1450	37	140
27	4220	130	1500	1620	28	120	1370	34	130
28	3670	530	5300	1510	27	110	1310	28	99
29	3530	220	2100	1420	45	170	1300	25	88
30	3550	120	1200	--	--	--	1470	36	140
31	3330	140	1300	--	--	--	1980	75	400
Total	99110	--	39450	59820	--	11010	55520	--	6721

DUWAMISH RIVER BASIN--Continued

12-1133.5. GREEN RIVER AT TUKWILA, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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	2620	82	580	2060	33	180	4090	110	1200
2	2730	73	540	1860	30	150	4130	150	1700
3	2260	44	270	1690	28	130	1360	180	660
4	1940	52	270	1560	26	110	4160	280	3100
5	1960	48	250	1550	30	130	4520	140	1700
6	1840	40	200	1530	24	99	4460	140	1700
7	1770	36	170	1470	22	87	4000	88	950
8	1840	46	230	1490	22	88	3830	62	640
9	1990	46	250	1590	28	120	3690	57	570
10	2160	54	310	2020	48	260	3420	45	420
11	2420	54	350	2640	72	510	3400	57	520
12	2410	52	340	2790	60	450	3130	56	470
13	2320	43	270	2780	53	400	2880	68	530
14	2130	41	240	2660	51	370	2760	50	370
15	2640	70	500	2410	41	270	2730	40	290
16	3240	97	850	2150	36	210	3190	64	550
17	2600	60	420	2200	36	210	4030	83	900
18	2200	35	210	2520	52	350	4840	160	2100
19	1960	36	190	2710	45	330	4470	110	1300
20	1830	34	170	3040	62	510	3610	60	580
21	1760	37	180	4240	140	1600	3000	50	400
22	1870	39	200	4130	120	1300	2620	47	330
23	2090	34	190	3200	79	680	1670	35	160
24	1880	27	140	2600	68	480	1370	25	92
25	1740	24	110	2500	56	380	1270	20	69
26	1830	26	130	2380	47	300	1150	20	62
27	2050	36	200	2420	50	330	1080	16	47
28	2080	36	200	2820	74	560	1060	18	52
29	2080	36	200	3180	74	640	1040	16	45
30	2140	35	200	3320	65	580	1020	14	39
31	--	--	--	3670	86	850	--	--	--
Total	64380	--	8360	77180	--	12664	87980	--	21546

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	1010	C 25	68	671	C 30	54	530	C 44	63
2	1180	C 25	80	677	C 30	55	632	C 44	75
3	1250	C 25	84	674	C 30	55	668	C 44	79
4	1250	C 25	84	680	C 30	55	662	C 44	79
5	1230	C 25	83	659	C 30	53	662	C 44	79
6	1220	C 25	82	650	C 30	53	656	C 44	78
7	1330	C 25	90	635	C 30	51	659	C 44	78
8	1350	C 25	91	623	C 30	50	698	C 44	83
9	1420	C 25	96	617	C 30	50	704	C 44	84
10	1530	C 25	100	614	C 30	50	677	C 44	80
11	1420	C 25	96	602	C 30	49	662	C 44	79
12	1380	C 25	93	593	C 30	48	650	C 44	77
13	1370	C 25	92	590	C 30	48	644	C 44	76
14	1230	C 25	83	590	C 30	48	635	C 44	75
15	1240	C 25	84	582	C 30	47	632	C 44	75
16	1220	C 25	82	578	C 30	47	629	C 44	75
17	1190	C 25	80	572	C 30	46	692	C 44	82
18	1170	C 25	79	572	C 30	46	716	C 44	85
19	1140	C 25	77	575	C 30	47	686	C 44	81
20	1130	C 25	76	555	C 30	45	698	C 44	83
21	1030	C 25	70	538	C 30	44	707	C 44	84
22	1000	C 25	68	515	C 30	42	692	C 44	82
23	980	C 25	66	502	C 30	41	857	C 44	100
24	965	C 25	65	495	C 30	40	890	C 44	110
25	962	C 25	65	468	C 30	38	971	C 44	120
26	944	C 25	64	450	C 30	36	980	C 44	120
27	932	C 25	63	450	C 30	36	962	C 44	110
28	812	C 25	55	455	C 30	37	950	C 44	110
29	743	C 25	50	470	C 30	38	842	C 44	100
30	698	C 25	47	478	C 30	39	860	C 44	100
31	677	C 25	46	495	C 30	40	--	--	--
Total	35003	--	2359	17625	--	1428	21903	--	2602

Total discharge for year (cfs-days)..... 645,878
Total load for year (tons)..... 125,485

C Composite period.

DUWAMISH RIVER BASIN--Continued

12-1133.5 GREEN RIVER AT TUKWILA, WASH.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964

(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
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 22, 1963.....	1250	54		540	88	128	23	27	36	49	63	84	97	99	--	--		VBWC
Jan. 2, 1964.....	0830	43		4170	470	5290	14	20	26	37	46	53	63	92	100	--		VPWC
Jan. 25.....	1455	41		5940	605	9700	19	26	37	49	63	76	84	94	100	--		VPWC
Apr. 7.....	1150	51		1750	38	180	5	8	13	16	19	25	34	77	99	100		VBWC

DUWAMISH RIVER BASIN--Continued

12-1134. DUWAMISH RIVER AT TUKWILA, WASH.

LOCATION.--At 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 1964.
Water temperatures: July 1959 to September 1962.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963		15				7.0	1.3	4.2	0.9		29		5.2	2.2	0.1	2.0	0.16	58	23	0		67	7.2	10	9.5	11000
Nov. 15.....		15				8.5	3.0	4.7	1.7		34		9.8	3.5	.1	3.4	.18	71	33	5		94	6.7	25	10.6	24000
Dec. 9.....		15				9.0	2.1	4.9	1.2		35		7.8	3.2	.1	2.9	.16	71	31	2		89	6.8	15	10.3	2400
Jan. 14, 1964		15				8.5	2.4	5.5	1.1		36		7.0	4.2	.1	2.9	.15	68	31	2		93	6.8	5	10.8	4600
Feb. 25.....		16				8.0	2.2	6.1	.7		36		5.2	5.8	.2	1.3	.15	72	29	0		90	7.1	5	11.0	430
Mar. 27.....		16				9.0	2.7	7.8	.8		40		5.6	7.5	.1	1.0	.23	77	34	0		106	7.5	5	10.7	11000
Apr. 24.....		14				6.5	1.7	4.6	.7		30		5.6	3.5	.1	.9	.14	A 53	23	0		70	6.9	5	10.5	4600
May 20.....		11				4.5	1.2	2.7	.1		23		2.0	1.5	.1	.4	.05	34	16	0		46	7.0	5	11.0	4600
June 30.....		13				9.5	3.4	9.2	1.3		47		4.8	9.5	.1	1.2	.11	77	38	0		120	7.0	0	9.7	930
July 14.....		13				7.5	2.1	5.8	.5		37		3.4	5.8	.1	.7	.09	57	27	0		85	7.6	5	--	--
Aug. 27.....		16				12	3.9	13	1.1		59		5.6	15	.0	2.1	.19	97	46	0		162	7.0	5	8.2	11000
Sept. 28.....		13				7.0	1.5	4.2	.8		33		2.8	2.5	.0	.8	.12	56	24	0		69	7.0	5	9.5	2400

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.00	0.05	0.00	0.03
Sept. 28.....	.00	.00	.07	.05	.00	.03

LAKE WASHINGTON BASIN

12-1175. CEDAR RIVER NEAR LANDSBURG, WASH.

LOCATION.--Temperature recorder at gaging station, 2 miles upstream from Landsburg and intake of Seattle municipal water-supply system, 4.8 miles east of Maple Valley, King County, 5 miles downstream from Taylor Creek, and 12 miles downstream from Chester Morse Lake.
DRAINAGE AREA (revised).--122 square miles, excluding Rock Creek drainage upstream from Walsh Lake diversion.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to July 1960.
Water temperatures: August 1953 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 59°F July 19; minimum, 42°F on many days during December and January.
EXTREMES, 1953-64.--Water temperatures: Maximum, 67°F July 27-28, 1960, July 13, 1961; minimum, 36°F Jan. 30 to Feb. 2, Feb. 14-17, 1956, Jan. 23-27, 1957, Jan. 18, 19, 1960.
REMARKS.--Recorder pen failed to ink Aug. 17-28.

Temperature (°F) of water, water year October 1963 to September 1964

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	53	50	50	49	49	49	49	48	48	48	48	48	48	48	48	48	48	48	48	48	48	47	47	47	47	47	47	47	47	47	48
Minimum	49	49	50	49	49	49	49	48	48	48	48	48	48	48	48	48	48	48	48	47	47	47	47	47	47	47	47	47	47	47	47	48
November																																
Maximum	47	46	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	43	43	43	43	43	43	44	44	44	44	--	45
Minimum	46	46	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	43	43	43	43	43	43	43	43	44	44	43	--	44
December																																
Maximum	43	43	43	43	43	43	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
Minimum	43	43	43	43	43	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
January																																
Maximum	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	43	43	43	43	44	43	43
Minimum	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	42	42	43	43	43	43
February																																
Maximum	43	44	44	43	43	44	43	44	44	44	43	43	44	44	43	44	44	44	44	44	44	44	44	44	44	44	44	44	44	--	--	44
Minimum	43	43	43	43	43	43	43	43	44	43	43	43	43	43	43	43	44	44	44	44	44	44	44	44	44	44	44	44	44	--	--	43
March																																
Maximum	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	45	44	45	44
Minimum	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43	43	43	43	43	43	44	44	44	44
April																																
Maximum	45	44	44	45	44	45	45	45	45	45	45	45	45	45	45	45	45	45	46	45	45	45	45	45	45	45	45	46	46	46	--	45
Minimum	44	44	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	46	45	--	45
May																																
Maximum	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	48	48	49	49	48	48	48	48	48	48	49	49	49	49	50	52	47
Minimum	46	45	46	46	46	46	46	46	46	46	46	46	46	46	46	46	48	48	48	48	48	48	48	48	48	48	48	49	49	49	50	47
June																																
Maximum	52	52	52	52	52	52	52	52	51	51	51	51	52	52	52	52	52	52	52	52	52	52	52	52	55	53	53	53	55	56	--	52
Minimum	52	52	52	52	52	52	52	51	51	51	51	51	51	52	52	52	52	52	52	52	52	52	52	52	52	53	53	53	53	54	--	52
July																																
Maximum	55	55	55	55	54	56	58	56	57	58	58	58	58	57	57	58	58	58	59	58	57	57	57	57	57	57	57	57	56	55	54	57
Minimum	54	55	55	54	54	54	55	55	55	56	56	55	55	56	57	57	58	57	57	56	57	57	56	56	54	54	54	54	54	54	54	55
August																																
Maximum	54	54	54	58	58	58	58	58	55	58	58	58	58	58	58	57	--	--	--	--	--	--	--	--	--	--	--	--	56	56	56	--
Minimum	54	54	54	54	55	55	55	55	55	54	56	55	55	56	55	54	--	--	--	--	--	--	--	--	--	--	--	--	53	53	53	--
September																																
Maximum	55	55	57	57	57	57	55	54	55	56	55	56	53	55	55	53	53	54	54	52	52	53	54	55	55	52	52	52	52	52	--	54
Minimum	53	54	53	53	53	53	53	53	53	53	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	--	52

12-1350. WALLACE RIVER AT GOLD BAR, WASH.

LOCATION.--Temperature recorder at gaging station, 30 feet downstream from highway bridge, 0.2 mile north of Gold Bar, Snohomish County, and 1.2 miles upstream from Olney Creek.
DRAINAGE AREA.--19.0 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1955 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 61°F Aug. 23, 24; minimum, 38°F Dec. 10-14.
EXTREMES, 1955-64.--Water temperatures: Maximum, 70°F July 29, Aug. 8, 9, 1960, July 13, 1961; minimum, freezing point on several days during winter months.

Temperature (°F) of water, water year October 1963 to September 1964

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

SNOHOMISH RIVER BASIN--Continued

12-1555. SNOHOMISH RIVER AT SNOHOMISH, WASH.

LOCATION.--At gaging station at bridge on State Highway 1A 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 1964.
Water temperatures: July 1959 to September 1961.
REMARKS.--Only discharges above 10,000 cfs are published.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963	--	7.1		--		5.0	0.9	2.0	0.7		18		4.0	1.5	0.1	1.6	0.02	36	16	2		45	6.8	10	10.9	430
Nov. 12.....	10300	7.1		--		5.0	.9	2.1	.6		18		2.6	1.2	.0	1.8	.01	33	16	2		42	6.9	5	10.9	930
Dec. 9.....	12400	7.2		--		5.0	1.0	2.2	.7		20		3.4	1.5	.1	2.6	.02	39	17	0		46	6.7	10	11.7	430
Jan. 14, 1964	--	8.1		--		5.0	1.0	2.8	.7		20		4.0	1.2	.1	2.1	.02	34	17	0		47	6.9	5	11.8	750
Feb. 20.....	15500	6.4		--		4.0	1.1	1.9	.6		16		2.4	1.2	.0	1.4	.02	35	14	2		42	6.7	10	13.1	390
Mar. 27.....	--	7.5		--		5.5	1.1	1.9	.4		22		3.8	1.8	.0	1.6	.01	36	18	0		50	6.9	5	11.7	930
Apr. 24.....	10700	6.7		--		4.5	1.0	1.7	.3		18		2.4	1.5	.1	.8	.02	29	15	0		41	7.1	5	11.1	36
June 1.....	37900	3.7		--		2.0	.6	1.0	.1		10		1.2	.8	.0	.3	.00	16	8	0		20	7.0	5	12.0	750
June 30.....	17300	4.6		0.24		3.5	.6	1.4	.8		14		1.4	.8	.1	.3	.01	A 21	11	0		29	6.9	5	10.6	230
July 14.....	21900	3.3		--		2.0	.8	.8	.0		11		.8	.2	.0	.2	.01	14	8	0		20	6.8	5	13.4	11000
Aug. 25.....	--	5.1		--		4.0	1.0	2.1	.5		19		1.6	1.0	.0	.3	.01	A 25	14	0		43	7.3	5	9.4	4600
Sept. 28.....	--	5.8		.33	.3	4.5	1.3	1.8	.3		20		2.6	1.0	.0	.5	.02	31	16	0		43	6.7	5	10.4	4600

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.00	0.05	0.00	0.01
Sept. 28.....	.00	.01	.08	.05	.00	.02

STILLAGUAMISH RIVER BASIN

12-1677. STILLAGUAMISH RIVER NEAR SILVANA, WASH.

LOCATION.--At bridge on U.S. Highway 99, 1.5 miles east of Silvana, Snohomish County, and 7 miles downstream from confluence of the North and South Forks.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colinies per 100 ml)
Oct. 30, 1963		--				--	--	--	--		--		--	--	--	--	--	--	--	--		--	--	--	11.4	36
Nov. 30.....		6.1				4.5	1.7	1.5	0.4		20		3.2	1.2	0.1	1.1	0.03	36	18	2		44	7.0	20	10.3	930
Dec. 9.....		6.8				6.0	1.6	3.1	.5		24		4.4	1.5	.1	1.9	.00	42	22	2		53	6.9	10	11.6	230
Jan. 14, 1964		6.8				5.0	2.1	2.0	.3		22		3.6	1.2	.1	1.8	.01	37	21	3		51	6.8	15	12.2	930
Feb. 20.....		6.5				5.5	1.7	1.9	.7		22		3.0	1.5	.1	1.1	.01	A 33	20	2		51	7.0	15	12.8	23
Mar. 27.....		7.3				6.0	2.2	2.0	.4		27		3.2	1.8	.0	1.4	.02	40	24	2		58	7.1	15	11.7	430
Apr. 24.....		6.4				5.0	1.9	1.4	.1		22		2.8	1.5	.1	.8	.00	33	20	2		50	7.1	5	11.2	23
June 2.....		3.4				3.0	.9	1.0	.1		14		1.2	1.0	.0	.3	.00	18	11	0		26	6.9	5	12.2	91
June 30.....		4.3				3.5	1.7	1.3	.2		19		1.8	.5	.0	.2	.01	27	16	0		36	7.0	5	10.5	230
July 14.....		3.2				3.5	1.0	1.0	.0		15		1.2	.5	.0	.2	.01	17	12	0		30	7.0	5	13.0	36
Aug. 25.....		5.6				7.0	1.4	1.9	1.1		28		2.8	1.0	.0	.2	.01	38	24	0		55	7.1	0	10.6	110
Sept. 28.....		6.5				6.5	2.1	2.0	.4		30		3.0	1.2	.0	.5	.01	40	24	0		58	7.0	5	10.9	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.00	0.05	0.00	0.01
Sept. 28.....	.00	.00	.08	.05	.00	.03

12-1685. PILCHUCK CREEK NEAR BRYANT, WASH.

LOCATION.--Temperature recorder at gaging station, 500 feet upstream from highway bridge, and 2 miles north of Bryant, Snohomish County.
DRAINAGE AREA.--52.0 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F July 28, 29; minimum, 37°F on several days during winter months.
EXTREMES, 1952-64.--Water temperatures: Maximum, 82°F July 28, 1958; minimum, 33°F on many days during winter months.

Temperature (°F) of water, water year October 1963 to September 1964

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	55	55	55	54	52	52	52	53	53	53	54	54	55	55	54	53	51	48	49	49	49	49	49	48	48	47	47	47	47	52
Minimum	57	55	55	55	54	52	51	51	52	52	53	53	53	54	54	54	53	51	48	48	48	49	49	49	48	48	47	47	47	47	47	51
November																																
Maximum	47	47	47	47	47	47	47	47	47	46	46	45	45	45	45	45	45	45	44	43	42	42	42	42	42	43	43	43	42	41	--	45
Minimum	47	47	47	47	47	47	47	47	46	46	45	45	45	45	45	45	45	44	43	42	42	42	42	42	42	42	43	42	41	41	--	44
December																																
Maximum	41	40	40	40	40	40	40	40	40	40	38	38	38	38	38	39	39	40	40	40	40	40	42	42	42	42	42	42	42	42	43	40
Minimum	40	40	40	40	40	40	40	40	40	38	37	38	38	38	38	38	39	38	40	40	40	40	40	42	42	42	42	42	41	41	42	40
January																																
Maximum	42	42	42	42	41	41	41	40	40	40	39	39	39	39	38	38	38	38	38	38	38	38	38	37	37	37	37	37	37	37	37	39
Minimum	42	42	42	41	41	41	40	40	40	39	39	39	39	38	38	38	38	38	38	38	38	38	37	37	37	37	37	37	37	37	37	39
February																																
Maximum	37	38	38	39	39	38	38	38	38	38	38	38	38	38	39	39	39	39	39	39	39	40	40	40	40	40	40	40	40	--	--	39
Minimum	37	37	38	38	38	38	37	37	38	38	38	38	38	38	38	39	39	39	39	39	38	39	39	39	39	39	39	39	40	--	--	38
March																																
Maximum	40	40	40	40	40	40	40	40	41	40	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	41	42	42	42	40
Minimum	40	40	40	40	39	39	39	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	40	40	40	40	41	42	42	40
April																																
Maximum	42	41	41	41	41	42	43	43	43	43	41	41	41	41	41	41	40	41	41	41	41	41	40	42	42	42	42	42	42	42	--	42
Minimum	41	41	40	41	41	41	42	43	43	41	41	41	41	41	41	37	38	39	40	41	41	40	40	40	42	42	42	41	42	42	--	41
May																																
Maximum	42	42	42	42	42	44	44	44	43	42	44	44	43	44	45	45	45	48	48	48	46	44	44	44	47	49	50	50	50	52	52	45
Minimum	42	42	42	42	42	42	43	43	42	42	42	43	42	42	43	44	45	45	47	46	44	44	44	44	44	46	48	49	49	49	51	44
June																																
Maximum	52	51	50	50	50	49	49	49	52	52	51	51	50	50	51	51	50	50	49	50	50	53	53	53	54	54	54	52	52	56	--	51
Minimum	51	50	50	50	49	49	49	49	49	51	51	50	50	50	50	50	50	49	49	49	50	50	53	53	53	54	52	51	50	52	--	50
July																																
Maximum	56	56	56	55	55	56	58	58	57	59	61	62	62	62	61	57	56	56	57	58	58	58	60	62	64	64	64	65	65	64	61	59
Minimum	55	55	55	55	55	55	55	57	55	56	59	61	62	61	57	55	55	55	55	57	58	58	57	58	60	61	61	64	64	61	60	58
August																																
Maximum	60	60	58	58	58	61	62	61	61	61	62	63	63	62	59	61	61	60	60	59	60	62	63	64	64	61	59	55	55	54	54	60
Minimum	60	58	58	58	57	57	61	61	61	57	59	62	62	58	58	58	60	60	59	58	58	60	61	62	61	59	55	55	54	54	53	59
September																																
Maximum	53	54	55	56	56	56	56	56	53	53	53	54	54	54	54	54	54	54	54	54	54	53	53	53	53	53	52	52	52	52	--	54
Minimum	53	53	54	54	56	56	56	53	52	52	52	53	53	54	54	54	54	54	54	54	53	53	53	52	53	52	52	32	52	52	--	53

SKAGIT RIVER BASIN

12-1790. SKAGIT RIVER ABOVE ALMA CREEK, NEAR MARBLEMOUNT, WASH.

LOCATION.--Temperature recorder at gaging station, 0.8 mile upstream from Alma Creek, and 7 miles north of Marblemount, Skagit County.
DRAINAGE AREA.--1,274 square miles, including 400 square miles in Canada.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to July 1960.
Water temperatures: January 1953 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 53°F Aug. 14-17; minimum, 39°F on several days during February and March.
EXTREMES, 1953-64.--Water temperatures: Maximum, 56°F July 30, 1961; minimum, 35°F Mar. 1, 1956.

Temperature (°F) of water, water year October 1963 to September 1964

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

SKAGIT RIVER BASIN--Continued

12-1825. CASCADE RIVER AT MARBLEMOUNT, WASH.

LOCATION.--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.
RECORDS AVAILABLE.--Water temperatures: May 1952 to September 1964 (discontinued).
EXTREMES, 1952-63.--Water temperatures: Maximum, 58°F July 27-29, 1958, on several days during August 1961, Aug. 12, 13, 1963; minimum, freezing point Feb. 1, 2, 18, 1956, Nov. 16, 1959, Jan. 19, 1960.
REMARKS.--Recorder not operating properly Nov. 27, 1963 to Sept. 2, 1964; temperature range not determined.

Temperature (°F) of water, water year October 1963 to September 1964

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	52	52	51	51	50	50	50	51	51	51	51	51	51	51	50	49	49	48	46	47	47	47	46	45	44	44	44	43	42	43	48
Minimum	52	50	51	51	50	50	49	50	50	50	51	51	51	51	50	49	49	48	45	46	46	47	46	45	44	44	43	43	42	42	42	48
November																																
Maximum	43	43	43	44	44	43	43	43	43	43	42	42	42	42	42	41	41	41	40	40	39	39	40	41	41	41	--	--	--	--	--	42
Minimum	43	42	42	43	43	43	42	42	43	42	40	42	42	42	41	41	41	40	40	39	39	39	39	40	41	40	--	--	--	--	--	41
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	--	50	51	51	51	51	50	50	50	50	49	49	49	50	49	50	50	48	47	47	47	49	49	50	50	48	48	49	49	48	--	49
Minimum	--	49	48	48	48	49	49	48	47	47	47	47	47	48	48	49	47	47	47	47	47	47	48	48	48	46	46	47	48	46	--	48

SKAGIT RIVER BASIN--Continued

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

LOCATION.--At gaging station at bridge on U.S. Highway 99, 1 mile north of Mount Vernon, Skagit County, and 3 miles downstream from Nookachamps Creek.
DRAINAGE AREA.--3,093 square miles, of which 400 square miles is in Canada.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: July 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F Aug. 23, 24; minimum, 39°F on several days during January and February.
EXTREMES, 1962-64.--Water temperatures: Maximum, 62°F Aug. 8, 9, 30, 31, 1963; minimum, 37°F Jan. 11, 1963.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963	20200	6.6				7.0	1.2	1.3	0.6		25		5.0	0.2	0.1	0.7	0.01	42	22	2		52	7.1	5	10.9	230
Dec. 9.....	16100	7.4				8.0	1.3	1.9	.6		29		4.8	.5	.1	.9	.01	45	25	1		59	6.9	5	11.5	230
Jan. 14, 1964	16600	6.8				8.0	1.5	1.5	.5		30		5.2	.5	.0	.7	.01	41	26	2		60	7.3	5	12.0	430
Feb. 20.....	12400	7.6				10	1.1	1.6	.6		34		4.6	.5	.1	.6	.01	52	30	2		67	7.1	5	13.1	36
Mar. 27.....	14200	8.1				8.5	1.7	1.6	.6		32		5.8	.5	.1	.6	.01	A 43	28	2		66	7.5	5	12.3	150
Apr. 24.....	13600	7.3				9.0	1.9	1.2	.3		35		4.4	.5	.1	.4	.01	42	30	2		70	7.3	5	11.4	36
June 6.....	43600	4.4				4.5	1.0	1.0	.3		18		2.6	.5	.0	.4	.00	23	15	0		36	7.0	5	11.8	230
June 30.....	26100	4.9				5.5	1.4	1.2	.8		22		3.0	.2	.1	.3	.01	A 29	20	2		45	7.1	5	10.8	73
July 14.....	50800	4.2				5.0	.7	1.0	.3		19		3.4	.0	.1	.3	.00	A 24	15	0		36	7.2	5	13.0	4600
Aug. 25.....	15000	4.9				5.5	.7	1.0	.7		20		3.8	.5	.0	.2	.01	A 27	16	0		40	7.1	0	11.2	91
Sept. 28.....	8730	6.5				7.0	1.4	1.6	.9		28		3.8	.5	.0	.5	.01	A 36	24	0		55	7.0	5	10.8	930

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.00	0.05	0.00	0.05
Sept. 28.....	.00	.00	.07	.05	.00	.02

SKAGIT RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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	56	55	55	55	54	54	54	54	54	54	55	56	55	55	54	55	54	52	52	52	52	51	51	50	48	48	48	48	48	48	53
Minimum	56	55	55	55	53	53	53	54	54	54	54	53	54	54	54	54	54	52	52	51	51	51	51	50	48	48	48	48	48	48	48	52
November																																
Maximum	48	48	48	47	48	48	47	47	46	46	46	46	46	47	47	46	46	45	44	44	43	43	43	43	43	44	43	43	43	43	--	45
Minimum	48	48	47	47	47	47	47	46	46	46	46	46	46	46	46	46	45	44	44	43	43	43	43	43	43	43	43	43	43	42	--	45
December																																
Maximum	42	42	42	42	42	42	42	42	42	42	41	41	42	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	42	42
Minimum	42	42	42	42	42	42	42	42	41	41	41	41	41	42	42	42	42	41	42	42	42	42	42	41	41	41	41	41	41	41	41	42
January																																
Maximum	42	41	41	41	41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	39	39	39	40	40	40	40	40	40
Minimum	41	41	41	41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	40	39	39	39	39	39	39	39	39	40	40	40	40	40
February																																
Maximum	40	40	40	41	41	40	40	39	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	40	41	41	40	--	--	40
Minimum	40	40	40	40	40	39	39	39	39	40	40	40	39	40	40	40	40	40	40	41	41	41	41	40	40	40	40	40	40	--	--	40
March																																
Maximum	40	40	40	40	40	40	41	41	40	40	41	41	40	41	41	41	41	41	41	41	41	42	42	42	42	41	41	42	45	45	45	41
Minimum	40	40	40	40	40	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	42	42	41	41	41	41	42	45	45	41
April																																
Maximum	45	44	43	43	43	45	46	46	45	44	44	43	43	43	43	43	44	45	46	46	46	44	44	46	46	46	45	45	45	45	--	45
Minimum	44	43	43	43	43	43	45	45	44	44	43	43	43	43	43	42	42	44	45	46	44	44	43	44	46	44	45	44	45	44	--	44
May																																
Maximum	45	45	46	46	46	45	46	46	46	46	46	46	46	46	47	48	48	47	48	48	44	45	45	46	47	49	50	50	49	48	48	47
Minimum	45	44	44	45	44	45	46	46	46	45	45	46	45	45	46	47	47	46	47	44	44	44	45	45	45	47	49	49	48	48	47	46
June																																
Maximum	48	46	46	46	46	46	46	46	48	48	48	47	47	47	48	49	48	47	47	49	49	49	50	50	50	50	50	49	50	51	--	48
Minimum	44	44	46	46	45	46	46	45	45	48	46	46	47	47	47	48	47	47	47	47	48	49	49	50	50	50	49	48	48	50	--	47
July																																
Maximum	51	51	49	49	49	49	51	51	50	51	52	52	52	52	51	51	51	51	54	53	52	52	53	55	55	55	56	55	55	56	53	52
Minimum	51	49	48	48	49	49	49	50	50	50	51	52	52	51	51	50	50	51	51	52	51	51	51	53	54	54	54	55	55	53	52	51
August																																
Maximum	52	52	53	53	55	55	56	56	54	55	56	56	56	56	56	56	56	56	56	54	56	57	58	58	57	56	53	52	52	52	52	55
Minimum	52	52	52	53	53	54	55	54	54	53	55	55	54	54	54	55	55	56	54	53	54	56	57	57	55	53	52	52	52	52	52	54
September																																
Maximum	52	53	54	55	55	55	55	54	54	54	54	53	53	53	53	52	52	52	52	51	50	50	52	53	53	53	52	52	52	51	--	53
Minimum	52	52	52	53	54	55	54	52	52	53	53	53	52	52	52	52	52	52	51	50	50	50	50	52	52	52	52	52	51	51	--	52

NOOKSACK RIVER BASIN

12-2131. NOOKSACK RIVER AT FERNDALE, WASH.

LOCATION.--At Main Street Bridge at Ferndale, Whatcom County, 1.3 miles downstream from Tenmile Creek.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 30, 1963		8.8				10	2.5	2.3	0.7		35		9.2	1.5	0.1	1.4	0.02	62	36	7		83	7.0	20	11.1	930
Nov. 12.....		8.6				9.5	3.4	2.2	.6		37		8.4	1.5	.1	1.1	.03	A 53	38	7		84	7.1	20	11.1	930
Dec. 9.....		9.6				10	3.9	3.0	.7		40		11	2.5	.1	1.6	.03	72	41	8		96	7.1	10	11.9	150
Jan. 14, 1964		8.6				10	3.1	3.2	.7		38		9.4	2.2	.1	1.6	.02	58	38	6		90	7.1	20	11.5	1500
Feb. 20.....		11				10	3.9	3.2	.7		42		9.4	2.8	.2	1.3	.02	70	41	6		98	7.2	15	12.9	230
Mar. 27.....		11				12	4.3	3.4	.6		48		10	3.0	.1	.7	.01	75	48	8		113	7.2	5	11.5	430
Apr. 24.....		9.0				10	3.5	2.8	.7		40		6.4	2.0	.1	.8	.01	56	39	6		93	7.1	10	11.1	36
June 2.....		5.4				5.0	2.4	1.9	.2		23		5.6	1.8	.1	.4	.02	33	22	4		51	7.2	5	11.2	430
June 30.....		8.2				7.0	2.9	1.7	.7		30		6.6	.8	.1	.3	.01	A 43	30	5		65	7.1	5	10.1	930
July 14.....		5.3				6.5	1.4	1.3	.2		22		6.4	.5	.1	.2	.00	32	22	4		52	7.2	5	12.7	2400
Aug. 31.....		6.6				8.5	2.4	2.0	.3		32		7.8	1.2	.0	.5	.01	46	31	5		73	7.1	15	10.7	930
Sept. 28.....		6.0				12	2.8	2.7	1.0		42		11	1.8	.0	.9	.04	A 59	42	7		97	7.2	5	10.9	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.00	0.05	0.00	0.01
Sept. 28.....	.00	.00	.10	.05	.00	.02

KOOTENAI RIVER BASIN

12-3018.5. KOOTENAI RIVER AT WARLAND BRIDGE, NEAR LIBBY, MONT.

LOCATION.--Temperature recorder at gaging station, on right bank at county bridge, 0.1 mile downstream from Barron Creek, and 14.5 miles northeast of Libby, Lincoln County.
DRAINAGE AREA.--8,892 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 60°F July 28-30; minimum, freezing point on several days during December and March.
EXTREMES, 1962-64.--Water temperatures: Maximum, 68°F Aug. 14, 15, 1963; minimum, freezing point on several days in 1963-64.
REMARKS.--Recorder stopped Dec. 15 to Mar. 19, Mar. 29 to Apr. 20. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, water year October 1963 to September 1964

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	55	55	54	53	52	51	50	49	50	49	49	49	49	49	49	49	49	49	48	46	46	46	46	46	44	43	42	41	40	40	48
Minimum	55	54	54	53	52	51	50	49	49	49	49	48	48	49	49	49	49	49	47	46	46	46	46	46	44	42	42	41	40	40	40	47
November																																
Maximum	40	39	39	39	39	39	39	39	39	39	39	38	38	38	39	39	39	39	39	39	36	34	34	35	35	36	37	37	35	35	--	38
Minimum	39	39	39	39	39	39	39	39	39	39	38	38	38	38	38	39	39	39	39	36	34	33	33	34	35	35	36	35	35	33	--	37
December																																
Maximum	33	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40	40	40	39	35	33	34	37	39	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38	39	39	35	33	32	33	34	37	--	--	--	--
April																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	45	45	46	46	47	46	46	46	46	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	45	44	44	45	46	44	44	46	46	--	--
May																																
Maximum	46	45	44	43	44	44	45	47	47	48	47	47	48	48	48	50	50	50	49	49	49	48	46	46	47	47	46	46	46	46	46	47
Minimum	45	44	43	43	43	44	44	45	47	47	47	46	47	47	47	48	50	49	49	49	48	46	45	45	46	45	45	46	46	46	46	46
June																																
Maximum	47	47	48	48	47	46	46	46	45	45	46	46	46	46	46	46	46	46	46	46	47	49	49	50	50	51	50	50	49	49	--	47
Minimum	46	47	47	47	46	46	46	45	45	45	45	46	46	46	46	46	46	46	46	46	46	47	49	49	50	50	50	49	48	48	--	47
July																																
Maximum	51	51	52	52	51	51	53	54	55	55	55	56	56	56	56	56	55	55	55	55	56	56	57	57	56	58	59	60	60	60	58	55
Minimum	49	51	51	51	51	50	51	53	54	55	55	55	56	56	56	55	54	55	54	54	55	56	56	56	56	56	58	59	60	58	57	55
August																																
Maximum	57	55	54	55	54	56	56	58	58	57	58	58	58	58	58	59	59	59	58	55	56	57	57	57	56	54	54	52	51	51	50	56
Minimum	55	54	54	54	54	54	56	56	57	56	57	58	57	57	58	58	58	58	55	54	53	55	57	56	54	54	52	51	51	50	50	55
September																																
Maximum	50	50	49	50	51	51	51	51	51	50	50	50	50	53	53	54	54	54	54	52	52	52	52	53	53	53	52	51	51	51	--	52
Minimum	50	49	48	49	50	51	51	51	50	50	49	49	49	50	52	53	54	54	52	52	52	51	51	52	53	52	51	51	51	50	--	51

KOOTENAI RIVER BASIN--Continued

12-3020. FISHER RIVER NEAR JENNINGS, MONT.

LOCATION.--Temperature recorder at gaging station, on right bank 80 feet downstream from bridge, 1 mile downstream from Wolf Creek, 9 miles upstream from mouth, and 9 miles southeast of Jennings, Lincoln County.
DRAINAGE AREA.--780 square miles.
RECORDS AVAILABLE.--Water temperatures: May to November 1963, May to September 1964.
EXTREMES, October and November 1963, May to September 1964.--Water temperatures: Maximum, 68°F July 28, 29; minimum, freezing point Nov. 21, 22.
EXTREMES, 1963-64.--Water temperatures: Maximum, 70°F July 7, 8, 1963; minimum, freezing point Nov. 21, 22, 1963.
REMARKS.--Recorder stopped July 11-20. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, water year October 1963 to September 1964

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

KOOTENAI RIVER BASIN--Continued

12-3045. YAAK RIVER NEAR TROY, MONT.

LOCATION.--Temperature recorder at gaging station, on right bank 400 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 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 71°F Aug. 9, 1963; minimum, freezing point Nov. 30, 1963.
REMARKS.--Recorder stopped June 28 to July 23. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, water year October 1963 to September 1964

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

KOOTENAI RIVER BASIN--Continued

12-3050. KOOTENAI RIVER AT LEONIA, IDAHO

LOCATION.--Temperature recorder at gaging station at Leonia, Boundary County, 450 feet east of Montana-Idaho State line, and 0.5 mile upstream from Boulder Creek.
DRAINAGE AREA.--11,740 square miles, approximately.
EXTREMES, July 1962 to May 1963.--Water temperatures: Maximum, 65°F July 29 to Aug. 2, 1962; minimum, freezing point on many days during winter months.

Temperature (°F) of water, October 1962 to May 1963

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	52	52	52	51	49	48	48	48	47	47	47	47	47	47	46	44	44	44	44	45	46	46	46	46	46	45	45	45	44	44	47
Minimum	52	52	52	51	49	48	48	48	47	47	47	46	46	47	46	44	44	44	44	44	44	45	46	45	45	45	45	45	44	44	44	46
November																																
Maximum	45	44	43	43	43	42	42	42	41	41	41	40	40	40	40	40	40	39	39	39	39	39	39	38	37	37	38	38	38	38	--	40
Minimum	44	43	43	43	42	42	42	41	41	41	40	40	40	40	40	40	39	39	39	39	39	39	38	37	37	37	37	38	38	37	--	40
December																																
Maximum	37	37	37	36	36	37	38	38	39	39	39	39	39	39	40	40	40	40	40	40	39	39	36	34	32	32	32	32	32	32	32	37
Minimum	37	36	36	36	36	36	37	37	38	38	38	39	39	39	39	40	40	40	40	39	39	36	34	32	32	32	32	32	32	32	32	36
January																																
Maximum	32	32	33	33	33	33	34	34	34	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--
Minimum	32	32	32	33	33	33	33	34	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32	32	32	33	33	33	33	33	34	34	34	35	35	35	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32	32	32	32	33	33	33	33	34	34	34	34	35	35	--	--	--	--
March																																
Maximum	35	35	35	35	36	36	37	37	37	38	39	38	38	38	38	39	39	40	40	41	42	43	43	43	43	43	43	43	43	43	42	39
Minimum	35	35	35	35	35	36	36	36	37	37	38	38	38	38	38	38	38	39	40	40	41	42	43	43	42	42	43	43	43	42	40	39
April																																
Maximum	39	39	39	41	42	42	42	42	42	43	43	43	44	46	46	46	44	43	42	42	43	43	43	44	45	47	48	49	49	49	--	44
Minimum	39	39	39	39	41	42	42	42	42	42	43	43	43	44	46	44	43	42	42	42	42	43	43	43	44	45	47	48	49	47	--	43
May																																
Maximum	47	45	44	43	42	43	43	44	43	44	45	46	47	48	48	49	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	45	44	43	42	42	42	43	43	43	43	44	45	46	47	48	48	49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

KOOTENAI RIVER BASIN--Continued

12-3220. KOOTENAI RIVER AT PORTHILL, IDAHO

LOCATION.--Temperature recorder at gaging station, on right bank 300 feet upstream from international boundary at Porthill, Boundary County.
DRAINAGE AREA.--13,700 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1950.
Water temperatures: January 1949 to September 1950, May 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F Aug. 22, 23; minimum, freezing point on many days during winter months.
EXTREMES, 1949-50, May 1963 to September 1964.--Water temperatures: Maximum, 69°F Aug. 5-8, 10, 16, 1949; minimum, freezing point on many days during winter months.

Temperature (°F) of water, May to September 1963

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	
May																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	52	52	52	51	51	50	51	51	51	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	52	52	51	51	50	50	50	51	51	--
June																																
Maximum	52	52	51	51	51	51	51	50	50	50	50	50	51	52	54	55	55	56	57	5[illegible]	58	57	57	55	53	53	54	55	56	56	--	53
Minimum	51	51	51	51	51	51	50	50	50	50	50	50	50	51	52	54	54	55	56	57	57	57	55	53	53	53	53	54	55	56	--	53
July																																
Maximum	56	55	54	55	56	57	58	58	59	59	58	57	56	55	56	57	57	58	58	58	59	60	60	61	61	61	61	60	60	62	63	58
Minimum	55	54	54	54	55	56	57	58	58	58	57	56	55	55	55	56	57	57	58	58	58	59	60	60	61	61	60	60	60	60	62	58
August																																
Maximum	63	64	64	64	64	65	66	66	66	67	68	68	68	68	68	68	68	68	68	67	66	66	65	65	64	63	62	62	63	64	64	66
Minimum	62	62	63	64	64	64	65	66	66	66	67	68	68	68	68	68	68	68	67	66	66	65	65	64	63	62	62	62	62	63	64	65
September																																
Maximum	64	64	64	64	65	64	65	65	64	65	65	64	64	63	62	62	62	61	59	58	58	57	57	57	57	58	58	58	59	59	--	61
Minimum	64	63	63	63	64	64	64	64	64	64	64	64	63	62	62	62	61	59	58	58	57	57	57	57	57	57	58	57	58	58	--	61

KOOTENAI RIVER BASIN--Continued

12-3220. KOOTENAI RIVER AT PORTHILL, IDAHO--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	58	58	58	58	57	57	56	56	55	54	54	53	53	53	53	52	52	52	52	52	52	52	51	51	50	49	48	48	47	47	53
Minimum	58	57	58	58	57	57	56	56	55	54	54	53	53	53	53	52	51	51	52	52	52	52	51	51	50	49	48	48	47	47	46	53
November																																
Maximum	46	46	45	44	44	44	44	43	43	42	41	41	40	40	40	41	41	41	41	40	40	39	39	39	39	39	38	37	36	36	--	41
Minimum	46	45	44	44	44	44	43	43	42	41	41	40	40	40	40	40	41	41	40	40	39	39	39	39	39	38	37	36	36	36	--	20
December																																
Maximum	37	36	36	36	36	35	34	34	34	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33
Minimum	35	36	36	36	35	34	34	34	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33
January																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March																																
Maximum	32	32	32	32	32	32	32	32	32	32	33	33	34	35	36	36	36	37	37	37	39	40	40	40	40	40	40	40	41	41	42	36
Minimum	32	32	32	32	32	32	32	32	32	32	32	33	33	34	35	36	36	36	37	37	37	39	40	40	40	40	40	40	40	41	41	36
April																																
Maximum	41	41	42	43	44	44	44	44	44	44	45	45	45	45	44	44	44	45	45	46	46	46	47	47	47	48	49	49	48	49	--	45
Minimum	41	41	41	42	43	44	44	44	44	44	44	45	45	44	44	44	44	44	45	45	46	46	46	47	47	47	48	48	48	48	--	45
May																																
Maximum	49	49	49	49	48	47	47	48	49	51	51	51	51	51	51	50	50	51	51	51	51	50	50	49	48	48	49	49	51	51	51	50
Minimum	49	49	49	48	47	47	47	47	48	49	51	51	51	51	50	50	50	50	51	50	50	50	49	48	48	48	48	49	49	50	50	49
June																																
Maximum	51	51	52	52	52	51	52	52	52	51	51	51	52	52	52	52	52	51	51	52	52	52	53	54	56	56	56	56	56	55	--	53
Minimum	51	51	51	52	51	51	51	52	51	51	51	51	51	52	52	52	51	51	51	51	52	52	52	53	54	56	56	56	55	55	--	52
July																																
Maximum	56	56	57	57	58	58	58	58	60	61	62	62	63	63	63	64	64	63	62	63	63	63	63	62	62	63	63	64	64	64	64	61
Minimum	55	56	56	57	57	58	58	58	58	60	61	62	62	63	63	63	63	62	62	62	63	63	62	62	62	62	63	63	63	64	64	61
August																																
Maximum	64	63	62	61	60	62	62	63	63	62	62	63	63	63	62	62	63	63	63	64	64	65	65	63	63	62	62	62	61	60	59	62
Minimum	63	62	61	60	60	60	62	62	62	62	62	62	63	62	62	62	62	63	63	63	64	64	63	63	62	62	62	61	60	59	58	62
September																																
Maximum	58	57	56	56	56	56	56	56	56	57	57	57	56	56	55	55	55	55	55	55	55	55	54	54	53	53	53	53	53	53	--	55
Minimum	57	56	56	56	56	56	56	56	56	56	57	56	55	55	55	55	55	55	55	55	55	54	54	53	53	53	53	53	53	53	--	55

PEND OREILLE RIVER BASIN

12-3530. CLARK FORK BELOW MISSOULA, MONT.

LOCATION.--Temperature recorder at gaging station, on right bank 1 mile downstream from Bitterroot River and 5 miles west of Missoula, Missoula County.
DRAINAGE AREA.--9,003 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 21, 22, 26, 27, Aug. 4.
EXTREMES, 1959-64.--Water temperatures: Maximum, 77°F Aug. 19, 22, 24, 1961; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped Nov. 29 to Dec. 19, Dec. 23-26, 30, Jan. 8-15, 22-24, Sept. 17-30.

Temperature (°F) of water, water year October 1963 to September 1964
(Water-stage recorder with temperature attachment)

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

PEND OREILLE RIVER BASIN--Continued

12-3590. SOUTH FORK FLATHEAD RIVER AT SPOTTED BEAR RANGER STATION, NEAR HUNGRY HORSE, MONT.

LOCATION.--Temperature recorder at gaging station, on left bank 600 feet south of Spotted Bear ranger station, 1,000 feet upstream from Spotted Bear River, and 40 miles southeast of Hungry Horse, Flathead County.
DRAINAGE AREA.--958 square miles.
RECORDS AVAILABLE.--Water temperatures: October to December 1963, May and June 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 51°F Oct. 1; minimum, freezing point on several days during November and December.
REMARKS.--Recorder stopped May 1-14.

Temperature (°F) of water, water year October 1963 to September 1964

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	51	50	49	49	49	48	47	47	46	46	46	47	47	45	45	45	44	44	42	40	41	44	44	44	42	40	38	38	37	37	36	44
Minimum	48	47	46	48	48	47	46	44	44	44	44	45	45	43	43	43	41	41	40	40	40	41	44	42	40	38	38	37	37	36	34	42
November																																
Maximum	34	34	34	34	34	34	34	35	35	35	35	35	34	35	35	35	34	34	34	34	34	33	32	33	34	34	35	35	34	32	--	34
Minimum	34	34	34	34	34	34	34	34	35	35	35	34	34	34	35	34	34	34	34	34	33	32	32	32	33	34	34	34	32	32	--	34
December																																
Maximum	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	32	32	32	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	44	44	44	43	43	43	42	40	43	43	44	44	45	45	42	42	43	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40	40	40	40	40	40	40	39	40	40	40	40	42	42	40	40	40	--
June																																
Maximum	45	45	45	45	44	44	43	42	43	43	43	43	44	44	44	44	43	44	44	45	45	47	50	50	50	50	50	50	--	--	--	45
Minimum	40	40	42	41	42	42	42	40	40	40	42	42	42	42	42	42	42	43	43	43	43	44	45	46	45	46	47	44	--	--	--	43

PEND OREILLE RIVER BASIN--Continued

12-3610. SULLIVAN CREEK NEAR HUNGRY HORSE, MONT.

LOCATION.--Temperature recorder at gaging station, on left bank 0.2 mile downstream from Quintonkon Creek, 1 mile upstream from Hungry Horse Reservoir flow line, and 30 miles southeast of Hungry Horse, Flathead County.
DRAINAGE AREA.--71.3 square miles.
RECORDS AVAILABLE.--Water temperatures: May to October 1963, July to September 1964.
EXTREMES, October 1963, July to September 1964.--Water temperatures: Maximum, 57°F Aug. 18.
EXTREMES, 1963-64.--Water temperatures: Maximum, 61°F Aug. 13, 14, 1963.
REMARKS.--Recorder stopped July 1-7. Records furnished by Corps of Engineers, U.S. Army.

Temperature (°F) of water, October 1963, July to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	49	49	48	48	48	47	46	45	44	44	44	44	45	45	44	44	43	43	42	41	43	45	45	42	41	40	40	39	39	39	37	44
Minimum	46	45	46	47	47	46	45	41	42	41	42	43	43	42	42	41	40	41	40	38	40	43	42	41	40	40	39	39	39	37	36	42
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	--	--	--	--	--	--	--	52	52	52	53	55	53	53	52	50	54	55	54	55	56	55	55	53	55	56	56	56	56	56	55	--
Minimum	--	--	--	--	--	--	--	47	49	47	47	49	50	50	50	49	48	50	50	49	50	49	50	49	48	49	50	50	53	52	52	--
August																																
Maximum	53	52	55	56	55	55	55	56	55	55	55	54	52	53	54	55	56	57	56	53	53	55	54	53	53	52	50	48	48	48	47	53
Minimum	50	50	50	51	52	49	49	51	50	50	49	50	51	50	50	49	49	52	50	49	50	49	51	49	48	50	48	48	48	47	46	50
September																																
Maximum	47	47	45	45	46	46	47	47	46	45	44	45	45	45	45	47	46	45	45	44	44	44	44	46	46	46	43	43	44	45	--	45
Minimum	46	45	45	43	43	45	45	46	45	44	43	42	43	43	43	45	45	45	42	44	44	44	43	44	46	43	41	42	43	44	--	44

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

LOCATION.--At county bridge at Columbia Falls, Flathead County, 200 feet upstream from gaging station and 5 miles downstream from South Fork.
DRAINAGE AREA.--4,464 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1950, August 1963 to September 1964.
Water temperatures: January 1949 to September 1950, August 1963 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 123 ppm Oct. 26-31; minimum, 85 ppm Feb. 1-19.
Hardness: Maximum, 107 ppm Oct. 26-31; minimum, 76 ppm June 1-7.
Specific conductance: Maximum daily, 220 micromhos July 21; minimum daily, 135 micromhos June 4.
Water temperatures: Maximum, 65°F Aug. 18; minimum, 33°F Dec. 16.
EXTREMES, 1949-50, 1963-64.--Dissolved solids: Maximum, 135 ppm Jan. 11-20, 1949; minimum, 77 ppm July 1-10, 1950.
Hardness: Maximum, 119 ppm Jan. 11-31, 1949; minimum, 67 ppm June 1-10, 1949.
Specific conductance (1963-64): Maximum daily, 220 micromhos July 21, 1964; minimum daily, 135 micromhos June 4, 1964.
Water temperatures: Maximum, 69°F Aug. 23, 1963; minimum, freezing point on many days during winter months.
REMARKS.--Minimum observed during water year: Dissolved solids, 75 ppm June 4; hardness, 69 ppm June 4. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-16, 1963.	1804	5.5	0.00	27	7.5	1.2	0.2	112	0	6.0	0.5	0.0	0.1	0.00	111	0.15	541	98	6	0.1	195	7.2	1
Oct. 17-25.....	5416	5.4	.00	25	6.0	1.1	.2	102	0	4.8	.2	.0	.0	.00	100	.14	1460	87	3	.1	172	7.3	1
Oct. 26-31.....	1670	5.6	.00	30	7.8	1.2	.2	121	0	7.5	.4	.0	.0	.00	123	.17	555	107	8	.1	210	7.1	1
Nov. 1-30.....	1557	5.3	.01	28	8.3	1.6	.7	119	0	9.2	.5	.2	.3	.07	A113	.15	475	104	6	.1	200	7.6	--
Dec. 1-9.....	3680	4.5	.00	26	7.1	1.8	.5	110	0	5.6	.5	.2	.2	.00	A100	.14	994	94	4	.1	184	7.2	--
Dec. 10-31.....	10470	3.9	.00	23	5.5	1.2	.5	96	0	5.2	.0	.1	.2	.00	A87	.12	2460	80	1	.1	156	7.3	--
Jan. 1-17, 1964.	10620	5.3	.00	21	6.7	1.4	.7	94	0	8.0	.2	.1	.4	.04	A92	.13	2640	80	3	.1	157	7.3	--
Jan. 18-31.....	10800	4.1	.00	23	5.3	1.5	.6	95	0	4.2	.0	.1	.2	.01	A86	.12	2510	79	1	.1	154	7.5	--
Feb. 1-19.....	4767	3.8	.00	24	5.1	1.4	.6	97	0	2.0	.1	.1	.1	.03	A85	.12	1090	81	1	.1	159	7.8	--
Feb. 20-29.....	2924	4.1	.00	25	5.3	1.5	.6	101	0	2.6	.0	.1	.1	.00	A89	.12	703	84	1	.1	164	8.0	--
Mar. 1-17.....	6316	4.5	.00	25	5.3	1.3	.6	96	0	2.6	.0	.1	.2	--	90	.12	1530	84	5	.1	158	7.9	--
Mar. 18-31.....	2824	4.9	.00	28	5.4	1.5	.5	108	0	5.0	.0	.1	.1	.01	102	.14	778	92	3	.1	179	7.8	--
Apr. 1-15.....	5558	4.7	.00	27	4.5	1.6	.8	100	0	5.2	.0	.1	.5	.01	98	.13	1470	86	4	.1	168	7.8	--
Apr. 16-30.....	7420	4.8	.00	26	5.9	2.0	1.2	102	0	6.2	.1	.1	1.1	.01	98	.13	1960	89	5	.1	176	7.8	--
May 1-17.....	18360	5.8	.00	26	4.7	1.8	.9	96	0	6.0	.5	.2	.7	.01	106	.14	5250	84	5	.1	165	7.6	--
May 18-31.....	29810	5.0	.00	25	4.5	1.3	.8	95	0	3.8	.0	.2	.6	.01	100	.14	8050	81	3	.1	157	7.1	--
June 1-7.....	37760	4.3	.00	24	3.9	1.3	.6	89	0	3.8	.0	.1	.1	.01	92	.13	9380	76	3	.1	147	7.4	--
June 8-10.....	104200	5.6	.00	32	4.4	1.4	1.5	117	0	1.2	.0	.2	.3	.02	120	.16	33760	98	2	.1	191	7.3	--
June 11-18.....	42890	4.9	.00	25	4.5	1.1	.7	96	0	3.6	.0	.2	.1	.01	96	.13	11120	81	2	.1	157	7.4	--

A Calculated from determined constituents.

PEND OREILLE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1963 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
June 19-30, 1964	37120	4.4	0.00	26	4.4	1.4	1.1	99	0	4.2	0.0	0.1	1.4	0.01	96	0.13	9620	83	2	0.1	165	7.6	--
July 1-20.....	19740	4.4	.00	25	5.3	1.3	.6	99	0	6.8	.0	.1	.4	.01	96	.13	5120	84	3	.1	164	7.6	--
July 21-31.....	8478	4.5	.00	28	5.6	1.3	.6	109	0	5.4	.0	.1	.5	.00	104	.14	2380	93	4	.1	182	7.6	--
Aug. 1-31.....	4693	4.5	.00	27	6.5	1.4	.6	112	0	6.0	.3	.0	.3	.02	104	.14	1320	94	2	.1	184	7.7	2
Sept. 1-30.....	4346	4.3	.00	26	5.9	.1	.9	105	0	5.2	.5	.0	.4	.00	98	.13	1150	89	3	.0	180	7.8	--
Weighted average.....	--	4.7	0.00	26	5.1	1.3	0.8	100	--	4.7	0.1	0.1	0.5	0.01	98	0.13	2940	85	3	0.1	166	7.4	--
Time-weighted average.....	11060	4.7	0.00	26	5.8	1.3	0.7	103	--	5.4	0.2	0.1	0.4	0.02	99	--	--	88	3	0.1	172	7.5	--
Tons per day..	--	142	0.00	765	151	40	24	2980	--	140	2.9	4.0	14	0.36	--	--	--	--	--	--	--	--	--
Analysis of additional sample																							
June 4, 1964....	B41200	4.0	C0.06	19	5.3	1.4	0.7	83	0	3.4	0.0	0.1	0.2	0.00	A75	0.10	8340	69	1	0.1	135	7.8	

A Calculated from determined constituents.
B Discharge at time of sampling.
C In solution at time of collection.

PEND OREILLE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964
(Once-daily measurement between 1600 and 1900)

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	55	54	54	55	53	57	50	51	49	50	50	49	48	49	53	47	45	49	41	42	51	43	42	43	43	43	41	40	42	40	48
November	45	41	49	40	41	41	41	40	40	40	40	40	40	40	41	40	38	39	40	38	37	35	36	40	42	38	42	43	42	--	--	40
December	--	--	--	--	39	38	34	34	34	40	38	39	40	39	41	33	38	39	40	41	40	41	42	41	41	41	41	42	38	41	39	39
January	39	40	40	41	39	37	38	37	38	38	39	38	39	39	39	39	39	39	39	38	37	38	39	37	39	36	38	39	39	39	37	38
February	39	39	38	39	39	39	39	39	39	40	39	39	40	38	37	38	39	38	38	39	38	39	39	40	40	38	39	38	38	--	--	39
March	39	39	39	38	37	38	35	37	37	38	39	40	38	39	41	40	40	39	41	37	36	35	32	39	38	39	40	40	45	46	38	39
April	39	40	45	44	42	45	45	44	44	42	40	42	42	40	44	42	43	42	44	42	44	45	45	43	44	44	44	46	45	42	--	43
May	43	45	43	41	42	44	43	45	44	44	45	47	48	45	47	48	48	46	48	51	48	46	47	45	39	46	47	48	48	50	51	46
June	49	46	49	46	49	47	48	49	45	48	48	45	48	49	47	44	49	48	48	47	47	49	41	53	56	52	49	49	50	52	--	48
July	57	55	59	51	56	59	57	55	52	58	58	59	58	60	57	59	56	59	58	58	57	56	57	58	58	59	58	59	58	59	59	57
August	53	57	59	58	55	56	54	--	64	63	63	62	63	60	62	59	61	65	64	64	63	61	63	63	60	62	64	57	58	57	59	60
September	57	53	52	52	53	53	55	52	55	51	51	52	52	52	52	52	52	52	55	52	50	52	53	53	52	52	51	52	51	51	--	52

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

LOCATION.--At bridge on U.S. Highway 2 at Newport, Pend Oreille County, 0.2 mile downstream from gaging station, 1.3 mile downstream from Idaho-Washington state line, and 1.8 miles downstream from Albeni Falls Dam.
DRAINAGE AREA.--24,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
REMARKS.--No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	8780	7.2				20	5.7	2.7	0.8		85		8.2	0.2	0.1	0.4	0.02	92	73	4		150	7.9	5	10.0	23
Dec. 27.....	13800	6.5				23	6.3	3.0	.9		94		11	.5	.1	.3	.01	100	83	6		171	7.7	0	12.8	91
Feb. 7, 1964.	19100	6.7				24	6.2	2.8	.8		97		11	.5	.1	.2	.01	100	86	6		175	7.8	0	--	23
Feb. 26.....	16100	6.6				24	6.6	2.9	.7		98		11	.8	.2	.3	.01	102	87	6		174	7.6	0	12.7	23
Mar. 17.....	24400	7.0				24	5.9	3.1	.8		98		10	.5	.1	.3	.01	103	84	4		178	8.1	0	12.3	30
Apr. 30.....	20800	6.6				22	6.3	2.5	.7		90		12	.5	.1	.0	.02	A 95	81	7		168	7.9	5	11.9	91
June 2.....	70300	6.2				19	6.3	2.5	.5		82		9.6	.8	.1	.5	.00	85	74	6		152	7.8	5	10.8	23
June 30.....	72200	5.9				20	5.8	2.2	1.1		85		7.2	.5	.1	.1	.02	84	74	4		150	7.8	5	10.5	--
Aug. 26.....	8550	6.0				21	5.6	2.2	.4		88		7.6	.2	.1	.2	.01	85	76	4		154	7.8	0	8.6	36
Sept. 22.....	13300	5.7				22	5.6	2.4	1.0		91		8.2	.2	.1	.2	.01	92	78	4		160	8.0	5	8.9	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 17, 1964....	0.00	0.00	0.25	0.1	0.00	0.00

12-3995. COLUMBIA RIVER AT INTERNATIONAL BOUNDARY, WASH.
(Formerly published as Columbia River at Northport, Wash.)

LOCATION.--At bridge on State Highway 22 at Northport, Stevens County, and 12 miles downstream from gaging station at international boundary.
DRAINAGE AREA.--59,700 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1964.
Water temperatures: November 1951 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 112 ppm Mar. 22-27; minimum (sum), 73 ppm July 8-25.
Hardness: Maximum, 94 ppm Mar. 22-27; minimum, 62 ppm July 26 to Aug. 15.
Specific conductance: Maximum daily, 209 micromhos Mar. 22; minimum daily, 125 micromhos Aug. 3.
Water temperatures: Maximum, 60°F on several days during August and September; minimum, 36°F on several days during December, January and February.
EXTREMES, 1958-64.--Dissolved solids: Maximum, 158 ppm Feb. 23, 1963; minimum, 71 ppm July 8-25, 1964.
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.
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 1963 to September 1964

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)	Phosphate (PO_4)	Dissolved solids (residue at 180°C) Parts per million	Dissolved solids (residue at 180°C) Tons per acre-foot	Dissolved solids (residue at 180°C) Tons per day	Hardness as $CaCO_3$ Calcium, Magnesium	Hardness as $CaCO_3$ Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1963...	55100	4.0		22	3.7	1.8	0.6	73		14	0.8	0.2	0.0	0.10	87	0.12	12940	70	10	0.1	149	7.6
Nov. 1-22.....	50000	4.5		22	5.1	2.0	.6	78		15	.8	.2	.4	.13	91	.12	12290	76	12	.1	159	7.7
Nov. 23-Dec. 15...	40000	4.9		23	5.1	2.6	.8	80		17	.8	.2	.5	.13	A 94	.13	10150	78	12	.1	164	7.7
Dec. 16-Jan. 6, 1964.....	36900	5.1		23	5.5	2.3	.8	81		17	.5	.2	.3	.14	102	.14	10160	80	14	.1	167	7.8
Jan. 7-21, 28-31..	41300	5.4		24	5.6	2.4	.7	84		17	1.0	.2	.1	.15	100	.14	11150	83	14	.1	172	7.7
Feb. 1-26.....	36900	5.2		25	5.4	2.4	.9	86		18	1.0	.2	.1	.16	101	.14	10060	85	14	.1	177	7.8
Feb. 27-Mar. 21...	46100	5.2		25	6.0	2.6	.8	90		17	.8	.2	.4	.17	A 102	.14	12700	87	13	.1	179	7.4
Mar. 22-27.....	41400	5.2		27	6.4	2.8	1.0	93		19	.8	.2	.6	.16	112	.15	12520	94	18	.1	191	7.5
Mar. 28-Apr. 11...	42500	5.3		25	6.0	2.6	.9	88		17	.5	.3	.2	.21	103	.14	11820	87	15	.1	179	7.4
Apr. 12-26.....	54800	6.1		24	5.7	2.7	1.6	84		18	1.0	.2	1.3	.18	101	.14	15090	84	15	.1	177	7.6
Apr. 27,28.....	68400	6.0		26	5.7	2.1	1.2	89		19	.5	.2	.7	.13	A 106	.14	19580	88	15	.1	185	7.7
Apr. 29-May 11....	83600	5.6		22	5.4	2.0	1.2	81		15	.5	.1	.5	.09	93	.13	20990	77	11	.1	162	7.9
May 12-June 10....	203800	5.2		21	4.5	1.8	.6	74		12	.2	.2	.5	.05	88	.12	48420	71	10	.1	148	7.5
June 11-July 7....	366500	5.0		20	4.8	1.7	.7	72		11	.2	.2	.5	.04	78	.11	77180	70	11	.1	141	7.5
July 8-25.....	282000	4.3		18	4.4	1.4	.7	66		11	.2	.1	.6	.04	A 73	.10	55580	63	9	.1	131	7.6
July 26-Aug. 15...	159500	5.9		19	3.5	1.2	.7	65		10	.2	.1	.5	.05	77	.10	33160	62	9	.1	129	7.5
Aug. 16-Sept. 8...	98700	5.7		20	3.2	1.4	.6	65		11	.2	.2	.5	.09	79	.11	21050	63	10	.1	131	7.6
Sept. 9-30.....	70400	3.2		20	3.9	1.4	.7	67		13	.5	.2	.7	.15	81	.11	15400	66	11	.1	139	7.6
Weighted average	--	5.0		21	4.6	1.8	0.7	73		13	0.4	0.2	0.5	0.08	84	0.11	24200	71	11	0.1	146	7.5
Time-weighted average.....	B106300	5.0		22	4.8	2.0	0.8	77		15	0.6	0.2	0.4	0.11	91	--	--	75	12	0.1	156	7.5
Tons per day....	--	1440		5971	1326	507	208	21020		3630	105	51	139	22	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

B Mean discharge based on 366 days; mean discharge for 358 days of chemical analyses, 106654 cfs.

COLUMBIA RIVER MAIN STEM--Continued

12-3995. COLUMBIA RIVER AT INTERNATIONAL BOUNDARY, WASH.--Continued

Specific conductance (micromhos at 25°C), water year October 1963 to September 1964

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	138	157	166	164	172	179	193	161	148	140	126	132
2	140	155	169	162	172	178	189	164	146	137	127	135
3	141	157	164	167	173	181	198	163	142	135	125	132
4	143	149	156	165	174	178	174	163	148	136	126	133
5	143	150	166	167	175	178	174	165	145	137	131	132
6	142	155	172	167	173	179	175	168	141	137	130	133
7	141	156	165	169	174	180	174	159	140	136	132	133
8	152	155	169	165	177	178	173	161	143	132	130	133
9	141	155	155	169	175	179	171	156	141	134	129	138
10	143	156	160	170	177	178	169	155	141	135	132	138
11	143	156	155	168	176	180	168	159	146	133	131	133
12	142	161	166	170	175	180	182	151	142	135	131	139
13	148	162	160	170	175	180	186	153	142	131	131	140
14	157	162	155	172	179	181	180	155	150	130	131	136
15	147	156	167	173	178	181	184	155	153	131	131	135
16	147	160	157	171	176	180	186	152	140	133	129	139
17	151	162	161	173	175	181	194	152	145	131	131	139
18	146	158	163	173	176	181	176	145	147	129	130	141
19	150	159	158	170	176	181	173	151	151	128	135	140
20	154	161	155	174	175	181	181	149	147	129	130	143
21	153	165	155	173	176	182	187	145	142	129	129	142
22	152	159	168	--	175	209	188	146	143	128	132	141
23	156	158	167	--	176	194	170	150	145	129	129	140
24	154	158	167	--	178	195	163	151	145	128	128	135
25	158	147	163	--	180	180	169	155	142	128	131	139
26	157	155	164	--	178	186	166	157	140	131	130	140
27	154	173	163	--	176	183	196	154	138	130	133	138
28	153	166	162	172	180	179	176	153	137	126	133	138
29	154	158	159	174	178	180	166	152	139	126	130	132
30	156	159	165	173	--	180	178	153	141	126	130	136
31	156	--	168	173	--	182	--	150	--	126	129	--
Average	148	158	162	169	175	182	178	154	143	131	130	136

COLUMBIA RIVER MAIN STEM--Continued

12-3995. COLUMBIA RIVER AT INTERNATIONAL BOUNDARY, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

12-4195. SPOKANE RIVER ABOVE LIBERTY BRIDGE, NEAR OTIS ORCHARDS, WASH.
(Formerly published as Spokane River near Otis Orchards, Wash.)

LOCATION (revised).--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.
DRAINAGE AREA.--3,880 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: December 1963 to September 1964.
EXTREMES, December 1963 to September 1964.--Dissolved solids: Maximum, 46 ppm Apr. 10 to May 9; minimum (sum), 32 ppm July 21 to Aug. 19.
Hardness: Maximum, 26 ppm Apr. 10 to May 9; minimum, 17 ppm June 6-27, June 28 to July 20.
Specific conductance: Maximum daily, 71 micromhos Apr. 27; minimum daily, 41 micromhos June 18.
Water temperatures: Maximum, 70°F July 13-15; minimum, 36°F Mar. 24, 25.
REMARKS.--Monthly sampling discontinued in October 1963. Daily sampling started in December 1963. 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 1963 to September 1964

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)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1963 A...	1390	7.5	0.05	6.5	1.5	1.6	1.0	24	0	7.2	0.2	0.3	0.1	0.03	40	--	--	22	--	--	56	7.0
Dec. 12-Jan. 11, 1964.....	3240	7.8		6.0	2.0	1.8	.7	24	0	8.0	.0	.3	.2	.02	39	0.05	341	23	3	0.2	58	7.2
Jan. 12-25.....	2710	7.7		6.5	1.8	1.8	.7	24	0	8.2	.0	.3	.1	.02	39	.05	285	23	3	.2	59	7.2
Jan. 26-Feb. 24...	3730	7.5		6.0	2.2	1.8	.7	24	0	9.0	.0	.3	.1	.01	41	.06	413	24	4	.2	60	7.0
Feb. 25-Mar. 24...	2620	7.2		6.5	2.0	1.8	.5	24	0	9.0	.0	.1	.3	.03	44	.06	311	24	4	.2	61	7.0
Mar. 25-Apr. 9....	6080	6.8		6.5	2.2	1.9	.5	20	0	9.2	.0	.1	.2	.02	45	.06	739	25	9	.2	62	6.7
Apr. 10-May 9.....	13800	7.0		7.5	1.7	1.7	.6	24	0	11	.2	.4	.1	.01	46	.06	1710	26	6	.1	67	7.0
May 10-22.....	20700	7.5		7.0	1.6	1.5	.6	23	0	9.8	.2	.3	.2	.02	41	.06	2290	24	5	.1	62	7.0
May 23-June 5.....	26500	7.8		6.0	1.6	1.4	.6	20	0	8.2	.2	.3	.1	.02	40	.05	2860	22	6	.1	54	7.0
June 6-27.....	22200	8.0		5.0	1.1	1.4	.7	18	0	6.2	.5	.2	.1	.01	35	.05	2100	17	2	.1	45	7.0
June 28-July 20...	4250	7.5		5.0	1.1	1.4	.8	19	0	5.6	.2	.1	.0	.01	36	.05	413	17	1	.1	44	7.0
July 21-Aug. 19...	1300	7.2		5.0	1.4	1.4	.8	20	0	5.6	.0	.2	.2	.03	B 32	.04	112	18	2	.1	47	7.3
Aug. 20-Sept. 15..	1060	6.5		6.0	1.1	1.4	.6	20	0	6.2	.2	.2	.2	.04	34	.05	97.3	20	4	.1	49	7.0
Sept. 16-30.....	1280	5.7		5.5	1.5	1.4	.7	21	0	6.4	.2	.2	.2	.03	33	.04	114	20	3	.1	50	7.0
Weighted average	--	7.5		6.2	1.6	1.6	0.6	21	--	8.4	0.2	0.3	0.1	0.02	40	0.04	782	22	4	0.1	56	6.9
Time-weighted average.....	C 6135	7.3		6.0	1.7	1.6	0.7	22	--	7.9	0.1	0.2	0.2	0.02	39	--	--	22	4	0.1	55	7.0
Tons per day....	--	146		121	31	30	12	415	--	164	4.3	5.0	2.5	0.31	--	--	--	--	--	--	--	--

A Not included in weighted averages.
B Calculated from determined constituents.
C Mean discharge based on 366 days; mean discharge for 292 days of chemical analyses, 6135 cfs.

SPOKANE RIVER BASIN--Continued

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

Chemical analyses, water year October 1963 to September 1964

Date of collection	Time (24 hr)	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
					Hexavalent (Cr^{+6})	Total (Cr)				
Oct. 29, 1963....	0930	9.6		230						
Dec. 27.....	0900	12.0		430						
Feb. 6, 1964.....	0900	13.5		23						
Feb. 26.....	0940	12.3		150						
Mar. 19.....	0930	12.7		91	0.00	0.00	0.08	0.4	0.00	0.03
Apr. 30.....	1030	12.7		91						
June 2.....	1400	11.0		73						
Aug. 26.....	1045	8.3		150						
Sept. 22.....	1100	10.1		230						

SPOKANE RIVER BASIN--Continued

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

Specific conductance (micromhos at 25°C), water year October 1963 to September 1964

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

SPOKANE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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

SPOKANE RIVER BASIN--Continued

12-4310. LITTLE SPOKANE RIVER AT DARTFORD, WASH.

LOCATION.--At Mill Road bridge, 0.5 mile east of Dartford, Spokane County, and 0.6 mile upstream from gaging station.
DRAINAGE AREA.--665 square miles, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: July 1960 to September 1964.
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 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	155	18		0.10		32	9.0	5.2	2.2		141	0	6.8	3.0	0.2	1.7	0.08	154	117	2		241	7.8	5	9.4	91
Dec. 27.....	183	19		.12		30	7.3	5.7	1.9		129	0	7.8	1.8	.4	1.5	.08	139	105	0		222	7.7	5	13.7	930
Feb. 7, 1964.	192	21		.17		28	7.5	5.2	1.9		124	0	7.0	2.0	.2	1.7	.09	137	101	0		217	7.6	5	---	30
Feb. 26.....	196	21		.17		29	7.5	5.1	1.9		126	0	6.8	2.5	.2	1.4	.09	141	104	0		214	8.2	5	13.7	930
Mar. 19.....	500	22		---		21	5.0	6.0	2.8		89	0	7.6	1.8	.2	4.2	.24	127	74	0		173	7.4	20	12.1	2900
Apr. 30.....	521	20		.29		17	4.4	4.2	1.8		77	0	4.8	1.0	.2	1.0	.09	94	60	0		138	7.1	10	9.8	750
June 2.....	269	16		---		20	5.2	4.0	1.1		89	0	5.4	1.2	.2	1.0	.10	100	71	0		154	7.6	5	8.8	230
Aug. 26.....	140	19		.12		32	7.6	5.2	1.7		136	0	6.6	2.0	.2	1.4	.09	A 143	111	0		234	7.8	5	8.9	230
Sept. 22.....	171	17		.10		30	7.7	5.1	2.4		134	0	6.0	1.8	.2	1.1	.09	143	107	0		228	8.0	5	10.2	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 19, 1964....	0.00	0.00	0.09	0.05	0.00	0.00

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

LOCATION.--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 (revised).
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: July 1959 to September 1962.
REMARKS.--No inflow between sampling point and gaging station. Records of discharge for water year 1964 is published in reports of the Geological Survey.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 29, 1963	2790	9.9		0.15		25	9.3	4.5	1.9		113	0	13	3.5	0.1	2.9	0.33	A 127	101	8		213	7.1	5	2.9	23
Dec. 27.....	3950	9.7		.06		16	5.1	3.6	1.4		62	0	11	2.2	.2	1.7	.16	86	61	10		137	7.0	5	10.4	23
Jan. 29, 1964	5670	11		.11		16	6.9	3.7	1.6		74	0	11	3.2	.2	1.9	.19	95	68	8		154	7.1	5	10.2	23
Feb. 26.....	5940	11		--		14	4.6	3.2	1.6		56	0	11	1.5	.3	2.6	.16	82	54	8		122	7.1	10	10.8	230
Mar. 19.....	5630	12		--		18	7.2	4.1	1.9		80	0	11	2.8	.3	3.1	.20	106	74	9		168	7.1	5	9.3	23
Apr. 30.....	16000	8.4		--		9.0	2.8	2.3	.8		33	0	11	1.2	.3	.4	.07	53	34	7		84	7.3	5	13.2	4600
June 2.....	26500	7.8		--		7.0	2.3	2.0	.8		26	0	8.8	1.0	.2	.3	.05	45	27	6		66	7.1	5	12.2	150
Aug. 26.....	2620	9.9		.06		20	6.9	3.2	1.2		86	0	10	2.2	.0	2.6	.18	A 98	78	8		169	7.2	5	3.8	36
Sept. 22.....	2800	7.4		--		21	8.2	3.7	1.8		95	0	11	2.8	.2	2.5	.14	108	86	8		186	7.3	5	4.2	110

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 19, 1964.....	0.00	0.00	0.07	0.1	0.00	0.02

CRAB CREEK BASIN

12-4725. CRAB CREEK NEAR SMYRNA, WASH.
(Formerly published as 12-4726. Crab Creek near Beverly, Wash.)

LOCATION.--At former gaging station, 2.5 miles east of Smyrna, Grant County, and 17 miles upstream from mouth.
DRAINAGE AREA (revised).--4,781 square miles, of which 665 square miles in the vicinity of Soap Lake is noncontributing.
REMARKS.--No discharge records available. Formerly erroneously reported as no appreciable inflow between sampling point and gaging station ("near Beverly," 12-4726) except during periods of heavy local inflow.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 7, 1963.	79	31				42	28	135	15		301	20	149	53	1.0	2.4	0.49	632	222	0		966	8.5	15	12.6	930
Jan. 27, 1964	75	33				45	28	113	12		329	0	137	46	.9	4.1	.39	A 581	226	0		887	7.8	5	13.2	24000
Feb. 11.....	77	32				46	27	116	13		330	0	142	46	1.0	3.6	.40	A 589	226	0		887	7.8	5	13.5	73
Apr. 2.....	70	25				37	27	114	13		313	0	130	49	1.0	2.0	.49	558	203	0		887	7.5	15	12.7	750
May 18.....	68	16				35	24	80	12		254	0	108	36	.8	2.1	.32	443	186	0		706	7.7	10	9.5	930
July 28.....	73	20				37	22	73	9.6		236	0	104	34	.7	1.6	.21	A 418	182	0		673	8.1	5	9.5	230
Aug. 26.....	63	21				41	24	83	11		270	0	112	39	.7	1.8	.22	468	202	0		745	7.9	10	10.3	230
Sept. 22.....	99	23				43	27	96	13		286	0	135	44	.8	2.7	.23	526	217	0		821	8.1	5	11.1	360

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 2, 1964.....	0.01	0.01	0.12	0.05	0.01	0.03
Sept. 22.....	.00	.00	.07	.05	.01	.04

YAKIMA RIVER BASIN

12-4872. MIDDLE FORK NACHES RIVER NEAR CLIFFDELL, WASH.

LOCATION.--At bridge on U.S. Highway 410, 0.2 mile upstream from mouth, 0.7 mile upstream from Milk Creek, and 3.5 miles northwest of Cliffdell, Kittitas County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		21				9.0	2.0	4.8	0.5		48		1.8	1.2	0.1	0.0	0.07	67	30	0		82	7.7	5	12.0	--
Dec. 7.....		20				8.0	1.7	4.6	.6		41		2.4	1.2	.1	.2	.07	A 59	27	0		71	7.6	5	13.6	--
Dec. 28.....		19				8.5	1.3	4.6	.5		42		2.0	1.5	.0	.1	.05	59	26	0		73	7.5	0	--	23
Feb. 7, 1964.		18				8.0	1.8	4.5	.5		42		1.8	1.2	.1	.2	.07	60	27	0		73	7.2	5	13.5	23
Mar. 7.....		19				9.0	1.6	4.7	.3		44		1.8	1.5	.1	.0	.06	62	29	0		76	7.3	5	14.0	23
Apr. 13.....		18				8.0	1.7	4.4	.3		41		1.0	.8	.1	.3	.04	56	27	0		71	7.3	15	12.1	23
May 4.....		17				6.5	2.0	4.0	.3		38		.2	.5	.1	.1	.03	60	24	0		66	7.3	10	11.1	23
May 21.....		15				6.0	.7	2.9	.2		28		.2	.5	.1	.2	.07	46	18	0		49	7.1	5	11.4	23
June 22.....		16				4.5	1.3	3.0	1.1		27		.0	.0	.1	.0	.06	44	16	0		48	7.2	5	10.0	36
July 29.....		17				7.0	1.8	4.0	.5		38		1.0	.5	.0	.1	.07	52	25	0		64	7.4	5	9.5	150
Aug. 25.....		19				8.5	1.5	4.5	.9		44		1.6	.5	.1	.1	.07	60	28	0		75	7.5	0	9.9	91
Sept. 22.....		18				8.5	1.6	4.5	.7		44		1.2	.8	.1	.1	.07	57	28	0		74	7.5	5	10.8	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.12	0.05	0.00	0.00
Sept. 22.....	.00	.00	.01	.05	.00	.02

YAKIMA RIVER BASIN--Continued

12-4881. BUMPING RIVER AT AMERICAN RIVER, WASH.

LOCATION.--At left bank at town of American River, Yakima County, and 0.5 mile upstream from American River.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		12				6.0	1.1	2.8	0.3		28		2.2	0.8	0.0	0.0	0.01	41	20	0		51	7.3	0	11.2	--
Dec. 7.....		9.7				5.0	.8	2.3	.6		22		2.4	.8	.1	.1	.01	39	16	0		44	6.9	0	13.3	--
Dec. 28.....		11				6.0	.4	2.8	.5		22		2.8	1.2	.0	.3	.00	A 36	16	0		45	7.0	0	--	23
Feb. 7, 1964.		9.4				5.0	.6	2.3	.3		22		2.4	.8	.1	.3	.01	36	15	0		41	7.0	5	13.5	23
Apr. 13.....		13				7.0	.8	2.6	.7		28		2.6	1.0	.1	.1	.02	43	21	0		54	7.1	0	11.8	23
May 4.....		11				6.0	1.0	2.6	.3		28		2.2	1.0	.0	.3	.01	44	19	0		51	7.1	0	10.7	23
May 21.....		13				7.0	1.0	2.5	.2		32		.2	.2	.0	.0	.02	44	22	0		55	7.1	5	10.8	23
June 22.....		8.6				4.5	.8	1.9	.9		20		1.8	.2	.1	.1	.01	31	14	0		37	7.1	0	9.7	23
July 29.....		7.2				4.0	.6	1.5	.2		18		1.2	.5	.0	.0	.00	23	12	0		32	7.1	5	8.8	91
Aug. 25.....		7.3				4.0	.6	1.6	.6		18		1.4	.5	.0	.2	.01	28	12	0		33	7.0	0	9.5	2400
Sept. 22.....		8.3				4.5	.7	2.0	.7		20		1.4	.5	.1	.2	.01	29	14	0		37	7.1	5	10.5	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.08	0.1	0.00	0.02
Sept. 22.....	.00	.00	.02	.05	.00	.02

YAKIMA RIVER BASIN--Continued

12-4885. AMERICAN RIVER NEAR NILE, WASH.

LOCATION.--At Forest Service bridge, 300 feet downstream from gaging station, 0.8 mile upstream from mouth, and 16 miles northeast of Nile, Yakima County.
DRAINAGE AREA.--78.9 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964 (discontinued).

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963	33	13				9.5	1.3	3.0	0.4		41		2.2	0.2	0.0	0.0	0.02	52	28	0		69	7.6	0	11.9	--
Dec. 7.....	127	9.4				7.0	.9	2.3	.5		28		2.6	.2	.0	.2	.01	42	21	0		54	7.0	0	13.6	--
Dec. 28.....	101	11				8.9	.7	2.5	.3		32		2.8	.5	.0	.1	.00	A 42	23	0		56	7.3	0	--	23
Feb. 7, 1964.	90	11				7.5	1.1	2.6	.3		33		2.4	.2	.1	.2	.02	46	23	0		58	7.3	5	13.3	23
Mar. 7.....	70	13				9.0	.9	2.7	.2		36		2.8	.8	.1	.1	.01	52	26	0		62	7.1	0	14.5	23
Apr. 13.....	135	13				9.5	.7	2.5	.6		37		3.2	.5	.1	.1	.03	49	26	0		65	7.2	0	11.9	23
May 4.....	180	12				8.5	1.0	2.4	.1		35		3.4	.0	.0	.2	.02	46	25	0		62	7.3	5	10.9	23
May 21.....	786	8.8				6.0	.9	1.5	.1		25		2.6	.0	.1	.2	.01	35	19	0		45	7.0	5	10.8	23
June 22.....	585	8.1				5.0	1.0	1.8	.8		23		1.4	.0	.1	.0	.01	32	17	0		40	7.2	0	10.1	23
July 29.....	271	8.2				5.5	.6	1.5	.3		23		.8	.0	.0	.0	.01	28	16	0		39	7.2	0	10.1	23
Aug. 25.....	85	10				8.5	.6	2.3	.4		34		1.8	.2	.1	.0	.01	42	24	0		59	7.5	0	10.4	91
Sept. 22.....	52	11				8.5	1.2	2.7	.6		36		2.0	.2	.1	.0	.01	43	26	0		63	7.3	0	11.0	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.06	0.05	0.00	0.00
Sept. 22.....	.00	.00	.01	.05	.00	.02

YAKIMA RIVER BASIN--Continued

12-4893. RATTLESNAKE CREEK NEAR NILE, WASH.

LOCATION.--At county bridge, 0.2 mile upstream from mouth, 0.8 mile downstream from Little Rattlesnake Creek, and 1.7 miles south of Nile, Yakima County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		18				11	2.6	4.4	0.6		52		3.8	2.5	0.0	0.0	0.03	73	38	0		97	7.6	5	11.6	--
Dec. 7.....		13				10	1.9	3.6	.4		42		4.2	1.2	.1	.2	.02	55	33	0		79	7.2	5	14.5	--
Dec. 28.....		16				11	1.7	3.8	.5		46		4.4	1.8	.0	.1	.01	A 62	34	0		85	7.4	0	--	23
Feb. 7, 1964.		13				12	1.8	4.6	.5		43		10	1.5	.1	.2	.02	75	37	2		97	7.0	5	12.9	23
Mar. 7.....		15				12	2.3	3.9	.3		53		4.0	1.8	.1	.0	.02	68	40	0		93	7.4	0	14.2	23
Apr. 13.....		15				12	2.4	3.7	.3		51		2.8	.8	.1	.2	.03	61	38	0		92	7.4	5	11.9	23
May 4.....		13				11	2.4	3.4	.3		51		3.2	1.0	.1	.1	.03	63	37	0		88	7.9	5	10.9	23
May 21.....		11				8.5	1.2	2.0	.1		35		2.6	.2	.1	.2	.02	48	26	0		60	7.5	5	11.2	23
June 22.....		12				7.0	1.5	2.3	.5		31		2.6	.0	.1	.1	.02	40	24	0		55	7.2	5	9.7	23
July 29.....		11				7.5	1.9	2.5	.3		34		2.6	.5	.1	.0	.03	A 43	26	0		63	7.3	5	9.9	36
Aug. 25.....		14				9.5	2.0	3.4	.8		43		3.8	1.2	.1	.1	.02	57	32	0		80	7.5	0	9.5	23
Sept. 22.....		15				10	2.4	3.8	.8		46		3.4	1.5	.1	.1	.03	59	35	0		86	7.6	0	10.2	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.09	0.05	0.00	0.02
Sept. 22.....	.00	.00	.00	.05	.00	.06

YAKIMA RIVER BASIN--Continued

12-4895. NACHES RIVER NEAR NACHES, WASH.

LOCATION.--At bridge on State Highway 5, approximately 500 feet upstream from Tieton River, and 4.3 miles west of Naches, Yakima County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		--				--	--	--	--		--		--	--	--	0.1	0.02	--	--	--		76	--	--	12.2	--
Dec. 7.....		13				7.5	1.1	3.0	0.4		32		3.2	0.8	0.1	.2	.02	48	23	0		59	7.1	0	13.7	--
Dec. 28.....		13				7.5	1.3	3.1	.5		33		3.2	1.0	.0	.1	.01	A 46	24	0		61	7.2	0	--	23
Feb. 7, 1964.		15				8.5	1.8	3.9	.9		40		3.6	1.2	.1	.4	.05	62	28	0		74	7.0	5	13.4	23
Mar. 7.....		18				10	2.7	4.4	.7		50		4.2	1.5	.1	.2	.04	71	36	0		90	7.4	5	13.9	23
Apr. 13.....		17				8.5	2.0	3.8	.4		41		2.2	.8	.0	.2	.04	55	30	0		74	7.2	5	12.2	23
May 4.....		16				8.0	1.9	3.5	.3		42		2.4	.8	.1	.1	.06	64	28	0		70	7.7	10	11.1	36
May 21.....		14				6.5	1.2	2.5	.3		30		1.8	.0	.1	.2	.03	47	21	0		53	7.2	5	11.5	23
June 22.....		12				6.0	.6	2.4	.6		26		1.8	.0	.1	.0	.03	38	18	0		46	7.1	5	9.5	36
July 29.....		12				5.5	1.6	2.4	.5		28		1.6	.2	.1	.0	.02	39	20	0		50	7.0	5	9.1	150
Aug. 20.....		11				5.5	1.7	2.3	.6		28		1.8	.2	.1	.0	.02	36	20	0		50	7.2	5	9.7	23
Sept. 22.....		12				6.5	1.3	2.8	.6		31		1.8	.5	.1	.3	.01	40	21	0		55	7.3	5	10.4	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.14	0.1	0.00	0.00
Sept. 22.....	.00	.00	.01	.05	.00	.02

12-4930. TIETON RIVER AT OAK CREEK GAME RANGE, WASH.
(Formerly published as 12-4925. Tieton River at Oak Creek Game Range, near Naches, Wash.)

LOCATION.--At logging road bridge at Oak Creek Game Range, 0.2 mile downstream from Oak Creek, 1.6 miles upstream from mouth, and 6 miles west of Naches, Yakima County.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		--				--	--	--	--		--		--	--	--	0.2	0.07	--	--	--		78	--	--	11.2	--
Dec. 7.....		19				10	3.3	4.3	1.0		51		5.0	1.0	0.1	.2	.03	70	38	0		93	7.3	5	13.6	--
Dec. 28.....		22				12	3.2	5.0	1.1		58		4.8	1.5	.1	.1	.03	A 79	43	0		106	7.5	0	--	23
Feb. 7, 1964.		21				10	3.2	4.7	1.2		52		4.8	1.2	.1	.4	.05	80	38	0		96	7.3	5	13.9	23
Mar. 7.....		22				10	3.4	4.8	1.0		55		4.4	1.5	.1	.1	.05	81	39	0		97	7.4	10	14.5	23
Apr. 13.....		22				9.0	3.0	4.3	.9		49		3.2	.5	.1	.3	.02	70	35	0		88	7.2	10	12.2	23
May 4.....		18				9.0	2.5	3.4	.8		48		3.4	.5	.1	.1	.04	67	33	0		81	7.4	5	10.7	23
May 21.....		22				8.0	2.8	3.2	1.0		45		3.0	.0	.1	.2	.07	68	32	0		78	7.4	5	10.6	23
June 22.....		18				7.0	2.7	3.2	1.7		40		2.2	.5	.1	.2	.04	58	28	0		73	7.2	5	8.5	23
July 29.....		15				6.5	2.2	2.8	1.0		35		2.6	.5	.1	.1	.02	A 48	25	0		63	7.2	5	9.5	430
Aug. 25.....		14				6.0	1.6	2.4	1.0		30		2.8	.5	.1	.1	.02	44	22	0		56	7.2	0	9.7	23
Sept. 22.....		14				6.0	2.1	2.6	1.0		31		2.6	.2	.1	.4	.02	44	23	0		58	7.1	5	9.7	23

A Calculated from determined constituents.

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.16	0.05	0.00	0.04
Sept. 22.....	.00	.00	.02	.05	.00	.04

12-4987. NACHES RIVER NEAR YAKIMA, WASH.

LOCATION.--At bridge on old U.S. Highway 410, 1.8 miles north of Yakima, Yakima County, and 3.8 miles upstream from mouth.
RECORDS AVAILABLE.--Chemical analyses: July 1960 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 19, 1963		20				11	3.6	4.9	1.1		59		4.4	1.5	0.0	0.1	0.05	77	42	0		107	7.6	5	12.4	--
Dec. 7.....		16				9.0	2.2	4.2	.8		43		4.0	1.2	.1	.2	.03	60	32	0		80	7.4	0	15.2	--
Dec. 28.....		16				9.5	2.2	4.2	.7		44		4.0	1.5	.0	.3	.02	A 60	32	0		83	7.6	0	--	23
Feb. 7, 1964.		13				7.0	1.2	2.9	.7		32		2.8	1.0	.1	.2	.02	52	22	0		58	7.1	0	13.5	23
Mar. 7.....		15				9.0	2.5	3.5	.4		40		3.0	1.2	.1	.1	.02	61	33	0		72	7.2	5	14.0	23
Apr. 13.....		19				9.5	2.2	4.2	.5		46		3.0	1.0	.1	.2	.05	63	32	0		84	7.5	5	11.7	23
May 4.....		16				9.0	2.1	3.8	.5		45		3.0	.8	.1	.1	.03	67	31	0		78	7.7	5	11.6	36
May 21.....		14				6.5	1.7	2.8	.3		33		2.2	.5	.1	.3	.06	48	23	0		59	7.1	5	11.2	110
June 22.....		12				6.0	1.1	2.6	1.3		28		1.8	.2	.1	.1	.04	41	20	0		51	7.1	5	9.5	130
July 29.....		13				7.5	2.2	3.2	.8		38		2.6	.5	.1	.0	.03	A 49	28	0		69	7.1	0	8.8	930
Aug. 25.....		14				7.5	1.6	3.0	1.0		36		2.6	.8	.2	.2	.04	51	25	0		66	7.3	0	9.9	91
Sept. 22.....		15				7.5	2.3	3.5	1.1		39		3.2	1.0	.1	.4	.04	52	28	0		72	7.3	5	10.6	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 13, 1964....	0.00	0.00	0.02	0.1	0.00	0.00
Sept. 22.....	.00	.00	.01	.05	.00	.00

12-5050. YAKIMA RIVER NEAR PARKER, WASH.

LOCATION.--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 mile 103.7.
DRAINAGE AREA.--3,660 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1964.
Water temperatures: August 1959 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 180 ppm Oct. 17, 18; minimum, 55 ppm July 1-10.
Hardness: Maximum, 103 ppm Oct. 17, 18; minimum, 33 ppm June 7-30.
Specific conductance: Maximum daily, 282 micromhos Oct. 18; minimum daily, 79 micromhos June 16.
Water temperatures: Maximum, 70°F July 23, 29, 31; minimum, freezing point Dec. 24, Jan. 14, 15.
EXTREMES, 1959-64.--Dissolved solids: Maximum, 204 ppm Nov. 29, 30, 1963; 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 July 18, 1960, July 13, 18, Aug. 3, 4, 22, 1961, July 28, 1962; 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 1963 to September 1964

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)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-16, 1963...	270	20		14	5.8	9.3	1.8	85	0	7.6	3.0	0.1	0.8	0.22	A 105	0.14	76.6	59	0	0.5	157	7.6
Oct. 17-18.....	1180	28		23	11	18	2.7	132	0	20	7.5	.3	2.1	.27	180	.24	573	103	0	.8	277	7.7
Oct. 19-Nov. 11...	1070	23		20	8.0	13	2.4	118	0	9.8	5.0	.2	.9	.27	A 141	.19	407	83	0	.6	219	7.7
Nov. 12-27.....	1220	27		18	7.5	11	2.4	105	0	8.2	4.2	.1	1.2	.28	135	.18	445	76	0	.5	198	7.4
Nov. 28-Dec. 11...	1410	21		16	6.0	9.4	1.6	91	0	7.4	3.5	.1	1.0	.21	118	.16	449	65	0	.5	169	7.6
Dec. 12-Jan. 2, 1964.....	1160	22		17	6.4	10	1.6	97	0	8.0	3.8	.1	1.2	.24	A 118	.16	370	69	0	.5	181	7.5
Jan. 3-29.....	1466	20		15	5.9	9.0	1.3	85	0	7.4	3.2	.1	.8	.20	A 105	.14	416	62	0	.5	159	7.5
Jan. 30-Feb. 24...	1470	20		15	6.3	9.4	1.8	88	0	7.2	3.2	.2	.8	.22	A 107	.15	425	64	0	.5	164	7.4
Feb. 25-Mar. 8....	1880	18		14	6.5	7.8	1.3	83	0	5.8	2.5	.1	.9	.17	98	.13	497	62	0	.4	154	7.6
Mar. 9-Apr. 8.....	1260	16		12	4.9	6.3	1.1	70	0	5.0	1.5	.2	.8	.16	81	.11	276	50	0	.4	127	7.4
Apr. 9-May 8.....	657	15		12	3.4	5.9	.8	61	0	4.6	2.0	.1	.4	.32	74	.10	131	44	0	.4	112	7.4
May 9-28.....	1150	15		11	3.7	5.7	.9	59	0	4.2	2.0	.1	.7	.17	76	.10	236	42	0	.4	108	7.3
May 29-June 6.....	4100	14		9.0	2.9	4.3	.7	48	0	3.4	1.0	.1	.5	.12	66	.09	731	34	0	.3	88	7.2
June 7-30.....	4010	14		8.5	3.0	4.3	.9	46	0	3.0	.8	.1	.4	.11	58	.08	628	33	0	.3	85	7.3
July 1-10.....	2400	12		8.0	3.3	4.2	.8	46	0	2.8	1.0	.1	.3	.10	55	.07	356	34	0	.3	84	7.2
July 11-Aug. 3....	845	12		9.5	3.9	5.1	.9	55	0	3.4	1.2	.1	.4	.11	63	.09	144	40	0	.4	100	7.5
Aug. 4-31.....	440	13		10	3.9	5.9	.9	60	0	4.2	1.5	.1	.4	.13	72	.10	85.5	41	0	.4	109	7.6
Sept. 1-30.....	434	14		12	3.8	7.0	1.2	66	0	5.0	2.8	.1	.5	.15	80	.11	93.7	46	0	.5	122	7.7
Weighted average	--	17		12	4.8	7.1	1.2	70	--	5.4	2.2	0.1	0.7	0.17	87	0.12	310	51	0	0.4	113	7.3
Time-weighted average.....	1322	17		13	5.0	7.6	1.3	75	--	5.8	2.5	0.1	0.7	0.19	91	--	--	53	4	0.4	137	7.4
Tons per day....	--	61		44	17	25	4.4	252	--	19	8.0	0.4	2.4	0.62	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

YAKIMA RIVER BASIN--Continued

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

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
					Hexavalent (Cr^{6})	Total (Cr)				
Nov. 19, 1963....	1500	11.9		--	--	--	--	--	--	--
Dec. 7.....	1700	13.2		--	--	--	--	--	--	--
Dec. 28.....	1230	--		4600	--	--	--	--	--	--
Feb. 7, 1964.....	1830	13.2		--	--	--	--	--	--	--
Mar. 7.....	1315	14.2		--	--	--	--	--	--	--
Apr. 13.....	1250	12.5		230	0.00	0.00	0.12	0.05	0.00	0.00
May 4.....	0955	11.7		930	--	--	--	--	--	--
May 21.....	0940	10.8		230	--	--	--	--	--	--
June 22.....	0920	10.2		24000	--	--	--	--	--	--
July 28.....	1715	9.4		4300	--	--	--	--	--	--
Aug. 25.....	1535	10.1		24000	--	--	--	--	--	--
Sept. 22.....	1050	10.1		24000	.00	.00	.03	.05	.00	.01

YAKIMA RIVER BASIN--Continued

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

Specific conductance (micromhos at 25°C), water year October 1963 to September 1964

Day	October	November	December	January	February	March	April	May	June	July	August	September
1.....	129	217	160	180	161	161	116	116	87	88	109	116
2.....	135	218	158	156	168	162	115	118	83	85	111	117
3.....	136	228	173	181	170	162	122	123	83	85	115	117
4.....	143	225	177	140	167	161	125	123	83	86	118	117
5.....	147	221	181	139	169	130	126	119	87	83	113	118
6.....	153	219	171	143	158	130	127	119	88	83	112	117
7.....	154	210	169	137	160	130	128	123	89	85	111	118
8.....	162	223	167	143	150	120	119	123	89	85	110	118
9.....	159	219	166	144	150	111	121	108	89	82	109	118
10.....	168	213	167	145	150	114	118	107	89	80	109	118
11.....	170	208	170	152	155	115	114	106	84	87	104	121
12.....	168	213	189	158	158	134	116	111	81	93	105	121
13.....	164	216	188	159	159	130	113	113	81	93	106	120
14.....	166	207	181	156	160	131	109	116	82	88	106	120
15.....	169	210	173	165	165	131	107	121	80	91	105	122
16.....	169	192	173	167	165	132	106	111	79	94	106	121
17.....	277	193	175	163	165	127	112	112	80	93	107	119
18.....	282	194	177	163	165	126	108	108	82	97	107	120
19.....	206	190	183	164	170	127	107	105	84	96	106	121
20.....	215	187	183	161	167	127	107	103	84	102	106	121
21.....	215	190	184	165	162	136	103	100	83	101	105	121
22.....	218	196	185	168	164	138	107	98	87	101	105	121
23.....	218	193	185	172	163	138	104	105	90	102	104	124
24.....	208	182	181	172	163	139	107	110	90	101	106	126
25.....	218	195	178	168	160	140	107	113	87	104	107	127
26.....	212	195	179	151	161	131	107	107	83	106	107	123
27.....	216	184	178	156	162	131	107	108	82	106	105	124
28.....	215	166	178	154	161	122	112	108	91	103	105	125
29.....	219	147	178	158	161	123	114	97	90	103	106	135
30.....	218	160	182	165	--	122	114	93	88	104	106	134
31.....	218	--	181	165	--	119	--	87	--	105	107	--
Average	188	200	176	158	161	132	113	110	85	93	107	121

YAKIMA RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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

YAKIMA RIVER BASIN--Continued

12-5105. YAKIMA RIVER AT KIONA, WASH.

LOCATION.--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.--5,615 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: December 1952 to September 1964.
Water temperatures: December 1952 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum (sum), 236 ppm Oct. 1-31; minimum, 104 ppm June 16-23.
Hardness: Maximum, 138 ppm Oct. 1-31; minimum, 58 ppm June 16-23.
Specific conductance: Maximum daily, 393 micromhos Oct. 15; minimum daily, 145 micromhos June 13, 18.
Water temperatures: Maximum, 75°F July 12; minimum, freezing point Dec. 11, 12, 14.
EXTREMES, 1952-64.--Dissolved solids: Maximum, 242 ppm Oct. 1-11, 1958; minimum, 76 ppm May 1-23, 1957, Dec. 16-31, 1959, Jan. 1-15, 1960.
Hardness: Maximum, 148 ppm Oct. 1-11, 1958; minimum, 42 ppm May 1-23, 1957, Dec. 16-31, 1959.
Specific conductance: Maximum daily, 409 micromhos Oct. 3, 10, 1961; minimum daily, 99 micromhos Dec. 17, 1959.
Water temperatures: Maximum, 84°F July 18, 1960, July 21, 1961; minimum, freezing point on several days during winter months.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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)	Phosphate (PO_4)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	2010	32		36	12	24	4.1	188		24	7.5	0.3	3.2	0.35	236	0.32	1280	138	0	0.9	359	8.0
Nov. 1-17.....	2170	30		34	12	22	3.8	178		23	8.0	.3	2.9	.33	224	.33	1310	133	0	.8	348	7.8
Nov. 18-Dec. 13...	2310	28		28	11	20	3.1	156		20	7.0	.2	2.8	.30	197	.27	1230	117	0	.8	309	8.0
Dec. 14-Jan. 3, 1964.....	2070	28		28	12	22	3.2	160		22	7.5	.3	2.6	.30	205	.28	1150	118	0	.9	317	7.8
Jan. 4-17.....	2480	25		24	9.9	17	3.2	134		18	6.2	.2	2.7	.31	173	.24	1160	101	0	.7	267	7.6
Jan. 18-Feb. 9....	2250	25		26	9.3	17	2.7	140		18	7.0	.2	2.4	.30	177	.24	1080	103	0	.7	276	7.8
Feb. 10-Mar. 2....	2510	23		23	9.6	16	2.5	130		16	6.5	.2	1.7	.28	163	.22	1100	97	0	.7	256	7.8
Mar. 3-8.....	2570	24		24	8.4	15	2.2	126		14	5.2	.3	2.1	.28	157	.21	1090	95	0	.7	244	8.0
Mar. 9-14.....	3100	20		17	7.6	11	1.5	97		11	4.2	.2	2.2	.24	123	.17	1030	74	0	.6	188	8.0
Mar. 15-Apr. 6....	2280	21		22	7.1	13	1.9	110		13	4.5	.3	1.9	.26	139	.19	856	89	0	.6	216	7.9
Apr. 7-16.....	1620	21		24	8.8	15	2.2	125		16	5.0	.3	1.6	.26	156	.21	682	96	0	.7	244	7.8
Apr. 17-May 6.....	1720	21		26	9.3	16	2.7	133		19	5.5	.3	2.6	.30	A 178	.24	827	103	0	.7	271	7.8
May 7-19.....	1850	23		28	11	19	3.2	148		20	6.2	.3	2.9	.34	A 192	.26	959	114	0	.8	299	7.9
May 20-31.....	2820	21		23	8.6	15	2.4	120		16	4.5	.2	2.2	.28	A 159	.22	1210	93	0	.7	246	7.7
June 1-15.....	6650	18		16	5.2	9.4	1.7	80		9.0	2.8	.2	1.8	.20	A 108	.15	1940	61	0	.5	162	7.4
June 16-23.....	6730	19		15	5.0	8.3	1.5	76		8.2	2.5	.2	1.6	.22	A 104	.14	1890	58	0	.5	153	7.5
June 24-29.....	3600	21		20	6.1	12	2.2	98		13	4.0	.2	2.1	.28	A 132	.18	1280	75	0	.6	198	7.9
June 30-July 5....	2900	21		22	7.2	14	2.2	112		14	4.5	.2	2.1	.24	A 147	.20	1150	84	0	.7	223	7.8
July 6-13.....	3620	19		18	6.7	11	2.0	96		11	3.5	.2	1.8	.28	A 126	.17	1230	72	0	.6	191	7.6
July 14-20.....	2590	21		23	8.0	14	2.4	118		15	4.5	.2	2.5	.25	A 152	.21	1060	90	0	.6	237	7.8
July 21-Aug. 14...	1700	23		31	11	20	3.5	162		21	6.5	.3	3.1	.28	200	.27	918	122	0	.8	317	7.7
Aug. 15-Sept. 2...	1760	26		33	11	22	3.7	173		21	6.2	.3	3.0	.31	212	.29	1010	126	0	.8	332	8.2
Sept. 3-30.....	1810	25		33	11	22	3.8	175		22	6.5	.3	3.2	.31	A 215	.29	1050	128	0	.8	342	8.1
Weighted average	--	24		25	9.0	16	2.7	133		17	5.5	0.2	2.4	0.28	169	0.23	1130	100	0	0.7	261	7.7
Time-weighted average.....	2474	24		27	9.7	18	2.9	143		18	6.0	0.3	2.5	0.29	181	--	--	107	0	0.7	281	7.8
Tons per day....	--	157		167	60	110	18	885		112	37	2.0	16	1.9	--	--	--	--	--	--	--	--

A Residue at 180°C.

YAKIMA RIVER BASIN--Continued

12-5105. YAKIMA RIVER AT KIONA, WASH.--Continued

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	D.O. (dissolved oxygen ppm)	B.O.D. (biochemical demand ppm)	M.P.N. (most probable number coliform groups per 100 ml)	Chromium		Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
					Hexavalent (Cr^{6})	Total (Cr)				
Dec. 10, 1963....	--	--		2300	--	--	--	--	--	--
Mar. 23, 1964....	1035	12.2		240	0.00	0.00	0.20	0.1	0.00	0.03
June 22.....	1055	9.2		11000	--	--	--	--	--	--
Sept. 23.....	1210	9.9		3900	.00	.00	.04	.05	.00	.02

YAKIMA RIVER BASIN--Continued

12-5105. YAKIMA RIVER AT KIONA, WASH.--Continued

Specific conductance (micromhos at 25°C), water year October 1963 to September 1964

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	370	343	269	309	259	250	218	282	188	238	344	310
2	366	344	277	312	265	248	212	313	174	229	337	310
3	364	344	294	308	265	246	201	311	157	227	331	321
4	370	348	291	285	267	246	192	295	151	223	322	330
5	365	342	302	253	273	246	204	297	165	211	305	324
6	370	336	299	251	275	254	217	315	172	183	311	333
7	377	345	314	253	275	247	235	330	162	192	305	339
8	364	351	311	254	275	227	245	327	163	187	308	339
9	357	348	305	254	275	198	258	314	173	196	322	339
10	353	345	--	256	263	180	266	338	172	192	331	336
11	368	349	297	264	257	172	252	330	157	181	341	336
12	375	344	294	266	257	176	232	257	148	180	341	333
13	377	349	300	269	255	186	225	230	145	208	341	336
14	382	341	317	268	255	215	240	256	153	244	351	345
15	393	345	322	282	259	225	241	274	156	238	350	342
16	--	349	316	284	259	233	250	280	156	229	331	344
17	387	342	307	291	259	222	243	302	158	219	325	351
18	361	329	311	295	263	210	237	321	145	223	328	354
19	327	332	308	285	270	207	242	336	147	241	334	354
20	325	325	308	276	265	196	263	277	150	262	337	348
21	328	328	309	285	256	196	280	253	148	281	340	344
22	337	328	318	283	249	199	280	219	153	290	340	344
23	346	325	312	287	247	205	256	198	171	308	331	335
24	339	329	320	282	249	214	252	211	182	303	331	329
25	343	329	323	292	252	222	246	234	207	295	334	338
26	343	328	323	297	246	228	244	260	211	303	337	354
27	339	294	312	271	244	236	258	270	209	318	319	361
28	339	332	312	251	246	239	274	276	190	319	337	365
29	339	342	317	246	248	228	262	277	189	328	337	358
30	340	292	308	255	--	228	263	260	212	337	316	358
31	340	--	309	261	--	225	--	217	--	344	310	--
Average	356	335	306	275	259	219	242	279	168	249	329	340

YAKIMA RIVER BASIN--Continued

12-5105. YAKIMA RIVER AT KIONA, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

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

CHEHALIS RIVER BASIN

Chemical analyses, in parts per million, November 1961 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-200. CHEHALIS RIVER NEAR DOTY, WASH. (Formerly published as Chehalis River at Dryad, Wash.)																										
Nov. 15, 1961	295	15		--		5.5	1.3	4.4	0.2		24		4.0	4.0	0.1	0.6	0.01	51	19	0		63	7.0	10	13.0	280
Feb. 19, 1962	710	15		0.20		5.0	1.0	3.9	.4		22		2.6	4.0	.1	.8	.03	50	17	0		54	7.1	10	12.0	230
May 10.....	394	15		.33		5.0	1.2	4.5	.6		24		3.0	3.5	.1	.5	.03	48	18	0		58	7.2	10	11.4	230
Aug. 17.....	66	15		--		6.5	1 7	5.2	.6		32		3.2	4.5	.1	.4	.04	57	23	0		71	7.2	20	9.2	430
Oct. 16.....	480	15		.13		5.5	1.2	4.2	.5		24		4.0	4.0	.0	.8	.03	54	18	0		62	7.1	10	11.1	230
Jan. 7, 1963.	620	16		.29		5.5	.9	4.1	.2		23		2.8	4.0	.1	1.0	.04	48	18	0		55	7.1	5	11.9	23
Apr. 3.....	976	15		--		5.5	.8	4.0	.3		22		3.2	3.8	.0	1.4	.03	47	16	0		54	7.2	10	11.8	23
July 15.....	56	15		--		6.5	1.7	5.1	.6		32		2.8	4.5	.1	.3	.04	60	23	0		72	7.2	15	8.3	430
Nov. 1.....	585	15		.29		5.5	1.3	4.2	.3		24		3.2	4.0	.1	1.3	.03	54	19	0		73	7.0	10	11.1	1500
Jan. 29, 1964	2730	13		--		3.5	1.2	3.6	.3		17		2.4	3.2	.1	.8	.02	39	14	0		45	6.7	10	12.2	290
Apr. 17.....	418	14		--		5.0	1.0	4.1	.5		22		2.4	4.2	.0	.6	.02	46	17	0		54	7.0	10	--	230
July 15.....	100	14		--		6.0	2.0	5.1	.3		32		2.6	3.8	.1	.3	.03	55	23	0		73	7.0	10	9.7	2400

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 15, 1961.....	1430	0.00	0.00	0.04	0.05	0.00	0.00
May 10, 1962.....	1800	.00	.00	.02	.05	.01	.00
Oct. 16.....	1355	.00	.00	.02	.05	.00	.00
Apr. 3, 1963.....	1010	.01	.01	.03	.05	.00	.00
Nov. 1.....	1540	.01	.01	.01	.05	.00	.07
Apr. 17, 1964.....	1445	.00	.00	.02	.05	.00	.00

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

CHEHALIS RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-250. NEWAUKUM RIVER NEAR CHEHALIS, WASH.																										
Oct. 17, 1962	190	16		0.33		7.0	1.5	4.7	0.5		31		1.0	5.2	0.1	0.4	0.05	60	24	0		70	7.4	15	9.9	430
Jan. 9, 1963.	458	15		.28		5.0	1.2	3.5	.6		24		1.8	2.8	.0	.9	.04	47	18	0		52	7.1	15	11.7	230
Apr. 3.....	798	13		--		4.5	1.0	3.0	.3		20		1.2	2.8	.1	1.4	.04	43	15	0		46	7.2	15	11.3	150
July 15.....	122	15		.26		7.0	1.9	4.4	.6		34		1.2	4.5	.0	.3	.04	58	25	0		72	7.4	10	9.6	430
Nov. 1.....	268	15		--		6.0	1.7	4.2	.6		28		2.0	4.5	.1	.9	.05	54	22	0		64	6.8	20	11.1	1500
Jan. 29, 1964	1910	12		--		3.0	1.1	2.8	.5		16		.2	2.2	.1	1.2	.02	38	12	0		37	6.6	10	11.5	430
Apr. 17.....	785	14		--		4.0	1.5	3.1	.4		22		.4	2.8	.0	.7	.03	42	16	0		46	7.0	15	--	230
July 15.....	228	16		--		7.0	1.9	4.9	.3		34		.2	4.5	.0	.3	.06	57	25	0		75	7.1	5	9.6	2400

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Oct. 17, 1962....	1010	0.00	0.00	0.06	0.05	0.00	0.01
Apr. 3, 1963.....	1110	.00	.01	.06	.05	.00	.00
Nov. 1.....	1445	.01	.01	.04	.05	.00	.00
Apr. 17, 1964....	1400	.00	.00	.05	.05	.00	.00

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

CHEHALIS RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-350. SATSOP RIVER NEAR SATSOP, WASH.																										
Nov. 1, 1961.	975	14		0.08		6.5	1.4	3.6	0.3		27		5.8	2.5	0.1	0.8	0.00	52	22	0		65	7.0	10	12.3	23
Feb. 14, 1962	2820	13		--		5.0	.9	2.9	.4		22		3.0	2.0	.1	.4	.02	46	16	0		49	7.2	5	11.8	23
May 14.....	1560	14		.06		5.5	1.1	3.0	.5		25		3.4	2.0	.1	.3	.04	44	18	0		55	7.0	5	11.5	23
Aug. 15.....	410	15		.12		7.0	1.7	4.0	.6		33		4.8	2.5	.0	.5	.02	52	24	0		68	7.4	5	10.2	36
Dec. 14.....	4920	12		--		5.0	.9	3.2	.4		21		3.0	2.2	.1	.9	.03	42	16	0		48	7.2	10	10.4	360
Mar. 4, 1963.	1920	14		.06		5.5	1.1	3.0	.2		24		3.0	2.0	.1	.6	.02	A 42	18	0		51	7.1	5	12.6	23
June 18.....	428	14		.08		6.0	2.3	3.3	.5		32		2.8	2.2	.1	.2	.02	51	24	0		65	7.4	5	11.0	91
Aug. 29.....	295	16		.10		7.5	1.9	3.8	.5		35		4.0	2.2	.1	.2	.02	52	26	0		72	7.1	5	9.0	230
Dec. 23.....	11100	9.8		--		3.5	.9	3.1	.4		14		4.4	1.8	.1	1.0	.03	38	12	0		39	6.8	5	11.5	210
Mar. 9, 1964.	2910	12		--		4.5	1.3	3.1	.1		22		2.4	2.5	.0	.7	.01	42	16	0		47	7.1	5	12.1	91
June 16.....	715	11		.12		5.5	2.4	3.4	.4		30		2.4	2.0	.0	.3	.01	43	23	0		60	7.3	5	10.9	36
Sept. 16.....	343	13		.14		6.5	2.1	4.0	.3		33		4.2	2.5	.1	.3	.02	50	24	0		69	7.1	5	10.4	390

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1245	0.00	0.01	0.04	0.05	0.00	0.00
May 14, 1962.....	1630	.00	.00	.00	.05	.00	.01
Dec. 14.....	0910	.00	.00	.01	.05	.00	.00
June 18, 1963....	1435	.00	.00	.01	.05	.00	.04
Mar. 9, 1964.....	0950	.00	.00	.00	.05	.00	.01
Sept. 16.....	1040	.00	.00	.01	.05	.00	.01

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

CHEHALIS RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-368. WYNOOCHEE RIVER NEAR MONTESANO, WASH.																										
Nov. 1, 1961.	739	9.9		--		7.5	1.5	2.4	0.3		30		3.6	1.5	0.0	0.4	0.00	47	24	0		63	6.9	5	12.1	36
Feb. 15, 1962	1700	9.0		--		5.5	1.2	2.1	.3		22		2.8	2.5	.1	.3	.00	A 35	18	0		49	7.1	10	11.7	23
May 14.....	967	10		--		6.5	1.3	2.4	.4		26		3.2	1.8	.0	.3	.01	43	22	0		56	7.2	5	10.9	230
Aug. 15.....	177	10		0.06		8.5	1.5	2.6	.4		36		3.0	1.5	.1	.1	.02	45	28	0		70	7.3	5	9.6	62
Dec. 14.....	--	8.4		--		6.0	.7	2.0	.2		22		2.6	2.0	.1	.7	.01	38	18	0		47	7.2	5	10.6	91
Mar. 4, 1963.	--	9.8		--		6.5	1.2	2.2	.2		26		4.0	2.0	.0	.4	.01	39	21	0		53	7.3	5	12.2	23
June 18.....	--	10		.01		8.5	1.5	2.3	.4		36		2.4	1.5	.0	.0	.01	46	27	0		66	7.4	0	10.0	23
Aug. 29.....	--	11		.04		8.5	2.0	2.8	.4		38		3.2	1.8	.1	.0	.01	58	30	0		72	7.2	0	9.2	36
Dec. 23.....	--	6.8		--		4.5	.7	2.0	.3		16		3.2	1.2	.0	.6	.01	30	14	1		36	6.8	10	11.9	430
Mar. 9, 1964.	--	8.9		.18		5.0	1.5	2.3	.1		24		2.0	1.5	.1	.5	.01	36	19	0		50	7.1	5	12.4	36
June 16.....	--	7.3		.10		7.0	1.7	2.0	.3		31		1.6	1.8	.1	.2	.01	A 38	24	0		57	7.3	5	11.0	36
Sept. 16.....	--	9.1		.05		8.0	2.1	2.8	.1		37		2.6	1.8	.1	.1	.01	44	29	0		70	7.0	0	10.4	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1210	0.00	0.01	0.04	0.05	0.00	0.00
May 14, 1962.....	1610	.00	.00	.00	.05	.00	.00
Dec. 14.....	0835	.00	.01	.01	.05	.00	.00
June 18, 1963....	1350	.00	.00	.00	.05	.00	.00
Mar. 9, 1964.....	1415	.00	.00	.00	.05	.00	.00
Sept. 16.....	1425	.00	.01	.01	.05	.00	.01

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

HUMPTULIPS RIVER BASIN

Chemical analyses, in parts per million, November 1961 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-390. HUMPTULIPS RIVER NEAR HUMPTULIPS, WASH.																										
Nov. 1, 1961.	858	10		--		6.5	1.2	2.6	0.3		26		3.4	2.5	0.1	0.5	0.00	43	21	0		57	7.0	5	12.3	91
Feb. 15, 1962	1720	9.6		0.29		6.0	.5	2.3	.5		22		2.4	2.2	.1	.4	.01	38	17	0		48	7.4	5	11.8	23
May 14.....	854	11		.08		5.5	1.3	2.7	.2		25		1.6	2.2	.1	.1	.02	38	19	0		54	7.0	5	11.1	360
Aug. 15.....	301	11		.06		7.0	1.8	3.1	.4		32		3.6	2.0	.0	.2	.00	A 45	25	0		63	7.5	5	9.8	36
Dec. 13.....	1260	10		--		5.5	1.4	2.9	.1		24		2.6	2.8	.0	.5	.03	42	20	0		52	7.4	5	12.9	430
Mar. 4, 1963.	1040	11		.10		5.5	1.4	2.5	.1		25		2.8	2.5	.1	.3	.02	42	19	0		51	7.4	5	12.6	23
June 18.....	220	11		.04		7.5	1.5	2.9	.3		32		2.0	2.5	.1	.0	.02	49	24	0		65	7.4	5	9.9	36
Aug. 29.....	195	13		.04		7.0	2.3	3.3	.3		35		2.8	2.2	.1	.3	.02	47	27	0		68	7.8	5	9.5	23
Dec. 23.....	9060	6.7		--		5.0	.1	2.2	.2		15		3.4	1.8	.0	.5	.02	32	13	0		35	6.7	10	11.7	91
Mar. 9, 1964.	1790	9.3		.10		4.5	1.3	2.8	.0		21		1.8	3.2	.0	.4	.01	35	16	0		46	7.2	5	12.4	91
June 16.....	640	8.3		.09		6.0	1.5	2.9	.1		27		2.2	2.0	.0	.2	.01	39	21	0		56	7.0	0	10.8	91
Sept. 16.....	308	10		.07		7.0	1.8	3.4	.1		32		2.2	2.5	.1	.2	.01	45	25	0		65	7.3	5	10.0	430

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1025	0.00	0.01	0.02	0.05	0.00	0.01
Dec. 13, 1962....	1640	.00	.00	.00	.05	.00	.00
June 18, 1963....	1115	.00	.00	.01	.05	.00	.01
Mar. 9, 1964.....	1200	.00	.00	.00	.05	.00	.00
Sept. 16.....	1200	.00	.00	.03	.05	.00	.02

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

QUINAULT RIVER BASIN

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-395. QUINAULT RIVER AT QUINAULT LAKE, WASH.																										
Dec. 23, 1963	13300	4.8				9.0	0.5	1.7	0.2		26		6.0	1.5	0.0	0.3	0.00	36	24	3		58	7.0	5	10.6	23
June 16, 1964	3730	3.8		0.09		9.0	.7	1.7	.3		26		5.6	1.2	.1	.1	.03	36	25	4		59	7.0	0	11.0	36

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 23, 1963....	1430	0.01	0.01	0.37	0.1	0.00	0.00
June 16, 1964....	1030	.00	.00	.00	.05	.00	.02

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

QUEETS RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-406. QUEETS RIVER AT QUEETS, WASH.																										
Nov. 1, 1961.		6.1				7.5	0.9	2.6	0.2		22		7.0	2.2	0.1	0.4	0.00	47	22	4		61	6.8	10	12.1	91
Feb. 14, 1962		5.4				6.5	.6	2.5	.4		20		5.2	2.5	.1	.3	.01	34	18	2		54	6.9	15	11.6	23
May 14.....		5.9				7.5	.7	2.7	.3		24		6.2	2.5	.1	.0	.01	38	22	2		61	7.0	5	11.5	23
Aug. 15.....		5.2		0.14		10	.7	2.7	.4		30		9.2	1.8	.1	.3	.01	45	28	4		73	7.3	5	9.4	230
Dec. 13.....		5.8				8.0	.7	2.6	.2		24		6.4	3.0	.1	.2	.02	43	23	4		59	7.0	20	12.9	230
June 18, 1963		5.5				10	.9	2.2	.3		30		8.2	1.8	.1	.1	.01	47	29	4		71	7.1	5	10.9	36
Dec. 23.....		3.9				3.5	.3	2.1	.3		10		5.2	1.8	.0	.4	.01	26	10	2		30	6.4	80	11.7	150
June 16, 1964		4.6				8.5	1.2	2.3	.5		27		6.8	1.8	.1	.1	.04	41	26	4		60	7.2	5	10.8	36

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	0910	0.00	0.00	0.06	0.05	0.00	0.00
May 14, 1962.....	1400	.00	.00	.01	.05	.00	.00
Dec. 13.....	1540	.00	.00	.03	.05	.00	.03
June 18, 1963....	1000	.00	.00	.02	.05	.00	.01
Dec. 23.....	1330	.01	.01	.55	.1	.00	.06
June 16, 1964....	0945	.00	.01	.01	.05	.00	.01

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

HOH RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-412. HOH RIVER AT U.S. HIGHWAY 101 BRIDGE, NEAR FORKS, WASH.																										
Nov. 1, 1961.	2250	5.5		--		12	0.7	1.9	0.3		32		10	1.5	0.1	0.4	0.00	53	33	7		79	7.0	5	12.1	30
Feb. 15, 1962	1770	5.7		0.10		10	.8	2.2	.5		31		8.2	1.8	.1	.4	.01	52	28	2		75	7.5	10	11.8	23
May 14.....	1550	5.7		.09		12	.8	2.2	.3		34		8.8	1.5	.1	.0	.01	49	34	6		82	7.1	5	11.2	23
Aug. 15.....	1050	4.4		--		12	.8	1.7	.5		33		10	.8	.0	.1	.00	45	33	6		77	7.5	5	10.3	36
Dec. 13.....	3270	5.5		--		12	.7	2.1	.1		32		9.4	2.2	.1	.2	.02	52	33	7		76	7.4	5	12.9	230
June 18, 1963	1690	3.2		--		12	.2	1.3	.1		30		8.6	.8	.1	.0	.01	45	31	6		74	7.4	5	10.7	23
Dec. 23.....	11000	3.4		--		5.5	.7	1.8	.3		15		6.8	.8	.1	.3	.01	34	16	4		41	6.6	20	11.8	200
June 16, 1964	3030	3.7		--		12	.6	1.8	.5		31		8.8	1.5	.1	.1	.04	46	32	7		71	7.2	0	10.9	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	0815	0.00	0.00	0.04	0.05	0.00	0.00
May 14, 1962.....	1315	.00	.00	.00	.05	.00	.04
Dec. 13.....	1450	.00	.00	.00	.05	.00	.01
June 18, 1963....	0845	.00	.00	.04	.05	.00	.00
Dec. 23.....	1230	.01	.01	.45	.1	.00	.02
June 16, 1964....	0845	.00	.01	.01	.05	.00	.01

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

QUILLAYUTE RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-420. SOLEDUCK RIVER ABOVE KUGEL CREEK, NEAR FAIRHOLM, WASH. (Formerly published as Soleduck River near Fairholm, Wash.)																										
Nov. 1, 1961.	630	5.4		0.00		10	0.9	1.9	0.3		32		5.2	1.0	0.1	0.0	0.01	46	29	3		69	7.1	5	12.1	36
Feb. 14, 1962	420	5.8		.01		11	1.2	2.3	.3		36		6.0	1.5	.1	.0	.03	51	32	3		77	7.4	5	12.0	23
May 14.....	428	5.9		.03		11	1.6	2.2	.4		38		6.8	1.0	.0	.1	.01	53	34	3		82	7.6	5	11.7	360
Aug. 14.....	140	5.8		.00		15	.8	2.4	.3		44		8.2	1.2	.1	.0	.01	56	41	5		94	7.5	5	10.2	36
Dec. 13.....	--	5.3		.04		10	1.0	2.2	.2		32		6.4	1.8	.1	.1	.01	45	29	3		69	7.0	5	13.7	73
June 17, 1963	--	4.2		.00		11	1.3	1.6	.2		36		5.4	.8	.1	.0	.01	46	33	4		75	7.5	0	10.7	23
Dec. 23.....	--	3.5		--		5.0	.8	1.8	.3		18		3.2	1.0	.1	.3	.01	27	16	0		38	7.0	15	12.0	23
June 15, 1964	--	4.3		.04		9.0	1.0	1.7	.3		30		4.8	1.2	.1	.2	.03	39	27	2		60	7.5	5	11.6	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1700	0.00	0.00	0.04	0.05	0.00	0.00
May 14, 1962.....	1130	.00	.00	.00	.05	.00	.00
Dec. 13.....	1305	.00	.00	.00	.05	.00	.00
June 17, 1963....	1630	.00	.00	.01	.05	.00	.00
Dec. 23.....	1145	.01	.01	.09	.05	.00	.00
June 15, 1964....	1430	.00	.00	.00	.05	.00	.01

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

ELWHA RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-455. ELWHA RIVER AT McDONALD BRIDGE, NEAR PORT ANGELES, WASH. (Formerly published as Elwha River near Port Angeles, Wash.)																										
Nov. 1, 1961.	952	5.9		--		15	0.6	2.0	0.3		44		8.6	1.0	0.1	0.2	0.01	58	40	4		93	7.5	5	11.9	23
Feb. 14, 1962	1190	6.6		0.07		14	1.1	1.9	.3		43		8.2	.8	.1	.3	.01	58	40	4		90	7.7	5	12.5	23
May 14.....	1440	6.8		.08		14	1.3	2.1	.2		44		8.2	.5	.1	.0	.01	58	40	4		94	7.3	5	11.2	23
Aug. 14.....	761	5.6		.05		13	.8	1.8	.4		39		8.0	.5	.1	.1	.01	50	36	4		82	7.7	5	10.0	23
Dec. 13.....	2970	6.6		--		14	.5	2.1	.0		40		8.2	1.0	.1	.1	.02	57	37	4		83	7.5	5	14.1	430
June 17, 1963	1560	5.5		--		12	1.0	1.4	.2		37		7.2	.5	.0	.0	.01	48	34	4		76	7.6	0	10.8	23
Dec. 23.....	5200	6.0		--		14	.8	2.3	.3		41		7.4	.8	.1	.2	.01	54	38	5		88	7.4	5	12.5	30
June 15, 1964	3170	4.3		--		10	1.0	1.5	.1		32		5.8	.5	.1	.1	.04	43	29	3		63	7.2	0	11.6	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1610	0.01	0.02	0.01	0.05	0.00	0.00
Dec. 13, 1962....	1215	.00	.00	.00	.05	.00	.01
June 17. 1963....	1545	.00	.00	.00	.05	.00	.00
Dec. 23.....	1100	.00	.01	.04	.05	.00	.00
June 15. 1964....	1345	.00	.00	.00	.05	.00	.01

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

DUNGNESS RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-480. DUNGENESS RIVER NEAR SEQUIM, WASH.																										
Nov. 1, 1961.	157	7.2		0.04		21	2.5	3.3	0.4		72		9.4	2.0	0.1	0.3	0.02	86	62	4		141	7.9	5	11.9	36
Feb. 14, 1962	225	7.1		.08		19	2.7	3.3	.5		67		8.8	1.2	.1	.3	.02	80	58	4		130	7.9	5	12.2	91
May 14.....	311	7.7		.11		18	2.4	3.2	.4		64		8.4	1.0	.1	.0	.02	78	55	2		123	7.4	10	11.7	23
Aug. 14.....	228	6.3		.05		18	1.7	2.6	.6		60		7.8	1.0	.1	.2	.02	68	52	3		115	7.8	5	10.1	36
Dec. 13.....	560	7.2		--		18	2.0	2.7	.1		62		7.8	1.2	.1	.2	.02	74	53	2		116	7.7	5	13.4	230
June 17, 1963	776	4.4		--		12	1.7	1.6	.2		44		4.4	.2	.0	.1	.01	50	37	1		80	7.5	0	10.6	23
Dec. 23.....	1340	5.6		--		14	2.0	2.5	.3		50		6.0	.5	.1	.4	.01	57	43	2		94	7.2	10	12.1	91
June 15, 1964	898	4.2		--		12	2.3	2.1	.2		45		5.2	.5	.1	.1	.04	53	40	2		83	7.5	5	10.9	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1525	0.00	0.00	0.01	0.05	0.00	0.00
May 14, 1962.....	1010	.00	.00	.03	.05	.00	.04
Dec. 13.....	1130	.00	.00	.00	.05	.01	.00
June 17, 1963....	1440	.00	.00	.02	.05	.00	.00
Dec. 23.....	1010	.01	.01	.07	.05	.00	.00
June 15, 1964....	1245	.00	.00	.00	.05	.00	.01

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

QUILCENE RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-523. BIG QUILCENE RIVER NEAR QUILCENE, WASH.																										
Nov. 1, 1961.		10		0.01		16	2.2	6.6	0.1		48		3.2	15	0.1	0.3	0.03	84	49	10		135	7.5	5	11.8	23
Feb. 14, 1962		11		.03		11	2.1	3.0	.2		42		2.4	4.8	.1	.4	.01	60	36	2		88	7.5	5	12.0	91
May 14.....		10		.08		12	1.7	3.3	.2		43		2.8	3.8	.0	.2	.03	57	37	2		87	7.5	5	11.7	23
Aug. 14.....		9.7		.05		15	2.6	5.2	.3		50		2.6	11	.0	.5	.04	72	48	7		120	7.7	5	10.3	36
Dec. 13.....		11		--		12	1.9	2.7	.1		45		2.8	4.0	.1	.0	.00	60	38	1		88	6.9	5	13.5	91
June 17, 1963		7.2		.06		12	1.8	2.7	.1		45		1.6	5.0	.1	.1	.03	58	38	0		90	7.5	5	11.7	23
Dec. 23.....		9.3		--		9.5	2.2	2.9	.2		39		2.4	4.5	.0	.3	.01	50	32	0		79	7.2	10	11.8	23
June 15, 1964		7.9		.11		14	1.5	4.6	.4		44		2.0	9.5	.0	.4	.05	66	41	5		105	7.1	5	11.3	430

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1340	0.00	0.00	0.02	0.05	0.00	0.01
May 14, 1962.....	0905	.00	.00	.00	.05	.00	.00
Dec. 13.....	1035	.00	.00	.00	.05	.00	.00
June 17, 1963....	1330	.00	.00	.01	.05	.00	.02
Dec. 23.....	0915	.00	.01	.12	.05	.00	.06
June 15, 1964....	1130	.00	.00	.00	.05	.00	.00

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

DOSEWALLIPS RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-535. DOSEWALLIPS RIVER AT BRINNON, WASH.																										
Nov. 1, 1961.		6.8		--		16	1.2	2.0	0.2		50		8.2	1.0	0.1	0.3	0.01	66	45	4		102	7.6	5	12.2	36
Feb. 14, 1962		8.3		0.02		14	1.0	1.8	.3		44		6.2	.8	.0	.2	.01	54	39	3		89	7.4	5	12.0	230
May 14.....		7.5		.02		15	.9	1.8	.2		48		7.6	.5	.1	.5	.01	A 58	42	2		94	7.3	5	11.9	23
Aug. 14.....		6.2		.09		15	1.4	2.1	.5		49		8.4	.8	.1	.1	.00	A 59	44	4		95	7.7	5	10.6	36
Dec. 13.....		7.1		--		14	1.0	1.8	.1		44		6.4	.8	.1	.0	.01	60	39	3		86	6.9	0	13.6	73
June 17, 1963		4.3		--		10	1.0	1.1	.2		33		4.4	.2	.0	.1	.01	42	29	2		64	7.3	0	11.2	23
Dec. 23.....		5.6		--		9.5	.9	1.6	.2		32		4.8	.2	.1	.3	.01	38	28	2		62	7.3	10	12.2	36
June 15, 1964		4.6		.17		12	.4	1.7	.5		36		5.2	.5	.1	.1	.01	42	32	2		73	7.4	5	11.8	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1310	0.00	0.02	0.01	0.05	0.00	0.00
May 14, 1962.....	0850	.00	.00	.00	.05	.00	.03
Dec. 13.....	1010	.00	.00	.00	.05	.00	.00
June 17. 1963....	1230	.00	.00	.02	.05	.00	.01
Dec. 23,.....	0820	.01	.01	.08	.05	.00	.00
June 15, 1964....	1100	.00	.01	.00	.05	.00	.00

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

DUCKABUSH RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-541. DUCKABUSH RIVER AT U.S. HIGHWAY 101 BRIDGE, NEAR BRINNON, WASH. (Formerly published as 12-540, Duckabush River near Brinnon, Wash.)																										
Nov. 1, 1961.	256	--		--		16	17	--	--		37		--	235	--	--	--	--	110	79		A 942	7.4	--	12.0	36
Feb. 14, 1962	485	7.2		0.02		9.5	1.0	1.8	0.4		33		4.2	1.5	0.1	0.3	0.00	47	28	0		67	7.4	5	12.1	36
May 14.....	345	6.6		.01		11	.6	1.7	.2		35		4.8	1.0	.1	.0	.01	44	30	2		72	7.2	5	12.1	23
Aug. 14.....	143	6.5		.05		12	1.4	4.9	.5		40		7.4	6.2	.1	.1	.00	B 59	36	2		96	7.6	5	10.6	36
Dec. 13.....	--	6.4		--		10	.9	1.7	.1		32		4.8	1.0	.1	.1	.01	45	29	3		65	7.2	5	13.9	230
June 17, 1963	--	3.7		--		8.5	.5	.9	.1		28		3.2	.2	.0	.0	.01	35	23	0		54	7.3	5	11.1	23
Dec. 23.....	--	5.2		--		6.5	.9	1.4	.1		24		3.2	.2	.0	.3	.02	33	20	0		46	7.1	10	12.4	23
June 15, 1964	--	4.3		.16		9.0	.9	1.5	.1		30		3.6	.5	.1	.0	.03	39	26	2		56	7.3	5	12.1	23

A Salt water intrusion.
B Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1245	0.00	0.02	0.02	0.05	0.00	0.00
May 14, 1962.....	0820	.00	.00	.00	.05	.00	.04
Dec. 13.....	0955	.00	.00	.00	.05	.00	.01
June 17, 1963....	1210	.00	.00	.00	.05	.01	.00
Dec. 23.....	0815	.01	.01	.05	.05	.00	.02
June 15, 1964....	1040	.00	.00	.00	.05	.00	.03

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

HAMMA HAMMA RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-550. HAMMA HAMMA RIVER AT ELDON, WASH.																										
Nov. 1, 1961.		8.8		0.03		9.5	1.0	1.4	0.3		35		3.6	1.0	0.0	0.3	0.02	46	28	0		63	7.0	5	12.0	23
Feb. 14, 1962		7.7		.02		7.0	.9	1.2	.2		26		2.2	.5	.0	.2	.01	32	22	0		51	7.0	5	12.4	36
May 14.....		7.2		.01		9.0	2.2	14	.7		32		5.4	23	.1	.0	.01	77	32	6		A 144	7.3	0	12.3	23
Aug. 14.....		--		--		--	--	--	--		38		--	--	--	--	--	--	--	--		A 487	7.6	--	11.0	23
Sept. 6.....		8.5		.00		10	1.3	1.5	.5		38		2.0	1.0	.1	.1	.01	46	30	0		69	7.5	5	11.0	36
Dec. 13.....		8.4		.04		8.0	1.3	1.4	.0		31		2.8	1.2	.1	.0	.01	40	25	0		55	6.8	0	13.9	36
June 17, 1963		6.0		.01		9.0	1.2	1.1	.3		34		2.6	.8	.0	.0	.01	38	28	0		60	7.5	0	11.7	23
Dec. 23.....		9.1		--		5.0	1.1	1.3	.2		22		2.4	.5	.0	.3	.01	32	17	0		41	7.1	5	11.7	23
June 15, 1964		5.8		.07		8.0	1.4	1.3	.3		31		1.8	.5	.1	.2	.03	39	26	0		53	7.3	0	11.8	23

A Salt water intrusion.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1250	0.01	0.02	0.03	0.05	0.00	0.01
May 14, 1962.....	0800	.00	.00	.00	.05	.00	.05
Dec. 13.....	0925	.00	.00	.00	.05	.01	.01
June 17, 1963....	1135	.00	.00	.00	.05	.00	.02
Dec. 23.....	0740	.00	.01	.03	.05	.00	.00
June 15, 1964....	1000	.00	.00	.00	.05	.00	.00

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

DESCHUTES RIVER BASIN

Chemical analyses, in parts per million, October 1962 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-800. DESCHUTES RIVER NEAR OLYMPIA, WASH.																										
Oct. 16, 1962	218	21		0.48		9.5	2.0	5.2	0.9		40		3.8	5.5	0.0	0.9	0.07	71	32	0		89	7.2	15	9.6	230
Jan. 9, 1963.	480	21		.23		8.0	2.3	5.2	1.0		36		3.0	5.0	.0	1.2	.07	68	30	0		82	7.3	10	11.1	36
Apr. 3.....	604	19		--		8.0	1.7	4.5	.6		34		3.2	4.5	.1	1.2	.07	66	27	0		75	7.1	5	11.2	72
July 10.....	175	23		--		10	3.1	5.7	1.0		47		3.2	6.8	.1	.6	.06	76	38	0		103	7.1	10	8.7	1500
Nov. 5.....	428	18		--		8.0	1.8	4.2	.6		35		2.6	4.0	.1	.8	.06	71	27	0		74	6.8	15	10.7	390
Jan. 28, 1964	1750	16		--		5.5	1.7	3.8	.5		25		2.4	3.0	.1	.9	.03	54	20	0		59	6.6	20	11.3	91
July 15.....	--	22		--		9.5	3.3	6.1	.8		46		3.0	7.0	.1	.9	.08	83	37	0		107	7.0	5	10.1	2400

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Oct. 16, 1962....	1150	0.00	0.01	0.05	0.05	0.00	0.00
Apr. 3, 1963.....	0700	.00	.01	.06	.05	.00	.00
Nov. 5.....	1045	.01	.01	.01	.05	.00	.00

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

PUYALLUP RIVER BASIN

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-895. NISQUALLY RIVER AT MCKENNA, WASH.																										
Nov. 8, 1961.	720	14				6.0	1.7	3.2	0.5		27		3.8	2.2	0.1	0.2	0.01	48	22	0		54	6.9	10	11.7	73
Feb. 19, 1962	1800	22				5.5	.9	2.8	.7		25		2.6	1.5	.0	.6	.03	A 49	17	0		50	7.3	20	11.3	30
May 10.....	1420	15				6.0	.8	3.1	.6		26		2.4	1.2	.1	.2	.02	46	18	0		53	7.0	15	11.5	91
Aug. 17.....	50	19		0.09		7.5	2.4	4.2	.9		41		3.0	2.0	.1	.5	.03	61	28	0		79	7.1	5	8.6	210
Oct. 16.....	1000	15				6.0	1.2	3.6	.8		28		3.4	2.0	.1	.3	.03	50	20	0		56	7.4	15	10.9	23
Jan. 9, 1963.	1950	15				5.5	1.1	3.1	.8		26		2.8	1.5	.1	.6	.04	49	18	0		50	7.3	20	12.0	23
Apr. 3.....	1690	15				5.5	1.4	3.1	.5		26		3.4	1.8	.1	.7	.03	48	20	0		53	7.1	20	11.7	36
July 10.....	203	15				6.0	1.7	3.0	.8		32		2.4	2.0	.1	.2	.01	48	22	0		59	7.1	20	10.3	230
Oct. 31.....	996	16				6.0	1.7	3.8	.7		30		3.2	2.2	.1	.3	.05	55	22	0		61	7.0	20	11.3	2400
Jan. 29, 1964	4160	15				5.0	1.4	3.3	.7		24		2.6	1.8	.1	.8	.02	48	18	0		51	7.0	25	11.7	36
Apr. 17.....	2040	15				5.0	1.8	3.2	.6		27		2.2	2.2	.0	.7	.04	45	20	0		55	6.8	20	---	230
July 15.....	1310	12				5.0	1.1	3.1	.4		25		1.4	1.5	.1	.2	.01	37	17	0		47	7.3	5	---	---

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 8, 1961.....	1450	0.00	0.02	0.03	0.05	0.00	0.00
May 10, 1962.....	0900	.00	.00	.04	.05	.00	.08
Oct. 16.....	1100	.01	.01	.06	.05	.00	.00
Apr. 3, 1963.....	0835	.00	.00	.08	.05	.00	.00
Oct. 31.....	1245	.01	.01	.02	.05	.00	.05
Apr. 17, 1964....	1130	.00	.00	.04	.05	.00	.00

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

PUYALLUP RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-935. PUYALLUP RIVER NEAR ORTING, WASH.																										
Nov. 8, 1961.	303	16		0.15		7.5	1.5	3.0	0.9		25		10	1.5	0.1	0.2	0.01	58	24	4		71	7.1	10	12.6	36
Feb. 9, 1962.	440	16		.14		6.5	1.0	2.9	.7		24		7.0	1.5	.1	.3	.02	54	20	0		58	7.4	10	10.7	2400
May 7.....	618	15		.17		5.0	1.2	2.8	.6		24		3.8	1.0	.0	.1	.01	44	18	0		51	7.1	10	10.6	23
Aug. 15.....	564	10		--		5.0	1.1	2.3	.7		16		9.0	.5	.1	.2	.03	42	17	4		48	7.3	10	9.5	23
Nov. 16.....	324	12		--		6.0	1.5	3.6	.7		31		3.2	1.0	.1	.0	.10	52	21	0		59	7.3	10	11.8	36
Feb. 18, 1963	538	12		.07		5.5	1.3	3.5	.5		29		2.0	1.0	.0	.2	.01	43	19	0		56	7.2	5	11.7	230
May 5.....	610	11		--		6.0	1.4	3.4	.6		31		2.8	1.2	.0	.4	.00	48	21	0		57	7.4	5	11.8	36
Aug. 13.....	961	7.0		--		3.0	.5	2.8	1.0		18		1.6	.8	.0	.5	.02	33	10	0		28	7.3	5	10.6	91
Nov. 15.....	720	9.4		--		4.5	1.2	3.0	.5		24		2.8	1.0	.0	.5	.01	40	16	0		45	7.2	5	11.7	430
Feb. 25, 1964	392	12		.07		6.5	1.7	4.0	1.0		34		3.6	1.5	.1	.4	.01	49	23	0		64	7.2	5	12.4	150
May 20.....	1160	11		--		4.5	1.1	2.4	.5		19		4.2	1.0	.0	.4	.01	39	16	0		44	6.8	5	11.4	23
Aug. 27.....	764	6.9		--		3.0	.8	2.1	.6		18		1.4	.5	.2	.1	.04	A 25	10	0		31	7.2	10	11.3	30

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 8, 1961.....	1350	0.00	0.00	0.04	0.05	0.01	0.01
May 7, 1962.....	1745	.00	.00	.03	.05	.00	.00
Nov. 16.....	1130	.00	.00	.01	.05	.00	.01
May 3, 1963.....	1220	.00	.00	.02	.05	.00	.00
Nov. 15.....	1205	.01	.01	.03	.05	.00	.02
May 20, 1964.....	1700	.00	.00	.02	.05	.00	.00

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

PUYALLUP RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-995. BOISE CREEK NEAR ENUMCLAW, WASH.																										
Jan. 16, 1963	40	13		0.08		3.0	0.5	2.1	0.1		14		2.4	1.0	0.0	1.0	0.02	30	10	0		30	7.1	5	12.4	36
Apr. 24.....	47	12		.06		3.0	.6	2.0	.5		15		1.4	1.0	.0	.6	.02	30	10	0		29	7.0	5	10.4	23
July 31.....	14.5	14		.06		4.5	.6	3.0	.6		22		1.2	1.2	.0	.5	.02	39	14	0		40	7.2	5	10.2	36
Oct. 28.....	22	14		.04		4.0	.6	2.9	.4		17		1.4	1.5	.0	1.1	.02	40	12	0		37	6.9	15	10.9	36
Jan. 21, 1964	66	13		--		3.0	.4	2.5	.7		14		.4	1.5	.1	.8	.02	33	9	0		30	6.9	5	11.6	23
Apr. 7.....	40	12		--		3.0	.5	2.0	.8		14		.4	2.0	.1	.6	.02	31	10	0		31	6.8	5	11.6	23
July 15.....	24	13		--		4.0	.7	2.7	.6		20		.2	1.0	.1	.4	.03	32	13	0		38	6.9	5	10.5	150

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
July 31, 1963....	1510	0.00	0.00	0.01	0.05	0.00	0.02
Apr. 7, 1964.....	1030	.00	.00	.00	.05	.00	.00

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

PUYALLUP RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-996. BOISE CREEK AT BUCKLEY, WASH.																										
Jan. 16, 1963		18				6.0	1.3	3.5	1.4		24		4.0	2.2	0.1	2.9	0.24	54	20	1		60	6.5	30	11.8	4300
Apr. 24.....		15				5.0	1.2	3.0	1.2		23		2.8	1.8	.1	2.0	.32	50	18	0		51	6.6	35	10.4	1500
July 31.....		16		0.29		6.5	1.1	4.5	1.4		27		2.8	2.5	.1	3.6	1.4	57	20	0		65	6.8	10	9.5	11000
Oct. 28.....		17				6.0	1.9	3.6	3.0		25		4.6	3.5	.0	3.9	.64	67	23	2		72	6.5	50	10.0	240000
Jan. 21, 1964		17				5.0	1.5	3.3	1.6		22		3.2	1.0	.1	4.0	.18	55	19	1		58	6.6	20	11.7	4600
Apr. 7.....		16				5.5	1.2	3.1	1.7		23		2.4	2.5	.1	2.1	.52	49	18	0		56	6.4	35	10.2	4600
July 15.....		16				7.0	1.6	4.7	2.2		29		3.4	2.5	.1	4.7	1.1	61	24	0		76	6.6	40	9.0	110000

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
July 31, 1963....	1430	0.00	0.00	0.02	0.05	0.00	0.03
Apr. 7, 1964.....	0930	.01	.01	.13	.05	.00	.03

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

PUYALLUP RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1015. PUYALLUP RIVER AT PUYALLUP, WASH.																										
Nov. 8, 1961.	1450	17		--		8.0	2.2	4.3	0.8		36		7.2	2.0	0.1	0.3	0.06	66	29	0		81	7.0	5	11.8	930
Feb. 7, 1962.	3200	15		--		7.5	.8	3.4	1.2		28		7.2	1.8	.1	.5	.05	58	22	0		66	7.0	10	11.5	24000
May 7.....	4240	15		0.19		6.5	.8	3.0	.6		26		5.0	1.0	.3	.1	.04	46	19	0		57	7.0	10	10.0	930
Aug. 14.....	2000	13		--		7.0	2.0	4.2	1.4		32		7.4	1.8	.1	.7	.04	60	26	0		76	6.9	20	9.3	430
Nov. 15.....	2110	16		--		9.0	2.5	4.6	1.3		38		10	2.5	.1	1.2	.10	66	33	2		89	7.0	10	10.4	24000
Jan. 6, 1963.	3920	14		--		5.5	1.3	2.8	.6		23		5.4	1.5	.1	1.0	.03	47	19	0		52	7.0	20	11.5	750
May 3.....	2860	14		--		7.0	1.6	3.4	1.0		30		5.6	1.5	.1	.7	.05	52	24	0		68	7.0	10	11 1	150
Aug. 13.....	3300	11		--		6.0	1.1	3.6	.9		21		8.8	1.0	.1	.5	.01	48	20	2		54	7.1	5	9.4	4600
Nov. 15.....	3560	14		--		7.0	1.6	4.0	1.0		27		8.8	1.8	.1	1.3	.03	61	24	2		69	6.9	20	10.9	11000
Feb. 25, 1964	2750	16		.23		7.5	1.3	3.8	1.1		30		6.4	1.8	.1	1.0	.04	55	24	0		68	6.9	5	11.4	930
May 20.....	6500	11		--		5.0	1.1	2.9	.5		21		6.0	1.0	.0	.5	.03	42	17	0		51	6.7	5	10.9	930
Aug. 27.....	2770	9.9		--		5.5	1.2	3.1	.7		24		6.2	1.0	.1	.2	.02	A 40	18	0		56	7.2	10	9.6	2400

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 8, 1961.....	0905	0.00	0.00	0.08	0.05	0.00	0.01
May 7, 1962.....	1645	.00	.00	.05	.05	.00	.02
Nov. 15.....	0950	.00	.00	.07	.05	.00	.04
May 3, 1963.....	1145	.01	.01	.05	.05	.00	.00
Nov. 15.....	1040	.00	.01	.11	.05	.00	.01
May 20, 1964.....	1230	.00	.00	.03	.05	.01	.00

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

LAKE WASHINGTON BASIN

Chemical analyses, in parts per million, November 1962 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1190. CEDAR RIVER AT RENTON, WASH.																										
Nov. 8, 1962.	250	14		--		11	1.5	3.2	0.6		42		4.6	1.5	0.1	0.5	0.28	57	34	0		83	7.9	5	10.5	91
Feb. 6, 1963.	1250	11		--		7.0	.8	2.3	.2		25		3.6	1.2	.0	1.5	.02	43	20	0		52	7.0	10	11.5	30
May 2.....	792	9.5		0.10		6.0	1.4	2.1	.4		26		2.4	1.0	.1	.5	.02	39	21	0		54	7.2	5	11.0	36
Nov. 15.....	1070	9.8		--		6.5	1.1	2.7	.3		26		3.2	1.2	.0	1.1	.03	44	20	0		53	7.0	5	10.8	2400
Feb. 25, 1964	527	12		.11		8.5	1.9	3.1	.5		35		4.0	1.5	.0	1.0	.03	55	29	0		70	7.1	0	11.5	36
May 20.....	863	9.2		.12		7.0	1.3	2.4	.3		28		2.6	1.2	.0	.5	.02	39	22	0		55	7.1	5	11.4	230
Aug. 27.....	645	9.2		--		7.0	1.1	2.4	.3		30		2.6	1.2	.1	.3	.03	A 39	22	0		56	7.3	5	10.3	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 8, 1962.....	1420	0.00	0.01	0.00	0.05	0.00	0.05
May 2, 1963.....	0950	.00	.00	.02	.05	.00	.00
Nov. 15.....	1550	.01	.01	.03	.05	.00	.02
May 20, 1964.....	1420	.00	.00	.00	.05	.00	.02

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

LAKE WASHINGTON BASIN--Continued

Chemical analyses, in parts per million, November 1962 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1265. SAMMAMISH RIVER AT BOTHELL, WASH.																										
Nov. 8, 1962.		14				10	4.2	5.9	1.3		52		8.2	3.5	0.1	1.6	0.16	80	42	0		114	7.0	20	9.0	930
Feb. 7, 1963.		11				8.5	3.2	4.2	1.1		33		8.2	3.0	.1	5.0	.10	70	34	7		92	7.0	30	10.1	930
May 3.....		5.1				9.0	3.5	4.8	1.1		44		7.2	2.5	.1	1.6	.09	59	37	1		98	7.0	20	10.3	91
Aug. 13.....		12				10	4.7	5.9	1.4		54		7.0	3.2	.2	1.3	.13	80	44	0		115	7.0	15	7.3	430
Nov. 13.....		15				12	4.5	5.4	2.0		41		16	3.8	.1	6.3	.16	100	48	15		125	7.0	50	9.7	4600
Feb. 21, 1964		9.4				8.5	3.2	4.8	1.3		38		8.8	3.0	.1	2.7	.05	69	34	3		93	6.8	25	10.9	930
June 2.....		6.3				8.5	4.4	5.4	1.0		46		9.2	3.5	.0	1.5	.04	65	40	2		107	6.9	15	8.6	4600
Aug. 25.....		8.8				10	5.1	5.9	1.3		54		11	3.0	.1	1.0	.06	A 73	46	2		121	7.0	10	7.6	4600

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 8, 1962.....	1505	0.00	0.00	0.07	0.05	0.00	0.00
May 3, 1963.....	0900	.00	.00	.07	.05	.00	.00
Nov. 13.....	1600	.01	.01	.01	.05	.00	.02
June 2, 1964.....	1200	.00	.02	.01	.05	.01	.02

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

SNOHOMISH RIVER BASIN

Chemical analyses, in parts per million, November 1961 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1345. SKYKOMISH RIVER NEAR GOLD BAR, WASH.																										
Nov. 1, 1961.	3150	5.9		0.04		4.0	0.6	1.8	0.3		16		3.2	1.2	0.0	0.5	0.06	26	12	0		36	7.1	5	12.4	23
Feb. 7, 1962.	3620	6.6		.09		4.0	.2	1.4	.6		15		2.2	1.0	.0	.5	.00	23	11	0		31	7.1	5	12.1	23
May 4.....	5190	5.7		.04		3.0	.5	2.3	.9		12		2.8	.5	.0	.1	.01	22	10	0		28	6.9	5	12.2	23
Aug. 15.....	1430	5.6		.03		4.0	.7	1.6	.6		16		2.4	1.0	.0	.2	.01	26	13	0		35	7.3	5	9.6	23
Nov. 9.....	2840	5.8		--		4.5	.3	1.6	.5		15		2.4	1.2	.1	.3	.00	31	12	0		34	7.1	5	10.9	23
Feb. 6, 1963.	9680	5.7		--		3.5	.1	.8	.2		12		1.4	.5	.1	.6	.01	22	9	0		25	6.8	5	12.3	23
May 2.....	3420	4.8		--		4.0	.3	1.4	.5		14		2.0	.8	.0	.1	.01	22	11	0		31	6.5	5	12.0	23
Aug. 13.....	1250	5.9		--		4.5	.6	2.1	.7		19		1.6	1.8	.1	.3	.00	31	14	0		38	7.3	5	9.6	30
Nov. 13.....	3320	5.7		--		4.0	.5	1.8	.4		16		2.4	1.2	.0	.5	.00	26	12	0		34	7.0	5	11.4	230
Feb. 20, 1964	2740	5.8		.09		4.5	.6	1.9	.9		17		2.8	1.5	.0	.5	.01	27	14	0		36	6.9	5	13.6	23
June 1.....	16900	3.8		--		2.0	.6	.9	.2		10		1.4	.8	.0	.3	.00	16	8	0		20	6.8	5	12.8	23
Aug. 25.....	2290	4.1		.05		3.5	.3	1.4	.5		14		1.4	.8	.1	.1	.01	A 19	10	0		30	7.5	0	10.4	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1410	0.01	0.02	0.00	0.05	0.00	0.03
May 4, 1962.....	1300	.00	.00	.01	.05	.00	.00
Nov. 9.....	1530	.01	.01	.01	.05	.00	.00
May 2, 1963.....	1255	.00	.00	.02	.05	.00	.00
Nov. 13.....	1450	.00	.00	.02	.05	.00	.04
June 1, 1964.....	1100	.00	.00	.02	.05	.00	.00

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

SNOHOMISH RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1382. SULTAN RIVER AT SULTAN, WASH.																										
Nov. 1, 1961.		4.3		--		3.5	0.7	1.3	0.3		12		3.6	0.8	0.0	0.4	0.07	23	12	2		29	6.9	15	12.4	23
Feb. 7, 1962.		4.7		0.26		4.0	.2	.9	.4		13		3.0	.8	.0	.4	.00	28	11	0		29	7.1	5	12.0	23
May 4.....		3.9		--		3.5	.1	.8	.3		12		2.4	.5	.0	.6	.00	18	9	0		25	6.8	5	12.3	23
Aug. 15.....		5.8		.08		5.0	1.0	1.4	.6		21		3.6	.5	.1	.3	.03	32	17	0		44	7.2	5	9.3	36
Nov. 9.....		4.5		--		4.5	.1	1.3	.4		14		2.8	1.0	.0	.5	.04	26	12	0		31	7.0	5	10.8	91
Feb. 6, 1963.		3.8		--		3.5	.2	.6	.1		11		2.2	.5	.1	.4	.01	19	10	0		35	6.8	5	12.3	36
May 2.....		3.8		--		3.5	.7	.8	.4		13		3.2	.8	.1	.3	.01	23	12	1		29	7.0	10	11.7	23
Aug. 13.....		10		.10		8.0	2.3	2.2	.6		35		3.6	1.0	.1	.8	.02	A 46	30	1		67	7.4	5	9.1	36
Nov. 13.....		3.9		--		3.5	.6	1.3	.3		12		4.0	1.0	.0	.5	.00	24	11	1		28	6.9	10	11.5	36
Feb. 20, 1964		4.6		--		4.0	.7	1.4	.7		14		3.0	1.2	.1	.6	.00	27	13	2		32	7.0	10	13.7	23
June 1.....		2.6		--		2.0	.8	.8	.1		9		1.4	1.0	.1	.2	.01	16	8	1		20	6.8	5	11.5	23
Aug. 25.....		4.7		.42		5.0	.5	1.3	.1		18		2.6	.5	.0	.2	.01	24	14	0		36	6.9	5	9.5	210

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1440	0.01	0.04	0.02	0.05	0.00	0.00
May 4, 1962.....	1230	.00	.00	.03	.05	.00	.03
Nov. 9.....	1500	.00	.00	.01	.05	.00	.01
May 2, 1963.....	1215	.01	.01	.03	.05	.00	.01
Nov. 13.....	1505	.01	.01	.01	.05	.00	.01
June 1, 1964.....	1005	.00	.00	.01	.05	.00	.00

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

SNOHOMISH RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1444. SNOQUALMIE RIVER AT SNOQUALMIE, WASH.																										
Nov. 1, 1961.		5.4				3.5	0.1	1.3	0.4		11		2.0	1.2	0.1	0.6	0.01	19	9	0		26	6.8	20	11.9	230
Feb. 7, 1962.		6.6				4.0	.2	1.3	.4		14		2.2	1.0	.1	.3	.01	27	11	0		31	6.8	5	11.7	430
May 4.....		5.4				3.0	.2	1.0	.4		11		2.0	.5	.0	1.0	.00	20	8	0		25	6.7	10	11.1	--
Aug. 15.....		6.1				4.5	.7	1.5	.6		18		2.2	.5	.0	.3	.02	28	14	0		38	7.1	5	9.4	4600
Nov. 9.....		5.9				4.5	.0	1.6	.4		14		2.4	1.0	.0	.5	.02	28	11	0		31	6.9	5	10.4	4600
Feb. 6, 1963.		4.7				3.0	.1	.7	.2		11		1.8	.5	.1	.5	.00	18	8	0		22	6.6	5	11.9	430
May 2.....		4.6				3.5	.3	1.1	.3		13		2.0	.5	.0	.3	.01	19	10	0		27	6.9	5	11.6	1500
Aug. 13.....		7.3				6.0	.8	1.7	.7		21		2.6	.8	.0	.3	.12	33	18	2		45	7.0	5	9.2	4600
Nov. 13.....		5.8				3.5	.6	1.5	.3		14		2.4	1.0	.1	.9	.00	24	11	0		30	6.9	5	10.8	930
Feb. 20, 1964		5.9				4.0	.5	1.5	.7		14		2.4	1.5	.0	.7	.01	26	12	0		32	6.8	5	13.1	23
June 1.....		3.1				1.5	.4	.9	.1		7		.0	1.0	.0	.3	.01	14	6	0		16	6.6	5	12.2	36
Aug. 25.....		--				--	--	--	--		--		--	--	--	--	--	--	--	--		--	--	--	9.7	4600

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1220	0.01	0.02	0.03	0.05	0.00	0.00
May 4, 1962.....	1615	.00	.00	.03	.05	.00	.03
Nov. 9.....	1645	.00	.00	.02	.05	.00	.00
May 2, 1963.....	1045	.00	.00	.02	.05	.00	.00
Nov. 13.....	1830	.01	.01	.01	.05	.00	.01
June 1, 1964.....	0820	.00	.02	.03	.05	.00	.00

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

SNOHOMISH RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1485. TOLT RIVER NEAR CARNATION, WASH. (Formerly published as 12-1488. Tolt River at Carnation, Wash.)																										
Nov. 1, 1961.	1070	5.3		--		3.0	0.7	1.3	0.3		10		3.4	1.0	0.1	0.5	0.02	29	10	2		28	6.6	30	11.7	23
Feb. 7, 1962.	550	8.0		0.17		5.0	.7	1.5	.4		18		3.6	1.0	.0	.6	.00	36	15	0		40	7.2	5	11.8	23
May 4.....	656	6.5		--		5.0	1.0	1.5	.3		19		4.2	1.2	.1	.2	.00	31	17	2		43	7.0	15	11.0	--
Aug. 15.....	219	8.0		.08		6.5	1.2	1.9	.4		26		5.4	.8	.1	.4	.01	39	21	0		54	7.5	5	9.4	23
Nov. 9.....	520	7.0		--		5.0	.8	1.6	.1		17		4.4	1.0	.0	.5	.00	33	16	2		39	6.9	20	10.3	73
Feb. 6, 1963.	1020	6.6		--		4.0	.6	1.2	.2		14		3.6	.2	.0	1.0	.02	33	12	1		33	7.1	15	12.0	36
May 2.....	657	6.8		--		4.5	.8	1.4	.2		16		3.2	.5	.0	.3	.01	27	14	1		36	6.9	15	11.7	23
Aug. 13.....	147	10		.07		7.0	1.5	2.0	.6		28		3.8	1.0	.0	.3	.01	A 40	24	0		56	7.3	5	9.7	23
Nov. 13.....	613	7.4		--		5.0	1.2	1.8	.3		20		4.2	1.2	.0	1.0	.00	35	18	1		44	7.0	15	10.7	36
Feb. 20, 1964	1070	6.5		--		4.0	.8	1.8	.3		16		3.8	1.2	.1	.6	.01	32	14	0		35	6.9	15	13.7	23
June 1.....	1630	3.8		--		3.0	.7	1.3	.3		12		2.4	.5	.0	.4	.01	21	10	0		27	7.0	10	11.6	36
Aug. 25.....	190	7.3		.04		8.0	1.3	2.0	.7		30		5.6	1.0	.0	.2	.01	40	25	0		61	7.2	0	10.5	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1300	0.01	0.01	0.09	0.05	0.00	0.01
May 4, 1962.....	1545	.00	.00	.05	.05	.00	.00
Nov. 9.....	1620	.00	.00	.04	.05	.00	.01
May 2, 1963.....	1125	.01	.01	.02	.05	.00	.00
Nov. 13.....	1720	.01	.01	.04	.05	.00	.00
June 1, 1964.....	0910	.00	.00	.03	.05	.00	.00

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

STILLAGUAMISH RIVER BASIN

Chemical analyses, in parts per million, November 1961 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1610. SOUTH FORK STILLAGUAMISH RIVER NEAR GRANITE FALLS, WASH.																										
Nov. 2, 1961.	828	5.5				5.0	0.7	1.3	0.4		17		3.6	1.0	0.1	0.4	0.02	31	16	2		39	7.0	10	12.8	23
Feb. 8, 1962.	948	4.9				4.5	.6	1.6	.7		18		3.4	.8	.0	.4	.00	33	14	0		34	7.3	10	12.0	23
May 4.....	1650	4.2				4.0	.4	1.0	.2		13		2.6	.8	.1	.6	.00	24	12	1		30	6.8	20	12.4	23
Aug. 15.....	300	5.8				6.0	.9	1.3	.4		23		3.0	.8	.0	.0	.01	33	19	0		46	7.3	5	9.8	36
Nov. 8.....	1100	4.3				4.5	.2	1.5	.4		13		3.2	1.5	.0	.7	.03	31	12	2		32	6.8	30	10.6	91
Feb. 6, 1963.	1990	4.0				4.0	.7	.9	.1		15		2.2	1.0	.1	.1	.01	26	13	0		32	6.1	5	12.2	23
May 2.....	1290	4.2				4.0	1.0	1.2	.4		17		3.0	.5	.1	.5	.01	22	14	0		33	6.7	20	12.0	23
Aug. 13.....	185	7.6				8.0	2.1	2.0	.4		34		2.8	1.0	.0	.3	.02	40	29	1		64	7.4	5	9.2	91
Nov. 13.....	1930	4.6				3.5	.9	1.4	.3		14		2.4	1.0	.0	.7	.01	28	12	0		31	6.8	20	11.5	36
Feb. 20, 1964	824	4.9				5.0	.8	1.6	.7		18		2.8	1.2	.1	.5	.00	30	16	0		37	7.0	10	13.8	23
June 1.....	3160	2.8				2.5	.8	1.0	.1		11		1.2	1.5	.0	.3	.00	18	9	0		22	6.9	5	12.1	23
Aug. 25.....	485	4.1				4.5	.8	1.0	.4		18		2.0	.5	.0	.1	.01	25	14	0		34	7.1	5	10.5	91

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 2, 1961.....	1450	0.00	0.02	0.08	0.05	0.00	0.00
May 4, 1962.....	1100	.00	.01	.07	.05	.00	.00
Nov. 8.....	1620	.00	.00	.10	.05	.00	.00
May 2, 1963.....	1420	.01	.01	.11	.05	.00	.02
Nov. 13.....	1330	.01	.01	.07	.05	.00	.00
June 1, 1964.....	1210	.00	.00	.03	.05	.00	.00

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

STILLAGUAMISH RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colinies per 100 ml)
12-1670. NORTH FORK STILLAGUAMISH RIVER NEAR ARLINGTON, WASH.																										
Nov. 2, 1961.	1520	6.8		--		5.5	2.0	1.6	0.4		25		2.8	1.5	0.1	0.9	0.00	42	22	1		52	7.5	20	12.6	36
Feb. 8, 1962.	1900	6.8		--		5.0	1.5	1.3	.4		22		3.0	.5	.1	.5	.03	31	19	1		45	7.2	15	11.6	36
May 4.....	3550	5.5		--		4.5	1.3	1.2	.5		19		2.6	1.2	.1	.5	.01	28	16	0		39	6.9	20	12.0	23
Aug. 15.....	685	8.4		0.16		8.5	1.8	2.2	.6		36		3.6	1.2	.0	.3	.02	46	28	0		68	7.5	5	9.5	36
Nov. 8.....	1530	5.7		--		5.5	.9	1.6	.3		20		2.8	1.2	.1	.7	.02	35	17	0		43	7.1	20	10.4	210
Feb. 6, 1963.	4260	5.8		--		4.5	1.2	1.0	.2		19		2.6	.8	.1	.8	.02	32	16	0		38	7.0	20	11.7	23
May 2.....	3180	5.1		--		5.0	1.6	1.1	.3		22		3.0	.8	.1	.7	.01	35	19	1		43	7.3	30	12.3	150
Aug. 13.....	400	9.0		--		10	2.2	2.8	.9		44		3.2	1.5	.0	.6	.03	55	34	0		80	7.6	5	9.3	430
Feb. 20, 1964	1890	7.1		--		6.0	1.8	1.9	.5		26		2.8	1.8	.1	.8	.02	41	22	1		52	7.0	5	13.4	23
June 1.....	5070	3.5		--		3.0	1.0	1.3	.3		14		1.8	.8	.0	.4	.00	22	12	0		29	6.7	5	12.5	36
Aug. 25.....	575	5.7		.10		7.0	1.8	2.0	.7		32		2.2	1.0	.2	.1	.01	A 37	25	0		60	7.3	5	10.1	930

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 2, 1961.....	1410	0.00	0.02	0.07	0.05	0.00	0.02
May 4, 1962.....	1015	.00	.00	.08	.05	.00	.00
Nov. 8.....	1700	.00	.00	.07	.05	.00	.02
May 2, 1963.....	1510	.00	.00	.23	.05	.00	.01
June 1, 1964.....	1400	.00	.00	.04	.05	.00	.01

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

SKAGIT RIVER BASIN

Chemical analyses, in parts per million, November 1961 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1810. SKAGIT RIVER AT MARBLEMOUNT, WASH.																										
Nov. 2, 1961.	5010	5.2		0.02		6.5	0.7	0.9	0.9		23		3.2	0.0	0.0	0.3	0.01	30	19	0		45	7.3	5	12.4	36
Feb. 7, 1962.	6630	5.6		.08		7.0	.6	.8	.7		24		3.8	.0	.0	.5	.00	37	20	0		48	7.2	5	12.0	23
May 3.....	4120	5.5		.03		8.0	.8	.9	.5		26		3.8	.0	.1	.2	.00	35	23	2		54	7.1	5	12.1	91
Aug. 15.....	4570	4.7		.06		6.5	.8	.8	.6		23		3.0	.0	.0	.3	.01	30	20	0		45	7.6	5	9.7	23
Nov. 9.....	--	5.3		.03		8.0	.4	.9	.8		25		4.0	.5	.1	.1	.00	36	22	2		50	7.3	5	10.5	30
Feb. 7, 1963.	--	3.9		.14		4.5	.7	.6	.3		16		2.2	.0	.1	.4	.01	24	14	1		32	6.8	5	12.1	23
May 2.....	--	5.4		.02		9.5	.9	.9	.6		31		4.6	.2	.1	.3	.00	41	27	2		61	7.2	5	12.2	23
Aug. 14.....	--	4.5		--		7.0	.4	.8	.6		23		3.4	.0	.1	.2	.02	A 28	19	0		43	7.4	5	10.7	36
Nov. 13.....	--	4.5		--		7.0	.6	.9	.5		23		4.0	.0	.0	.3	.01	32	20	1		45	7.0	5	12.1	91
Feb. 20, 1964	--	6.2		.04		10	1.3	1.2	.9		35		5.2	.5	.1	.2	.00	44	30	2		67	7.0	5	13.1	23
June 1.....	--	3.7		.14		5.5	.9	.8	.3		20		2.4	.0	.0	.4	.08	25	17	0		38	7.1	5	12.1	23
Aug. 25.....	--	3.9		.09		7.0	.6	.8	.4		24		3.4	.5	.0	.3	.01	28	20	0		46	7.3	0	10.4	230

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 2, 1961.....	1120	0.01	0.02	0.00	0.05	0.00	0.02
May 3, 1962.....	2050	.00	.00	.00	.05	.00	.01
Nov. 9.....	0740	.00	.01	.00	.05	.00	.01
May 2, 1963.....	1625	.00	.00	.00	.05	.00	.02
Nov. 13.....	1115	.00	.00	.00	.05	.00	.02
June 1, 1964.....	1515	.00	.02	.00	.05	.00	.00

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

SKAGIT RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to August 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-1935. BAKER RIVER AT CONCRETE, WASH.																										
Nov. 2, 1961.	1600	6.6		0.24		6.0	0.6	1.5	0.6		17		7.2	0.8	0.1	0.3	0.00	38	18	4		47	6.9	5	9.7	23
Feb. 8, 1962.	2990	8.4		--		6.0	1.2	1.4	.7		18		7.8	.5	.1	.4	.02	40	20	5		53	7.0	5	11.8	23
May 3.....	636	8.3		--		7.5	1.2	2.4	.7		25		7.6	.5	.0	.3	.01	41	24	3		62	7.0	5	11.4	--
Aug. 15.....	1620	6.2		.10		6.0	.5	1.2	.8		18		6.8	.2	.0	.3	.01	A 31	17	2		43	7.0	5	10.8	23
Nov. 9.....	2510	7.2		.15		6.0	.6	1.8	.5		18		7.6	.5	.1	.2	.01	35	18	2		46	7.0	5	9.6	30
Feb. 7, 1963.	3400	8.0		--		6.5	.8	1.3	.3		19		7.4	.5	.1	.4	.01	37	20	4		48	6.9	5	12.0	23
May 2.....	332	7.0		--		11	1.8	1.6	.7		37		7.8	.5	.1	.4	.02	55	35	4		81	7.3	5	12.2	36
Aug. 14.....	2280	6.2		--		5.5	.7	1.4	.6		18		5.6	.2	.0	.2	.00	32	17	2		44	6.9	5	10.0	23
Nov. 13.....	5770	6.4		--		6.5	.8	1.7	.6		18		7.6	.8	.1	.3	.01	40	20	4		49	6.9	15	9.9	23
Feb. 20, 1964	686	7.2		--		7.0	.9	1.7	.7		20		7.4	.5	.1	.4	.02	42	22	5		52	7.0	5	13.8	23
June 1.....	1150	7.5		.43		10	1.7	2.0	.7		32		9.8	.5	.0	.5	.01	50	32	6		73	7.0	5	12.4	23
Aug. 25.....	2710	4.7		.09		4.5	.6	1.1	.3		15		5.0	.2	.1	.1	.01	24	14	1		36	7.2	5	11.7	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 2, 1961.....	1155	0.00	0.00	0.00	0.05	0.00	0.01
May 3, 1962.....	2010	.00	.00	.01	.05	.00	.00
Nov. 9.....	0830	.00	.01	.00	.05	.00	.02
May 2, 1963.....	1710	.01	.01	.02	.05	.00	.01
Nov. 13.....	1040	.01	.01	.00	.05	.00	.04
June 1, 1964.....	1600	.00	.02	.01	.05	.00	.01

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

SAMISH RIVER BASIN

Chemical analyses, in parts per million, November 1961 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-2015. SAMISH RIVER NEAR BURLINGTON, WASH.																										
Nov. 1, 1961.	184	8.0		--		7.0	2.1	2.6	0.6		25		6.6	2.8	0.1	2.3	0.02	55	26	6		69	6.7	30	11.3	930
Feb. 7, 1962.	290	7.3		0.32		7.0	1.4	2.6	.8		24		5.0	2.5	.1	2.9	.01	52	24	4		64	7.3	15	11.1	430
May 4.....	298	6.0		--		6.0	1.4	1.7	.6		22		4.4	1.8	.0	1.3	.03	42	20	2		57	6.9	20	11.1	430
Aug. 14.....	45	10		.11		10	3.2	3.4	.9		45		5.4	2.2	.1	1.7	.05	62	38	1		94	7.5	10	9.7	430
Nov. 9.....	292	8.0		--		7.0	1.7	3.1	.7		26		5.2	2.5	.1	3.5	.03	53	24	3		67	7.0	30	9.9	23
Feb. 7, 1963.	238	7.7		--		7.0	2.0	2.5	.5		25		3.8	2.5	.1	4.2	.04	49	26	5		66	6.7	20	12.0	23
May 2.....	372	5.1		--		6.0	1.4	2.4	.6		21		4.8	2.0	.1	2.9	.01	44	21	4		55	6.7	30	10.9	930
Aug. 14.....	37	10		.16		10	3.6	3.7	.9		46		4.6	2.8	.1	2.3	.04	64	40	2		97	7.1	5	10.1	430
Nov. 12.....	347	6.7		--		6.0	2.2	3.3	1.3		22		5.4	3.0	.1	4.7	.07	48	24	6		66	6.6	40	10.8	11000
Feb. 20, 1964	447	6.2		--		7.0	1.3	3.0	1.2		22		4.8	2.5	.1	3.5	.01	46	23	5		60	7.0	10	12.3	36
June 2.....	224	5.1		.31		6.0	2.2	2.7	.3		26		4.0	2.2	.0	1.7	.09	42	24	2		60	7.1	10	10.9	430
Aug. 31.....	81	6.0		.35		8.0	1.9	4.2	.2		34		4.6	4.0	.0	.7	.03	49	28	0		77	7.1	15	10.4	230

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1610	0.00	0.00	0.12	0.05	0.00	0.00
May 4, 1962.....	0826	.01	.01	.09	.05	.00	.00
Nov. 9.....	1215	.00	.00	.11	.05	.01	.00
May 2, 1963.....	1950	.01	.01	.08	.05	.00	.03
Nov. 12.....	1600	.01	.01	.01	.05	.00	.04
June 2, 1964.....	0935	.00	.02	.04	.05	.00	.01

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

NOOKSACK RIVER BASIN

Chemical analyses, in parts per million, November 1962 to August 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-2105. NOOKSACK RIVER AT DEMING, WASH. (Formerly published as Nooksack River at Lawrence, Wash.)																										
Nov. 9, 1962.	--	8.2				9.0	2.6	1.9	0.4		34		8.0	0.8	0.1	0.6	0.01	53	33	5		76	7.3	10	10.7	1500
Feb. 7, 1963.	6000	6.7				6.5	1.8	1.0	.3		24		6.8	.5	.1	.5	.01	41	24	4		54	7.0	20	12.1	36
May 2.....	--	7.7				8.5	2.8	1.5	.6		35		6.8	1.0	.1	.5	.01	50	33	4		74	7.1	20	11.2	23
Aug. 14.....	--	6.6				10	1.6	2.1	.8		28		12	1.0	.1	.6	.01	52	32	8		73	7.4	5	10.3	91
Nov. 13.....	9130	6.2				6.5	2.2	1.8	.8		26		6.4	1.0	.1	1.0	.01	46	26	4		57	6.9	50	11.6	24000
Feb. 20, 1964	--	8.6				10	3.3	2.1	.6		41		7.6	1.0	.1	.7	.01	57	38	5		87	7.0	5	12.9	23
June 2.....	8680	4.7				6.0	1.7	1.4	.4		22		5.4	.2	.0	.4	.01	35	22	4		49	7.0	10	11.6	91
Aug. 25.....	--	6.2				8.5	2.6	1.5	.5		31		9.8	.2	.1	.1	.01	A 45	32	6		73	7.3	5	10.8	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 9, 1962.....	1040	0.00	0.00	0.02	0.05	0.01	0.00
May 2, 1963.....	1830	.01	.01	.04	.05	.00	.06
Nov. 13.....	0910	.01	.01	.07	.05	.00	.00
June 2, 1964.....	0800	.00	.00	.03	.1	.00	.01

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

PEND OREILLE RIVER BASIN

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-3993. PEND OREILLE RIVER AT WANETA, B.C., CANADA																										
Nov. 23, 1963		6.3		0.01		23	5.6	2.9	0.9		94		9.6	0.5	0.1	0.1	0.01	96	80	4		164	7.8	0	--	--
Mar. 17, 1964		6.3		.16		24	6.9	2.6	.8		99		11	.5	.1	.3	.00	A 102	88	8		178	7.7	0	14.1	36
June 19.....		5.8		--		20	4.5	2.4	.8		77		9.4	.0	.2	.2	.01	85	68	6		141	7.5	5	11.3	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 17, 1964....	1500	0.00	0.00	0.00	0.1	0.00	0.00

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

KETTLE RIVER BASIN

Chemical analyses, in parts per million, December 1962 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4049. KETTLE RIVER NEAR BARSTOW, WASH.																										
Dec. 17, 1962		12		0.05		18	3.2	3.7	0.8		69		8.4	0.2	0.2	0.3	0.02	81	58	2		128	7.9	5	12.8	36
Mar. 26, 1963		11		.04		20	3.1	3.6	1.0		76		8.4	.2	.2	.1	.01	88	63	0		139	7.6	5	11.2	340
June 26.....		9.1		.02		10	1.8	1.9	.6		40		4.8	.0	.1	.2	.01	53	32	0		72	7.4	5	9.4	150
Sept. 24.....		9.2		.03		23	4.8	4.4	1.0		92		11	.2	.3	.1	.01	103	78	2		169	7.7	5	9.5	23
Nov. 23.....		12		.03		24	4.0	4.5	1.0		93		11	.5	.3	.2	.00	103	76	0		168	7.8	5	--	--
Mar. 17, 1964		11		--		26	5.4	5.1	1.2		101		13	.5	.3	.3	.01	A 113	87	4		188	8.1	0	11.9	23
June 19.....		7.5		--		7.0	.8	1.4	.4		25		.6	.0	.1	.3	.01	41	20	0		46	7.0	20	11.7	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 17, 1962....	0845	0.00	0.00	0.00	0.1	0.01	0.00
June 26, 1963....	1330	.00	.00	.10	.05	.00	.00
Mar. 17, 1964....	1130	.00	.00	.00	.1	.00	.00

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

COLVILLE RIVER BASIN

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4090. COLVILLE RIVER AT KETTLE FALLS, WASH.																										
Jan. 6, 1964.	142	21		0.25		42	16	5.1	3.1		201		18	1.5	0.2	1.9	0.22	209	171	6		343	7.9	5	12.0	930
Mar. 17.....	280	20		--		48	20	8.1	3.9		219		32	2.2	.2	6.6	.28	260	202	22		421	7.9	10	12.2	4600
June 19.....	285	16		.39		38	11	4.5	2.5		164		13	.5	.1	.8	.15	173	140	5		281	7.8	10	9.3	930

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 17, 1964....	1245	0.00	0.00	0.17	0.05	0.00	0.06

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

SANPOIL RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4350. SANPOIL RIVER AT KELLER, WASH.																										
Nov. 22, 1961		23		0.08		27	5.6	6.3	1.1		106		17	0.8	0.3	0.1	0.06	135	90	4		202	7.5	5	13.2	36
Feb. 21, 1962		21		.08		26	5.5	6.5	1.3		104		16	.8	.2	.2	.10	137	88	2		199	7.9	5	12.7	24000
May 24.....		22		.26		18	4.4	5.6	1.4		74		13	.0	.4	.2	.12	109	63	2		151	7.7	10	9.6	930
Aug. 23.....		20		.00		28	4.8	6.7	1.5		112		16	.5	.4	.0	.10	137	90	0		207	8.0	5	9.7	36
Dec. 17.....		24		--		23	5.1	6.1	1.2		91		14	.5	.3	.4	.16	126	78	4		175	7.9	15	12.5	23
Mar. 26, 1963		21		.12		24	4.9	6.0	.9		93		15	.5	.3	.1	.95	122	80	4		177	7.3	5	10.8	270
June 27.....		21		.09		22	5.9	6.0	1.4		96		12	.5	.4	.3	.11	120	79	0		173	7.8	5	9.4	11000
Sept. 24.....		22		.10		30	7.5	8.0	1.6		126		17	1.2	.2	.2	.17	156	106	2		236	7.7	5	--	--
Feb. 25, 1964		22		.04		26	6.4	6.1	1.3		107		17	1.0	.3	.1	.07	133	91	4		200	7.7	5	13.6	23
Mar. 17.....		21		.09		26	6.1	6.5	1.0		104		16	.8	.3	.2	.09	128	90	5		191	7.7	0	12.0	36
June 19.....		--		--		--	--	--	--		--		--	--	--	.7	.07	--	73	--		164	--	--	8.9	36

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 22, 1961....	1345	0.00	0.00	0.04	0.1	0.00	0.00
May 24, 1962.....	1300	.01	.01	.21	.05	.00	.00
Dec. 17.....	1140	.00	.00	.04	.05	.00	.00
June 27, 1963....	0915	.00	.00	.04	.1	.00	.00
Mar. 17, 1964....	0915	.00	.00	.08	.05	.00	.02

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

OKANOGAN RIVER BASIN

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4395. OKANOGAN RIVER AT OROVILLE, WASH.																										
Nov. 20, 1961	385	7.8		0.02		36	8.3	10	2.3		142	0	29	1.0	0.3	0.3	0.02	172	124	8		281	7.7	5	11.8	23
Feb. 19, 1962	395	5.2		.02		36	9.4	10	2.5		144	0	28	1.8	.3	.1	.02	178	129	11		288	7.9	5	13.1	23
May 18.....	798	5.1		.04		35	9.4	10	2.6		143	0	29	1.2	.3	.1	.00	171	126	9		285	8.0	5	9.4	36
Aug. 23.....	365	5.4		.00		32	8.8	10	2.6		130	2	29	1.5	.3	.3	.03	164	116	6		270	8.3	5	10.1	91
Dec. 18.....	405	6.9		.05		36	9.8	11	2.4		146	0	31	1.2	.3	.3	.04	172	130	11		290	8.0	5	11.7	23
Mar. 28, 1963	179	5.8		.03		36	10	10	2.3		146	0	30	1.5	.3	.1	.02	174	131	12		287	7.9	5	11.1	36
June 27.....	154	4.7		.15		36	11	10	2.6		148	0	31	1.5	.3	.3	.01	172	136	14		286	8.1	5	8.8	23
Sept. 23.....	268	7.8		.03		34	10	11	2.6		144	0	31	1.2	.3	.5	.02	176	128	10		290	7.8	0	9.6	230
Nov. 19.....	302	4.6		.03		35	10	11	2.6		148	0	30	1.0	.3	.2	.01	A 168	128	7		288	7.9	5	--	--
Apr. 3, 1964.	560	4.4		.02		36	10	10	2.5		151	0	30	1.5	.3	.2	.02	174	133	10		297	7.8	0	12.4	23
July 28.....	680	3.7		.04		32	9.7	9.8	2.3		134	0	27	1.5	.4	.3	.01	155	120	10		273	8.1	0	8.4	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 20, 1961....	2045	0.00	0.01	0.02	0.05	0.00	0.00
May 18, 1962.....	--	.00	.00	.87	.05	.00	.00
Dec. 18.....	1135	.00	.00	.02	.05	.01	.01
June 27, 1963....	1145	.00	.00	.03	.1	.00	.00
Apr. 3, 1964.....	1300	.00	.00	.05	.05	.00	.00

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

OKANOGAN RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to July 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4473. OKANOGAN RIVER NEAR MALOTT, WASH. (Formerly published as Okanogan River near Brewster, Wash.)																										
Nov. 19, 1963	1600	9.8		0.05		28	6.4	6.5	1.4		110		21	1.0	0.2	0.1	0.03	133	96	6		212	7.7	5	--	--
Jan. 29, 1964	1400	9.6		.05		28	8.2	6.7	1.4		113		24	1.0	.1	.2	.03	145	104	11		232	7.6	0	14.4	430
Apr. 3.....	1500	11		.10		34	9.5	9.0	2.1		136		28	1.5	.2	.3	.07	166	124	12		275	7.7	5	10.8	430
May 19.....	5610	11		--		20	4.1	4.1	1.1		78		11	.0	.1	.3	.04	97	67	3		148	7.3	15	9.1	930
July 28.....	3120	7.8		--		22	5.0	5.0	1.4		89		17	.0	.1	.1	.04	107	76	2		176	7.8	5	8.0	430

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 3, 1964.....	1100	0.00	0.00	0.06	0.05	0.01	0.01

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

METHOW RIVER BASIN

Chemical analyses, in parts per million, December 1962 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4499.5. METHOW RIVER NEAR PATEROS, WASH. (Formerly puhlished as Methow River at Pateros, Wash.)																										
Dec. 18, 1962	804	11		0.04		22	3.6	3.7	0.6		84		7.2	0.2	0.2	0.5	0.01	90	70	0		148	8.0	5	13.4	36
Mar. 28, 1963	812	12		.07		23	3.5	3.2	.6		88		8.6	.2	.2	.3	.01	101	72	0		151	7.7	5	11.6	91
June 27.....	2780	9.0		.09		14	2.5	2.1	.5		54		4.2	.2	.2	.3	.01	61	45	0		93	7.7	5	10.0	23
Sept. 23.....	518	13		.01		28	5.1	4.2	1.0		108		10	.0	.2	1.0	.01	124	91	2		189	8.0	0	9.5	430
Nov. 19.....	626	14		.03		24	3.7	3.8	.7		92		7.2	.2	.2	.5	.00	100	75	0		160	7.8	0	--	--
Jan. 29, 1964	451	12		.01		24	4.6	3.8	.7		94		8.4	.2	.2	.6	.00	104	79	2		169	7.7	0	12.9	23
Apr. 3.....	708	14		--		24	4.2	3.5	.7		93		8.4	.5	.2	.6	.01	101	77	1		163	7.3	5	11.9	36
May 19.....	4820	9.1		--		13	2.2	2.0	.3		51		4.2	.0	.1	.5	.01	59	42	0		91	7.2	5	10.4	430
July 28.....	1100	9.5		.03		20	3.1	3.0	.8		76		6.4	.0	.2	.6	.00	A 81	62	0		134	7.6	0	9.3	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^6)	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Dec. 18, 1962....	1440	0.00	0.02	0.00	0.05	0.00	0.00
June 27, 1963....	1430	.00	.00	.03	.05	.00	.00
Apr. 3, 1964.....	1030	.00	.00	.09	.05	.01	.00

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

CHELAN RIVER BASIN

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4525. CHELAN RIVER AT CHELAN, WASH.																										
Nov. 20, 1961	2090	5.5		0.00		6.5	0.7	1.3	0.6		23		4.0	0.0	0.1	0.0	0.00	34	19	0		49	7.1	5	10.5	23
Feb. 19, 1962	2060	5.3		.02		7.0	.5	1.3	.8		24		4.4	.0	.0	.3	.01	35	20	0		50	7.2	5	11.9	23
May 21.....	67	5.0		--		7.0	.8	1.4	.9		26		4.0	.0	.0	.1	.03	38	21	0		53	7.3	5	9.9	530
Aug. 24.....	1020	4.8		--		6.5	.7	1.3	.7		25		3.6	.0	.1	.3	.00	34	19	0		49	7.1	5	10.2	23
Dec. 18.....	2090	5.3		.03		6.0	1.1	1.4	.5		24		4.2	.0	.1	.3	.01	A 31	20	0		47	7.3	5	11.1	23
Mar. 28, 1963	3160	4.9		.02		6.5	.7	1.2	.6		24		4.8	.0	.0	.2	.00	30	19	0		48	7.3	5	11.4	91
June 27.....	3040	4.7		--		7.0	.9	1.6	1.0		24		5.6	.0	.0	.1	.00	A 33	21	2		48	7.3	5	9.4	290
Sept. 23.....	797	5.0		.00		6.5	.9	1.4	.7		24		4.6	.0	.0	.1	.00	36	20	0		47	7.2	0	8.9	36
Nov. 19.....	2100	4.8		.00		6.5	.8	1.6	.7		24		4.4	.0	.1	.1	.00	33	20	0		46	7.2	0	--	--
Jan. 29, 1964	2120	4.7		.01		6.5	.8	1.4	.6		24		4.2	.5	.0	.2	.00	35	19	0		48	7.2	0	11.8	23
Apr. 2.....	2070	4.9		.02		6.5	.9	1.2	.6		24		4.8	.5	.1	.2	.01	32	20	0		49	7.0	0	11.7	23
May 19.....	313	4.3		.11		6.5	1.0	1.3	.5		24		4.6	.0	.0	.2	.01	30	20	0		50	7.3	0	9.9	150
July 28.....	2360	4.2		.02		6.0	1.2	1.2	.7		25		4.2	.0	.1	.1	.00	30	20	0		48	7.3	0	9.3	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 20, 1961....	1630	0.00	0.01	0.01	0.05	0.00	0.03
May 21, 1962.....	1800	.01	.01	.10	.05	.00	.00
Dec. 18.....	1510	.00	.00	.01	.1	.00	.00
June 27, 1963....	1515	.00	.00	.03	.1	.00	--
Apr. 2, 1964.....	1900	.00	.00	.29	.2	.00	.00

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

ENTIAT RIVER BASIN

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
																			Calcium, magnesium	Noncarbonate						
12-4530. ENTIAT RIVER NEAR ENTIAT, WASH.																										
Nov. 20, 1961		17		0.04		13	2.3	3.0	1.3		55		6.0	0.5	0.1	0.5	0.01	73	42	0		102	7.7	5	14.0	36
Feb. 19, 1962		15		.02		11	2.4	2.8	1.2		48		5.2	.5	.1	.2	.03	67	37	0		90	7.5	5	12.8	430
May 21.....		12		.12		6.5	1.0	1.6	.9		27		3.6	.0	.1	.1	.01	43	20	0		55	7.1	5	10.9	11000
Aug. 24.....		14		.00		12	1.8	2.7	1.3		49		5.2	.0	.1	.3	.02	65	38	0		90	7.7	5	10.6	230
Dec. 18.....		14		.03		9.0	1.9	2.5	1.1		39		4.2	.0	.1	.2	.02	53	30	0		72	7.6	5	13.2	930
Mar. 28, 1963		14		.03		10	2.2	2.6	1.0		44		5.6	.2	.1	.1	.03	57	34	0		80	7.5	5	12.3	2400
June 27.....		11		.01		6.0	.8	1.3	.7		24		2.8	.0	.0	.1	.01	37	18	0		45	7.2	0	10.1	2400
Sept. 23.....		16		.02		13	3.2	3.1	1.4		58		5.8	.0	.1	.5	.03	79	46	0		103	7.8	0	10.3	430
Nov. 19.....		15		.02		12	1.6	3.0	1.1		47		4.8	.5	.1	.2	.02	61	36	0		85	7.3	0	--	--
Jan. 29, 1964		14		.02		9.5	2.3	2.7	1.0		42		5.0	.5	.1	.3	.02	60	33	0		80	7.2	0	13.1	36
Apr. 2.....		15		--		14	2.1	2.9	1.2		54		6.4	.5	.1	.2	.03	70	44	0		101	7.2	5	11.2	140
May 19.....		12		--		7.0	1.2	1.6	.7		30		3.4	.0	.0	.4	.02	41	22	0		54	7.0	5	11.2	43
July 28.....		10		.05		6.5	1.2	1.6	.8		28		3.0	.0	.1	.2	.02	37	21	0		51	7.2	0	9.9	430

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)				
Nov. 20, 1961....	1538	0.00	0.01	0.02	0.05	0.00	0.00
May 21, 1962.....	1715	.00	.01	.14	.05	.00	.00
Dec. 18.....	1515	.00	.00	.00	.1	.00	.00
June 27, 1963....	1600	.00	.00	.03	.05	.00	.00
Apr. 2, 1964.....	1800	.00	.00	.07	.05	.00	.00

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

WENATCHEE RIVER BASIN

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4578. WENATCHEE RIVER NEAR LEAVENWORTH, WASH.																										
Nov. 20, 1961		8.4		0.00		3.5	1.1	1.1	0.9		18		2.6	0.0	0.0	0.0	0.00	31	14	0		36	7.0	5	13.0	23
Feb. 19, 1962		8.6		.01		4.5	.4	1.3	1.0		18		2.8	.0	.0	.2	.03	28	13	0		38	7.0	5	11.6	2400
May 21.....		8.1		.05		4.0	.3	1.1	.9		16		2.8	.0	.0	.3	.00	29	12	0		32	7.0	5	11.1	23000
Aug. 24.....		7.3		.01		4.0	.8	1.2	.9		19		2.8	.5	.0	.0	.02	A 27	14	0		37	7.2	5	9.5	36
Dec. 18.....		7.8		.07		4.5	.2	1.1	.9		16		3.6	.2	.0	.4	.00	30	12	0		34	7.0	5	11.8	23
Mar. 28, 1963		9.7		.01		4.0	1.0	1.2	.8		20		2.4	.0	.1	.2	.01	31	14	0		38	7.2	5	12.0	36
June 27.....		6.7		.09		3.5	.9	1.2	1.0		16		2.0	.2	.1	.6	.01	25	12	0		30	7.0	5	9.8	430
Sept. 23.....		8.8		.01		4.5	1.0	1.4	1.1		22		2.2	.2	.0	.1	.01	37	15	0		39	7.1	0	9.8	36
Nov. 19.....		7.6		.07		4.0	.9	1.4	.9		18		2.6	.5	.0	.2	.00	28	14	0		36	7.0	5	--	--
Jan. 29, 1964		7.6		.05		3.5	1.2	1.3	.9		19		2.6	.5	.0	.2	.00	33	14	0		37	7.1	0	12.5	23

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 20, 1961....	1408	0.00	0.00	0.03	0.05	0.00	0.00
May 21, 1962.....	1200	.01	.01	.13	.05	.00	.01
Dec. 18.....	1730	.00	.00	.01	.1	.00	.00
June 27, 1963....	1745	.00	.00	.03	.05	.00	.00

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

WENATCHEE RIVER BASIN--Continued

Chemical analyses, in parts per million, November 1961 to July 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4625.2. WENATCHEE RIVER AT WENATCHEE, WASH.																										
Nov. 19, 1963		8.8		0.08		6.5	2.1	2.7	1.0		33		4.4	0.2	0.1	0.3	0.01	A 42	24	0		60	7.1	5	--	--
Jan. 29, 1964		8.4		.05		6.0	2.7	2.1	1.0		34		4.0	.5	.0	.4	.02	46	26	0		63	7.0	5	13.6	36
Apr. 2.....		12		.12		8.0	3.8	2.2	1.1		46		4.0	.5	.1	.4	.03	57	36	0		82	7.4	5	11.6	230
May 19.....		7.7		--		4.0	2.0	1.1	.7		24		2.4	.0	.0	.4	.02	29	18	0		43	7.1	5	11.1	36
July 28.....		5.5		.07		3.0	1.6	1.0	.7		19		1.4	.0	.0	.2	.01	23	14	0		34	7.0	5	9.9	150

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 2, 1964.....	1730	0.00	0.00	0.08	0.05	0.00	0.01

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

YAKIMA RIVER BASIN

Chemical analyses, in parts per million, November 1961 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
12-4795. YAKIMA RIVER AT CLE ELUM, WASH.																										
Nov. 20, 1961	206	11		0.00		8.0	2.4	2.6	0.2		41		1.2	0.8	0.1	0.1	0.01	46	30	0		73	7.4	5	12.1	36
Feb. 19, 1962	885	9.2		.05		7.0	1.7	2.8	.3		34		2.0	.8	.0	.0	.01	46	24	0		62	7.2	5	12.5	930
May 21.....	1770	6.9		--		6.0	1.8	1.5	.2		30		.6	.2	.0	.1	.01	37	22	0		52	7.2	5	12.2	2900
Aug. 24.....	3740	5.7		--		5.0	1.5	1.2	.2		26		1.6	.2	.0	.0	.01	30	19	0		44	7.3	5	9.4	85
Dec. 18.....	969	9.0		.09		7.5	1.1	2.1	.3		30		2.8	.8	.1	.3	.01	43	23	0		56	7.2	5	11.4	36
Mar. 29, 1963	660	10		.02		8.0	1.7	3.0	.1		39		2.0	.5	.1	.1	.02	45	27	0		66	7.3	5	11.3	430
June 27.....	3020	6.2		.07		5.0	3.0	1.0	.2		29		1.6	.5	.0	.2	.01	31	25	1		46	7.4	5	10.4	230
Sept. 23.....	1160	7.0		.02		5.5	2.7	1.4	.1		32		.8	.5	.1	.0	.01	35	24	0		52	7.4	0	9.7	150
Dec. 7.....	282	11		.13		9.0	3.2	3.0	.3		47		2.8	1.5	.1	.2	.01	55	36	0		82	7.3	5	13.5	--
Feb. 7, 1964.	308	9.5		.03		7.5	2.6	2.9	.3		40		1.6	1.0	.0	.1	.00	52	30	0		69	7.2	0	13.4	23
Apr. 13.....	1930	8.1		.08		6.5	2.2	2.1	.7		34		1.6	1.0	.1	.2	.01	39	25	0		58	7.2	0	11.7	23
July 27.....	4060	5.5		.07		4.5	2.3	1.4	.1		27		.0	.2	.0	.1	.01	29	20	0		45	7.4	0	9.4	430
Sept. 22.....	1720	5.7		.03		4.5	2.2	1.3	.4		27		.6	.2	.0	.2	.01	28	20	0		44	7.2	0	9.7	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 20, 1961....	1204	0.00	0.00	0.04	0.05	0.00	0.00
May 21, 1962.....	1030	.01	.01	.15	.05	.00	.01
Dec. 18.....	1855	.00	.00	.01	.1	.00	.00
June 27, 1963....	1900	.00	.00	.06	.05	.00	.00
Apr. 13, 1964....	1535	.00	.00	.09	.05	.00	.01
Sept. 22.....	1545	.00	.00	.01	.05	.00	.00

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

CHEHALIS RIVER BASIN

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-200. CHEHALIS RIVER NEAR DOTY, WASH.					
Oct. 13, 1961	1250	52	552	17	25
Apr. 27, 1962	1705	46	2870	122	945
July 20	1240	66	52	3	.4
Nov. 11	1150	49	1120	20	60
Nov. 12	1245	46	1240	10	33
Dec. 14	1240	49	740	28	56
Dec. 14	2250	48	626	6	10
Dec. 15	1000	48	1330	64	230
Dec. 15	1650	48	1300	30	105
Dec. 16	1000	46	1020	11	30
Dec. 16	1410	48	992	9	24
Dec. 16	1800	49	962	8	21
Dec. 30	1150	46	2280	214	1320
Dec. 30	1620	46	2450	216	1430
Dec. 30	1935	46	2540	180	1230
Dec. 31	0935	46	1860	66	331
Jan. 2, 1963	0140	45	2980	217	1750
Jan. 2	1550	46	2280	84	517
Jan. 2	2150	46	2270	77	472
Feb. 1	1120	37	620	19	32
Feb. 27	0900	48	575	8	12
Mar. 30	1450	45	2010	56	304
Jan. 15, 1964	1630	--	928	25	63
12-211. SOUTH FORK CHEHALIS RIVER AT CURTIS, WASH.					
Oct. 13, 1961	1205	55	860	23	53
Feb. 28, 1962	1130	34	--	6	--
Apr. 27	1800	49	8990	181	4400
Aug. 22	1155	66	22	7	.4
Nov. 11	1140	49	347	14	13
Nov. 12	1450	47	720	14	27
Dec. 14	1200	48	640	33	57
Dec. 15	1055	51	1250	38	128
Dec. 15	1740	48	1350	36	131
Dec. 15	2205	48	1350	30	109
Dec. 16	1050	47	1100	22	65
Dec. 16	1450	48	1050	20	57
Dec. 16	1850	48	880	18	43
Dec. 17	1000	48	720	15	29
Dec. 30	1300	47	1500	91	369
Dec. 30	1700	46	2000	84	454
Dec. 30	2015	46	2400	100	648
Dec. 31	1005	45	2000	40	216
Dec. 31	1335	45	1750	34	161
Jan. 2, 1963	0250	45	9600	208	5390
Jan. 2	1615	47	6000	94	1520
Jan. 2	2115	46	4750	82	1050
Mar. 30	1530	44	11000	109	3240
May 6	1435	49	610	11	18

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
12-212. LAKE CREEK AT CURTIS, WASH.					
Oct. 13, 1961	1125	53	12	6	0.2
Feb. 28, 1962	1140	--	--	8	--
Apr. 27	1820	49	330	88	78
Aug. 22	1015	59	.5	18	T
Nov. 11	1120	48	36	18	1.7
Nov. 12	1315	46	84	34	7.7
Dec. 14	1130	49	17	13	.6
Dec. 15	1030	49	53	18	3.6
Dec. 15	1720	48	66	20	3.6
Dec. 15	2140	48	70	20	3.8
Dec. 16	1025	47	76	14	2.9
Dec. 16	1440	46	74	18	3.6
Dec. 16	1840	48	70	16	3.0
Dec. 17	0940	48	59	16	2.5
Dec. 30	1240	44	14	9	.3
Dec. 30	1645	44	18	14	.7
Dec. 30	2005	44	25	13	.9
Dec. 31	2005	45	32	13	1.1
Dec. 31	1325	45	33	15	1.3
12-240. SOUTH FORK NEWAUKUM RIVER NEAR ONALASKA, WASH.					
Oct. 13, 1961	0905	50	133	10	3.6
Oct. 13	0910	50	133	9	3.2
Dec. 19	1115	41	486	24	3[illegible]
Dec. 20	0750	42	554	34	51
Dec. 20	1350	42	598	40	65
Dec. 20	1935	--	670	64	116
Dec. 21	0405	40	794	122	262
Dec. 21	0700	--	750	94	190
Dec. 23	1810	45	690	62	116
Dec. 24	1355	45	1210	257	840
Mar. 28, 1962	1400	42	290	4	3.1
July 19	0835	54	40.5	9	1.0
Nov. 11	0830	46	257	9	6.2
Nov. 19	2330	51	2640	927	6610
Nov. 20	1200	49	1780	600	2880
Nov. 20	2210	49	1240	328	1100
Nov. 21	1715	47	722	134	261
Feb. 2, 1963	1540	--	434	225	264
Feb. 2	2005	40	663	448	802
Feb. 3	0015	42	960	680	1760
Feb. 3	1000	45	1880	831	4220
Feb. 3	1525	45	1340	462	1670
Feb. 6	1040	48	420	28	482
July 16	0930	55	71.8	4	.8
12-245. NORTH FORK NEWAUKUM RIVER NEAR FOREST, WASH.					
Oct. 13, 1961	0940	52	48	4	0.5
Dec. 19	1155	41	315	30	26
Dec. 20	0830	42	361	32	31
Dec. 20	1510	43	440	42	50
Dec. 20	2015	--	535	90	130
Dec. 21	0330	--	778	240	504
Dec. 21	0625	--	690	122	227
Dec. 23	1920	47	575	101	157
Dec. 24	1315	46	800	134	289
Mar. 28, 1962	1440	49	167	6	2.7
July 19	0925	55	10.8	14	.4
Nov. 11	0920	46	109	6	1.8
Nov. 20	0100	50	1780	470	2230
Nov. 20	1100	49	1000	292	789
Nov. 20	2130	48	786	172	365
Nov. 21	1630	48	414	62	69
Feb. 2, 1963	1450	40	323	208	181
Feb. 2	1925	40	629	582	989
Feb. 2	2340	42	876	465	1100
Feb. 3	0920	42	1320	176	627
Feb. 3	1450	43	872	206	485
Feb. 6	1005	48	203	16	8.7
July 16	1245	66	21	28	1.6

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-250. NEWAUKUM RIVER NEAR CHEHALIS, WASH.					
Oct. 13, 1961	1020	54	253	17	12
Dec. 19	1620	--	1460	24	95
Dec. 20	0905	42	1550	36	151
Dec. 20	1540	--	1700	36	165
Dec. 20	2100	--	2260	86	525
Dec. 21	0440	41	3050	192	1580
Dec. 21	0730	--	2410	193	1260
Dec. 23	2215	46	2040	60	330
Dec. 24	1240	45	3360	300	2720
Feb. 28, 1962	0950	35	308	2	1.7
Mar. 28	1300	--	792	10	21
Apr. 28	1430	50	848	16	37
May 24	0815	52	354	6	5.7
June 22	0850	63	99	1	.3
July 19	1005	62	56	8	1.2
Aug. 22	0920	64	56	6	.9
Aug. 27	0805	60	40	2	.2
Oct. 8	1415	50	247	20	13
Nov. 11	1250	48	692	10	19
Nov. 11	2050	48	884	58	138
Nov. 12	0745	45	932	37	93
Nov. 12	2000	46	840	14	32
Nov. 13	0930	47	740	12	24
Nov. 15	1615	48	468	0	T
Nov. 20	0745	50	5640	492	7490
Nov. 20	1555	49	5110	427	5890
Nov. 20	2245	49	4020	361	3920
Nov. 21	1800	48	2250	158	960
Nov. 22	1900	47	1440	68	264
Nov. 26	1105	46	3540	209	2000
Nov. 27	0940	45	2340	92	581
Dec. 14	1020	48	922	42	105
Dec. 14	2150	48	866	25	58
Dec. 15	0915	48	1000	21	57
Dec. 15	1805	48	1160	32	100
Dec. 16	1325	48	1060	17	49
Dec. 17	1030	48	850	8	18
Dec. 30	0925	46	750	48	97
Dec. 31	1405	46	846	24	55
Jan. 2, 1963	0025	45	1580	120	512
Jan. 2	1445	47	1210	32	105
Jan. 2	2230	46	1060	24	69
Jan. 3	1000	46	1140	26	80
Jan. 3	1830	46	1000	22	59
Feb. 1	0940	34	1350	151	550
Feb. 1	1850	34	1200	64	207
Feb. 2	0935	35	975	33	87
Feb. 2	1135	35	1040	33	93
Feb. 2	1400	35	1220	48	158
Feb. 2	1610	35	1540	114	474
Feb. 2	1850	36	2040	307	1690
Feb. 2	2045	36	2420	448	2930
Feb. 2	2300	38	2890	586	4570
Feb. 3	0055	40	3220	624	5430
Feb. 3	0530	42	3960	610	6520
Feb. 3	0810	43	4320	637	7430
Feb. 3	1050	43	4640	551	6900
Feb. 3	1415	44	4830	534	6960
Feb. 3	1555	44	4800	470	6090
Feb. 3	1825	44	5110	388	5350
Feb. 4	0850	45	4500	140	1700
Feb. 4	1515	46	2120	138	790

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-250. NEWAUKUM RIVER NEAR CHEHALIS, WASH.--Continued					
Feb. 5, 1963	1105	45	1880	102	518
Feb. 5	2035	48	1590	76	326
Feb. 6	0930	48	1340	58	210
Feb. 27	0905	45	618	13	22
Mar. 28	1330	44	870	61	143
Mar. 29	0100	43	1380	106	395
Mar. 29	1805	44	2680	282	2040
Mar. 29	1955	44	2720	283	2080
Mar. 30	1145	42	2500	120	810
Mar. 30	1905	43	2370	98	627
Mar. 31	1330	44	1920	70	363
Mar. 31	2100	45	1720	54	251
Apr. 1	1500	46	1300	36	126
Apr. 22	1100	49	630	8	14
May 5	1440	51	770	28	58
May 5	2020	49	810	26	57
May 6	0610	48	742	20	40
May 6	1330	50	710	12	23
May 25	1645	63	146	3	1.2
June 20	0840	64	80	5	1.1
July 18	1700	70	94	7	1.8
Aug. 27	1015	64	80	4	.9
Oct. 2	0730	56	53	4	57
Oct. 22	1010	54	430	82	95
Oct. 28	1300	51	278	9	6.8
Nov. 13	1555	45	874	23	54
Nov. 26	1920	48	826	12	27
Nov. 26	2115	48	870	12	28
Nov. 27	1100	41	818	8	18
Dec. 26	1020	42	630	6	10
Jan. 1, 1964	1345	49	2340	254	1600
Jan. 1	1715	49	3200	528	4560
Jan. 1	2145	47	3450	404	3760
Jan. 2	0840	44	2230	115	692
Jan. 2	1320	45	1910	84	433
Jan. 2	1710	47	1690	74	338
Jan. 2	2220	46	1480	59	236
Jan. 3	1140	44	1160	42	132
Jan. 3	1430	44	1110	30	84
Jan. 14	1105	44	1110	23	69
Jan. 16	1225	45	2220	138	827
Jan. 17	1840	41	3410	170	1570
Jan. 18	1000	41	3280	96	850
Jan. 18	1355	41	3260	78	687
Jan. 19	1255	40	2590	54	378
Jan. 19	2000	41	3550	153	1470
Jan. 20	1200	41	2980	111	893
Jan. 20	1710	41	2600	87	611
Jan. 21	0710	42	2020	56	305
Jan. 21	1650	41	1700	46	211
Jan. 24	2100	44	1620	62	271
Jan. 25	1210	44	6380	943	16200
Jan. 25	1915	46	6360	472	8110
Jan. 26	0905	42	3800	456	4680
Jan. 26	1130	43	3510	392	3710
Jan. 26	1605	44	3070	366	3030
Jan. 26	2000	44	2810	302	2290
Jan. 27	0855	44	2250	188	1140
Jan. 27	1410	44	1860	166	834
Jan. 28	1000	40	1850	128	639
Jan. 28	1515	42	1720	74	344
Jan. 29	1315	46	2030	124	680
Jan. 29	1745	45	2010	109	592
Jan. 31	0920	44	216	44	26
Feb. 28	0845	41	336	6	5.4
Mar. 30	0910	52	372	5	5.0
Apr. 27	0640	47	342	7	6.5
May 25	0810	50	267	3	2.2
June 23	0820	60	276	6	4.5
July 28	0950	68	78	5	1.1
Aug. 24	0635	64	58	4	.6
Sept. 23	0930	58	96	3	.8

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-266. SKOOKUMCHUCK RIVER AT CENTRALIA, WASH.					
Oct. 13, 1961	1410	62	300	15	12
Dec. 19	1550	40	505	30	41
Dec. 20	0940	43	950	44	113
Dec. 20	1620	42	885	32	76
Dec. 21	0515	41	2050	134	742
Dec. 23	2255	46	985	23	61
Dec. 24	1135	46	1670	50	225
Mar. 28, 1962	1540	46	185	12	6.0
July 19	1055	62	46	8	1.0
Aug. 22	1545	65	47	13	1.6
Nov. 11	1340	48	380	26	27
Nov. 20	0920	50	9100	166	4080
Nov. 20	1350	50	10000	137	3700
Nov. 20	2020	49	10300	88	2450
Nov. 21	0725	47	5400	71	1040
Nov. 21	1545	48	3300	56	499
Nov. 22	1830	48	1200	27	87
Nov. 26	1205	47	9400	79	2010
Nov. 27	1010	46	4000	46	497
Jan. 2, 1963	1410	47	1150	55	171
Jan. 2	1855	47	1000	42	113
Feb. 5	1510	46	2750	46	342
Mar. 30	1321	43	2150	51	296
Mar. 31	1420	43	1500	35	142
Mar. 31	2130	43	1300	33	116
Apr. 1	1410	46	900	35	85
July 16	1600	69	46	6	.7
Jan. 1, 1964	1640	--	1240	115	385
Jan. 1	2115	--	2550	238	1640
Jan. 2	0900	--	3300	90	802
Jan. 2	1745	46	1800	54	262
Jan. 3	1220	44	980	30	79
Jan. 26	1205	43	8600	175	4060
12-292. BLACK RIVER NEAR OAKVILLE, WASH.					
Feb. 28, 1962	1415	36		3	
July 19	1400	65		13	
Nov. 12	0806	47		10	
12-342. EAST FORK SATSOP RIVER NEAR ELMA, WASH.					
Nov. 20, 1961	1330	38	180	2	1.0
Mar. 29, 1962	1005	--	481	4	5.2
Apr. 7	0340	47	597	12	19
Apr. 7	1015	47	586	6	9.5
Apr. 8	0935	47	487	3	3.9
July 19	1830	60	110	1	.3
Oct. 8	1740	51	228	5	3.1
Oct. 9	1200	52	363	22	22
Oct. 10	0905	49	293	4	3.2
Oct. 12	1650	49	354	1	1.0
Oct. 13	1050	50	440	2	2.4
Oct. 14	1455	51	330	0	T
Oct. 14	1645	50	842	6	14
Nov. 14, 1963	1020	48	918	4	9.9
Nov. 14	1555	47	914	8	20
Nov. 27	0010	45	1550	52	218

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
12-343. DECKER CREEK NEAR ELMA, WASH.					
Mar. 29, 1962	0925	46		3	
Apr. 7	0315	47		8	
Apr. 7	1050	47		7	
Apr. 8	1005	47		7	
July 19	2000	51		0	
Aug. 23	1610	61	70	0	T
Oct. 8	1830	50		10	
Oct. 9	1310	52		4	
Oct. 10	0950	49		4	
Oct. 12	1705	49		2	
Oct. 13	1045	50		5	
Oct. 14	1510	51		0	
Dec. 14	1720	48		14	
Feb. 5, 1963	1025	47		24	
Nov. 14	1040	49		7	
12-345. MIDDLE FORK SATSOP RIVER NEAR ELMA, WASH.					
Nov. 20, 1961	1445	38	143	3	1.2
Mar. 29, 1962	0900	--	330	7	6.2
Apr. 7	0250	45	820	74	164
Apr. 7	1115	46	600	33	53
Apr. 8	1040	46	395	7	7.5
July 19	2030	64	59	3	.5
Aug. 24	0615	61	69	2	.4
Oct. 8, 1962	1850	50	420	34	39
Oct. 9	1325	50	1000	192	518
Oct. 10	1015	49	560	42	64
Oct. 12	1720	47	1900	382	1960
Oct. 13	1015	48	2050	219	1210
Oct. 13	1800	50	1550	142	594
Oct. 13	2130	49	1250	110	371
Oct. 14	0800	47	840	59	134
Oct. 14	1525	50	700	38	72
Dec. 14	1745	48	1100	93	276
Feb. 5, 1963	1040	47	2350	244	1550
Feb. 5	1450	48	2000	238	1290
May 6	1000	47	310	10	8.4
Nov. 14	1610	48	1220	95	313
Nov. 15	1250	47	1080	76	222
Nov. 27	0030	45	3050	288	2370
Nov. 27	0940	45	1780	112	538
Dec. 23	1745	46	720	452	879
Dec. 26	1540	46	1050	20	57
12-348. WEST FORK SATSOP RIVER NEAR SATSOP, WASH.					
Nov. 20, 1961	1535	36	305	1	0.8
Mar. 29, 1962	0840	44	648	3	5.2
Apr. 7	1210	46	1410	90	343
Apr. 8	1105	47	840	19	43
July 20	1000	61	108	2	.6
Aug. 23	1330	68	130	1	.4
Oct. 8, 1962	1920	50	890	46	111
Oct. 9	1345	51	1960	272	1440
Oct. 10	1045	50	1025	62	172
Oct. 12	1740	49	4500	729	8860
Oct. 13	0930	49	3820	346	3570
Oct. 13	1735	49	3300	250	2230
Oct. 13	2110	49	860	219	509
Oct. 14	0740	47	1800	130	632
Oct. 14	1540	50	1350	87	317
Dec. 14	1810	48	3050	348	2870
Feb. 5, 1963	1105	47	5500	492	7310
Feb. 5	1430	48	4450	407	4890
Nov. 14	1100	49	3850	358	3720
Nov. 14	1630	47	3490	262	2470
Nov. 15	1230	47	3150	248	2110
Nov. 27	0050	45	E 5000	554	7500
Nov. 27	0920	45	4500	310	3770
Dec. 23	1815	48	E 9900	871	23300
Dec. 26	1620	44	1800	50	243

E Estimated.

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-350. SATSOP RIVER NEAR SATSOP, WASH.					
Nov. 20, 1961	1640	38	932	3	7.5
Dec. 24	1025	46	11000	215	6390
Jan. 24, 1962	1550	43	2170	7	41
Mar. 1	0950	37	1040	2	5.6
Mar. 28	1900	47	2710	1	7.3
Mar. 29	1055	47	2440	6	40
Apr. 7	0135	47	5010	168	2270
Apr. 7	1325	47	3770	45	458
Apr. 7	1815	48	3520	31	295
Apr. 8	1135	47	2900	9	70
Apr. 27	2150	45	4950	154	2060
Apr. 28	1000	49	4340	52	609
May 24	1220	52	870	2	4.7
June 22	1250	64	490	36	48
July 19	1745	62	356	3	2.9
Aug. 23	0730	58	401	14	15
Sept. 27	1300	60	338	4	3.7
Oct. 8	1700	50	2240	42	254
Oct. 9	1040	50	3970	193	2070
Oct. 9	1745	51	4070	173	1900
Oct. 10	0830	49	3150	54	459
Oct. 10	1550	50	2780	32	240
Oct. 12	1600	49	6620	784	14000
Oct. 12	2100	48	5790	422	6600
Oct. 13	0830	49	5550	203	3040
Oct. 13	1710	50	5650	210	3200
Oct. 13	2040	49	5250	173	2450
Oct. 14	0830	48	3980	80	860
Oct. 14	1110	50	3770	68	692
Oct. 14	1430	51	3480	59	554
Oct. 14	1720	50	3360	49	445
Nov. 11	1600	49	3100	14	117
Nov. 12	1010	46	3060	10	83
Nov. 21	1120	48	8740	341	8050
Nov. 21	2120	46	7280	180	3540
Nov. 22	0645	46	6280	104	1760
Nov. 22	1625	48	5500	78	1160
Nov. 26	1640	48	8700	220	5170
Nov. 26	1950	47	8340	222	5000
Nov. 27	0700	--	7840	135	2860
Nov. 27	1315	46	7350	114	2260
Dec. 14	1610	49	6620	225	4020
Dec. 14	1930	47	6300	194	3300
Jan. 3, 1963	1600	46	9740	279	7340
Feb. 1	1440	40	1080	7	20
Feb. 4	1720	47	8040	401	8710
Feb. 4	2015	47	9030	702	17100
Feb. 5	0815	46	9050	480	11700
Feb. 5	1125	47	8450	390	8900
Feb. 5	1410	47	7960	300	6450
Feb. 5	1735	48	7140	224	4320
Feb. 5	1845	47	6860	202	3740
Feb. 27	1250	48	3170	23	197
Mar. 28	1640	45	2900	49	384
Mar. 29	1500	42	3970	46	493
Mar. 29	2230	42	4170	53	597
Mar. 30	0845	42	4260	36	414
Mar. 31	1030	42	3940	16	170
Apr. 1	1130	45	3200	9	78
Apr. 22	1320	50	286	1	.8
May 5	1720	50	3010	25	203
May 25	1045	55	728	0	T
June 20	1240	61	428	8	9.2
July 17	1435	65	362	6	5.9
Aug. 28	1525	67	304	3	2.5
Oct. 2	1010	60	268	3	2.2
Oct. 22	1200	52	7060	537	10240
Oct. 22	1600	53	6140	40	663

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
12-350. SATSOP RIVER NEAR SATSOP, WASH.--Continued					
Oct. 23, 1963	0800	49	3990	64	689
Oct. 23	1755	50	3830	238	2460
Oct. 28	1530	51	4000	8	85
Nov. 13	1740	48	5570	12	180
Nov. 14	0730	48	7570	18	368
Nov. 14	1315	50	7000	222	4200
Nov. 14	1710	47	6780	165	3020
Nov. 15	1215	48	6530	126	2220
Nov. 15	1450	48	6550	148	2620
Nov. 26	2120	47	12600	746	25400
Nov. 26	2300	46	12100	546	17900
Nov. 27	0905	46	9310	534	13400
Nov. 27	1210	47	8740	200	4720
Nov. 28	0800	42	6290	74	1260
Dec. 23	0015	46	9180	449	11100
Dec. 23	0530	46	9790	448	11800
Dec. 23	1015	47	10520	491	13900
Dec. 23	1700	47	13120	949	33600
Dec. 23	2215	46	12300	714	23700
Dec. 26	1200	--	5630	57	863
Jan. 14, 1964	1520	44	3960	270	2890
Jan. 18	0830	42	7440	78	1570
Jan. 19	1615	41	6710	122	2210
Jan. 21	0930	39	6030	30	488
Jan. 24	2300	43	8740	222	5240
Jan. 25	0920	42	14100	571	21700
Jan. 25	2105	44	11500	348	10800
Jan. 26	1430	44	7660	122	2520
Jan. 28	1120	43	6910	112	2090
Jan. 29	1510	45	8120	126	2760
Jan. 31	1110	45	5970	38	613
Feb. 28	1130	44	1400	2	7.6
Mar. 30	1250	48	1700	5	23
Apr. 27	1025	49	1240	1	3.3
May 25	1150	54	895	1	2.4
June 23	1120	60	597	2	3.2
July 28	1120	63	458	4	4.9
Aug. 24	0930	62	381	2	2.1
Sept. 23	1310	60	469	2	2.5
12-374. WYNOOCHEE RIVER ABOVE BLACK CREEK, NEAR MONTESANO, WASH.					
Oct. 13, 1961	1900	--	1670	74	334
Jan. 29, 1962	1320	43	1220	24	79
Mar. 1	0745	36	505	0	T
Mar. 29	0730	--	1210	7	23
Apr. 28	0740	44	2840	96	735
Apr. 28	1635	47	2540	41	281
May 24	1330	53	527	3	4.3
June 22	1400	67	259	0	T
July 20	0820	60	127	0	T
Aug. 23	0840	62	180	0	T
Sept. 27	1400	61	106	0	T
Oct. 9	1535	51	2760	138	1030
Oct. 10	1335	51	1860	28	141
Oct. 12	1850	49	5320	627	9010
Oct. 13	1900	49	4910	249	3300
Oct. 14	1215	49	3080	84	699
Oct. 14	1640	50	2820	108	822
Nov. 11	1650	48	1870	13	66
Nov. 21	1230	47	5140	228	3160
Nov. 26	1740	47	5030	229	3110
Nov. 27	1400	47	4110	123	1360
Feb. 1, 1963	1510	41	453	0	T
Feb. 4	1810	48	7100	835	16000
Feb. 4	2100	48	7680	1135	23500
Feb. 5	0730	46	7650	774	16000

T Less than 0.05 ton.

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

CHEHALIS RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, October 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
12-374. WYNOOCHEE RIVER ABOVE BLACK CREEK, NEAR MONTESANO, WASH.--Continued					
Feb. 5, 1963	1200	48	6190	448	7490
Feb. 5	1540	48	5420	321	4700
Feb. 5	1815	48	5020	262	3550
Feb. 27	1340	46	1970	43	229
Mar. 28	1730	41	2280	116	714
Mar. 29	0950	42	2410	66	429
Mar. 29	2330	41	2460	54	359
Mar. 30	0805	41	2410	46	299
Mar. 31	0945	42	2120	33	189
Apr. 22	1405	48	884	6	14
May 5	1810	50	2140	165	953
May 24	1300	57	422	5	5.7
June 20	1340	63	144	2	.8
July 18	0730	59	90	2	.5
Aug. 28	1245	67	76	3	.6
Oct. 2	1150	57	56	0	T
Oct. 22	1350	53	5520	457	6810
Oct. 22	1635	53	4790	358	4630
Oct. 23	0230	53	3320	165	1480
Oct. 23	1830	--	3050	125	1030
Oct. 28	1700	50	2360	64	408
Nov. 14	0635	47	5820	636	10000
Nov. 14	1205	49	5620	478	7250
Nov. 14	1710	48	4880	254	3350
Nov. 15	1410	47	4180	155	1750
Nov. 26	2210	47	8670	661	15300
Nov. 26	2225	--	8660	644	15100
Nov. 27	0830	46	5990	312	5050
Nov. 27	1130	47	5500	270	4010
Nov. 28	0845	40	3550	126	1210
Dec. 23	0115	46	6570	632	11200
Dec. 23	0445	46	7390	787	15700
Dec. 23	1315	47	9780	1101	29100
Dec. 23	1500	47	10200	1217	33500
Dec. 23	1615	46	10200	1042	28700
Dec. 23	2130	46	9990	799	21600
Dec. 26	1705	43	3470	68	637
Jan. 14, 1964	1610	44	2140	32	185
Jan. 18	0735	41	4090	60	663
Jan. 19	1720	40	3890	54	567
Jan. 21	1020	39	2750	24	178
Jan. 24	2355	43	5330	267	3840
Jan. 25	0725	42	7490	387	7830
Jan. 25	2140	42	5320	98	1410
Jan. 26	1355	42	3640	46	452
Jan. 28	1200	44	3470	59	553
Jan. 29	1550	45	4340	99	1160
Jan. 31	1145	44	3250	35	307
Feb. 28	1245	44	1550	4	17
Mar. 30	1440	49	912	4	9.8
Apr. 27	1110	48	716	4	7.7
May 25	1245	56	653	4	7.1
June 23	1215	60	460	1	1.2
July 28	1200	63	305	2	1.6
Aug. 24	1030	65	172	1	.5
Sept. 23	1400	63	228	1	.6

T Less than 0.05 ton.

PART 13. SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

13-375. SNAKE RIVER NEAR HEISE, IDAHO

LOCATION.--At Eagle Rock canal headgate, 1.2 miles upstream from Heise, Jefferson County, 1.6 miles downstream from Anderson canal headgate, 1.8 miles downstream from gaging station, 4.8 miles east of Ririe, and 21 miles upstream from Henrys Fork.
DRAINAGE AREA.--5,752 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January 1953 to September 1964.
Water temperatures: January 1953 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 298 ppm Nov. 30; minimum, 166 ppm July 25 to Aug. 7.
Hardness: Maximum, 221 ppm Nov. 30; minimum, 131 ppm July 25 to Aug. 7.
Specific conductance: Maximum daily, 504 micromhos Nov. 30; minimum daily, 282 micromhos Aug. 6.
Water temperatures: Maximum, 61°F July 30; minimum, freezing point on several days during December to February.
EXTREMES, 1953-64.--Dissolved solids: Maximum, 378 ppm Nov. 11-20, 1956; minimum, 161 ppm July 1-10, 1954.
Hardness: Maximum, 276 ppm Feb. 1-28, 1955; minimum, 117 ppm July 21 to Aug. 10, 1955.
Specific conductance: Maximum daily, 791 micromhos Nov. 13, 1956; minimum daily, 240 micromhos June 27, 1954.
Water temperatures: Maximum, 67°F July 19, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. Approximately 2.5 percent of normal annual streamflow of 5,000,000 acre feet is diverted by Anderson canal between sampling point and gaging station. This diversion occurs during the months of May to November. Except for leakage through the headgate, no other diversion or appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-28, 1963...	4202	8.2		50	12	12	2.1	164		45	12	0.4	0.8	0.03	241	0.33	2734	175	40	0.4	376	7.9
Oct. 29-Nov. 10...	2411	--		--	--	13	--	174		--	--	--	--	--	254	.35	1653	189	46	.4	416	8.0
Nov. 11-22.....	1752	--		--	--	17	--	190		--	--	--	--	--	282	.38	1334	209	53	.5	462	8.1
Nov. 23-25.....	1817	--		--	--	17	--	152		--	--	--	--	--	244	.33	1197	178	53	.6	406	8.1
Nov. 26-29.....	1675	--		--	--	17	--	184		--	--	--	--	--	271	.37	1226	202	51	.5	451	8.2
Nov. 30.....	1650	--		--	--	29	--	206		--	--	--	--	--	298	.41	1328	221	52	.8	504	7.8
Dec. 1-16.....	1590	--		--	--	18	--	193		--	--	--	--	--	280	.38	1202	210	52	.5	468	8.1
Dec. 17-Jan. 10, 1964.....	1529	--		--	--	18	--	194		--	--	--	--	--	284	.39	1172	207	48	.5	471	8.1
Jan. 11-Feb. 9....	1545	7.5		58	16	19	2.7	192		60	22	.4	.4	.00	295	.40	1230	210	52	.6	471	8.1
Feb. 10-24.....	1760	--		--	--	18	--	192		--	--	--	--	--	290	.39	1378	213	55	.5	466	8.2
Feb. 25-Mar. 24...	2153	--		--	--	16	--	192		--	--	--	--	--	279	.38	1622	210	52	.5	459	8.0
Mar. 25-Apr. 9....	2560	7.2		59	16	16	2.5	194		60	18	.4	.4	.02	280	.38	1935	212	53	.5	462	8.0
Apr. 10-16.....	3927	--		--	--	16	--	194		--	--	--	--	--	287	.39	3043	215	56	.5	467	8.2
Apr. 17-May 9.....	11230	--		--	--	12	--	178		--	--	--	--	--	262	.36	7944	198	52	.4	429	8.2
May 10-24.....	15440	--		--	--	12	--	168		--	--	--	--	--	242	.33	10088	182	44	.4	393	7.8
May 25-June 8.....	14950	--		--	--	10	--	163		--	--	--	--	--	223	.30	9001	170	36	.3	366	7.8

June 9-24, 1964...	18320	--		--	--	8.5	--	152		--	--	--	--	--	189	.26	9349	149	24	.3	323	7.8
June 25-July 2....	14080	--		--	--	8.5	--	150		--	--	--	--	--	186	.25	7071	145	22	.3	319	7.7
July 3-24.....	15800	8.5		39	9.4	8.1	1.5	143		26	5.8	.3	.6	.01	173	.24	7380	136	19	.3	298	7.6
July 25-Aug. 7....	12850	--		--	--	7.7	--	138		--	--	--	--	--	166	.23	5759	131	18	.3	288	7.8
Aug. 8-31.....	9444	--		--	--	8.1	--	138		--	--	--	--	--	171	.23	4360	137	24	.3	299	7.9
Sept. 1-21.....	8075	--		--	--	10	--	144		--	--	--	--	--	186	.25	4055	147	29	.4	325	7.8
Sept. 22-30.....	6433	--		--	--	11	--	151		--	--	--	--	--	204	.28	3543	151	27	.4	343	7.9
Weighted average	--	--		--	--	11	--	158		--	--	--	--	--	213	0.29	4010	163	33	0.3	358	7.8
Time-weighted average.....	6974	--		--	--	13	--	171		--	--	--	--	--	242	--	--	181	41	0.4	399	7.9
Tons per day....	--	--		--	--	199	--	2980		--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1963 to September 1964

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

HENRYS FORK BASIN

13-550. TETON RIVER NEAR ST. ANTHONY, IDAHO

LOCATION.--Temperature recorder at gaging station, 0.5 mile upstream from railroad bridge, and 4 miles southeast of St. Anthony, Fremont County.
DRAINAGE AREA.--890 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: April to September 1964.
EXTREMES, April to September 1964.--Water temperatures: Maximum, 70°F July 27, 29-31, Aug. 4-6.

Temperature (°F) of water, April to September 1964

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																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	46	50	50	49	44	46	48	49	48	45	43	44	44	44	49	55	58	57	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	45	44	45	42	39	41	42	44	44	42	41	41	41	41	43	46	51	53	--	--
May																																
Maximum	55	49	43	45	45	48	51	51	54	54	54	56	58	59	55	53	53	52	52	52	50	50	50	49	50	49	50	49	47	52	53	51
Minimum	49	43	41	41	44	43	45	48	48	50	48	49	52	55	52	52	52	50	50	50	49	49	48	47	48	48	48	47	45	47	50	48
June																																
Maximum	53	54	54	53	53	52	52	50	50	50	50	51	53	54	54	53	51	50	50	50	50	53	56	59	59	59	58	58	58	59	--	54
Minimum	51	51	52	51	52	51	49	49	50	50	49	49	50	51	53	51	48	48	49	49	48	48	53	56	58	58	56	55	57	57	--	52
July																																
Maximum	60	60	60	61	61	61	63	64	64	60	63	64	64	62	60	64	65	65	65	66	67	68	68	68	68	69	70	69	70	70	70	65
Minimum	59	59	59	59	58	57	59	60	60	56	58	61	61	59	57	59	60	62	62	62	63	63	63	63	63	63	63	64	64	65	65	61
August																																
Maximum	69	68	69	70	70	70	67	67	68	68	68	66	64	64	65	66	68	67	65	58	61	63	65	66	64	63	58	58	53	56	60	65
Minimum	64	63	62	63	65	63	63	61	62	62	62	61	58	58	58	59	60	61	58	54	53	55	57	59	59	58	54	53	51	50	54	59
September																																
Maximum	60	55	55	56	58	59	59	59	58	56	57	58	59	59	60	60	59	58	56	54	53	55	55	56	55	53	52	54	54	53	--	56
Minimum	55	52	49	50	52	53	53	53	53	51	52	52	53	54	55	55	54	54	51	51	49	50	51	51	52	50	48	49	50	51	--	52

HENRYS FORK BASIN--Continued

13-565. HENRYS FORK NEAR REXBURG, IDAHO

LOCATION.--Temperature recorder at gaging station, 200 feet downstream from highway bridge, downstream from all tributaries, and 6 miles west of Rexburg, Madison County.
DRAINAGE AREA.--2,920 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1953 to April 1964 (discontinued).
EXTREMES, 1963-64.--Water temperatures: Minimum, freezing point on many days during winter months.
EXTREMES, July 1953 to April 1964.--Water temperatures: Maximum (1953-63), 78°F Aug. 5, 1961; minimum, freezing point on many days during winter months.

Temperature (°F) of water, October 1963 to April 1964

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	59	59	58	57	57	57	57	57	56	54	55	55	55	53	53	52	52	51	51	52	51	50	50	48	46	46	46	43	43	43	43	52
Minimum	57	57	56	56	57	54	54	54	54	52	53	54	52	51	51	50	50	49	50	50	49	48	48	45	45	46	43	42	43	43	41	50
November																																
Maximum	41	40	40	40	40	40	41	41	40	41	41	41	42	42	42	42	39	38	38	38	38	36	34	35	35	35	36	36	36	33	--	39
Minimum	40	40	40	40	40	40	40	39	39	40	41	40	41	42	42	39	38	38	38	38	36	34	34	34	35	35	35	36	33	32	--	38
December																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	35	37	38	40	39	33
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	35	36	38	38	33
April																																
Maximum	40	40	40	40	41	40	42	45	47	47	46	43	41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	39	39	39	39	40	39	39	42	45	46	43	41	41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SNAKE RIVER MAIN STEM

13-1545. SNAKE RIVER AT KING HILL, IDAHO

LOCATION.--At county highway bridge, approximately 400 yards downstream from gaging station at King Hill, Elmore County, and 20 miles downstream from Big Wood River.
DRAINAGE AREA.--35,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1964.
Water temperatures: March 1951 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 352 ppm Nov. 1-28; minimum; 290 ppm Apr. 1-11.
Hardness: Maximum, 218 ppm Apr. 18 to May 11; minimum, 176 ppm Apr. 1-11.
Specific conductance: Maximum daily, 567 micromhos Jan. 24; minimum, 417 micromhos Apr. 2.
Water temperatures: Maximum, 70°F on several days during July; minimum, 44°F on several days during January.
EXTREMES, 1951-64.--Dissolved solids: Maximum, 375 ppm May 13, 14, 1963; minimum, 238 ppm Feb. 10-15, 1962.
Hardness: Maximum, 221 ppm Apr. 14, 15, 1963; minimum, 136 ppm Feb. 10-15, 1962.
Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 355 micromhos Feb. 11, 1962.
Water temperatures: Maximum, 73°F Aug. 2, 1955; minimum, 40°F Feb. 2, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. 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 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	8857	33		48	22	37	4.9	232	0	57	26	0.7	4.1	0.09	351	0.48	8394	212	22	1.1	544	8.2
Nov. 1-28.....	9302	--		--	--	37	--	235	0	--	--	--	--	--	352	.48	8841	213	20	1.1	548	8.2
Nov. 29-Dec. 28...	9308	--		--	--	35	--	230	0	--	--	--	--	--	340	.46	8545	211	22	1.0	538	8.2
Dec. 29-Jan. 27, 1964.....	8899	33		50	20	35	4.9	229	0	58	26	.7	4.2	.08	341	.46	8193	209	21	1.1	539	8.2
Jan. 28-Feb. 26...	8487	--		--	--	34	--	225	0	--	--	--	--	--	333	.45	7631	207	22	1.0	527	8.2
Feb. 27-Mar. 19...	8222	--		--	--	34	--	223	0	--	--	--	--	--	331	.45	7348	210	27	1.0	524	8.1
Mar. 20-31.....	8792	--		--	--	32	--	212	0	--	--	--	--	--	317	.43	7525	202	28	1.0	501	8.0
Apr. 1-11.....	8837	29		42	17	29	4.3	193	0	46	21	.7	3.5	--	290	.39	6919	176	18	1.0	453	8.2
Apr. 12-17.....	7965	--		--	--	30	--	200	2	--	--	--	--	--	308	.42	6624	188	21	1.0	487	8.4
Apr. 18-May 11....	18810	--		--	--	29	--	220	0	--	--	--	--	--	330	.45	16760	218	38	.9	531	7.6
May 12-June 10....	11540	--		--	--	29	--	212	0	--	--	--	--	--	324	.44	10095	203	29	.9	510	8.0
June 11-30.....	20390	--		--	--	25	--	201	0	--	--	--	--	--	300	.41	16516	196	31	.8	473	8.0
July 1-18.....	7534	26		41	19	30	4.3	194	0	51	22	.7	2.9	.06	298	.41	6062	181	22	1.0	471	8.0
July 19-Aug. 9....	7644	--		--	--	33	--	214	0	--	--	--	--	--	320	.44	6604	198	22	1.0	511	8.1
Aug. 10-31.....	7865	--		--	--	32	--	222	0	--	--	--	--	--	330	.45	7008	201	19	1.0	520	8.1
Sept. 1-30.....	9509	--		--	--	34	--	229	0	--	--	--	--	--	333	.46	7856	209	21	1.0	539	8.2
Weighted average	--	--		--	--	32	--	219	--	--	--	--	--	--	328	0.45	8980	205	25	0.9	518	8.0
Time-weighted average.....	10130	--		--	--	33	--	220	--	--	--	--	--	--	330	--	--	205	24	1.0	520	8.0
Tons per day....	--	--		--	--	876	--	6000	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SNAKE RIVER MAIN STEM--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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	65	65	64	63	63	63	62	62	62	61	60	59	60	59	59	60	60	60	59	59	59	60	58	57	56	57	55	55	53	54	54	59
November	54	55	54	54	53	55	54	53	53	54	55	55	56	54	54	54	52	52	51	52	50	48	48	49	50	51	50	51	50	49	--	52
December	49	49	49	49	48	47	48	47	47	46	46	46	45	46	48	48	48	49	49	49	49	47	47	47	47	46	47	--	47	47	48	48
January	48	48	47	47	47	47	46	45	44	45	44	44	44	45	44	44	45	47	47	48	48	48	48	47	48	48	47	47	48	47	47	46
February	48	47	46	48	47	46	46	47	47	46	45	48	47	46	47	48	48	49	50	50	50	50	50	48	47	48	47	47	48	--	--	48
March	48	48	49	49	48	50	50	48	49	50	49	49	49	48	49	49	50	51	52	52	51	50	50	52	51	52	52	52	53	54	55	50
April	53	52	52	54	52	53	55	56	57	57	55	54	55	56	57	56	56	55	54	54	52	51	49	49	50	49	51	52	54	54	--	53
May	54	53	51	51	50	52	52	53	55	55	55	58	58	60	61	62	60	61	63	63	64	63	61	61	60	60	60	60	61	63	64	58
June	63	64	65	65	65	64	63	62	61	59	61	62	63	64	63	63	61	60	60	61	61	62	63	65	65	67	66	65	66	67	--	63
July	68	68	68	68	68	69	70	70	69	70	70	69	69	70	69	69	69	69	70	70	70	70	68	67	67	68	68	69	69	68	68	69
August	68	68	67	67	67	68	68	68	68	69	69	67	67	66	67	66	67	66	64	64	64	63	64	66	65	64	64	63	62	61	59	66
September	59	60	62	60	61	62	62	63	62	60	61	63	62	62	62	61	61	59	59	55	59	58	58	58	59	60	59	59	60	60	--	60

BOISE RIVER BASIN

13-1860. SOUTH FORK BOISE RIVER NEAR FEATHERVILLE, IDAHO

LOCATION.--Temperature recorder at gaging station on right bank, 2.5 miles upstream from Deer Creek, and 8 miles southwest of Featherville, Elmore County.
DRAINAGE AREA.--635 square miles.
RECORDS AVAILABLE.--Water temperatures: Decemher 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 76°F Aug. 8; minimum, 33°F on many days during winter months.
EXTREMES, 1962-64.--Water temperatures: Maximum, 78°F Aug. 11, 1963; minimum, 33°F on many days during winter months.

Temperature (°F) of water, water year October 1963 to September 1964

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

13-2125. BOISE RIVER AT NOTUS, IDAHO

LOCATION.--At highway bridge, 1,100 feet downstream from gaging station, 0.2 mile southeast of Notus, Canyon County, and 7 miles northwest of Caldwell.
DRAINAGE AREA.--3,820 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1939 to January 1940, November 1950 to September 1964.
Water temperatures: November 1950 to September 1964.
Sediment records: January 1939 to June 1940.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 436 ppm July 2, 3; minimum, 92 ppm June 15-23.
Hardness: Maximum, 183 ppm Oct. 17 to Nov. 8, Nov. 23 to Dec. 3; minimum, 45 ppm June 15-23.
Specific conductance: Maximum daily, 694 micromhos July 3; minimum daily, 135 micromhos June 20-22.
Water temperatures: Maximum, 81°F July 11; minimum, 35°F Jan. 14.
EXTREMES, 1939-40, 1950-64.--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, 85°F on several days during summer months in 1951, 1952, 1954; minimum, freezing point Jan. 31, 1956, Jan. 11-14, 1963.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. 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 1963 to September 1964

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): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-16, 1963...	672	33		44	10	59	4.4	234	0	63	15	0.6	5.2	0.13	353	0.48	640	153	0	2.1	538	7.9
Oct. 17-Nov. 8....	876	--		--	--	73	--	276	0	--	--	--	--	--	420	.57	993	183	0	2.3	636	7.7
Nov. 9-22.....	973	--		--	--	63	--	241	0	--	--	--	--	--	368	.50	967	164	0	2.1	556	7.9
Nov. 23-Dec. 3....	787	--		--	--	70	--	270	0	--	--	--	--	--	413	.56	878	183	0	2.3	622	7.6
Dec. 4-25.....	710	--		--	--	70	--	268	0	--	--	--	--	--	410	.56	786	182	0	2.3	625	7.9
Dec. 26-Jan. 17, 1964.....	697	34		48	14	67	4.8	262	0	77	18	.6	8.0	.07	397	.54	747	177	0	2.2	617	7.6
Jan. 18-20.....	720	--		--	--	69	--	253	0	--	--	--	--	--	410	.56	797	168	0	2.3	605	7.8
Jan. 21, 22.....	1091	--		--	--	54	--	195	0	--	--	--	--	--	337	.46	993	141	0	2.0	496	7.2
Jan. 23-Feb. 2....	782	--		--	--	63	--	239	0	--	--	--	--	--	382	.52	806	162	0	2.2	577	7.7
Feb. 3-7.....	773	--		--	--	59	--	227	0	--	--	--	--	--	366	.50	764	158	0	2.0	544	7.5
Feb. 8-12.....	949	--		--	--	48	--	186	0	--	--	--	--	--	296	.40	758	136	0	1.8	452	7.4
Feb. 13-26.....	1779	--		--	--	30	--	138	0	--	--	--	--	--	209	.28	1004	94	0	1.3	320	7.2
Feb. 27-Mar. 2....	2756	--		--	--	22	--	103	0	--	--	--	--	--	154	.21	1146	73	0	1.1	235	7.4
Mar. 3, 4.....	2495	--		--	--	25	--	117	2	--	--	--	--	--	182	.25	1226	85	0	1.2	280	8.4
Mar. 5, 6.....	1530	--		--	--	40	--	174	0	--	--	--	--	--	247	.34	1020	109	0	1.7	392	7.4
Mar. 7-20.....	773	--		--	--	60	--	235	0	--	--	--	--	--	356	.48	743	152	0	2.1	548	7.8
Mar. 21-Apr. 11...	700	--		--	--	57	--	215	0	--	--	--	--	--	332	.45	627	148	0	2.0	521	7.8
Apr. 12-15.....	799	--		--	--	44	--	176	0	--	--	--	--	--	260	.35	561	113	0	1.8	409	7.8
Apr. 16-20.....	1606	--		--	--	20	--	98	0	--	--	--	--	--	146	.20	633	68	0	1.1	225	7.6
Apr. 21-30.....	885	19		24	5.4	25	3.1	119	0	27	7.0	.5	3.7	.00	180	.24	430	82	0	1.2	277	7.6

BOISE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1963 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 1-7, 1964.....	1396	--		--	--	22	--	109	0	--	--	--	--	--	165	0.22	622	75	0	1.1	254	7.4
May 8-11.....	1037	--		--	--	25	--	115	0	--	--	--	--	--	174	.24	487	80	0	1.2	269	7.4
May 12-22.....	312	--		--	--	37	--	154	0	--	--	--	--	--	235	.32	198	104	0	1.6	369	7.5
May 23-June 7.....	2420	--		--	--	20	--	97	0	--	--	--	--	--	153	.21	1000	68	0	1.1	228	7.4
June 8-14.....	3667	--		--	--	13	--	74	0	--	--	--	--	--	112	.15	1109	51	0	.8	163	7.4
June 15-23.....	4064	--		--	--	12	--	66	0	--	--	--	--	--	92	.13	1010	45	0	.8	143	7.7
June 24.....	2220	--		--	--	16	--	81	0	--	--	--	--	--	126	.17	755	54	0	.9	184	7.3
June 25.....	1230	--		--	--	22	--	101	0	--	--	--	--	--	152	.21	505	67	0	1.2	231	7.3
June 26-28.....	555	--		--	--	34	--	141	0	--	--	--	--	--	216	.29	324	93	0	1.5	332	7.8
June 29-30.....	363	--		--	--	38	--	158	0	--	--	--	--	--	243	.33	238	104	0	1.6	376	7.7
July 1.....	221	--		--	--	58	--	195	0	--	--	--	--	--	330	.45	197	125	0	2.3	485	7.6
July 2, 3.....	83	--		--	--	88	--	254	0	--	--	--	--	--	436	.59	97.7	163	0	3.0	667	8.1
July 4-7.....	212	--		--	--	58	--	204	0	--	--	--	--	--	315	.43	180	131	0	2.2	502	7.9
July 8-11.....	124	--		--	--	70	--	234	0	--	--	--	--	--	380	.52	127	149	0	2.5	583	8.0
July 12-20.....	367	24		36	7.3	47	3.9	189	0	47	12	.5	3.5	.00	288	.39	285	120	0	1.9	439	7.7
July 21-29.....	290	--		--	--	59	--	217	0	--	--	--	--	--	329	.45	258	139	0	2.2	507	7.8
July 30-Aug. 9....	466	--		--	--	53	--	208	0	--	--	--	--	--	308	.42	388	135	0	2.0	487	7.7
Aug. 10-26.....	366	--		--	--	60	--	227	0	--	--	--	--	--	338	.46	334	144	0	2.2	530	7.8
Aug. 27-Sept. 11..	806	--		--	--	49	--	202	0	--	--	--	--	--	297	.40	646	132	0	1.9	465	7.9
Sept. 12-30.....	577	--		--	--	54	--	219	0	--	--	--	--	--	324	.44	505	142	0	2.0	499	7.9
Weighted average	--	--		--	--	40	--	166	--	--	--	--	--	--	253	0.34	684	112	0	1.5	386	7.5
Time-weighted average.....	1001	--		--	--	51	--	202	--	--	--	--	--	--	307	--	--	135	0	1.8	471	7.6
Tons per day....	--	--		--	--	109	--	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--

BOISE RIVER BASIN-Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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

WEISER RIVER BASIN

13-2513. WEST BRANCH WEISER RIVER NEAR TAMARACK, IDAHO

LOCATION.--Temperature recorder at gaging station on left bank, at Price Valley guard station, 0.1 mile upstream from East Branch Weiser River, and 5.2 miles northwest of Tamarack, Adams County.
DRAINAGE AREA.--3.96 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Minimum, freezing point Dec. 24, 25, Jan. 12-14.
EXTREMES, 1959-64.--Water temperatures: Maximum (1959-63), 62°F July 20, 1960, Aug. 12, 1963; minimum, freezing point on several days during winter months.

Temperature (°F) of water, water year October 1963 to September 1964

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

SNAKE RIVER MAIN STEM

13-2902. SNAKE RIVER BELOW PINE CREEK, AT OXBOW, OREG.

LOCATION.--Temperature recorder at gaging station on right bank at Oxbow, Baker County, 0.1 mile upstream from Hansaker Creek, 0.1 mile north of Oxbow school, 0.3 mile downstream from Pine Creek, and 3.2 miles north of Homestead.
DRAINAGE AREA.--73,150 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: May 1956 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 71°F on several days during August; minimum, 36°F on many days during January and February.
EXTREMES, 1956-64.--Water temperatures: Maximum (1956-62, 1963-64), 81°F July 25, 1956; minimum, freezing point Jan. 18-22, 25-31, 1957.

Temperature (°F) of water, water year October 1963 to September 1964

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

13-3343. SNAKE RIVER NEAR ANATONE, WASH.

LOCATION.--Temperature recorder at gaging station on left bank, 1.5 miles downstream from Grande Ronde River, 7.8 miles east of Anatone, Asotin County, 22 miles south of Clarkston, at mile 28.4 from Lewiston, and 167.9 miles upstream from mouth.
DRAINAGE AREA.--92,960 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 73°F Aug. 8, 9, 17; minimum, 35°F Feb. 6-10.
EXTREMES, 1959-64.--Water temperatures: Maximum, 77°F Aug. 11, 1960; minimum, freezing point Jan. 25, 26, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

CLEARWATER RIVER BASIN

13-3410. NORTH FORK CLEARWATER RIVER AT AHSAHKA, IDAHO

LOCATION.--Temperature recorder on right bank at cableway at Ahsahka, Clearwater County, 0.4 mile upstream from mouth, and 1.6 miles downstream from gaging station.
DRAINAGE AREA.--2,440 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: August 1959 to August 1960.
Water temperatures: October 1957 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 75°F Aug. 5, 6, 8; minimum, 34°F on many days during winter months.
EXTREMES, 1957-64.--Water temperatures: Maximum, 84°F Aug. 11-13, 1963; minimum, freezing point on many days during winter months.
REMARKS.--Clock stopped July 12-19, recorded range 64°F to 69°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

CLEARWATER RIVER BASIN--Continued

13-3425. CLEARWATER RIVER AT SPALDING, IDAHO

LOCATION.--Temperature recorder at gaging station, 0.2 mile downstream from Lapwai Creek, 0.4 mile northwest of Spalding Post Office, Nez Perce County, and 3,100 feet downstream from bridge on U.S. Highway 12 (formerly bridge at U.S. Highway 95).
DRAINAGE AREA.--9,570 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1959 to August 1960.
Water temperatures: September 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 75°F Aug. 8, 13; minimum, 33°F Dec. 19, 20, Jan. 8.
EXTREMES, 1959-64.--Water temperatures: Maximum, 82°F Aug. 13, 1963; minimum, freezing point on many days during winter months.
REMARKS.--No temperature record Oct. 1-11 when temperature bulb was near water surface.

Temperature (°F) of water, water year October 1963 to September 1964

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

TUCANNON RIVER BASIN

13-3445. TUCANNON RIVER NEAR STARBUCK, WASH.

LOCATION.--At county road bridge, 180 feet upstream from gaging station, 3 miles east of Starbuck, Columbia County, and 3.5 miles downstream from Pataha Creek.
DRAINAGE AREA.--431 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 12; minimum, freezing point Dec. 11, 12.
Sediment concentrations: Maximum daily, 24,400 ppm Jan. 25; minimum daily, 8 ppm Nov. 30.
Sediment loads: Maximum daily, 77,600 tons Jan. 25; minimum daily, 2 tons on several days during October and November.
EXTREMES, 1962-64.--Water temperatures: Maximum, 72°F July 12, 1964; minimum, freezing point Dec. 11, 12, 1963.
Sediment concentrations: Maximum daily, 30,700 ppm Feb. 3, 1963; minimum daily, 8 ppm Nov. 30, 1963.
Sediment loads: Maximum daily, 276,000 tons Feb. 3, 1963; minimum daily, 2 tons on many days in 1963 and 1964.
REMARKS.--Maximum sediment concentration observed during water year, 131,000 ppm Jan. 25.

Temperature (°F) of water, water year October 1963 to September 1964

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

TUCANNON RIVER BASIN--Continued

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

Suspended sediment, water year October 1963 to September 1964

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	59	40	6	72	16	3	91	12	3
2	61	24	4	70	16	3	88	12	3
3	57	24	4	70	10	2	86	14	3
4	59	22	4	72	15	3	86	14	3
5	63	24	4	77	14	3	88	16	4
6	66	23 B	4	86	26	6	130	364	128
7	66	21	4	91	29	7	104	40	11
8	65	16	3	96	43 S	15	101	34	9
9	65	33	6	109	59	17	101	25	7
10	66	31	6	98	35	9	96	14	4
11	65	22	4	88	29	7	79	14	3
12	65	12	2	86	26	6	88	21	5
13	66	12	2	84	27	6	96	20	5
14	66	22	4	84	25	6	93	18	5
15	65	12	2	98	55	15	93	19	5
16	65	18	3	91	29	7	96	26	7
17	63	12	2	84	20	5	109	42	12
18	63	19	3	86	23	5	117	46	15
19	65	16	3	86	19	4	106	41	12
20	65	17	3	93	17	4	123	219 S	84
21	65	16	3	96	14	4	133	155	56
22	68	27	5	93	14	4	126	70	24
23	77	34	7	91	14	3	133	132	47
24	72	19	4	96	16	4	136	122	45
25	82	55	12	93	14	4	142	2520 S	1030
26	79	30	6	91	10	2	142	1020	391
27	75	17	3	96	18	5	130	807	283
28	72	16	3	98	14	4	126	338	115
29	70	21	4	93	12	3	120	110	36
30	70	16	3	91	8	2	117	84	27
31	72	13	3	--	--	--	117	80	25
Total	2077	--	126	2659	--	168	3393	--	2407

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	130	339	119	287	4400 J	11000	130	53	19
2	146	442 S	178	204	718	395	126	47	16
3	120	210	68	194	270	141	123	38	13
4	117	95	30	182	195	96	120	49	16
5	112	53	16	182	195	96	136	64	24
6	115	72	22	175	158	75	126	42	14
7	115	70	22	171	152	70	120	40	13
8	104	55	15	163	118	52	117	29	9
9	106	54	15	163	113	50	117	30	9
10	104	39	11	160	115	50	117	28	9
11	98	43	11	167	104	47	120	61 S	21
12	93	35	9	163	94	41	139	213	80
13	91	33	8	167	92	41	133	60	22
14	88	36	9	160	82	35	133	48	17
15	86	31	7	156	84	35	136	138	51
16	86	38	9	152	75	31	133	139	50
17	91	68	17	133	76	27	130	70	25
18	91	164	40	123	77	26	163	240 A	110
19	88	54	13	123	77	26	175	250 A	120
20	152	6430 S	5470	115	91	28	182	194	95
21	112	565	171	112	70	21	190	147	75
22	104	178	50	115	57	18	186	108	54
23	98	100	26	112	54	16	179	102	49
24	104	1480 S	478	115	58	18	171	84	39
25	460	24400 S	77600	117	50	16	160	72	31
26	326	1 300 S	11800	115	50	16	156	59	25
27	235	900	571	117	51	16	152	58	24
28	222	550	330	120	53	17	146	48	19
29	226	750 S	488	120	50	16	142	45	17
30	240	1240 S	862	--	--	--	152	59	24
31	208	375	211	--	--	--	186	215 S	108
Total	4468	--	98676	4383	--	12516	4496	--	1198

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

TUCANNON RIVER BASIN--Continued

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

Suspended sediment, water year October 1963 to September 1964--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	314	1610	1360	284	168	129	284	2500 J	4300
2	430	1090	1270	284	80	61	367	11000	10900
3	392	400	423	257	47	33	314	1030	873
4	344	320	297	235	49	31	308	430	358
5	302	530	432	217	48	28	314	370	314
6	284	179	137	199	38	20	350	435	411
7	257	130	90	186	34	17	386	425	443
8	235	104	66	175	36	17	397	540	579
9	230	110	68	179	47	23	386	370	386
10	246	138	92	204	54	30	350	235	222
11	274	170	126	226	97	59	320	195	168
12	308	142	118	235	147	93	305	155	128
13	290	110	86	262	203	144	285	132	102
14	268	87	63	284	244	187	275	120	89
15	257	101	70	262	188	133	285	122	94
16	279	135	102	257	157	109	300	320	259
17	290	109	85	296	529	423	285	110	85
18	268	70	51	350	585	553	257	97	67
19	240	69	45	374	618	624	239	95	61
20	222	80	48	430	1090	1270	222	89	53
21	212	58	33	449	800	970	210	78	44
22	222	68	41	404	450	491	198	71	38
23	235	70	44	338	258	235	190	67	34
24	222	48	29	262	170	120	190	61	31
25	212	49	28	235	160	102	190	56	29
26	204	57	31	217	178	104	186	93	47
27	208	62	35	212	160	92	183	40	20
28	204	52	29	208	162	91	180	28	14
29	208	65	37	226	230	140	183	30	15
30	240	109	71	235	200	127	149	28	11
31	--	--	--	235	235	149	--	--	--
Total	7897	--	5407	8217	--	6605	8088	--	20175

Day	JULY			AUGUST			SEPTEMBER		
1	136	40	15	84	468	106	62	C 17	3
2	133	42	15	82	238	53	64	C 17	3
3	130	39	14	75	74	15	68	C 17	3
4	127	44	15	70	47	9	68	C 17	3
5	121	44	14	66	48	9	62	C 17	3
6	116	47	15	66	97	17	64	C 17	3
7	113	44	13	64	62	11	64	C 17	3
8	108	56	16	61	48	8	62	C 17	3
9	97	52	14	61	C 22	4	62	C 17	3
10	90	43	10	61	C 22	4	64	C 17	3
11	86	40	9	57	C 22	3	62	C 17	3
12	79	40	9	57	C 22	3	62	C 17	3
13	79	67	14	57	C 22	3	64	C 17	3
14	82	44	10	57	C 22	3	62	C 17	3
15	93	68	17	56	C 22	3	61	C 17	3
16	90	36	9	56	C 22	3	61	C 17	3
17	82	34	8	56	C 22	3	62	C 17	3
18	82	36	8	56	C 22	3	68	C 17	3
19	82	24	5	61	C 22	4	68	C 17	3
20	77	32	7	57	C 22	3	68	C 17	3
21	70	36	7	56	C 22	3	70	C 17	3
22	71	36	7	54	C 22	3	68	C 17	3
23	70	34	6	54	C 22	3	66	C 17	3
24	68	32	6	54	C 29	4	64	C 17	3
25	66	31	6	52	C 29	4	62	C 17	3
26	66	38	7	52	C 29	4	64	C 17	3
27	66	40	7	56	C 29	4	64	C 17	3
28	64	113	20	61	C 29	5	64	C 17	3
29	62	39	7	61	C 29	5	61	C 17	3
30	75	64	13	62	C 29	5	64	C 17	3
31	95	351	90	62	C 29	5	--	--	--
Total	2776	--	413	1884	--	312	1925	--	90

Total discharge for year (cfs-days)..... 52,263
Total load for year (tons)..... 148,093

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

TUCANNON RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1963 to September 1964

(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
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 6, 1963.....	1530	42		133	268	96	35	46	63	79	91	97	99	100				VPWC
Jan. 20, 1964.....	0730	42		104	44400	12900	17	26	38	65	93	99	100	--				VPWC
Jan. 20.....	1700	47		488	3820	5030	38	55	74	90	100	--	--	--				PWC
Jan. 25.....	2145	44		2060	131000	783000	18	24	36	57	82	97	99	100				VPWC
Jan. 25.....	2255	39		1400	105000	426000	14	22	35	54	78	97	100	--				VPWC
Jan. 26.....	1830	36		240	1820	1180	31	33	48	59	83	96	100	--				VPWC
Feb. 1.....	0830	44		222	16900	10100	28	41	57	80	95	100	--	--				VPWC
Apr. 1.....	1300	48		296	1610	1290	8	11	17	30	54	86	96	100				VPWC
May 19.....	1755	64		386	720	750	9	12	18	28	49	87	97	100				VPWC
June 2.....	1645	60		344	2210	2050	22	32	36	61	79	94	99	100				VPWC

PALOUSE RIVER BASIN

13-3510. PALOUSE RIVER AT HOOPER, WASH.
(Formerly published as Palouse River near Hooper, Wash.)

LOCATION.--At bridge on State Highway 26 (revised) at Hooper, Whitman County, 150 feet upstream from gaging station, and 0.4 mile upstream from Cow Creek.
DRAINAGE AREA (revised).--2,500 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: October 1961 to September 1964.
Sediment records: October 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 86°F July 12; minimum, 33°F Dec. 12.
Sediment concentrations: Maximum daily, 9,430 ppm Jan. 26; minimum daily, 16 ppm Dec. 14.
Sediment loads: Maximum daily, 41,300 tons Mar. 19; minimum daily, 2 tons on many days during July to September.
EXTREMES, 1961-64.--Water temperatures: Maximum (1962-64), 86°F July 12, 1964; minimum, freezing point on several days during December 1961, January 1962, January and February 1963.
Sediment concentrations: Maximum daily, 45,100 ppm Feb. 5, 1963; minimum daily, 6 ppm on several days during November 1961.
Sediment loads: Maximum daily, 2,110,000 tons Feb. 5, 1963; minimum daily, 1 ton on many days in 1962 and 1963.
REMARKS.--Maximum sediment concentration observed during water year, 12,000 ppm Jan. 26.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 16, 1963	34	26		--		35	14	29	5.8		216		12	12	0.4	3.8	0.38	244	146	0		389	7.9	10		
Nov. 19.....	109	26		--		24	8.6	18	4.5		142		8.8	6.8	.3	3.9	.88	A 172	95	0		267	7.3	10		
Dec. 19.....	123	29		--		25	11	19	4.2		152		9.6	7.8	.3	5.7	.89	186	107	0		286	7.5	10		
Jan. 19, 1964	187	28		--		26	8.8	18	4.8		136		9.6	5.5	.3	12	.87	181	101	0		271	7.6	15		
Feb. 18.....	400	29		--		24	7.6	16	4.1		117		11	4.2	.3	17	.61	178	91	0		251	7.4	15		
Mar. 20.....	2190	26		--		15	5.2	9.5	4.0		57		10	2.0	.2	24	.68	156	59	12		168	6.9	--		
Apr. 14.....	1140	24		--		9.0	3.3	6.3	2.1		50		4.6	1.5	.2	3.6	.28	95	36	0		101	7.3	35		
May 19.....	910	18		--		6.5	2.5	4.8	1.4		40		3.4	1.0	.1	.9	.22	70	26	0		76	7.4	10		
June 19.....	248	16		0.58		16	6.6	11	3.0		97		5.4	3.0	.2	2.0	.19	115	67	0		177	7.4	5		
July 21.....	60	19		--		24	10	19	4.3		155		8.2	5.5	.3	1.8	.34	169	103	0		277	7.6	10		
Aug. 12.....	25	15		.12		28	11	21	5.1		176		9.2	7.0	.3	1.7	.26	A 186	117	0		316	7.9	5		
Sept. 28.....	50	17		--		29	11	21	5.0		175		8.8	7.5	.2	2.6	.41	189	118	0		309	7.9	5		

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Feb. 18, 1964....	0.00	0.00	0.03	0.05	0.00	0.02
Aug. 12.....	.00	.00	.04	.05	.00	.01

PALOUSE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1963 to September 1964

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	65	65	64	64	63	62	--	63	65	60	60	60	60	59	62	64	--	59	--	54	--	54	--	--	--	41	44	46	47	48	48	--
November	49	--	--	49	--	48	--	48	48	48	47	47	48	47	47	47	47	45	46	42	42	41	42	41	47	47	45	38	39	38	--	45
December	39	39	39	39	38	37	38	41	36	36	34	33	35	34	36	35	35	34	35	36	37	36	46	38	36	35	36	36	35	38	37	37
January	36	36	37	37	37	36	34	36	35	36	36	36	36	35	35	35	36	35	38	34	36	37	36	37	38	38	37	38	38	37	37	36
February	36	37	37	35	36	37	37	38	37	37	38	37	37	37	37	37	37	42	39	38	38	38	39	37	36	36	38	38	38	--	--	37
March	39	39	40	38	39	39	39	38	38	40	42	40	41	41	40	43	43	42	43	41	43	42	38	37	41	44	44	45	45	50	54	42
April	48	47	49	48	49	49	52	51	52	50	50	50	52	52	50	48	48	51	52	52	49	50	50	47	45	52	53	53	52	54	--	50
May	52	--	--	54	52	53	56	53	53	--	58	56	57	60	--	62	58	62	69	64	62	55	59	57	60	60	67	68	64	65	73	60
June	70	70	70	68	70	70	69	58	68	64	67	71	--	70	70	70	70	70	70	--	70	--	76	77	75	72	--	75	--	79	--	70
July	78	78	78	--	74	76	82	81	76	79	--	86	81	--	75	--	80	--	78	--	70	75	--	80	--	79	--	--	74	--	70	--
August	--	70	--	--	63	--	78	--	--	74	--	75	--	74	--	--	75	--	68	--	70	--	76	--	68	--	66	--	64	65	--	--
September	--	64	66	--	70	67	65	65	--	64	64	--	65	--	65	--	60	65	--	60	--	64	--	--	64	--	63	--	60	--	--	--

PALOUSE RIVER BASIN--Continued

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

Suspended sediment, water year October 1963 to September 1964

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	29	50	4	60	C 33	5	111	27	8
2..	28	52	4	57	C 33	5	103	27	8
3..	26	54	4	55	C 33	5	93	24	6
4..	27	52	4	52	C 33	5	91	41	10
5..	29	54	4	54	C 33	5	96	22	6
6..	32	57	5	62	C 33	6	108	20	6
7..	33	-- E	5	67	C 33	6	106	19	5
8..	32	53	5	74	C 33	7	122	20	7
9..	31	48	4	75	C 33	7	151	31	13
10..	34	54	5	88	C 33	8	114	40	12
11..	34	40	4	120	38	12	88	26	6
12..	30	41	3	164	51	23	112	21	6
13..	34	35	3	142	60	23	111	18	5
14..	34	38	3	117	53	17	102	16	4
15..	34	38	3	100	64	17	112	18	5
16..	34	48	4	91	78	19	115	18	6
17..	34	-- E	5	91	65	16	115	22	7
18..	33	54	5	94	61	15	122	23	8
19..	35	58 B	5	109	58	17	123	45	15
20..	36	62	6	114	46	14	134	54	20
21..	37	82 B	8	138	46	17	135	42	15
22..	39	104	11	142	45	17	144	42	16
23..	44	104 B	12	128	48	17	156	54	23
24..	46	92 B	11	132	53	19	171	49	23
25..	51	76 B	10	119	49	16	190	89 S	55
26..	48	58	8	109	53	16	234	375	237
27..	52	50	7	103	55	15	168	298	135
28..	50	46	6	97	42	11	173	403	188
29..	52	45	6	100	33	9	175	307	145
30..	50	40	5	104	24	7	173	360	168
31..	54	38	6	--	--	--	155	202	85
Total	1162	--	175	2958	--	376	4103	--	1253

	JANUARY			FEBRUARY			MARCH		
1..	177	498	238	685	920	1700	387	150	157
2..	168	307	139	675	944	1720	450	152	185
3..	175	402	190	635	956	1640	540	230	335
4..	222	260	156	563	562	854	460	388	482
5..	211	148	84	563	442	672	536	478	692
6..	194	81	42	586	534	845	800	1110	2400
7..	192	103	53	509	640	880	680	1840	3380
8..	160	100	43	439	510	605	645	850	1480
9..	164	105	46	411	258	286	581	362	568
10..	171	98	45	436	228	268	522	265	373
11..	181	86	42	615	345	573	558	227	342
12..	162	63	28	690	790 A	1500	948	591 S	1880
13..	135	55	20	522	1200	1690	1150	3540	11000
14..	146	58	23	464	535	670	920	1410	3500
15..	151	48	20	414	280	313	908	620	1520
16..	156	50	21	442	185	221	1630	2060 S	9610
17..	194	58	30	425	180	206	1750	3260	15400
18..	222	330	198	400	165	178	2620	4960 S	37100
19..	187	760	383	504	220	299	2900	5280	41300
20..	255	1660 S	1280	568	1090	1670	2190	1570	9280
21..	224	1040	629	563	459	698	1890	805	4110
22..	209	560	316	456	255	314	1790	530	2560
23..	192	445	231	446	215	259	1740	518	2430
24..	215	301	175	453	175	214	1290	398	1390
25..	657	1610 S	6060	484	150	196	1100	308	915
26..	830	9430 S	22400	425	162	186	980	310	820
27..	645	3770	6570	374	198	200	914	252	622
28..	884	2350	5610	364	195	192	980	224	593
29..	789	1800	3830	364	158	155	1050	298	845
30..	980	2650	7010	--	--	--	1510	691 S	3020
31..	712	1350	2600	--	--	--	2230	1880	11300
Total	9960	--	58512	14475	--	19204	36649	--	169589

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph
C Composite period.

PALOUSE RIVER BASIN--Continued

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

Suspended sediment, water year October 1963 to September 1964--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..	2720	2230	16400	1280	127	439	383	24	25
2..	3290	2420	21500	1230	100 B	330	370	23	23
3..	2920	1660	13100	1160	89 B	280	370	26	26
4..	1960	592	3130	1040	80	225	374	17	17
5..	1790	262	1270	986	72	192	351	32	30
6..	1560	187	788	914	66	163	335	32	29
7..	1400	208	786	824	67	149	326	48	42
8..	1370	216	799	718	73	142	354	21	20
9..	1390	209	784	675	80	146	380	27	28
10..	1460	222	875	762	67	138	476	23	30
11..	1620	256	1120	926	63	158	400	89 A	96
12..	1670	261	1180	1200	104	337	332	76	68
13..	1470	177	703	1150	87	270	306	60 B	50
14..	1140	133	409	1100	77	229	274	43	32
15..	1050	178	505	1120	59 B	180	260	32	22
16..	1130	170	519	968	46	120	240	46	30
17..	1610	333	1450	842	52	118	236	27	17
18..	1320	176	627	866	58	136	238	28	18
19..	1030	112	311	910	61	150	248	33	22
20..	872	92	216	932	66	166	248	-- E	20
21..	812	92	202	938	54	137	243	20	13
22..	860	112	260	908	43	105	220	-- E	18
23..	1300	209 S	858	794	39	84	196	35	19
24..	1920	468	2430	655	44	78	175	26	12
25..	1520	272	1120	540	44	64	170	30	14
26..	1250	160	540	456	35	43	162 C	29	13
27..	1250	117	395	408	35	39	142 C	29	11
28..	1470	154	611	367	34	34	135 C	29	11
29..	1250	111	375	354	34	32	137 C	29	11
30..	1200	98	318	364	29	29	130 C	29	10
31..	--	--	--	383	32	33	--	--	--
Total	45604	--	73581	25770	--	4746	8211	--	777

Day	JULY			AUGUST			SEPTEMBER		
1..	112	C 28	8	36	C 40	4	30	45 B	4
2..	125	C 28	9	43	C 40	5	57	52	8
3..	98	C 28	7	50	C 40	5	63	50	9
4..	94	C 28	7	54	C 40	6	51	-- E	12
5..	88	C 28	7	61	C 40	7	52	150 A	21
6..	84	C 28	6	52	C 40	6	45	104	13
7..	88	C 28	7	44	C 31	4	50	76	10
8..	74	C 28	6	34	C 31	3	52	59	8
9..	68	C 28	5	28	C 31	2	35	51 B	5
10..	68	C 28	5	29	C 31	2	42	52	6
11..	65	C 28	5	28	C 31	2	36	39	4
12..	61	C 18	3	25	C 31	2	31	39 B	3
13..	54	C 18	3	26	C 31	2	30	46	4
14..	46	C 18	2	23	50	3	33 C	23	2
15..	54	C 18	3	20	C 33	2	31 C	23	2
16..	56	C 18	3	20	C 33	2	32 C	23	2
17..	54	41	6	21	C 33	2	33 C	23	2
18..	46	C 28	3	19	C 33	2	34 C	23	2
19..	62	C 28	5	18	C 33	2	40 C	23	2
20..	80	C 28	6	18	C 33	2	45 C	23	3
21..	60	C 28	5	19	C 33	2	47 C	23	3
22..	56	C 28	4	19	C 33	2	52 C	23	3
23..	50	C 28	4	18	C 33	2	61 C	23	4
24..	44	C 28	3	18	C 33	2	54	39	6
25..	39	C 28	3	17	C 33	2	50	34	5
26..	36	C 28	3	18	C 33	2	59 C	18	3
27..	34	C 28	3	22	C 33	2	54 C	18	3
28..	28	C 28	2	25	C 33	2	50 C	18	2
29..	29	C 28	2	28	C 33	2	46 C	18	2
30..	34	C 28	3	29	C 33	3	45 C	18	2
31..	34	C 28	3	29	C 33	3	--	--	--
Total	1921	--	141	891	--	89	1340	--	155

Total discharge for year (cfs-days)..... 153,044
Total load for year (tons)..... 328,598

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.
C Composite period.

PALOUSE RIVER BASIN--Continued

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

Particle-size analyses of suspended sediment, water year October 1963 to September 1964

(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
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 19, 1964.....	1500	34		175	1080	510	69	95	100	--	--	--	--					PWC
Jan. 26.....	0200	34		1350	9160	33400	29	43	64	89	100	--	--					PWC
Jan. 27.....	0505	36		630	3990	6790	50	73	93	100	--	--	--					PWC
Jan. 28.....	1620	38		824	1920	4270	44	60	85	98	100	--	--					PWC
Feb. 20.....	1350	39		572	1440	2220	54	67	89	94	100	--	--					PWC
Feb. 20.....	1350	39		572	1440	2220	45	68	90	100	--	--	--					PN
Mar. 13.....	1150	38		1090	3340	9830	50	67	88	100	--	--	--					PWC
Mar. 19.....	0935	38		2950	5820	46600	32	42	57	78	95	99	100					VPWC
Apr. 1.....	1230	48		2650	2360	16900	30	38	58	76	98	99	100					VPWC
Apr. 2.....	2000	43		3410	2570	23700	24	28	41	60	83	94	100					VPWC

SNAKE RIVER MAIN STEM

13-3530. SNAKE RIVER BELOW ICE HARBOR DAM, WASH.
(Formerly published as 13-3532. Snake River near Pasco, Wash.)

LOCATION.--At bridge on U.S. Highway 395, 7 miles downstream from gage, 0.3 mile upstream from mouth, and 2 miles southeast of Pasco, Franklin County.
DRAINAGE AREA.--108,500 square miles, approximately upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: July 1960 to September 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 20, 1963	28200	20		0.12		28	10	28	3.3		140		36	13	0.4	1.5	0.13	211	112	0		340	7.7	5	--	--
Dec. 10.....	29200	23		.09		32	13	32	3.6		162		45	16	.6	3.7	.13	248	135	2		393	7.9	5	--	36
Jan. 24, 1964	31000	24		--		35	16	37	4.0		180		53	18	.6	2.7	.10	284	152	4		444	7.7	5	--	--
Feb. 24.....	27500	25		--		34	14	31	3.6		166		46	16	.5	3.2	.14	256	142	6		401	7.6	5	--	--
Mar. 23.....	37900	22		--		29	11	24	3.4		138		35	13	.5	3.9	.17	217	118	6		340	7.8	5	--	150
Apr. 20.....	58100	21		.43		12	4.6	9.3	1.8		60		11	4.2	.3	1.7	.12	104	49	0		142	7.8	20	--	--
May 12.....	99000	20		.28		17	6.7	13	2.0		84		19	7.0	.4	1.3	.12	133	70	1		199	7.7	10	--	--
June 22.....	184900	12		--		12	3.8	8.5	1.7		56		13	3.8	.4	.5	.08	A 84	46	0		128	7.3	5	10.0	430
July 30.....	28000	11		.12		16	5.4	10	1.6		76		15	5.8	.4	.3	.06	A 103	62	0		169	7.7	5	--	--
Aug. 20.....	22000	11		.07		21	6.6	15	2.5		97		23	7.5	.4	.4	.06	A 136	80	0		231	7.6	5	--	--
Sept. 23.....	26000	10		--		24	9.0	23	3.1		119		33	11	.5	.5	.08	174	97	0		293	7.9	5	8.7	--

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Feb. 24, 1964....	0.00	0.00	0.00	0.05	0.00	0.12
Aug. 20.....	.00	.00	.03	.05	.00	.02

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
																			Calcium, magnesium	Noncarbonate						
13-3353. SNAKE RIVER ABOVE CLEARWATER RIVER AT CLARKSTON, WASH.																										
Nov. 5, 1863.		23		0.07		34	15	37	4.2		178		54	17	0.7	2.7	0.14	276	145	0		435	7.9	5	7.6	91
Dec. 10.....		26		.08		38	15	37	4.0		189		55	18	.6	2.6	.22	290	158	2		459	7.8	5	--	23
Jan. 14, 1964		25		.07		40	17	41	4.3		202		61	20	.7	3.7	.13	312	170	4		493	8.0	0	13.3	39
Feb. 27.....		27		.08		39	16	34	4.1		187		53	18	.6	4.0	.15	288	162	9		446	7.9	5	13.7	23
May 3.....		24		--		18	7.3	14	2.4		92		21	7.2	.4	1.7	.13	A 144	75	0		214	7.8	10	--	--

A Residue at 180°C.

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)				
May 3, 1964.....	1800	0.00	0.00	0.02	0.05	0.00	0.03

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

DEADMAN CREEK BASIN

Periodic determinations of suspended-sediment discharge and particle size July 1962 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
13-3437.5. DEADMAN CREEK NEAR CENTRAL FERRY, WASH.																	
Nov. 16, 1962	1105	40		3	1	T	--	--	--	--	--	--	--	--			
Dec. 3	1545	40		6	1330	22	--	--	--	--	--	--	--	--			
Dec. 18	1035	46		6	1040	17	69	89	96	100	--	--	--	--			PWC
Dec. 20	1240	44		5	260	4	--	--	--	--	--	--	--	--			
Feb. 3, 1963	1210	33		3430	44800	430000	14	20	32	50	75	97	99	100			VPWC
Feb. 3	1500	33		5200	73000	4060000	--	--	--	--	--	--	--	--			
Feb. 3	1755	35		2640	86600	640000	--	--	--	--	--	--	--	--			
Feb. 4	1410	45		94	4210	1070	33	46	65	82	94	100	--	--			PWC
Feb. 4	1410	45		94	4210	1070	24	42	62	80	94	100	--	--			PN
Feb. 6	1705	--		8	646	14	--	--	--	--	--	--	--	--			
Feb. 21	1525	--		6	178	3	--	--	--	--	--	--	--	--			
Mar. 20	1620	59		5	24	T	--	--	--	--	--	--	--	--			
Mar. 30	0110	47		6	125	2	--	--	--	--	--	--	--	--			
Mar. 30	0935	46		7	74	1	--	--	--	--	--	--	--	--			
July 26	1120	72		.2	8	T	--	--	--	--	--	--	--	--			
Oct. 17, 1963	1035	58		F 1.0	32	T	--	--	--	--	--	--	--	--			
Nov. 8	1215	49		5.0	20	T	--	--	--	--	--	--	--	--			
Nov. 8	1900	48		4.0	18	T	--	--	--	--	--	--	--	--			
Dec. 6	1205	40		15	862	35	--	--	--	--	--	--	--	--			
Dec. 6	1400	40		15	845	34	62	83	96	98	99	100	--	--			PWC
Dec. 6	1730	39		13	450	16	--	--	--	--	--	--	--	--			
Dec. 7	0845	34		5.0	78	1.1	--	--	--	--	--	--	--	--			
Dec. 19	1150	39		6.0	19	T	--	--	--	--	--	--	--	--			
Dec. 20	1425	39		6.0	16	T	--	--	--	--	--	--	--	--			
Dec. 23	1115	--		8.0	809	17	--	--	--	--	--	--	--	--			
Dec. 23	1415	--		8.0	1120	24	--	--	--	--	--	--	--	--			
Dec. 24	1545	--		7.0	876	17	90	100	--	--	--	--	--	--			PWC
Jan. 25, 1964	1455	41		256	9430	6520	--	--	--	--	--	--	--	--			
Jan. 25	1545	40		310	12100	10100	15	20	31	45	70	94	99	100			VPWC
Jan. 25	2020	37		420	101000	123000	17	28	41	62	86	99	100	--			VPWC
Jan. 26	0320	--		64	13600	2350	--	--	--	--	--	--	--	--			
Jan. 26	1715	41		14	2440	92	--	--	--	--	--	--	--	--			
Jan. 27	0935	--		9.0	493	12	--	--	--	--	--	--	--	--			
Feb. 13	1045	37		5.0	48	1	--	--	--	--	--	--	--	--			
Mar. 30	1540	68		4.0	38	T	--	--	--	--	--	--	--	--			
July 22	1440	82		.8	8	T	--	--	--	--	--	--	--	--			
Sept. 23	1415	73		E 1.0	4	T	--	--	--	--	--	--	--	--			

E Estimated. T Less than 0.05 ton. F Discharge at time of sampling.

DEADMAN CREEK BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle-size, July 1962 to September 1964--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 temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
13-3438. MEADOW CREEK NEAR CENTRAL FERRY, WASH.																	
July 24, 1962	1320	91		0.1	6	T	--	--	--	--	--	--	--	--			
Nov. 16	1220	42		1.5	10	T	--	--	--	--	--	--	--	--			
Dec. 3	1535	42		4.7	1540	20	--	--	--	--	--	--	--	--			
Dec. 18	1055	48		2.7	12	T	--	--	--	--	--	--	--	--			
Feb. 3, 1963	1235	33		2230	86300	539000	--	--	--	--	--	--	--	--			
Feb. 3	1405	33		1590	104000	480000	--	--	--	--	--	--	--	--			
Feb. 3	1510	33		1190	96600	334000	9	13	18	32	53	89	97	99	99	100	VPWC
Feb. 3	1830	38		191	58300	32200	16	16	28	50	78	97	99	100			VPWC
Feb. 4	1525	47		16	1540	67	58	76	87	96	98	--	--	--			PWC
Feb. 6	1715	48		5.2	708	10	--	--	--	--	--	--	--	--			
Feb. 21	1525	52		.9	26	T	--	--	--	--	--	--	--	--			
Mar. 20	1630	57		.8	4	T	--	--	--	--	--	--	--	--			
Mar. 30	0100	48		1.8	6	T	--	--	--	--	--	--	--	--			
Mar. 30	0949	46		3.0	10	T	--	--	--	--	--	--	--	--			
July 26	1200	81		.4	5	T	--	--	--	--	--	--	--	--			
Oct. 17, 1963	1055	59		.9	10	T	--	--	--	--	--	--	--	--			
Nov. 8	1235	50		1.3	9	T	--	--	--	--	--	--	--	--			
Nov. 8	1720	49		1.2	13	T	--	--	--	--	--	--	--	--			
Dec. 6	1225	40		1.4	70	T	--	--	--	--	--	--	--	--			
Dec. 7	0910	34		1.5	112	T	--	--	--	--	--	--	--	--			
Dec. 19	1120	39		1.2	9	T	--	--	--	--	--	--	--	--			
Dec. 20	1440	39		1.3	738	3	--	--	--	--	--	--	--	--			
Dec. 24	1525	38		1.2	5	T	--	--	--	--	--	--	--	--			
Jan. 25, 1964	1520	42		54	206	30	30	44	60	80	90	99	100	--			VPWC
Jan. 25	1605	41		50	4650	628	--	--	--	--	--	--	--	--			
Jan. 25	1900	40		380	183000	209000	14	25	39	56	82	98	100	--			VPWC
Jan. 26	0245	37		27	22700	1650	--	--	--	--	--	--	--	--			
Jan. 26	1645	42		7.6	3920	80	--	--	--	--	--	--	--	--			
Jan. 27	0950	--		6.7	948	17	--	--	--	--	--	--	--	--			
Feb. 13	1110	40		2.0	226	1	--	--	--	--	--	--	--	--			
Mar. 30	1520	63		1.4	96	4	--	--	--	--	--	--	--	--			
July 22	1500	82		.7	3	T	--	--	--	--	--	--	--	--			
Sept. 23	1350	69		1.2	4	T	--	--	--	--	--	--	--	--			

T Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3454. PALOUSE RIVER AT PALOUSE, WASH.					
Sept. 20, 1961	1930	55	--	24	--
Feb. 14, 1962	2215	39	640	200	346
Feb. 15	0900	36	590	160	255
Feb. 15	1530	37	540	121	176
Mar. 9	1035	35	87	466	109
Aug. 17	0925	69	F 6.6	22	T
Oct. 10, 1962	1255	50	58	21	3
Apr. 15, 1963	1800	46	582	102	160
Apr. 16	1035	43	438	43	51
May 16	0940	57	F 124	15	5
June 19	0930	71	24	22	1
Sept. 23	1235	60	104	18	5
Dec. 6	1930	33	175	194	92
Jan. 7, 1964	1630	32	165	52	23
Jan. 27	1940	32	E 600	235	380
Feb. 18	1640	36	98	30	8
Feb. 19	1645	36	130	122	43
Feb. 20	1000	32	112	74	22
Mar. 20	1350	36	670	196	355
Mar. 20	1800	36	680	195	358
Mar. 21	0755	36	725	184	360
Mar. 30	2230	42	1430	1080	4170
Mar. 31	0840	39	F 1860	1240	6230
Mar. 31	1610	40	1820	692	3400
Apr. 1	0515	39	1910	738	3810
Apr. 1	1805	38	2250	1080	6560
Apr. 2	0855	36	2600	652	4580
Apr. 2	1700	37	2280	398	2450
Apr. 4	0830	41	1330	184	661
May 18	2110	52	950	50	128
May 19	1810	53	895	46	111
Aug. 12	0840	69	5.2	23	T
13-3457. CLEAR CREEK NEAR GLENWOOD, WASH.					
Mar. 9, 1962	1115	36	E 5	3420	46
13-3460. PALOUSE RIVER NEAR COLFAX, WASH.					
July 31, 1962	1310	82	D 10	10	T
Aug. 28	1035	56	6	8	T
Sept. 24	1125	61	D 8	4	T
Oct. 10	1550	50	17	6	T
Nov. 10	0840	40	34	10	1
Mar. 20, 1963	1345	48	175	19	9
May 15	1540	65	131	11	4
June 18	1600	83	37	782	78
June 19	0625	68	68	234	43
July 19	1500	80	18	6	T
Aug. 29	1220	73	4.5	12	T
Oct. 17	0825	50	30	65	5
Nov. 19	1355	41	55	68	10
13-3461. PALOUSE RIVER AT COLFAX, WASH.					
July 20, 1961	1250	85	9.6	10	T
Sept. 21	1120	51	5.8	19	T
Nov. 25	0020	32	40	346	37
Nov. 25	0915	33	33	192	17
Nov. 25	1450	33	36	141	14
Dec. 21	1930	32	188	163	83
Dec. 22	0210	--	255	72	50
Dec. 22	0905	33	278	70	53
Dec. 22	1440	34	299	224	181
Feb. 14, 1962	2305	39	580	601	941
Feb. 15	0750	36	592	240	384
Feb. 15	1335	39	580	216	338
Mar. 9	0040	34	207	1930	1080
Mar. 9	0910	33	168	1480	671
Mar. 9	1355	39	158	1470	627
Mar. 9	1820	37	180	1340	651
Mar. 26	2125	40	3520	3140	29800
Mar. 27	0100	--	3700	4110	41100

E Estimated.
T Less than 0.05 ton.
D Daily mean discharge.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
13-3461. PALOUSE RIVER AT COLFAX, WASH.--Continued					
Mar. 27, 1962	0715	39	3980	3480	37400
Mar. 27	1420	41	3790	2130	21800
Mar. 27	1900	38	3970	1910	20500
Mar. 27	2230	--	4060	1640	18000
Mar. 28	0830	39	3910	838	8850
Mar. 28	1715	40	3310	614	5490
Mar. 29	0825	39	1910	513	2650
May 1	0700	50	288	19	15
May 25	1245	61	261	17	12
June 26	1340	74	20	58	3
July 31	1345	86	D 10	130	31
Aug. 28	1100	58	6	594	10
Sept. 24	1145	67	D 8	29	1
Oct. 10	1605	50	19	200	10
Nov. 9	2330	43	46	32	4
Nov. 10	0905	40	37	18	2
Dec. 3	1710	--	151	143	58
Dec. 18	1210	41	490	401	531
Dec. 18	1625	41	575	556	863
Dec. 18	2355	41	560	280	423
Dec. 19	0815	39	466	218	274
Dec. 19	1535	41	394	138	147
Jan. 17, 1963	1730	32	95	35	9
Jan. 18	1035	32	80	16	4
Feb. 3	2145	36	7500	4700	95200
Feb. 4	2200	--	3920	54800	601000
Feb. 5	0250	36	4110	35600	410000
Feb. 5	0810	35	2450	12100	80000
Feb. 5	1910	36	1520	5740	23600
Feb. 6	0905	36	1240	1740	5830
Mar. 20	1410	48	170	34	16
Mar. 28	1435	46	403	52	57
Mar. 30	0310	42	575	104	161
Mar. 30	1230	42	1530	1670	6900
Mar. 30	1740	40	1980	3580	19100
Mar. 31	1815	41	2310	1450	9040
Apr. 1	0900	39	1660	652	2920
Apr. 15	1715	47	459	41	51
Apr. 16	0945	43	403	44	48
May 15	1610	63	142	22	8
June 18	1740	83	37	472	47
June 19	0715	66	48	242	31
July 19	1520	74	18	86	4
Sept. 23	1125	60	24	4670	303
Sept. 23	1715	60	17	4090	188
Sept. 24	1110	58	10	3740	101
Nov. 8	1645	44	30	66	5
Nov. 19	1430	40	55	88	13
Dec. 6	1630	35	27	38	3
Dec. 6	2125	34	35	138	13
Dec. 7	0715	33	41	60	7
Dec. 19	1355	32	34	31	3
Dec. 23	1825	32	61	69	11
Jan. 7, 1964	1320	33	76	132	27
Jan. 7	1720	32	55	107	16
Jan. 8	0930	32	14	68	3
Jan. 26	1535	33	257	1240	860
Jan. 27	0840	32	661	1910	3410
Jan. 27	1440	32	647	1360	2380
Jan. 27	1900	33	580	1480	2320
Jan. 28	0630	--	520	323	453
Jan. 30	1735	34	315	272	231

D Daily mean discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3461. PALOUSE RIVER AT COLFAX, WASH.--Continued					
Feb. 18, 1964	1750	40	126	51	17
Feb. 19	0810	34	160	132	57
Feb. 19	1420	--	160	112	48
Feb. 19	2340	36	209	178	100
Feb. 20	0845	33	193	176	92
Mar. 11	2200	38	544	4970	7300
Mar. 12	0730	34	478	1960	2530
Mar. 12	1425	38	410	753	834
Mar. 13	0835	33	350	685	647
Mar. 19	1635	40	968	545	1420
Mar. 20	1125	38	850	332	762
Mar. 20	1900	39	801	300	649
Mar. 21	0705	36	843	286	651
Mar. 30	1755	48	1250	1180	3980
Mar. 30	2310	42	1240	870	2910
Mar. 31	0615	41	1710	1530	7060
Mar. 31	1520	44	1920	2010	10400
Apr. 1	0605	40	1820	755	3710
Apr. 1	1615	42	2220	1680	10100
Apr. 2	0725	36	2660	1400	10100
Apr. 2	1805	38	2790	915	6890
Apr. 3	2305	--	1380	244	909
Apr. 14	1410	47	922	58	149
May 18	2030	60	920	52	129
May 19	0735	58	857	44	102
June 19	1340	62	205	29	16
July 22	1215	67	27	14	1
Aug. 12	0930	73	15	12	T
Sept. 24	0730	57	30	25	2
13-3480. SOUTH FORK PALOUSE RIVER AT PULLMAN, WASH.					
July 20, 1961	1720	88	1.4	16	T
Sept. 21	0805	49	D 2.6	8	T
Oct. 18	1730	52	3.2	6	T
Dec. 21	2055	32	64	234	40
Dec. 22	0255	--	49	119	16
Dec. 22	1000	32	47	100	13
Dec. 22	1540	33	52	100	14
May 1, 1962	0940	55	18	44	2
May 25	1505	61	39	124	13
Aug. 28	1330	60	1.9	0	0
Oct. 10	1415	50	6.5	50	1
Nov. 9	2220	45	5.1	25	1
Mar. 30, 1963	0435	41	96	1080	280
Mar. 30	0735	41	91	1910	469
Mar. 30	0800	41	89	1950	469
Mar. 30	1515	42	124	2280	763
Mar. 31	1925	45	65	1300	228
June 19	1045	72	3.8	30	T
Dec. 6	2030	37	16	120	5
Feb. 18, 1964	1440	40	38	60	6
Feb. 18	2015	37	57	221	34
Feb. 19	0840	34	72	151	29
Feb. 19	1610	36	82	220	49
Feb. 19	2235	34	93	236	59
Feb. 20	0920	--	52	125	18
Mar. 11	2305	36	162	518	227
Mar. 12	0620	33	135	368	134
Mar. 12	1100	36	135	589	215
Mar. 12	1525	--	140	384	145
Mar. 12	1930	37	157	398	169
Mar. 13	0735	33	85	234	54
Apr. 1	1700	42	365	1530	1510
Apr. 2	0805	37	216	614	358
Apr. 2	1620	43	167	400	180

T Less than 0.05 ton.
D Daily mean discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
13-3485. MISSOURI FLAT CREEK AT PULLMAN, WASH.					
July 20, 1961	1750	--	0.2	18	T
Sept. 21	0820	47	.1	31	T
Oct. 18	1715	57	.1	5	T
Dec. 21	2040	--	6.8	137	3
Dec. 22	0305	32	6.4	117	2
Dec. 22	1015	--	5.7	96	1
Dec. 22	1555	--	6.5	74	1
May 1, 1962	0940	54	2.3	168	1
May 25	1515	61	3.7	25	T
Aug. 28	1340	56	.3	0	0
Oct. 10	1400	50	.6	84	T
Nov. 9	2230	45	.4	30	T
Mar. 30, 1963	0510	40	19	554	28
Mar. 30	0840	41	15	583	24
Mar. 30	1525	42	33	3130	279
Mar. 31	1935	43	8.2	2490	55
June 19	1025	67	.3	206	T
Dec. 6	2005	38	.8	122	T
Feb. 18, 1964	1520	40	7.7	228	5
Feb. 18	2020	36	11	266	8
Feb. 19	0845	32	8.2	108	2
Feb. 19	1615	37	16	328	14
Feb. 19	2225	33	14	399	15
Feb. 20	0925	32	13	178	6
Mar. 11	2325	34	44	1060	126
Mar. 12	0600	32	18	402	20
Mar. 12	1110	37	27	356	26
Mar. 12	1535	38	66	2040	364
Mar. 12	1935	36	53	2120	303
Mar. 13	0730	33	15	492	20
Apr. 1	1730	43	45	2030	247
Apr. 2	0820	38	20	282	15
Apr. 2	1630	43	30	276	22
13-3492. SOUTH FORK PALOUSE RIVER AT COLFAX, WASH.					
Sept. 21, 1961	1005	52	2.9	12	T
Oct. 18	1640	49	6.4	8	T
Nov. 24	2305	32	19	207	11
Nov. 25	0850	32	16	208	9
Nov. 25	1430	--	14	172	7
Dec. 21	1935	32	155	304	127
Dec. 22	0230	--	120	195	63
Dec. 22	0845	--	90	132	32
Dec. 22	1500	--	64	207	36
Feb. 14, 1962	1050	42	61	324	53
Feb. 15	0805	40	55	239	35
Feb. 15	1345	41	50	188	25
Mar. 9	0050	35	112	644	195
Mar. 9	0930	34	94	882	224
Mar. 9	1350	38	68	684	126
Mar. 9	1835	37	74	741	148
Mar. 26	2140	44	1420	2140	8200
Mar. 27	0015	--	880	2260	5370
Mar. 27	0640	--	1180	3790	12100
Mar. 27	1525	--	1670	3000	13500
Mar. 27	1955	42	760	2400	4920
Mar. 28	0845	40	255	1100	757
Mar. 28	1530	43	360	708	688
Mar. 29	0840	42	213	589	339
May 1	0740	52	15	141	6
May 25	1320	59	35	38	4
June 26	1415	74	1.8	30	T
July 31	1440	80	F 2.2	11	T
Aug. 28	1145	57	3.2	16	T
Sept. 24	1200	59	5.2	40	1

T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3492. SOUTH FORK PALOUSE RIVER AT COLFAX, WASH.--Continued					
Oct. 10, 1962	1450	49	10	15	T
Nov. 9	2315	43	6.2	20	T
Dec. 3	1455	--	38	430	44
Dec. 18	1150	43	77	170	35
Dec. 18	1550	43	84	240	54
Dec. 18	2340	43	71	230	44
Dec. 19	0755	41	59	200	32
Dec. 19	1625	43	49	204	27
Jan. 18, 1963	1020	32	F 16	12	1
Feb. 3	2000	34	7410	10800	216C00
Feb. 4	2225	39	3550	80200	797C00
Feb. 5	0230	37	3920	62900	690C00
Feb. 5	0910	36	1130	32300	102C00
Feb. 5	1730	36	392	12800	13500
Feb. 6	0920	39	215	4930	2860
Mar. 20	1450	49	22	32	2
Mar. 28	1445	49	34	38	3
Mar. 30	0340	44	80	123	27
Mar. 30	1055	45	210	415	235
Mar. 30	1700	43	218	648	381
Mar. 31	1855	43	183	3420	1690
Apr. 1	0840	40	134	1360	492
Apr. 15	1925	48	60	118	19
Apr. 16	0855	44	F 56	135	20
May 15	1630	64	18	12	1
June 18	1525	75	12	8240	267
June 19	0730	66	11	6440	191
July 19	1530	79	3.7	30	T
Aug. 29	1345	69	F 2.7	80	1
Sept. 23	1200	58	5.6	3850	58
Sept. 23	1750	60	5.1	3280	45
Sept. 24	1140	58	5.1	2100	29
Oct. 17	0800	50	5.8	75	1
Nov. 8	1705	44	11	46	1
Nov. 19	1330	41	16	58	3
Dec. 6	1655	35	45	44	5
Dec. 6	2105	34	78	221	47
Dec. 7	0735	33	49	118	16
Dec. 19	1440	32	23	56	3
Dec. 23	1700	35	22	100	6
Dec. 24	1115	32	19	56	3
Jan. 7, 1964	1345	33	45	234	28
Jan. 7	1740	32	41	201	22
Jan. 8	0900	32	61	190	31
Jan. 26	1545	34	130	798	280
Jan. 27	0850	--	125	308	104
Jan. 27	1500	35	134	300	109
Jan. 27	2010	34	158	381	163
Jan. 28	1615	--	167	512	231
Jan. 28	0815	32	158	474	202
Jan. 30	1750	35	151	270	110
Feb. 18	1800	38	56	66	10
Feb. 19	0755	34	158	232	99
Feb. 19	1435	38	139	272	102
Feb. 19	2310	37	183	333	165
Feb. 20	0855	34	137	338	125
Mar. 11	2220	36	310	2190	1830
Mar. 12	0920	36	295	1660	1320
Mar. 12	1440	38	268	726	525
Mar. 13	0845	35	219	900	532
Mar. 19	1650	40	345	828	771
Mar. 20	1130	40	370	656	655
Mar. 20	1845	40	335	514	465
Mar. 21	0725	38	385	524	545
Mar. 30	1715	52	294	1670	1330
Mar. 30	2310	47	318	984	845

T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3492. SOUTH FORK PALOUSE RIVER AT COLFAX, WASH.--Continued					
Mar. 31, 1964	0605	46	485	1830	2400
Mar. 31	1640	50	352	1680	1600
Apr. 1	0550	45	369	765	762
Apr. 1	1025	--	448	1200	1450
Apr. 2	0745	42	335	1120	1010
Apr. 2	1555	44	237	604	386
Apr. 4	0745	48	176	220	105
May 19	1030	62	40	19	2
June 19	1315	64	25	67	5
July 22	1140	74	2	32	T
Aug. 12	1020	69	4	18	T
Sept. 24	0715	53	11	15	T
13-3493.1. PALOUSE RIVER AT WINONA, WASH.					
Sept. 21, 1961	1205	61	E 15	17	1
Oct. 18	1515	57	E 44	21	2
Nov. 24	2205	34	182	14	7
Nov. 25	1030	34	125	110	37
Nov. 25	1620	33	113	271	83
Jan. 24, 1962	0820	31	--	32	--
Mar. 9	1510	39	390	1230	1300
Mar. 26	2300	42	4200	5080	57600
Mar. 27	0900	41	4730	5600	71500
Mar. 27	1315	52	4800	5560	72100
Mar. 27	1830	41	4400	4520	53700
Mar. 27	2315	--	4900	3600	47600
Mar. 28	0750	39	4550	2400	29500
Mar. 28	1855	40	3950	1500	16000
Mar. 29	0740	39	3250	1160	10200
May 1	1210	57	280	56	42
May 25	1130	58	198	39	21
June 26	1215	71	41	132	15
July 31	1110	78	11	12	T
Aug. 16	1435	74	F 11	22	1
Aug. 28	1545	67	9	39	1
Sept. 24	1015	63	19	33	2
Oct. 10	1730	50	32	34	3
Nov. 15	1600	40	F 73	28	6
Dec. 3	1955	--	228	916	564
Dec. 18	1340	43	360	168	163
Dec. 18	1810	42	418	240	271
Dec. 19	0045	41	600	340	551
Dec. 19	1000	42	665	419	752
Dec. 19	1125	42	665	430	772
Dec. 19	1705	43	600	407	659
Jan. 18, 1963	1205	32	E 100	20	5
Feb. 4	1950	36	4580	9590	119000
Feb. 5	1800	38	3580	32200	323000
Feb. 20	1255	40	1720	3020	14000
Feb. 20	1710	40	1830	3490	17200
Feb. 21	0150	--	1790	3060	14800
Feb. 21	1045	39	1480	2340	9350
Mar. 20	1240	47	165	23	10
Apr. 16	1135	47	488	35	46
May 15	1410	65	133	10	4
June 18	1125	72	102	28	2
Aug. 29	1630	70	4.1	36	T
Sept. 23	1045	61	16	96	4
Sept. 23	1815	60	15	51	2
Sept. 24	0735	57	24	61	4
Sept. 24	1520	67	37	61	6
Sept. 26	1255	69	17	37	2
Oct. 16	1320	61	18	--	--
Nov. 7	1140	43	34	--	--
Dec. 6	1230	35	60	--	--
Dec. 23	1245	34	100	--	--

E Estimated.
T Less than 0.05 ton.
D Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3493.1. PALOUSE RIVER AT WINONA, WASH.--Continued					
Jan. 7, 1964	1215	36	118	--	--
Jan. 8	1105	35	76	--	--
Jan. 18	1800	33	107	--	--
Jan. 19	0010	33	104	--	--
Jan. 19	1015	32	92	--	--
Jan. 19	1800	--	86	--	--
Jan. 25	1740	33	1040	--	--
Jan. 25	2340	--	415	--	--
Jan. 26	1240	34	292	--	--
Jan. 26	1630	--	390	--	--
Jan. 27	0710	34	430	--	--
Jan. 27	1715	34	720	--	--
Jan. 28	0930	34	639	--	--
Jan. 28	1035	34	639	2680	4620
Jan. 28	1525	--	440	1360	1620
Jan. 30	1210	35	555	1270	1900
Jan. 31	1410	35	485	356	466
Feb. 18	1120	38	166	86	39
Mar. 13	1005	36	1010	1920	5240
Apr. 14	1235	46	1200	180	583
May 19	1200	63	990	53	142
June 19	1110	62	140	40	15
July 21	1555	74	28	20	2
Aug. 12	1305	73	F 19	9	T
Sept. 24	0915	59	31	16	1
13-3493.2. REBEL FLAT CREEK AT WINONA, WASH.					
Aug. 16, 1962	1335	70	0.9	6	T
Nov. 15	1305	40	E 3	15	T
Feb. 20, 1963	1335	43	E 22	3190	189
Feb. 20	1730	--	E 20	2100	113
Feb. 21	1125	40	E 18	888	43
Jan. 18, 1964	1810	35	8.0	1500	32
Jan. 19	1145	32	F 5.6	2600	39
Jan. 25	1755	34	422	53500	63200
Jan. 25	2155	--	115	40800	13100
Jan. 25	2310	34	84	32600	7600
Jan. 26	1310	36	10	5640	152
Jan. 26	1715	38	21	6260	355
Jan. 27	0705	38	12	10700	347
July 21	1430	78	F 1.1	28	T
13-3493.5. PALOUSE RIVER NEAR ENDICOTT, WASH.					
Sept. 23, 1963	1605	63		71	
Sept. 23	1845	--		65	
Sept. 24	0140	57		62	
Sept. 24	0705	57		72	
Sept. 24	1030	61		241	
Sept. 24	1450	66		474	
Sept. 26	1500	72		92	

E Estimated.
T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
13-3494. PINE CREEK AT PINE CITY, WASH.					
July 20, 1961	0810	66	--	20	--
Jan. 24, 1962	1027	--	--	52	--
Nov. 30	2215	37	15	18	1
Dec. 1	0840	35	16	62	3
Feb. 6, 1963	1905	39	573	25900	40100
Feb. 6	2045	38	813	16400	36000
Feb. 6	2310	38	795	14000	30100
Feb. 7	0815	36	354	6800	6500
Mar. 28	1120	44	35	32	3
May 16	1400	65	16	4	T
Nov. 6	2135	42	4.1	294	3
Nov. 7	0850	42	4.1	329	4
Nov. 8	1220	45	5.9	601	10
Nov. 8	1835	41	5.6	536	8
Dec. 6	1415	39	5.2	44	1.0
Dec. 23	1430	38	7.0	38	1
Jan. 30, 1964	1330	35	86	394	91
Jan. 30	1615	35	76	560	115
Jan. 30	2115	33	103	1160	323
Jan. 31	0615	33	92	446	111
Jan. 31	1205	34	96	363	94
Feb. 19	1200	38	62	198	33
Feb. 19	1740	38	55	329	49
Feb. 20	0030	36	96	270	70
Feb. 20	1135	36	90	376	91
Mar. 18	2155	39	357	4380	4220
Mar. 19	0640	37	347	1900	1780
Mar. 19	1410	41	245	1060	701
Mar. 19	2015	41	211	790	450
Mar. 20	0935	42	247	780	520
Mar. 20	1500	41	209	612	345
Mar. 20	2340	40	198	414	221
Mar. 21	0930	36	217	526	308
Mar. 30	1910	53	137	1180	436
Mar. 31	1310	54	184	1200	596
Mar. 31	2240	54	379	1160	1190
Apr. 1	2150	44	258	1080	752
Apr. 2	0540	42	217	1220	715
Apr. 2	1420	47	165	996	444
13-3495. ROCK CREEK NEAR EWAN, WASH.					
Nov. 30, 1962	2315	37	3.5	17	T
Dec. 1	0735	36	4.9	20	T
Feb. 6, 1963	1945	38	2680	48	347
Feb. 7	0925	38	2210	24	43
Mar. 28	1235	47	67	72	13
May 16	1210	53	F 75	42	9
Nov. 6	2230	42	1.2	14	T
Nov. 7	1020	42	1.1	16	T
Nov. 8	1325	43	1.7	14	T
Dec. 6	1330	38	7.5	16	T
Dec. 23	1350	38	14	20	1
Jan. 30, 1964	1430	39	57	24	4
Jan. 30	1930	38	57	24	4
Jan. 31	1300	38	62	24	4
Feb. 19	1130	39	117	24	8
Feb. 19	1815	39	117	26	8
Feb. 20	1210	39	120	24	8
Mar. 18	2050	39	420	34	39
Mar. 19	0820	39	460	34	42
Mar. 19	1835	41	450	31	38
Mar. 20	0900	40	410	31	34
Mar. 21	1010	39	430	24	28
July 22	0810	67	F 12	28	1

T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3496.5. COTTONWOOD CREEK NEAR EWAN, WASH.					
July 20, 1961	0945	67	E 1	18	T
Jan. 24, 1962	1120	32	E 3	113	1
Feb. 6, 1963	2015	41	--	72900	--
Feb. 6	2225	39	--	44200	--
Feb. 7	0845	37	--	8300	--
13-3496.9. COTTONWOOD CREEK BELOW PLEASANT VALLEY CREEK, NEAR EWAN, WASH.					
Mar. 28, 1963	1305	47	11	38	1
May 16	1215	63	F 5.4	12	T
Nov. 6	2220	43	8.4	78	2
Nov. 7	0940	41	4.4	36	T
Nov. 8	1310	45	3.6	62	1
Nov. 8	1805	41	2.9	52	T
Dec. 6	1350	37	4.6	95	1
Dec. 23	1325	37	3.8	19	T
Jan. 30, 1964	1450	38	24	2590	168
Jan. 30	1855	37	30	1840	149
Jan. 31	0655	34	18	1030	50
Jan. 31	1240	34	17	628	29
Feb. 19	1020	36	27	3460	252
Feb. 19	1040	36	27	3380	246
Feb. 19	1830	39	25	1860	126
Feb. 20	0055	35	26	2880	202
Feb. 20	1155	37	18	1210	59
Mar. 18	2035	41	32	3400	294
Mar. 19	0805	37	29	1400	110
Mar. 19	1505	42	23	1060	66
Mar. 19	2040	43	18	850	41
Mar. 20	0915	39	23	733	46
Mar. 20	1535	44	20	578	31
Mar. 21	0005	41	18	545	26
Mar. 21	0955	40	22	486	29
July 22	0910	63	F 2.1	37	T
13-3497. COTTONWOOD CREEK AT EWAN, WASH.					
Aug. 16, 1962	1855	70	1.9	12	T
Nov. 30	2250	37	--	1120	--
Dec. 1	0815	34	--	410	--
13-3499. ROCK CREEK NEAR WINONA, WASH.					
Jan. 24, 1962	1240	34	--	18	--
Aug. 16	1635	78	4.2	46	1
Nov. 15	1650	39	E 20	14	1
Feb. 20, 1963	1310	41	E 270	1400	1020
Feb. 20	1640	--	E 270	2160	1570
Feb. 21	1100	40	E 270	544	397
Oct. 16	1525	62	F 3.3	27	T
Jan. 19, 1964	1050	33	57	104	16
Jan. 25	2120	36	120	690	224
Jan. 26	1210	36	128	341	118
Jan. 26	1655	36	110	463	138
Jan. 27	1645	37	108	1130	330
Jan. 28	1105	35	126	2960	1010
Jan. 28	1305	35	F 67	3140	568

E Estimated.
T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
13-3505. UNION FLAT CREEK NEAR COLFAX, WASH.					
Sept. 21, 1961	1220	56	2.2	22	T
Oct. 18	1600	51	2.8	4	T
Mar. 9, 1962	1200	36	70	887	168
Mar. 27	1620	42	422	7170	8170
May 1	0820	34	23	49	3
May 25	1345	63	45	75	9
June 26	1445	76	5.7	16	T
July 31	1540	81	.4	2	T
Aug. 28	1210	59	.1	0	0
Sept. 24	1230	64	1.2	1	T
Oct. 10	1625	49	3.4	14	T
Nov. 15	1805	39	6.4	13	T
Dec. 3	1635	37	28	408	31
Jan. 18, 1963	0845	32	7.0	22	T
Feb. 6	0945	39	208	3690	2070
Mar. 20	1530	51	19	20	1
Apr. 16	0920	43	30	48	4
May 15	1650	67	9.9	83	2
June 18	1345	82	3.9	3640	38
June 19	0800	67	3.9	3670	39
July 19	1550	81	.7	6	T
Aug. 29	1430	78	0	72	0
Sept. 24	1210	58	.7	4160	8
Oct. 16	1645	62	1.2	32	T
Nov. 19	1300	41	3.4	28	T
Dec. 19	1510	32	5.8	104	2
Dec. 23	1310	--	8.2	87	2
Jan. 7, 1964	1540	32	9.5	144	4
Jan. 8	0830	32	9.5	87	2
Feb. 19	1450	36	48	528	68
Mar. 12	1340	39	57	1080	166
Apr. 4	0910	44	97	359	94
May 19	1055	68	9.5	10	3
June 19	1240	62	7.0	14	T
July 22	1020	66	1.2	4	T
Aug. 12	1040	70	.6	--	--
Sept. 23	1550	67	1.0	4	T
13-3507. UNION FLAT CREEK NEAR LACROSSE, WASH.					
July 21, 1961	1110	--	--	79	--
Sept. 21	1555	65	E 2	104	1
Oct. 18	1335	53	--	89	--
Aug. 16, 1962	1040	72	E .4	14	T
Feb. 4, 1963	0025	--	6000	8860	144000
Feb. 4	1545	36	2850	12400	95400
Feb. 4	1645	36	2620	11500	81400
Feb. 5	0400	37	2160	63800	386000
Feb. 5	1305	39	1160	24000	75200
Feb. 5	2100	39	1180	26600	84700
Feb. 6	1250	41	F 314	10800	9160
Feb. 20	1415	42	260	8680	6090
Feb. 20	1805	--	215	8360	4630
Feb. 21	1150	42	86	4880	1130
May 15	1220	68	F 18	4	T
Oct. 16	1140	59	1.5	116	T
Jan. 18, 1964	1840	33	18	3280	159
Jan. 19	0130	32	55	2110	313
Jan. 19	0845	32	86	2270	527
Jan. 25	1840	34	450	32900	41500
Jan. 26	0030	--	130	33400	12200
Jan. 26	1050	36	48	14200	1840
Jan. 26	1845	35	47	5400	685
Jan. 27	0600	35	37	1820	182
Jan. 27	1645	36	35	1980	187
July 21	1250	75	F .4	26	T

E Estimated.
T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN SNAKE RIVER BASIN--Continued

PALOUSE RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, July 1961 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
13-3509. WILLOW CREEK AT GORDON, WASH.					
Sept. 21, 1961	1640	65	E 1	3	T
Oct. 18	1300	--	E .5	6	T
Aug. 16, 1962	0935	68	F .5	3	T
Feb. 4, 1963	0150	33	630	13500	23000
Feb. 4	1345	--	495	28500	38100
Feb. 5	0425	36	93	40800	10600
Feb. 5	1350	42	15	17200	697
Feb. 6	1410	43	5.1	3260	45
May 15	1105	69	F 1.6	11	T
Jan. 18, 1964	1905	34	8.0	11900	257
Jan. 19	1255	33	4.3	6510	76
Jan. 25	1920	37	74	22000	4100
Jan. 26	0055	--	20	20000	1080
Jan. 26	1025	37	F 5.4	18400	268
Jan. 26	1815	31	F 3.8	12500	128
July 21	1115	75	F .6	3	T
Sept. 24	1030	60	2.0	13	T
13-3525. COW CREEK AT HOOPER, WASH.					
July 21, 1961	1445	--	--	15	--
Sept. 21	1730	63	E 10	10	T
Mar. 9, 1962	1625	44	28	54	4
Mar. 29	1018	49	41	90	10
Apr. 30	1630	57	42	98	11
May 25	1045	57	47	98	12
July 31	0940	74	0	0	0
Aug. 28	0910	60	.1	0	0
Sept. 24	0915	57	4	3	T
Oct. 22	1410	60	7.3	14	T
Nov. 15	1140	40	9.2	8	T
Nov. 30	2010	39	12	6	T
Dec. 1	1025	38	12	6	T
Jan. 18, 1963	1320	32	D 24	18	1
Feb. 6	0735	33	357	532	513
Feb. 6	1355	37	319	461	397
Feb. 7	1215	36	117	374	118
Mar. 20	1135	48	55	62	9
Mar. 28	1620	48	54	102	15
Apr. 1	1015	43	54	88	13
Apr. 16	1330	49	58	88	14
May 15	1020	60	35	46	4
June 18	1020	70	26	86	6
July 19	1740	--	16	22	1
Aug. 28	1805	74	.5	10	T
Sept. 26	1600	72	4.4	8	T
Oct. 16	0950	55	5.0	10	T
Nov. 6	2000	46	9.1	7	T
Nov. 7	1220	46	9.5	10	T
Nov. 8	1050	43	9.8	8	T
Dec. 6	1140	38	11	14	T
Dec. 23	1150	40	13	14	T
Jan. 8, 1964	1155	35	14	27	1
Jan. 25	2010	41	20	22	1
Jan. 30	1125	41	21	15	1
Feb. 18	1040	43	23	33	2
Mar. 13	1100	41	19	22	1
Mar. 19	1000	42	20	42	2
Apr. 1	1130	49	24	78	5
May 19	1510	76	10	44	1
June 19	1015	62	8.4	17	1
July 21	1020	70	1.3	2	T
Aug. 12	1520	74	.5	6	T
Sept. 24	1100	61	.4	--	T

E Estimated.
D Daily mean discharge.
F Discharge at time of sampling.

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

WALLA WALLA RIVER BASIN

14-136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.

LOCATION.--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 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 74°F July 11; minimum, 34°F Dec. 12, Jan. 12.
Sediment concentrations: Maximum daily, 1,400 ppm Jan. 25; minimum daily, 2 ppm Nov. 1-5.
Sediment loads: Maximum daily, 1,810 tons Apr. 1; minimum daily, less than 0.50 ton on many days during October, November, August and September.
EXTREMES, 1962-64.--Water temperatures: Maximum, 74°F July 11, 1964; minimum, freezing point Dec. 26, 1962.
Sediment concentrations: Maximum daily, 1,400 ppm Jan. 25, 1964; minimum daily, 2 ppm Nov. 3, 4, 1962, Nov. 1-5, 1963.
Sediment loads: Maximum daily, 1,810 tons Apr. 1, 1964; minimum daily, less than 0.50 ton on many days in 1962-64.
REMARKS.--Maximum observed sediment concentration during water year, 4,960 ppm Jan. 25. Records of discharge 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.

Temperature (°F) of water, water year October 1963 to September 1964

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

WALLA WALLA RIVER BASIN--Continued

14-136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

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	30	C 6	T	30	C 2	T	62	6	1
2	30	C 6	T	29	C 2	T	54	6	1
3	29	C 6	T	29	C 2	T	48	7	1
4	28	C 6	T	33	C 2	T	46	4	1
5	29	C 6	T	31	C 2	T	51	10	1
6	28	C 6	T	42	17	2	77	49	10
7	28	C 6	T	45	15	2	69	15	3
8	28	C 6	T	150	134	54	72	20	4
9	28	C 6	T	122	43	14	72	17	3
10	28	C 6	T	88	10	2	66	6	1
11	27	C 6	T	67	5	1	61	38 B	6
12	27	C 6	T	57	4	1	56	14	2
13	28	C 6	T	49	5	1	52	6	1
14	26	C 6	T	58	36 A	6	50	6	1
15	26	C 6	T	79	23	5	52	7	1
16	26	C 6	T	64	5	1	70	50 S	11
17	26	C 6	T	63	6	1	134	162	59
18	27	C 6	T	65	11	2	154	56	23
19	26	C 6	T	63	13	2	132	26	9
20	28	C 6	T	83	67 A	15	121	42	14
21	29	C 6	T	72	17	3	109	20	6
22	31	C 6	1	66	7	1	100	12	3
23	33	C 6	1	63	10	2	93	13	3
24	33	C 6	1	68	15	3	89	8	2
25	35	C 6	1	70	11	2	87	8	2
26	32	C 6	1	72	23	4	85	5	1
27	31	C 6	1	107	141	41	86	10	2
28	30	C 6	T	94	21	5	94	14	4
29	30	C 6	T	82	8	2	97	12	3
30	30	C 6	T	71	10	2	89	8	2
31	30	C 6	T	--	--	--	85	9	2
Total	897	--	17	2012	--	175	2513	--	183

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	93	33 J	10	188	24	12	86	6	1
2	130	38	13	161	19	8	82	8	2
3	123	20	7	141	20	8	79	4	1
4	112	14	4	129	18	6	93	23 A	6
5	97	10	3	132	14	5	124	14	5
6	114	30	9	125	10	3	122	10	3
7	107	15	4	113	14	4	110	8	2
8	95	10	3	104	18	5	103	4	1
9	85	14	3	96	15	4	97	7	2
10	80	9	2	99	13	3	95	12	3
11	70	11	2	118	16	5	104	51 S	16
12	63	8	1	118	10	3	126	24	8
13	60	-- E	1	111	10	3	111	10	3
14	59	7	1	100	8	2	113	38 A	12
15	57	7	1	97	10	3	151	64 A	26
16	62	10	2	88	7	2	175	38	18
17	71	19	4	81	12	3	214	219 S	164
18	73	13	3	85	12	3	335	212	192
19	76	20	4	101	14	4	252	51	35
20	142	94	36	107	10	3	205	31	17
21	124	31	10	104	19	5	175	20	9
22	111	23	7	101	8	2	147	17	7
23	94	19	5	95	6	2	124	12	4
24	91	24	6	99	6	2	106	11	3
25	255	1400 S	1400	93	8	2	92	13	3
26	374	546 S	626	84	6	1	78	8	2
27	246	117	78	79	6	1	72	6	1
28	216	42	24	81	4	1	73	14	3
29	226	92	56	80	4	1	110	230 J	93
30	221	50	30	--	--	--	263	627 S	523
31	191	38	20	--	--	--	469	620	785
Total	3918	--	2375	3110	--	106	4485	--	1950

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

WALLA WALLA RIVER BASIN--Continued

14-136. MILL CREEK BELOW BLUE CREEK, NEAR WALLA WALLA, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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	703	954	1810	221	13	8	160	16	7
2	440	176	209	197	10	5	150	22	9
3	279	74	56	172	9	4	134	13	5
4	247	32	21	165	8	4	129	16	6
5	218	24	14	162	10	4	132	30	11
6	187	24	12	152	10	4	127	18	6
7	184	16	8	154	6	2	120	12	4
8	200	22	12	176	24 A	11	111	22	7
9	222	36	22	206	47 A	26	102	11	3
10	274	59	44	229	53 A	33	96	14	4
11	319	72	62	221	42 A	25	94	14	4
12	248	21	14	228	61 A	38	90	14	3
13	205	13	7	253	58	40	84	16	4
14	197	21	11	223	42	25	82	14	3
15	226	37	23	213	39	22	82	14	3
16	222	20	12	243	48	31	81	17	4
17	189	14	7	278	66	50	79	13	3
18	169	16	7	267	66	48	75	13	3
19	166	14	6	293	63	50	68	24	4
20	176	15	7	280	43	33	61 C	12	2
21	176	16	8	219	24	14	60 C	12	2
22	247	68	45	187	20	10	57 C	12	2
23	230	20	12	156	15	6	55 C	12	2
24	212	21	12	145	13	5	54 C	12	2
25	200	16	9	141	12	5	50 C	12	2
26	211	18	10	137	14	5	52 C	12	2
27	213	14	8	144	16	6	50 C	12	2
28	208	12	7	150	18	7	45 C	12	1
29	235	22	14	154	20	8	47 C	12	2
30	244	34	22	157	16	7	44 C	12	1
31	--	--	--	160	18	8	--	--	--
Total	7247	--	2511	6083	--	544	2571	--	113

Day	JULY			AUGUST			SEPTEMBER		
1	42	19	2	37	C 9	1	31	C 7	1
2	42	C 10	1	33	C 9	1	35	C 7	1
3	41	C 10	1	31	C 9	1	33	C 7	1
4	42	C 10	1	31	C 9	1	31	C 7	1
5	41	C 10	1	31	C 9	1	30	C 7	1
6	42	C 10	1	31	C 9	1	30	C 7	1
7	44	C 10	1	30	C 9	1	30	C 7	1
8	40	C 10	1	30	C 9	1	29	C 7	1
9	38	C 10	1	30	C 9	1	29	C 7	1
10	37	C 10	1	30	C 9	1	29	C 7	1
11	36	C 10	1	31	C 9	1	30	C 7	1
12	35	C 10	1	32	C 9	1	30	C 7	1
13	36	C 10	1	32	C 9	1	30	C 7	1
14	36	C 10	1	32	C 6	1	30	C 7	1
15	40	C 10	1	31	C 6	1	30	C 7	1
16	36	C 10	1	30	C 6	T	29	C 7	1
17	35	C 10	1	31	C 6	1	33	C 7	1
18	33	C 10	1	33	C 6	1	31	C 7	1
19	33	C 10	1	33	C 6	1	31	C 7	1
20	32	C 10	1	31	C 6	1	36	22	2
21	32	C 10	1	30	C 6	T	31	C 6	1
22	31	C 10	1	30	C 6	T	30	C 6	T
23	32	C 10	1	28	C 6	T	30	C 6	T
24	31	C 10	1	28	C 6	T	30	C 6	T
25	30	C 10	1	29	C 6	T	30	C 6	T
26	30	C 10	1	30	C 6	T	30	C 6	T
27	30	C 10	1	30	C 6	T	30	C 6	T
28	30	C 10	1	33	C 6	1	30	C 6	T
29	32	C 10	1	31	C 6	1	30	C 6	T
30	38	57	6	30	C 6	T	35	19	2
31	35	14	1	30	C 6	T	--	--	--
Total	1112	--	37	959	--	26	923	--	28

Total discharge for year (cfs-days)..... 35,830
Total load for year (tons)..... 8,065

T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.
C Composite period.

WALLA WALLA RIVER BASIN--Continued

14-136. MILL CREEK BELOW BLUE CREEK NEAR WALLA WALLA, WASH.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964

(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 25, 1964.....	1915	42		425	4560	5230	0	3	27	48	80	96	99	100	--			VPWC
Apr. 1.....	1020	42		718	1840	3570	16	19	32	70	71	87	96	98	100			VPWC

14-185. WALLA WALLA RIVER NEAR TOUCHET, WASH.

LOCATION.--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.
DRAINAGE AREA (revised).--1,657 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: July 1959 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 83°F July 11; minimum, 35°F Dec. 4, 11, 13.
Sediment concentrations: Maximum daily, 8,160 ppm Jan. 26; minimum daily, 11 ppm on many days during September.
Sediment loads: Maximum daily, 49,500 tons Jan. 26; minimum daily, less than 0.50 ton Sept. 1, 2, 16, 17.
EXTREMES, 1959-64.--Water temperatures: Maximum, 94°F Aug. 4, 1961; minimum (1959-61, 1962-64), freezing point on several days during winter months.
Sediment concentrations (1962-64): Maximum daily, 58,800 ppm Feb. 5, 1963; minimum daily, 4 ppm June 20, 1963.
Sediment loads (1962-64): Maximum daily, 818,000 tons Feb. 5, 1963; minimum daily, less than 0.50 ton on many days.
REMARKS.--Maximum sediment concentration observed during water year, 15,400 ppm Jan. 26. No appreciable inflow between gaging station and sampling point.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 20, 1963	172	36				21	7.9	16	3.9		115	0	13	10	0.2	1.5	0.36	167	85	0		242	7.5	5	--	
Dec. 10.....	250	35				20	8.4	18	4.4		114	0	15	11	.2	2.6	.49	175	84	0		246	7.4	5	--	
Jan. 15, 1964	456	33				16	6.0	12	3.0		86	0	8.2	7.0	.2	2.4	.35	132	65	0		181	7.2	5	--	
Feb. 18.....	605	33				14	5.6	9.2	3.0		75	0	6.0	6.0	.2	2.5	.44	126	58	0		159	7.2	10	--	
Mar. 23.....	685	32				12	4.9	8.3	2.5		66	0	6.8	4.2	.2	2.6	.38	106	50	0		140	7.3	20	12.2	
Apr. 20.....	650	32				10	4.8	7.8	2.2		62	0	5.8	4.0	.1	1.0	.25	102	44	0		125	7.6	5	--	
May 19.....	1100	25				7.0	3.0	4.9	1.8		44	0	3.0	1.5	.1	.9	.21	78	30	0		83	7.1	5	--	
June 22.....	236	31				18	7.6	19	3.8		101	0	13	14	.2	1.9	.35	159	76	0		235	7.5	5	8.6	
July 23.....	27	23				50	19	46	7.5		241	7	56	28	.3	1.0	.35	356	202	0		579	8.5	5	--	
Aug. 17.....	14	26		0.21		56	24	54	7.9		272	0	87	31	.3	1.1	.25	424	236	14		673	8.2	5	--	
Sept. 23.....	36	28				46	18	42	7.1		248	0	46	23	.3	1.0	.30	338	188	0		536	8.0	5	9.7	

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Feb. 18, 1964....	0.01	0.01	0.02	0.05	0.00	0.06
Aug. 17.....	.00	.00	.02	.05	.00	.10

WALLA WALLA RIVER BASIN--Continued

14-185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

WALLA WALLA RIVER BASIN--Continued

14-185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	14	62 B	2	35	24	2	202	35	19
2	11	48 B	1	37	28	3	180	26	13
3	11	68	2	33	-- E	2	170	21	10
4	12	74 B	2	35	22	2	160	19	8
5	12	52	2	46	25	3	155	17	7
6	12	38 B	1	64	78	13	229	104 S	70
7	12	73	2	74	52	10	277	146	109
8	15	80 B	3	130	84 S	39	245	97	64
9	18	89 B	4	344	393	365	280	73	55
10	20	98	5	304	348	286	250	73	49
11	16	63	3	207	100	56	220	53	31
12	13	48 B	2	146	60	24	280	136	103
13	15	52 B	2	124	44	15	320	148	128
14	16	49	2	122	38 B	13	330	132	118
15	12	32 B	1	139	54	20	348	124	117
16	12	45 B	1	180	57	28	356	120	115
17	12	68	2	153	54	22	464	417 S	613
18	13	67	2	148	53	21	766	1200	2480
19	12	64	2	183	76	38	755	1020	2080
20	12	65 B	2	172	46	21	722	615	1200
21	14	66	2	213	58	33	828	1690	3780
22	19	72 B	4	196	44	23	675	545	993
23	27	57	4	178	38	18	660	445	793
24	33	42	4	165	46	20	660	1070	1910
25	36	35	3	183	50	25	615	980	1630
26	41	33 B	4	180	50	24	625	1330	2240
27	40	23	2	191	52	27	590	840	1340
28	36	22	2	248	68	46	595	660	1060
29	35	31	3	236	43	27	605	465	760
30	34	27	2	221	38	23	590	259	413
31	34	-- E	2	--	--	--	565	208	317
Total	619	--	75	4687	--	1249	13717	--	22625

	JANUARY			FEBRUARY			MARCH		
1	536	178	258	1320	785	2800	460	87	108
2	600	274 S	468	1200	570	1850	460	82	102
3	706	429	818	1040	310	870	415	74	83
4	675	246	448	930	249	625	383	90	93
5	635	168	288	894	247	596	496	250 J	360
6	620	195	326	828	208	465	546	327	482
7	665	167	300	772	162	338	496	118	158
8	630	123	209	722	127	248	460	68	84
9	595	106	170	685	116	215	446	72	87
10	570	127	195	670	156	282	415	57	64
11	536	87	126	733	202	400	420	78	88
12	505	72	98	744	150	301	532	210 A	300
13	464	58	73	733	110	218	555	230 A	340
14	469	82	104	680	90	165	500	133	180
15	456	70	86	650	83	146	600	420 J	740
16	442	107	128	650	92	161	738	815	1620
17	482	138	180	615	84	139	788	578	1230
18	536	179	259	605	111	181	1210	2350 S	8750
19	532	216	310	660	187	333	1270	1220	4180
20	620	355 S	624	695	160	300	1010	520	1420
21	810	778	1700	680	161	296	888	313	750
22	766	342	707	660	133	237	782	210	443
23	685	158	292	630	168	286	685	163	301
24	650	123	216	615	138	229	595	127	204
25	772	670 S	1690	546	79	116	518	148	207
26	2120	8160 S	49500	541	121	177	446	112	135
27	1870	2560	12900	505	116	158	415	102	114
28	1460	1090	4300	474	127	163	395	89	95
29	1290	890	3100	464	105	132	428	89	103
30	1600	2040	8810	--	--	--	706	726 S	1600
31	1320	715	2550	--	--	--	1550	2570	10800
Total	24617	--	91233	20941	--	12427	19608	--	35221

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

WALLA WALLA RIVER BASIN--Continued

14-185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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..	2460	3740	24800	1000	231	624	550	54	80
2..	2470	2720	18100	870	127	298	640	74	128
3..	1510	1060	4320	733	94	186	605	63	103
4..	1210	638	2080	645	105	183	536	48	69
5..	1060	425	1220	585	100	158	532	53	76
6..	894	328	792	514	68	94	605	61	100
7..	760	254	521	442	64	76	585	44	69
8..	766	268	554	487	85	112	560	40	60
9..	846	287	656	625	125	211	532	42	60
10..	1070	648	1870	782	195	412	442	32	38
11..	1290	671	2340	876	186	440	403	31	34
12..	1270	542	1860	876	162	383	403	33	36
13..	972	310	814	979	258	682	367	25	25
14..	794	190	407	958	227	587	332	23	21
15..	840	265	601	846	143	327	314	23	19
16..	972	301	790	852	158	363	403	1100 J	1200
17..	870	196	460	1030	308	857	399	2770	2980
18..	716	131	253	1070	287	829	395	380	405
19..	650	110	193	1100	334	992	352	110	105
20..	650	129	226	1180	421	1340	304	102	84
21..	660	116	207	1040	275	772	264	82	58
22..	782	229 S	531	810	146	319	236	58	37
23..	1020	461	1270	680	102	187	196	48	25
24..	894	205	495	536	78	113	134	34	12
25..	810	151	330	460	63	78	132	33	12
26..	772	129	269	415	50	56	119	48	15
27..	828	141	315	395	44	47	115	52	16
28..	772	129	269	464	57	71	109	39	11
29..	840	175	397	510	64	88	107	26	8
30..	1000	259	699	523	54	76	90	20	5
31..	--	--	--	536	49	71	--	--	--
Total	30448	--	67639	22819	--	11032	10761	--	5891

Day	JULY			AUGUST			SEPTEMBER		
1..	96	33	9	56	45 B	7	16	C 11	T
2..	78	34	7	36	23	2	15	C 11	T
3..	84	27	6	43	38 B	4	18	C 11	1
4..	80	18	4	39	38	4	28	C 11	1
5..	85	22	5	27	C 26	2	25	C 11	1
6..	78	44	9	24	C 26	2	21	C 11	1
7..	46	36	4	27	C 26	2	19	C 11	1
8..	45	36	4	24	C 26	2	21	C 11	1
9..	31	39	3	22	C 26	2	21	C 11	1
10..	29	29	2	25	C 26	2	19	C 11	1
11..	31	27	2	23	C 26	2	19	C 11	1
12..	32	30	3	20	C 26	1	20	C 11	1
13..	26	35	2	16	C 26	1	20	C 11	1
14..	27	22	2	14	C 26	1	21	C 11	1
15..	35	26	2	14	C 26	1	18	C 11	1
16..	55	38 A	6	14	C 26	1	16	C 11	T
17..	52	30 A	4	14	C 26	1	16	C 11	T
18..	41	26	3	14	C 26	1	21	C 11	1
19..	39	20	2	14	47	2	30	15 B	1
20..	40	21	2	14	48 B	2	33	22	2
21..	39	29	3	16	41	2	36	2\ B	2
22..	29	27	2	19	41 B	2	39	13	1
23..	27	30 A	2	19	38	2	36	18 B	2
24..	23	18 B	1	16	C 20	1	34	13	1
25..	19	18	1	15	C 20	1	34	23 B	2
26..	17	20 B	1	14	C 20	1	29	C 11	1
27..	16	32	1	14	C 20	1	27	C 11	1
28..	16	47 B	2	14	C 20	1	31	C 11	1
29..	16	41	2	15	C 20	1	35	C 11	1
30..	17	33 B	2	17	C 20	1	45	C 11	1
31..	37	38 A	4	18	C 20	1	--	--	--
Total	1286	--	102	657	--	56	763	--	32

Total discharge for year (cfs-days)..... 150,923
Total load for year (tons)..... 247,582

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.

WALLA WALLA RIVER BASIN--Continued

14-185. WALLA WALLA RIVER NEAR TOUCHET, WASH.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964

(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
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 18, 1963	1110	37		782	1360	2870	26	29	51	74	100	--	--	--				PWC
Dec. 21	0835	37		937	1240	3140	56	56	56	75	95	98	100	--				VPWC
Jan. 26, 1964	1320	38		2770	11600	86800	16	26	39	59	82	98	99	100				VPWC
Jan. 30	1910	41		1520	1440	5910	26	35	44	56	76	92	97	100				VPWC
Mar. 18	2140	44		1440	3630	14100	21	30	42	61	80	95	100	--				VPWC
Mar. 31	1635	52		1820	2600	12800	8	10	17	25	43	79	97	100				VPWC
Apr. 2	0155	45		3040	3820	31400	11	13	21	43	62	84	96	100				VPWC
June 17	1630	64		407	11000	12100	70	88	100	--	--	--	--	--				PWC

COLUMBIA RIVER MAIN STEM

14-192. COLUMBIA RIVER BELOW McNARY DAM, NEAR UMATILLA, OREG.
(Formerly published as Columbia River at McNary Dam, Wash.)

LOCATION.--At McNary Dam, Benton County, 1.2 miles upstream from gaging station, 2.5 miles east of Plymouth, and approximately 3 miles upstream from Umatilla River.
DRAINAGE AREA.--214,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1964.
Water temperatures: October 1961 to September 1962.
REMARKS.--No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 21, 1963	90000	9.7				24	6.8	12	1.9		102		23	5.8	0.3	1.1	0.10	A 135	88	4		229	7.9	5	--	--
Dec. 10.....	112000	9.0				24	6.0	11	1.5		95		22	4.8	.2	1.1	.10	126	85	7		211	7.9	5	--	230
Jan. 15, 1964	91500	11				25	7.4	12	1.8		104		25	5.8	.3	1.4	.10	143	93	8		237	7.7	0	--	--
Feb. 20.....	107000	9.9				24	7.1	9.7	1.7		100		22	4.8	.4	1.4	.11	132	89	7		222	7.6	5	--	--
Mar. 23.....	104000	11				25	7.4	10	1.7		102		22	5.2	.4	1.6	.10	137	93	10		231	7.5	5	11.8	36
Apr. 13.....	124000	13				21	5.6	8.0	1.8		82		17	3.8	.3	2.0	.15	113	76	8		187	7.4	15	--	--
May 25.....	365000	7.7				20	4.7	3.2	.8		72		14	1.5	.3	.5	.10	94	69	10		151	7.4	5	--	--
June 22.....	616000	11				12	3.8	7.0	1.5		54		12	3.2	.3	.5	.08	82	46	1		125	7.3	5	14.4	230
July 17.....	365000	5.6				16	5.0	2.3	.6		66		10	.5	.2	.5	.04	75	60	6		128	7.5	5	--	--
Aug. 13.....	155000	4.7				19	4.0	3.2	1.0		70		11	1.2	.3	.4	.05	A 79	64	6		142	7.9	0	--	--
Sept. 23.....	90000	4.8				20	5.6	6.8	1.5		81		17	3.0	.2	.6	.07	104	73	6		176	7.5	5	9.2	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Feb. 20, 1964....	0.00	0.00	0.00	0.05	0.00	0.01
Aug. 13.....	.00	.00	.02	.05	.00	.00

UMATILLA RIVER BASIN

14-200. UMATILLA RIVER ABOVE MEACHAM CREEK, NEAR GIBBON, OREG.

LOCATION.--Temperature recorder at gaging station, 0.8 mile downstream from Ryan Creek, 2.2 miles upstream from Meacham Creek, and 2.5 miles northeast of Gibbon, Umatilla County.
DRAINAGE AREA.--125 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 71°F July 11, 27; minimum, freezing point Jan. 24.
EXTREMES, 1959-64.--Water temperatures: Maximum, 77°F July 13, 15, 21, 1961; minimum, freezing point on several days during January of most years.

Temperature (°F) of water, water year October 1963 to September 1964

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

UMATILLA RIVER BASIN--Continued

14-200. UMATILLA RIVER ABOVE MEACHAM CREEK, NEAR GIBBON, OREG.

Periodic determinations of suspended-sediment discharge and particle-size analyses, April 1962 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 21, 1962.....	1000	45		555	6	9												
July 26.....	1030	64		45	4	T												
Oct. 19.....	1730	52		87	6	1												
Nov. 20.....	1150	46		425	45	52												
Nov. 20.....	1300	46		455	52	64												
Dec. 18.....	1620	43		363	6	6												
Jan. 18, 1963.....	1355	34		97	2	1												
Feb. 1.....	1805	32		160	34	15												
Feb. 2.....	0940	35		228	22	14												
Feb. 3.....	2150	38		1080	136	397	38	51	57	64	83	93	96	99	100			VPWC
Feb. 14.....	1230	--		214	4	2												
Feb. 18.....	1620	44		268	8	6												
Mar. 20.....	1540	49		178	3	1												
Apr. 19.....	1210	41		480	6	8												
Apr. 25.....	1730	48		460	8	10												
May 14.....	1420	61		260	3	2												
July 24.....	1520	--		49	2	T												
Aug. 7.....	0845	61		45	4	T												
Sept. 23.....	1200	57		46	4	T												
Oct. 18.....	1005	50		42	8	1												
Nov. 15.....	1540	45		105	4	1												
Dec. 19.....	1220	40		190	8	4												
Jan. 14, 1964.....	1635	38		101	8	2												
Feb. 18.....	1330	42		155	8	3												
Mar. 19.....	1550	45		318	12	10												
Mar. 31.....	1220	45		812	38	83												
Apr. 1.....	0045	42		1150	163	506												
Apr. 1.....	1525	43		1290	134	467												
Apr. 15.....	1335	44		600	14	23												
May 14.....	1500	--		610	19	31												
May 19.....	0850	45		710	26	50												
May 19.....	2315	45		906	73	159												
July 23.....	1345	71		63	10	2												
Aug. 11.....	1225	65		51	12	2												
Sept. 29.....	0635	50		48	6	1												

T Less than 0.50.

UMATILLA RIVER BASIN--Continued

14-335. UMATILLA RIVER NEAR UMATILLA, OREG.

LOCATION.--At gaging station, 1.5 miles downstream from West Division main canal of Umatilla project, 1.8 miles southeast of Umatilla, Umatilla County, and 2 miles upstream from mouth.
DRAINAGE AREA.--2,290 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1911 to August 1912, August 1960 to July 1962.
Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Minimum, 39°F Feb. 8.
Sediment concentrations: Maximum daily, 1,160 ppm Apr. 2; minimum daily, 2 ppm Dec. 17.
Sediment loads: Maximum daily, 8,610 tons Apr. 2; minimum daily, less than 0.05 ton Aug. 10, 16, 17.
EXTREMES, 1962-64.--Water temperatures: Minimum, freezing point Jan. 29, 1963.
Sediment concentrations: Maximum daily, 7,540 ppm Feb. 5, 1963; minimum daily, 2 ppm Aug. 16, Dec. 17, 1963.
Sediment loads: Maximum daily, 87,300 tons Feb. 5, 1963; minimum daily, less than 0.05 ton Aug. 10, 16, 17, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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

UMATILLA RIVER BASIN--Continued

14-335. UMATILLA RIVER NEAR UMATILLA, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1..	7.3	C 5	0.1	183	C 9	4.4	165	--	3.6
2..	7.3	C 5	.1	157	C 9	3.8	145	C 6	2.3
3..	7.3	C 5	.1	149	C 9	3.6	133	C 6	2.2
4..	7.3	C 5	.1	149	C 9	3.6	129	C 6	2.1
5..	7.3	C 5	.1	149	C 9	3.6	129	C 6	2.1
6..	7.3	C 5	.1	149	C 9	3.6	137	C 6	2.2
7..	7.3	C 5	.1	149	C 9	3.6	133	C 6	2.2
8..	7.7	C 5	.1	153	C 9	3.7	133	C 6	2.2
9..	7.7	C 5	.1	153	C 9	3.7	133	C 6	2.2
10..	7.7	C 5	.1	201	12	6.5	129	C 6	2.1
11..	7.7	C 5	.1	174	C 10	4.7	129	C 6	2.1
12..	22	8	K 1.8	149	C 10	4.0	125	C 6	2.0
13..	137	15	B 5.5	145	C 10	3.9	178	16	B 7.7
14..	88	--	1.7	145	C 10	3.9	174	--	4.7
15..	9.5	C 6	.2	141	C 10	3.8	145	6	2.3
16..	8.8	C 6	.1	137	C 10	3.7	129	3	1.0
17..	8.8	C 6	.1	137	C 10	3.7	125	2	.7
18..	9.2	C 6	.1	137	C 10	3.7	137	13	A 4.8
19..	9.2	C 6	.1	137	C 10	3.7	230	24	15
20..	9.2	C 6	.1	153	C 10	4.1	255	19	13
21..	9.2	C 6	.1	157	C 10	4.2	272	16	12
22..	9.2	C 6	.1	196	C 10	5.3	284	14	11
23..	9.2	C 6	.1	188	C 10	5.1	272	--	7.3
24..	9.2	C 6	.1	174	C 10	4.7	245	8	5.3
25..	9.2	C 6	.1	161	C 10	4.3	225	--	3.6
26..	9.2	C 6	.1	170	C 10	4.6	206	C 5	2.8
27..	9.2	C 6	.1	174	C 10	4.7	188	C 5	2.5
28..	9.2	C 6	.1	183	C 10	4.9	183	C 5	2.5
29..	72	20	J 7.8	183	C 10	4.9	178	C 5	2.4
30..	210	16	B 9.1	178	C 10	4.8	192	C 5	2.6
31..	206	--	6.1	--	--	--	196	C 5	2.6
Total	945.2	--	34.6	4811	--	126.8	5434	--	131.1

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1..	196	C 6	3.2	594	53	85	308	11	9.1
2..	192	C 6	3.1	594	39	63	308	14	12
3..	206	C 6	3.3	524	38	54	278	15	11
4..	235	C 6	3.8	453	35	43	302	17	14
5..	240	C 6	3.9	418	38	43	302	15	12
6..	230	C 6	3.7	404	21	23	492	25	33
7..	225	C 6	3.6	369	22	22	500	31	42
8..	225	C 6	3.6	341	20	18	476	26	33
9..	215	C 6	3.5	308	--	13	453	C 28	34
10..	196	C 6	3.2	290	12	9.4	446	C 28	34
11..	178	C 6	2.9	320	19	16	439	C 28	33
12..	161	C 6	2.6	376	33	33	418	C 28	32
13..	145	C 6	2.3	376	24	24	446	C 28	34
14..	129	C 7	2.4	355	18	17	439	C 28	33
15..	122	C 7	2.3	314	16	14	411	C 28	31
16..	119	C 7	2.2	296	--	14	397	C 28	30
17..	119	C 7	2.2	278	18	14	411	C 28	31
18..	116	C 7	2.2	266	20	14	460	C 28	35
19..	116	C 7	2.2	284	21	16	594	48	77
20..	116	C 7	2.2	383	22	23	576	41	64
21..	141	11	S 5.3	425	35	40	603	42	68
22..	220	14	8.3	411	32	B 36	549	29	43
23..	215	10	5.8	404	30	B 33	540	24	35
24..	192	10	5.2	411	27	30	446	21	25
25..	188	8	4.1	446	23	28	341	21	19
26..	310	25	S 43	418	19	21	290	16	13
27..	890	246	591	369	13	13	284	12	9.2
28..	860	118	274	334	16	14	192	11	5.7
29..	783	69	146	314	10	8.5	174	10	4.7
30..	774	68	142	--	--	--	281	110	J 180
31..	675	158	288	--	--	--	1280	510	J 2200
Total	8729	--	1571.1	11075	--	781.9	13436	--	3236.7

S Computed by subdividing day.
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.
K Computed from estimated-concentration graph and subdividing day.

14-335. UMATILLA RIVER NEAR UMATILLA, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--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	2160	962	S	5980	1020	68		187	8.0	11		0.2
2	2750	1160		8610	840	40		91	258	35	J	32
3	1530	389	S	1710	675	21		38	284	35	J	30
4	1080	162		472	468	18		23	141	10	S	4.4
5	870	99		233	260	11		7.7	183	13	A	6.4
6	738	58		116	170	8		3.7	284	19	A	15
7	532	38		55	67	8		1.4	230	11		6.8
8	432	36	S	47	39	6		.6	165	17		7.6
9	657	74	A	130	160	6	J	3.7	93	10	S	2.8
10	954	170	J	500	468	15	J	20	76	5	J	1.1
11	1490	400	A	1600	603	20		33	28	18		1.4
12	1710	440	A	2000	639	20		35	16	9	C	.4
13	1290	168		585	738	29		58	15	9	C	.4
14	900	99		241	756	25		51	15	9	C	.4
15	932	123	S	331	630	15		26	14	9	C	.3
16	1200	151		489	508	15		21	13	9	C	.3
17	987	72		192	612	23		38	15	9	C	.4
18	756	39		80	666	25		45	14	9	C	.3
19	558	26		39	549	17		25	15	9	C	.4
20	516	22		31	558	15	B	23	14	9	C	.3
21	558	27		41	524	16		23	14	9	C	.3
22	612	32		53	383	13		13	13	9	C	.3
23	820	58		128	222	10		6.0	13	9	C	.3
24	738	35		70	72	10		1.9	13	9	C	.3
25	594	24		38	30	8	C	.6	13	9	C	.3
26	500	21		28	15	8	C	.3	13	9	C	.3
27	476	19		24	10	8	C	.2	13	9	C	.3
28	418	14		16	8.4	8	C	.2	12	9	C	.3
29	404	14		15	6.0	8	C	.1	10	9	C	.2
30	910	67		165	8.8	8	C	.2	9.2	9	C	.2
31	--	--		--	5.8	8	C	.1	--	--		--
Total	28072	--		24019	11711.0	--		776.7	2004.2	--		113.7

	JULY				AUGUST				SEPTEMBER			
1	9.5	9	C	0.2	7.7	6	C	0.1	9.5	16	C	0.4
2	9.2	9	C	.2	8.4	6	C	.1	9.2	16	C	.4
3	8.8	9	C	.2	6.8	6	C	.1	8.8	16	C	.4
4	9.5	9	C	.2	5.6	6	C	.1	8.4	16	C	.4
5	9.5	9	C	.2	6.3	6	C	.1	8.4	16	C	.4
6	9.2	9	C	.2	4.8	6	C	.1	8.4	16	C	.4
7	8.8	9	C	.2	4.6	6	C	.1	8.4	16	C	.4
8	9.5	9	C	.2	5.6	6	C	.1	8.4	16	C	.4
9	8.4	9	C	.2	4.3	6	C	.1	11	16	C	.5
10	8.0	9	C	.2	3.0	6	C	T	8.8	16	C	.4
11	7.0	9	C	.2	3.2	6	C	.1	8.4	16	C	.4
12	6.3	9	C	.2	4.8	6	C	.1	8.4	16	C	.4
13	6.3	9	C	.2	3.6	6	C	.1	8.4	16	C	.4
14	6.0	9	C	.1	4.3	6	C	.1	8.4	16	C	.4
15	8.4	45	A	1.0	3.9	6	C	.1	8.8	16	C	.4
16	6.8	17	B	.3	2.7	6	C	T	8.4	16	C	.4
17	6.3	8	C	.1	3.0	6	C	T	7.7	16	C	.3
18	6.8	8	C	.1	4.1	6	C	.1	8.0	16	C	.3
19	6.3	8	C	.1	4.3	6	C	.1	8.4	16	C	.4
20	6.6	8	C	.1	159	28	B	12	8.0	16	C	.3
21	6.3	8	C	.1	145	14		5.5	8.0	16	C	.3
22	6.8	8	C	.1	8.8	14	C	.3	7.7	16	C	.3
23	6.3	8	C	.1	7.7	14	C	.3	9.2	16	C	.4
24	6.3	8	C	.1	7.7	14	C	.3	9.2	16	C	.4
25	7.0	8	C	.2	8.0	14	C	.3	8.0	16	C	.3
26	7.7	8	C	.2	12	14	C	.5	9.5	16	C	.4
27	7.3	8	C	.2	9.2	14	C	.3	7.7	16	C	.3
28	7.7	8	C	.2	9.2	14	C	.3	7.0	16	C	.3
29	8.0	8	C	.2	9.2	14	C	.3	6.8	16	C	.3
30	8.0	8	C	.2	8.8	14	C	.3	6.8	16	C	.3
31	7.7	8	C	.2	8.4	14	C	.3	--	--		--
Total	236.3	--		6.2	484.0	--		22.4	252.1	--		11.1

Total discharge for year (cfs-days)..... 87,189.8
Total load for year (tons)..... 30,831.3

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

14-335. UMATILLA RIVER NEAR UMATILLA, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 27, 1964.....	1710	42		870	272	639	62	87	99	99	99	100	--	--				PWC
Mar. 31.....	1455	54		1560	466	1960	31	34	51	62	88	96	99	100				VPWC
Apr. 2.....	1655	46		2520	882	6000	18	24	35	49	73	85	97	100				VPWC

ALDER CREEK BASIN

14-343.5. ALDER CREEK AT ALDERDALE, WASH.

LOCATION.--At gaging station at bridge on State Highway 8, 0.5 mile northwest of Alderdale, Klickitat County, and 2.4 miles downstream from Six Prong Creek.
DRAINAGE AREA (revised).--198 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Minimum, freezing point Dec. 2, 10, 13.
Sediment concentrations: Maximum daily, 22 ppm Jan. 9, Apr. 4; minimum daily, 0 ppm on many days.
Sediment loads: Maximum daily, 1.8 tons Jan. 26; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1962-64.--Water temperatures: Maximum (1962-63), 79°F June 13, 15, 1963; minimum, freezing point on several days during January and December 1963.
Sediment concentrations: Maximum daily, 5,180 ppm Feb. 3, 1963; minimum daily, 0 ppm on many days.
Sediment loads: Maximum daily, 45,100 tons Feb. 3, 1963; minimum daily, less than 0.05 ton on many days.
REMARKS.--Maximum sediment concentration observed during water year, 33 ppm Jan. 30.

Temperature (°F) of water, water year October 1963 to September 1964

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

ALDER CREEK BASIN--Continued

14-343.5. ALDER CREEK AT ALDERDALE, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

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	0.7	C	9	T	0.9	C	4	T	1.0	C	4	T
2	.7	C	9	T	.9	C	4	T	1.0	C	4	T
3	.7	C	9	T	.9	C	4	T	1.0	C	4	T
4	.8	C	9	T	.9	C	4	T	1.0	C	4	T
5	.9	C	9	T	.9	C	4	T	1.2	C	4	T
6	.9	C	9	T	.9	C	4	T	1.3	C	4	T
7	1.0	C	9	T	1.0	C	4	T	1.0	C	4	T
8	1.0	C	9	T	1.1	C	4	T	1.2	C	4	T
9	1.0	C	9	T	1.0	C	4	T	1.1	C	4	T
10	1.0	C	9	T	.9	C	4	T	.9	C	4	T
11	1.1	C	9	T	.9	C	4	T	.9	C	4	T
12	1.0	C	9	T	.9	C	4	T	.9	C	4	T
13	.9	C	9	T	.9	C	4	T	.9	C	4	T
14	.8	C	9	T	1.1	C	4	T	.9	C	4	T
15	.8	C	9	T	1.0	C	4	T	.9	C	4	T
16	.8	C	9	T	.9	C	4	T	1.0	C	4	T
17	.8	C	9	T	.9	C	4	T	1.0	C	4	T
18	.9	C	9	T	.9	C	4	T	1.0	C	4	T
19	.9	C	9	T	.9	C	4	T	1.0	C	4	T
20	.9	C	9	T	.9	C	4	T	1.0	C	4	T
21	.9	C	9	T	.9	C	4	T	1.0	C	4	T
22	.9	C	9	T	.9	C	4	T	.9	C	4	T
23	.9	C	9	T	.9	C	4	T	1.0	C	4	T
24	.9	C	9	T	.9	C	4	T	.9	C	4	T
25	.9	C	9	T	.9	C	4	T	.9	C	4	T
26	.9	C	9	T	.9	C	4	T	.8	C	4	T
27	.9	C	9	T	1.0	C	4	T	.8	C	4	T
28	.9	C	9	T	1.0	C	4	T	.8	C	4	T
29	.9	C	9	T	.9	C	4	T	.8	C	4	T
30	.9	C	9	T	.9	C	4	T	.8	C	4	T
31	.9	C	9	T	--	--		--	.8	C	4	T
Total	27.5	--		0.7	27.9	--		0.3	29.7	--		0.3

Day	JANUARY					FEBRUARY					MARCH			
	Mean discharge (cfs)	Suspended sediment				Mean discharge (cfs)	Suspended sediment				Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)			Tons per day		Mean concentration (ppm)			Tons per day		Mean concentration (ppm)		Tons per day
1	0.8	C	6		T	10		10	A	0.3	2.7	C	6	T
2	.8	C	6		T	8.8		10		.2	2.7	C	6	T
3	.8	C	6		T	6.6		4		.1	2.4	C	6	T
4	.8	C	6		T	5.8		6		.1	2.7	C	6	T
5	.8	C	6		T	5.1		10		.1	2.7	C	6	T
6	.8	C	6		T	5.8		6		.1	2.7	C	6	T
7	.8	C	6		T	5.1		6		.1	2.4	C	6	T
8	.8	C	6		T	4.3	C	4		T	2.2	C	6	T
9	.8		22		T	4.0	C	4		T	2.4	C	6	T
10	.8	C	4		T	3.7	C	4		T	2.4	C	6	T
11	.8	C	4		T	4.0	C	4		T	2.4	C	6	T
12	.8	C	4		T	4.6	C	4		.1	2.4	C	6	T
13	.8	C	4		T	4.6	C	4		.1	2.2	C	6	T
14	.9	C	4		T	4.0	C	4		T	2.2	C	6	T
15	.9	C	4		T	3.7	C	4		T	2.2	C	6	T
16	.9	C	4		T	3.4	C	4		T	2.1	C	6	T
17	.9	C	4		T	3.4	C	4		T	2.2	C	6	T
18	1.0	C	4		T	3.2	C	4		T	2.2	C	6	T
19	1.1	C	4		T	2.9	C	4		T	2.2	C	6	T
20	1.0	C	4		T	2.9	C	4		T	2.2	C	6	T
21	.9	C	4		T	2.9	C	4		T	2.2	C	6	T
22	.9	C	4		T	2.9	C	4		T	2.2	C	6	T
23	.9	C	4		T	2.9	C	4		T	2.2	C	6	T
24	.9	C	4		T	2.7	C	4		T	2.2	C	6	T
25	.9	C	4		T	2.7	C	4		T	2.1	C	6	T
26	26		19	J	1.8	2.7	C	4		T	1.9	C	6	T
27	6.4		13	A	.2	2.4	C	4		T	1.9	C	6	T
28	5.6		11		.2	2.7	C	4		T	1.9	C	6	T
29	5.4		10		.1	2.7	C	4		T	1.9	C	6	T
30	9.2		17		.4	--		--		--	1.9	C	6	T
31	7.4		10		.2	--		--		--	1.9	C	6	T
Total	81.6	--			3.2	120.5	--			1.9	69.9	--		1.1

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.

ALDER CREEK BASIN--Continued

14-343.5. ALDER CREEK AT ALDERDALE, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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	1.9	18	0.1	1.4	C 2	T	0.7	C 5	T
2	1.9	20	.1	1.4	C 2	T	.7	C 5	T
3	1.9	18	.1	1.4	C 2	T	.8	C 5	T
4	1.7	22	.1	1.4	C 2	T	.8	C 5	T
5	1.9	20	.1	1.3	C 2	T	1.0	C 5	T
6	1.9	19	.1	1.3	C 2	T	1.0	C 5	T
7	1.7	C 3	T	1.3	C 2	T	.9	C 5	T
8	1.7	C 3	T	1.3	C 2	T	1.0	C 5	T
9	1.7	C 3	T	1.2	C 2	T	.9	C 5	T
10	1.7	C 3	T	1.2	C 2	T	.8	C 5	T
11	1.7	C 3	T	1.2	C 2	T	.7	C 5	T
12	1.7	C 3	T	1.2	C 2	T	.6	C 5	T
13	1.7	C 3	T	1.1	C 2	T	.6	C 5	T
14	1.6	C 3	T	1.1	C 2	T	.6	C 5	T
15	1.4	C 3	T	1.1	C 2	T	.8	C 5	T
16	1.6	C 3	T	1.0	C 2	T	.8	C 5	T
17	1.6	C 3	T	1.0	C 2	T	.8	C 5	T
18	1.6	C 3	T	1.0	C 2	T	.8	C 5	T
19	1.6	C 3	T	.9	C 2	T	.7	C 5	T
20	1.4	C 3	T	.9	C 2	T	.7	C 5	T
21	1.4	C 3	T	.9	C 2	T	.7	C 5	T
22	1.6	C 3	T	.9	C 2	T	.7	C 5	T
23	1.7	C 3	T	1.0	C 2	T	.7	C 5	T
24	1.7	C 3	T	.9	C 2	T	.6	C 5	T
25	1.6	C 3	T	.9	C 2	T	.6	C 5	T
26	1.6	C 3	T	.9	C 2	T	.6	C 5	T
27	1.6	C 3	T	.9	C 2	T	.6	C 5	T
28	1.6	C 3	T	.8	C 2	T	.7	C 5	T
29	1.4	C 3	T	1.0	C 2	T	.6	C 5	T
30	1.4	C 3	T	.8	C 2	T	.6	C 5	T
31	--	--	--	.8	C 2	T	--	--	
Total	49.5	--	0.9	33.5	--	0.2	22.1	--	0.3

Day	JULY			AUGUST			SEPTEMBER		
1	0.6	C 1	T	0.6			0.8	C 2	T
2	.6	C 1	T	.6			.8	C 2	T
3	.6	C 1	T	.6			.8	C 2	T
4	.6	C 1	T	.6			.8	C 2	T
5	.6	C 1	T	.6			.8	C 2	T
6	.6	C 1	T	.6			.8	C 2	T
7	.6	C 1	T	.6			.8	C 2	T
8	.5	C 1	T	.6			.8	C 2	T
9	.6	C 1	T	.6			.8	C 2	T
10	.6	C 1	T	.6			.8	C 2	T
11	.5	C 1	T	.6			.8	C 2	T
12	.5	C 1	T	.6			.8	C 2	T
13	.4	C 1	T	.6			.8	C 2	T
14	.5	C 1	T	.6			.8	C 2	T
15	.6	C 1	T	.6			.8	C 2	T
16	.6	C 1	T	.6			.8	C 2	T
17	.6	C 1	T	.6			.8	C 2	T
18	.6	C 1	T	.6			.8	C 2	T
19	.6	C 1	T	.6			.8	C 2	T
20	.6	C 1	T	.6			.8	C 2	T
21	.6	C 1	T	.6			.8	C 2	T
22	.6	--	T	.6			.8	C 2	T
23	.6	--	T	.6			.8	C 2	T
24	.6	--	T	.6			.8	C 2	T
25	.6	--	T	.6			.8	C 2	T
26	.6	--	T	.6			.8	C 2	T
27	.6	--	T	.6			.8	C 2	T
28	.6	--	T	.6			.8	C 2	T
29	.6	--	T	.6			.8	C 2	T
30	.6	--	T	.6			.8	C 2	T
31	.6	--	T	.6			--	--	
Total	18.0	--	T	18.6	--	T	24.0	--	0.1

Total discharge for year (cfs-days)..... 522.8
Total load for year (tons)..... 9.0

T Less than 0.05 ton.
C Composite period.

WILLOW CREEK BASIN

14-345. WILLOW CREEK AT HEPPNER, OREG.

LOCATION.--At Court Street bridge, 100 feet downstream from gaging station, 800 feet southeast of Morrow County Courthouse at Heppner, Morrow County, and 0.3 mile downstream from Balm Fork.
DRAINAGE AREA.--87 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: February 1963 to September 1964.
Sediment records: February 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 78°F Aug. 24; minimum, freezing point Dec. 10, 11, Jan. 13.
Sediment concentrations: Maximum daily, 5,300 ppm July 13; minimum daily, 6 ppm on many days during November and December.
Sediment loads: Maximum daily, 520 tons July 13; minimum daily, less than 0.05 ton on many days during October and July to September.
EXTREMES, February 1963 to September 1964.--Water temperatures: Maximum, 78°F Aug. 24, 1964; minimum, freezing point Feb. 1, 2, Dec. 10, 11, 1963, Jan. 13, 1964.
Sediment concentrations: Maximum daily, 14,100 ppm Feb. 4, 1963; minimum daily, 6 ppm on many days during June, November, and December 1963.
Sediment loads: Maximum daily, 4,370 tons Feb. 4, 1963; minimum daily, less than 0.05 ton on many days each year.
REMARKS.--Flow affected by ice Dec. 10, 11, and Jan. 13.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLOW CREEK BASIN--Continued

14-345. WILLOW CREEK AT HEPPNER, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	0.4	C 10		T	3.9	C 12		0.1	5.4	C 6		0.1
2	.4	C 10		T	3.7	C 12		.1	5.0	C 6		.1
3	.5	C 10		T	3.9	C 12		.1	5.0	C 6		.1
4	.6	C 10		T	4.1	C 12		.1	4.8	C 6		.1
5	.7	C 10		T	4.6	--		.2	5.4	C 6		.1
6	.9	C 10		T	5.4	20	A	.3	6.1	C 6		.1
7	1.0	C 10		T	6.1	22	B	.4	5.8	C 6		.1
8	1.3	C 10		T	9.8	170	J	5.7	5.6	C 6		.1
9	1.3	C 10		T	12	180	A	5.8	5.6	C 6		.1
10	1.3	C 10		T	8.8	65	B	1.5	5.0	C 6		.1
11	1.4	C 10		T	7.4	15		.3	4.4	C 6		.1
12	1.5	C 10		T	6.6	--		.2	4.6	C 6		.1
13	1.5	C 10		T	6.4	13		.2	5.2	C 6		.1
14	1.0	C 10		T	6.6	--		.3	5.4	C 6		.1
15	.8	C 10		T	8.6	22		.5	5.4	C 6		.1
16	.7	C 10		T	7.6	--		.3	5.6	C 6		.1
17	.8	C 10		T	7.1	--		.2	5.8	C 6		.1
18	.9	C 10		T	6.4	C 6		.1	6.1	C 6		.1
19	.9	C 10		T	6.1	C 6		.1	5.8	C 6		.1
20	1.0	C 10		T	6.1	C 6		.1	6.6	C 6		.1
21	1.1	C 10		T	5.8	C 6		.1	6.6	C 6		.1
22	1.3	C 10		T	5.8	C 6		.1	6.4	C 6		.1
23	1.6	C 10		T	5.8	C 6		.1	6.4	C 6		.1
24	1.9	C 10		0.1	6.1	C 6		.1	6.4	C 6		.1
25	1.9	C 10		.1	6.1	C 6		.1	6.4	C 6		.1
26	2.2	C 10		.1	6.1	C 6		.1	6.4	C 6		.1
27	2.3	C 10		.1	5.8	C 6		.1	6.6	C 6		.1
28	2.5	C 10		.1	5.6	C 6		.1	8.3	32	B	.7
29	3.5	14		.2	5.4	C 6		.1	8.8	27		.6
30	4.4	14		.2	5.4	C 6		.1	8.6	C 8		.2
31	4.1	--		.1	--	--		--	8.3	C 8		.2
Total	45.7	--		1.6	189.1	--		17.6	187.8	--		4.4

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	8.6	C 8		0.2	17	230	A	11	8.3	C 9		0.2
2	9.8	C 8		.2	15	70		2.8	7.8	C 9		.2
3	8.8	C 8		.2	14	C 44		1.7	7.6	C 9		.2
4	8.6	C 8		.2	13	C 44		1.5	7.6	C 9		.2
5	8.0	C 8		.2	12	C 44		1.4	8.0	C 9		.2
6	8.3	C 8		.2	9.8	C 44		1.2	7.6	C 9		.2
7	8.0	C 8		.2	12	C 44		1.4	8.0	C 9		.2
8	7.8	C 8		.2	11	C 27		.8	7.6	C 9		.2
9	7.8	C 8		.2	11	C 27		.8	7.6	C 9		.2
10	7.4	C 8		.2	11	C 27		.8	7.4	C 9		.2
11	6.8	C 8		.1	10	C 27		.7	7.1	C 9		.2
12	6.6	C 8		.1	8.8	C 27		.6	7.1	C 9		.2
13	5.5	C 8		.1	11	C 27		.8	6.8	C 9		.2
14	7.1	C 8		.2	9.8	C 16		.4	7.4	C 9		.2
15	5.2	C 8		.1	9.4	C 16		.4	7.1	C 9		.2
16	6.1	C 12		.2	9.1	C 16		.4	7.6	14	A	.3
17	7.1	C 12		.2	8.8	C 16		.4	8.3	37	A	.8
18	6.4	C 12		.2	8.6	C 16		.4	9.8	38		1.0
19	6.4	C 12		.2	8.3	C 16		.4	9.8	22		.6
20	7.8	C 12		.3	7.1	C 16		.3	10	--		.6
21	7.4	C 12		.2	8.3	C 16		.4	10	23		.6
22	6.8	C 12		.2	8.0	C 16		.3	11	29		.9
23	6.6	C 12		.2	7.6	C 16		.3	8.8	19	A	.5
24	7.8	90	A	1.9	8.8	C 16		.4	11	33	A	1.0
25	8.8	55	B	1.3	7.1	C 9		.2	11	26		.8
26	20	380	A	21	7.6	C 9		.2	11	23		.7
27	23	190		12	7.1	C 9		.2	12	40	A	1.3
28	23	128		7.9	8.3	C 9		.2	20	340	J	19
29	20	100		5.4	8.0	C 9		.2	44	810	A	96
30	19	170	A	8.7	--	--		--	76	1000	A	210
31	18	170	A	8.3	--	--		--	83	680	A	150
Total	308.5	--		70.8	287.5	--		30.6	456.3	--		487.1

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

14-345. WILLOW CREEK AT HEPPNER, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--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	89	640		154	42	71		8.1	17	C 21		1.0
2	67	300		54	39	48	B	5.1	17	C 21		1.0
3	49	200		26	34	C 43		3.9	14	C 21		.8
4	37	140	B	14	31	C 43		3.6	13	212	S	8.0
5	37	80		8.0	29	C 43		3.4	15	32		1.3
6	33	84		7.5	26	C 43		3.0	18	32		1.6
7	32	76		6.6	25	C 43		2.9	17	C 16		.7
8	34	85		7.8	24	C 43		2.8	16	C 16		.7
9	39	98		10	25	C 43		2.9	15	C 16		.6
10	52	200	A	28	27	C 43		3.1	13	C 16		.6
11	56	190	A	29	31	68	A	5.7	13	C 16		.6
12	50	120	B	16	32	100	A	8.6	11	C 16		.5
13	44	73		8.7	36	160	A	16	9.8	C 16		.4
14	41	75		8.3	34	190	A	17	7.8	C 16		.3
15	45	110		13	32	98		8.5	7.8	30	K	.7
16	43	100		12	31	--		7.7	11	86	A	2.6
17	35	C 51		4.8	32	--		8.2	13	34	A	1.2
18	29	C 51		4.0	31	90		7.5	22	130	A	7.7
19	27	C 51		3.7	29	88		6.9	20	58	A	3.1
20	27	C 51		3.7	29	130		10	18	54		2.6
21	29	C 51		4.0	26	82		5.8	17	30		1.4
22	32	C 51		4.4	29	62		4.9	14	C 8		.3
23	32	C 51		4.4	29	52		4.1	13	C 8		.3
24	29	C 51		4.0	25	--		2.9	12	C 8		.3
25	28	C 51		3.9	21	38		2.2	11	C 8		.2
26	29	C 51		4.0	18	C 21		1.0	9.8	C 8		.2
27	31	C 51		4.3	18	C 21		1.0	8.8	C 8		.2
28	32	C 51		4.4	16	C 21		.9	8.3	C 8		.2
29	38	120	A	12	16	C 21		.9	7.4	C 8		.2
30	42	120		14	17	C 21		1.0	7.4	C 8		.2
31	--	--		--	18	C 21		1.0	--	--		--
Total	1188	--		478.5	852	--		160.6	397.1	--		39.5

Day	JULY				AUGUST				SEPTEMBER			
1	7.1	C 8		0.2	0.3	C 18		T	0.2	C 19		T
2	7.4	C 8		.2	.3	C 18		T	.3	C 19		T
3	6.8	C 8		.1	.6	C 18		T	.3	C 19		T
4	5.6	C 8		.1	.4	C 18		T	.3	C 19		T
5	4.4	C 8		.1	.4	C 18		T	.2	C 19		T
6	3.7	C 8		.1	.4	C 18		T	.2	C 19		T
7	3.0	C 8		.1	.3	C 18		T	.2	C 19		T
8	3.0	C 8		.1	.3	C 18		T	.2	C 19		T
9	3.4	C 8		.1	.3	C 18		T	.2	C 19		T
10	3.5	C 8		.1	.2	C 18		T	.2	C 19		T
11	3.0	C 8		.1	.2	C 18		T	.3	C 19		T
12	2.5	C 8		.1	.2	C 18		T	.3	C 19		T
13	5.6	5300	J	520	.2	C 18		T	.3	C 19		T
14	3.9	1800	J	27	.3	C 18		T	.3	C 19		T
15	2.2	86		.5	.3	C 18		T	.3	C 19		T
16	1.6	40	B	.2	.3	C 18		T	.3	C 19		T
17	1.0	30	B	.1	.2	C 18		T	.3	C 19		T
18	.6	C 18		T	.3	C 18		T	.3	C 19		T
19	.5	C 18		T	.4	C 18		T	.3	C 19		T
20	.5	C 18		T	.4	C 18		T	.3	C 19		T
21	.4	C 18		T	.3	C 18		T	.3	C 19		T
22	.4	C 18		T	.3	C 18		T	.4	C 19		T
23	.4	C 18		T	.2	C 18		T	.4	C 19		T
24	.3	C 18		T	.2	C 18		T	.4	C 19		T
25	.2	C 18		T	.1	C 18		T	.3	C 19		T
26	.2	C 18		T	.3	C 18		T	.3	C 19		T
27	.2	C 18		T	.4	C 18		T	.3	C 19		T
28	.2	C 18		T	.4	C 18		T	.3	C 19		T
29	.2	C 18		T	.3	C 18		T	.3	C 19		T
30	.3	C 18		T	.3	C 18		T	.3	C 19		T
31	.6	C 18		T	.2	C 18		T	--	--		--
Total	72.7	--		549.4	9.3	--		0.5	8.6	--		0.4

Total discharge for year (cfs-days)..... 4,002.6
Total load for year (tons)..... 1,841.0

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.
K Computed from estimated-concentration graph and subdividing day.

WILLOW CREEK BASIN--Continued

14-345. WILLOW CREEK AT HEPPNER, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 4, 1964.....	1900	58		12	358	12	30	52	66	88	99	100						PWC
June 4.....	2000	58		12	2220	72	28	43	68	98	100							PWC

WILLOW CREEK BASIN--Continued

14-360. WILLOW CREEK NEAR ARLINGTON, OREG.

LOCATION.--At private bridge, 1.5 miles downstream from gaging station, 4.4 miles downstream from Eightmile Canyon, and 10 miles east of Arlington, Gilliam County.
DRAINAGE AREA.--850 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, 16,000 ppm June 6; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 12,700 tons June 5; minimum daily, 0 ton on many days.
EXTREMES, 1962-64.--Water temperatures: Minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 32,700 ppm Feb. 5, 1963; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 91,400 tons Feb. 3, 1963; minimum daily, 0 ton on many days.
REMARKS.--No flow Oct. 1 to Nov. 22, Feb, 22, Mar. 24-28, 30, Apr. 26, 27, 30, May 1, 2, June 23 to Sept. 16.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLOW CREEK BASIN--Continued

14-360. WILLOW CREEK NEAR ARLINGTON, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0	--	0	1.7	C 21	0.1
2				0	--	0	1.7	C 21	.1
3				0	--	0	1.7	C 21	.1
4				0	--	0	.8	C 21	T
5				0	--	0	2.2	C 21	.1
6				0	--	0	4.4	C 21	.2
7				0	--	0	4.0	C 21	.2
8				0	--	0	5.2	C 21	.3
9				0	--	0	5.6	C 21	.3
10				0	--	0	3.2	C 21	.2
11				0	--	0	1.0	C 21	.1
12				0	--	0	.6	C 21	T
13				0	--	0	3.2	C 21	.2
14				0	--	0	4.4	C 21	.2
15				0	--	0	5.2	C 21	.3
16				0	--	0	5.6	C 21	.3
17				0	--	0	6.0	C 21	.3
18				0	--	0	6.5	C 21	.4
19				0	--	0	8.0	C 17	.4
20				0	--	0	8.6	C 17	.4
21				0	--	0	9.2	C 17	.4
22				0	--	0	9.2	C 17	.4
23				.7	C 80	.2	9.2	C 17	.4
24				.2	C 80	T	9.2	C 17	.4
25				.3	C 80	.1	9.8	C 17	.4
26				.3	C 80	.1	10	C 17	.5
27				.7	C 21	T	10	C 17	.5
28				.7	C 21	T	11	C 17	.5
29				1.2	C 21	.1	12	C 17	.6
30				1.7	C 21	.1	15	C 17	.7
31				--	--	--	16	C 17	.7
Total	0		0	5.8	--	0.7	200.2	--	9.8
	JANUARY			FEBRUARY			MARCH		
1	16	C 17	0.7	43	83	9.6	0.6	C 14	T
2	16	C 17	.7	39	45	4.7	.7	C 14	T
3	17	C 17	.8	34	--	3.7	.8	C 14	T
4	12	C 17	.6	9.2	--	.7	1.7	C 14	0.1
5	13	C 17	.6	6.0	C 24	.4	1.5	C 14	.1
6	15	C 17	.7	4.8	C 24	.3	.8	C 14	T
7	15	C 17	.7	4.8	C 24	.3	1.7	C 14	.1
8	15	C 17	.7	5.2	C 24	.3	.8	C 14	T
9	16	C 17	.7	5.2	C 24	.3	1.5	C 14	.1
10	15	C 17	.7	5.6	C 24	.4	2.0	C 14	.1
11	15	C 17	.7	8.0	C 24	.5	1.5	C 14	.1
12	15	C 17	.7	7.0	C 24	.5	1.7	C 14	.1
13	12	C 17	.6	10	C 24	.6	1.5	C 14	.1
14	14	C 17	.6	5.2	C 24	.3	2.8	C 14	.1
15	15	C 17	.7	6.5	C 24	.4	2.8	C 14	.1
16	17	C 17	.8	8.0	C 24	.5	2.0	C 14	.1
17	16	C 17	.7	5.2	C 24	.3	1.0	C 14	T
18	17	C 17	.8	2.5	C 20	.1	1.3	C 14	T
19	19	C 17	.9	1.7	C 20	.1	1.7	C 14	.1
20	18	C 17	.8	1.0	C 20	.1	1.7	C 14	.1
21	16	C 17	.7	.5	C 20	T	2.2	C 14	.1
22	17	C 17	.8	0	--	0	2.5	C 14	.1
23	18	C 17	.8	.5	C 14	T	1.2	11	T
24	18	C 17	.8	.8	C 14	T	0	--	0
25	19	C 17	.9	.3	C 14	T	0	--	0
26	21	C 17	1.0	2.2	C 14	.1	0	--	0
27	32	65	A 5.6	3.2	C 14	.1	0	--	0
28	43	220	B 26	2.2	C 14	.1	0	--	0
29	43	280	A 33	.6	C 14	T	.2	10	T
30	42	160	A 18	--	--	--	0	--	0
31	40	77	8.3	--	--	--	42	251	S 31
Total	617	--	110.1	222.2	--	24.5	78.2	--	32.8

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.

WILLOW CREEK BASIN--Continued

14-360. WILLOW CREEK NEAR ARLINGTON, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	APRIL Mean discharge (cfs)	APRIL Suspended sediment Mean concentration (ppm)		APRIL Suspended sediment Tons per day	MAY Mean discharge (cfs)	MAY Suspended sediment Mean concentration (ppm)		MAY Suspended sediment Tons per day	JUNE Mean discharge (cfs)	JUNE Suspended sediment Mean concentration (ppm)		JUNE Suspended sediment Tons per day
1	43	336	S	41	0	--		0	5.2	--		0.2
2	52	360		51	0	--		0	5.6	87	J	1.6
3	44	150		18	3.6	C 12		.1	5.2	37		.5
4	33	30		2.7	5.6	C 12		.2	4.0	22	B	.2
5	23	25		1.6	6.0	C 12		.2	66	14000	S	12700
6	16	34		1.5	5.6	C 12		.2	68	16000	J	4600
7	15	C 23		.9	8.6	C 12		.3	37	10000	A	1000
8	10	C 23		.6	7.5	C 12		.2	35	1600		151
9	7.0	C 23		.4	8.0	C 12		.3	30	820	B	66
10	6.0	C 23		.4	7.5	C 12		.2	24	400		26
11	5.2	C 23		.3	7.0	C 12		.2	21	242		14
12	8.0	C 23		.5	7.5	C 12		.2	18	220		11
13	9.2	C 23		.6	7.5	C 12		.2	12	148		4.8
14	12	C 23		.7	8.0	C 12		.3	9.8	98	B	2.6
15	11	C 23		.7	8.6	C 12		.3	4.4	60		.7
16	7.5	C 23		.5	6.5	C 12		.2	3.6	41		.4
17	7.5	C 23		.5	5.6	C 12		.2	3.2	27	B	.2
18	6.0	C 23		.4	5.2	C 12		.2	2.0	19		.1
19	5.6	C 23		.3	3.2	C 12		.1	2.8	--		.2
20	4.4	C 23		.3	4.4	C 12		.1	2.8	--		.2
21	2.5	C 61		.4	3.6	C 12		.1	.9	19	S	.1
22	1.7	C 61		.3	2.5	C 12		.1	.2	--		T
23	.8	C 61		.1	2.5	C 12		.1	0	--		0
24	.3	C 61		T	3.2	C 12		.1	0	--		0
25	.3	C 61		T	5.2	C 12		.2	0	--		0
26	0	--		0	4.4	C 12		.1	0	--		0
27	0	--		0	4.8	C 12		.2	0	--		0
28	.3	26		T	4.4	C 12		.1	0	--		0
29	.3	20		T	5.2	C 12		.2	0	--		0
30	0	--		0	5.2	C 12		.2	0	--		0
31	--	--		--	4.8	C 12		.2	--	--		--
Total	331.6	--		123.8	161.7	--		5.3	360.7	--		18579.8

Day	JULY Mean discharge (cfs)	JULY Suspended sediment Mean concentration (ppm)	JULY Suspended sediment Tons per day	AUGUST Mean discharge (cfs)	AUGUST Suspended sediment Mean concentration (ppm)	AUGUST Suspended sediment Tons per day	SEPTEMBER Mean discharge (cfs)	SEPTEMBER Suspended sediment Mean concentration (ppm)	SEPTEMBER Suspended sediment Tons per day
1							0		0
2							0		0
3							0		0
4							0		0
5							0		0
6							0		0
7							0		0
8							0		0
9							0		0
10							0		0
11							0		0
12							0		0
13							0		0
14							0		0
15							0		0
16							0		0
17							.1		T
18							.6		T
19							.6		T
20							.6		T
21							.9		T
22							.9		T
23							.8		T
24							.9		T
25							.9		T
26							1.0		T
27							.8		T
28							.6	6	T
29							.6		T
30							.6		T
31							--		--
Total	0		0	0		0	9.9	--	0.1

Total discharge for year (cfs-days)..... 1,987.3
Total load for year (tons)..... 18,886.9

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

14-360. WILLOW CREEK NEAR ARLINGTON, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 29, 1964.....	0940	42		46	345	43	60	73	81	86	92	95	97	100				VPWC
June 5.....	1420	69		9.8	5230	138	74	95	100									PWC
June 8.....	0735	55		37	1720	172	56	82	100									PWC

ROCK CREEK BASIN

14-366. ROCK CREEK NEAR ROOSEVELT, WASH.

LOCATION.--At gaging station at bridge on State Highway 12, 3.8 miles downstream from Harrison Creek, 4.2 miles upstream from mouth, and 14 miles west of Roosevelt, Klickitat County.
DRAINAGE AREA (revised).--213 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum observed, 73°F May 18; minimum observed, 40°F Jan. 20, Feb. 6.
Sediment concentrations: Maximum daily, 580 ppm Jan. 25; minimum daily, no flow on many days during October, November, and July to September.
Sediment loads: Maximum daily, 1,110 tons Jan. 25; minimum daily, 0 tons on many days during October, November, and July to September.
EXTREMES, 1962-64.--Water temperatures: Maximum (revised), 75°F June 10, 18, 1963; minimum, freezing point Jan. 19, 20, 23, 24, 1963.
Sediment concentrations: Maximum daily, 7,500 ppm Feb. 3, 1963; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 44,000 tons Feb. 3, 1963; minimum daily, 0 tons on many days.
REMARKS.--No flow Oct. 1 to Nov. 4, July 19 to Sept. 30.

Temperature (°F) of water, water year October 1963 to September 1964

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

ROCK CREEK BASIN--Continued

14-366. ROCK CREEK NEAR ROOSEVELT, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964

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	4.0	--	T
2				0	--	0	4.0	--	T
3				0	--	0	4.0	--	T
4				0	--	0	4.0	--	T
5				0.1	--	T	4.4	--	T
6				.1	--	T	7.8 C	8	0.2
7				.1	--	T	9.6 C	8	.2
8				.6	22 B	T	9.6 C	8	.2
9				1.2	16	.1	9.6 C	8	.2
10				1.2	6 B	T	8.4 C	8	.2
11				1.5	--	T	7.2 C	8	.2
12				1.6	--	T	6.0 C	8	.1
13				1.8	--	T	6.0 C	8	.1
14				2.5	--	T	5.4 C	8	.1
15				2.1	--	T	6.0 C	8	.1
16				2.5	--	T	6.0 C	8	.1
17				2.7	--	T	5.4 C	8	.1
18				2.7	--	T	5.4 C	8	.1
19				2.9	--	T	6.0 C	8	.1
20				2.9	--	T	6.6 C	8	.1
21				3.2	--	T	7.2 C	8	.2
22				3.4	--	T	7.8 C	8	.2
23				3.4	--	T	8.4 C	8	.2
24				3.4	--	T	8.4 C	8	.2
25				3.4	--	T	9.0 C	8	.2
26				3.7	4	T	12	4	.1
27				3.4	--	T	12	-- E	.4
28				3.4	--	T	24	15 J	1.3
29				4.0	--	T	32	9 B	.8
30				4.0	--	T	25	6	.4
31				--	--	--	22	-- E	.3
Total	0		0	61.8	--	0.8	293.2	--	6.6

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	C 5	.3	180	15	7.3	40	C 4	.4
2	23	C 5	.3	141	6	2.3	39	C 4	.4
3	20	C 5	.3	121	5	1.6	35	C 4	.4
4	18	C 5	.2	110	4	1.2	34	C 4	.4
5	17	C 5	.2	119	11	3.5	48	C 7	.9
6	16	C 5	.2	93	6	1.5	43	C 7	.8
7	16	C 5	.2	82	C 5	1.1	39	C 7	.7
8	16	C 5	.2	77	C 5	1.0	38	C 7	.7
9	15	C 5	.2	72	C 5	1.0	35	C 7	.7
10	14	C 5	.2	82	C 5	1.1	35	C 7	.7
11	13	C 5	.2	89	C 5	1.2	41	C 7	.8
12	13	C 5	.2	78	C 5	1.1	54	C 7	1.0
13	13	C 5	.2	72	C 5	1.0	47	C 7	.9
14	13	C 5	.2	66	C 5	.9	45	C 7	.8
15	13	C 5	.2	64	C 5	.9	62	C 7	1.2
16	14	C 5	.2	56	C 5	.8	66	C 7	1.2
17	36	17	1.8	52	C 5	.7	67	C 7	1.3
18	53	14	2.3	47	C 5	.6	78	C 7	1.5
19	47	6	.9	47	C 5	.6	82	C 7	1.5
20	145	46 A	18	45	C 5	.6	80	C 7	1.5
21	95	13 S	3.7	43	C 5	.6	75	C 7	1.4
22	64	8	1.4	46	C 5	.6	75	C 7	1.4
23	44	8	1.0	47	C 5	.6	70	C 7	1.3
24	41	6	.7	50	C 5	.7	62	C 7	1.2
25	539	580 S	1110	46	C 5	.6	58	C 7	1.1
26	345	56	63	43	C 5	.6	52	C 7	1.0
27	222	17 B	10	41	C 5	.6	51	C 7	1.0
28	182	15 A	7.4	40	C 5	.5	58	C 7	1.1
29	195	11	5.8	39	C 5	.5	75	C 7	1.4
30	170	8 B	3.7	--	--	--	114	-- E	4.5
31	164	11 K	6.7	--	--	--	141	28 A	11
Total	2599	--	1174.2	2088	--	35.3	1839	--	44.2

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.
K Computed from estimated-concentration graph and subdividing day.

ROCK CREEK BASIN--Continued

14-366. ROCK CREEK NEAR ROOSEVELT, WASH.--Continued

Suspended sediment, water year October 1963 to September 1964--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	141	--	E 7.6	21	C 2	0.1	5.4	C 3	T
2	123	16	5.3	20	C 2	.1	5.0	C 3	T
3	110	7	2.1	19	C 2	.1	5.0	C 3	T
4	106	5	1.4	18	C 2	.1	5.4	C 3	T
5	102	6	1.7	18	C 2	.1	6.0	C 4	.1
6	89	8	1.9	17	C 2	.1	6.0	C 4	.1
7	85	C 5	1.1	16	C 2	.1	5.6	C 4	.1
8	85	C 5	1.1	14	C 2	.1	5.4	C 4	.1
9	85	C 5	1.1	14	C 2	.1	5.4	C 4	.1
10	80	C 5	1.1	14	C 2	.1	4.8	C 4	.1
11	72	C 5	1.0	13	C 2	.1	4.3	C 4	T
12	66	C 5	.9	12	C 2	.1	4.1	C 4	T
13	60	C 5	.8	12	C 2	.1	3.4	C 5	T
14	54	C 5	.7	12	C 2	.1	3.2	C 5	T
15	54	C 5	.7	11	C 2	.1	3.2	C 5	T
16	50	C 5	.7	10	C 2	.1	3.8	C 5	.1
17	46	C 5	.6	10	C 2	.1	3.8	C 5	.1
18	41	C 5	.6	9.2	C 2	.1	3.8	C 5	.1
19	39	C 5	.5	8.4	C 2	T	3.6	C 5	T
20	34	C 5	.5	8.4	C 2	T	3.2	C 5	T
21	31	C 5	.4	8.4	C 2	T	3.1	C 5	T
22	33	C 5	.4	8.4	C 2	T	2.6	C 5	T
23	33	C 5	.4	8.4	C 2	T	2.3	C 5	T
24	31	C 5	.4	7.6	C 2	T	1.9	C 2	T
25	28	C 1	.1	7.2	C 2	T	1.5	C 2	T
26	26	C 1	.1	7.2	C 2	T	1.2	C 2	T
27	25	C 1	.1	6.6	C 2	T	1.1	C 2	T
28	24	C 1	.1	6.6	C 2	T	1.1	C 2	T
29	22	C 1	.1	6.6	C 2	T	1.1	C 2	T
30	21	C 1	.1	6.6	C 2	T	1.0	C 2	T
31	--	--	--	5.6	C 2	T	--	--	
Total	1796	--	33.6	356.2	--	2.3	107.3	--	1.5

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	0.9		T						
2	.8		T						
3	.8	4	T						
4	.8		T						
5	.7		T						
6	.7		T						
7	.6		T						
8	.6		T						
9	.6		T						
10	.5		T						
11	.4		T						
12	.3		T						
13	.3		T						
14	.2		T						
15	.2		T						
16	.1		T						
17	.1		T						
18	.1		T						
19	0								
20	0								
21	0								
22	0								
23	0								
24	0								
25	0								
26	0								
27	0								
28	0								
29	0								
30	0								
31	0								
Total	8.7		0.1	0		0	0		0

Total discharge for year (cfs-days)..... 9,149.2
Total load for year (tons)..... 1,298.6

E Estimated.
T Less than 0.05 ton.
C Composite period.

JOHN DAY RIVER BASIN

14-480. JOHN DAY RIVER AT McDONALD FERRY, OREG.

LOCATION.--At gaging station at McDonald Ferry, 0.8 mile downstream from Rock Creek, and 10 miles east of Klondike, Sherman County, and at mile 20.9.
DRAINAGE AREA.--7,580 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1911 to August 1912, August 1960 to July 1962.
Water temperatures: October 1962 to September 1964.
Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 83°F Aug. 22, 23; minimum, freezing point Dec. 11, 12.
Sediment concentrations: Maximum daily, 1,540 ppm Apr. 1; minimum daily, 3 ppm July 12, 13.
Sediment loads: Maximum daily, 33,000 tons Apr. 2; minimum daily, 1 ton on several days during August and September.
EXTREMES, 1962-64.--Water temperatures: Maximum (1963-64), 83°F Aug. 22, 23, 1964; minimum, freezing point during winter months.
Sediment concentrations: Maximum daily, 9,200 ppm Feb. 3, 1963; minimum daily, 2 ppm Oct. 11, 1962.
Sediment loads: Maximum daily, 310,000 tons Feb. 3, 1963; minimum daily, 1 ton Oct. 11, 1962, Aug. 11, 12, 1963, and on several days during August and September 1964.
REMARKS.--Stream partly frozen over Dec. 11, 12, Jan. 21, 22, 26, 27.

Temperature (°F) of water, water year October 1963 to September 1964

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

JOHN DAY RIVER BASIN--Continued

14-480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964
(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..	280	C 10	8	394	C 16	17	581	C 17	27
2..	280	C 10	8	381	C 16	16	535	C 17	25
3..	260	C 10	7	381	C 16	16	462	C 17	21
4..	260	C 10	7	388	C 16	17	434	C 17	20
5..	260	C 10	7	381	C 16	16	434	C 17	20
6..	240	C 10	6	381	C 16	16	434	C 17	20
7..	240	C 10	6	388	C 16	17	420	C 17	19
8..	240	C 10	6	434	--	35	448	C 17	21
9..	240	C 10	6	476	--	60	520	--	35
10..	240	C 10	6	558	C 74	111	662	40	71
11..	240	C 10	6	605	C 74	121	650	--	65
12..	240	C 10	6	704	C 74	141	600	--	55
13..	240	C 10	6	704	C 74	141	490	--	40
14..	260	C 10	7	654	C 74	131	420	--	28
15..	260	C 10	7	605	C 74	121	520	--	40
16..	260	C 10	7	573	C 74	114	498	--	27
17..	280	C 10	8	581	--	120	573	C 22	34
18..	280	C 10	8	621	--	130	605	C 22	36
19..	300	C 10	8	722	--	140	597	C 22	35
20..	300	C 10	8	645	44	77	589	C 22	35
21..	280	C 10	8	589	--	55	589	C 22	35
22..	280	C 10	8	581	--	55	605	C 22	36
23..	280	C 10	8	573	33	51	621	C 22	37
24..	300	C 16	13	573	--	50	605	C 22	36
25..	300	C 16	13	565	--	45	573	C 22	34
26..	320	C 16	14	565	28	43	558	C 22	33
27..	340	C 16	15	581	--	45	542	C 22	32
28..	360	C 16	16	581	--	40	573	1500 A	2300
29..	380	C 16	16	581	--	34	589	230	366
30..	400	C 16	17	581	18	28	704	95	180
31..	414	C 16	18	--	--	--	920	260 J	690
Total	8854	--	284	16346	--	2003	17351	--	4453

	JANUARY			FEBRUARY			MARCH		
1..	930	230	578	1240	369	1240	838	C 27	61
2..	856	95 B	220	1150	260 B	810	874	C 27	64
3..	856	102	236	1110	190	569	892	C 27	65
4..	901	103	251	1110	--	500	892	C 27	65
5..	990	140 B	370	1010	--	350	856	C 27	62
6..	856	95	220	990	--	280	838	C 27	61
7..	802	60 B	130	990	--	230	874	C 27	64
8..	766	40	83	970	--	150	910	C 27	66
9..	802	--	100	838	C 24	54	874	C 27	64
10..	766	--	70	874	C 24	57	838	C 27	61
11..	713	--	50	910	C 24	59	820	C 27	60
12..	679	--	42	950	C 24	62	829	C 27	60
13..	662	--	35	970	C 24	63	838	C 27	61
14..	613	16	26	980	C 24	64	847	C 27	62
15..	581	--	24	910	C 24	59	910	C 27	66
16..	550	--	22	920	C 24	60	892	C 27	65
17..	565	--	24	910	C 24	59	874	C 27	64
18..	605	--	35	901	C 24	58	970	47	123
19..	696	--	50	874	C 24	57	1200	67	217
20..	722	30 B	58	856	C 24	55	1500	153	620
21..	700	67	127	874	C 24	57	1730	250	1170
22..	800	55 B	120	950	C 24	62	1790	275	1330
23..	910	85	209	901	C 24	58	1760	236	1120
24..	838	60 B	140	892	C 24	58	1680	165	748
25..	802	50 B	110	910	C 24	59	1640	121	536
26..	800	110 B	240	910	C 24	59	1500	81	328
27..	900	160 A	390	930	C 24	60	1370	--	260
28..	1220	290 A	960	838	C 24	54	1340	--	230
29..	1600	500 A	2200	820	C 24	53	1340	--	220
30..	1500	370	1500	--	--	--	1550	110 J	520
31..	1340	350 B	1300	--	--	--	3210	1100 S	11700
Total	26321	--	9920	27488	--	5356	37276	--	20193

S Computed by subdividing day.
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.

JOHN DAY RIVER BASIN--Continued

14-480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--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	5380	1540	22400	3200	90 B	780	3500	55	520
2	7650	1470 S	33000	3640	100 B	980	3380	270	2460
3	7200	889	17300	3580	72	696	3580	90 A	870
4	4910	360	4770	3200	51	441	3840	120 A	1200
5	4310	210	2440	2850	33	254	3620	175	1710
6	4220	150	1710	2620	26 B	180	3700	98	979
7	3820	117	1210	2390	--	160	4660	200	2520
8	3500	109	1030	2210	25	149	4990	200	2700
9	3660	117	1160	2180	27	159	5080	175	2400
10	4180	180	2030	2210	28	167	4640	115	1440
11	4440	172	2060	2420	34	222	4120	90	1000
12	4840	188	2460	2830	49	374	4860	110	1440
13	4880	183	2410	3110	52	437	4530	112	1370
14	4120	128	1420	3380	65	593	4100	92	1020
15	4000	102	1100	3780	94	959	3740	63	636
16	4640	142	1780	3640	88	865	3540	46	440
17	4910	169	2240	3580	72	696	3540	48	459
18	4440	122	1460	3840	86	892	3480	45	423
19	3640	76	747	4180	123	1390	3310	34	304
20	3240	74	647	4400	160	1900	3580	49	474
21	3060	52	430	4660	161	2030	3340	36	325
22	3090	52	434	4800	164	2130	3060	29	240
23	3200	50	432	4400	114	1350	3110	30	252
24	3340	58	523	3780	72	735	2750	24	178
25	3020	--	320	3290	45	400	2490	23	155
26	2850	26	200	2990	40	323	2280	28	172
27	2760	32	238	2730	35	258	2100	17	96
28	2620	29	205	2520	29	197	1970	16	85
29	2520	26	177	2490	22	148	1800	14	68
30	2600	41 A	290	2850	37 J	300	1670	12	54
31	--	--	--	3740	69	697	--	--	--
Total	121040	--	106623	101490	--	20862	104360	--	25990

Day	JULY			AUGUST			SEPTEMBER		
1	1500	13	53	204	C 9	5	89	C 5	1
2	1390	10	38	214	C 9	5	89	C 5	1
3	1290	9	31	237	C 9	6	92	C 5	1
4	1160	24	75	343	C 9	8	95	C 5	1
5	1070	70 A	200	400	--	15	107	C 5	1
6	1010	14	38	381	12	12	107	C 5	1
7	930	4	10	343	C 10	9	107	C 5	1
8	883	15	36	307	C 10	8	174	--	9
9	811	8	18	274	C 10	7	174	15	7
10	775	6	13	253	C 10	7	158	13	6
11	704	6	11	237	C 10	6	147	C 8	3
12	662	3	5	214	C 8	5	140	C 8	3
13	581	3	5	200	C 8	4	140	C 8	3
14	662	5	9	195	C 8	4	144	C 8	3
15	654	8	14	179	C 8	4	133	C 8	3
16	581	75	118	158	C 8	3	130	C 8	3
17	550	160	238	147	C 8	3	126	C 8	3
18	498	590	793	136	C 8	3	122	C 8	3
19	483	450	587	130	C 8	3	119	C 8	3
20	469	140	177	126	C 8	3	122	C 8	3
21	427	54	62	122	C 5	2	126	C 8	3
22	394	27	29	113	C 5	2	130	C 8	3
23	362	17	17	101	C 5	1	130	C 8	3
24	349	13	12	95	C 5	1	136	C 8	3
25	325	C 12	11	95	C 5	1	136	C 8	3
26	284	C 12	9	92	C 5	1	130	C 8	3
27	258	C 12	8	84	C 5	1	133	C 8	3
28	237	C 12	8	79	C 5	1	144	C 8	3
29	233	C 12	8	79	C 5	1	158	C 8	3
30	200	C 12	6	92	C 5	1	162	C 8	3
31	183	C 12	6	95	C 5	1	--	--	--
Total	19915	--	2645	5725	--	133	3900	--	89

Total discharge for year (cfs-days)..... 490,066
Total load for year (tons)..... 198,551

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

JOHN DAY RIVER BASIN--Continued

14-480. JOHN DAY RIVER AT McDONALD FERRY, OREG.--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 29, 1964.....	1145	44		1620	639	2790	14	22	43	69	93	99	100	--	--			VPWC
Feb. 1.....	1140	42		1240	365	1220	47	64	81	93	99	100	--	--	--			PWC
Mar. 31.....	1540	57		3780	1240	12700	14	20	32	49	75	92	97	100	--			VPWC
Mar. 31.....	2200	54		4580	2170	26800	10	14	28	49	75	92	97	100	--			VPWC
Apr. 1.....	1120	55		6300	2030	34500	12	18	26	41	64	83	95	99	100			VPWC
Apr. 2.....	1255	51		9360	2190	55300	12	19	29	41	62	78	92	98	100			VPWC

DESCHUTES RIVER BASIN

14-765. DESCHUTES RIVER NEAR CULVER, OREG.

LOCATION.--Temperature recorder at gaging station, 2.5 miles downstream from Squaw Creek, 6.0 miles southwest of Culver, Jefferson County, and at mile 120.6.
DRAINAGE AREA.--2,705 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1952 to September 1957, January 1959 to August 1961, July 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F July 11, 13, 17; minimum, 38°F Dec. 11-14.
EXTREMES, 1952-57, 1959-64.--Water temperatures: Maximum, 64°F July 13, 17, 1956; minimum, 36°F Jan. 12, 13, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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	52	52	52	51	51	51	50	50	50	50	50	50	50	50	50	50	50	50	49	50	50	50	50	50	50	49	48	48	48	48	50
Minimum	51	51	51	51	51	51	50	50	50	50	50	50	50	50	50	50	50	50	49	49	49	50	50	50	49	48	48	48	48	48	48	50
November																																
Maximum	48	46	46	46	46	46	46	46	46	46	46	46	46	46	46	45	45	45	45	45	44	43	43	43	44	45	45	44	43	42	--	45
Minimum	46	46	46	46	46	46	45	45	45	45	46	46	45	46	45	45	45	44	44	44	43	43	43	43	43	44	44	43	42	42	--	45
December																																
Maximum	42	43	43	43	44	44	41	42	42	41	39	38	38	39	40	42	42	42	42	42	42	42	42	42	42	42	44	44	44	44	44	42
Minimum	41	41	43	43	43	41	41	41	41	39	38	38	38	38	39	40	42	42	42	42	42	42	42	42	42	42	42	44	44	44	43	41
January																																
Maximum	43	43	43	42	42	42	42	42	41	41	40	41	41	40	40	41	41	42	41	41	41	41	41	42	43	45	46	46	47	47	47	42
Minimum	43	43	42	42	42	42	42	41	41	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	42	43	45	46	47	47	44	42
February																																
Maximum	44	44	43	44	44	43	42	42	44	45	45	44	43	42	42	42	43	44	44	44	44	45	45	45	45	45	45	45	44	--	--	44
Minimum	44	43	43	43	43	42	41	42	42	44	44	43	42	42	42	42	42	43	44	43	43	44	44	44	43	44	44	44	44	--	--	43
March																																
Maximum	46	46	47	48	48	48	45	44	45	45	45	45	45	46	48	48	48	48	48	47	47	48	48	47	46	48	49	49	50	51	51	47
Minimum	44	46	46	47	48	45	44	44	44	45	45	45	44	44	46	47	47	47	47	46	47	47	47	46	46	46	48	48	48	50	51	46
April																																
Maximum	51	51	50	51	51	50	51	52	52	51	51	51	52	52	52	52	51	51	52	51	52	52	51	51	52	52	51	53	53	52	--	51
Minimum	50	49	49	50	50	50	49	50	51	49	50	49	49	50	51	50	49	49	49	50	50	50	50	50	50	50	50	50	51	51	--	50
May																																
Maximum	52	52	51	52	52	52	53	53	53	53	54	54	54	53	53	53	54	54	54	55	54	54	54	54	54	55	55	54	55	55	55	54
Minimum	50	49	49	50	50	50	50	50	51	51	50	51	51	51	51	51	51	52	53	53	52	52	51	52	51	51	53	53	53	53	53	51
June																																
Maximum	55	55	54	54	54	55	55	54	54	55	55	55	55	55	55	54	55	54	55	55	55	56	56	56	56	56	56	56	55	56	--	55
Minimum	53	54	53	54	54	54	54	53	53	53	53	53	53	53	54	53	53	53	52	53	52	52	53	53	53	54	53	52	53	52	--	53
July																																
Maximum	--	--	--	--	--	--	--	56	56	56	57	55	57	55	56	56	57	56	56	56	56	56	56	56	55	56	55	55	56	55	54	--
Minimum	--	--	--	--	--	--	--	54	53	53	54	54	54	54	54	53	53	54	53	53	54	53	53	53	52	53	52	53	53	53	52	--
August																																
Maximum	54	54	54	54	54	55	55	55	55	55	56	56	55	55	55	55	56	55	54	55	55	55	55	55	55	54	54	54	54	53	53	55
Minimum	52	52	52	53	52	52	53	53	53	53	53	54	53	53	53	53	53	53	53	53	53	53	53	53	53	53	52	53	52	52	52	53
September																																
Maximum	53	53	53	53	53	53	53	52	52	52	52	52	53	53	53	53	53	52	52	52	52	53	53	53	53	53	52	52	52	52	--	53
Minimum	52	51	51	51	51	51	51	51	51	51	51	51	51	52	51	51	52	51	51	51	50	51	52	52	52	51	51	51	51	52	--	51

DESCHUTES RIVER BASIN--Continued

14-874. CROOKED RIVER BELOW OPAL SPRINGS, NEAR CULVER, OREG.

LOCATION.--Temperature recorder at gaging station, 800 feet below Opal Springs, 4.8 miles southwest of Culver, Jefferson County, and at mile 6.7.
DRAINAGE AREA.--4,300 square miles, approximately, of which 500 square miles is probably noncontributing.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 59°F on many days during June and July; minimum, 48°F on several days during February.

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54	54	54	54	53	53	53	53	53	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54	54	53	53	53	53	53	53	52	--
November																																
Maximum	53	53	53	53	53	53	53	53	53	53	53	53	53	53	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	51	--	52
Minimum	52	53	53	53	53	53	53	53	53	53	53	53	53	52	52	52	52	52	52	52	52	52	52	52	52	52	51	51	51	51	--	52
December																																
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
Minimum	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
January																																
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
Minimum	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
February																																
Maximum	51	51	51	51	51	51	51	51	51	51	51	51	51	51	50	50	50	49	49	49	49	49	49	49	49	49	49	48	49	--	--	50
Minimum	51	51	51	51	51	51	51	51	51	51	51	51	51	50	50	50	49	49	49	48	48	48	48	49	49	48	48	48	48	--	--	50
March																																
Maximum	50	50	50	50	50	50	50	50	50	50	50	50	50	50	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	52	51
Minimum	49	49	50	50	50	50	50	50	50	50	50	50	50	50	50	51	51	51	51	51	51	51	51	50	51	50	50	51	51	51	51	50
April																																
Maximum	52	52	52	51	51	51	50	50	51	51	50	50	51	52	52	52	52	51	52	52	52	52	52	52	52	52	52	54	54	54	--	52
Minimum	52	51	51	51	51	50	49	50	50	50	50	50	50	51	52	52	51	51	51	52	52	52	52	52	51	52	52	52	54	54	--	51
May																																
Maximum	54	54	54	54	54	54	54	54	54	55	55	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	57	55
Minimum	54	54	54	54	54	54	54	54	54	54	54	55	56	56	56	56	55	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55
June																																
Maximum	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	59	59	59	59	59	--	58
Minimum	57	58	58	58	58	58	58	58	58	57	58	58	58	58	58	58	58	58	57	58	58	58	58	58	58	58	59	59	59	59	--	58
July																																
Maximum	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	59
Minimum	59	59	59	59	59	59	59	59	59	58	58	59	58	59	59	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
August																																
Maximum	58	58	58	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Minimum	58	58	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	56	56	56	57
September																																
Maximum	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	--	56
Minimum	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	55	56	56	--	56

DESCHUTES RIVER BASIN--Continued

14-915. METOLIUS RIVER NEAR GRANDVIEW, OREG.

LOCATION.--Temperature recorder at gaging station at Monty Forest Camp, 9 miles northwest of Grandview, Jefferson County, and 15 miles northwest of Culver.
DRAINAGE AREA.--316 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 55°F Aug. 7, 9; minimum, 40°F on several days during winter months.
EXTREMES, 1952-64.--Water temperatures: Maximum, 56°F July 5, 1957; minimum, 37°F Jan. 30, 31, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

DESCHUTES RIVER BASIN--Continued

14-1030. DESCHUTES RIVER AT MOODY, NEAR BIGGS, OREG.

LOCATION.--Temperature recorder at gaging station at Moody, Sherman County, 4 miles southwest of Biggs, and at mile 1.4.
DRAINAGE AREA.--10,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1911 to July 1912, December 1952 to February 1954.
Water temperatures: December 1952 to February 1954, November 1954 to September 1958, June 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 12, 13; minimum, 41°F Dec. 11-14, Jan. 23-25.
EXTREMES, 1952-58, 1962-64.--Water temperatures: Maximum, 72°F July 12, 13, 1964; minimum, 33°F Dec. 30, 1955.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1057. COLUMBIA RIVER NEAR THE DALLES, OREG.

LOCATION.--At The Dalles Dam, 3.2 miles upstream from gaging station, and 2.6 miles northeast of The Dalles, Wasco County.
DRAINAGE AREA.--237,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1964.
Water temperatures: December 1950 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 147 ppm Feb. 1-14; minimum, 70 ppm June 4-16.
Hardness: Maximum, 95 ppm Feb. 1-14; minimum, 47 ppm June 4-16.
Specific conductance: Maximum daily, 254 micromhos Feb. 4; minimum daily, 97 micromhos June 11.
Water temperatures: Maximum, 69°F Aug. 24, 25; minimum, 41°F on many days during January and February.
EXTREMES, 1950-64.--Dissolved solids: Maximum, 163 ppm Dec. 2-11, 14, 1955; minimum, 69 ppm June 1-30, 1962.
Hardness: Maximum, 104 ppm Dec. 21-31, 1952; minimum, 38 ppm May 18-31, 1958.
Specific conductance: Maximum daily, 324 micromhos Dec. 7, 1955; minimum daily, 97 micromhos June 11, 1964.
Water temperatures: Maximum, 81°F Aug. 12, 13, 1958; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. 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 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	91720	9.2		22	6.7	9.8	1.7	93		20	4.8	0.3	0.5	0.04	124	0.17	30710	82	6	0.5	204	7.6
Nov. 1-18.....	90320	--		--	--	11	--	97		--	--	--	--	--	132	.18	32190	85	5	.5	215	7.8
Nov. 19-Dec. 3....	92240	--		--	--	11	--	98		--	--	--	--	--	130	.18	32380	84	4	.5	214	7.9
Dec. 4-19.....	98060	--		--	--	10	--	94		--	--	--	--	--	119	.16	31510	81	4	.5	205	7.9
Dec. 20-Jan. 2, 1964.....	90860	--		--	--	11	--	102		--	--	--	--	--	135	.18	33120	89	5	.5	228	7.9
Jan. 3-31.....	93360	13		22	8.7	11	1.9	104		24	5.8	.2	1.1	.02	141	.19	35540	91	6	.5	232	7.8
Feb. 1-14.....	103200	--		--	--	13	--	107		--	--	--	--	--	147	.20	40960	95	7	.6	242	7.9
Feb. 15-26.....	113800	--		--	--	10	--	99		--	--	--	--	--	130	.18	39940	88	7	.5	216	7.8
Feb. 27-Mar. 26...	105300	--		--	--	10	--	103		--	--	--	--	--	136	.18	38670	92	8	.5	228	8.1
Mar. 27-Apr. 12...	119600	--		--	--	10	--	99		--	--	--	--	--	135	.18	43590	87	6	.5	220	8.1
Apr. 13-22.....	145300	15		19	6.2	8.8	1.6	84		17	3.8	.3	1.6	.00	116	.16	45510	73	4	.4	186	7.9
Apr. 23-May 20....	206500	--		--	--	7.1	--	77		--	--	--	--	--	111	.15	61890	67	4	.4	169	7.5
May 21-June 3.....	409900	--		--	--	4.3	--	65		--	--	--	--	--	93	.13	102930	60	7	.2	142	7.5
June 4-16.....	564100	--		--	--	2.8	--	52		--	--	--	--	--	70	.10	106610	47	4	.2	107	7.2
June 17-July 10...	539200	--		--	--	3.5	--	62		--	--	--	--	--	80	0.11	116470	56	5	0.2	129	7.4
July 11-Aug. 4....	301600	5.8		18	3.8	2.7	1.2	66		10	1.5	0.1	0.1	0.00	78	.11	63520	60	6	.2	133	7.5
Aug. 5-Sept. 2....	151500	--		--	--	3.9	--	74		--	--	--	--	--	81	.11	33130	65	4	.2	147	7.5
Sept. 3-30.....	104800	--		--	--	6.5	--	81		--	--	--	--	--	96	.13	27160	70	4	.3	171	7.7
Weighted average	--	--		--	--	6.0	--	76		--	--	--	--	--	99	0.13	49300	67	5	0.3	161	7.5
Time-weighted average.....	184191	--		--	--	7.9	--	86		--	--	--	--	--	113	--	--	76	5	0.3	186	7.6
Tons per day....	--	--		--	--	3000	--	37670		--	--	--	--	--	--	--	--	--	--	--	--	--

COLUMBIA RIVER MAIN STEM--Continued

14-1057. COLUMBIA RIVER NEAR THE DALLES, OREG.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

KLICKITAT RIVER BASIN

14-1130. KLICKITAT RIVER NEAR PITT, WASH.

LOCATION.--Temperature recorder at gaging station, 3.5 miles south of Pitt, Klickitat County, 5 miles upstream from Silvias Creek, and 7 miles upstream from mouth at Lyle.
DRAINAGE AREA.--1,297 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
Water temperatures: August 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F July 12, 13, 25-27; minimum, 34°F Dec. 11-13.
EXTREMES, 1950--64.--Water temperatures: Maximum, 69°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.

Temperature (°F) of water, water year October 1963 to September 1964

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

COLUMBIA RIVER MAIN STEM

14-1427. COLUMBIA RIVER AT WASHOUGAL, WASH.

LOCATION.--Cross-section No. 2, at Washougal, Clark County, on a line perpendicular to stream channel and through navigation light 50, 1.1 miles downstream from Reed Island, and 1.8 miles upstream from the mouth of Washougal River.
RECORDS AVAILABLE.--Chemical analyses: February to September 1964.
REMARKS.--Samples for chemical and biological analyses collected at quarters points A (right bank), B (center), and C (left bank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^{+6})	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	0925	A	42	97	0		1.3		0.0	Trace	18.6	7.8				210	7.9	0.12	0.14	0.1	0.0
Feb. 19.....	0920	B	42	97	0		3.2		.0	--	--	--				210	7.9	.12	.15	.4	.0
Feb. 19.....	0910	C	42	96	0		1.7		.0	--	--	--				211	7.7	.12	.12	.2	.0
Mar. 4.....	0938	A	43	96	0		.7		.0	--	--	--				210	7.8	.09	.11	.7	.0
Mar. 4.....	0935	B	43	96	0		.3		.0	--	--	--				210	7.8	.09	.11	1.0	.0
Mar. 4.....	0925	C	43	96	0		.2		.0	Trace	11.0	3.3				210	7.8	.09	.12	.5	.0
Mar. 18.....	0933	A	44	98	0		1.1		.0	Trace	23	7				210	8.0	.05	.10	.5	.0
Mar. 18.....	0930	B	44	97	0		.9		.0	Trace	23	7				212	7.7	.05	.11	.2	.0
Mar. 18.....	0920	C	44	96	0		1.1		.0	Trace	23	7				210	7.7	.05	.10	.1	.0
Apr. 1.....	0925	A	47	100	0		.9		.0	1	40	13				216	8.0	.04	.17	.4	.0
Apr. 1.....	0920	B	46	100	0		1.2		.0	1	40	13				218	8.0	.06	.18	.5	.0
Apr. 1.....	0915	C	47	99	0		1.4		.0	1	40	13				218	7.9	.05	.11	.7	.0
Apr. 15.....	0945	A	50	93	0		2.2		.0	Trace	28	11				205	7.9	.09	.22	.5	.0
Apr. 15.....	0940	B	50	90	0		1.6		.0	Trace	28	11				202	7.7	.11	.23	.7	.0
Apr. 15.....	0933	C	50	92	0		1.4		.0	Trace	28	11				202	7.8	.11	.27	.9	.0
Apr. 29.....	0955	A	51	74	0		1.4		.0	Trace	46	16				156	7.9	.05	.16	.2	.0
Apr. 29.....	0950	B	51	73	0		1.2		.0	Trace	46	16				156	7.7	.05	.17	.3	.0
Apr. 29.....	0945	C	51	73	0		1.4		.0	Trace	46	16				156	7.9	.05	.14	.4	.0
May 13.....	0945	A	53	75	0		1.2		2.0	Trace	44	16				161	7.8	.07	.28	.3	.0
May 13.....	0940	B	53	75	0		1.9		.0	Trace	44	16				161	8.0	.07	.23	.1	.0
May 13.....	0935	C	53	75	0		1.1		.0	Trace	44	16				161	7.9	.07	.23	.5	.0
May 27.....	0925	A	56	64	0		1.3		3.0	--	--	--				136	7.7	.08	.29	.4	.0
May 27.....	0922	B	56	64	0		1.4		.0	--	--	--				136	7.6	.11	.30	.0	.0
May 27.....	0915	C	56	64	0		1.4		.0	--	--	--				136	7.7	.07	.32	.3	.0

June 10, 1964....	0920	A	56	50	0		.8		1.0	--	--	--			101	7.2	.06	.25	.3	.0
June 10.....	0915	B	56	50	0		1.4		2.0	--	--	--			101	7.5	.06	.31	.3	.0
June 10.....	0910	C	56	50	0		1.3		7.0	--	--	--			101	7.5	.06	.15	.2	.0
June 24.....	0925	A	59	61	0		.9		.0	--	--	--			125	7.8	.05	.26	.2	.0
June 24.....	0920	B	59	61	0		.2		.0	--	--	--			125	7.8	.05	.29	.2	.0
June 24.....	0910	C	59	60	0		.3		.0	--	--	--			125	7.6	.05	.27	.1	.0
July 22.....	0940	A	65	65	1		1.3		2.0	--	--	--			129	8.4	.01	.15	.5	.0
July 22.....	0930	B	65	64	1		1.3		1.0	--	--	--			131	8.4	.01	.16	.1	.0
July 22.....	0925	C	65	64	1		1.6		.0	--	--	--			131	8.3	.01	.14	.1	.0
Aug. 5.....	0935	A	65	69	0		1.2		4.0	Trace	14	4			137	7.9	.01	.17	.2	.0
Aug. 5.....	0930	B	65	70	0		1.8		2.0	Trace	14	4			138	7.9	.01	.21	.1	.0
Aug. 5.....	0920	C	65	69	0		1.9		4.0	Trace	14	4			138	8.2	.01	.19	.0	.0
Aug. 19.....	0940	A	66	71	0		1.7		.0	Trace	18	6			141	8.1	.01	.07	.4	.0
Aug. 19.....	0935	B	66	70	0		1.4		.0	Trace	18	6			141	8.0	.01	.06	.3	.0
Aug. 19.....	0925	C	67	70	0		1.8		3.0	Trace	18	6			141	8.2	.01	.07	.7	.0
Sept. 2.....	0945	A	63	76	0		1.4		.0	1	26	11			152	8.1	.01	.05	.0	.0
Sept. 2.....	0940	B	63	75	0		.9		.0	1	26	11			150	8.1	.01	.05	.1	.0
Sept. 2.....	0934	C	63	75	0		.9		.0	1	26	11			150	8.1	.01	.05	.2	.0
Sept. 16.....	0935	A	64	82	0		1.2		.0	Trace	38	13			171	8.1	.01	.04	.0	.0
Sept. 16.....	0940	B	64	81	0		1.0		.0	Trace	38	13			171	8.0	.01	.05	.0	.0
Sept. 16.....	0945	C	64	82	0		1.0		.0	Trace	38	13			171	8.0	.01	.07	.1	.0
Sept. 30.....	0934	A	62	82	0		1.8		2	--	--	--			172	7.8	.01	.08	.1	.0
Sept. 30.....	0930	B	63	82	0		1.6		1	--	--	--			173	7.9	.01	.07	.0	.0
Sept. 30.....	0920	C	63	82	0		1.2		0	--	--	--			172	7.9	.02	.07	.3	.0

COLUMBIA RIVER MAIN STEM--Continued

14-1447. COLUMBIA RIVER AT VANCOUVER, WASH.

LOCATION.--Cross-section No. 3, on upstream side of Interstate bridge, 0.5 mile south of Vancouver, Clark County.
RECORDS AVAILABLE.--Chemical analyses: February to September 1964.
REMARKS.--Samples for chemical and biological analyses collected at quarter points A (right bank), B (center), and C (left bank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^6)	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	1200	A	43	94	0		2.4		1.0	1	36.6	14.3				206	7.7	0.26	0.27	0.5	0.0
Feb. 19.....	1205	B	43	96	0		1.7		.0	1	36.6	14.3				208	7.8	.13	.14	.3	.0
Feb. 19.....	1215	C	43	94	0		1.9		.0	1	36.6	14.3				205	7.8	.17	.18	.3	.0
Mar. 4.....	1230	A	43	92	0		5.1		130.0	Trace	35.3	15.4				205	7.2	.05	.09	.2	.0
Mar. 4.....	1235	B	43	92	0		4.3		228.0	Trace	35.3	15.4				204	7.5	.08	.11	.3	.0
Mar. 4.....	1240	C	43	92	0		2.6		97.0	Trace	35.3	15.4				206	7.4	.08	.10	.6	.0
Mar. 18.....	1220	A	44	95	0		1.3		.0	1	42	12				205	7.6	.04	.10	.3	.0
Mar. 18.....	1225	B	44	96	0		1.3		.0	1	42	12				207	7.7	.05	.10	.6	.0
Mar. 18.....	1230	C	44	92	0		1.3		.0	1	42	12				202	7.8	.04	.11	.6	.0
Apr. 1.....	1155	A	47	96	0		1.2		.0	Trace	27	10				214	7.9	.04	.13	.4	.0
Apr. 1.....	1200	B	47	98	0		1.5		.0	Trace	27	10				215	8.0	.05	.15	.6	.0
Apr. 1.....	1203	C	47	95	0		1.5		.0	Trace	27	10				210	8.0	.04	.16	.9	.0
Apr. 15.....	1250	A	50	92	0		1.5		.0	1	41	19				206	7.8	.11	.23	.5	.0
Apr. 15.....	--	B	50	92	0		1.1		.0	1	41	19				205	7.8	.11	.24	.9	.0
Apr. 15.....	1300	C	51	90	0		1.4		.0	1	41	19				198	7.8	.09	.20	.7	.0
Apr. 29.....	1205	A	51	73	0		1.4		.0	Trace	19	6				156	7.7	.06	.14	.6	.0
Apr. 29.....	1200	B	51	72	0		1.4		.0	Trace	19	6				156	7.6	.05	.16	.6	.0
Apr. 29.....	1155	C	51	72	0		1.3		.0	Trace	19	6				154	7.6	.05	.16	.5	.0
May 13.....	1220	A	54	75	0		1.3		.0	Trace	651	58				160	7.8	.07	.18	.3	.0
May 13.....	1225	B	53	74	0		1.0		.0	Trace	651	58				160	7.8	.08	.23	.5	.0
May 13.....	1230	C	53	73	0		1.2		.0	Trace	651	58				156	7.8	.07	.20	.6	.0
May 27.....	1225	A	57	64	0		1.2		1.0	--	--	--				137	7.8	.07	.33	.7	.0
May 27.....	1230	B	56	64	0		1.5		12.0	--	--	--				137	7.7	.07	.29	.3	.0
May 27.....	1235	C	56	64	0		1.3		2.0	--	--	--				137	--	.07	.36	.6	.0

June 10, 1964....	1145	A	56	50	0		1.1		3.0	--	--	--			102	7.4	.05	.36	.3	.0
June 10.....	1150	B	56	50	0		.6		16.0	--	--	----			102	7.4	.05	.49	.3	.0
June 10.....	--	C	56	50	0		1.4		1.0	--	--	--			102	7.4	.06	.24	.4	.0
June 24.....	1155	A	60	61	0		.9		.0	--	--	--			125	7.6	.05	.26	.1	.0
June 24.....	1205	B	60	60	0		.2		1.0	--	--	--			126	7.4	.05	.22	.2	.0
June 24.....	1207	C	60	61	0		.3		.0	--	--	--			125	7.6	.05	.24	.1	.0
July 8.....	1200	A	62	64	0		1.3		0.0	--	--	--			128	7.8	.02	.15	.5	.0
July 8.....	1205	B	62	64	0		1.0		.0	--	--	--			128	7.9	.02	.14	.1	.0
July 8.....	1210	C	62	64	0		1.0		.0	--	--	--			128	8.0	.02	.14	.1	.0
July 22.....	1215	A	65	67	0		1.3		.0	--	--	--			131	8.2	.01	.15	.3	.0
July 22.....	1220	B	65	64	1		1.1		.0	--	--	--			130	8.3	.01	.14	.0	.0
July 22.....	1225	C	65	67	0		1.5		6.0	--	--	--			130	8.2	.01	.15	.1	.0
Aug. 5.....	1155	A	66	70	0		1.3		6.0	--	--	--			138	7.8	.01	.15	.0	.0
Aug. 5.....	1157	B	66	69	0		1.2		3.0	--	--	--			137	8.1	.01	.14	.1	.0
Aug. 5.....	1200	C	66	69	0		1.6		2.0	--	--	--			137	7.9	.01	.15	.1	.0
Aug. 19.....	1230	A	67	71	0		1.7		5.0	Trace	32	9			142	8.0	.01	.08	.6	.0
Aug. 19.....	1233	B	67	71	0		1.6		.0	Trace	32	9			140	8.0	.01	.06	.2	.0
Aug. 19.....	1240	C	67	70	0		1.8		1.0	Trace	32	9			140	8.1	.02	.08	.2	.0
Sept. 2.....	1228	A	63	76	0		1.3		.0	2	105	24			152	8.0	.01	.05	.2	.0
Sept. 2.....	1232	B	63	75	0		.9		.0	2	105	24			151	8.0	.01	.05	.2	.0
Sept. 2.....	1235	C	63	75	0		.9		.0	2	105	24			150	8.1	.01	.05	.0	.0
Sept. 16.....	1225	A	65	81	0		1.1		.0	1	158	34			170	8.0	.01	.05	.3	.0
Sept. 16.....	1230	B	65	81	0		1.5		.0	1	158	34			170	8.0	.02	.06	.0	.0
Sept. 16.....	1235	C	65	80	0		1.4		.0	1	158	34			167	8.0	.01	.05	.4	.0
Sept. 30.....	1240	A	62	81	0		1.2		0	--	--	--			173	7.9	.02	.07	.3	.0
Sept. 30.....	1243	B	63	81	0		1.4		0	--	--	--			170	8.0	.01	.07	.0	.0
Sept. 30.....	1247	C	62	80	0		1.2		0	--	--	--			169	8.0	.01	.08	.0	.0

COLUMBIA RIVER MAIN STEM--Continued

14-1447.5. COLUMBIA RIVER NEAR VANCOUVER, WASH.

LOCATION.--Cross-section No. 4, on a line through Mathews Point and perpendicular to stream channel, 0.9 mile upstream from the mouth of Willamette River, 3.8 miles west of Vancouver, Clark County, and 4.2 miles downstream from Interstate bridge.
RECORDS AVAILABLE.--Chemical analyses: February to September 1964.
REMARKS.--Samples for chemical and biological analyses were collected at quarter points A (right bank), B (center), and C (left bank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^{+6})	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	1005	A	43	97	0		2.0		0	49	573.3	230.1				209	7.7	0.13	0.13	0.3	0.0
Feb. 19.....	1010	B	43	96	0		1.7		0	--	--	--				208	7.6	.12	.13	.4	.0
Feb. 19.....	1015	C	43	94	0		1.3		0	--	--	--				204	7.8	.15	.15	.4	.0
Mar. 4.....	1045	A	44	91	0		4.2		183	116	479	279				209	7.4	.02	.10	.2	.0
Mar. 4.....	--	B	44	93	0		4.1		242	116	479	279				213	7.5	.07	.21	.1	.0
Mar. 4.....	--	C	--	92	0		1.6		109	116	479	279				208	7.4	.08	.14	.3	.0
Mar. 18.....	1100	A	44	96	0		1.5		0	95	359	172				208	7.8	.05	.09	.6	.0
Mar. 18.....	1105	B	44	95	0		1.3		0	95	359	172				205	7.8	.06	.12	.2	.0
Mar. 18.....	1110	C	45	92	0		1.2		0	95	359	172				202	7.7	.07	.16	.4	.0
Apr. 1.....	1050	A	47	96	0		1.5		3	102	327	215				212	7.9	.04	.13	.2	.0
Apr. 1.....	1055	B	47	97	0		1.5		0	102	327	215				214	7.9	.05	.16	.4	.0
Apr. 1.....	1100	C	47	95	0		2.0		0	102	327	215				210	8.0	.07	.18	.3	.0
Apr. 15.....	1100	A	51	93	0		1.4		0	97	357	214				207	7.8	.10	.22	.6	.0
Apr. 15.....	1110	B	51	92	0		1.2		0	97	357	214				206	7.8	.11	.23	.6	.0
Apr. 15.....	1115	C	51	93	0		1.2		0	97	357	214				215	7.9	.10	.20	.6	.0
Apr. 29.....	1125	A	51	73	0		1.3		0	48	256	137				157	7.8	.05	.16	.5	.0
Apr. 29.....	1130	B	51	73	0		1.5		0	48	256	137				156	7.8	.06	.14	.5	.0
Apr. 29.....	1135	C	51	71	0		1.5		0	48	256	137				153	7.7	.08	.17	.5	.0
May 13.....	--	A	54	74	0		1.3		0	12	960	470				160	7.8	.07	.26	.1	.0
May 13.....	--	B	54	74	0		1.3		0	12	960	470				160	7.8	.07	.22	.3	.0
May 13.....	--	C	53	73	0		1.2		0	12	960	470				158	7.8	.08	.21	.5	.0
May 27.....	1125	A	55	64	0		1.6		14	19	1080	460				137	7.6	.06	.32	.3	.0
May 27.....	1130	B	55	64	0		1.2		12	19	1080	460				137	7.7	.06	.31	.0	.0
May 27.....	1135	C	55	65	0		1.2		5	18	1080	460				138	7.6	.10	.32	.1	.0

June 10, 1964....	1120	A	56	50	0		1.1		5	--	--	--			102	7.4	.05	.27	.5	.0
June 10..........	1130	B	56	50	0		1.0		3	--	--	--			102	7.3	.05	.46	.3	.0
June 10..........	1140	C	56	50	0		1.4		6	--	--	--			102	7.4	.05	.27	.2	.0
June 24..........	0945	A	59	60	0		.4		0	--	--	--			125	7.6	.05	.25	.7	.0
June 24..........	0950	B	59	61	0		1.1		1	--	--	--			125	7.6	.04	.26	.4	.0
June 24..........	0955	C	59	60	0		.9		1	--	--	--			125	7.5	.05	.24	.1	.0
July 8...........	0950	A	62	65	0		1.3		0	--	--	--			128	8.1	.02	.08	.5	.0
July 8...........	0955	B	62	64	0		1.3		0	--	--	--			128	8.1	.02	.17	.1	.0
July 8...........	1000	C	62	65	0		1.3		0	--	--	--			128	8.0	.02	.13	.1	.0
July 22..........	1000	A	64	66	0		3.0		0	8	114	36			130	8.2	.01	.14	.5	.0
July 22..........	1005	B	64	66	0		1.4		2	8	114	36			130	8.2	.01	.15	.3	.0
July 22..........	1010	C	64	66	0		1.4		0	8	114	36			130	8.2	.01	.15	.3	.0
Aug. 5...........	1105	A	66	69	0		1.3		9	6	159	31			138	7.8	.01	.08	.0	.0
Aug. 5...........	1110	B	66	70	0		1.2		1	6	159	31			138	8.0	.01	.14	.1	.0
Aug. 5...........	1115	C	66	69	0		1.6		2	6	159	31			137	8.0	.01	.09	.3	.0
Aug. 19..........	1005	A	67	71	0		1.9		0	32	205	73			141	8.1	.01	.06	.1	.0
Aug. 19..........	1010	B	67	70	0		1.5		0	32	205	73			140	8.1	.01	.06	.4	.0
Aug. 19..........	1020	C	67	70	0		1.5		0	32	205	73			141	8.1	.02	.06	.3	.0
Sept. 2..........	1000	A	64	75	0		.9		0	92	356	130			152	7.9	.01	.05	.1	.0
Sept. 2..........	1005	B	64	75	0		.9		0	92	356	130			151	8.0	.01	.05	.1	.0
Sept. 2..........	1010	C	64	74	0		1.2		0	92	356	130			151	8.1	.01	.08	.3	.0
Sept. 16.........	1235	A	65	81	0		1.8		0	--	--	--			169	8.0	.01	.06	.0	.0
Sept. 16.........	1240	B	65	81	0		1.2		0	--	--	--			169	7.9	.01	.07	.1	.0
Sept. 16.........	1245	C	65	80	0		1.4		0	--	--	--			168	8.0	.01	.08	.2	.0
Sept. 30.........	1000	A	63	82	0		1.0		0	8	124	74			171	8.0	.01	.08	.0	.0
Sept. 30.........	1005	B	63	80	0		1.1		0	8	124	74			171	7.8	.01	.06	.5	.0
Sept. 30.........	1010	C	63	80	0		1.0		0	8	124	74			169	8.0	.01	.09	.1	.0

14-1448. MIDDLE FORK WILLAMETTE RIVER NEAR OAKRIDGE, OREG.

LOCATION.--Temperature recorder at gaging station, 0.2 mile downstream from Cone Creek, 8.8 miles upstream from Hills Creek Dam, 10 miles south of Oakridge, Lane County, and at mile 241.3.
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 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 27; minimum, 36°F Feb. 27.
EXTREMES, 1958-64.--Water temperatures: Maximum, 66°F Aug. 2, 3, 6, 7, 1961, July 27, 1964; minimum, freezing point on several days during January and February 1962, Jan. 12, 1963.
REMARKS.--Temperature recorder stopped Nov. 11-13; temperature range, 55°F to 57°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1449. HILLS CREEK ABOVE HILLS CREEK RESERVOIR, NEAR OAKRIDGE, OREG.

LOCATION.--Temperature recorder at gaging station, 0.2 mile downstream from Tufti Creek, 0.7 mile upstream from Hills Creek Reservoir, 6.5 miles southeast of Oakridge, Lane County, and at mile 4.1.
DRAINAGE AREA.--52.7 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Minimum, 38°F Dec. 11-14, Feb. 27.
EXTREMES, 1958-64.--Water temperatures: Maximum (1958-63), 69°F July 28, 1960; minimum, freezing point several days during January 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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	56	56	56	55	54	53	53	54	54	53	53	53	53	53	53	53	53	52	51	52	52	50	50	50	47	44	45	45	45	44	52
Minimum	53	54	56	55	54	52	51	51	52	52	53	51	52	52	52	52	52	52	50	50	51	50	49	49	47	44	42	43	44	44	42	50
November																																
Maximum	44	44	44	44	44	44	44	44	45	45	45	45	45	45	45	44	43	43	43	43	42	42	42	42	42	42	42	41	41	41	--	43
Minimum	42	44	43	44	43	43	43	43	44	44	44	44	44	45	44	42	42	42	42	41	41	41	42	42	42	42	41	40	40	40	--	42
December																																
Maximum	40	40	40	41	43	43	42	41	41	41	39	38	38	39	39	40	40	40	42	42	41	41	41	41	41	41	42	43	42	43	43	41
Minimum	40	40	40	40	41	42	41	41	41	39	38	38	38	38	39	39	39	39	40	41	41	41	41	40	41	41	41	42	42	42	43	40
January																																
Maximum	43	44	43	42	42	42	42	42	41	41	41	40	40	41	41	41	41	41	41	41	42	42	42	42	42	42	42	42	43	43	43	42
Minimum	43	43	42	42	41	41	41	41	40	40	40	40	40	40	40	40	41	40	40	40	41	41	41	42	42	42	42	41	42	42	42	41
February																																
Maximum	43	43	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	40	40	40	41	--	--	42
Minimum	42	42	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	40	40	39	40	40	40	40	39	39	38	39	40	--	--	41
March																																
Maximum	41	40	40	41	41	41	41	41	41	41	41	41	41	41	42	42	42	42	42	42	43	42	42	43	43	43	44	44	44	44	44	42
Minimum	40	40	40	40	40	40	40	40	40	40	41	40	40	41	41	41	41	41	40	41	42	42	41	41	41	42	42	42	42	43	43	41
April																																
Maximum	43	43	43	44	44	44	45	45	46	46	46	45	46	46	47	46	46	46	46	46	47	47	46	46	46	47	49	49	49	47	--	46
Minimum	42	42	42	43	43	43	43	43	45	45	45	44	44	44	46	45	44	44	44	45	46	45	45	45	45	46	46	47	47	46	--	44
May																																
Maximum	47	46	46	46	46	45	46	47	49	49	48	48	48	47	48	48	48	48	48	48	48	48	48	48	48	49	49	48	49	49	49	48
Minimum	45	44	45	45	45	44	45	45	47	47	47	46	46	45	46	46	46	46	47	47	47	47	47	47	47	47	48	48	48	48	48	46
June																																
Maximum	48	49	49	49	49	49	48	48	49	49	49	50	50	50	50	51	50	50	50	50	51	--	--	--	--	--	--	--	--	--	--	--
Minimum	48	48	48	49	49	48	48	48	48	49	49	49	50	50	50	50	50	50	50	50	50	--	--	--	--	--	--	--	--	--	--	--
July																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61	61	61	60	60	59	57	56	55	54	53	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53	56	57	55	56	56	52	53	51	52	52	--
September																																
Maximum	53	54	55	55	55	54	53	52	52	53	54	54	54	53	53	54	54	52	53	53	51	53	54	54	53	52	52	52	52	52	--	53
Minimum	52	51	52	51	52	52	50	51	48	49	50	51	51	51	49	50	51	49	49	51	48	49	50	51	51	49	49	49	49	49	--	50

WILLAMETTE RIVER BASIN--Continued

14-1455. MIDDLE FORK WILLAMETTE RIVER ABOVE SALT CREEK, NEAR OAKRIDGE, OREG.

LOCATION.--Temperature recorder at gaging station, 90 feet upstream from highway bridge, 0.4 mile upstream from Salt Creek, 1.1 miles downstream from Hills Creek Dam, 2.3 miles southeast of Oakridge, Lane County, and at mile 231.4.
DRAINAGE AREA.--392 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1960 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 59°F Oct. 7-9; minimum, 40°F Feb. 25-29.
EXTREMES, 1960-64.--Water temperatures: Maximum, 77°F Sept. 4, 1961; minimum, 35°F Jan. 4, 1961.

Temperature (°F) of water, water year October 1963 to September 1964

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	58	58	56	56	57	59	59	59	58	57	58	58	58	58	58	58	58	58	58	58	58	58	58	57	57	57	57	57	57	57	58
Minimum	55	55	56	56	56	56	56	58	57	57	57	57	58	52	56	52	57	58	58	58	57	57	57	57	56	57	57	57	57	56	56	56
November																																
Maximum	56	55	55	55	55	55	55	55	54	53	52	53	53	53	53	53	53	52	51	50	49	50	49	48	48	48	47	46	46	46	--	52
Minimum	55	55	55	55	55	55	54	54	53	52	52	51	53	53	53	53	52	51	50	49	49	49	48	48	48	47	46	46	46	46	--	51
December																																
Maximum	46	46	45	44	44	44	44	44	44	43	43	43	43	43	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Minimum	46	45	44	44	44	44	44	44	43	43	43	43	43	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43
January																																
Maximum	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	43
Minimum	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	43
February																																
Maximum	42	42	44	42	42	42	42	42	42	42	42	41	42	42	42	42	42	44	43	43	43	43	43	42	42	42	42	40	42	--	--	42
Minimum	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	42	42	42	41	41	41	41	41	40	40	40	40	40	--	--	41
March																																
Maximum	43	43	42	43	43	43	44	45	44	44	43	43	43	43	45	44	43	43	43	41	44	44	44	44	44	44	44	44	43	43	43	43
Minimum	42	42	42	42	41	41	42	43	43	43	43	43	43	43	43	43	42	41	41	41	41	43	43	43	43	42	42	42	42	42	42	42
April																																
Maximum	43	44	44	43	43	44	45	44	43	44	44	45	48	44	44	46	46	45	45	45	47	45	45	44	44	46	45	45	45	45	--	45
Minimum	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	44	44	44	44	44	44	44	44	44	44	44	44	43	44	44	--	43
May																																
Maximum	45	45	45	45	45	47	46	47	47	47	47	46	46	46	46	46	47	47	47	48	48	48	47	46	46	46	46	46	46	46	46	46
Minimum	44	44	44	44	44	45	46	46	46	46	46	45	45	45	45	45	46	46	46	46	46	46	46	45	45	45	45	45	45	45	45	45
June																																
Maximum	46	46	46	45	45	45	47	48	48	48	48	48	48	48	48	47	47	48	48	48	48	48	48	48	48	47	47	48	48	48	--	47
Minimum	45	45	44	44	44	45	45	47	47	47	48	48	48	48	46	46	46	46	46	48	48	45	45	46	46	46	46	46	45	46	--	46
July																																
Maximum	48	48	48	48	48	48	48	47	47	48	48	48	48	48	48	48	47	47	47	48	48	48	48	47	47	47	47	47	47	48	48	48
Minimum	46	46	46	46	47	46	46	46	46	46	46	47	47	46	47	46	46	46	46	46	46	46	46	46	46	46	46	46	46	47	47	46
August																																
Maximum	48	49	49	48	49	50	49	49	49	49	49	49	48	49	48	48	48	48	49	49	49	49	50	50	49	48	49	49	49	49	49	49
Minimum	47	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	47	47	48	48	48	48
September																																
Maximum	48	49	49	48	49	49	49	49	49	49	49	49	49	49	49	49	49	50	50	50	52	52	52	52	52	53	53	53	53	53	--	50
Minimum	48	48	47	47	47	47	47	47	47	47	47	47	48	47	47	48	48	48	48	48	49	51	52	52	52	52	52	53	53	53	--	49

WILLAMETTE RIVER BASIN--Continued

14-1480. MIDDLE FORK WILLAMETTE RIVER BELOW NORTH FORK, NEAR OAKRIDGE, OREG.

LOCATION.--Temperature recorder at gaging station, 0.5 mile downstream from Whitehead Creek, 4.2 miles downstream from North Fork of Middle Fork Willamette River, 7 miles northwest of Oakridge, Lane County, and at mile 220.2
DRAINAGE AREA.--924 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1950 to October 1960, June 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 62°F July 26, 27, Aug. 22, 23; minimum, 38°F Feb. 26, 27.
EXTREMES, 1950-60, 1961-64.--Water temperatures: Maximum, 74°F Aug. 3, 1961; minimum, freezing point Jan. 20-22, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1500. MIDDLE FORK WILLAMETTE RIVER NEAR DEXTER, OREG.

LOCATION.--Temperature recorder at gaging station, 0.6 mile upstream from Lost Creek, 2 miles northwest of Dexter, Lane County, 2.6 miles downstream from Dexter Dam, and at mile 201.2.
DRAINAGE AREA.--1,001 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1955 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 61°F on several days during October; minimum, 42°F on many days during January and February.
EXTREMES, 1955-64.--Water temperatures: Maximum, 65°F on several days during September 1961; minimum, 38°F several days during January and February 1957.

Temperature (°F) of water, water year October 1963 to September 1964

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	61	61	61	61	60	61	60	61	61	61	61	61	61	61	60	60	59	59	59	59	59	59	59	59	60	59	58	58	58	58	58	60
Minimum	60	60	60	60	60	59	59	59	60	60	60	60	60	60	59	59	59	59	59	59	59	59	59	59	59	58	58	58	58	58	57	59
November																																
Maximum	57	58	57	57	57	56	56	55	55	55	54	54	53	53	53	53	53	53	52	52	52	52	51	50	50	50	50	49	49	48	--	53
Minimum	57	57	57	57	56	56	55	54	54	54	54	53	53	53	53	53	53	52	52	52	52	51	50	50	50	50	49	49	48	48	--	53
December																																
Maximum	48	47	47	47	47	47	47	47	47	47	46	46	45	45	46	45	45	45	45	45	45	45	45	44	45	44	44	44	44	44	44	46
Minimum	47	47	47	47	47	47	47	47	47	46	46	45	45	45	45	45	45	45	45	45	44	44	44	44	44	44	44	44	44	44	44	45
January																																
Maximum	44	45	44	44	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	44	43	42	42	42	42	42	42	42	42	42	42	43
Minimum	44	44	44	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	42	43	42	42	42	42	42	42	42	42	42	42	42	43
February																																
Maximum	42	43	43	43	43	43	43	44	44	44	44	43	43	44	43	43	43	44	45	45	45	45	46	44	45	45	45	43	45	--	--	44
Minimum	42	42	43	43	43	43	43	42	42	42	43	43	43	42	43	42	43	42	42	42	43	43	43	42	42	42	42	42	43	--	--	42
March																																
Maximum	45	45	44	44	44	44	45	44	45	45	46	46	46	45	47	48	46	49	49	48	49	50	49	49	49	49	52	52	53	52	50	47
Minimum	44	44	43	43	43	43	43	43	44	44	45	45	45	45	45	45	45	46	46	46	47	47	47	47	47	48	48	48	48	49	49	46
April																																
Maximum	50	52	52	50	51	51	53	52	50	51	51	52	53	52	50	51	52	52	53	51	53	52	51	52	49	51	51	52	49	50	--	51
Minimum	49	49	49	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	50	49	48	48	48	48	48	48	48	--	49
May																																
Maximum	51	51	51	50	50	50	50	49	49	49	50	49	50	48	48	48	49	49	49	49	50	50	50	51	51	51	51	51	51	52	52	50
Minimum	49	48	48	48	48	48	48	47	47	47	47	47	47	47	47	47	47	48	48	48	49	49	49	49	49	49	49	49	49	50	50	48
June																																
Maximum	52	52	52	52	51	52	51	51	52	53	54	54	54	54	53	53	52	52	52	53	53	55	54	54	54	54	55	55	55	55	--	53
Minimum	50	51	51	50	51	51	50	51	51	52	52	52	53	53	52	51	51	51	51	51	52	52	53	53	53	53	54	53	54	53	--	52
July																																
Maximum	56	55	55	54	56	56	56	55	58	58	58	57	57	54	55	56	56	56	57	56	56	56	57	57	57	57	57	57	57	55	56	56
Minimum	53	54	53	53	53	53	53	54	54	53	53	53	53	53	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
August																																
Maximum	55	55	56	55	57	57	57	57	58	58	56	58	57	58	58	58	58	57	58	58	59	59	58	60	59	57	58	57	58	57	57	57
Minimum	54	54	54	54	54	54	54	55	55	55	55	55	55	55	55	55	56	56	56	56	56	56	55	55	56	55	55	56	56	56	56	55
September																																
Maximum	57	57	58	58	58	57	57	58	57	58	58	58	58	58	59	59	--	--	--	--	--	58	57	57	56	56	56	56	56	56	--	57
Minimum	56	56	56	55	56	56	56	56	55	55	54	54	54	55	55	55	--	--	--	--	--	56	56	56	55	55	55	55	55	55	--	55

WILLAMETTE RIVER BASIN--Continued

14-1503. FALL CREEK NEAR LOWELL, OREG.

LOCATION.--Temperature recorder at gaging station, 280 feet downstream from North Fork, 8 miles northeast of Lowell, Lane County, and at mile 14.4.
DRAINAGE AREA.--118 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 13; minimum, 38°F Feb. 27, 28.
EXTREMES, August 1963 to September 1964.--Water temperatures: Maximum, 68°F Sept. 7-9, 1963; minimum, 38°F Feb. 27, 28, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1508. WINBERRY CREEK NEAR LOWELL, OREG.

LOCATION.--Temperature recorder at gaging station, 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.
RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 13, 25-27; minimum, 37°F Feb. 26, 27.
EXTREMES, August 1963 to September 1964.--Water temperatures: Maximum, 72°F July 13, 25-27, 1964; minimum, 37°F Feb. 26, 27, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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	61	61	62	60	58	57	56	56	58	58	58	58	58	58	58	58	57	56	55	53	55	55	54	53	53	49	47	48	48	48	46	55
Minimum	57	58	60	58	57	53	53	53	56	57	57	56	56	57	57	56	56	55	53	52	52	54	53	52	49	47	45	47	48	46	44	53
November																																
Maximum	46	47	46	47	47	47	47	50	50	49	49	49	50	50	48	48	48	48	48	48	45	46	46	47	47	48	48	44	42	42	--	47
Minimum	44	45	44	46	46	46	46	47	49	49	49	49	49	48	48	48	48	48	48	45	45	45	46	46	47	47	44	42	42	42	--	46
December																																
Maximum	42	--	--	--	--	--	45	45	45	44	40	39	39	41	42	43	43	43	45	45	45	44	43	43	44	43	45	47	47	47	47	44
Minimum	42	--	--	--	--	--	43	44	44	40	39	39	39	39	41	42	43	42	43	45	44	43	43	42	43	43	43	45	46	46	47	43
January																																
Maximum	47	47	44	43	43	45	45	44	44	44	44	43	44	43	43	43	43	43	43	43	43	42	41	41	42	42	43	42	42	42	43	43
Minimum	47	44	43	43	43	43	44	44	43	43	43	43	43	43	43	43	43	42	42	43	42	41	41	41	41	42	42	42	42	42	42	43
February																																
Maximum	43	42	42	42	43	41	40	40	40	42	42	41	40	40	40	41	42	43	42	41	41	41	41	41	40	39	38	39	40	--	--	41
Minimum	42	41	42	42	41	40	39	39	40	40	41	39	39	39	40	40	41	42	41	41	40	40	40	40	38	37	37	38	38	--	--	40
March																																
Maximum	40	39	39	40	40	40	41	41	41	41	41	41	42	43	44	44	44	44	43	43	43	43	42	42	42	44	45	47	46	47	46	43
Minimum	39	38	38	39	40	40	40	40	40	40	41	40	41	42	43	42	43	43	41	42	42	42	41	41	41	42	41	42	43	44	44	41
April																																
Maximum	45	42	44	44	43	44	46	47	46	45	45	44	47	48	46	44	45	46	48	45	48	46	45	45	45	47	50	53	49	45	--	46
Minimum	41	41	42	43	42	42	42	43	45	44	44	43	43	44	44	42	41	41	42	43	44	42	42	43	45	45	46	45	44	43	--	43
May																																
Maximum	45	45	46	45	45	44	46	50	49	49	53	49	48	48	50	48	51	50	52	50	50	48	52	51	53	54	51	51	55	57	57	50
Minimum	43	41	41	43	43	42	44	45	45	47	47	47	45	44	44	45	46	47	46	48	46	44	43	46	45	45	48	48	48	49	50	45
June																																
Maximum	53	54	52	52	51	50	50	48	51	50	54	56	56	54	53	52	51	50	51	53	56	58	60	60	60	57	57	58	59	58	--	54
Minimum	50	49	49	50	50	49	48	47	47	49	49	50	51	52	50	50	50	49	48	49	50	50	53	54	53	52	50	49	52	54	--	50
July																																
Maximum	60	57	60	56	63	64	67	63	64	66	70	69	72	67	62	67	66	63	67	66	64	67	68	70	72	72	72	67	70	66	62	66
Minimum	55	54	52	54	54	54	57	57	55	55	58	62	62	62	60	57	59	59	55	57	61	59	58	59	61	61	61	63	64	60	59	58
August																																
Maximum	62	61	66	62	68	70	69	70	70	69	65	63	65	66	65	66	67	63	63	65	67	70	70	70	68	66	64	62	61	59	57	65
Minimum	60	58	59	60	58	60	60	62	60	62	61	59	57	58	57	57	59	60	56	57	58	60	61	61	61	62	57	58	57	57	54	59
September																																
Maximum	56	59	60	60	59	57	54	57	56	56	57	58	58	58	57	59	58	56	56	56	56	57	59	59	58	56	55	54	54	54	--	57
Minimum	54	55	55	54	55	54	52	53	50	50	51	52	53	54	52	53	55	51	51	54	51	51	54	54	54	51	50	50	51	53	--	53

14-1510. FALL CREEK BELOW WINBERRY CREEK, NEAR FALL CREEK, OREG.

LOCATION.--Temperature recorder at gaging station, 10 feet upstream from highway bridge, 1.6 miles downstream from Winberry Creek, 2.3 miles southeast of town of Fall Creek, Lane County, and at mile 6.1.
DRAINAGE AREA.--186 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum observed, 74°F Aug. 23; minimum, 40°F on several days during February.
EXTREMES, 1950-64.--Water temperatures: Maximum, 79°F July 28, 1958; minimum, 33°F Jan. 23, 24, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1520. MIDDLE FORK WILLAMETTE RIVER AT JASPER, OREG.

LOCATION.--Temperature recorder at gaging station, 25 feet downstream from highway bridge at Jasper, Lane County, 650 feet downstream from Hills Creek, and at mile 195.0.
DRAINAGE AREA.--1,340 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1953 to December 1962, October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 63°F Aug. 24; minimum, 39°F Feb. 27.
EXTREMES, 1953-62, 1963-64.--Water temperatures: Maximum, 69°F July 27, 28, 1958; minimum, 36°F Feb. 1-3, 16, 1956.
REMARKS.--Temperature recorder stopped Nov. 17-19; temperature range, 47°F to 51°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1525. COAST FORK WILLAMETTE RIVER AT LONDON, OREG.

LOCATION.--Temperature recorder at gaging station, 0.6 mile north of London, Lane County, 11 miles south of Cottage Grove, and at mile 35.9.
DRAINAGE AREA.--72.1 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1960 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum observed, 67°F July 13, 14, Aug. 6-8.
EXTREMES, 1960-64.--Water temperatures: Maximum, 74°F July 28, 29, 1960, July 12, 1961; minimum (1960-63), 36°F Jan. 19 to Feb. 1, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1575. COAST FORK WILLAMETTE RIVER NEAR GOSHEN, OREG.

LOCATION.--Temperature recorder at gaging station, 2.5 miles southeast of Goshen, Lane County, and at mile 6.4 (revised).
DRAINAGE AREA.--642 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F Oct. 1, Aug. 22-26; minimum, 40°F Dec. 11-14.
EXTREMES, 1961-64.--Water temperatures: Maximum, 80°F July 24, 1962; minimum, freezing point, Jan. 12, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1591. HORSE CREEK NEAR McKENZIE BRIDGE, OREG.

LOCATION.--Temperature recorder at gaging station, 450 feet upstream from bridge on Horse Creek Road, 1 mile southeast of McKenzie Bridge, Lane County, and at mile 3.4.
DRAINAGE AREA.--149 square miles.
RECORDS AVAILABLE.--Water temperatures: February 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 54°F July 6, 7, 13; minimum, 37°F Jan. 6, 7, 19, 20.
EXTREMES, February 1963 to September 1964.--Water temperatures: Maximum, 56°F July 13, 14, 19, 21, 1963; minimum, 37°F Jan. 6, 7, 19, 20, 1964.
REMARKS.--Recorder stopped Oct. 1-8, Feb. 20 to Mar. 24; temperature range, 48°F to 52°F and 40°F to 42°F, respectively.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1592. SOUTH FORK McKENZIE RIVER ABOVE COUGAR RESERVOIR, NEAR RAINBOW, OREG.

LOCATION.--Temperature recorder at gaging station, 100 feet upstream from Tipsoo Creek, 8 miles south of Rainbow, Lane County, 9 miles southeast of town of Blue River, and at mile 10.4.
DRAINAGE AREA.--160 square miles at cableway, 0.2 mile downstream where all discharge measurements are made.
RECORDS AVAILABLE.--Water temperatures: November 1957 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F on several days during July; minimum, 37°F Jan. 18, 19.
EXTREMES, 1957-64.--Water temperatures: Maximum, 60°F July 18, 1960; minimum, 33°F Mar. 1, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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	51	49	49	48	48	48	49	49	49	49	49	49	49	48	48	48	47	47	49	48	47	47	47	45	45	45	46	45	44	48
Minimum	48	48	48	48	47	46	46	46	47	47	48	47	47	48	47	46	46	47	46	45	47	47	46	46	45	43	43	44	45	44	43	46
November																																
Maximum	44	45	44	45	45	45	46	46	46	46	46	46	46	46	45	45	45	45	45	44	43	43	43	44	44	44	44	42	42	42	--	44
Minimum	43	44	43	44	44	44	44	45	46	46	46	45	46	45	44	44	44	44	44	43	42	43	43	43	44	43	42	41	41	41	--	44
December																																
Maximum	42	42	42	42	44	44	42	42	42	41	39	40	40	42	42	42	42	42	43	43	41	42	41	42	42	42	43	44	43	44	44	42
Minimum	41	41	41	41	42	42	41	42	41	39	38	39	40	40	41	41	41	41	42	41	40	41	41	40	41	41	42	43	42	43	43	41
January																																
Maximum	44	43	41	41	41	40	41	40	40	39	39	39	39	40	40	40	40	38	38	40	40	40	39	39	41	41	41	41	41	41	41	40
Minimum	43	41	40	41	40	39	40	39	38	38	38	39	39	39	39	40	38	37	37	38	40	38	38	39	39	41	41	40	41	40	41	39
February																																
Maximum	42	42	41	42	42	40	40	41	41	41	41	40	40	40	40	40	41	42	41	40	41	41	41	41	40	40	40	40	41	--	--	41
Minimum	41	41	40	41	40	39	39	40	40	40	40	39	39	39	38	39	40	41	40	39	39	39	39	40	39	38	38	39	40	--	--	40
March																																
Maximum	41	40	40	41	39	40	40	41	40	41	40	40	41	41	42	42	42	42	42	42	42	42	41	41	42	42	43	44	44	44	43	41
Minimum	39	39	40	39	38	38	39	40	40	39	40	39	39	40	40	40	40	40	39	40	40	40	39	39	40	41	40	40	40	41	41	40
April																																
Maximum	42	43	43	43	42	44	45	45	43	44	43	43	45	45	43	42	42	43	44	44	44	42	42	42	43	43	45	46	42	42	--	43
Minimum	41	41	41	41	41	41	41	41	41	42	42	41	41	40	41	40	39	39	39	40	41	40	40	41	41	42	41	41	41	40	--	41
May																																
Maximum	42	42	43	42	42	42	44	45	46	44	47	46	45	45	47	45	46	46	46	44	44	45	46	46	46	47	46	45	47	47	46	45
Minimum	40	39	39	40	40	40	41	42	42	43	42	41	42	41	41	42	42	42	42	42	42	41	41	42	41	41	43	43	43	43	43	41
June																																
Maximum	45	46	46	44	44	43	43	43	46	45	46	47	47	49	47	46	46	46	48	48	50	51	52	53	53	50	50	52	52	53	--	48
Minimum	43	43	43	43	43	42	42	42	42	43	43	44	44	45	45	45	45	44	45	45	46	46	47	48	48	47	46	46	47	47	--	45
July																																
Maximum	53	53	53	53	54	55	56	52	54	55	57	57	57	53	52	55	56	55	55	56	55	55	55	56	57	57	57	53	53	52	52	55
Minimum	49	49	48	49	48	48	50	50	48	48	50	51	52	51	50	49	49	51	48	49	50	50	48	49	49	50	49	50	50	50	49	49
August																																
Maximum	50	52	54	52	54	55	55	55	55	55	56	54	54	54	54	54	55	52	51	54	54	55	55	55	54	52	53	51	51	50	50	53
Minimum	49	49	48	49	48	49	49	49	49	49	50	50	49	49	48	48	49	50	47	48	48	49	49	49	49	49	47	48	47	48	47	49
September																																
Maximum	49	50	51	51	51	51	50	49	50	50	51	51	51	50	50	51	49	50	50	49	49	50	50	50	50	49	49	48	48	47	--	50
Minimum	47	47	46	47	47	47	46	47	45	46	46	47	47	47	46	47	48	47	46	48	46	46	47	47	47	46	46	45	46	46	--	47

14-1595. SOUTH FORK McKENZIE RIVER NEAR RAINBOW, OREG.

LOCATION.--Temperature recorder at gaging station, 0.2 mile upstream from Cougar Creek, 0.6 mile downstream from Cougar Dam, 2 miles south of Rainbow, Lane County, and at mile 3.9.
DRAINAGE AREA.--208 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1955 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F July 16, 17; minimum, 40°F on several days during January and February.
EXTREMES, 1955-64.--Water temperatures: Maximum, 68°F July 28, 1958; minimum, 33°F Jan. 20-23, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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	55	55	54	53	52	52	52	52	51	51	52	52	51	51	52	52	52	52	50	50	49	49	49	50	50	47	47	47	47	47	51
Minimum	54	53	53	53	52	51	50	50	50	51	51	51	51	51	51	51	50	50	50	50	49	49	49	49	49	47	46	46	46	47	46	50
November																																
Maximum	46	46	45	45	45	45	45	46	48	49	49	48	48	47	47	47	47	47	47	47	47	47	46	46	47	46	47	46	46	46	--	47
Minimum	46	45	45	45	45	45	45	45	46	48	48	48	47	47	47	47	47	47	47	47	47	46	46	46	46	46	46	46	46	46	--	46
December																																
Maximum	46	46	46	46	46	46	46	45	45	44	44	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	44
Minimum	46	46	46	46	46	46	45	45	44	44	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	44
January																																
Maximum	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	42	42	41	40	40	40	40	40	40	40	40	40	40	40	40	41
Minimum	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	40	40	40	40	40	40	40	40	40	40	41
February																																
Maximum	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	42	43	42	42	--	--	41
Minimum	40	40	40	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	42	42	--	--	41
March																																
Maximum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	43	44	42	42	42	43	44	44	44	45	43
Minimum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	42	42	42	42	42	43	43	43	42	42
April																																
Maximum	43	43	44	43	43	43	47	45	43	43	43	43	43	43	42	42	42	42	42	42	42	42	43	42	42	42	42	42	42	42	--	43
Minimum	43	43	43	43	43	43	43	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	--	42
May																																
Maximum	43	43	42	42	42	42	42	42	43	43	46	42	42	42	44	44	43	43	43	43	43	44	45	45	45	45	46	50	46	46	45	44
Minimum	42	42	42	42	41	41	41	42	41	41	42	42	42	42	42	43	43	43	43	43	43	43	44	44	44	43	43	46	45	45	45	43
June																																
Maximum	49	46	46	45	44	45	45	45	45	45	45	45	45	45	45	45	45	45	45	46	46	46	46	46	47	47	47	47	48	48	--	46
Minimum	45	44	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45	45	46	46	46	46	46	47	47	46	46	48	--	45
July																																
Maximum	49	49	50	50	50	51	51	51	51	51	51	51	52	52	51	57	57	51	51	51	51	53	51	51	51	51	52	52	52	52	51	51
Minimum	48	49	49	50	50	50	51	45	47	46	50	51	51	51	51	50	50	50	50	51	51	51	46	49	50	51	51	52	52	51	51	50
August																																
Maximum	51	51	51	50	51	51	44	48	49	51	51	51	45	45	45	45	45	45	45	45	47	48	48	49	49	48	48	48	48	48	52	48
Minimum	51	50	44	49	50	44	44	44	46	45	45	45	45	45	45	45	45	45	45	45	45	47	48	48	48	48	48	48	48	48	48	46
September																																
Maximum	50	50	50	56	49	49	49	48	48	48	48	48	48	48	48	47	47	47	47	47	49	49	49	48	47	47	47	47	47	47	--	48
Minimum	50	50	50	48	49	49	48	48	48	48	48	48	48	48	47	46	47	47	47	46	46	49	47	47	47	47	47	47	47	47	--	48

WILLAMETTE RIVER BASIN--Continued

14-1611. BLUE RIVER BELOW TIDBITS CREEK, NEAR BLUE RIVER, OREG.

LOCATION.--Temperature recorder at gaging station, 0.2 mile downstream from Tidbits Creek, 5.5 miles northeast of Blue River, Lane County, and at mile 8.5.
DRAINAGE AREA.--45.8 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F July 13, 27; minimum, 34°F Jan. 19.
EXTREMES, September 1963 to September 1964.--Water temperatures: Maximum, 65°F July 13, 27, 1964; minimum, 34°F Jan. 19, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1615. LOOKOUT CREEK NEAR BLUE RIVER, OREG.

LOCATION.--Temperature recorder at gaging station, 6 miles northeast of Blue River, Lane County, and at mile 0.5.
DRAINAGE AREA.--24.1 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 64°F July 25-27; minimum, 37°F Jan. 6, 19.
EXTREMES, September 1963 to September 1964.--Water temperatures: Maximum, 64°F July 25-27, 1964; minimum, 37°F Jan. 6, 19, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1620. BLUE RIVER NEAR BLUE RIVER, OREG.

LOCATION.--Temperature recorder at gaging station, 3 miles upstream from Quartz Creek, 3.5 miles northeast of town of Blue River, Lane County, and at mile 5.1.
DRAINAGE AREA.--75.0 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 70°F Aug. 10, 11, 22-24; minimum, 38°F Jan. 19, 20.
EXTREMES, 1961-64.--Water temperatures: Maximum, 76°F Aug. 3, 1961; minimum, 34°F Jan. 30, 31, 1963.
REMARKS.--Recorder stopped Nov. 16-25; temperature range, 46°F to 48°F.

Temperature (°F) of water, water year October 1963 to September 1964

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	63	62	60	57	57	58	57	58	58	57	58	58	58	56	58	58	57	54	52	53	53	52	52	52	50	48	48	50	49	49	55
Minimum	58	58	60	57	56	55	53	53	56	55	56	56	56	56	55	55	56	55	51	50	51	52	52	52	50	48	46	47	48	48	48	53
November																																
Maximum	48	49	48	48	48	48	48	48	48	48	48	48	48	48	48	--	--	--	--	--	--	--	--	--	--	--	47	45	44	44	--	--
Minimum	46	46	46	46	48	48	47	47	48	48	48	48	48	48	48	--	--	--	--	--	--	--	--	--	--	--	45	44	44	44	--	--
December																																
Maximum	44	44	44	44	46	46	46	45	45	44	42	41	41	42	42	43	43	43	43	43	43	42	42	42	43	43	43	45	45	45	45	44
Minimum	44	44	44	44	44	46	45	45	44	42	41	41	41	41	42	42	43	42	42	43	41	42	42	42	42	43	43	43	45	45	45	43
January																																
Maximum	45	45	45	44	44	41	41	42	41	41	41	41	40	41	41	41	40	41	40	40	40	40	40	40	40	41	41	41	41	41	41	41
Minimum	45	45	44	44	41	41	41	41	40	40	41	40	40	40	41	40	40	40	38	38	40	40	40	40	40	40	41	41	41	41	41	41
February																																
Maximum	41	41	41	41	41	40	40	40	40	40	40	40	41	41	41	41	42	42	42	41	42	42	42	43	42	41	41	41	41	--	--	41
Minimum	41	41	41	41	40	40	40	40	40	40	40	40	40	41	40	40	41	42	41	41	41	41	41	42	41	41	41	41	41	--	--	41
March																																
Maximum	41	41	41	41	41	41	42	42	42	41	41	41	42	42	43	44	44	44	44	43	44	44	44	43	44	44	44	44	42	42	42	43
Minimum	41	41	41	41	41	41	41	42	41	41	41	41	41	42	42	43	43	44	43	43	43	43	43	43	43	43	43	41	41	41	42	42
April																																
Maximum	42	42	42	42	41	43	44	44	43	42	42	42	44	44	43	43	42	43	44	44	44	43	43	42	42	44	43	46	43	43	--	43
Minimum	42	42	41	40	40	41	41	41	42	42	42	42	42	42	43	41	41	40	40	41	42	43	42	42	42	42	43	42	43	43	--	42
May																																
Maximum	43	42	43	42	42	42	43	43	45	44	46	44	44	44	46	44	46	47	46	44	44	43	46	46	47	47	47	46	48	47	46	45
Minimum	41	41	40	41	41	41	42	42	43	43	43	43	43	41	43	43	43	43	44	44	43	43	42	43	43	43	44	44	44	44	44	43
June																																
Maximum	46	47	46	46	45	45	45	44	48	47	47	49	51	51	49	48	48	47	48	50	53	54	56	57	57	54	53	55	56	59	--	50
Minimum	45	44	44	45	45	45	44	44	44	46	45	46	47	49	48	47	47	46	46	46	48	49	50	51	51	50	49	48	50	51	--	47
July																																
Maximum	58	58	58	56	61	62	63	60	61	63	66	67	69	64	60	65	65	65	65	64	64	65	66	66	68	69	69	65	65	64	62	64
Minimum	54	54	51	54	54	54	56	55	55	55	57	60	61	60	58	56	57	59	56	57	59	59	57	58	58	59	60	61	62	60	58	57
August																																
Maximum	60	59	62	60	66	67	68	68	68	70	70	66	68	68	67	68	68	65	61	67	69	70	70	70	69	65	66	63	63	62	61	66
Minimum	59	57	56	58	56	59	60	62	61	60	62	62	61	60	60	60	60	61	57	57	60	61	61	61	61	61	59	60	58	59	56	60
September																																
Maximum	59	62	64	64	65	64	62	64	62	63	63	64	64	64	62	63	61	59	59	58	58	60	61	61	61	59	58	58	57	57	--	61
Minimum	57	58	56	57	58	58	58	58	54	55	56	56	56	58	56	56	56	55	55	56	54	55	56	55	56	53	53	53	54	56	--	56

WILLAMETTE RIVER BASIN--Continued

14-1625. McKENZIE RIVER NEAR VIDA, OREG.

LOCATION.--Temperature recorder at gaging station, 1 mile upstream from head of Martin Rapids, 5 miles east of Vida, Lane County, and at mile 47.7.
DRAINAGE AREA.--930 square miles at cableway 0.4 mile downstream, where all discharge measurements are made.
RECORDS AVAILABLE.--Water temperatures: June 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F July 11-13; minimum, 41°F on several days during January.
EXTREMES, 1961-64.--Water temperatures: Maximum, 59°F on several days during July and August 1962; minimum, 36°F Jan. 21-24, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1650. MOHAWK RIVER NEAR SPRINGFIELD, OREG.

LOCATION.--Temperature recorder at gaging station, 4 miles northeast of Springfield, Lane County, and at mile 1.59.
DRAINAGE AREA.--177 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 73°F on several days during July and August; minimum, 39°F Dec. 11-14, Feb. 26, 27.
REMARKS.--Recorder stopped Nov. 6 to Dec. 1; temperature range, 42°F to 50°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1655. McKENZIE RIVER NEAR COBURG, OREG.

LOCATION.--Temperature recorder 200 feet downstream from gaging station at Armitage Bridge on opposite bank, 2 miles southeast of Coburg, Lane County, and at mile 7.1.
DRAINAGE AREA.--1,337 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 67°F July 13, 25, 27, 28; minimum, 39°F Feb. 26, 27.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1660. WILLAMETTE RIVER AT HARRISBURG, OREG.

LOCATION.--Temperature recorder 600 feet (revised) downstream from gaging station at bridge on U.S. Highway 99 at Harrisburg, Linn County, and at mile 161.2.
DRAINAGE AREA.--3,420 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: June 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 13, 14; minimum, 42°F on many days during December to February.
EXTREMES, 1961-64.--Water temperatures: Maximum, 69°F July 12, 13, 1961; minimum, 36°F Jan. 21-24, 1962, Jan. 12, 13, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1717.5. WILLAMETTE RIVER ABOVE CALAPOOIA RIVER, AT ALBANY, OREG.

LOCATION.--Temperature recorder at site on left bank, 0.4 mile upstream from Calapooia River, 0.6 mile upstream from gaging station at bridge on U.S. Highway 20 in Albany, Linn-Benton County, and at mile 119.9.
DRAINAGE AREA.--4,460 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 71°F July 13; minimum, 40°F Dec. 11-14.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1720. CALAPOOIA RIVER AT HOLLEY, OREG.

LOCATION.--Temperature recorder at gaging station 200 feet downstream from bridge on State Highway 228, 0.3 mile southwest of Holley, Linn County, 5.0 miles upstream from Hrush Creek, and at mile 45.4.
DRAINAGE AREA.--105 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 76°F July 13, 27; minimum, 38°F Dec. 12, 13.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1735. CALAPOOIA RIVER AT ALBANY, OREG.
(Formerly published as Calapooya River at Albany)

LOCATION.--Temperature recorder at gaging station 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 to September 1964.
EXTREMES, January to September 1964.--Water temperatures: Maximum, 78°F July 27.

Temperature (°F) of water, January to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1780. NORTH SANTIAM RIVER BELOW BOULDER CREEK, NEAR DETROIT, OREG.

LOCATION.--Temperature recorder at gaging station, 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 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F July 12, 13, 25-27; minimum, 34°F Jan. 19, 20.
EXTREMES, 1951-64.--Water temperatures: Maximum, 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 1963 to September 1964

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	51	50	51	50	48	48	47	47	48	48	47	48	49	49	48	48	47	47	45	45	47	47	47	46	46	44	42	43	44	43	43	47
Minimum	48	48	49	48	47	46	45	45	47	47	47	46	47	48	47	47	45	45	42	43	45	47	46	46	44	42	41	42	43	42	41	45
November																																
Maximum	43	44	43	43	43	43	43	43	43	44	44	44	45	45	44	43	42	42	43	43	41	41	42	42	43	43	42	41	40	40	---	43
Minimum	41	43	41	42	43	43	42	42	43	43	44	44	44	44	43	42	42	42	42	41	41	41	41	41	42	42	41	40	40	40	---	42
December																																
Maximum	40	39	39	40	42	42	40	40	40	39	37	37	38	39	39	40	40	40	40	40	40	39	39	39	40	40	40	40	40	40	41	40
Minimum	39	39	39	39	40	40	40	40	39	37	36	36	37	38	39	39	40	39	39	40	38	38	39	38	38	39	39	40	39	39	40	39
January																																
Maximum	41	40	40	38	38	38	38	38	38	37	37	37	37	38	38	38	38	36	36	37	37	37	37	37	38	38	39	39	39	39	39	38
Minimum	40	40	38	38	38	35	36	38	37	37	37	37	37	37	38	38	36	35	34	34	37	37	37	37	37	38	38	39	39	39	39	37
February																																
Maximum	39	39	39	39	39	39	37	38	39	39	39	39	39	39	38	38	39	40	40	39	39	39	39	40	39	38	38	38	39	---	---	39
Minimum	39	39	38	38	39	37	37	37	38	39	39	37	37	38	37	37	38	39	39	38	38	38	37	39	37	37	37	37	38	---	---	38
March																																
Maximum	39	40	39	39	39	39	40	40	39	39	39	38	39	40	42	42	40	41	41	41	41	42	40	40	39	39	42	43	43	43	42	40
Minimum	38	39	39	39	38	38	39	39	39	38	38	37	37	39	40	39	39	40	39	40	40	40	39	37	38	38	39	38	38	39	39	39
April																																
Maximum	41	40	42	40	40	42	44	43	42	42	41	40	43	44	42	40	41	42	43	41	43	42	41	40	41	42	42	46	43	41	---	42
Minimum	40	38	38	38	38	38	39	38	40	40	40	39	39	38	39	38	37	37	38	38	39	39	38	39	40	40	40	39	40	40	---	39
May																																
Maximum	42	42	43	42	41	41	44	43	43	43	47	44	44	43	45	45	46	46	46	43	44	43	47	47	47	48	48	46	47	47	46	45
Minimum	40	39	39	40	40	40	41	41	41	42	41	41	41	39	40	41	41	41	41	42	42	41	40	42	41	41	43	43	43	42	43	41
June																																
Maximum	45	47	46	45	44	44	44	43	47	46	45	49	48	48	47	45	45	45	47	48	50	51	53	52	52	50	48	51	50	53	---	48
Minimum	43	43	42	44	43	43	43	42	42	44	43	43	44	45	45	44	44	43	44	43	45	45	46	46	46	47	45	44	46	47	---	44
July																																
Maximum	51	52	52	51	54	55	57	55	54	56	57	58	58	56	51	55	56	55	56	56	54	55	56	57	58	58	58	56	55	54	52	55
Minimum	48	48	47	48	48	48	49	50	47	48	50	51	52	51	50	49	50	51	48	50	51	50	49	49	50	51	51	52	52	51	49	50
August																																
Maximum	52	51	51	51	55	56	57	57	57	57	57	56	56	55	55	56	56	55	52	55	56	57	57	56	56	55	52	52	50	51	50	54
Minimum	50	49	49	50	49	49	50	51	51	50	52	52	51	50	50	50	50	52	49	49	50	51	52	51	52	51	49	50	48	49	47	50
September																																
Maximum	49	49	51	52	52	51	50	50	49	50	51	51	52	52	51	52	52	50	50	50	49	52	51	51	51	49	48	48	48	47	---	50
Minimum	47	48	47	47	48	48	48	48	46	46	47	47	48	49	47	48	49	48	48	49	48	48	49	49	49	46	46	46	47	47	---	48

WILLAMETTE RIVER BASIN--Continued

14-1790. BREITENBUSH RIVER ABOVE CANYON CREEK, NEAR DETROIT, OREG.

LOCATION.--Temperature recorder at gaging station, 600 feet upstream from Canyon Creek, 1.5 miles northeast of Detroit, Marion County, and at mile 2.0.
DRAINAGE AREA.--106 square miles.
RECORDS AVAILABLE.--Water temperatures: December 1950 to July 1961, January 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F Aug. 11; minimum, 34°F Jan. 6.
EXTREMES, 1950-61, 1962-64.--Water temperatures: Maximum, 60°F July 25, 1962; minimum, 33°F Mar. 3-7, 1951, Feb. 17, 1956, Jan. 11, 12, 28-31, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1815. NORTH SANTIAM RIVER AT NIAGARA, OREG.

LOCATION.--Temperature recorder at gaging station, 0.1 mile downstream from Little Sardine Creek, 0.8 mile downstream from Big Cliff Dam, 2.1 miles east of Niagara, Marion County, and at mile 57.3.
DRAINAGE AREA.--453 square miles.
RECORDS AVAILABLE.--Water temperatures: January 1953 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F July 13; minimum, 40°F on many days during January and February.
EXTREMES, 1953-64.--Water temperatures: Maximum, 62°F July 28, 29, 1958; minimum, 35°F Jan. 30 to Feb. 16, 1957.

Temperature (°F) of water, water year October 1963 to September 1964

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	53	53	53	53	54	54	54	54	54	54	54	55	55	55	55	55	56	56	56	56	56	56	56	56	55	55	55	55	55	55	55
Minimum	53	53	53	53	53	53	54	54	54	54	54	54	54	54	54	55	55	55	55	55	55	55	56	56	55	55	55	55	55	55	55	54
November																																
Maximum	55	55	54	54	54	53	53	53	51	50	50	50	50	50	50	49	49	49	49	48	48	48	48	48	48	48	48	48	48	48	--	50
Minimum	55	54	54	54	53	53	53	51	50	50	50	50	50	50	49	48	49	49	48	48	48	48	48	48	48	48	48	48	48	47	--	50
December																																
Maximum	47	47	47	46	45	45	45	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	44
Minimum	47	46	46	45	45	45	44	44	44	44	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	44
January																																
Maximum	43	43	43	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41	41	40	40	40	41	41	41	40	40	40	41
Minimum	43	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	40	40	40	40	40	41	40	40	40	40	41
February																																
Maximum	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	41	--	--	40
Minimum	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	41	41	41	41	41	41	41	41	41	41	--	--	40
March																																
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	42	42	42	41
Minimum	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	42	42	41
April																																
Maximum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	--	43
Minimum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	--	42
May																																
Maximum	43	43	43	43	43	43	43	43	43	43	43	44	44	44	44	44	43	44	44	44	44	44	45	45	44	44	44	44	44	44	44	44
Minimum	43	43	43	43	43	43	43	43	43	43	43	43	43	43	44	43	43	43	44	44	44	44	44	44	44	44	44	44	44	44	44	43
June																																
Maximum	44	44	44	44	44	45	45	45	47	47	45	44	44	44	44	44	44	44	46	46	46	46	45	46	46	46	46	46	46	46	--	45
Minimum	44	44	44	44	44	44	45	45	45	45	44	44	44	44	44	44	44	44	44	46	46	45	45	45	46	45	45	45	45	45	--	45
July																																
Maximum	46	46	46	46	46	51	54	55	55	55	55	56	57	51	49	48	47	46	46	46	46	46	47	47	47	47	48	48	47	47	47	49
Minimum	45	46	46	45	45	46	51	54	54	54	55	55	51	49	48	47	46	46	46	46	46	46	46	46	47	47	47	47	47	47	47	48
August																																
Maximum	47	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	49	49	49	49	49	49	49	49	48	48	48
Minimum	47	47	47	47	47	47	48	48	47	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	49	49	49	48	48	48	48
September																																
Maximum	50	51	54	54	52	51	50	49	49	49	50	50	51	50	50	50	50	51	51	51	51	51	51	51	51	52	52	52	52	52	--	51
Minimum	48	50	51	52	51	50	49	49	49	49	49	50	50	50	50	50	50	50	51	51	51	51	51	51	51	51	52	52	52	52	--	50

WILLAMETTE RIVER BASIN--Continued

14-1850. SOUTH SANTIAM RIVER BELOW CASCADIA, OREG.

LOCATION.--Temperature recorder at gaging station, 100 feet downstream from bridge at Cascadia ranger station, 0.5 mile downstream from Mouse Creek, 0.5 mile upstream from Deer Creek, 1.5 miles soutbwest of Cascadia, Linn County, and at mile 48.5.
DRAINAGE AREA.--174 square miles at gaging cable, 0.7 mile upstream above Mouse Creek.
RECORDS AVAILABLE.--Water temperatures: June 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 64°F Aug. 23-25; minimum, 38°F Dec. 13-15.
EXTREMES, 1962-64.--Water temperatures: Maximum, 69°F July 25-30, 1962; minimum, 33°F sometime during period Jan. 11-24, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1858. MIDDLE SANTIAM RIVER NEAR CASCADIA, OREG.

LOCATION.--Temperature recorder at gaging station, 5.6 miles downstream from Bear Creek, 10 miles northeast of Cascadia, Linn County, and at mile 17.5.
DRAINAGE AREA.--104 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 62°F July 27; minimum, 36°F Feb. 15, 16.
EXTREMES, August 1963 to September 1964.--Water temperatures: Maximum, 63°F Aug. 14, 1963; minimum, 36°F Feb. 15, 16, 1964.
REMARKS.--Recorder stopped Jan. 7-25; temperature range, 37°F to 42°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1859. QUARTZVILLE CREEK NEAR CASCADIA, OREG.

LOCATION.--Temperature recorder at gaging station, 80 feet downstream from Panther Creek, 10 miles north of Cascadia, Linn County, and at mile 6.6.
DRAINAGE AREA.--99.2 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 67°F July 27; minimum, 38°F Feb. 15, 16, 26, 27.
EXTREMES, August 1963 to September 1964.--Water temperatures: Maximum, 67°F July 27, 1964; minimum, 38°F Feb. 15, 16, 26, 27, 1964.
REMARKS.--Recorder stopped Nov. 22 to Dec. 19, Dec. 20-30; temperature range, 39°F to 45°F and 40°F to 44°F, respectively.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1865. MIDDLE SANTIAM RIVER AT MOUTH, NEAR FOSTER, OREG.

LOCATION.--Temperature recorder at gaging station, 2.7 miles northeast of Foster, Linn County, and at mile 0.7.
DRAINAGE AREA.--287 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1953 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 70°F July 13, 14, Aug. 23-25; minimum, 39°F Dec. 11, 12.
EXTREMES, 1953-64.--Water temperatures: Maximum, 77°F July 28, 1958; minimum, 33°F Jan. 29, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

14-1875. SOUTH SANTIAM RIVER AT WATERLOO, OREG.

LOCATION.--Temperature recorder at gaging station, 600 feet downstream from highway bridge at Waterloo, Linn County, 2 miles upstream from Hamilton Creek, and at mile 23.3.
DRAINAGE AREA.--640 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 74°F July 27, 28; minimum, 38°F Dec. 11-14, Feb. 26, 27.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1888. THOMAS CREEK NEAR SCIO, OREG.

LOCATION.--Temperature recorder at gaging station, 0.3 mile upstream from bridge on Highway 226, 1.6 miles upstream from Mill Creek, 4.2 miles east of Scio, Linn County, and at mile 14.6.
DRAINAGE AREA.--109 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 73°F July 13, 27, 28, Aug. 23, 24; minimum, 36°F Feb. 26, 27.
EXTREMES, 1962-64.--Water temperatures: Maximum, 74°F Aug. 10, 11, 1963; minimum, 33°F Jan. 11-14, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1890. SANTIAM RIVER AT JEFFERSON, OREG.

LOCATION.--Temperature recorder at gaging station, 350 feet upstream from Southern Pacific railroad bridge at Jefferson, Marion County, 2.1 miles downstream from confluence of North and South Santiam Rivers, and at mile 9.62.
DRAINAGE AREA.--1,790 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 70°F July 12, 13, 27, Aug. 23, 24; minimum, 42°F on many days during winter months.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1900. LUCKIAMUTE RIVER AT PEDEE, OREG.

OCATION.--Temperature recorder at gaging station, 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 to September 1964.
EXTREMES, March to September 1964.--Water temperatures: Maximum, 69°F on several days during July and August.

Temperature (°F) of water, February to September 1964

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	
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	42	42	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41	42	--	--	--
March																																
Maximum	43	43	43	44	44	43	43	43	43	43	43	43	43	45	46	46	45	44	44	44	44	44	44	43	43	44	44	46	47	48	48	44
Minimum	42	43	42	43	43	43	42	43	43	43	43	43	43	43	45	44	44	44	42	43	44	44	42	42	42	42	43	43	45	47	47	43
April																																
Maximum	47	46	46	46	45	47	48	48	48	48	47	47	48	48	48	48	46	47	48	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	46	45	44	45	44	45	46	47	48	47	46	46	45	46	48	45	43	44	45	--	--	--	--	--	--	--	--	--	--	--	--	--
May																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	59	60	60	60	62	62	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53	56	57	56	56	59	--
June																																
Maximum	61	58	58	57	56	56	56	55	57	57	56	59	60	60	59	57	56	56	55	56	58	61	63	63	63	62	57	58	59	61	--	58
Minimum	58	56	55	56	56	56	55	53	52	55	55	55	57	59	57	55	56	55	54	54	55	55	58	59	59	57	54	54	55	56	--	56
July																																
Maximum	60	58	60	60	58	63	64	64	62	64	68	69	69	67	63	63	63	62	64	63	61	60	64	66	68	68	69	69	68	66	62	64
Minimum	58	57	54	58	56	57	60	60	56	58	61	64	64	63	61	59	60	60	58	60	60	58	57	58	60	61	62	63	64	62	60	60
August																																
Maximum	62	61	58	59	62	64	64	65	64	66	64	63	63	64	63	64	66	64	60	65	66	67	69	69	67	64	61	61	60	58	59	63
Minimum	59	58	58	58	56	58	58	60	60	60	62	62	61	58	58	58	60	60	57	58	60	61	62	63	64	61	58	59	57	57	56	59
September																																
Maximum	58	58	60	61	61	59	58	57	58	58	58	58	59	60	60	60	60	57	57	57	56	58	59	60	59	57	57	56	55	55	--	58
Minimum	56	57	56	56	57	58	56	56	54	53	54	54	56	58	56	57	57	54	56	55	52	55	56	56	57	54	54	53	54	54	--	55

14-1910. WILLAMETTE RIVER AT SALEM, OREG.

LOCATION.--At bridge on State Highway 22, 300 feet downstream from gaging station at Salem, Marion County.
DRAINAGE AREA.--7,280 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August to December 1910, August 1911 to August 1912, February 1951 to September 1964.
Water temperatures: February 1951 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 61 ppm Nov. 29 to Dec. 28; minimum, 41 ppm Mar. 31 to Apr. 11.
Hardness: Maximum, 21 ppm Oct. 1-31, Nov. 29 to Dec. 28, Feb. 7-26, Aug. 10-31, Sept. 1-30; minimum, 14 ppm Nov. 8-11.
Specific conductance: Maximum daily, 67 micromhos Dec. 20, Sept. 15, 17; minimum daily, 37 micromhos Nov. 9.
Water temperatures: Maximum, 71°F July 13, 14, 28, 29; minimum, 38°F Dec. 12-15.
EXTREMES, 1951-64.--Dissolved solids: Maximum, 73 ppm Oct. 18-31, 1962; minimum, 38 ppm Nov. 22-30, 1953.
Hardness: Maximum, 28 ppm Sept. 16-20, 24-29, 1951, Aug. 11-20, Oct. 11-31, 1952, Aug. 1-10, 1953; minimum, 13 ppm Feb. 1-28, 1958.
Specific conductance: Maximum daily, 133 micromhos Nov. 7, 1954; minimum daily, 35 micromhos Jan. 20, 1953, Feb. 12, 1961.
Water temperatures: Maximum, 78°F July 22, 1959; minimum, freezing point on several days during February 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. Temperature recorder stopped Jan. 8, to Feb. 18; temperature range, 40°F to 45°F.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	11050	17		6.0	1.5	3.8	1.0	26		3.6	3.0	0.0	1.0	0.02	54	0.07	1610	21	0	0.4	64	6.7
Nov. 1-7.....	14500	--		--	--	3.7	--	23		--	--	--	--	--	53	.07	2070	20	1	.4	60	6.6
Nov. 8-11.....	60020	--		--	--	2.8	--	17		--	--	--	--	--	44	.06	7130	14	0	.3	42	6.5
Nov. 12-28.....	48100	--		--	--	3.2	--	19		--	--	--	--	--	55	.07	7140	18	2	.3	52	6.4
Nov. 29-Dec. 28...	22930	--		--	--	3.6	--	21		--	--	--	--	--	61	.08	3780	21	4	.3	60	6.7
Dec. 29-Jan. 27, 1964.....	63660	14		4.5	1.5	3.1	.7	20		3.6	2.0	.0	1.0	.00	53	.07	9110	18	2	.3	51	6.8
Jan. 28-Feb. 6....	71040	--		--	--	3.0	--	20		--	--	--	--	--	49	.07	9400	17	1	.3	49	6.7
Feb. 7-26.....	21820	--		--	--	3.5	--	23		--	--	--	--	--	57	.08	3360	21	2	.3	60	6.7
Feb. 27-Mar. 15...	27700	--		--	--	3.4	--	22		--	--	--	--	--	59	.08	4410	20	2	.3	58	6.8
Mar. 16-30.....	25240	--		--	--	3.4	--	22		--	--	--	--	--	54	.07	3680	19	1	.3	55	6.6
Mar. 31-Apr. 11...	21100	14		4.5	1.6	3.2	.3	22		3.4	2.0	.1	1.0	.00	41	.06	2340	18	0	.3	51	6.5
Apr. 12-May 11....	16890	--		--	--	3.3	--	21		--	--	--	--	--	53	.07	2420	18	1	.3	55	6.7
May 12-June 10....	22360	--		--	--	2.7	--	20		--	--	--	--	--	51	.07	3080	16	0	.3	48	6.5
June 11-July 10, 1964.....	15500	--		--	--	3.3	--	23		--	--	--	--	--	45	.06	1880	18	0	.3	52	6.7
July 11-Aug. 9....	7512	14		5.0	1.8	3.7	0.7	28		2.6	2.5	0.1	0.7	0.00	48	.07	974	20	0	.4	60	6.9
Aug. 10-31.....	6721	--		--	--	4.2	--	29		--	--	--	--	--	50	.07	907	21	0	.4	63	7.0
Sept. 1-30.....	7786	--		--	--	4.4	--	28		--	--	--	--	--	51	.07	1070	21	0	.4	63	7.1
Weighted average	--	--		--	--	3.3	--	21		--	--	--	--	--	53	0.07	3370	19	1	0.3	53	6.6
Time-weighted average.....	23625	--		--	--	3.5	--	23		--	--	--	--	--	52	--	--	19	1	0.3	56	6.7
Tons per day....	--	--		--	--	209	--	1370		--	--	--	--	--	--	--	--	--	--	--	--	--

WILLAMETTE RIVER BASIN--Continued

14-1910. WILLAMETTE RIVER AT SALEM, OREG.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	--	--	--	--	--	--	--	60	60	60	60	60	59	58	59	59	59	58	56	54	55	55	55	54	54	53	52	52	52	52	52	--
Minimum	--	--	--	--	--	--	--	59	59	59	59	59	58	58	58	58	58	56	54	53	53	55	54	53	52	52	51	50	50	50	50	--
November																																
Maximum	51	51	50	51	50	50	49	48	48	49	49	49	49	50	50	48	48	48	48	48	46	46	46	47	48	48	48	47	45	44	--	48
Minimum	50	50	50	50	50	49	48	48	48	48	48	48	48	49	48	48	47	47	47	46	46	46	46	46	47	47	47	45	44	43	--	47
December																																
Maximum	43	44	43	43	44	44	44	44	44	43	41	39	38	39	40	42	43	43	43	44	44	45	44	43	43	43	43	44	45	45	45	43
Minimum	42	42	43	43	43	44	44	44	43	41	39	38	38	38	38	40	42	42	42	43	43	44	43	43	43	43	43	43	44	45	45	42
January																																
Maximum	45	45	45	45	44	44	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	45	45	45	44	43	43	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	45	45	44	44	44	44	44	43	42	42	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	45	44	44	44	44	44	43	42	42	42	--	--	--
March																																
Maximum	43	43	43	44	44	43	43	43	43	44	44	44	43	44	44	44	45	45	45	45	45	45	45	45	45	45	46	47	48	50	50	45
Minimum	42	42	43	43	43	42	42	43	43	43	44	43	43	43	44	44	44	44	44	44	44	45	45	45	45	45	45	46	47	48	49	44
April																																
Maximum	49	48	48	47	47	47	48	49	49	49	48	48	49	50	51	51	50	49	50	51	50	50	51	51	51	51	51	51	51	51	--	50
Minimum	48	48	46	46	46	46	47	48	49	48	48	48	48	49	50	50	49	49	49	50	50	50	50	50	50	50	51	51	51	49	--	49
May																																
Maximum	49	49	49	50	50	52	52	52	53	53	54	53	52	51	51	51	52	52	53	53	53	52	51	53	54	55	56	56	56	58	59	53
Minimum	49	49	49	49	50	50	51	51	52	52	52	53	52	51	51	51	51	52	52	53	52	51	50	51	53	54	55	56	55	56	58	52
June																																
Maximum	59	58	56	56	56	55	54	54	53	54	55	56	58	59	59	57	57	57	56	57	58	60	62	64	64	63	61	59	60	61	--	58
Minimum	58	56	56	56	55	54	54	52	52	53	54	55	56	58	57	57	57	56	56	56	57	58	60	62	63	61	58	58	59	59	--	57
July																																
Maximum	61	60	60	60	60	63	66	65	65	65	67	70	71	71	68	66	65	65	65	65	65	65	65	67	67	68	70	71	71	70	67	66
Minimum	60	60	60	60	59	60	63	65	63	63	65	67	69	68	66	65	64	64	63	65	64	63	64	65	66	67	68	69	70	67	65	64
August																																
Maximum	65	64	64	63	63	64	66	67	67	67	68	67	66	64	64	65	66	66	66	65	66	68	69	70	69	68	66	64	62	62	61	66
Minimum	64	63	63	62	62	62	64	65	66	66	66	66	64	63	63	64	65	66	64	64	64	66	67	68	68	66	64	62	62	61	60	64
September																																
Maximum	61	61	60	62	62	62	62	60	59	60	61	62	62	63	64	64	63	63	62	61	60	60	61	61	60	60	59	58	58	57	--	61
Minimum	60	60	59	60	62	62	60	59	58	59	60	61	62	62	62	62	62	61	61	60	59	59	59	60	59	58	58	57	57	57	--	60

WILLAMETTE RIVER BASIN--Continued

14-1930. WILLAMINA CREEK NEAR WILLAMINA, OREG.

LOCATION.--Temperature recorder at gaging station, 4.5 miles north of Willamina, Yamhill County, and at mile 6.2.
DRAINAGE AREA.--64.7 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 69°F July 12, 29; minimum, 39°F Dec. 13, Feb. 25, 26.
REMARKS.--Recorder stopped Aug. 24 to Sept. 2, Sept. 13-15, and Sept. 27-30; temperature range, 51°F to 67°F, 53°F to 59°F, and 43°F to 57°F, respectively.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1940. SOUTH YAMHILL RIVER NEAR WHITESON, OREG.

LOCATION.--Temperature recorder at gaging station, near left bank on downstream side of Whiteson Bridge on U.S. Highway 99W, 1.3 miles northwest of Whiteson, Yamhill County, 1.4 miles downstream from Salt Creek, and at mile 16.71.
DRAINAGE AREA.--502 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 12, 13; minimum, 38°F Dec. 11-15. Recorder inoperative Oct. 1-30.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1970. NORTH YAMHILL RIVER AT PIKE, OREG.

LOCATION.--Temperature recorder at gaging station, 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.--Water temperatures: February to September 1964.
EXTREMES, February to September 1964.--Water temperatures: Maximum, 71°F July 12, 28, 29.

Temperature (°F) of water, February to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-1985. MOLALLA RIVER ABOVE PINE CREEK, NEAR WILHOIT, OREG.

LOCATION.--Temperature recorder at gaging station, 0.3 mile upstream from Pine Creek, 5 miles southeast of Wilhoit, Clackamas County, and at mile 32.3.
DRAINAGE AREA.--97.0 square miles.
RECORDS AVAILABLE.--Water temperatures: January to September 1964.
EXTREMES, January to September 1964.--Water temperatures: Maximum, 67°F July 27, 28.

Temperature (°F) of water, January to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2000. MOLALLA RIVER NEAR CANBY, OREG.

LOCATION.--Temperature recorder at gaging station on left bank at upstream side of Good's Bridge, 1.5 miles south of Canby, and at mile 6.01.
DRAINAGE AREA.--323 square miles.
RECORDS AVAILABLE.--Water temperatures: January to September 1964.
EXTREMES, January to September 1964.--Water temperatures: Maximum, 78°F July 12, 13, 28.

Temperature (°F) of water, January to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2003. SILVER CREEK AT SILVERTON, OREG.

LOCATION.--Temperature recorder at gaging station, 300 feet downstream from railroad bridge in Silverton, Marion County, 2.5 miles upstream from Brush Creek, and at mile 3.4.
DRAINAGE AREA.--47.9 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 77°F July 13; minimum, 36°F Dec. 11, 12.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2035. TUALATIN RIVER NEAR DILLEY, OREG.

LOCATION.--Temperature recorder at gaging station, 5 feet upstream from highway bridge, 1.0 mile south of Dilley, Washington County, 1.2 miles downstream from Scoggins Creek, and at mile 58.81.
DRAINAGE AREA.--133 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1963 to September 1964.
EXTREMES, November 1963 to September 1964.--Water temperatures: Maximum, 74°F Aug. 22-24; minimum, 38°F Dec. 13, 14.

Temperature (°F) of water, November 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2040. GALES CREEK NEAR GALES CREEK, OREG.

LOCATION.--Temperature recorder at gaging station, 0.5 mile downstream from Beaver Creek, 4.6 miles northwest of Gales Creek, Washington County, and at mile 17.5.
DRAINAGE AREA.--33.9 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 65°F July 12, 28, 29; minimum, 38°F Feb. 25, 26.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2075. TUALATIN RIVER AT WEST LINN, OREG.

LOCATION.--Temperature recorder at gaging station, 300 feet upstream from bridge on State Highway 212, 0.4 mile west of West Linn, Clackamas County, and at mile 1.8.
DRAINAGE AREA.--710 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 80°F July 12, 27; minimum, 38°F Dec. 14-17.
REMARKS.--Recorder stopped Mar. 23 to Apr. 9; temperature range, 47°F to 51°F.

Temperature (°F) of water, water year October 1963 to September 1964

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	63	63	62	61	62	61	62	62	60	59	58	57	57	57	57	56	56	55	54	53	52	51	51	--
Minimum	--	--	--	--	--	--	--	62	62	62	61	61	61	61	61	60	59	58	57	57	57	57	56	56	55	54	53	52	51	51	51	--
November																																
Maximum	51	50	50	49	49	48	48	47	47	47	47	47	47	47	47	47	47	47	46	46	45	45	45	45	45	46	46	46	46	45	--	47
Minimum	50	50	49	49	48	48	47	47	47	47	47	47	47	47	47	47	47	46	46	45	45	45	45	45	45	45	46	46	45	44	--	47
December																																
Maximum	44	42	40	40	39	39	39	40	41	41	40	40	40	39	39	38	39	39	40	41	42	42	42	42	42	42	42	43	43	44	44	41
Minimum	42	40	40	39	39	39	39	39	40	40	40	40	39	38	38	38	38	39	39	40	41	42	42	42	42	42	42	42	43	43	44	40
January																																
Maximum	44	44	44	44	44	44	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	41	41	41	42	43	44	44	45	45	45	43
Minimum	44	44	44	44	44	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	42	43	44	44	45	45	43
February																																
Maximum	45	45	45	45	45	44	43	43	42	42	42	42	43	43	43	43	43	43	43	44	44	44	44	44	44	43	43	43	43	--	--	43
Minimum	45	45	45	45	44	43	43	42	42	42	42	42	42	43	43	42	42	43	43	43	44	44	44	44	43	43	43	43	42	--	--	43
March																																
Maximum	42	42	43	43	44	44	45	45	44	44	45	45	45	45	45	46	47	47	47	47	47	47	--	--	--	--	--	--	--	--	--	--
Minimum	42	42	42	43	43	44	44	44	44	44	44	44	44	45	45	45	45	46	47	47	47	47	--	--	--	--	--	--	--	--	--	--
April																																
Maximum	--	--	--	--	--	--	--	--	--	50	50	50	50	50	50	51	52	52	53	53	53	52	51	52	53	53	53	55	54	54	--	--
Minimum	--	--	--	--	--	--	--	--	--	50	50	50	50	50	50	50	51	51	51	52	52	51	51	51	52	52	52	53	54	54	--	--
May																																
Maximum	54	54	53	52	52	53	53	53	53	53	54	54	54	54	54	55	56	57	59	58	58	58	58	59	60	62	62	62	63	64	64	57
Minimum	53	53	52	52	52	52	52	52	52	52	52	54	54	53	54	54	55	56	57	58	58	57	57	58	58	60	61	61	60	62	63	56
June																																
Maximum	64	63	64	64	63	63	63	62	62	62	63	64	64	64	63	63	62	62	62	62	64	65	67	69	68	68	65	68	68	70	--	64
Minimum	63	62	63	63	63	62	62	61	61	61	61	62	63	63	63	62	61	62	62	62	62	62	64	65	66	65	64	63	64	66	--	63
July																																
Maximum	68	66	68	66	66	72	74	72	72	75	78	80	79	74	70	70	70	70	75	70	70	70	74	76	78	78	80	79	78	74	71	73
Minimum	66	66	64	64	64	64	66	66	64	66	69	71	71	70	68	66	67	68	66	68	68	67	66	67	70	70	70	72	73	70	69	68
August																																
Maximum	69	68	68	69	73	73	75	74	73	76	74	72	74	75	75	77	75	72	68	74	76	76	78	77	73	70	66	67	66	66	68	72
Minimum	68	66	66	66	65	67	68	70	70	68	70	70	70	67	67	67	68	68	66	65	66	68	68	69	70	66	65	64	64	63	63	67
Septermber																																
Maximum	65	64	65	67	66	64	63	62	64	67	66	65	64	64	66	64	64	62	62	62	61	63	66	69	63	63	66	64	61	60	--	64
Minimum	64	63	62	62	62	63	62	62	61	61	62	62	62	62	61	62	62	61	62	61	60	61	61	60	61	60	59	58	59	58	--	61

WILLAMETTE RIVER BASIN--Continued

14-2077. WILLAMETTE RIVER AT OREGON CITY, OREG.

LOCATION.--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.
DRAINAGE AREA.--10,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: March 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 73°F July 16, 28-30; minimum, 40°F Dec. 14, 15.
EXTREMES, March 1963 to September 1964.--Water temperatures: Maximum, 74°F June 19, 20, Aug. 12, 1963; minimum, 40°F Dec. 14, 15, 1964.

Temperature (°F) of water, water year October 1963 to September 1964

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

WILLAMETTE RIVER BASIN--Continued

14-2110. CLACKAMAS RIVER NEAR CLACKAMAS, OREG.

LOCATION.--Temperature recorder at gaging station, 0.8 mile upstream from Johnson Creek, 2.1 miles southeast of Clackamas, Clackamas County, and at mile 4.8.
DRAINAGE AREA.--936 square miles at Gladstone Bridge, 3.6 miles downstream where all discharge measurements are made.
RECORDS AVAILABLE.--Water temperatures: May 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 66°F July 12, 25-28; minimum, 38°F Dec. 13-16.
EXTREMES, May 1963 to September 1964.--Water temperatures: Maximum, 68°F Aug. 16-18, 1963; minimum, 38°F Dec. 13-16, 1963.
REMARKS.--Recorder stopped Oct. 11 to Nov. 22, Mar. 25 to Apr. 2; temperature range, 44°F to 57°F, 41°F to 46°F, respectively.

Temperature (°F) of water, water year October 1963 to September 1964

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

COLUMBIA RIVER MAIN STEM

14-2118.5. COLUMBIA RIVER NEAR SCAPPOOSE. OREG.

LOCATION.--Cross-section No. 5, on a line between navigation lights 21 and 26, 5.7 miles downstream from the mouth of Willamette River, and 5.8 miles east of Scappoose, Columbia County.
RECORDS AVAILABLE.--Chemical analyses: February to September 1964.
REMARKS.--Samples for chemical and biological analyses were collected at quarter points A (right bank), B (center), and C (left bank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^6)	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	0910	A	43	90	0		1.7		9	27	2498.4	390.1				197	7.8	0.12	0.13	0.6	0.0
Feb. 19.....	0915	B	43	84	0		1.5		20	--	--	--				182	7.7	.11	.13	.4	.0
Feb. 19.....	0920	C	43	78	0		1.7		6	6	206.9	53.3				170	7.6	.11	.13	.3	.0
Mar. 4.....	0910	A	44	89	0		3.1		211	11	1491	169				203	7.0	.02	.14	.2	.0
Mar. 4.....	0915	B	44	80	0		1.6		161	6	169	46				182	7.0	.04	.14	.7	.0
Mar. 4.....	0920	C	44	70	0		.8		110	--	--	--				162	7.0	.07	.16	.4	.0
Mar. 18.....	0935	A	45	79	0		1.5		7	13	232	52				174	7.5	.06	.11	.7	.0
Mar. 18.....	0940	B	45	74	0		1.1		10	11	166	52				162	7.7	.06	.11	.6	.0
Mar. 18.....	0945	C	46	67	0		1.1		11	--	--	--				149	7.7	.07	.14	.5	.0
Apr. 1.....	0920	A	48	85	0		1.8		28	71	296	96				192	7.7	.03	.15	.3	.0
Apr. 1.....	0925	B	48	84	0		1.9		23	66	75	31				188	7.6	.04	.16	.3	.0
Apr. 1.....	0930	C	48	81	0		2.0		23	--	--	--				178	7.7	.04	.19	.2	.0
Apr. 15.....	0855	A	51	90	0		1.6		9	74	621	100				202	7.7	.09	.20	.5	.0
Apr. 15.....	0900	B	51	84	0		1.4		15	70	53	17				188	7.7	.09	.18	.4	.0
Apr. 15.....	0905	C	51	84	0		1.6		17	--	--	--				182	7.7	.08	.17	.6	.0
Apr. 29.....	0925	A	51	72	0		1.5		5	25	298	74				157	7.7	.05	.17	.8	.0
Apr. 29.....	0930	B	51	69	0		1.3		6	4	55	18				148	7.7	.10	.15	.2	.0
Apr. 29.....	0935	C	51	67	0		1.3		10	--	--	--				143	7.5	.07	.19	.4	.0
May 13.....	0840	A	53	74	0		1.3		11	8	3160	420				160	7.8	.06	.21	.3	.0
May 13.....	0845	B	53	74	0		2.0		0	4	100	70				160	7.8	.07	.23	.3	.0
May 13.....	0850	C	53	72	0		1.3		0	--	--	--				155	7.8	.08	.23	.6	.0
May 27.....	0900	A	55	64	0		1.4		8	--	--	--				138	7.7	.06	.26	.6	.0
May 27.....	0910	B	55	64	0		1.1		9	5	330	120				137	7.5	.06	.32	.1	.0
May 27.....	0915	C	55	64	0		1.0		8	--	--	--				136	7.6	.05	.28	.6	.0
June 10.....	0950	A	56	51	0		.9		14	--	--	--				103	7.5	.05	.28	.4	.0
June 10.....	0955	B	56	51	0		1.3		14	--	--	--				103	7.5	.05	.31	.3	.0
June 10.....	1000	C	56	50	0		1.0		40	--	--	--				102	7.5	.05	.21	.5	.0
June 24.....	1120	A	59	60	0		1.0		1	--	--	--				123	7.7	.04	.33	.2	.0
June 24.....	1125	B	59	60	0		.7		2	--	--	--				124	7.5	.04	.34	.2	.0
June 24.....	1130	C	59	60	0		1.3		0	--	--	--				124	7.6	.05	.36	.3	.0

July 8, 1964.....	1145	A	62	64	0		1.2		2	--	--	--			127	7.8	.01	.13	.3	.0
July 8.....	1150	B	62	64	0		1.1		0	---	--	--			127	8.0	.02	.15	.2	.0
July 8.....	1155	C	62	64	0		1.2		0	--	--	--			127	7.9	.12	.15	.2	.0
July 22.....	--	A	65	66	0		1.6		2	130	21	5			130	8.1	.01	.16	.3	.0
July 22.....	1215	B	65	66	0		1.3		0	10	5	Trace			130	8.1	.01	.14	.0	.0
July 22.....	1220	C	65	66	0		1.3		0	--	--	--			128	7.8	.01	.14	.3	.0
Aug. 5.....	0905	A	65	68	0		1.9		11	--	--	--			138	7.8	.01	.12	.0	.0
Aug. 5.....	0910	B	65	70	0		2.0		2	--	--	--			137	7.9	.01	.14	.2	.0
Aug. 5.....	0915	C	66	68	0		2.1		3	--	--	--			133	8.0	.01	.09	.2	.0
Aug. 19.....	1210	A	67	71	0		2.1		5	8	1370	105			141	8.1	.01	.10	.0	.0
Aug. 19.....	1215	B	67	71	0		1.9		15	10	99	23			141	8.1	.02	.11	.5	.0
Aug. 19.....	1220	C	67	71	0		2.7		3	--	--	--			140	8.0	.02	.11	.1	.0
Sept. 2.....	1140	A	64	75	0		.9		12	12	472	85			152	8.0	.01	.04	.3	.0
Sept. 2.....	1145	B	64	74	0		.8		0	16	316	71			149	7.9	.02	.08	.1	.0
Sept. 2.....	1150	C	64	72	0		1.2		0	--	--	--			147	7.7	.03	.10	.3	.0
Sept. 16.....	1200	A	64	81	0		2.0		3	--	--	--			169	7.9	.01	.06	.0	.0
Sept. 16.....	1205	B	65	80	0		1.8		0	--	--	--			168	8.0	.01	.08	.1	.0
Sept. 16.....	1210	C	65	79	0		1.6		0	--	--	--			165	8.1	.02	.12	.0	.0
Sept. 30.....	1200	A	63	80	0		1.1		2	--	--	--			170	7.8	.01	.08	.2	.0
Sept. 30.....	1205	B	63	79	0		1.4		4	14	57	24			167	7.8	.00	.08	.2	.0
Sept. 30.....	1210	C	63	76	0		1.1		7	--	--	--			162	7.9	.02	.09	.4	.0

14-2217. LEWIS RIVER AT WOODLAND, WASH.

LOCATION.--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 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colinies per 100 ml)
Nov. 1, 1963.		14				4.5	0.4	2.9	0.6		21		1.6	1.5	0.1	0.1	0.01	38	12	0		40	6.9	5	9.1	36
Nov. 14.....		14				4.0	.6	1.8	.4		20		.8	1.5	.1	.3	.01	A 33	12	0		38	6.9	5	9.9	230
Dec. 3.....		14				4.0	.6	2.8	.3		20		1.6	1.0	.1	.4	.01	38	12	0		38	6.8	5	10.5	91
Jan. 29, 1964		14				3.5	.8	2.6	.3		18		.0	1.5	.1	.4	.02	34	12	0		36	7.0	0	12.0	91
Feb. 26.....		14				3.0	1.0	2.5	.5		19		.2	1.5	.1	.3	.01	32	12	0		35	6.9	5	12.1	36
Mar. 27.....		14				3.5	.8	2.3	.4		20		.4	1.8	.1	.1	.02	36	12	0		36	6.9	5	13.8	23
Apr. 24.....		15				4.0	.7	2.6	.4		20		.8	2.0	.1	.3	.02	35	13	0		39	6.8	5	12.3	150
May 8.....		13				4.0	.5	2.4	.2		19		.2	1.5	.1	.1	.01	33	12	0		37	7.0	0	12.1	23
June 17.....		12				4.0	.5	2.6	.4		20		.8	1.0	.1	.1	.01	30	12	0		37	7.1	5	11.7	36
July 21.....		12				3.5	1.3	2.7	.1		20		1.0	1.2	.1	.1	.01	33	14	0		39	6.9	0	10.1	230
Aug. 10.....		12				4.0	.9	2.9	.5		21		.8	1.5	.0	.1	.03	33	14	0		42	7.0	5	10.4	430
Sept. 14.....		12				4.0	1.3	2.9	.3		22		1.0	1.8	.1	.1	.01	34	16	0		43	6.9	5	10.3	150

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.95	0.1	0.00	0.01

14-2225. EAST FORK LEWIS RIVER NEAR HEISSON, WASH.

LOCATION.--Temperature recorder at gaging station 60 feet downstream from Basket Creek, 1.5 miles northeast of Heisson, Clark County, and 20 miles upstream from mouth.
DRAINAGE AREA.--125 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 68°F July 28-30; minimum, 37°F Dec. 11-13.
EXTREMES, 1950-64.--Water temperatures: Maximum (1950-60, 1962-64), 74°F Aug. 4, 1952; minimum, freezing point Jan. 24 to Feb. 1, 1957, Jan. 11-14, 1963.
REMARKS.--Recorder not operating Oct. 1-25.

Temperature (°F) of water, water year October 1963 to September 1964

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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	47	46	47	47	46	46	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45	44	45	46	45	44	--
November																																
Maximum	46	46	46	46	46	46	46	46	46	46	46	47	47	47	46	46	46	45	45	45	44	45	45	45	46	46	46	43	43	42	--	46
Minimum	45	46	44	45	45	45	45	46	46	46	46	46	47	46	45	46	45	45	45	43	43	43	45	45	45	46	43	42	42	41	--	45
December																																
Maximum	42	42	41	41	44	44	43	42	42	41	38	37	38	40	41	42	43	43	43	43	43	43	43	43	43	43	44	44	44	44	45	42
Minimum	41	41	40	40	41	43	42	42	41	38	37	37	37	38	40	41	42	41	42	43	42	42	42	41	43	42	43	44	42	42	44	41
January																																
Maximum	45	45	44	43	43	43	43	43	43	41	42	42	41	42	42	43	42	41	41	42	42	41	41	42	42	43	43	42	43	43	43	42
Minimum	45	44	43	43	42	42	42	42	41	41	41	41	41	42	42	42	41	40	40	41	41	40	40	41	41	42	42	41	42	42	42	42
February																																
Maximum	43	43	42	42	41	40	39	40	41	41	41	40	40	40	40	40	42	42	42	42	42	42	41	41	41	40	40	40	40	--	--	41
Minimum	43	41	41	41	40	38	38	38	40	41	40	39	39	39	40	40	40	42	42	40	40	40	39	41	38	39	38	40	40	--	--	40
March																																
Maximum	41	41	41	42	41	41	41	41	41	41	41	40	41	42	43	44	43	42	42	42	42	43	43	41	41	42	44	46	47	47	46	42
Minimum	40	40	40	41	39	40	40	41	40	40	40	40	40	41	41	40	41	42	40	41	41	41	40	38	39	40	41	41	43	44	43	41
April																																
Maximum	45	42	44	44	42	45	46	46	46	44	43	43	45	45	45	42	44	45	47	47	44	43	43	46	46	45	44	48	48	44	--	45
Minimum	42	42	40	42	40	41	42	43	44	43	42	41	42	42	42	40	40	40	41	43	42	42	41	43	45	44	43	42	44	42	--	42
May																																
Maximum	43	42	42	43	43	45	46	45	45	46	49	49	45	47	47	49	49	50	51	50	47	47	50	50	50	53	54	54	53	55	55	48
Minimum	42	40	41	42	41	41	44	45	44	45	43	45	43	42	43	45	46	45	46	47	45	45	44	47	45	47	48	50	49	50	51	45
June																																
Maximum	55	52	52	52	52	51	51	50	53	53	50	55	55	54	54	52	51	49	49	50	51	55	57	57	57	57	53	55	56	59	--	53
Minimum	52	50	49	52	50	50	50	48	48	50	50	50	52	52	51	51	49	48	48	47	48	49	52	52	52	53	51	50	52	54	--	50
July																																
Maximum	59	55	56	56	54	60	62	62	59	61	64	66	66	65	59	58	60	60	61	61	60	60	61	64	66	67	67	68	68	68	67	62
Minimum	55	54	52	53	53	54	58	57	55	57	60	63	63	59	57	56	58	58	57	60	59	58	57	60	63	64	64	65	66	62	60	59
August																																
Maximum	60	57	57	58	60	62	63	63	63	62	65	64	63	63	61	63	64	63	61	61	64	66	67	66	65	62	58	56	56	55	55	61
Minimum	57	56	57	56	56	59	61	61	60	59	61	62	62	60	60	60	61	61	59	58	60	63	64	65	62	58	56	55	55	54	53	59
September																																
Maximum	54	53	54	55	55	53	53	53	53	54	55	55	55	56	55	56	55	53	52	52	52	53	54	55	55	53	52	52	51	51	--	54
Minimum	52	52	52	53	53	53	53	53	51	52	53	54	54	55	54	54	53	51	52	52	50	51	52	53	53	51	50	51	51	51	--	52

COLUMBIA RIVER MAIN STEM

14-2229. COLUMBIA RIVER NEAR ST. HELENS, OREG.

LOCATION.--Cross-section No. 6, between navigational lights 69 and 72, 4.5 miles north of St. Helens, Columbia County, and 5.1 miles downstream from the mouth of Lewis River.
RECORDS AVAILABLE.--Chemical analyses: February to Septemher 1964.
REMARKS.--Samples for chemical and biological analyses were collected at quarter points A (right bank), B (center), and C (left hank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^6)	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	0905	A	44	74	0		2.0		12	40	210	110				164	7.6	0.09	0.14	0.2	0.0
Feb. 19.....	0920	B	45	73	0		2.4		39	--	--	--				162	7.5	.09	.13	.1	.0
Feb. 19.....	0930	C	45	68	0		2.5		59	7	280	90				152	7.4	.09	.15	.2	.0
Mar. 4.....	0900	A	45	82	0		1.4		19	59	60	30				182	7.4	.08	.10	.4	.0
Mar. 4.....	0915	B	45	66	0		1.3		73	--	--	--				150	7.1	.06	.12	.2	.0
Mar. 4.....	0925	C	45	62	0		1.7		82	9	450	140				142	7.1	.05	.13	.5	.0
Mar. 18.....	0900	A	46	66	0		1.1		7	43	110	50				147	7.5	.05	.11	.2	.0
Mar. 18.....	0915	B	46	68	0		1.2		11	--	--	--				150	7.5	.06	.12	.1	.0
Mar. 18.....	0925	C	47	52	0		1.7		19	7	310	700				117	7.2	.07	.13	.7	.0
Apr. 1.....	0850	A	49	78	0		1.6		31	--	--	--				171	7.5	.03	.14	.3	.0
Apr. 1.....	0905	B	50	77	0		1.9		36	--	--	--				171	7.5	.03	.13	.6	.0
Apr. 1.....	0920	C	50	65	0		1.9		53	--	--	--				147	7.3	.03	.15	.2	.0
Apr. 15.....	0915	A	52	84	0		1.7		19	48	900	50				189	7.6	.06	.12	.3	.0
Apr. 15.....	0925	B	52	76	0		1.9		30	--	--	--				171	7.4	.06	.21	.4	.0
Apr. 15.....	0940	C	52	81	0		2.0		25	6	440	70				180	7.6	.07	.19	.5	.0
Apr. 29.....	0900	A	52	65	0		1.1		20	19	240	60				141	7.5	.05	.15	.3	.0
Apr. 29.....	0910	B	52	66	0		1.3		21	--	--	--				142	7.5	.06	.19	.7	.0
Apr. 29.....	0920	C	53	55	0		1.8		49	4	330	50				123	7.3	.05	.19	.4	.0
May 13.....	0850	A	55	70	0		.8		5	20	70	20				152	7.6	.06	.20	.4	.0
May 13.....	0900	B	55	72	0		1.7		0	--	--	--				155	7.6	.07	.23	.7	.0
May 13.....	0910	C	55	62	0		1.5		31	6	910	90				135	7.4	.06	.21	.4	.0
May 27.....	0850	A	57	64	0		1.3		10	--	--	--				137	7.6	.02	.24	.1	.0
May 27.....	0900	B	57	63	0		1.1		7	--	--	--				134	7.6	.03	.14	.4	.0
May 27.....	0910	C	57	52	0		1.2		24	--	--	--				112	7.4	.01	.25	.1	.0
July 22.....	0850	A	66	65	0		1.8		2	--	--	--				128	7.8	.01	.14	.1	.0
July 22.....	0900	B	64	64	0		2.1		3	--	--	--				128	7.9	.01	.13	.0	.0
July 22.....	0915	C	67	61	0		2.8		12	--	--	--				122	7.5	.01	.19	.3	.0
Aug. 5.....	0845	A	67	66	0		1.8		6	5	180	30				132	8.0	.01	.15	.3	.0
Aug. 5.....	0855	B	67	68	0		1.4		5	--	--	--				134	8.1	.01	.12	.4	.0
Aug. 5.....	0905	C	68	63	0		1.1		3	3	8	30				127	7.7	.01	.19	.5	.0

Aug. 19, 1964....	0905	A	68	68	0		1.8		20	10	370	60				141	7.8	.01	.11	.3	.0
Aug. 19..........	0915	B	69	68	0		2.4		15	--	--	--				139	7.8	.01	.11	.6	.0
Aug. 19..........	0925	C	69	62	0		1.9		15	11	160	50				129	7.7	.02	.16	.3	.0
Sept. 2..........	0900	A	66	72	0		1.0		15	13	270	60				149	7.8	.02	.08	.2	.0
Sept. 2..........	0910	B	66	70	0		1.2		9	--	--	--				144	7.6	.01	.08	.3	.0
Sept. 2..........	0925	C	66	67	0		1.1		49	17	350	90				141	7.4	.02	.14	.1	.0
Sept. 16.........	0945	A	65	76	0		1.3		11	15	340	90				162	8.0	.01	.08	.0	.0
Sept. 16.........	0930	B	65	66	0		2.0		38	--	--	--				145	7.6	.02	.20	.2	.0
Sept. 16.........	0910	C	65	63	0		2.4		40	27	560	150				140	7.5	.02	.22	.4	.0
Sept. 30.........	0900	A	64	77	0		1.0		9	13	380	90				164	7.8	.01	.06	.3	.0
Sept. 30.........	0910	B	64	70	0		1.2		17	--	--	--				151	7.6	.02	.09	.4	.0
Sept. 30.........	0920	C	64	54	0		1.4		67	22	810	160				124	7.2	.03	.12	.4	.0

KALAMA RIVER BASIN

14-2235. KALAMA RIVER BELOW ITALIAN CREEK, NEAR KALAMA, WASH.

LOCATION.--Temperature recorder at gaging station, 2.5 miles northeast of Kalama, Cowlitz County, 3 miles upstream from mouth, and 5 miles downstream from Italian Creek.
DRAINAGE AREA.--198 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1954 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 63°F July 12, 13; minimum, 39°F Dec. 12-15, Feb. 13, 25, 26.
EXTREMES, 1954-64.--Water temperatures: Maximum, 69°F July 28, 1958; minimum, freezing point Nov. 19, 20, 1958.

Chemical analyses, in parts per million, October 1962 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 16, 1962	1150	15		0.06		4.5	0.7	2.7	0.4		20		0.6	2.0	0.0	0.4	0.03	37	14	0		40	7.3	5	11.2	36
Jan. 9, 1963.	1260	15		.08		4.0	.9	2.8	.4		20		.8	2.0	.1	.7	.04	38	14	0		39	7.3	5	12.1	36
Apr. 3.....	1870	15		--		4.0	.8	2.4	.2		19		.8	1.8	.1	1.3	.04	38	13	0		39	7.2	5	12.0	23
July 10.....	500	16		--		5.0	.9	3.0	.5		24		.8	3.0	.1	.2	.03	40	16	0		49	7.2	5	11.2	36
Nov. 1.....	698	15		--		5.0	.7	3.0	.3		21		.4	3.0	.1	.6	.03	46	15	0		45	7.1	5	11.7	4600
Jan. 29, 1964	3380	12		--		3.5	.5	3.0	.3		16		.2	1.8	.0	.9	.01	33	10	0		33	6.8	10	12.3	30
Apr. 24.....	1010	14		--		4.0	.9	2.5	.3		20		.2	2.5	.1	.5	.06	35	14	0		40	7.0	0	12.2	36
July 21.....	400	15		--		4.5	1.3	3.6	.2		24		.2	3.5	.1	.2	.03	45	16	0		53	7.1	5	10.5	430

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Oct. 16, 1962....	1230	0.00	0.00	0.00	0.05	0.01	0.00
Apr. 3, 1963.....	1535	.00	.01	.03	.05	.00	.00
Nov. 1.....	1120	.01	.01	.00	.05	.00	.03
Apr. 24, 1964....	1415	.00	.00	.00	.05	.00	.00

KALAMA RIVER BASIN--Continued

14-2235. KALAMA RIVER BELOW ITALIAN CREEK, NEAR KALAMA, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

COWLITZ RIVER BASIN

14-2325. CISPUS RIVER NEAR RANDLE, WASH.

LOCATION.--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 Randle, Lewis County.
DRAINAGE AREA.--321 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F July 25, 27, 28; minimum, 35°F Jan. 18-20, 25, 26.
EXTREMES, 1950-64.--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 1963 to September 1964

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

COWLITZ RIVER BASIN--Continued

14-2335. COWLITZ RIVER NEAR KOSMOS, WASH.

LOCATION.--Temperature recorder at gaging station, 0.5 mile downstream from Tumwater Creek, 1.5 miles downstream from Cispus River, and 4 miles southeast of Kosmos, Lewis County.
DRAINAGE AREA.--1,042 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to July 1960.
Water temperatures: November 1952 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F on several days during August; minimum, 36°F on several days during January and February.
EXTREMES, 1952-64.--Water temperatures: Maximum (1952-61, 1962-64), 65°F July 11, 12, 1958; minimum, freezing point Jan. 20, 1962.

Chemical analyses, in parts per million, November 1961 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 18, 1961	2240	15		0.06		7.0	1.1	3.3	0.5		32		3.2	1.5	0.0	0.1	0.02	A 48	22	0		61	7.2	5	12.3	360
Feb. 19, 1962	3340	16		.09		7.0	.8	3.0	.5		30		1.8	1.2	.1	.0	.03	50	21	0		56	7.4	5	12.2	23
May 10.....	6210	13		.14		5.5	.7	2.4	.4		25		.6	.8	.0	.1	.02	A 36	16	0		46	7.3	5	11.7	23
Aug. 17.....	1910	14		--		7.0	.7	3.9	.7		30		4.0	1.5	.0	.2	.03	A 47	20	0		56	7.7	5	9.2	23
Oct. 16.....	3160	14		--		6.0	.8	2.8	.4		27		2.0	1.2	.0	.0	.03	46	18	0		52	7.3	5	9.7	91
Jan. 7, 1963.	4480	15		--		6.5	.9	2.9	.6		29		2.4	.8	.0	.2	.03	44	20	0		52	7.4	5	12.2	23
Apr. 3.....	3900	16		.21		7.5	.7	2.9	.3		31		2.8	1.0	.0	.3	.03	47	22	0		56	7.5	5	12.2	91
July 10.....	2500	13		--		6.0	1.1	2.5	.4		28		2.0	1.0	.1	.0	.05	44	20	0		52	7.3	5	10.4	23
Oct. 31.....	1640	16		--		7.5	1.3	3.4	.5		34		3.6	1.8	.1	.1	.03	58	24	0		64	7.4	5	12.4	150
Jan. 31, 1964	6960	15		--		6.0	1.2	3.0	.4		29		1.8	.5	.0	.3	.02	50	20	0		53	7.0	5	11.8	36
Apr. 17.....	5000	14		--		6.0	1.3	2.7	.5		28		2.0	1.2	.1	.1	.02	43	20	0		53	7.2	0	--	36
July 15.....	9280	8.1		--		3.5	.7	1.8	.1		18		1.0	.2	.0	.1	.01	32	12	0		32	7.0	5	11.2	91

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 18, 1961....	1515	0.00	0.00	0.04	0.05	0.00	0.04
May 10, 1962.....	1045	.00	.00	.00	.05	.00	.00
Oct. 16.....	1535	.00	.00	.00	.05	.00	.00
Apr. 3, 1963.....	1220	.00	.00	.02	.05	.00	.01
Oct. 31, 1963....	1615	.01	.01	.00	.05	.00	.05
Apr. 17, 1964....	1300	.00	.00	.01	.05	.00	.00

COWLITZ RIVER BASIN--Continued

14-2335. COWLITZ RIVER NEAR KOSMOS, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	56	56	55	54	53	52	50	51	51	51	51	51	52	52	52	52	51	50	47	47	47	47	47	46	45	43	43	43	43	43	50
Minimum	56	55	55	54	53	52	50	50	50	51	51	51	51	51	52	52	51	50	47	47	47	47	47	46	45	43	42	42	43	43	42	49
November																																
Maximum	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	42	42	42	41	41	42	41	41	42	42	42	42	41	39	39	--	42
Minimum	42	42	42	42	42	42	42	42	42	42	42	42	43	43	42	42	42	41	41	41	41	41	41	41	42	42	42	39	39	39	--	42
December																																
Maximum	39	39	39	39	39	40	39	38	39	39	38	38	38	38	38	38	38	38	38	39	39	38	38	38	38	38	38	39	39	38	40	39
Minimum	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	38	38	38	38
January																																
Maximum	40	40	39	39	39	38	37	38	38	38	37	37	37	38	38	38	38	37	36	36	36	36	36	36	36	36	37	37	38	38	38	37
Minimum	40	39	39	39	38	37	37	37	38	37	37	37	37	37	38	38	37	36	36	36	36	36	36	36	36	36	36	37	37	38	37	37
February																																
Maximum	38	38	38	38	38	37	36	36	38	38	39	39	39	38	38	38	39	39	39	39	39	39	39	39	39	39	39	38	38	--	--	38
Minimum	37	38	38	38	37	36	36	36	36	38	38	39	38	38	38	38	38	39	39	39	39	39	39	39	39	38	38	38	38	--	--	38
March																																
Maximum	39	39	39	38	38	38	39	39	39	39	38	38	38	40	41	41	41	41	41	41	43	43	43	43	41	41	43	46	47	47	47	41
Minimum	38	38	38	38	38	37	38	39	39	38	38	38	38	38	40	41	41	41	41	41	41	43	43	40	41	40	40	43	46	46	46	40
April																																
Maximum	46	45	45	45	45	46	46	47	48	47	47	46	46	46	47	47	47	47	49	49	49	49	49	50	50	49	49	50	50	49	--	48
Minimum	45	44	44	45	44	44	46	46	47	47	46	45	45	46	46	46	46	46	47	48	49	49	48	49	49	49	48	48	49	48	--	47
May																																
Maximum	48	48	48	47	47	47	48	50	49	49	49	49	47	47	47	48	48	48	47	47	46	45	46	46	47	47	46	45	44	44	45	47
Minimum	48	48	47	47	47	47	48	48	49	48	48	47	46	46	47	47	48	47	47	46	45	45	45	46	46	46	45	44	44	43	44	46
June																																
Maximum	44	44	44	44	43	43	43	43	45	45	44	45	45	46	46	45	44	44	44	45	45	48	48	48	48	48	47	49	49	50	--	46
Minimum	43	43	43	43	43	43	43	43	43	44	44	44	45	45	45	44	43	44	44	44	45	45	48	47	47	46	46	47	48	49	--	45
July																																
Maximum	50	48	48	48	49	50	50	50	49	50	51	51	51	51	48	47	48	48	50	50	50	50	50	54	56	56	56	57	57	56	52	51
Minimum	48	47	47	48	48	48	50	48	47	49	49	50	50	48	47	47	47	48	48	50	50	49	48	50	54	55	55	56	56	52	51	50
August																																
Maximum	51	50	50	49	53	55	57	57	57	56	58	58	57	56	56	57	57	57	54	55	57	58	58	58	58	56	52	51	51	52	53	55
Minimum	50	50	49	49	49	53	55	56	55	53	54	57	54	54	53	53	55	54	51	51	53	55	56	56	56	52	50	50	50	50	50	53
September																																
Maximum	53	50	54	54	55	55	55	53	53	54	54	54	54	55	55	55	55	54	53	52	51	53	55	56	56	53	51	51	51	50	--	53
Minimum	50	49	49	51	52	53	53	51	50	50	50	51	51	53	53	52	54	52	52	51	50	50	52	53	53	50	49	50	50	49	--	51

COWLITZ RIVER BASIN--Continued

14-2355. WEST FORK TILTON RIVER NEAR MORTON, WASH.

LOCATION.--Temperature recorder at gaging station, 0.8 mile upstream from mouth, and 4 miles northeast 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 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 67°F July 12.
EXTREMES, 1950-59, 1960-64.--Water temperatures: Maximum (1950-59, 1960-62, 1963-64), 72°F July 28-31, Aug. 3, 1962; minimum (1950-59, 1960-63), freezing point on several days during February and March 1962, Jan. 27 to Feb. 1, 1963.
REMARKS.--Recorder not operating properly Oct. 1 to May 20; temperature range not determined.

Temperature (°F) of water, water year October 1963 to September 1964

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	
May																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	44	44	46	45	47	48	48	46	48	48	47	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	42	41	40	42	40	42	42	44	43	43	43	--
June																																
Maximum	46	45	46	46	44	45	45	44	49	48	46	49	49	51	51	49	47	47	47	47	48	54	55	54	55	53	51	53	56	58	--	49
Minimum	44	42	42	44	42	44	44	43	43	45	45	46	47	47	48	47	47	46	46	46	46	45	48	49	47	50	48	47	47	48	--	46
July																																
Maximum	54	53	57	54	53	60	62	59	59	63	65	67	66	63	58	58	60	57	62	59	57	56	62	63	65	64	65	66	64	62	56	60
Minimum	50	51	50	50	51	51	53	53	51	53	55	58	58	58	57	55	55	55	53	55	55	54	53	54	56	56	57	58	59	56	54	54
August																																
Maximum	55	54	54	54	58	60	61	60	56	60	62	60	58	59	58	59	59	58	55	57	59	60	61	61	60	56	54	54	53	52	53	57
Minimum	53	52	53	52	51	52	54	55	55	52	54	57	55	54	53	53	54	54	52	52	53	54	55	55	56	54	53	52	52	51	49	53
September																																
Maximum	52	53	55	55	54	54	53	52	53	53	54	54	54	55	54	55	55	53	52	51	51	54	53	53	53	51	50	50	50	50	--	53
Minimum	49	51	51	50	50	53	52	51	49	49	49	49	50	53	52	51	52	50	51	50	50	51	50	50	50	48	48	48	49	49	--	50

COWLITZ RIVER BASIN--Continued

14-2380. COWLITZ RIVER BELOW MAYFIELD DAM, WASH.

LOCATION.--Temperature recorder at gaging station, 1 mile upstream from Mill Creek, 1.5 miles downstream from Mayfield Dam, Lewis County, and 2 miles downstream from Winston Creek.
DRAINAGE AREA.--1,400 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 61°F on several days during October; minimum, 41°F on many days during winter months.
EXTREMES, 1950-64.--Water temperatures: Maximum, 70°F July 28, 29, 1958; minimum, 33°F Jan. 28 to Feb. 2, 1956.
REMARKS.--Recorder stopped Nov. 19 to Dec. 11, Aug. 31 to Sept. 1, Sept. 9-16; temperature ranges not determined.

Temperature (°F) of water, water year October 1963 to September 1964

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	61	61	61	61	61	61	61	61	60	60	60	59	59	59	59	59	59	59	59	58	58	55	55	55	54	54	54	52	51	51	51	58
Minimum	61	61	61	61	61	60	60	60	60	60	59	59	59	59	59	59	59	59	58	58	55	55	55	54	54	54	51	51	51	51	51	57
November																																
Maximum	51	50	50	50	50	50	49	49	49	48	48	48	48	48	48	47	47	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	50	50	50	50	50	49	49	49	48	48	48	48	48	48	47	47	47	47	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	42	42	42	42	42	42	42	42	41	41	41	41	41	41	42	42	42	42	42	42	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	42	42	42	42	--
January																																
Maximum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
Minimum	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
February																																
Maximum	41	42	42	42	42	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	41	42	42	42	42	42	41	--	--	42
Minimum	41	41	42	42	42	42	43	43	43	43	42	42	42	42	42	42	42	42	42	42	42	41	41	41	42	42	42	41	41	--	--	42
March																																
Maximum	41	41	41	41	41	41	41	41	41	41	41	41	41	41	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	44	42
Minimum	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	43	42
April																																
Maximum	44	45	46	46	45	46	46	46	47	47	47	47	47	47	47	47	47	47	48	49	48	48	49	49	49	50	50	50	50	50	--	47
Minimum	44	44	45	45	45	45	46	46	46	47	46	46	47	47	47	47	47	47	47	48	48	48	48	49	49	49	50	50	50	50	--	47
May																																
Maximum	50	50	49	49	48	48	48	49	48	48	48	49	49	49	49	48	48	48	48	49	49	48	49	47	48	48	47	48	48	49	49	48
Minimum	50	49	49	48	48	48	48	48	48	48	48	48	49	49	48	47	47	47	48	48	48	48	47	46	47	47	46	47	48	48	48	48
June																																
Maximum	48	48	47	47	46	46	46	45	45	45	45	45	45	46	46	47	48	47	47	47	46	46	46	50	50	51	51	51	51	51	--	47
Minimum	48	47	47	46	46	46	45	45	45	45	45	45	45	45	46	46	47	47	47	46	46	46	46	46	50	50	51	50	49	49	--	47
July																																
Maximum	51	52	52	51	51	51	51	51	53	53	53	53	54	55	55	54	54	54	54	55	55	54	55	55	54	55	56	57	57	57	58	54
Minimum	51	51	51	51	51	51	51	51	51	52	51	52	53	54	54	54	53	54	54	54	53	53	54	53	53	53	54	56	57	57	57	53
August																																
Maximum	58	57	57	57	55	55	55	56	57	57	57	58	57	58	58	58	58	58	58	59	59	59	59	60	60	60	60	60	60	59	--	58
Minimum	57	57	57	55	55	55	55	55	56	56	56	56	57	57	57	58	58	58	58	58	57	57	58	59	59	60	60	60	59	58	--	57
September																																
Maximum	--	58	58	58	57	56	56	55	--	--	--	--	--	--	--	--	55	57	56	56	56	57	56	56	56	56	56	56	55	54	--	--
Minimum	--	58	58	57	56	56	55	55	--	--	--	--	--	--	--	--	55	55	56	55	55	56	56	56	55	55	55	55	54	52	--	--

14-2390.5. COWLITZ RIVER NEAR TOLEDO, WASH.

LOCATION.--At bridge on U.S. Highway 99, 2.0 miles upstream from Lacamas Creek, 2.4 miles downstream from Salmon Creek, and 2.5 miles southwest of Toledo, Lewis County.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1964.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 1, 1963.		14				7.0	1.3	3.6	0.9		34		2.6	2.0	0.1	0.2	0.01	51	23	0		63	7.0	5	11.1	36
Nov. 14.....		14				6.0	1.3	3.3	.5		28		2.4	2.0	.1	.5	.02	A 44	20	0		55	7.0	15	11.1	36
Dec. 3.....		14				5.5	.9	2.7	.3		25		2.0	1.0	.1	.5	.03	43	17	0		47	7.2	5	11.8	36
Jan. 29, 1964		13				5.0	.9	2.8	.3		22		1.4	1.2	.1	.8	.01	40	16	0		44	7.0	20	12.6	230
Feb. 26.....		16				6.0	1.3	3.2	.4		30		1.8	1.8	.2	.5	.02	51	20	0		56	7.1	5	12.4	36
Mar. 27.....		15				6.5	1.3	3.2	.5		31		1.6	1.8	.0	.4	.01	49	22	0		58	7.1	5	13.3	23
Apr. 24.....		14				6.0	1.0	2.8	.5		28		1.4	1.5	.0	.2	.03	44	19	0		52	7.3	5	12.7	91
May 6.....		13				6.0	1.0	2.7	.2		27		1.8	1.5	.1	.2	.05	43	19	0		52	7.2	5	12.3	23
June 17.....		8.8				4.0	.5	2.0	.3		20		1.0	.2	.1	.2	.01	31	12	0		36	7.2	5	11.5	23
July 21.....		9.0				4.5	.9	2.2	.0		21		1.4	.5	.0	.1	.01	30	14	0		38	7.1	5	10.9	36
Aug. 10.....		11				5.0	.9	2.6	.5		25		1.0	.8	.0	.1	.01	33	16	0		45	7.2	5	10.1	23
Sept. 14.....		13				6.0	1.4	3.1	.2		30		2.0	1.5	.1	.1	.02	43	21	0		57	7.2	5	11.0	130

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	2.1	0.1	0.00	0.05

COWLITZ RIVER BASIN--Continued

14-2425. TOUTLE RIVER NEAR SILVER LAKE, WASH.

LOCATION.--Temperature recorder at gaging station just downstream from highway bridge, 0.5 mile downstream from confluence of North and South Forks, and 5 miles northeast of Silver Lake, Cowlitz County.
DRAINAGE AREA.--474 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 64°F Aug. 22-24; minimum, 39°F on several days during December to February.
EXTREMES, 1950-62, 1963-64.--Water temperatures: Maximum, 72°F Aug. 4, 1952; minimum (1950-60, 1961-62, 1963-64), freezing point Jan. 4, 5, 1959.
REMARKS.--Recorder not operating Dec. 14-23, Mar. 4-19; temperature ranges not determined.

Temperature (°F) of water, water year October 1963 to September 1964

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

COWLITZ RIVER BASIN--Continued

14-2430. COWLITZ RIVER AT CASTLE ROCK, WASH.

LOCATION.--Temperature recorder at gaging station at highway bridge in Castle Rock, Cowlitz County, 2.5 miles downstream from Toutle River, and 14 miles upstream from mouth.
DRAINAGE AREA.--2,238 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
Water temperatures: August 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 64°F Oct. 1, Aug. 23, 24; minimum, 39°F on several days during December.
EXTREMES, 1950-64.--Water temperatures: Maximum (1950-62), 75°F July 28-30, 1958; minimum, freezing point Jan. 29, 30, 1951.

Temperature (°F) of water, water year October 1963 to September 1964

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

COWLITZ RIVER BASIN--Continued

14-2442. COWLITZ RIVER AT KELSO, WASH.

(Formerly published as 14-2452. Cowlitz River at Kelso, Wash.)

LOCATION.--At Allen Street Bridge at Kelso, Cowlitz County, 3.2 miles upstream from Coweman River, 3.5 miles downstream from Ostrander Creek, and 12 miles downstream from gaging station.
DRAINAGE AREA.--2,238 square miles, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: July 1960 to September 1964.
REMARKS.--Records of discharge given for 12-2430. Cowlitz River at Castle Rock. Minor inflow between gaging station and sampling point except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 1, 1963.	4100	15		--		6.5	1.3	3.9	0.6		31		2.6	2.5	0.1	0.3	0.02	52	22	0		61	7.0	10	10.9	91
Nov. 14.....	9240	14		--		5.0	1.3	3.5	.5		24		2.2	2.2	.1	.6	.03	45	18	0		52	6.9	20	9.9	230
Dec. 3.....	8710	14		--		5.5	.8	3.0	.4		24		2.0	1.5	.1	.5	.02	41	16	0		47	7.0	5	12.1	230
Jan. 29, 1964	24000	13		--		4.0	.9	2.9	.3		19		1.4	1.8	.1	.8	.01	39	14	0		41	6.8	20	12.3	230
Feb. 25.....	7760	16		0.16		6.0	1.5	3.3	.4		28		1.8	2.2	.2	.4	.02	49	21	0		55	7.5	5	12.2	36
Mar. 27.....	6070	15		--		5.5	1.6	3.4	.1		29		1.2	1.8	.1	.3	.02	48	20	0		56	7.1	5	12.7	91
Apr. 24.....	8990	14		--		5.5	1.2	3.1	.7		27		1.8	2.0	.1	.2	.02	A 42	18	0		53	6.9	5	12.2	36
May 6.....	7310	13		.15		6.0	.9	3.1	.2		26		1.4	2.0	.1	.2	.02	45	18	0		52	7.0	0	11.9	23
June 17.....	20300	9.1		--		4.0	1.0	2.2	.3		20		1.0	.8	.0	.2	.01	30	14	00		36	7.3	5	11.1	91
July 21.....	6780	9.8		--		4.0	1.2	2.5	.0		22		1.4	.8	.0	.1	.01	34	15	0		40	7.0	5	10.4	36
Aug. 10.....	4620	11		--		5.0	1.0	2.8	.5		25		.8	1.2	.1	.1	.01	37	17	0		48	7.2	0	10.0	91
Sept. 14.....	3130	13		--		6.0	1.3	3.6	.5		30		2.2	1.8	.0	.1	.03	43	20	0		59	7.2	5	10.6	430

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.58	0.1	0.00	0.04

14-2450. COWEMAN RIVER NEAR KELSO, WASH.
(Formerly published as Coweman River at Kelso, Wash.)

LOCATION.--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.
DRAINAGE AREA.--119 square miles, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1961 to September 1964.
Water temperatures: July 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 79°F July 28; minimum, 38°F Dec. 12-14.
EXTREMES, 1950-64.--Water temperatures: Maximum, 82°F July 27, 28, 1958; minimum, freezing point on several days during winter months.
REMARKS.--Temperature recorder located at gaging station. Some inflow between gaging station and sampling point.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Nov. 1, 1963.	196	15		--		6.0	1.5	4.0	0.5		27	0	1.6	4.0	0.0	2.9	0.23	54	21	0		64	6.7	10	10.7	4600
Nov. 13.....	410	14		--		5.0	1.2	3.3	.4		22	0	1.2	2.5	.1	2.2	.03	44	18	0		50	6.8	25	10.1	91
Dec. 3.....	344	16		0.14		5.0	1.1	3.1	.3		24	0	1.6	2.5	.1	1.6	.02	44	17	0		50	6.9	5	12.7	36
Jan. 29, 1964	1460	13		--		3.0	1.3	2.8	.4		18	0	.8	2.0	.1	2.0	.03	41	13	0		39	6.9	10	11.7	230
Feb. 26.....	331	15		.11		5.0	1.1	3.3	.3		22	0	1.0	2.8	.1	1.5	.02	44	17	0		49	6.9	5	12.5	36
Mar. 27.....	417	15		--		5.0	1.2	3.0	.6		23	0	.4	2.5	.1	1.5	.02	45	18	0		49	7.1	5	13.3	91
Apr. 24.....	364	15		--		5.0	1.1	3.2	.5		23	0	.6	2.8	.1	1.4	.03	44	17	0		51	7.0	5	12.1	23
May 6.....	286	13		.17		5.0	1.3	3.3	.3		24	0	.2	3.0	.0	.8	.02	40	18	0		51	7.1	5	12.6	36
June 17.....	309	14		.28		6.0	1.7	3.7	.8		29	0	.0	3.8	.1	.6	.04	47	22	0		61	7.1	5	8.2	430
July 21.....	110	14		--		6.0	2.7	4.3	.1		34	0	.2	4.5	.0	.5	.02	A 49	26	0		72	6.8	10	--	--
Aug. 10.....	82	15		--		8.0	2.1	4.9	.7		38	0	.0	5.8	.1	.6	.04	A 56	29	0		82	7.4	5	9.7	1500
Sept. 14.....	62	14		--		7.0	2.3	4.6	.2		34	0	.2	6.2	.1	.5	.06	53	27	0		77	7.0	5	10.3	4600

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Mar. 27, 1964....	0.00	0.00	0.77	0.1	0.00	0.00

COWLITZ RIVER BASIN--Continued

14-2450. COWEMAN RIVER NEAR KELSO, WASH.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

COLUMBIA RIVER MAIN STEM

14-2453. COLUMBIA RIVER AT LONGVIEW, WASH.

LOCATION.--Cross-section No. 7, between log-boom walkway and navigational light 26, on downstream side of Longview bridge, 1.0 miles west of Longview, Cowlitz County, and 2.1 miles downstream from the mouth of Cowlitz River.
RECORDS AVAILABLE.--Chemical analyses: February to September 1964.
REMARKS.--Samples for chemical and biological analyses were collected at quarter points A (right bank), B (center), and C (left bank). No discharge records available.

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^{+6})	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	0940	A	43	71	0		2.7		16	8	311	48				156	7.6	0.10	0.15	0.1	0.0
Feb. 19.....	0950	B	43	78	0		2.4		22	--	--	--				172	7.6	.09	.15	.1	.0
Feb. 19.....	1000	C	43	75	0		2.3		35	3	112	21				168	7.6	.10	.15	.1	.0
Mar. 4.....	0930	A	44	72	0		1.8		26	18	301	42				164	7.4	.07	.13	.5	.0
Mar. 4.....	0935	B	43	80	0		.8		34	--	--	--				176	7.4	.08	.14	.8	.0
Mar. 4.....	0945	C	44	76	0		1.1		49	7	193	42				169	7.2	.07	.17	.6	.0
Mar. 18.....	1000	A	45	35	0		1.6		7	12	248	44				74	7.2	.03	.08	.6	.0
Mar. 18.....	1010	B	44	63	0		1.3		10	--	--	--				138	7.4	.05	.11	.6	.0
Mar. 18.....	1015	C	45	59	0		1.5		14	4	171	63				132	7.3	.07	.16	.4	.0
Apr. 1.....	0920	A	48	50	0		2.2		26	14	269	63				111	7.2	.01	.13	.2	.0
Apr. 1.....	0930	B	48	78	0		1.7		28	--	--	--				172	7.6	.03	.17	.2	.0
Apr. 1.....	0935	C	48	79	0		1.7		29	7	198	71				174	7.4	.03	.20	.6	.0
Apr. 15.....	0925	A	49	36	0		2.2		25	20	295	95				73	7.3	.02	.10	.3	.0
Apr. 15.....	0935	B	51	81	0		2.0		30	--	--	--				182	7.5	.05	.19	.3	.0
Apr. 15.....	0940	C	51	74	0		1.7		46	6	162	64				169	7.4	.05	.19	.4	.0
Apr. 29.....	0935	A	51	37	0		1.8		24	20	394	112				79	7.3	.01	.07	.6	.0
Apr. 29.....	0945	B	51	66	0		1.4		18	--	--	--				143	7.5	.06	.18	.5	.0
Apr. 29.....	0950	C	51	62	0		1.5		24	8	150	47				137	7.2	.06	.19	.3	.0
May 13.....	0945	A	51	50	0		1.2		6	24	222	79				106	7.3	.04	.12	.4	.0
May 13.....	0955	B	53	70	0		.9		5	--	--	--				152	7.4	.06	.20	.2	.0
May 13.....	1000	C	54	65	0		1.3		25	--	--	--				141	7.4	.07	.20	.3	.0
May 27.....	0945	A	55	46	0		.8		9	2	64	27				103	7.4	.01	.14	.3	.0
May 27.....	0955	B	56	64	0		1.2		11	--	--	--				136	7.5	.04	.17	.6	.0
May 27.....	1000	C	56	54	0		.9		21	--	--	--				119	7.4	.02	.17	.5	.0
June 10.....	0945	A	55	39	0		1.0		5	--	--	--				80	7.3	.05	.20	.4	.0
June 10.....	0950	B	57	50	0		1.2		54	--	--	--				103	7.5	.05	.23	.4	.0
June 10.....	0955	C	57	47	0		1.3		66	--	--	--				95	7.2	.05	.23	.9	.0
June 24.....	0945	A	58	44	0		.9		5	--	--	--				97	7.0	.04	.19	.2	.0
June 24.....	0950	B	58	60	0		.9		3	--	--	--				121	7.4	.05	.36	.4	.0
June 24.....	0955	C	60	54	0		.6		9	--	--	--				115	7.4	.04	.29	.5	.0

COLUMBIA RIVER MAIN STEM--Continued

14-2453. COLUMBIA RIVER AT LONGVIEW, WASH.--Continued

Chemical analyses of water, February to September 1964--Continued

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^{+6})	Total (Cr)				Ortho	Total		
July 8, 1964.....	0950	A	62	50	0		1.3		0	--	--	--				100	7.6	0.02	0.13	0.5	0.0
July 8.....	1000	B	63	62	0		1.4		4	--	--	--				126	7.6	.02	.15	.4	.0
July 8.....	1005	C	63	60	0		1.3		3	--	--	--				123	7.5	.02	.19	.4	.0
July 22.....	0950	A	63	55	0		2.0		7	3	41	20				111	7.7	.01	.16	.4	.0
July 22.....	1000	B	64	64	0		1.8		7	--	--	--				127	7.8	.01	.12	.3	.0
July 22.....	1005	B	65	62	0		1.5		13	--	--	--				124	7.6	.02	.14	.2	.0
Aug. 5.....	0935	A	63	56	0		1.0		9	4	51	20				116	7.7	.02	.13	.0	.0
Aug. 5.....	0945	B	65	66	0		1.7		7	--	--	--				131	7.9	.01	.11	.1	.0
Aug. 5.....	0950	C	65	65	0		1.3		9	--	--	--				128	7.7	.01	.18	.0	.0
Aug. 19.....	0945	A	66	61	0		2.0		14	7	143	32				123	7.5	.02	.10	.3	.0
Aug. 19.....	1005	B	67	69	0		1.8		16	--	--	--				139	7.7	.01	.08	.1	.0
Aug. 19.....	1010	C	67	68	0		2.0		14	2	58	14				139	7.6	.02	.14	.2	.0
Sept. 2.....	0935	A	62	62	0		1.2		34	13	199	56				129	7.5	.01	.08	.1	.0
Sept. 2.....	0945	B	64	70	0		1.4		36	--	--	--				147	7.5	.01	.08	.0	.0
Sept. 2.....	0950	C	63	70	0		1.4		29	2	51	14				145	7.5	.01	.11	.6	.0
Sept. 16.....	0935	A	62	64	0		1.8		17	24	780	138				135	7.8	.02	.11	.0	.0
Sept. 16.....	0945	B	63	76	0		1.5		16	--	--	--				160	8.0	.01	.08	.0	.0
Sept. 16.....	0950	C	63	74	0		1.2		20	3	79	20				156	7.9	.01	.13	.1	.0
Sept. 30.....	0930	A	60	64	0		1.3		16	22	453	101				148	7.6	.01	.17	.2	.0
Sept. 30.....	0940	B	61	76	0		1.4		19	--	--	--				163	7.6	.01	.07	.4	.0
Sept. 30.....	0945	C	61	72	0		1.2		20	--	--	--				156	7.6	.02	.08	.6	.0

14-2454. COLUMBIA RIVER AT FISHER ISLAND, NEAR LONGVIEW, WASH.

(Formerly published as 14-2453. Columbia River at Fisher Island, near Longview, Wash.)

LOCATION.--Midpoint at Fisher Channel, 0.5 mile south of Fisher Island, 3 miles west of Longview, Cowlitz County, and 3.5 miles upstream from Coal Creek.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1964.
REMARKS.--Samples for biological analyses were collected at Cross-section No. 8 in Fisher Channel, between navigational lights 9 and 10, at quarter points A (right bank), B (center), and C (left bank). No discharge records available. Sampling point for monthly analyses subject to tidal influence.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
Oct. 23, 1963		9.8				20	5.7	9.0	1.5		83		17	4.5	0.3	0.5	0.10	115	73	5		186	7.4	5	8.6	2300
Nov. 21.....		13				14	3.8	7.1	1.1		60		13	4.2	.2	1.1	.07	90	50	2		133	7.2	5	10.6	--
Dec. 11.....		13				15	4.5	8.2	1.1		65		16	4.5	.2	.5	.07	98	56	2		150	7.2	10	11.7	1100
Feb. 19.....		13				18	5.4	8.5	1.3		76		16	4.8	.3	.3	1.4	117	67	4		174	7.2	5	12.2	--
Mar. 4.....		13				19	5.4	8.1	1.1		78		17	5.2	.3	.9	.09	113	70	6		174	7.2	5	--	--
Apr. 1.....		13				18	5.9	8.3	1.2		76		16	4.8	.2	1.3	.10	108	69	6		176	7.1	5	--	--
Apr. 29.....		14				15	4.7	6.6	1.2		64		12	3.2	.2	1.4	.11	88	56	4		145	7.1	5	--	910
May 13.....		12				16	4.5	7.2	1.2		66		13	3.2	.3	1.3	.11	96	58	4		150	7.2	10	--	--
June 10.....		7.7				12	3.4	2.6	.7		48		8.4	1.0	.1	.6	.08	61	44	4		99	7.3	5	--	--
July 8.....		7.3				16	4.0	3.2	.8		62		11	1.5	.2	.5	.06	A 76	56	6		127	7.4	5	12.6	24000
Aug. 5.....		5.0				16	5.2	3.0	.9		65		10	1.2	.2	.4	.04	75	61	8		132	7.3	5	11.2	730
Sept. 2.....		4.8				18	4.2	4.6	1.1		70		12	2.5	.2	.6	.06	A 82	62	5		146	7.2	5	9.1	910

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Apr. 29, 1964....	0.00	0.00	0.02	0.05	0.00	0.01

COLUMBIA RIVER MAIN STEM--Continued

14-2454. COLUMBIA RIVER AT FISHER ISLAND, NEAR LONGVIEW, WASH.--Continued

Chemical analyses of water, February to September 1964

Date of collection	Time (24 hr)	Station	Temperature (°F)	Bicarbonate (HCO_3)	Carbonate (CO_3)	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)	Specific conductance (micromhos at 25°C)	pH	Phosphate (PO_4)		Total nitrogen as N	Ammonium (NH_4)
										Settleable (ml/l)	Total (mg/l)	Volume (ml/l)	Hexavalent (Cr^6)	Total (Cr)				Ortho	Total		
Feb. 19, 1964....	1100	A	43	71	0		3.5		41	24	116	34				165	7.4	0.07	0.15	0.1	0.0
Feb. 19.....	1110	B	43	76	0		2.5		26	--	--	--				173	7.6	.11	.16	.7	.0
Feb. 19.....	1120	C	43	76	0		2.6		31	--	--	--				171	7.4	.10	.17	.4	.0
Mar. 4.....	1020	A	43	74	0		1.4		27	32	173	45				168	7.3	.06	.14	.6	.0
Mar. 4.....	1025	B	43	78	0		1.2		33	--	--	--				176	7.1	.06	.12	.4	.0
Mar. 4.....	1035	C	43	78	0		.6		36	--	--	--				177	7.2	.07	.12	.6	.0
Mar. 18.....	1045	A	45	58	0		1.8		15	28	211	45				132	7.5	.04	.12	.2	.0
Mar. 18.....	1055	B	45	64	0		1.5		12	--	--	--				140	7.5	.06	.13	.7	.0
Mar. 18.....	1100	C	45	63	0		1.4		13	--	--	--				140	7.4	.07	.12	.5	.0
Apr. 1.....	1010	A	48	74	0		2.2		32	30	219	79				169	7.4	.02	.16	.5	.0
Apr. 1.....	1020	B	48	78	0		1.7		24	--	--	--				172	7.5	.03	.16	.3	.0
Apr. 1.....	1025	C	48	80	0		2.0		28	--	--	--				177	7.5	.03	.15	.3	.0
Apr. 15.....	1000	A	50	72	0		2.2		39	22	224	64				164	7.3	.04	.13	.5	.0
Apr. 15.....	1010	B	50	78	0		2.0		32	--	--	--				175	7.4	.05	.18	.4	.0
Apr. 15.....	1015	C	50	78	0		2.1		37	--	--	--				177	7.4	.05	.19	.4	.0
Apr. 29.....	1020	A	51	61	0		1.8		24	22	280	89				137	7.2	.04	.16	.6	.0
Apr. 29.....	1030	B	51	66	0		1.4		18	--	--	--				143	7.4	.06	.16	.4	.0
Apr. 29.....	1035	C	51	64	0		1.5		24	--	--	--				141	7.5	.06	.19	.3	.0
May 13.....	1020	A	53	62	0		1.0		15	20	569	71				136	7.5	.05	.18	.3	.0
May 13.....	1030	B	54	69	0		1.6		8	--	--	--				151	7.5	.07	.20	.1	.0
May 13.....	1035	C	54	67	0		1.4		17	--	--	--				148	7.4	.07	.24	.2	.0
May 27.....	1025	A	56	60	0		1.0		9	8	492	71				132	7.4	.03	.29	.3	.0
May 27.....	1030	B	56	64	0		.9		11	--	--	--				136	7.5	.03	.37	.1	.0
May 27.....	1035	C	56	60	0		1.1		21	--	--	--				129	7.4	.04	.17	.2	.0
June 10.....	1020	A	57	50	0		1.1		66	--	--	--				102	7.4	.04	.39	.5	.0
June 10.....	1025	B	57	50	0		1.0		61	--	--	--				102	7.5	.04	.32	.4	.0
June 10.....	1030	C	57	49	0		.9		24	--	--	--				100	7.4	.05	.25	.4	.0
June 24.....	1020	A	60	59	0		.8		9	--	--	--				121	7.5	.05	.32	.3	.0
June 24.....	1025	B	60	59	0		1.1		1	--	--	--				120	7.5	.05	.49	.2	.0
June 24.....	1030	C	60	58	0		.9		5	--	--	--				119	7.5	.05	.46	.2	.0

July 8.....	1040	A	62	60	0		1.5		4	--	--	--			124	7.6	.02	.16	.4	.0
July 8.....	1045	B	62	63	0		--		2	--	--	--			126	7.6	.02	.17	.3	.0
July 8.....	1050	C	63	62	0		1.2		4	--	--	--			125	7.6	.02	.15	.3	.0
July 22.....	1035	A	64	61	0		1.9		12	--	--	--			122	7.7	.01	.11	.0	.0
July 22.....	1040	B	65	64	0		1.5		5	--	--	--			126	7.8	.01	.13	.2	.0
July 22.....	1045	C	65	63	0		1.8		10	--	--	--			125	7.7	.01	.14	.2	.0
Aug. 5.....	1025	A	65	62	0		1.1		11	--	--	--			125	7.7	.01	.12	.6	.0
Aug. 5.....	1030	B	65	66	0		1.2		8	--	--	--			129	7.9	.01	.11	.2	.0
Aug. 5.....	1035	C	65	66	0		1.2		9	--	--	--			128	7.9	.01	.11	.3	.0
Aug. 19.....	1035	A	66	66	0		1.8		17	--	--	--			136	7.6	.03	.20	.3	.0
Aug. 19.....	1040	B	67	68	0		1.8		12	--	--	--			139	7.6	.01	.14	.4	.0
Aug. 19.....	1045	C	67	69	0		1.7		14	--	--	--			139	7.6	.01	.15	.2	.0
Sept. 2.....	1025	A	63	66	0		1.5		24	--	--	--			140	7.4	.01	.09	.3	.0
Sept. 2.....	1030	B	63	70	0		1.1		25	--	--	--			144	7.6	.01	.07	.1	.0
Sept. 2.....	1035	C	63	70	0		1.2		49	--	--	--			145	7.4	.01	.08	.6	.0
Sept. 16.....	1030	A	63	71	0		2.1		22	--	--	--			153	7.7	.01	.10	.2	.0
Sept. 16.....	1035	B	63	74	0		1.1		17	--	--	--			157	7.9	.02	.10	.1	.0
Sept. 16.....	1040	C	63	74	0		1.4		18	--	--	--			155	7.8	.02	.11	.3	.0
Sept. 30.....	1020	A	61	73	0		1.3		24	32	375	105			159	7.6	.00	.06	.2	.0
Sept. 30.....	1025	B	61	75	0		1.3		21	--	--	--			161	7.7	.01	.08	.1	.0
Sept. 30.....	1030	C	61	74	0		1.0		22	--	--	--			160	7.7	.01	.06	.2	.0

ELOCHOMAN RIVER BASIN

14-2475. ELOCHOMAN RIVER NEAR CATHLAMET, WASH.

LOCATION.--Temperature recorder at gaging station, 125 feet upstream from railroad bridge, 2.5 miles northeast of Cathlamet, Wahkiakum County, and 4.5 miles upstream from mouth.
DRAINAGE AREA.--65.8 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1950 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 69°F Aug. 24; minimum, 39°F Dec. 11-13, Feb. 25.
EXTREMES, 1950-64.--Water temperatures: Maximum, 75°F July 11, 12, 1961; minimum, freezing point Feb. 17, 1956.

Temperature (°F) of water, water year October 1963 to September 1964

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

GRAYS RIVER BASIN

14-2505. WEST FORK GRAYS RIVER NEAR GRAYS RIVER, WASH.

LOCATION.--Temperature recorder at gaging station, 1 mile upstream from mouth, and 3.2 miles northeast of town of Grays River, Wahkiakum County.
DRAINAGE AREA.--15.2 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1950 to December 1958, August 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 62°F July 28, Aug. 22-24; minimum, 40°F Dec. 11, 12.
EXTREMES, 1950-58, 1961-64.--Water temperatures: Maximum (1950-58, 1962-64), 69°F July 27, 28, 1958; minimum (1961-64), 33°F Jan. 30, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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	58	57	57	57	57	58	58	58	57	56	56	56	57	57	55	55	53	52	53	53	51	51	50	50	49	50	50	50	50	54
Minimum	53	53	55	55	55	53	52	55	55	55	56	55	56	55	55	54	54	52	50	52	52	51	51	50	49	49	48	49	49	49	49	52
November																																
Maximum	49	49	49	49	49	49	48	48	48	48	49	49	49	49	48	48	48	48	48	46	46	47	47	47	47	48	47	45	45	45	--	48
Minimum	49	48	49	48	48	48	47	48	48	47	47	49	49	48	48	48	48	48	46	45	46	46	47	46	47	47	45	44	44	44	--	47
December																																
Maximum	44	44	45	45	46	46	45	45	44	43	41	41	42	43	44	45	46	45	46	46	45	46	46	46	46	46	46	47	46	46	47	45
Minimum	44	44	44	45	45	45	44	44	43	41	40	40	41	42	43	44	45	44	45	45	45	45	46	45	46	46	46	46	45	45	46	44
January																																
Maximum	47	46	46	45	45	45	44	44	44	43	44	44	44	44	44	44	44	44	43	43	43	43	43	44	45	45	45	45	44	44	45	44
Minimum	46	46	45	44	45	44	44	44	43	43	43	43	44	43	44	44	43	43	43	43	43	42	42	43	44	44	45	44	44	44	44	44
February																																
Maximum	45	45	44	45	45	44	42	43	44	45	44	42	43	43	43	43	44	45	45	45	45	46	45	45	44	45	45	45	44	--	--	44
Minimum	45	44	44	44	44	42	41	42	43	44	42	42	42	42	42	42	43	44	44	43	43	44	43	43	42	43	42	44	43	--	--	43
March																																
Maximum	44	45	44	45	44	45	45	45	44	44	44	44	44	44	46	47	46	46	46	45	47	47	46	46	43	45	47	48	50	48	47	46
Minimum	43	43	44	44	44	44	43	44	43	44	44	43	43	44	44	45	46	45	43	45	44	44	43	42	43	43	43	43	44	46	46	44
April																																
Maximum	47	47	49	47	46	49	51	48	47	47	47	47	47	46	46	46	48	49	50	48	47	47	48	51	47	48	46	51	48	45	--	48
Minimum	45	44	43	45	44	43	44	46	46	46	44	44	44	44	42	42	42	42	44	46	45	44	44	45	46	46	45	44	45	43	--	44
May																																
Maximum	46	48	47	47	49	47	47	47	48	49	52	48	49	52	51	51	49	54	56	52	50	51	53	52	55	57	58	52	54	59	53	51
Minimum	44	43	44	46	44	44	46	46	47	47	45	46	45	44	45	47	48	47	49	49	48	47	45	47	46	48	50	51	50	50	52	47
June																																
Maximum	54	55	55	53	53	52	52	50	58	53	52	52	54	58	53	52	52	52	51	53	53	58	--	--	57	54	52	54	58	59	--	54
Minimum	52	51	50	52	50	51	50	50	50	52	51	50	50	52	52	51	51	50	50	49	50	49	--	--	50	52	52	52	52	54	--	51
July																																
Maximum	55	54	54	53	53	57	59	56	58	59	60	61	58	56	55	54	53	53	57	55	55	55	59	60	60	60	61	62	61	58	57	57
Minimum	54	53	52	53	53	53	54	54	53	54	55	56	56	55	54	53	53	53	52	54	54	54	54	54	55	56	57	58	58	57	56	54
August																																
Maximum	56	56	55	56	59	60	59	58	58	61	59	58	58	58	--	--	--	58	57	61	61	62	62	62	60	59	58	58	58	57	58	59
Minimum	56	55	55	55	56	56	57	56	57	56	58	58	57	56	--	--	--	56	56	56	58	57	58	58	58	58	57	57	57	56	56	57
September																																
Maximum	57	57	59	59	57	57	57	57	58	58	58	58	56	57	56	57	57	57	56	56	55	57	57	58	56	56	56	54	54	54	--	57
Minimum	57	57	56	56	57	56	56	56	55	55	55	55	56	56	56	56	56	55	56	55	55	55	55	55	55	54	54	53	54	53	--	55

TRASK RIVER BASIN

14-3025. TRASK RIVER NEAR TILLAMOOK, OREG.

LOCATION.--Temperature recorder at gaging station, 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 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 68°F July 12, Aug. 23, 24; minimum, 40°F Mar. 24-26.
EXTREMES, 1962-64.--Water temperatures: Maximum, 70°F July 26, 27, 1962; minimum, 33°F Jan. 11-13, 30, 31, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

ALSEA RIVER BASIN

14-3061. NORTH FORK ALSEA RIVER AT ALSEA, OREG.

LOCATION.--Temperature recorder at gaging station at Alsea, Benton County, 0.2 mile upstream from bridge on Lobster Valley Road, and 0.7 mile upstream from confluence with South Fork.
DRAINAGE AREA.--63.0 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 71°F Aug. 24; minimum, 40°F Dec. 11-14.
EXTREMES, 1958-64.--Water temperatures: Maximum, 76°F July 27, 28, 1958; minimum, 34°F Jan. 21, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.

LOCATION.--At gaging station, 500 feet upstream from mouth, 4.6 miles southwest of Salado, Lincoln County, and 8.5 miles southeast of Toledo.
DRAINAGE AREA.--0.32 square mile.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1964.
Sediment records: November 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F Aug. 23-25; minimum, 41°F Feb. 27.
Sediment concentrations: Maximum daily, 265 ppm Jan. 6; minimum daily, 1 ppm on many days.
Sediment loads: Maximum daily, 13 tons Jan. 6; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1958-64.--Water temperatures: Maximum, 61°F Aug. 29, 31, Sept. 1, 1961, Aug. 11, 1963; minimum, 35°F Jan. 30, 1963.
Sediment concentrations: Maximum daily, 265 ppm Jan. 6, 1964; minimum daily, no flow on many days during 1958-63.
Sediment loads: Maximum daily, 15 tons Nov. 24, 1960; minimum daily, 0 tons on many days during 1958-63.
REMARKS.--Temperature recorder stopped Oct. 27-29; temperature range, 48°F to 49°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964

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	0.05	C 1	T	0.84	2	T	1.3	C 1	T
2	.05	C 1	T	1.4	1	T	1.1	C 1	T
3	.04	C 1	T	1.3	3	T	1.0	C 1	T
4	.04	C 1	T	2.6	10	0.1	.91	C 1	T
5	.06	C 1	T	2.3	2	T	1.2	5	T
6	.04	C 1	T	2.0	--	T	2.3	C 1	T
7	.04	C 1	T	5.1	98	S 3.0	2.0	C 1	T
8	.04	C 1	T	9.5	52	S 1.7	1.9	C 1	T
9	.04	C 1	T	4.9	8	.1	1.8	C 1	T
10	.04	C 1	T	3.9	2	T	1.7	C 1	T
11	.07	C 1	T	3.1	1	T	1.5	C 1	T
12	.05	C 1	T	2.3	2	T	1.4	C 1	T
13	.04	C 1	T	1.8	3	T	1.2	C 1	T
14	.04	C 1	T	2.4	8	A .1	1.1	C 1	T
15	.04	C 1	T	7.2	19	A .4	1.0	C 1	T
16	.04	C 1	T	5.3	3	T	.91	C 1	T
17	.04	C 1	T	7.2	17	A .3	.84	C 1	T
18	.04	C 1	T	5.8	7	.1	.80	C 1	T
19	.04	C 1	T	4.5	2	T	1.0	4	T
20	.08	4	T	3.5	C 2	T	1.6	8	T
21	.16	5	T	2.9	C 2	T	3.1	10	0.1
22	1.2	10	T	2.5	C 2	T	2.4	C 4	T
23	1.0	2	T	2.9	C 2	T	1.8	C 4	T
24	.84	C 1	T	3.1	C 2	T	1.6	C 4	T
25	.71	C 1	T	2.9	C 2	T	1.8	C 4	T
26	.48	C 1	T	2.5	C 2	T	1.8	C 4	T
27	.40	C 1	T	2.3	C 1	T	2.0	6	T
28	.90	C 1	T	2.1	C 1	T	3.0	8	.1
29	.75	C 1	T	1.7	C 1	T	2.8	C 4	T
30	.80	C 1	T	1.5	C 1	T	2.2	C 4	T
31	.68	C 1	T	--	--	--	2.4	C 4	T
Total	8.84	--	0.1	101.34	--	6.1	51.46	--	0.5
	JANUARY			FEBRUARY			MARCH		
1	4.0	24	0.3	3.3	C 4	T	1.2	10	T
2	5.1	10	.1	2.7	C 4	T	1.4	4	T
3	3.6	8	B .1	2.2	C 4	T	1.4	6	T
4	2.9	10	.1	1.8	C 4	T	2.8	16	0.1
5	2.7	10	.1	1.6	C 4	T	4.5	8	.1
6	16	265	S 13	1.4	C 4	T	4.0	8	.1
7	7.4	38	.8	1.2	C 4	T	3.5	8	.1
8	4.5	12	.1	1.1	C 4	T	3.0	2	T
9	3.6	8	.1	1.0	C 4	T	2.9	6	T
10	3.4	4	T	1.1	C 4	T	4.8	12	.2
11	3.2	4	T	1.0	C 4	T	10	108	S 3.3
12	2.7	3	T	1.1	C 4	T	7.2	24	.5
13	2.6	3	T	1.6	C 4	T	5.1	5	.1
14	2.6	2	T	2.0	5	T	4.0	5	.1
15	2.5	3	T	3.3	9	0.1	4.0	6	.1
16	3.4	15	.1	4.0	5	B .1	3.4	6	.1
17	8.2	50	J 1.3	3.5	C 5	T	2.8	C 4	T
18	9.6	48	1.2	3.0	C 5	T	2.2	C 4	T
19	18	150	J 9.2	2.4	C 5	T	1.8	C 4	T
20	13	95	S 3.6	1.9	C 5	T	1.7	C 4	T
21	6.8	50	.9	1.6	C 5	T	1.8	C 4	T
22	5.2	13	.2	1.4	C 5	T	1.8	C 4	T
23	4.6	4	T	1.2	C 5	T	1.6	C 4	T
24	8.0	76	S 2.1	1.1	C 5	T	1.5	C 4	T
25	12	52	S 1.9	.98	C 5	T	1.4	C 4	T
26	12	40	S 1.5	.91	C 5	T	1.4	C 4	T
27	6.5	16	.3	.84	C 5	T	1.3	C 4	T
28	4.2	5	.1	.84	C 5	T	1.1	C 4	T
29	4.6	6	.1	.87	C 5	T	1.0	C 4	T
30	4.2	6	.1	--	--	--	.95	C 4	T
31	3.6	6	B .1	--	--	--	.91	C 4	T
Total	190.7	--	37.6	50.94	--	0.7	86.46	--	5.2

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 1963 to September 1964--Continued

Day	APRIL				MAY				JUNE			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1..	0.91	C	3	T	0.98	C	1	T	0.24	C	1	T
2..	.95	C	3	T	.87	C	1	T	.24	C	1	T
3..	.80	C	3	T	.84	C	1	T	.22	C	1	T
4..	.77	C	3	T	.84	C	1	T	.27	C	1	T
5..	.80	C	3	T	.87	C	1	T	.24	C	1	T
6..	.77	C	3	T	.80	C	1	T	.29	C	1	T
7..	.74	C	3	T	.77	C	1	T	.41	C	1	T
8..	.68	C	3	T	.74	C	1	T	.29	C	1	T
9..	.84	C	3	T	.71	C	1	T	.25	C	1	T
10..	.84	C	3	T	.68	C	1	T	.24	C	1	T
11..	.95	C	3	T	.65	C	1	T	.22	C	1	T
12..	1.1	C	3	T	.62	C	1	T	.22	C	1	T
13..	1.1	C	3	T	.59	C	1	T	.20	C	1	T
14..	1.0	C	3	T	.54	C	1	T	.20	C	1	T
15..	.98	C	3	T	.51	C	1	T	.20	C	1	T
16..	.91	C	3	T	.48	C	1	T	.20	C	1	T
17..	.84	C	3	T	.46	C	1	T	.31	C	1	T
18..	.77	C	3	T	.43	C	1	T	.31	C	1	T
19..	.74	C	3	T	.41	C	1	T	.25	C	1	T
20..	.71	C	3	T	.46	C	1	T	.24	C	1	T
21..	.68	C	3	T	.51	C	1	T	.22	C	1	T
22..	.91	C	3	T	.41	C	1	T	.22	C	1	T
23..	.80	C	3	T	.37	C	1	T	.20	C	1	T
24..	.77	C	3	T	.35	C	1	T	.19	C	1	T
25..	.74	C	3	T	.35	C	1	T	.17	C	1	T
26..	.84	C	3	T	.33	C	1	T	.17	C	1	T
27..	.84	C	3	T	.33	C	1	T	.16	C	1	T
28..	.87	C	3	T	.29	C	1	T	.16	C	1	T
29..	.84	C	3	T	.29	C	1	T	.14	C	1	T
30..	.87	C	3	T	.27	C	1	T	.14	C	1	T
31..	--	--		--	.25	C	1	T	--	--		--
Total	25.36	--		0.2	17.00	--		T	6.81	--		T

	JULY				AUGUST				SEPTEMBER			
1..	0.14	C	1	T	0.24	C	1	T	0.06	C	1	T
2..	.14	C	1	T	.13	C	1	T	.07	C	1	T
3..	.13	C	1	T	.19	C	1	T	.06	C	1	T
4..	.13	C	1	T	.13	C	1	T	.05	C	1	T
5..	.13	C	1	T	.10	C	1	T	.04	C	1	T
6..	.12	C	1	T	.09	C	1	T	.04	C	1	T
7..	.10	C	1	T	.08	C	1	T	.05	C	1	T
8..	.16	C	1	T	.08	C	1	T	.07	C	1	T
9..	.12	C	1	T	.08	C	1	T	.05	C	1	T
10..	.12	C	1	T	.08	C	1	T	.04	C	1	T
11..	.10	C	1	T	.08	C	1	T	.04	C	1	T
12..	.09	C	1	T	.08	C	1	T	.04	C	1	T
13..	.09	C	1	T	.07	C	1	T	.04	C	1	T
14..	.20	C	1	T	.07	C	1	T	.04	C	1	T
15..	.20	C	1	T	.06	C	1	T	.04	C	1	T
16..	.12	C	1	T	.06	C	1	T	.04	C	1	T
17..	.12	C	1	T	.06	C	1	T	.12	C	1	T
18..	.10	C	1	T	.07	C	1	T	.06	C	1	T
19..	.09	C	1	T	.06	C	1	T	.06	C	1	T
20..	.10	C	1	T	.05	C	1	T	.08	C	1	T
21..	.13	C	1	T	.05	C	1	T	.05	C	1	T
22..	.10	C	1	T	.04	C	1	T	.04	C	1	T
23..	.09	C	1	T	.04	C	1	T	.04	C	1	T
24..	.09	C	1	T	.04	C	1	T	.04	C	1	T
25..	.08	C	1	T	.05	C	1	T	.04	C	1	T
26..	.08	C	1	T	.07	C	1	T	.03	C	1	T
27..	.08	C	1	T	.05	C	1	T	.03	C	1	T
28..	.08	C	1	T	.09	C	1	T	.03	C	1	T
29..	.08	C	1	T	.07	C	1	T	.04	C	1	T
30..	.08	C	1	T	.08	C	1	T	.09	C	1	T
31..	.12	C	1	T	.07	C	1	T	--	--		--
Total	3.51	--		T	2.51	--		T	1.52	--		T

Total discharge for year (cfs-days)..... 546.4
Total load for year (tons)..... 50.5

T Less than 0.05 ton.
C Composite period.

ALSEA RIVER BASIN--Continued

14-3067. NEEDLE BRANCH NEAR SALADO, OREG.--Continued

Particle-size analyses of suspended sediment, October 1961 to September 1964
(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 22, 1961.....	0930	48		29	307	24	--	18	25	27	45	51	69	87	98	100	--	VPWC
Nov. 8, 1963.....	0110	50		16	168	7.3	13	17	20	30	37	43	54	69	89	92	96	SVPW
Jan. 25, 1964.....	2005	47		16	143	6.2	7	9	12	16	20	24	31	53	88	90	95	SVBW

ALSEA RIVER BASIN--Continued

14-3068. FLYNN CREEK NEAR SALADO, OREG.

LOCATION.--At gaging station, 1,000 feet upstream from mouth, 3.4 miles west of Salado, Lincoln County, and 6.9 miles southeast of Toledo.
DRAINAGE AREA.--0.84 square mile.
RECORDS AVAILABLE.--Water temperatures: September 1958 to September 1964.
Sediment records: November 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F Aug. 24; minimum, 42°F Apr. 17, 18.
Sediment concentrations: Maximum daily, 350 ppm Jan. 19; minimum daily, 0 ppm Oct. 26, 31, Nov. 5.
Sediment loads: Maximum daily, 52 tons Jan. 19; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1958-64.--Water temperatures: Maximum, 62°F Aug. 3, 20, 21, Sept. 4, 1961; minimum, 36°F Jan. 30, 1963.
Sediment concentrations: Maximum daily, 365 ppm Nov. 24, 1960; minimum daily, 0 ppm on many days during 1959-64.
Sediment loads: Maximum daily, 58 tons Nov. 24, 1960; minimum daily, less than 0.05 ton on many days each year.

Temperature (°F) of water, water year October 1963 to September 1964

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

ALSEA RIVER BASIN--Continued

14-3068. FLYNN CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	0.22	--		T	1.5	4		T	4.6	C 5		0.1
2	.22	--		T	1.9	3		T	4.0	C 5		.1
3	.22	--		T	2.0	3		T	3.6	C 5		T
4	.22	--		T	3.4	7		0.1	3.3	C 5		T
5	.24	--		T	3.6	0		T	3.9	7	A	.1
6	.21	--		T	3.2	2		T	6.0	8		.1
7	.21	--		T	9.9	92	S	5.2	5.7	C 5		.1
8	.21	--		T	22	46	S	3.1	5.7	C 5		.1
9	.21	39		T	13	10		.4	5.4	C 5		.1
10	.19	--		T	10	15	B	.4	5.1	C 5		.1
11	.24	14		T	8.4	--		.3	4.7	C 5		.1
12	.21	--		T	6.8	--		.1	4.4	C 5		.1
13	.21	--		T	5.4	--		T	4.0	C 5		.1
14	.21	22		T	7.2	--		.4	3.7	C 5		T
15	.21	--		T	14	--		.9	3.4	C 2		T
16	.19	32		T	13	--		.5	3.1	C 2		T
17	.19	--		T	17	--		1.0	2.9	C 2		T
18	.19	10		T	16	--		.5	2.8	C 2		T
19	.19	--		T	13	--		.4	3.2	6	A	.1
20	.33	9		T	11	C 9		.3	4.0	10	A	.1
21	.29	6		T	9.8	C 9		.2	6.6	10	A	.2
22	2.4	16	A	0.1	8.5	C 9		.2	6.4	C 5		.1
23	1.6	9		T	9.0	C 9		.2	5.6	C 5		.1
24	1.7	6		T	9.4	C 9		.2	5.2	C 5		.1
25	1.5	2		T	8.9	C 9		.2	5.4	C 5		.1
26	1.1	0		T	8.2	C 4		.1	5.2	C 5		.1
27	.84	--		T	7.4	C 4		.1	5.5	5	A	.1
28	1.8	5		T	6.6	C 4		.1	7.4	7		.1
29	1.4	2		T	5.9	C 4		.1	7.4	--		.1
30	1.5	4		T	5.1	C 4		.1	6.8	4		.1
31	1.3	0		T	--	--		--	7.7	5		.1
Total	19.75	--		0.4	261.1	--		15.2	152.7	--		2.7
	JANUARY				FEBRUARY				MARCH			
1	11	25	S	1.0	10	8		0.2	3.8	11	B	0.1
2	16	18		.8	9.0	8		.2	3.9	5		.1
3	13	8		.3	8.1	6		.1	4.2	7		.1
4	10	6		.2	7.0	5		.1	8.0	24		.5
5	9.2	13	A	.3	6.1	C 5		.1	12	20	B	.6
6	30	190	J	17	5.4	C 5		.1	11	15		.4
7	24	30	S	2.0	4.8	C 5		.1	10	14		.4
8	16	14		.6	4.5	C 5		.1	9.2	11		.3
9	13	10		.4	4.1	C 5		.1	8.4	16		.4
10	11	6		.2	4.1	C 5		.1	11	29		.9
11	11	6		.2	3.8	C 5		.1	19	53	J	2.9
12	9.6	6		.2	3.8	C 5		.1	20	34	J	1.9
13	9.4	8		.2	4.4	C 5		.1	14	8		.3
14	9.2	9		.2	4.5	C 5		.1	13	C 5		.2
15	9.0	10		.2	6.2	9	A	.2	12	C 5		.2
16	11	13		.4	7.9	C 9		.2	11	C 5		.1
17	21	60	S	4.3	7.9	C 9		.2	9.2	C 5		.1
18	27	56		4.1	7.5	C 9		.2	7.9	C 5		.1
19	44	350	S	52	6.7	C 9		.2	6.8	C 5		.1
20	36	134	S	16	5.8	C 9		.1	6.5	C 5		.1
21	23	20		1.2	5.1	C 9		.1	6.4	C 5		.1
22	18	16		.8	4.6	C 9		.1	6.2	C 5		.1
23	15	12		.5	4.1	C 9		.1	5.9	C 5		.1
24	24	72	J	5.8	3.8	C 9		.1	5.6	C 5		.1
25	36	100		9.7	3.4	C 9		.1	5.4	C 5		.1
26	34	77		7.1	3.2	C 9		.1	5.1	C 3		T
27	23	23		1.4	2.9	C 9		.1	4.6	C 3		T
28	15	13		.5	2.9	C 9		.1	4.2	C 3		T
29	15	8		.3	3.0	C 9		.1	4.0	C 3		T
30	13	12		.4	--	--		--	3.7	C 3		T
31	12	11		.4	--	--		--	3.4	C 3		T
Total	568.4	--		128.7	154.6	--		3.6	255.4	--		10.5

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

14-3068. FLYNN CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--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	3.3	C	2	T	2.8	C	5	T	1.0	C	2	T
2	3.4	C	2	T	2.7	C	5	T	1.0	C	2	T
3	3.0	C	2	T	2.6	C	5	T	.98	C	2	T
4	2.9	C	2	T	2.6	C	5	T	1.1	C	2	T
5	2.9	C	2	T	2.7	C	5	T	.98	C	2	T
6	2.7	C	2	T	2.4	C	5	T	1.1	C	2	T
7	2.6	C	2	T	2.4	C	5	T	1.5	C	2	T
8	2.4	C	2	T	2.3	C	5	T	1.2	C	2	T
9	2.8	C	2	T	2.2	C	5	T	1.0	C	2	T
10	2.8	C	2	T	2.2	C	5	T	.98	C	2	T
11	2.9	C	2	T	2.1	C	5	T	.94	C	2	T
12	3.0	C	2	T	2.2	C	5	T	.90	C	2	T
13	3.1	C	2	T	2.1	C	5	T	.90	C	2	T
14	3.0	C	2	T	2.0	C	5	T	.90	C	2	T
15	3.0	C	2	T	1.9	C	5	T	.86	C	2	T
16	2.9	C	2	T	1.8	C	5	T	.86	C	2	T
17	2.8	C	2	T	1.8	C	5	T	1.1	C	2	T
18	2.7	C	2	T	1.7	C	5	T	1.0	C	2	T
19	2.5	C	2	T	1.6	C	5	T	.94	C	2	T
20	2.5	C	2	T	1.8	C	5	T	.86	C	2	T
21	2.3	C	2	T	1.8	C	5	T	.82	C	2	T
22	2.8	C	5	T	1.6	C	5	T	.78	C	2	T
23	2.6	C	5	T	1.5	C	5	T	.75	C	2	T
24	2.4	C	5	T	1.5	C	5	T	.78	C	2	T
25	2.5	C	5	T	1.4	C	5	T	.75	C	2	T
26	2.7	C	5	T	1.3	C	5	T	.72	C	2	T
27	2.6	C	5	T	1.3	C	5	T	.72	C	2	T
28	2.6	C	5	T	1.2	C	5	T	.68	C	2	T
29	2.6	C	5	T	1.2	C	5	T	.68	C	2	T
30	2.7	C	5	T	1.1	C	5	T	.65	C	2	T
31	--		--	--	1.1	C	5	T	--		--	--
Total	83.0		--	0.6	58.9		--	0.8	27.43		--	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	0.68	C	1	T	0.75	C	1	T	0.33	C	1	T
2	.65	C	1	T	.55	C	1	T	.35	C	1	T
3	.62	C	1	T	.72	C	1	T	.31	C	1	T
4	.62	C	1	T	.58	C	1	T	.29	C	1	T
5	.62	C	1	T	.52	C	1	T	.29	C	1	T
6	.58	C	1	T	.47	C	1	T	.27	C	1	T
7	.58	C	1	T	.44	C	1	T	.29	C	1	T
8	.65	C	1	T	.42	C	1	T	.35	C	1	T
9	.55	C	1	T	.42	C	1	T	.31	C	1	T
10	.52	C	1	T	.40	C	1	T	.27	C	1	T
11	.49	C	1	T	.40	C	1	T	.25	C	1	T
12	.49	C	1	T	.37	C	1	T	.25	C	1	T
13	.49	C	1	T	.35	C	1	T	.25	C	1	T
14	.78	C	1	T	.33	C	1	T	.25	C	1	T
15	.78	C	1	T	.33	C	1	T	.25	C	1	T
16	.62	C	1	T	.33	C	1	T	.27	C	1	T
17	.58	C	1	T	.31	C	1	T	.44	C	1	T
18	.52	C	1	T	.35	C	1	T	.29	C	1	T
19	.49	C	1	T	.33	C	1	T	.33	C	1	T
20	.52	C	1	T	.31	C	1	T	.33	C	1	T
21	.58	C	1	T	.31	C	1	T	.29	C	1	T
22	.49	C	1	T	.31	C	1	T	.27	C	1	T
23	.47	C	1	T	.29	C	1	T	.25	C	1	T
24	.44	C	1	T	.29	C	1	T	.25	C	1	T
25	.42	C	1	T	.33	C	1	T	.24	C	1	T
26	.42	C	1	T	.35	C	1	T	.22	C	1	T
27	.40	C	1	T	.33	C	1	T	.22	C	1	T
28	.40	C	1	T	.47	C	1	T	.22	C	1	T
29	.40	C	1	T	.37	C	1	T	.24	C	1	T
30	.40	C	1	T	.42	C	1	T	.37		5	T
31	.49	C	1	T	.35	C	1	T	--		--	--
Total	16.74		--	T	12.50		--	T	8.54		--	T

Total discharge for year (cfs-days)..... 1,619.1
Total load for year (tons)..... 162.7

T Less than 0.05 ton.
C Composite period.

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.

LOCATION.--At gaging station, 1,000 feet upstream from mouth, 4.6 miles west of Salado, Lincoln County, and 6.5 miles southeast of Toledo.
DRAINAGE AREA.--1.20 square miles.
RECORDS AVAILABLE.--Water temperatures: September 1958 to September 1964.
Sediment records: November 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F Aug. 22-24; minimum, 41°F Feb. 26.
Sediment concentrations: Maximum daily, 234 ppm Jan. 19; minimum daily, 1 ppm on many days.
Sediment loads: Maximum daily, 52 tons Jan. 19; minimum daily, less than 0.05 ton on many days.
EXTREMES, 1958-64.--Water temperatures: Maximum, 61°F Aug. 3, 1961; minimum, 34°F Jan. 30, 1963.
Sediment concentrations: Maximum daily, 359 ppm Nov. 24, 1960; minimum daily, 0 ppm on many days during 1959-62.
Sediment loads: Maximum daily, 87 tons Nov. 24, 1960; minimum daily, less than 0.05 ton on many days each year.
REMARKS.--Temperature recorder stopped Nov. 29 to Dec 8; temperature range, 45°F to 49°F.

Temperature (°F) of water, water year October 1963 to September 1964

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	53	53	53	52	51	52	53	54	54	53	53	54	54	54	53	52	49	50	53	53	51	51	51	48	48	50	49	50	49	52
Minimum	53	52	52	52	52	50	49	50	52	53	53	52	52	53	54	51	52	49	46	48	50	51	51	51	48	47	47	48	48	48	47	50
November																																
Maximum	49	49	49	49	49	49	50	50	49	49	50	50	50	50	49	49	49	49	49	48	48	48	48	49	49	49	48	47	--	--	--	49
Minimum	48	48	48	48	48	48	48	49	49	49	49	49	50	48	48	49	49	49	48	48	48	48	48	48	49	48	47	46	--	--	--	48
December																																
Maximum	--	--	--	--	--	--	--	--	47	45	44	44	44	45	46	47	46	46	47	47	47	47	47	47	47	47	47	48	48	48	48	--
Minimum	--	--	--	--	--	--	--	--	45	44	43	43	43	44	45	45	45	45	46	46	46	47	46	46	46	46	47	48	48	48	48	--
January																																
Maximum	48	48	48	47	47	47	47	47	47	46	46	46	46	46	47	47	47	46	47	47	46	45	44	46	46	47	47	47	46	46	47	47
Minimum	48	48	47	46	46	47	47	47	44	44	45	45	46	46	46	47	46	45	46	46	45	43	43	44	46	46	46	45	46	45	46	46
February																																
Maximum	47	46	46	46	45	45	44	44	44	45	45	43	44	43	43	44	45	47	47	46	47	47	47	46	46	45	46	44	43	--	--	45
Minimum	46	45	44	45	44	43	42	43	43	45	43	43	43	43	43	43	44	45	45	44	44	44	43	44	42	41	42	43	42	--	--	43
March																																
Maximum	44	44	44	45	45	45	46	45	45	45	45	46	46	46	48	48	46	47	48	46	46	47	46	46	46	47	50	51	51	50	48	47
Minimum	42	42	43	44	43	43	44	45	44	44	44	43	44	45	46	45	45	45	44	45	45	45	44	45	44	45	44	45	45	47	46	44
April																																
Maximum	49	47	50	46	46	50	51	52	48	48	48	47	51	51	48	48	49	51	52	48	49	47	47	47	47	47	47	53	47	46	--	49
Minimum	45	44	43	45	44	45	44	46	47	46	46	46	46	44	45	44	43	43	45	46	45	45	44	45	46	46	46	45	45	43	--	45
May																																
Maximum	47	46	47	47	46	49	48	49	49	50	52	48	51	51	51	50	50	53	53	51	50	50	53	54	53	55	55	52	53	54	52	51
Minimum	44	43	43	45	44	45	46	47	48	48	46	46	46	45	46	47	49	48	49	50	48	47	46	49	46	48	50	50	48	49	50	47
June																																
Maximum	51	51	51	51	51	51	50	49	52	51	50	54	55	53	51	50	50	50	50	53	52	54	54	54	54	53	51	53	53	52	--	52
Minimum	49	49	48	50	51	50	49	48	48	50	50	50	51	51	50	50	50	49	49	49	49	48	50	49	49	51	49	47	49	51	--	49
July																																
Maximum	51	51	53	52	53	55	55	54	54	54	57	57	57	54	54	55	53	53	55	53	53	53	55	57	57	57	57	57	57	55	53	55
Minimum	50	50	49	50	51	51	51	52	50	50	52	53	54	53	53	52	52	52	50	52	52	52	51	52	53	53	52	54	54	53	53	52
August																																
Maximum	53	53	53	54	55	55	54	55	53	56	55	54	56	55	54	55	54	55	54	56	57	58	58	58	57	56	54	54	53	53	52	55
Minimum	53	52	53	52	51	52	53	52	52	52	54	53	53	51	51	51	52	53	52	53	53	54	54	54	56	54	51	52	52	52	49	52
September																																
Maximum	52	53	54	54	53	53	52	52	52	53	53	53	54	54	53	53	54	52	52	52	51	53	55	56	54	52	52	52	52	52	--	53
Minimum	51	52	51	51	53	50	51	51	49	49	50	50	52	52	50	52	52	49	51	51	49	50	52	53	52	50	50	50	51	52	--	51

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	.43	C 4		T	3.0	2		T	7	C 5		0.1
2	.45	C 4		T	3.5	1		T	6	C 5		.1
3	.45	C 4		T	3.8	2		T	5.5	C 5		.1
4	.45	C 4		T	6.2	6		0.1	5	C 5		.1
5	.47	C 4		T	6.5	3		.1	6	9	A	.1
6	.43	C 4		T	6.0	1		T	9	7		.2
7	.43	C 4		T	17	126	S	14	9	C 6		.1
8	.41	C 4		T	40	68	S	8.7	8.5	C 6		.1
9	.41	C 4		T	19	12		.6	8.5	C 6		.1
10	.41	C 4		T	15	4	A	.2	8.0	C 6		.1
11	.45	C 4		T	12	8		.3	7.2	C 6		.1
12	.43	C 4		T	9.7	12		.3	6.4	C 6		.1
13	.45	C 4		T	7.9	5		.1	5.6	C 6		.1
14	.45	C 4		T	11	14	A	.4	5.1	C 6		.1
15	.43	C 4		T	18	21		1.0	4.6	C 6		.1
16	.43	C 4		T	18	12		.6	4.2	C 6		.1
17	.43	C 4		T	24	24	A	1.6	3.8	C 6		.1
18	.41	C 4		T	22	7		.4	3.8	C 6		.1
19	.41	C 4		T	17	6		.3	5.3	6	A	.1
20	.59	10		T	15	6		.2	7.3	12	A	.2
21	.64	11		T	13	C 5		.2	13	17		.6
22	4.8	24		0.3	12	C 5		.2	12	9		.3
23	3.2	8		.1	13	C 5		.2	9.2	5		.1
24	3.8	11		.1	14	C 5		.2	8.3	8		.2
25	3.4	7		.1	13	C 5		.2	7.9	8		.2
26	2.5	7		T	12	C 5		.2	7.7	7		.1
27	1.9	--		T	11	C 5		.1	8.5	10	A	.2
28	3.8	11	A	.1	9.7	C 5		.1	12	10	B	.3
29	3.1	8		.1	8.5	C 5		.1	12	--	E	.3
30	3.4	8	A	.1	8	C 5		.1	10	--	E	.2
31	2.8	8		.1	--	--		--	12	9		.3
Total	42.16	--		1.2	388.8	--		30.6	238.4	--		5.0

Day	JANUARY				FEBRUARY				MARCH			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	18	31	S	1.8	15	12		0.5	4.9	12	B	0.2
2	24	20	S	1.4	13	7		.2	4.9	2		T
3	17	7		.3	11	8		.2	5.9	4		.1
4	13	7		.2	9.3	6		.2	14	29	J	1.4
5	12	9		.3	7.9	6		.1	20	21		1.1
6	48	170	J	25	6.9	6		.1	16	14		.6
7	34	28		2.6	6.2	6		.1	14	8		.3
8	21	12	A	.7	5.9	--	E	.1	13	6		.2
9	17	10	A	.5	4.8	3		T	12	3		.1
10	16	8		.3	5.0	6		.1	17	14		.6
11	15	8		.3	4.4	4		T	30	59	A	4.8
12	13	6		.2	4.5	6		.1	28	25		1.9
13	13	13		.5	5.7	6		.1	19	12		.6
14	14	10		.4	6.6	9	A	.2	17	10		.5
15	13	6		.2	9.7	12		.3	19	18		.9
16	16	14	A	.6	12	--	E	.3	16	8		.3
17	36	77	J	7.9	12	C 6		.2	13	C 6		.2
18	36	27		2.6	11	C 6		.2	11	C 6		.2
19	64	234	S	52	8.6	C 6		.1	8.9	C 6		.1
20	54	200	J	32	7.2	C 6		.1	8.7	C 6		.1
21	31	36	B	3.0	6.3	C 6		.1	9.5	C 6		.2
22	23	17		1.1	5.4	C 6		.1	9.7	C 6		.2
23	20	12		.6	4.7	C 6		.1	9.1	C 6		.1
24	39	93	S	13	4.2	C 6		.1	8.2	C 6		.1
25	59	98		16	3.8	C 6		.1	7.4	C 6		.1
26	50	46		6.2	3.6	C 6		.1	6.8	C 6		.1
27	31	28		2.3	3.2	C 6		.1	6.0	C 6		.1
28	20	12		.6	3.2	C 6		.1	5.4	C 6		.1
29	21	12		.7	3.5	5		T	4.8	C 6		.1
30	18	--	E	.5	--	--		--	4.3	C 6		.1
31	16	11		.5	--	--		--	4.1	C 6		.1
Total	822	--		174.3	204.6	--		4.1	367.6	--		15.5

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

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	3.9	C 4	T	3.9	C 2	T	1.5	C 1	T
2..	4.0	C 4	T	3.5	C 2	T	1.4	C 1	T
3..	3.5	C 4	T	3.5	C 2	T	1.4	C 1	T
4..	3.4	C 4	T	3.4	C 2	T	1.6	C 1	T
5..	3.3	C 4	T	3.4	C 2	T	1.4	C 1	T
6..	3.2	C 4	T	3.2	C 2	T	1.6	C 1	T
7..	3.1	C 4	T	3.1	C 2	T	2.1	C 1	T
8..	3.0	C 4	T	2.9	C 2	T	1.6	C 1	T
9..	3.3	C 4	T	2.7	C 2	T	1.6	C 1	T
10..	3.4	C 4	T	2.8	C 2	T	1.4	C 1	T
11..	3.7	C 4	T	2.6	C 2	T	1.4	C 1	T
12..	4.1	C 4	T	2.7	C 2	T	1.4	C 1	T
13..	4.3	C 1	T	2.5	C 2	T	1.3	C 1	T
14..	4.3	C 1	T	2.4	C 2	T	1.4	C 1	T
15..	4.4	C 1	T	2.4	C 2	T	1.3	C 1	T
16..	4.0	C 1	T	2.2	C 2	T	1.3	C 1	T
17..	3.6	C 1	T	2.2	C 2	T	1.8	C 1	T
18..	3.4	C 1	T	2.1	C 2	T	1.8	C 1	T
19..	3.2	C 1	T	2.0	C 2	T	1.6	C 1	T
20..	3.0	C 1	T	2.2	C 2	T	1.6	C 1	T
21..	2.8	C 1	T	2.4	C 2	T	1.6	C 1	T
22..	3.6	9	A 0.1	2.1	C 2	T	1.4	C 1	T
23..	3.2	C 4	T	2.0	C 2	T	1.4	C 1	T
24..	3.0	C 4	T	2.0	C 2	T	1.3	C 1	T
25..	3.1	C 4	T	1.9	C 2	T	1.2	C 1	T
26..	3.6	C 4	T	1.8	C 2	T	1.2	C 1	T
27..	3.6	C 4	T	1.8	C 2	T	1.2	C 1	T
28..	3.6	C 4	T	1.7	C 2	T	1.1	C 1	T
29..	3.6	C 4	T	1.6	C 2	T	1.1	C 1	T
30..	3.6	C 4	T	1.6	C 2	T	1.1	C 1	T
31..	--	--	--	1.6	C 2	T	--	--	--
Total	105.8	--	0.9	76.2	--	0.4	43.1	--	0.1

Day	JULY			AUGUST			SEPTEMBER		
1..	1.0	C 1	T	1.4	C 3	T	.57	C 5	T
2..	1.0	C 1	T	1.1	C 3	T	.65	C 5	T
3..	.97	C 1	T	1.4	C 3	T	.62	C 5	T
4..	.94	C 1	T	1.2	C 3	T	.57	C 5	T
5..	.94	C 1	T	1.0	C 3	T	.55	C 5	T
6..	.90	C 1	T	.97	C 3	T	.55	C 5	T
7..	.83	C 1	T	.94	C 3	T	.55	C 5	T
8..	1.0	C 1	T	.87	C 3	T	.65	C 5	T
9..	.87	C 1	T	.83	C 3	T	.57	C 5	T
10..	.87	C 1	T	.80	C 3	T	.52	C 5	T
11..	.83	C 1	T	.77	C 3	T	.52	C 5	T
12..	.80	C 1	T	.77	C 3	T	.50	C 5	T
13..	.77	C 1	T	.74	C 3	T	.48	C 5	T
14..	1.3	C 1	T	.68	C 3	T	.48	C 5	T
15..	1.4	C 1	T	.65	C 3	T	.48	C 5	T
16..	1.0	C 1	T	.62	C 3	T	.55	C 5	T
17..	.94	C 1	T	.60	C 3	T	.77	C 5	T
18..	.90	C 1	T	.68	C 3	T	.57	C 5	T
19..	.83	C 1	T	.62	C 3	T	.62	C 5	T
20..	.87	C 1	T	.60	C 3	T	.65	C 5	T
21..	1.0	C 1	T	.60	C 3	T	.57	C 5	T
22..	.87	C 1	T	.57	C 3	T	.52	C 5	T
23..	.80	C 1	T	.55	C 3	T	.50	C 5	T
24..	.74	C 1	T	.55	C 3	T	.50	C 5	T
25..	.71	C 1	T	.60	C 3	T	.48	C 5	T
26..	.68	C 1	T	.65	C 3	T	.45	C 5	T
27..	.68	C 1	T	.60	C 3	T	.45	C 5	T
28..	.65	C 1	T	.74	C 3	T	.43	C 5	T
29..	.65	C 1	T	.68	C 3	T	.45	C 5	T
30..	.68	C 1	T	.68	C 3	T	.65	10	T
31..	.87	C 1	T	.62	C 3	T	--	--	--
Total	27.29	--	0.1	24.8	--	0.2	16.42	--	0.2

Total discharge for year (cfs-days)..... 2,356.4
Total load for year (tons)..... 232.6

T Less than 0.05 ton.
A Computed from partly estimated-concentration graph.
C Composite period.

ALSEA RIVER BASIN--Continued

14-3068.1. DEER CREEK NEAR SALADO, OREG.--Continued

Particle-size analyses of suspended sediment, October 1962 to September 1964
(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	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 26, 1962.....	1230	48		67	90	16	14	21	28	39	55	64	75	86	100			VBWC
Nov. 8, 1963.....	0045	49		58	276	43	15	22	32	43	54	60	74	88	99	100		VPWC

COOS RIVER BASIN

14-3245. WEST FORK MILLICOMA RIVER NEAR ALLEGANY, OREG.

LOCATION.--At gaging station 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 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 15, 1963.....	12	7.4	--	4.0	1.0	4.8	0.8	21		0.8	5.0	0.1	0.4		38			14	0		52	6.9
Nov. 20.....	690	8.6	0.17	2.5	.9	3.8	.6	11		2.0	4.0	.1	4.0		34			10	1		41	6.8
Dec. 18.....	106	8.8	--	3.0	.6	4.0	.5	13		1.4	3.8	.1	2.9		31			10	0		43	6.9
Jan. 15, 1964.....	354	8.5	--	2.5	.8	3.6	.3	9		2.2	3.5	.0	3.2		30			9	2		39	6.9
Feb. 19.....	287	8.5	--	2.5	.7	3.7	.7	11		1.6	4.0	.0	2.8		A 30			9	0		40	6.5
Mar. 17.....	396	8.5	--	2.5	.7	3.6	.7	10		1.2	4.8	.1	2.4		33			9	1		38	6.8
Apr. 15.....	126	7.9	--	3.0	.6	3.6	.5	12		1.6	4.2	.1	1.9		32			10	0		40	6.7
May 20.....	58	6.5	.09	3.0	.8	4.1	.4	14		1.4	4.0	.0	1.9		31			11	0		43	6.8
June 17.....	68	7.1	.07	3.0	.8	4.2	.8	15		1.4	4.2	.0	1.9		32			11	0		44	6.9
July 15.....	46	6.5	--	3.0	1.1	4.3	.7	16		.2	4.5	.1	1.4		32			12	0		46	6.7
Aug. 19.....	12	6.7	--	3.5	1.0	4.9	.9	20		.2	5.0	.0	.6		35			12	0		52	6.9
Sept. 16.....	6.9	5.7	.07	4.0	1.0	5.2	1.3	20		.6	5.5	.0	.3		32			14	0		55	6.7

A Calculated from determined constituents.

COOS RIVER BASIN--Continued

14-3245. WEST FORK MILLICOMA RIVER NEAR ALLEGANY, OREG.--Continued

Water temperature, turbidity, and color, water year October 1963 to September 1964

Date	Time (24 hr.)	Water temperature (°F)	Discharge (cfs)	Turbidity	Color
Oct. 15, 1963	1520	62	12	0	20
Oct. 22	1205	55	209	30	30
Oct. 30	1430	51	75	5	20
Nov. 6	1540	50	715	5	20
Nov. 13	1620	53	224	0	5
Nov. 20	1640	48	690	5	5
Nov. 27	1330	50	406	0	10
Dec. 4	1540	47	123	0	5
Dec. 11	1330	42	284	0	5
Dec. 18	1600	44	106	0	5
Dec. 25	1540	47	169	0	5
Jan. 1, 1964	1615	49	344	0	15
Jan. 7	1300	47	1360	0	10
Jan. 15	1605	47	354	5	5
Jan. 22	1330	43	790	0	5
Jan. 29	1340	48	492	5	10
Feb. 5	0955	43	197	0	0
Feb. 12	1510	43	136	5	5
Feb. 19	1340	47	287	0	0
Feb. 26	1400	45	104	0	5
Mar. 4	1540	46	922	35	20
Mar. 11	1415	45	1470	25	20
Mar. 17	1215	47	396	5	5
Mar. 25	1255	45	218	5	5
Apr. 1	1420	52	126	0	5
Apr. 8	1300	57	121	5	5
Apr. 15	1615	50	126	5	5
Apr. 22	1600	52	98	5	5
Apr. 29	1535	53	115	5	5
May 6	1350	49	167	0	5
May 13	1620	57	100	0	5
May 20	1645	56	58	0	5
May 27	1625	67	40	0	5
June 3	1720	63	31	0	5
June 10	1645	56	134	0	5
June 17	1615	58	68	0	5
June 24	1600	70	48	0	5
July 1	1530	61	32	0	5
July 8	1245	66	28	5	5
July 15	1625	66	46	5	5
July 22	1920	68	22	0	10
July 29	1945	71	15	0	10
Aug. 5	1420	69	30	0	10
Aug. 12	1030	63	15	0	10
Aug. 19	1000	60	12	5	5
Aug. 26	1500	68	9.7	0	10
Sept. 2	1630	62	9.2	0	5
Sept. 10	1340	58	7.7	0	5
Sept. 16	1225	59	6.9	5	5
Sept. 23	1620	64	8.2	0	10
Sept. 30	1240	58	7.3	0	10

COQUILLE RIVER BASIN

14-3249. SOUTH FORK COQUILLE RIVER NEAR POWERS, OREG.

LOCATION.--Temperature recorder at gaging station, 0.8 mile upstream from Hall Creek, and 7 miles southeast of Powers, Coos County.
DRAINAGE AREA.--93.2 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1956 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 72°F July 26, 27, Aug. 23, 24; minimum, 41°F on several days during December to February.
EXTREMES, 1956-64.--Water temperatures: Maximum, 76°F July 30 to Aug. 1, 1958; minimum, 34°F Jan. 12, 13, 1963.

Temperature (°F) of water, water year October 1963 to September 1964

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

ROGUE RIVER BASIN

14-3723. ROGUE RIVER NEAR AGNESS, OREG.

LOCATION.--Temperature recorder at gaging station, 0.7 mile upstream from Shasta Costa Creek, 1.5 miles north of Agness, Curry County, and 2.4 miles upstream from Illinois River.
DRAINAGE AREA.--3,939 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1960 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 76°F July 26, 27, Aug. 10, 24; minimum, 39°F Dec. 14-16.
EXTREMES, 1960-64.--Water temperatures: Maximum, 80°F on several days during July 1962; minimum, 34°F Jan. 22-25, 1962.

Temperature (°F) of water, water year October 1963 to September 1964

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

ROGUE RIVER BASIN--Continued

14-3780. ILLINOIS RIVER NEAR SELMA, OREG.

LOCATION.--Temperature recorder at gaging station, 200 feet upstream from Panther Creek, 0.3 mile downstream from Briggs Creek, 12 miles northwest of Selma, Josephine County, and at mile 32 (O.S.W.R.B. map).
DRAINAGE AREA.--665 square miles, including that of Panther Creek.
RECORDS AVAILABLE.--Water temperatures: October 1961 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 75°F July 13, 27; minimum, 40°F Feb. 27, 28.
EXTREMES, 1961-64.--Water temperatures: Maximum, 76°F on several days during July 1962; minimum, 38°F Jan. 12-15, 1963.
REMARKS.--Recorder stopped Oct. 23-27; temperature range, 52°F to 58°F.

Temperature (°F) of water, water year October 1963 to September 1964

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

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

SALMON RIVER BASIN

Chemical analyses, in parts per million, October 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
14-1235. WHITE SALMON RIVER NEAR UNDERWOOD, WASH.																										
Oct. 2, 1961.	647	29		0.10		6.0	2.4	3.6	1.5		37		3.6	1.2	0.1	0.1	0.10	66	25	0		68	7.5	5		
Nov. 1.....	658	29		.06		5.0	2.7	3.8	1.3		35		4.4	.5	.1	.2	.21	A 64	24	0		68	7.4	5		
Jan. 23, 1962	917	28		.05		5.0	2.3	3.4	1.1		34		3.6	.8	.1	.1	.10	65	22	0		62	7.3	5		
May 23.....	1230	25		.12		5.0	1.7	3.0	1.1		32		1.8	.8	.1	.0	.09	A 55	20	0		56	7.3	5		
Aug. 31.....	610	28		.03		5.5	2.6	3.6	1.5		37		3.8	.5	.1	.1	.10	67	24	0		70	7.4	5		
Dec. 4.....	1480	24		.14		5.0	1.9	3.0	.9		30		2.6	.8	.1	.1	.08	58	20	0		55	7.3	5		
Mar. 13, 1963	1050	27		.08		5.0	2.1	3.2	1.2		33		2.4	1.0	.0	.2	.07	57	21	0		58	7.2	5		
June 5.....	986	24		.09		5.0	2.3	3.0	1.4		34		1.6	.5	.1	.2	.09	61	22	0		59	7.2	5		
Sept. 16.....	570	29		.44		5.0	3.1	3.8	1.5		38		3.0	.8	.1	.3	.07	75	25	0		69	7.2	5		
Dec. 11.....	746	27		.04		5.0	2.2	3.5	1.2		33		3.8	.5	.1	.3	.06	A 60	22	0		60	7.0	5		
Mar. 11, 1964	1280	27		.09		5.0	2.7	3.4	1.1		36		2.0	.2	.1	.2	.08	61	24	0		62	7.2	5		
June 11.....	1550	20		.13		4.0	1.8	2.7	1.2		26		2.2	.2	.0	.2	.04	47	18	0		48	7.3	5		

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1415	0.00	0.00	0.03	0.05	0.00	0.02
May 23, 1962.....	1355	.00	.00	.00	.05	.00	.01
Dec. 4.....	1410	.00	.00	.00	.1	.00	.00
June 5, 1963.....	1340	.00	.00	.01	.05	.00	.00
Dec. 11.....	1215	.01	.01	.02	.05	.00	.04
June 11, 1964....	1425	.00	.02	.01	.05	.00	.01

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WASHOUGAL RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
14-1435. WASHOUGAL RIVER NEAR WASHOUGAL, WASH.																										
Nov. 1, 1961.	563	9.2		0.04		2.5	0.1	1.8	0.3		12		0.8	1.0	0.0	0.3	0.06	23	6	0		23	7.0	10		
Jan. 23, 1962	382	11		.03		2.0	.6	1.6	.3		12		2.4	1.0	.1	.3	.03	29	8	0		25	7.0	5		
May 23.....	390	11		.04		2.0	.6	2.0	.3		14		1.4	1.2	.1	.1	.02	23	8	0		26	7.0	5		
Aug. 31.....	70	12		.00		3.0	.9	2.4	.6		18		1.6	1.0	.1	.2	.05	33	11	0		37	7.1	5		
Dec. 4.....	1750	9.7		.04		2.0	.4	1.6	.1		11		.2	1.0	.1	.2	.01	22	6	0		21	6.3	5		
Mar. 13, 1963	427	10		.11		2.0	.6	1.5	.2		12		1.2	1.0	.0	.3	.02	23	8	0		24	7.0	5		
June 5.....	264	10		.02		3.0	.4	1.6	.3		14		.4	.8	.0	.2	.03	28	9	0		27	7.2	5		
Sept. 16.....	250	10		.15		2.5	.8	2.1	.5		14		1.8	1.0	.0	1.2	.04	34	10	0		30	6.8	5		
Dec. 11.....	622	11		.52		2.0	.6	1.8	.3		12		1.6	1.0	.0	.5	.01	25	8	0		23	6.8	0		
Mar. 11, 1964	1810	8.1		--		2.0	.3	1.6	.0		10		.2	.8	.0	.4	.02	20	6	0		20	6.9	5		
June 12.....	323	8.4		.04		2.0	.7	1.8	.4		13		1.2	.8	.0	.2	.01	A 22	8	0		24	7.0	5		

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 1, 1961.....	1600	0.00	0.02	0.06	0.05	0.00	0.01
May 23, 1962.....	1530	.00	.00	.00	.05	.00	.02
Dec. 4.....	1555	.00	.01	.00	.05	.00	.01
June 5, 1963.....	1510	.00	.00	.03	.05	.00	.00
Dec. 11.....	1340	.00	.01	.01	.05	.00	.04
June 12, 1964....	1310	.00	.01	.00	.05	.00	.01

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

COWLITZ RIVER BASIN

Chemical analyses, in parts per million, October 1962 to July 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
14-2427. TOUTLE RIVER NEAR CASTLE ROCK, WASH.																										
Oct. 16, 1962		16		0.13		4.5	0.8	3.9	0.5		22		2.8	2.5	0.1	0.2	0.02	43	14	0		48	7.3	10	10.5	91
Jan. 9, 1963.		16		.14		4.0	1.0	3.6	.6		22		2.2	2.5	.1	.3	.04	47	14	0		44	7.1	10	12.2	230
Apr. 3.....		15		--		4.0	.8	3.2	.3		20		1.6	2.2	.1	.5	.03	40	13	0		42	7.1	15	11.9	23
July 10.....		17		--		5.0	1.7	4.1	.7		27		2.0	3.0	.2	.1	.02	49	20	0		56	7.2	10	10.3	36
Nov. 1.....		17		--		4.5	1.4	4.4	.6		26		2.6	3.2	.1	.3	.04	53	17	0		56	7.0	10	11.4	230
Jan. 29, 1964		13		--		3.0	.8	2.9	.4		15		.2	2.2	.1	.3	.03	38	10	0		34	6.7	10	12.3	36
Apr. 24.....		14		.14		4.0	1.0	3.4	.8		22		1.4	2.5	.1	.2	.02	41	14	0		46	7.0	5	12.1	36
July 21.....		15		.10		4.0	1.1	4.1	.8		24		1.8	2.5	.1	.1	.03	42	14	0		49	7.3	5	10.6	36

A Calculated from determined constituents.

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Oct. 16, 1962....	1105	0.00	0.00	0.02	0.05	0.00	0.00
Apr. 3, 1963.....	1405	.00	.01	.05	.05	.00	.00
Nov. 1.....	1345	.01	.01	.02	.05	.00	.08
Apr. 24, 1964....	1150	.00	.00	.02	.05	.01	.02

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

OKANOGAN RIVER BASIN

Chemical analyses, in parts per million, November 1961 to June 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	D.O. (dissolved oxygen ppm)	MPN (coliform colonies per 100 ml)
14-4425. SIMILKAMEEN RIVER NEAR NIGHTHAWK, WASH. (Formerly published as Similkameen River at Oroville, Wash.)																										
Nov. 20, 1961	446	12		0.05		28	5.5	4.4	1.0		100		20	0.5	0.1	0.1	0.02	124	92	10		200	7.9	5	13.6	23
Feb. 19, 1962	1170	10		.11		24	3.9	3.8	.8		82		15	.2	.1	.1	.03	107	76	9		167	7.6	5	12.4	23
May 18.....	3570	12		.17		16	2.6	2.6	.8		60		8.4	.2	.2	.1	.01	79	50	2		113	7.5	10	13.0	930
Aug. 23.....	677	12		.01		28	3.4	4.2	1.1		96		16	.2	.1	.0	.02	119	84	6		186	8.0	5	9.0	36
Dec. 18.....	1420	9.8		.08		20	2.7	3.0	.8		69		11	.2	.1	.3	.02	86	62	5		132	7.8	5	13.7	230
Mar. 28, 1963	994	11		.06		24	4.3	3.6	.8		88		14	.2	.1	.1	.02	107	78	6		166	7.7	5	10.6	430
June 27.....	4010	9.0		--		14	2.8	2.2	.8		52		7.4	.2	.2	.3	.01	66	46	4		97	7.7	10	10.1	36
Sept. 23.....	895	13		.04		23	4.0	3.6	1.0		84		13	.0	.1	.2	.01	105	74	5		158	7.7	5	--	--
Nov. 19.....	1100	12		.06		21	3.6	3.6	.8		76		12	.8	.1	.0	.01	93	68	5		144	7.6	5	--	--
Apr. 3, 1964.	946	12		.09		25	5.6	4.3	.9		94		15	.5	.1	.1	.01	113	86	8		182	7.7	5	11.9	73
July 27.....	2630	9.5		.12		18	3.3	3.2	.7		69		10	.0	.2	.2	.02	82	58	2		129	7.8	5	9.0	23

Analyses, in parts per million, of trace elements

Date of collection	Time (24 hr)	Chromium: Hexavalent (Cr^{+6})	Chromium: Total (Cr)	Copper (Cu)	Zinc (Zn)	Arsenic (As)	Boron (B)
Nov. 20, 1961....	2030	0.00	0.00	0.03	0.05	0.01	0.06
May 18, 1962.....	0810	.01	.01	.51	.05	.00	.00
Dec. 18.....	1150	.00	.00	.00	.05	.01	.02
June 27, 1963....	1200	.00	.00	.06	.05	.00	.00
Apr. 3, 1964.....	1400	.00	.00	.07	.05	.00	.01

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

WALLA WALLA RIVER BASIN

Periodic determinations of suspended-sediment discharge and particle size, July 1962 to September 1964
(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
14-120. WALLA WALLA RIVER AT MILTON-FREEWATER, OREG.																		
July 26, 1962	1340	69		79	17	4	--	--	--	--	--	--	--	--	--			
Aug. 23	1520	62		84	6	1	--	--	--	--	--	--	--	--	--			
Oct. 19	1550	52		157	9	4	--	--	--	--	--	--	--	--	--			
Nov. 20	1405	47		320	64	55	--	--	--	--	--	--	--	--	--			
Dec. 18	1455	45		295	8	6	--	--	--	--	--	--	--	--	--			
Jan. 18, 1963	1100	36		150	3	1	--	--	--	--	--	--	--	--	--			
Feb. 18	1745	44		340	51	47	--	--	--	--	--	--	--	--	--			
Mar. 20	1430	49		207	18	10	--	--	--	--	--	--	--	--	--			
Apr. 19	1415	47		340	28	26	--	--	--	--	--	--	--	--	--			
May 14	1210	58		237	9	6	--	--	--	--	--	--	--	--	--			
June 13	1440	67		99	6	2	--	--	--	--	--	--	--	--	--			
July 24	1400	--		82	8	2	--	--	--	--	--	--	--	--	--			
Aug. 7	1240	68		79	7	1	--	--	--	--	--	--	--	--	--			
Sept. 23	1310	59		103	6	2	--	--	--	--	--	--	--	--	--			
Oct. 18	0900	51		106	6	2	--	--	--	--	--	--	--	--	--			
Nov. 8	1805	45		215	52	30	--	--	--	--	--	--	--	--	--			
Dec. 6	1500	41		188	110	56	--	--	--	--	--	--	--	--	--			
Dec. 19	1435	40		287	16	12	--	--	--	--	--	--	--	--	--			
Jan. 14, 1964	1810	39		185	6	3	--	--	--	--	--	--	--	--	--			
Jan. 25	1735	43		284	67	51	--	--	--	--	--	--	--	--	--			
Jan. 26	0055	40		405	254	278	--	--	--	--	--	--	--	--	--			
Jan. 26	0845	37		430	111	129	--	--	--	--	--	--	--	--	--			

Jan. 26, 1964.....	1550	40		420	68	77	--	--	--	--	--	--	--	--	--			
Jan. 27.....	0005	39		405	48	52	--	--	--	--	--	--	--	--	--			
Jan. 27.....	1210	42		395	33	35	--	--	--	--	--	--	--	--	--			
Jan. 30.....	1245	38		340	24	22	--	--	--	--	--	--	--	--	--			
Feb. 18.....	1450	46		215	6	3	--	--	--	--	--	--	--	--	--			
Mar. 19.....	1445	45		290	13	10	--	--	--	--	--	--	--	--	--			
Mar. 30.....	1200	49		410	56	62	--	--	--	--	--	--	--	--	--			
Mar. 30.....	1540	53		415	78	87	--	--	--	--	--	--	--	--	--			
Mar. 31.....	0115	44		670	574	1040	--	--	--	--	--	--	--	--	--			
Mar. 31.....	1050	46		650	166	291	--	--	--	--	--	--	--	--	--			
Mar. 31.....	1820	40		700	276	522	--	--	--	--	--	--	--	--	--			
Apr. 1.....	0150	44		830	582	1300	--	--	--	--	--	--	--	--	--			
Apr. 1.....	0820	43		940	1280	3250	18	21	34	47	70	86	95	98	100			VPWC
Apr. 1.....	1625	46		920	628	1560	--	--	--	--	--	--	--	--	--			
Apr. 1.....	2350	40		810	301	658	--	--	--	--	--	--	--	--	--			
Apr. 2.....	0940	43		700	186	352	--	--	--	--	--	--	--	--	--			
Apr. 15.....	1445	45		485	21	27	--	--	--	--	--	--	--	--	--			
May 14.....	1345	49		662	25	45	--	--	--	--	--	--	--	--	--			
May 19.....	0730	46		775	174	364	--	--	--	--	--	--	--	--	--			
May 20.....	0030	46		800	322	696	11	16	29	43	63	75	83	92	97	100		VPWC
May 20.....	0755	--		730	156	307	--	--	--	--	--	--	--	--	--			
June 17.....	1240	52		320	5	4	--	--	--	--	--	--	--	--	--			
July 23.....	1240	64		98	18	5	--	--	--	--	--	--	--	--	--			
Aug. 11.....	1325	65		74	6	1	--	--	--	--	--	--	--	--	--			
Sept. 17.....	1145	55		87	6	1	--	--	--	--	--	--	--	--	--			

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
14-130. MILL CREEK NEAR WALLA WALLA, WASH.					
Mar. 10, 1962	1350	42	100	6	2
Mar. 28	1350	45	367	46	46
July 25	1520	65	28.2	0	T
Oct. 12	1125	48	118	6	2
Oct. 12	2220	49	121	8	3
Oct. 13	0520	--	95	2	1
Oct. 13	2355	47	80	8	2
Nov. 20	1520	46	270	304	222
Nov. 20	2005	46	270	108	79
Nov. 21	0130	44	248	42	28
Nov. 21	0955	44	204	23	13
Dec. 2	1720	40	148	8	3
Dec. 18	1220	44	114	10	3
Jan. 17, 1963	1610	39	51	3	T
Feb. 19	0850	42	107	30	9
Mar. 20	1040	46	79	11	2
Mar. 30	1345	42	204	438	241
Apr. 15	1200	43	126	9	3
Apr. 18	1630	44	119	8	3
Apr. 23	1635	--	181	94	46
Apr. 23	2235	42	187	58	29
Apr. 24	0950	46	181	28	14
Apr. 25	1035	45	164	12	5
May 14	1015	53	79	11	2
June 13	1000	57	34	3	T
July 17	1405	57	34	4	T
Aug. 15	0740	52	30	6	T
Sept. 23	1450	54	36	5	T
Oct. 17	1650	52	26	4	T
Nov. 8	1130	44	121	33	11
Dec. 6	1130	41	68	14	3
Dec. 18	1550	38	134	16	6
Jan. 14, 1964	1035	37	53	4	1
Feb. 18	0945	41	66	8	1
Mar. 11	2120	40	100	15	4
Mar. 19	0900	39	192	14	7
Mar. 30	2310	42	363	398	390
Mar. 31	0815	42	360	131	127
Mar. 31	1550	46	367	227	225
Mar. 31	2325	41	412	372	414
Apr. 1	0840	41	645	879	1530
Apr. 1	2040	40	547	133	196
Apr. 2	0740	39	405	48	52
Apr. 2	1750	42	326	26	23
Apr. 3	0805	39	241	12	8
Apr. 15	0950	43	190	16	8
May 14	0925	43	210	26	15
May 18	2335	45	286	86	66
May 20	1830	46	254	38	26
June 17	0910	53	71	18	3
July 23	0920	53	32	2	T
Aug. 17	0905	--	30	4	T
Sept. 17	0915	50	35	66	6

T Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
14-135. BLUE CREEK NEAR WALLA WALLA, WASH.					
Mar. 10, 1962	1335	41	22	66	4
Mar. 28	1325	46	59	791	126
July 25	1400	70	.6	0	T
Oct. 8	1235	50	2.6	84	1.0
Oct. 12	1115	49	19	112	6
Oct. 12	2150	52	21	112	6
Oct. 13	0505	--	18	69	3
Oct. 14	0015	50	14	39	1
Oct. 19	1335	54	11	21	1.0
Nov. 20	1505	48	58	2640	413
Nov. 20	1920	47	76	1550	318
Nov. 21	0200	44	68	445	82
Nov. 21	1015	43	56	217	33
Nov. 21	1630	45	50	172	23
Dec. 2	1740	41	50	245	33
Dec. 18	1240	45	19	70	4
Jan. 17, 1963	1840	38	4.5	21	T
Feb. 19	0920	42	21	192	11
Mar. 20	1100	45	11	8	T
Mar. 30	1600	42	66	3350	597
Apr. 15	1220	45	20	40	2
Apr. 18	1650	44	23	50	3
Apr. 23	1610	--	93	440	110
Apr. 23	2215	42	93	324	81
Apr. 24	0900	43	89	198	48
Apr. 25	1050	46	70	254	48
May 14	1030	54	6.0	18	T
June 13	1015	63	1.4	30	T
July 17	1345	64	.5	6	T
Aug. 15	0800	56	.4	4	T
Sept. 23	1510	60	.2	8	T
Oct. 17	1700	55	.5	10	T
Nov. 8	1150	45	8.8	586	14
Nov. 9	0845	46	11	230	7
Dec. 6	1145	40	8.0	448	10
Dec. 17	1715	37	23	1050	65
Dec. 18	1605	37	20	246	13
Dec. 19	0935	38	16	139	6
Jan. 14, 1964	1050	37	6.4	28	T
Feb. 18	1000	41	16	49	2
Mar. 11	2140	39	31	274	23
Mar. 19	0930	38	62	134	22
Mar. 30	2330	42	87	3030	712
Mar. 31	0850	43	83	1120	251
Mar. 31	1620	49	83	2250	504
Apr. 1	0005	43	109	2510	739
Apr. 1	0920	41	135	4870	1780
Apr. 1	2100	39	99	1240	331
Apr. 2	0800	38	73	516	102
Apr. 2	1815	43	61	607	100
Apr. 3	0830	37	47	225	29
Apr. 15	1010	43	34	92	8
May 14	0945	43	14	41	2
May 18	2315	58	10	50	1
May 20	1700	56	9.2	22	1
June 17	0925	56	2.9	12	T
July 23	0935	57	.8	4	T
Aug. 17	0915	--	.6	4	T
Sept. 17	0935	53	.8	18	T

T Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
14-144. YELLOWHAWK CREEK NEAR COLLEGE PLACE, WASH.					
Nov. 20, 1962	1705	53	162	2400	1050
Nov. 20	2200	--	148	692	277
Nov. 20	2320	--	145	559	219
Nov. 21	0855	45	125	152	51
Nov. 21	1720	46	134	300	109
Apr. 15, 1963	1430	48	107	153	44
Apr. 18	1535	47	129	204	71
Apr. 19	1445	47	130	278	98
Apr. 23	1540	--	170	710	326
Apr. 23	2140	48	180	816	397
Apr. 24	1100	--	174	546	257
Apr. 25	1340	50	161	373	162
June 13	1530	72	F 16	24	1
Dec. 20	1600	41	93	157	39
Mar. 11, 1964	1950	44	63	36	6
Mar. 31	1030	48	138	500	186
Mar. 31	1800	51	145	536	210
Apr. 1	0210	47	174	1220	573
Apr. 1	0925	46	189	3360	1710
Apr. 1	1645	46	189	2070	1060
Apr. 2	0050	41	177	983	470
Apr. 2	1010	44	163	556	245
Apr. 2	1620	49	165	464	207
Apr. 3	1045	43	135	248	90
May 20	0830	53	F 61	82	14
14-160. DRY CREEK NEAR WALLA WALLA, WASH.					
Nov. 21, 1962	1535	45	57	162	25
Dec. 18	1315	45	34	112	10
Jan. 18, 1963	1015	32	23	42	3
Feb. 19	0815	44	50	924	125
Apr. 18	1820	43	40	1190	129
Apr. 19	0025	--	37	642	64
Apr. 19	0755	40	36	210	20
Apr. 19	1540	46	46	1390	173
May 14	1105	59	13	23	1
June 13	1150	69	3.4	7	T
July 17	1321	66	1.3	12	T
Aug. 15	0905	63	.7	14	T
Sept. 23	1410	63	1.8	44	T
Oct. 17	1615	58	1.5	12	T
Nov. 8	1150	46	25	665	45
Nov. 8	1715	46	22	582	35
Nov. 9	0055	46	31	667	56
Nov. 9	1000	46	20	391	21
Nov. 9	1055	46	21	404	23
Nov. 15	1200	45	14	221	8
Nov. 15	1715	45	13	115	4
Dec. 6	1315	38	12	77	2
Dec. 18	1500	35	32	148	13
Jan. 14, 1964	1425	38	12	18	1
Jan. 25	1535	42	66	1830	326
Feb. 18	1140	43	21	52	3
Mar. 12	0645	36	38	1360	140
Mar. 19	1210	41	61	641	106
Mar. 31	0010	44	103	3430	954
Mar. 31	0930	44	94	1160	294
Mar. 31	1655	50	97	1080	283
Apr. 1	0040	43	121	2580	843
Apr. 1	1050	42	167	6180	2790
Apr. 1	2135	40	129	2170	756
Apr. 2	0905	40	94	820	208
Apr. 2	1850	45	78	608	128
Apr. 3	0915	39	60	308	50
Apr. 15	1110	44	47	130	16
May 14	1040	45	34	28	3
May 18	2235	59	28	70	5
June 17	1050	58	5.8	432	7
July 23	1115	67	E 1.2	26	T
Aug. 17	1015	--	.8	50	T
Sept. 17	1100	57	1.8	160	1

E Estimated. T Less than 0.05 ton. F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
14-160.5. DRY CREEK AT LOWDEN, WASH.					
Oct. 12, 1962	1320	50	35	520	49
Oct. 12	2050	51	21	317	18
Oct. 13	0410	50	56	2740	414
Oct. 13	1305	52	F 12	897	29
Oct. 14	0150	51	9.8	282	7
Oct. 15	1725	51	34	860	79
Oct. 16	1615	51	61	178	29
Oct. 19	1115	50	9.8	40	1
Dec. 2	1600	41	34	1200	110
Dec. 2	2000	41	125	28400	9580
Dec. 2	2400	40	62	18600	3110
Dec. 3	0630	39	28	9280	702
Dec. 3	1410	41	25	2720	184
Dec. 4	1540	40	18	503	24
Dec. 18	1025	44	17	698	32
Feb. 18, 1963	1150	46	34	201	18
Apr. 15	1520	52	35	212	20
Apr. 19	1645	49	36	498	48
Apr. 23	1515	--	46	5370	667
Apr. 23	2110	50	45	3690	448
Apr. 25	1000	53	42	1260	143
Aug. 7	1505	74	F .5	3	T
Nov. 8	1345	48	8.2	33	1
Nov. 8	1900	48	9.0	104	3
Nov. 9	1125	47	22	1470	87
Nov. 9	1510	49	21	1040	59
Nov. 15	1120	48	4.2	48	1
Nov. 15	1810	45	9.2	69	2
Dec. 6	1020	40	10	1160	31
Dec. 6	1620	41	8.6	147	3
Dec. 6	2010	41	9.0	186	5
Dec. 18	1320	35	33	815	73
Dec. 18	2040	36	31	627	52
Dec. 19	1550	38	28	298	23
Dec. 20	1350	40	26	239	17
Dec. 20	2330	38	40	10800	1170
Jan. 3, 1964	1645	40	F 25	294	20
Jan. 24	1635	39	23	78	5
Jan. 25	1900	42	45	1540	187
Jan. 26	1005	38	90	9170	2330
Jan. 26	1720	38	68	3280	731
Jan. 27	0820	38	53	1820	260
Jan. 27	1300	40	50	1540	208
Jan. 27	2135	39	45	1410	171
Jan. 30	1545	40	55	1990	296
May 21	0945	55	F 13	48	2
14-160.8. PINE CREEK NEAR WESTON, OREG.					
Jan. 18, 1963	1245	34	3.9	8	T
Apr. 19	0950	39	56	436	66
Apr. 19	1045	--	56	1220	184
Apr. 19	1335	39	65	548	96
June 13	1305	73	.7	11	T
Nov. 8	1730	45	E 1.0	1290	3
Dec. 6	1415	41	3.9	162	2
Jan. 25, 1964	1635	39	55	2370	352
Jan. 25	2235	37	96	1560	404
Jan. 26	0800	35	63	220	37
Jan. 26	1520	39	64	216	37
Jan. 26	2330	36	60	184	30
Jan. 27	1145	39	51	118	16
Jan. 30	1110	38	38	1620	166
Mar. 31	1135	--	80	268	58
Mar. 31	1845	44	100	492	133
Apr. 1	0130	41	105	466	132
Apr. 1	0855	42	127	1040	357
Apr. 1	1605	41	106	392	112
Apr. 2	0015	48	101	254	69
May 19	0950	59	86	28	7

E Estimated.
T Less than 0.05.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)		Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
14-161. PINE CREEK NEAR TOUCHET, WASH.						
Dec. 2, 1962	1530	43		98	175	46
Dec. 2	2035	43		135	980	357
Dec. 3	0050	42		132	906	326
Dec. 3	0725	41		131	558	197
Dec. 3	1430	42		120	374	121
Dec. 4	1525	40		87	117	27
Jan. 17, 1963	1650	40		30	117	9
Feb. 18	1120	48		78	230	48
Apr. 23	1500	--		133	323	116
Apr. 24	1145	50		117	207	65
Apr. 25	1015	52		103	172	48
Aug. 8	0955	67		1.2	11	T
Aug. 12	1610	74		7.7	17200	358
Nov. 15	1050	48		6.0	64	1
Nov. 15	1830	46		6.7	16	T
Dec. 6	1700	40		45	1100	134
Dec. 6	2020	39		35	772	73
Dec. 18	1235	37		47	696	88
Dec. 18	2020	38		48	476	62
Dec. 19	1615	39		39	180	19
Jan. 24, 1964	1700	40		32	226	20
Jan. 25	1925	45		42	1400	159
Jan. 26	1045	38		170	13300	6100
Jan. 26	1740	38		144	7380	2870
Jan. 27	0900	39		125	4530	1530
Jan. 27	1330	40		117	3540	1120
Jan. 27	2120	41		115	3100	963
Jan. 30	1630	41		96	1870	485
May 21	1000	54	F	22	59	4
14-166.4. EAST FORK TOUCHET RIVER AT DAYTON, WASH.						
Nov. 9, 1962	1915	47		78	107	2
Nov. 10	1200	45		68	10	2
Nov. 16	1510	42		63	6	1
Dec. 1	0135	37		130	92	32
Dec. 1	0855	37		124	34	11
Dec. 20	1410	43		125	22	7
Jan. 1, 1963	1235	35	F	69	10	2
Feb. 21	1645	45		124	38	13
Mar. 20	1820	49		84	22	5
Mar. 30	0040	41		156	358	151
Mar. 30	1130	43		147	77	31
Mar. 30	1835	41		280	1840	139
Mar. 31	0830	38		205	168	9
Apr. 1	1600	48		112	23	7
May 16	1730	61		73	24	5
June 12	1230	67	F	54	12	2
July 19	0815	58		49	10	1
Aug. 28	1200	63		52	10	1
Sept. 24	1805	62		62	14	2
Oct. 17	1320	57		55	14	2
Nov. 8	2240	40		122	90	30
Nov. 9	0855	44		115	45	14
Nov. 9	1220	46		114	64	20
Dec. 17	1540	38		114	114	35
Jan. 26, 1964	0130	37		850	1680	386
Jan. 26	0730	36		740	578	115
Jan. 26	2000	40		410	220	244
Jan. 27	1120	42		305	91	75
Feb. 13	1335	41		108	12	4
Mar. 30	1350	54		135	69	25
Mar. 31	1420	50		255	251	17
Apr. 1	0155	42		353	636	60
Apr. 1	1530	--		580	437	684
Apr. 2	1205	45	F	353	132	12
Apr. 2	1955	42		320	101	87
Apr. 3	1315	48		255	54	37
Apr. 14	1700	53		198	26	14
May 18	2140	52		278	86	6
May 19	1625	59		270	59	4
May 20	1505	54		282	66	5
June 18	1050	55		143	61	24
July 30	0925	59		46	24	3

T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
14-167. SOUTH FORK TOUCHET RIVER NEAR DAYTON, WASH.					
Nov. 9, 1962	1900	47	30	107	9
Nov. 10	1150	45	31	15	1
Nov. 16	1520	42	27	12	1
Dec. 1	0120	37	65	72	13
Dec. 1	0810	36	53	27	4
Mar. 30, 1963	0025	41	127	256	88
Mar. 30	1125	43	117	59	19
Mar. 30	1815	40	220	1380	820
Mar. 31	0810	37	200	146	79
June 12	1130	70	F 11	7	T
July 26	1420	75	F 3.3	4	T
Nov. 8	2200	45	62	98	16
Nov. 9	0930	45	50	53	7
Nov. 9	1205	47	50	84	12
Mar. 30, 1964	1330	52	120	104	34
Mar. 31	1410	49	276	316	235
Apr. 1	0140	41	355	940	901
Apr. 1	1510	--	395	652	695
Apr. 2	1145	46	265	124	89
Apr. 2	1940	41	250	82	55
Apr. 3	1300	48	220	46	27
May 18	2120	55	160	47	20
May 19	1600	63	170	42	19
May 20	1400	53	179	42	20
14-168. PATIT CREEK NEAR DAYTON, WASH.					
Nov. 9, 1962	1930	46	6.0	166	3
Nov. 10	1120	42	2.6	748	5
Nov. 10	1535	45	2.3	611	4
Nov. 16	1405	39	1.6	6	T
Dec. 1	0100	36	19	983	50
Dec. 1	0700	34	16	546	24
Feb. 5, 1963	0930	38	109	2300	677
Mar. 30	0055	42	47	1380	175
Mar. 30	1105	42	38	614	63
Mar. 30	1855	39	91	9720	2390
Mar. 31	0910	36	77	929	193
June 12	1015	66	8	10	T
Dec. 17	1510	33	3.6	72	1
May 20, 1964	1300	61	F 23	42	3
WHISKEY CREEK NEAR WAITSBURG, WASH. (1 mile upstream from regular site 14-169. Whiskey Creek near Waitsburg, Wash.)					
Nov. 10, 1962	1640	48	E 2	20	T
Nov. 16	1530	--	E 2	18	T
Nov. 30	2340	38	E 9	1160	28
14-169. WHISKEY CREEK NEAR WAITSBURG, WASH.					
Nov. 9, 1962	1820	49	3.8	230	2
Nov. 10	1320	48	F 2.6	12200	86
Nov. 10	1625	48	2.5	4740	32
Nov. 16	1520	43	2.3	302	2
Nov. 30	2350	38	8.6	1640	38
Dec. 1	0600	36	10	482	13
Dec. 1	0930	36	8.6	354	8
Mar. 30, 1963	1030	41	34	634	58
Mar. 30	1235	45	20	250	14
Mar. 30	1705	41	F 78	10600	2230
June 12	1345	75	F .3	8	T
May 20, 1964	1105	61	F 1.4	12	T

E Estimated.
T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
14-169.5. COPPEI CREEK AT WAITSBURG, WASH.					
Nov. 9, 1962	1750	49	31	1750	146
Nov. 10	1400	46	F 8.7	67	2
Nov. 16	1750	40	5.8	6	T
Nov. 30	2240	39	45	8140	989
Dec. 1	0530	37	25	1880	127
Dec. 1	0955	37	23	260	16
Feb. 6, 1963	2115	42	158	13600	5800
Feb. 6	2305	41	143	4460	1720
Feb. 7	0930	41	102	698	192
Mar. 30	0200	42	31	2540	213
Mar. 30	1255	45	22	142	8
Mar. 30	1645	43	83	11600	2600
Mar. 31	0950	40	66	668	119
June 12	1430	76	F 2.5	8	T
Oct. 17	1445	58	F 2.4	18	T
Nov. 9	0900	45	14	250	9
Nov. 9	1135	46	F 13	196	7
May 20, 1964	1050	62	F 5.8	17	T
14-170. TOUCHET RIVER AT BOLLES, WASH.					
Nov. 9, 1962	1730	49	116	84	26
Nov. 10	1445	48	118	74	24
Nov. 16	1710	41	103	23	6
Nov. 30	2210	40	294	246	195
Dec. 1	0500	37	308	1520	1260
Dec. 1	1035	37	261	522	368
Dec. 20	1500	42	316	97	83
Jan. 21, 1963	1035	32	166	17	8
Feb. 3	1055	33	1600	22600	97600
Feb. 3	1310	34	1540	23700	98500
Feb. 3	2120	36	1250	23100	78000
Feb. 4	1200	38	6.6	4000	7100
Feb. 5	1130	40	919	3850	9550
Feb. 6	2040	43	790	2020	4310
Feb. 6	2240	43	884	6070	14500
Feb. 7	0950	42	693	944	1770
Feb. 21	1830	43	366	166	164
Mar. 20	1910	50	198	31	17
Mar. 29	2330	43	357	741	714
Mar. 30	0220	43	385	1400	1460
Mar. 30	1325	44	348	369	347
Mar. 30	2135	41	770	19600	40700
Mar. 31	1015	40	480	1060	1660
Apr. 16	1650	47	316	46	39
May 16	1810	65	137	28	10
June 12	1520	76	56	14	2
July 19	0730	63	33	18	2
Aug. 28	1120	68	25	14	11
Sept. 24	1900	64	43	66	8
Oct. 17	1505	61	43	13	2
Nov. 8	1030	46	124	827	277
Nov. 9	0925	46	167	254	115
Nov. 9	1330	48	151	192	78
Dec. 7	1005	36	113	38	12
Dec. 17	1420	36	200	266	144
Dec. 20	1250	39	231	714	445
Dec. 20	1745	38	234	309	195
Dec. 20	2120	38	224	138	83
Dec. 21	1730	37	186	61	31

T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
14-170. TOUCHET RIVER AT BOLLES, WASH.--Continued					
Jan. 25, 1964	1320	--	652	3300	5810
Jan. 26	0910	36	1270	2470	8470
Jan. 26	2040	40	939	1040	2640
Jan. 27	2230	40	750	408	826
Feb. 13	1410	41	E 260	41	29
Mar. 30	1245	50	E 400	194	210
Apr. 14	1810	53	327	50	44
May 18	2010	61	285	186	143
May 19	1720	63	345	211	197
May 20	0950	52	423	218	249
June 18	1350	59	174	286	134
July 30	0815	66	E 55	76	11
Aug. 12	1925	72	222	57	34
Sept. 23	0830	55	44	72	9
14-171. WHETSTONE HOLLOW CREEK AT PRESCOTT, WASH.					
Apr. 22, 1963	2110	--	2.5	26	T
Nov. 8	0950	46	.8	26	T
Nov. 9	0945	45	1.2	38	T
Dec. 20	1735	32	18	31200	1520
Dec. 20	2045	32	9	8690	211
Dec. 21	0300	32	4.6	2420	30
Dec. 21	1115	32	3.2	1900	16
14-171.2. TOUCHET RIVER NEAR LAMAR, WASH.					
Nov. 30, 1962	2130	41	278	76	57
Dec. 1	1130	38	293	2200	1740
Feb. 3, 1963	1220	35	2010	10300	55900
Feb. 3	2205	34	7450	28100	565000
Feb. 4	1135	37	1100	11800	35400
Feb. 5	1345	42	1050	12400	35200
Feb. 6	2210	42	780	3680	7750
Apr. 22	2140	--	295	66	53
Aug. 7	0820	69	F 10	8	T
Dec. 20	1220	39	200	183	99
Dec. 20	1945	36	305	11600	9550
Dec. 21	0235	35	220	2160	1280
Dec. 21	1140	37	190	360	185
Dec. 21	1700	37	F 208	410	230
Jan. 26, 1964	1020	36	1660	7200	32300
Jan. 26	2120	38	1090	4100	12100
Jan. 27	2305	39	720	1440	2800
May 18	1940	61	490	145	192
14-176. TOUCHET RIVER AT TOUCHET, WASH.					
Oct. 8, 1962	1040	53	15	13	1
Oct. 12	1010	51	78	40	8
Oct. 12	1330	50	92	42	10
Oct. 12	2025	51	12	262	8
Oct. 13	0450	--	250	372	251
Oct. 13	1055	51	190	1780	913
Oct. 14	0210	50	180	378	184
Oct. 15	1655	52	336	198	180
Oct. 16	1600	53	195	351	185
Oct. 19	1100	50	92	32	8
Dec. 1	1240	40	330	65	58
Dec. 2	1520	41	290	460	360
Dec. 2	2100	--	940	891	2260
Dec. 3	0210	41	1080	14100	41100
Dec. 3	0655	39	680	23200	42600
Dec. 3	1455	41	650	5720	10000
Dec. 4	1510	39	530	592	847
Dec. 18	1005	45	545	472	695

E Estimated.
T Less than 0.05 ton.
F Discharge at time of sampling.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

WALLA WALLA RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge, March 1962 to September 1964--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Discharge (tons per day)
14-176. TOUCHET RIVER AT TOUCHET, WASH.--Continued					
Jan. 18, 1963	1555	33	67	96	17
Feb. 3	2310	33	5900	25800	411000
Feb. 4	0130	33	6420	23800	413000
Feb. 4	0730	33	3100	26300	220000
Feb. 4	1530	44	1850	73200	379000
Feb. 7	1100	42	1400	6230	23500
Mar. 21	1055	49	157	67	28
Apr. 15	1550	51	470	384	487
Apr. 16	1625	49	342	218	201
Apr. 22	2235	--	280	106	80
Apr. 23	2050	52	360	184	179
Apr. 24	1340	56	320	212	183
Apr. 25	0940	54	295	120	96
July 18	1305	72	1.8	38	T
Aug. 8	1105	74	F .9	6	T
Nov. 8	0945	46	53	18	3
Nov. 8	1930	46	60	23	4
Nov. 9	1235	46	168	67	30
Nov. 9	1530	46	F 170	68	31
Nov. 15	1025	46	47	10	1
Nov. 15	1900	45	53	20	3
Dec. 6	1745	38	110	26	8
Dec. 6	2025	36	225	49	30
Dec. 18	1205	34	218	148	87
Dec. 18	1955	35	205	156	86
Dec. 19	1630	36	195	93	49
Dec. 20	2240	38	190	49	25
Dec. 21	0135	36	376	496	504
Dec. 21	0530	36	370	428	428
Dec. 21	0800	37	320	1200	1040
Dec. 21	0930	36	295	2540	2020
Dec. 21	1325	36	230	4920	3060
Dec. 21	1925	36	185	4240	2120
Dec. 24	1620	39	150	6000	2430
Jan. 3, 1964	1515	40	190	878	450
Jan. 24	1615	36	180	90	44
Jan. 25	2010	41	510	3980	5480
Jan. 26	1150	38	1470	15600	61900
Jan. 26	1235	38	1460	13800	54400
Jan. 26	1815	38	1350	8170	29800
Jan. 27	0930	38	920	3420	8500
Jan. 27	1345	--	865	2880	6730
Jan. 27	2100	40	790	2190	4670
Jan. 30	1820	40	700	1760	3330
Mar. 18	2300	43	715	3780	7300
Mar. 19	0450	40	680	2100	3860
Mar. 20	1050	42	510	734	1010
Mar. 31	0955	53	650	2330	4090
Mar. 31	1730	55	740	2700	5390
Apr. 1	1050	50	930	3440	8640
Apr. 1	1825	50	1070	4890	14100
Apr. 2	0130	46	1180	5640	18000
Apr. 2	1130	46	1050	3510	9950
Apr. 2	1810	46	960	2550	6610
Apr. 3	1430	50	655	1480	2620
May 21	1110	56	380	231	237
Aug. 17	1300	--	2.2	14	T
Sept. 17	1310	62	2.2	8	T

T Less than 0.05 ton.
F Discharge at time of sampling.

UMATILLA RIVER BASIN

Periodic determinations of suspended-sediment discharge and particle size, April 1962 to September 1964
(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
14-203. MEACHAM CREEK NEAR GIBBON, OREG.																		
Apr. 21, 1962.....	0940	45		--	1	E 1												
July 26.....	1100	72		--	3	E 1												
Oct. 19.....	1750	55		48	6	1												
Nov. 20.....	1120	49		63	7	1												
Dec. 18.....	1710	--		345	2	2												
Jan. 18, 1963.....	1415	34		63	0	T												
Feb. 1.....	1745	34		123	17	6												
Feb. 2.....	1025	36		218	24	14												
Feb. 3.....	2100	38		1170	274	865	16	18	25	39	53	66	73	81	90	100		VBWC
Feb. 14.....	1205	--		260	2	1												
Feb. 18.....	1645	45		285	4	3												
Mar. 20.....	1610	51		210	4	2												
Apr. 19.....	1250	44		510	8	11												
Apr. 25.....	1655	50		535	4	6												
May 14.....	1445	61		248	4	3												
July 24.....	1535	--		12	2	T												
Aug. 7.....	1020	68		8.5	3	T												
Sept. 23.....	1215	63		12	4	T												
Oct. 18.....	1015	56		10	0	T												
Nov. 15.....	1550	47		65	11	2												
Dec. 19.....	1250	41		103	6	2												
Jan. 14, 1964.....	1645	40		67	8	1												
Feb. 18.....	1350	43		125	10	3												
Mar. 19.....	1620	47		220	18	11												
Mar. 31.....	1210	45		990	82	219												
Apr. 1.....	0035	42		1490	307	1240												
Apr. 1.....	1510	45		1720	216	1000												
Apr. 15.....	1350	44		930	22	55												
May 14.....	1640	50		525	6	9												
July 23.....	1450	73		15	6	T												
Aug. 11.....	1240	73		11	9	T												
Sept. 29.....	0655	52		9.7	8	T												

E Estimated.
T Less than 0.50.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

JOHN DAY RIVER BASIN

Periodic determinations of suspended-sediment discharge and particle size, April 1962 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
14-385. JOHN DAY RIVER AT PRAIRIE CITY, OREG.																	
Apr. 19, 1962.....	0730	46		265	38	27											
July 10.....	1605	73		33	4	.4											
Sept. 24.....	1740	66		21	6	.3											
July 23, 1963.....	1300	67		68	18	3.3											
Sept. 18.....	1410	60		72	10	1.9											
Oct. 28.....	1640	46		67	5	.9											
Dec. 5.....	1030	36		64	6	1.0											
Jan. 7, 1964.....	1055	35		66	2	.4											
Jan. 31.....	1545	37		73	8	1.6											
Mar. 9.....	1625	41		75	12	2.4											
Mar. 24.....	1550	42		115	16	5.0											
Mar. 31.....	1725	51		285	252	194	45	45	59	77	89	89	92	96	99	100		VPWC
Apr. 14.....	0800	39		158	15	6.4											
Apr. 28.....	1705	60		139	16	6.0											
May 19.....	0755	51		127	14	4.8											
July 21.....	0820	61		59	12	1.9											
Sept. 30.....	0655	50		44	2	.2											
SOUTH FORK JOHN DAY RIVER AT DAYVILLE, OREG. (Lat. 45°28'05", Long. 119°32'10")																	
Apr. 18, 1962.....	1630				198	E 160											
July 10.....	1930	67		13	31	1											
14-395. SOUTH FORK JOHN DAY RIVER NEAR DAYVILLE, OREG.																	
Sept. 24, 1962....	1445	67		18	4	0.2											
July 23, 1963.....	1450	71		--	14	--											
Sept. 18.....	1550	62		38	10	1.0											
Oct. 28.....	1500	46		33	6	.5											
Dec. 5.....	1315	38		42	12	1.4											
Jan. 7, 1964.....	0835	37		52	20	2.8											
Jan. 31.....	1655	41		61	61	10											
Mar. 9.....	1430	43		58	8	1.3											
Mar. 24.....	1420	42		102	20	5.5											
Mar. 31.....	1550	47		310	146	122											
Apr. 13.....	1820	51		280	64	48											
Apr. 29.....	0830	51		230	37	23											
May 18.....	1800	64		160	16	6.9											
July 20.....	1945	72		47	8	1.0											
Sept. 30.....	0905	53		20	2	.1											

14-405. JOHN DAY RIVER AT PICTURE GORGE, NEAR DAYVILLE, OREG.																		
Apr. 18, 1962.....	1600	--			1530	124	512											
July 11.....	0655	61			84	14	3											
Sept. 24.....	1350	68			32	8	1											
July 23, 1963.....	1530	74			120	10	3											
Sept. 18.....	1810	62			209	28	16											
Oct. 28.....	1430	47			185	30	15											
Dec. 5.....	1500	37			209	14	8											
Jan. 7, 1964.....	0750	36			260	18	13											
Jan. 31.....	1720	42			312	38	32											
Mar. 9.....	1400	42			278	16	12											
Mar. 24.....	1340	42			428	34	39											
Mar. 31.....	1410	50			1140	444	1370											
Apr. 13.....	1735	52			829	55	123											
Apr. 29.....	0935	--			599	25	40											
May 18.....	1630	67			575	34	53											
July 20.....	1850	75			107	10	3											
Sept. 30.....	1150	57			80	8	2											
14-425. CAMAS CREEK NEAR UKIAH, OREG.																		
Apr. 19, 1962.....	1440	47			335	34	31											
July 10.....	0730	56			8.4	4	.1											
Sept. 25.....	0930	51			3.5	0	T											
July 23, 1963.....	0645	48			5.8	4	.1											
Sept. 18.....	0805	44			7.4	4	.1											
Oct. 29.....	1005	39			6.6	2	T											
Dec. 4.....	1600	32		D	11	4	.1											
Jan. 7, 1964.....	1645	32		D	17	8	.4											
Jan. 31.....	0915	32		D	18	3	.1											
Mar. 10.....	1135	35			17	4	.2											
Mar. 25.....	1130	34			37	9	.9											
Apr. 1.....	1245	37			630	173	294											
Apr. 14.....	1100	42			360	14	14											
Apr. 28.....	1140	47			236	3	1.9											
May 19.....	1410	58			281	32	24											
July 21.....	1330	77			9.0	2	T											
Sept. 29.....	1215	55			4.7	6	.1											

T Less than 0.50 ton.
D Daily mean discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN--Continued

JOHN DAY RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, April 1962 to September 1964--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 temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
14-440. MIDDLE FORK JOHN DAY RIVER AT RITTER, OREG.																		
Apr. 19, 1962	1210	52		832	61	137	--	--	--	--	--	--	--	--	--			
July 10	0920	67		66	3	1	--	--	--	--	--	--	--	--	--			
Sept. 25	0715	54		21	4	T	--	--	--	--	--	--	--	--	--			
July 23, 1963	0815	60		40	12	1	--	--	--	--	--	--	--	--	--			
Sept. 18	0935	51		60	14	2	--	--	--	--	--	--	--	--	--			
Oct. 29	0940	40		38	5	1	--	--	--	--	--	--	--	--	--			
Dec. 4	1730	32		D 18	9	T	--	--	--	--	--	--	--	--	--			
Jan. 7, 1964	1430	34		64	8	1	--	--	--	--	--	--	--	--	--			
Jan. 31	1120	32		64	4	1	--	--	--	--	--	--	--	--	--			
Mar. 10	1015	36		96	8	2	--	--	--	--	--	--	--	--	--			
Mar. 25	1020	36		150	15	6	--	--	--	--	--	--	--	--	--			
Apr. 1	1110	39		1210	420	1370	37	40	58	70	86	90	92	98	100			VPWC
Apr. 14	0945	44		620	42	70	--	--	--	--	--	--	--	--	--			
Apr. 28	1320	52		358	16	15	--	--	--	--	--	--	--	--	--			
May 19	1245	60		655	59	104	45	45	54	76	89	94	98	99	100			VPWC
July 21	1200	74		58	3	T	--	--	--	--	--	--	--	--	--			
Sept. 29	1420	61		28	3	T	--	--	--	--	--	--	--	--	--			
COTTONWOOD CREEK AT MONUMENT, OREG. (Lat. 44°48'40", Long. 119°25'00")																		
Apr. 19, 1962	1715	58			86	E 60												
Sept. 18	1110				72	E 2												
14-460. NORTH FORK JOHN DAY RIVER AT MONUMENT, OREG.																		
Apr. 19, 1962	1745	50		4950	82	1100	--	--	--	--	--	--	--	--	--			
July 10	1245	75		295	6	5	--	--	--	--	--	--	--	--	--			
Sept. 25	1230	74		77	0	T	--	--	--	--	--	--	--	--	--			
July 23, 1963	1020	68		181	11	5	--	--	--	--	--	--	--	--	--			
Sept. 18	1025	58		241	8	5	--	--	--	--	--	--	--	--	--			
Oct. 29	0725	41		130	3	1	--	--	--	--	--	--	--	--	--			
Dec. 5	0715	32		106	5	1	--	--	--	--	--	--	--	--	--			
Jan. 7, 1334	1320	35		350	4	4	--	--	--	--	--	--	--	--	--			
Jan. 31	1320	36		540	7	10	--	--	--	--	--	--	--	--	--			
Mar. 10	0850	37		388	4	4	--	--	--	--	--	--	--	--	--			
Mar. 25	0850	37		750	13	26	--	--	--	--	--	--	--	--	--			
Apr. 1	0935	41		7880	1160	24700	32	32	45	58	77	81	86	93	99	100		VPWC
Apr. 13	1620	47		2530	18	123	--	--	--	--	--	--	--	--	--			
Apr. 28	1500	52		1700	10	46	--	--	--	--	--	--	--	--	--			
May 19	1030	55		4100	94	1040	23	23	31	57	69	81	89	97	100			VPWC
July 21	1010	73		265	3	2	--	--	--	--	--	--	--	--	--			
Sept. 29	1550	60		96	2	1	--	--	--	--	--	--	--	--	--			

ROCK CREEK AT MOUTH, NEAR McDONALD FERRY, OREG.
(Lat. 45°34'40", Long. 120°23'50")

Sept. 17, 1963.....	1430	67		--	3		T											
Nov. 20.....	1155	43		--	4		--											
Dec. 4.....	1230	32		--	8		--											
Dec. 6.....	0745	36		--	6		T											
Dec. 17.....	1800	33		--	4		T											
Dec. 23.....	1415	40		--	3		T											
Jan. 6, 1964.....	1420	43		38	22		2											
Jan. 8.....	1600	40		--	12	E	1											
Jan. 14.....	1530	38		--	10	E	1											
Jan. 23.....	1730	38		--	4	E	1											
Jan. 29.....	1205	44		--	75		--											
Feb. 11.....	1555	43		33	16		1											
Feb. 18.....	1430	45		--	12		--											
Feb. 26.....	1755	40		--	9		--											
Mar. 11.....	1130	44		--	13	E	1											
Mar. 22.....	0940	46		--	50		--											
Mar. 30.....	1910	55		--	2140		--											
Mar. 31.....	0710	50		--	724		--											
Mar. 31.....	1730	53		315	2590		2200											
Apr. 3.....	0915	46		--	360		--											

GRASS VALLEY CANYON AT McDONALD FERRY, OREG.
(Lat. 45°35'35", Long. 120°25'00")

Feb. 4, 1963.....	1630				24000		130000											
Feb. 5.....	0930				6060	E	6500											

E Estimated.
T Less than 0.50 ton.
D Daily mean discharge.

PART 15. ALASKA

SOUTHEASTERN ALASKA

15-538. LAKE CREEK AT AUKE BAY, ALASKA

LOCATION.--Temperature recorder at gaging station, 15 feet upstream from bridge on Mendenhall Loop Road, 700 feet upstream from mouth at Auke Lake, and 0.8 mile northeast of Auke Bay.
DRAINAGE AREA.--2.50 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 56°F July 21; minimum, freezing point on many days during November, December, and January.

Temperature (°F) of water, water year October 1963 to September 1964

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	47	47	46	46	43	42	43	44	45	45	46	46	46	46	48	48	47	46	46	46	46	46	46	--	--	--	--	--	--	--	--	--
Minimum	47	47	45	44	42	41	42	44	45	45	45	46	46	46	46	48	46	46	46	46	46	46	46	--	--	--	--	--	--	--	--	--
November																																
Maximum	--	--	--	--	--	--	--	--	--	37	37	37	37	36	34	33	32	32	32	32	32	32	32	32	31	31	32	32	32	32	--	--
Minimum	--	--	--	--	--	--	--	--	--	37	37	37	36	34	33	32	32	32	32	32	32	32	32	31	31	31	31	32	32	32	--	--
December																																
Maximum	32	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	33	33
Minimum	32	32	32	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	33	33	33	33	32	32	32	33	32
January																																
Maximum	33	33	33	33	33	33	33	33	33	32	32	32	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	35	35	35	33
Minimum	33	33	33	33	33	33	33	33	33	32	32	32	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	35	35	35	33
February																																
Maximum	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	36	36	36	36	36	36	36	36	--	--	35
Minimum	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	36	36	36	36	36	36	36	--	--	35
March																																
Maximum	36	36	36	36	36	35	35	35	35	35	35	35	34	34	34	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34
Minimum	36	36	36	36	34	34	34	34	34	34	34	34	34	34	33	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33
April																																
Maximum	32	33	34	34	34	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	34	--	35
Minimum	32	33	34	34	34	35	35	35	35	35	35	35	35	34	34	35	35	35	35	35	35	34	35	35	35	35	35	35	34	34	--	35
May																																
Maximum	35	36	35	36	36	35	35	35	35	35	35	36	36	36	35	37	36	35	36	35	36	35	35	36	36	36	36	37	38	37	38	36
Minimum	34	35	34	34	34	35	35	35	35	35	35	35	34	35	35	35	34	35	35	34	35	35	35	34	35	36	35	35	35	35	36	35
June																																
Maximum	37	37	37	37	37	38	38	38	39	38	38	39	38	37	38	39	39	39	39	39	39	39	41	40	39	40	42	42	42	42	--	39
Minimum	35	37	37	36	37	37	36	36	37	37	37	37	37	37	37	37	39	39	39	39	38	38	38	39	39	39	40	41	42	42	--	38
July																																
Maximum	42	42	43	44	45	48	47	50	49	48	48	48	50	51	54	55	54	54	52	54	56	54	53	51	51	52	51	50	52	52	52	50
Minimum	42	42	42	44	45	45	46	48	49	48	48	48	48	48	51	52	54	53	51	51	52	53	51	51	50	50	50	50	50	52	51	49
August																																
Maximum	52	52	53	53	53	54	54	53	53	53	55	54	53	51	51	51	51	51	51	51	52	--	--	--	--	--	--	--	--	--	--	--
Minimum	51	51	52	52	52	52	52	53	53	53	53	54	51	51	51	51	51	51	51	51	51	--	--	--	--	--	--	--	--	--	--	--
September																																
Maximum	49	49	49	50	49	49	48	48	47	48	48	48	48	49	49	49	48	48	48	48	48	49	49	49	47	47	47	47	46	46	--	48
Minimum	49	48	48	49	48	48	48	47	46	46	46	47	48	49	49	49	48	48	48	48	48	49	49	49	46	46	46	46	46	46	--	48

SOUTHEASTERN ALASKA--Continued

15-540. AUKE CREEK AT AUKE BAY, ALASKA

LOCATION.--Temperature recorder at gaging station, 100 feet downstream from bridge on Glacier Highway, 200 feet downstream from Auke Lake, 0.3 mile upstream from mouth at Auke Bay, and 0.5 mile east of Auke Bay.
DRAINAGE AREA.--3.96 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1962 to September 1964.

Temperature (°F) of water, water year October 1962 to September 1963

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

SOUTHEASTERN ALASKA--Continued

15-540. AUKE CREEK AT AUKE BAY, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	51	51	51	50	49	48	48	48	48	48	48	48	48	47	47	47	47	46	46	45	45	44	44	44	44	44	44	43	43	43	42	46
Minimum	51	51	51	50	49	48	48	48	48	48	45	48	48	47	47	47	46	46	46	45	44	44	44	44	44	44	43	43	43	42	42	46
November																																
Maximum	42	41	41	41	41	41	41	41	41	41	41	40	40	39	39	38	37	37	37	37	37	37	37	37	37	37	37	37	37	37	--	39
Minimum	41	41	41	41	41	41	41	41	41	41	40	40	39	39	38	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	--	39
December																																
Maximum	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	36
Minimum	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	36
January																																
Maximum	35	35	35	35	35	35	35	35	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	35	35	35	35	35	35	35	35	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	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
March																																
Maximum	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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April																																
Maximum	--	--	--	--	--	--	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	39	39	40	40	40	40	40	41	41	--	39
Minimum	--	--	--	--	--	--	37	38	38	38	38	38	38	38	38	38	38	38	38	38	38	39	39	40	40	40	40	40	41	41	--	39
May																																
Maximum	41	41	41	42	43	42	42	42	42	41	41	41	42	41	41	42	43	44	44	45	46	47	46	46	47	47	48	51	54	55	55	45
Minimum	41	41	41	42	43	42	42	42	42	41	41	41	41	41	41	41	42	42	43	45	46	46	46	45	45	43	46	48	51	53	52	44
June																																
Maximum	55	55	53	53	53	52	52	53	55	57	55	54	56	56	55	56	57	57	56	56	55	55	55	56	55	55	55	55	55	55	--	55
Minimum	51	53	48	48	48	48	47	48	50	51	51	52	55	56	52	54	55	56	55	54	52	54	55	56	55	55	54	55	55	55	--	53
July																																
Maximum	52	51	50	50	49	49	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	50	51	47	47	47	47	51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September																																
Maximum	56	--	--	--	56	57	56	55	54	55	56	55	55	55	55	55	55	54	54	53	53	52	52	52	51	50	50	50	50	49	--	54
Minimum	56	--	--	--	56	56	51	51	54	54	54	55	55	55	55	55	55	54	54	53	52	52	52	51	51	50	50	50	50	49	--	53

15-564. CHILKAT RIVER AT GORGE, NEAR KLUKWAN, ALASKA

LOCATION.--Temperature recorder at gaging station, 1.2 miles downstream from unnamed tributary, 2.0 miles upstream from Tahini River, 8.1 miles upstream from Kelsall River, and 16 miles north of Klukwan.
DRAINAGE AREA.--190 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1962 to September 1964.
EXTREMES, 1962-63.--Water temperatures: Maximum, 48°F June 17; minimum, freezing point on many days during February and March.
EXTREMES, 1963-64.--Water temperatures: Maximum, 50°F May 19, 28; minimum, freezing point on many days during winter months.

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

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
July																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	43	42	43	44	42	43	43	44	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40	39	39	39	40	40	40	40	--
August																																
Maximum	41	42	43	43	41	42	41	41	41	41	43	41	41	42	41	41	41	40	42	41	41	41	41	40	41	41	43	43	41	41	41	41
Minimum	40	39	39	40	40	39	39	39	39	39	38	40	39	40	39	40	40	40	40	40	41	40	40	40	40	40	40	40	40	40	40	40
September																																
Maximum	41	42	41	40	40	41	39	42	42	43	41	41	40	40	40	39	42	41	39	40	40	40	39	39	39	38	37	38	38	37	--	40
Minimum	38	38	38	40	39	37	38	40	42	42	38	40	39	39	39	39	39	39	39	39	39	39	39	39	38	37	37	37	38	37	--	39

SOUTHEASTERN ALASKA--Continued

15-564. CHILKAT RIVER AT GORGE, NEAR KLUKWAN, ALASKA--Continued

Temperature (°F) of water, water year October 1962 to September 1963

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	37	37	39	39	38	38	38	38	38	38	38	38	38	38	36	36	37	37	37	38	38	38	37	37	38	38	37	37	37	35	36	37
Minimum	37	37	37	37	38	38	37	38	38	37	37	38	38	36	36	36	36	37	37	38	38	37	37	37	38	37	36	37	36	35	35	37
November																																
Maximum	37	38	38	38	38	36	36	36	36	36	36	36	36	36	36	35	35	35	34	34	34	35	35	34	34	34	33	33	33	33	--	35
Minimum	36	37	38	38	36	36	36	36	36	36	36	36	36	36	35	35	35	35	34	34	34	35	35	34	34	33	33	33	33	33	--	35
December																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	33
January																																
Maximum	32	32	32	32	32	32	32	32	32	33	33	33	33	33	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Minimum	32	32	32	32	32	32	32	32	32	32	33	33	33	32	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
February																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	--	--	--	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	32	32	--	--	--	33
March																																
Maximum	32	32	32	32	32	32	33	33	33	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Minimum	32	32	32	32	32	32	32	33	33	33	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
April																																
Maximum	33	33	33	33	33	33	33	33	33	34	36	37	37	36	36	36	36	36	38	39	39	39	39	40	40	40	40	40	38	41	--	36
Minimum	33	33	33	33	33	33	33	33	33	33	34	35	35	34	36	36	35	34	33	35	37	37	37	38	36	37	38	38	36	35	--	35
May																																
Maximum	40	42	42	42	42	44	44	42	42	42	39	42	42	45	44	43	46	47	45	46	46	44	40	40	42	45	44	45	39	41	41	43
Minimum	37	37	36	36	36	36	38	38	39	39	39	39	39	39	39	39	36	36	38	37	37	39	37	37	36	36	38	37	38	37	38	38
June																																
Maximum	43	41	40	39	39	41	44	46	44	44	43	40	41	43	45	44	48	46	42	42	47	45	42	41	42	43	43	41	47	48	--	43
Minimum	38	38	38	37	37	37	37	39	39	39	39	39	39	40	40	41	41	40	40	40	41	42	40	39	39	40	39	37	40	40	--	39
July																																
Maximum	47	45	42	45	44	42	41	44	45	43	40	39	40	42	41	39	39	39	40	38	39	43	40	39	40	42	41	42	42	40	39	41
Minimum	42	42	42	42	40	40	40	39	40	40	39	38	38	39	39	39	39	38	39	37	37	37	38	39	38	38	37	39	37	39	39	39
August																																
Maximum	39	39	39	38	38	38	38	38	39	41	41	41	40	41	39	38	39	39	39	39	41	41	41	42	40	39	41	40	40	41	41	40
Minimum	38	38	38	38	38	38	38	38	36	36	37	38	38	38	38	38	39	39	39	39	39	38	38	38	38	39	39	37	37	38	38	38
September																																
Maximum	40	40	39	39	39	39	39	39	38	38	38	38	38	38	38	37	37	38	38	38	38	38	39	38	39	39	40	38	39	39	--	38
Minimum	38	39	39	39	39	39	39	38	38	38	38	38	38	38	37	37	37	37	38	38	38	38	37	38	38	39	39	39	39	39	--	38

SOUTHEASTERN ALASKA--Continued

15-564. CHILKAT RIVER AT GORGE, NEAR KLUKWAN, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	39	39	38	38	38	37	39	39	39	38	38	38	38	38	39	39	38	38	38	37	38	38	38	38	37	37	37	36	36	36	36	38
Minimum	39	38	37	36	36	36	37	39	38	37	37	38	38	37	37	38	38	38	37	37	37	38	38	37	36	36	36	36	36	36	36	37
November																																
Maximum	37	37	37	36	35	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	--	34
Minimum	36	37	36	35	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	--	34
December																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
January																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	32	33
Minimum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	32	33
February																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
April																																
Maximum	34	34	34	34	34	34	34	34	35	35	36	37	38	38	40	40	40	40	40	40	42	42	41	41	41	41	41	42	43	43	--	38
Minimum	34	34	34	34	34	34	34	34	34	35	35	36	37	36	37	37	38	38	39	38	38	38	39	40	38	38	38	39	37	38	--	36
May																																
Maximum	43	44	44	44	46	46	43	42	42	42	41	43	46	46	43	46	48	48	50	48	44	44	48	48	47	48	49	50	49	48	47	46
Minimum	38	40	40	40	40	42	42	40	40	38	40	38	40	43	41	42	41	44	42	41	41	41	40	40	42	42	41	40	39	39	39	41
June																																
Maximum	45	43	43	42	41	45	45	44	43	41	43	44	42	42	43	43	44	43	42	42	41	41	45	43	41	40	44	44	41	41	--	43
Minimum	38	40	40	37	39	39	39	40	39	39	39	38	39	39	39	38	40	40	40	40	40	38	38	40	40	40	40	40	40	40	--	39
July																																
Maximum	41	41	40	43	42	45	44	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	40	40	40	40	40	40	40	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August																																
Maximum	--	--	--	--	--	42	42	42	40	39	43	41	39	39	39	40	40	39	39	40	40	41	40	39	40	40	41	40	42	40	40	40
Minimum	--	--	--	--	--	39	39	39	39	39	39	39	39	38	38	38	39	39	39	39	39	38	39	39	39	39	39	38	38	38	39	39
September																																
Maximum	42	41	41	41	39	39	41	--	--	--	--	--	--	--	--	--	37	38	39	39	39	38	39	39	39	39	39	39	38	38	--	--
Minimum	38	37	37	38	37	39	37	--	--	--	--	--	--	--	--	--	37	37	38	39	38	38	38	37	36	38	39	38	38	38	--	--

SOUTHEASTERN ALASKA--Continued

15-850. SALTERY CREEK NEAR KASAAN, ALASKA

LOCATION.--Temperature recorder at gaging station, on Prince of Wales Island, 0.1 mile upstream from mouth at Saltery Cove, 0.2 mile downstream from small unnamed lake, and 10 miles southeast of Kasaan.
DRAINAGE AREA.--5.53 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1962 to September 1964 (discontinued).
EXTREMES, 1962-63.--Water temperatures: Maximum, 72°F July 8; minimum, 35°F Jan. 4, 5, 11.
EXTREMES, 1963-64.--Water temperatures: Maximum, 67°F Aug. 11-13; minimum, freezing point Dec. 29.

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

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
June																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	59	60	60	60	59	59	59	61	61	61	61	61	60	60	60	61	60	60	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	59	59	60	59	59	58	59	59	61	61	61	60	59	60	60	60	60	60	--	--
July																																
Maximum	60	59	59	60	62	64	64	64	64	64	63	63	62	61	60	60	59	60	60	60	60	60	61	62	62	63	63	63	64	64	65	62
Minimum	59	59	59	59	60	62	63	63	63	63	63	62	62	60	60	60	59	59	60	60	60	60	60	61	61	61	62	62	62	62	63	61
August																																
Maximum	64	63	64	64	64	62	62	62	62	69	58	58	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	63	62	63	63	62	62	61	61	69	59	58	58	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

15-850. SALTERY CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1962 to September 1963

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

SOUTHEASTERN ALASKA--Continued

15-850. SALTERY CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

15-853. CABIN CREEK NEAR KASAAN, ALASKA

LOCATION.--Temperature recorder at gaging station, on Prince of Wales Island, 200 feet upstream from mouth, at Skowl Arm, 1 mile downstream from small unnamed lake, and 9 miles southeast of Kasaan.
DRAINAGE AREA.--8.83 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1962 to September 1964 (discontinued).
EXTREMES, June to September 1962.--Water temperatures: Maximum, 67°F Sept. 4.
EXTREMES, 1962-63.--Water temperatures: Maximum, 68°F July 6-9; minimum, 36°F on several days during December and January.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F on several days during July and August; minimum, 33°F on several days during January.

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

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
June																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	52	52	52	52	52	52	52	54	54	54	54	54	54	58	57	54	55	55	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	52	52	52	52	52	52	52	52	54	54	54	54	53	53	54	54	53	52	--	--
July																																
Maximum	52	53	53	55	57	57	57	59	59	59	59	58	58	58	57	55	54	57	56	56	56	56	59	59	60	61	63	63	63	64	64	58
Minimum	52	52	53	53	55	57	57	57	59	59	58	58	58	57	56	54	54	53	56	55	56	56	57	59	59	59	61	60	61	59	58	57
August																																
Maximum	64	60	63	62	62	60	60	60	58	58	58	58	58	56	54	54	55	54	53	52	60	55	54	56	57	55	54	57	63	64	65	58
Minimum	57	56	58	60	60	60	58	58	58	58	58	58	54	54	52	52	51	51	51	52	51	52	51	52	52	52	52	53	53	55	58	55
September																																
Maximum	63	63	64	67	61	64	54	55	57	55	53	52	52	50	51	49	51	51	52	52	54	54	52	53	53	53	51	51	50	48	--	54
Minimum	53	52	52	54	59	55	52	53	54	53	52	51	50	49	49	47	49	49	52	52	52	51	51	51	52	51	50	50	48	48	--	51

SOUTHEASTERN ALASKA--Continued

15-853. CABIN CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1962 to September 1963

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	49	49	47	48	48	47	46	46	46	45	49	50	50	50	47	46	46	46	46	44	44	43	43	44	44	44	44	45	46	47	46
Minimum	48	48	48	47	48	47	46	46	46	46	44	44	46	44	46	46	46	46	46	45	44	43	43	43	43	43	43	44	44	45	46	45
November																																
Maximum	47	48	47	47	46	46	45	44	44	44	45	48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	47	47	47	47	46	45	44	44	44	43	43	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December																																
Maximum	--	--	--	--	--	--	--	--	37	39	40	41	41	42	43	43	43	42	41	41	41	41	41	39	40	44	40	45	44	43	37	--
Minimum	--	--	--	--	--	--	--	--	37	38	39	40	41	41	42	43	42	41	41	41	41	41	40	38	38	38	38	36	36	36	36	--
January																																
Maximum	36	36	36	37	37	38	38	39	43	44	44	38	37	38	38	38	38	38	38	38	38	38	38	38	44	45	46	45	38	43	41	39
Minimum	36	36	36	36	36	37	38	37	36	36	36	37	37	37	38	38	38	38	38	38	38	38	38	38	38	39	39	38	37	37	37	37
February																																
Maximum	37	37	37	43	45	46	39	39	39	39	39	39	39	39	39	39	40	41	41	42	41	41	42	45	45	44	44	44	--	--	--	41
Minimum	37	37	37	37	37	37	38	39	39	39	39	39	39	39	39	39	39	40	41	41	41	41	41	42	44	44	44	44	--	--	--	40
March																																
Maximum	44	44	42	42	42	42	42	43	42	42	42	41	42	42	41	41	41	41	40	39	39	39	43	44	45	44	45	44	43	43	40	42
Minimum	44	42	42	42	41	41	41	41	42	41	41	41	41	41	41	40	40	40	40	38	38	38	38	39	40	40	40	39	40	39	39	40
April																																
Maximum	39	39	39	39	40	40	41	42	43	43	43	43	43	43	45	45	45	44	46	47	47	47	47	47	47	47	47	46	45	45	--	44
Minimum	39	39	39	39	39	39	39	40	40	41	41	40	42	43	43	43	43	42	42	44	44	47	47	47	47	47	46	45	45	44	--	43
May																																
Maximum	44	46	47	47	47	47	46	46	47	48	50	50	50	49	50	49	51	53	56	58	59	58	53	52	53	53	53	53	52	52	53	51
Minimum	44	44	46	46	47	46	46	46	46	47	48	49	49	49	49	49	49	51	53	51	51	51	51	49	51	50	52	52	52	52	52	49
June																																
Maximum	52	51	51	52	52	52	52	52	53	53	53	54	54	54	54	56	58	58	56	53	54	60	60	59	56	55	55	54	56	59	--	55
Minimum	51	51	50	51	51	51	51	51	51	52	52	51	51	52	53	54	56	55	54	51	53	54	54	54	53	53	53	53	53	54	--	52
July																																
Maximum	61	65	66	67	67	68	68	68	68	64	64	62	63	64	63	62	62	61	61	61	63	64	63	65	64	60	62	62	63	64	64	64
Minimum	59	61	64	63	63	62	60	60	60	60	62	61	60	60	62	62	62	60	59	59	57	57	58	58	59	59	59	61	58	58	59	60
August																																
Maximum	63	63	63	63	63	64	65	65	67	66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum	62	61	63	61	59	59	59	59	60	61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

15-853. CABIN CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	48	48	48	47	47	47	47	46	44	44	43	43	42	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	48	48	48	48	48	48	48	48	48	47	47	47	47	47	44	44	43	42	42	42	--
November																																
Maximum	46	46	42	46	46	41	41	40	40	40	40	40	40	42	45	46	45	42	38	37	36	35	35	35	35	35	35	35	35	35	--	40
Minimum	42	42	42	42	41	41	40	40	40	40	40	40	40	40	40	39	38	37	37	36	36	35	35	35	35	35	35	35	35	35	--	38
December																																
Maximum	39	40	37	37	37	37	37	37	36	36	36	36	35	36	40	40	41	41	36	35	35	35	35	35	35	35	40	41	37	37	37	37
Minimum	35	37	37	37	37	37	37	36	36	36	36	36	35	35	36	36	36	35	35	35	35	35	35	35	35	35	35	37	37	37	37	36
January																																
Maximum	37	37	37	37	37	37	37	37	37	37	36	36	36	35	35	39	40	40	35	34	33	33	33	33	41	40	42	42	41	41	36	37
Minimum	37	37	37	37	37	37	37	37	37	36	36	36	36	35	35	35	35	34	33	33	33	33	33	33	33	34	34	35	33	34	35	35
February																																
Maximum	35	35	35	35	35	35	35	36	36	36	36	36	36	36	36	41	37	37	37	37	37	37	36	36	36	41	41	42	41	--	--	37
Minimum	35	35	35	35	35	35	35	35	36	36	36	36	36	36	36	36	37	37	37	37	37	37	36	36	36	36	37	37	38	--	--	36
March																																
Maximum	41	37	37	37	38	38	37	37	37	37	37	41	42	42	42	42	38	37	37	37	37	37	37	37	36	40	40	40	40	37	37	38
Minimum	37	37	37	37	37	37	37	37	37	37	37	37	38	39	38	38	37	37	37	37	37	37	37	37	36	36	36	37	38	37	37	37
April																																
Maximum	37	38	38	38	38	39	39	40	40	40	41	39	40	41	41	41	40	41	40	40	40	41	41	41	42	42	42	43	44	42	--	40
Minimum	37	37	37	37	37	38	39	39	39	39	40	39	39	39	38	39	39	40	40	40	40	40	41	41	42	42	42	41	41	41	--	39
May																																
Maximum	42	45	45	45	45	45	44	44	44	43	43	43	44	44	44	43	43	43	43	43	44	44	44	47	45	44	47	47	46	46	46	44
Minimum	41	43	44	43	43	44	44	43	43	43	41	41	41	43	43	43	43	43	42	42	43	43	43	43	43	44	44	45	44	45	45	43
June																																
Maximum	46	45	44	44	44	47	48	50	54	52	51	51	50	50	50	51	51	51	53	51	49	49	48	49	51	50	56	56	53	53	--	50
Minimum	45	45	44	44	44	46	45	46	47	48	49	49	50	49	49	50	51	51	51	49	49	48	48	48	49	50	50	52	52	52	--	48
July																																
Maximum	53	53	52	52	52	52	51	51	51	51	51	52	53	57	57	56	58	58	56	57	57	56	55	54	54	56	56	55	56	56	55	54
Minimum	52	52	52	52	52	52	52	51	51	51	51	51	52	53	56	55	55	56	55	55	56	55	54	54	54	53	55	55	55	56	55	53
August																																
Maximum	55	55	57	57	56	57	57	56	58	58	58	58	57	57	57	56	55	55	54	56	56	54	58	58	57	56	54	54	54	53	54	56
Minimum	55	55	55	56	56	56	55	55	55	55	55	57	57	57	56	55	55	54	54	54	56	54	55	56	55	54	54	54	54	53	53	55
September																																
Maximum	55	56	56	55	55	55	55	55	55	56	55	54	52	52	52	52	51	50	49	49	49	49	49	49	49	48	48	48	48	48	--	52
Minimum	54	53	53	54	53	54	53	52	52	52	52	52	52	52	52	51	50	50	49	49	49	49	49	49	48	48	48	48	48	47	--	51

SOUTHEASTERN ALASKA--Continued

15-854. VIRGINIA CREEK NEAR KASAAN, ALASKA

LOCATION.--Temperature recorder at gaging station on Prince of Wales Island, 100 feet upstream from mouth, at Skowl Arm, 0.8 mile downstream from unnamed pond, and 7.5 miles south of Kasaan.
DRAINAGE AREA.--3.08 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1962 to September 1964 (discontinued).
EXTREMES, June to September 1962.--Water temperatures: Maximum, 61°F Aug. 31.
EXTREMES, 1962-63.--Water temperatures: Maximum, 70°F Sept. 10; minimum, freezing point on many days during winter months.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F on several days during June; minimum, freezing point on many days during winter months.

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

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
June																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	53	54	54	54	54	54	54	55	55	55	55	55	56	57	57	57	56	55	--	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	53	53	54	54	53	53	53	54	55	55	55	55	55	56	57	56	55	54	--	--
July																																
Maximum	54	54	54	56	57	55	56	56	57	57	57	55	55	55	55	53	54	55	57	56	55	55	58	58	57	57	57	57	57	57	57	56
Minimum	54	54	54	54	56	57	56	56	57	57	57	55	55	55	54	53	53	54	57	55	55	55	55	55	57	57	57	57	57	57	57	56
August																																
Maximum	57	59	59	59	59	58	57	57	55	55	53	54	59	58	58	59	59	59	57	55	60	59	56	58	58	58	55	58	59	60	61	58
Minimum	57	57	59	59	58	57	57	55	55	54	53	53	54	53	57	55	55	56	55	54	55	55	55	56	55	52	54	54	56	59	60	56
September																																
Maximum	60	57	55	55	57	58	56	56	56	54	53	50	49	50	49	51	53	55	57	58	58	56	53	54	54	55	52	50	50	49	--	54
Minimum	57	55	53	53	55	56	53	53	52	50	46	48	49	48	47	47	51	53	55	56	55	52	52	53	54	53	49	49	49	48	--	52

15-854. VIRGINIA CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1962 to September 1963

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

SOUTHEASTERN ALASKA--Continued

15-854. VIRGINIA CREEK NEAR KASAAN, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

15-866. BIG CREEK NEAR POINT BAKER, ALASKA

LOCATION.--Temperature recorder at gaging station, 1 mile upstream from mouth at Whale Passage, 2.5 miles downstream from small lake, and 24 miles southeast of Point Baker.
DRAINAGE AREA.--11.2 square miles.
RECORDS AVAILABLE.--Water temperatures: August 1963 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 64°F June 9; minimum, 33°F Dec. 17, 18, Jan. 24, 25.

Temperature (°F) of water, August to September 1963

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	
August																																
Maximum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61	61	--
Minimum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	60	59	--
September																																
Maximum	61	60	60	60	59	58	59	59	59	59	59	59	59	58	58	58	58	57	57	57	57	57	57	57	57	57	57	57	57	57	--	58
Minimum	60	60	60	58	58	58	58	58	59	59	58	58	58	58	58	58	57	57	57	57	57	57	57	57	57	57	57	56	57	57	--	58

SOUTHEASTERN ALASKA--Continued

15-866. BIG CREEK NEAR POINT BAKER, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	46	45	45	45	45	45	47
Minimum	48	48	48	48	47	46	46	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	46	45	45	45	45	45	45	47
November																																
Maximum	44	44	44	43	43	42	42	42	42	42	42	42	42	41	40	39	37	35	34	34	34	34	34	34	35	36	36	36	36	36	--	39
Minimum	44	44	44	43	43	42	42	42	42	42	42	42	41	40	39	37	35	34	34	34	34	34	34	34	34	35	36	35	36	36	--	38
December																																
Maximum	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	34	34	34	35	35	35	35	36	36	36	36	36	36	36	36	37	36
Minimum	36	36	36	36	36	36	36	36	36	36	36	36	36	35	34	34	33	33	34	35	35	35	35	36	36	36	36	36	36	36	36	35
January																																
Maximum	37	37	37	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	34	34	34	34	34	35	35	35	36	36	36
Minimum	37	37	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	34	34	34	33	33	34	34	35	35	35	36	35
February																																
Maximum	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	37	37	37	37	36	37	37	36	36	--	--	36
Minimum	36	36	36	36	36	34	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36	37	37	37	37	37	37	36	36	--	--	36
March																																
Maximum	37	37	37	38	38	37	37	36	36	37	37	36	36	37	36	36	36	37	36	36	36	36	36	36	37	36	36	36	36	37	37	37
Minimum	36	37	36	37	37	37	36	35	36	36	37	36	36	36	34	34	36	36	36	36	36	35	35	35	35	36	36	36	36	37	37	36
April																																
Maximum	37	37	37	38	38	38	38	39	39	38	38	38	38	38	39	39	39	41	41	40	42	43	42	42	42	43	43	43	44	42	--	40
Minimum	37	37	37	37	38	38	38	38	39	38	38	38	38	38	38	38	38	41	40	40	40	41	42	42	42	43	42	42	42	41	--	39
May																																
Maximum	45	45	45	46	47	46	46	46	45	45	45	46	48	46	46	48	48	48	48	48	49	48	49	50	49	49	53	55	56	57	61	48
Minimum	42	43	43	43	44	46	46	45	45	45	44	44	45	47	46	46	47	47	47	47	48	47	47	47	49	48	49	50	52	53	57	47
June																																
Maximum	60	59	60	58	57	57	59	62	64	62	62	63	61	57	59	62	60	58	57	57	56	56	54	52	53	55	56	56	56	55	--	58
Minimum	58	58	57	56	55	55	56	56	58	60	58	58	57	56	55	56	58	57	56	55	54	53	52	52	52	53	53	55	55	54	--	56
July																																
Maximum	55	55	54	53	53	57	56	56	55	54	52	52	55	58	57	57	56	58	57	57	57	57	55	54	54	55	55	51	54	54	54	55
Minimum	54	55	53	52	53	53	54	53	54	52	52	52	52	54	56	56	55	54	56	55	56	55	54	52	53	53	51	51	51	54	54	54
August																																
Maximum	54	56	58	58	57	57	57	56	56	56	57	56	53	53	51	51	52	52	52	52	53	54	55	55	52	52	53	53	53	54	55	54
Minimum	53	54	54	56	55	55	56	53	54	55	54	52	52	51	51	51	51	52	52	52	52	52	52	52	52	52	52	53	53	53	54	53
September																																
Maximum	56	56	56	56	55	56	55	54	53	53	53	52	52	51	51	51	52	52	51	51	51	51	51	51	51	51	51	50	50	50	--	52
Minimum	54	53	53	54	53	55	53	51	51	55	50	51	51	51	51	51	51	51	51	51	51	51	51	51	50	51	50	50	50	50	--	52

15-2080. TONSINA RIVER AT TONSINA, ALASKA

LOCATION.--At gaging station, near left bank on downstream side of bridge on Richardson Highway at Tonsina, 0.4 mile upstream from Bernard Creek, and 0.6 mile upstream from Squirrel Creek.
DRAINAGE AREA.--420 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1950 to September 1954, May to August 1956, October 1957 to September 1964.
Water temperatures: June to October 1953, May 1959 to September 1964.
Sediment records: May 1953 to July 1963 (periodic).
EXTREMES, 1963-64.--Water temperatures: Maximum, 55°F July 29.
EXTREMES, 1959-64.--Water temperatures: Maximum, 66°F Aug. 18, 1961.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-10, 1963.....	469	4.3	0.08	12	1.0	1.4	0.5	36	4.0	1.5	0.1	0.0	43	33	3	74	7.1	30
Oct. 11-18.....	380	4.2	.07	12	.7	1.5	.4	38	5.0	1.0	.1	.1	44	33	2	75	7.5	20
Oct. 19-31.....	263	4.9	.03	14	.2	1.6	--	37	5.5	2.0	.0	.4	47	35	5	81	7.7	5
Nov. 1-4.....	160	5.3	.03	14	1.2	1.6	--	43	5.5	2.0	.0	.3	51	39	5	85	7.6	5
Apr. 3-20, 1964.....	130	7.2	.03	18	1.9	2.8	--	56	6.0	2.5	.0	.3	67	52	6	117	7.9	5
Apr. 25-30.....	130	7.4	.00	17	3.3	3.1	.4	61	7.2	2.1	.0	.3	71	56	6	116	7.3	5
May 1-20.....	186	7.6	.00	14	5.1	3.1	.5	62	8.6	2.1	.0	.8	73	56	5	117	7.2	5
May 21-31.....	673	6.0	.06	12	3.2	2.0	.9	46	7.7	1.4	.1	.9	57	43	5	96	6.7	30
June 1-10.....	2220	5.0	.04	10	1.2	1.6	.5	32	3.4	1.4	.0	.8	40	30	4	66	6.9	30
June 11-20.....	4380	3.8	.02	7.6	1.7	1.6	.2	26	5.2	1.4	.0	.6	35	26	5	60	6.7	10
June 21-30.....	3620	3.8	.00	10	.7	1.6	.2	27	6.2	1.4	.0	.5	37	28	6	61	7.1	5
July 1-31.....	2950	4.3	.02	10	1.7	1.9	1.0	30	8.2	1.8	.1	.3	44	32	7	69	6.9	10
Aug. 1-31.....	1920	4.1	.00	7.2	3.2	1.6	1.6	27	8.1	2.1	.0	.9	42	31	9	66	7.0	10
Sept. 1-30.....	867	4.1	.04	11	1.3	1.9	.8	34	7.2	2.1	.1	.2	46	33	5	76	7.2	10

ALASKA WEST OF LONGITUDE 141°--Continued

15-2080. TONSINA RIVER AT TONSINA, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-2120. COPPER RIVER NEAR CHITINA, ALASKA

LOCATION.--At gaging station on right bank, at head of Woods Canyon, 0.5 mile downstream from Taral Creek, 2.2 miles upstream from Tenas Creek, and 3.5 miles south of Chitina.
DRAINAGE AREA.--20,600 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: June to November 1950, January 1954 to March 1957, June to September 1957.
Water temperatures: June to September 1957.
Sediment records: January to September 1956 (periodic), June to September 1957 (daily), May to July 1963 (weekly), October 1963 to September 1964 (daily).
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, 3,400 ppm Aug. 9, 11.
Sediment loads: Maximum daily, 1,100,000 tons Aug. 3, 4.

Suspended sediment, water year October 1963 to September 1964
(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	27800		15000	C 7300		1600	C 5800		470
2	27500		15000	C 7300		1600	C 5800		470
3	26300		14000	C 7300		1600	C 5800		470
4	25100		14000	C 7300		1600	C 5800		470
5	23800		13000	C 7300		1600	C 5800		470
6	22600		12000	C 7300		1600	C 5800		470
7	22700		12000	C 7300		1600	C 5800		470
8	23700		13000	C 7300		1600	C 5800		470
9	23200		13000	C 7300		1600	C 5800		470
10	21900		12000	C 7300		1600	C 5800		470
11	20900		11000	C 7300		1600	C 5800		470
12	19900		11000	C 7300		1600	C 5800		470
13	18900		10000	C 7300		1600	C 5800		470
14	18200		9800	C 7300		1600	C 5800		470
15	17700		9600	C 7300		1600	C 5800		470
16	18200		7400	C 5700		620	C 5800		470
17	18400		7500	C 5700		620	C 5800		470
18	17500		7100	C 5700		620	C 5800		470
19	16400		6600	C 5700		620	C 5800		470
20	15500		6300	C 5700		620	C 5800		470
21	14800		6000	C 5700		620	C 5800		470
22	14500		5900	C 5700		620	C 5800		470
23	14400		5800	C 5700		620	C 5800		470
24	13800		5600	C 5700		620	C 5800		470
25	13400		5400	C 5700		620	C 5800		470
26	12800		5200	C 5700		620	C 5800		470
27	12100		4900	C 5700		620	C 5800		470
28	11400		4600	C 5700		620	C 5800		470
29	11000		4500	C 5700		620	C 5800		470
30	10000		4000	C 5700		620	C 5800		470
31	9800		4000	--		--	C 5800		470
Total	564200		275200	195000		33300	179800		14570

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2120. COPPER RIVER NEAR CHITINA, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	C 5500		370	C 5600		380	C 5300		290
2	C 5500		370	C 5600		380	C 5300		290
3	C 5500		370	C 5600		380	C 5300		290
4	C 5500		370	C 5600		380	C 5300		290
5	C 5500		370	C 5600		380	C 5300		290
6	C 5500		370	C 5600		380	C 5300		290
7	C 5500		370	C 5600		380	C 5300		290
8	C 5500		370	C 5600		380	C 5300		290
9	C 5500		370	C 5600		380	C 5300		290
10	C 5500		370	C 5600		380	C 5300		290
11	C 5500		370	C 5600		380	C 5300		290
12	C 5500		370	C 5600		380	C 5300		290
13	C 5500		370	C 5600		380	C 5300		290
14	C 5500		370	C 5600		380	C 5300		290
15	C 5500		370	C 5600		380	C 5300		290
16	C 5500		370	C 5600		380	C 5300		290
17	C 5500		370	C 5600		380	C 5300		290
18	C 5500		370	C 5600		380	C 5300		290
19	C 5500		370	C 5600		380	C 5300		290
20	C 5500		370	C 5600		380	C 5300		290
21	C 5500		370	C 5600		380	C 5300		290
22	C 5500		370	C 5600		380	C 5300		290
23	C 5500		370	C 5600		380	C 5300		290
24	C 5500		370	C 5600		380	C 5300		290
25	C 5500		370	C 5600		380	C 5300		290
26	C 5500		370	C 5600		380	C 5300		290
27	C 5500		370	C 5600		380	C 5300		290
28	C 5500		370	C 5600		380	C 5300		290
29	C 5500		370	C 5600		380	C 5300		290
30	C 5500		370	--		--	C 5300		290
31	C 5500		370	--		--	C 5300		290
Total	170500		11470	162400		11020	164300		8990

Day	APRIL			MAY			JUNE		
1	C 6600		530	C 8000	--	1700	76800	3600	750000
2	C 6600		530	C 8000	--	1700	81000	3400	740000
3	C 6600		530	C 8000	--	1700	88600	3200	770000
4	C 6600		530	C 8000	--	1700	88300	2900	690000
5	C 6600		530	C 8000	--	1700	98700	3100	830000
6	C 6600		530	C 8000	--	1700	99800	2500	670000
7	C 6600		530	C 8000	--	1700	101000	2300	630000
8	C 6600		530	C 8000	--	1700	109000	2400	710000
9	C 6600		530	C 8000	--	1700	118000	2400	760000
10	C 6600		530	C 8000	--	1700	121000	2200	720000
11	C 6600		530	C 8000	--	1700	122000	2200	720000
12	C 6600		530	C 8000	--	1700	119000	2000	640000
13	C 6600		530	C 8000	--	1700	115000	1800	560000
14	C 6600		530	C 8000	--	1700	119000	2500	800000
15	C 6600		530	C 8000	--	1700	113000	2300	700000
16	C 7400		1000	C 17000	--	6900	108000	2000	580000
17	C 7400		1000	C 17000	--	6900	108000	2100	640000
18	C 7400		1000	C 17000	--	6900	112000	2000	600000
19	C 7400		1000	C 17000	--	6900	113000	2000	610000
20	C 7400		1000	C 17000	--	6900	114000	2000	620000
21	C 7400		1000	C 17000	--	6900	107000	2100	610000
22	C 7400		1000	C 17000	--	6900	101000	2000	550000
23	C 7400		1000	C 17000	--	6900	102000	1800	500000
24	C 7400		1000	C 17000	--	6900	108000	2000	580000
25	C 7400		1000	C 17000	--	6900	116000	1600	500000
26	C 7400		1000	C 17000	--	6900	126000	1300	440000
27	C 7400		1000	C 17000	--	6900	125000	1400	A 470000
28	C 7400		1000	25200	300	20000	124000	1500	500000
29	C 7400		1000	31000	1000	84000	117000	1500	470000
30	C 7400		1000	42800	1200	140000	111000	1600	450000
31	--		--	54400	1500	220000	--	--	--
Total	210000		22950	477400	--	572300	3262200	--	18810000

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-2120. COPPER RIVER NEAR CHITINA, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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..	105000	1500	430000	116000	2900	910000	62400	--	140000
2..	101000	1600	410000	119000	2900	930000	61800	--	140000
3..	97600	1500	400000	126000	3300	1100000	62100	--	140000
4..	93100	1300	330000	126000	3300	1100000	63800	--	150000
5..	92600	1200	300000	117000	3000	950000	63800	--	150000
6..	94000	1400	360000	112000	2600	790000	62300	--	140000
7..	94400	1600 A	410000	107000	2200	610000	59000	--	140000
8..	96000	1800 A	470000	107000	2000	580000	56000	--	130000
9..	99000	1800	480000	109000	3400	1000000	53000	--	120000
10..	102000	2000	550000	107000	3300	950000	50000	--	110000
11..	106000	2100	630000	108000	3400	850000	47000	--	110000
12..	115000	2000	650000	106000	3200	740000	46000	--	110000
13..	112000	2100	600000	99800	2900	780000	45000	--	100000
14..	108000	2000	580000	92600	2200	550000	45000	--	100000
15..	109000	1900 A	560000	88100	1800	430000	44000	--	100000
16..	110000	1800	530000	85000	2000	460000	45000	--	63000
17..	112000	1900	570000	84000	1800	410000	42000	--	59000
18..	114000	2000	620000	83600	2000	450000	40000	--	56000
19..	115000	2900	870000	77800	1600	340000	38000	--	53000
20..	112000	3100	940000	71800	1400	250000	36000	--	51000
21..	110000	3000	890000	68800	1500	280000	34000	--	48000
22..	110000	3000 A	890000	67100	1300	240000	32000	--	45000
23..	109000	2900 A	850000	66600	1000	180000	30000	--	42000
24..	105000	2800 A	790000	64900	1300	230000	29000	--	41000
25..	107000	2500 A	720000	64200	1300	230000	28000	--	39000
26..	109000	-- A	680000	64000	1100 A	190000	26000	--	37000
27..	111000	--	630000	64200	1500	260000	25000	--	35000
28..	106000	--	630000	63800	1400	240000	24300	230	15000
29..	104000	--	730000	60700	1100	180000	23400	200	13000
30..	110000	--	890000	59000	960	150000	22800	200	12000
31..	116000	--	1100000	59600	880 A	140000	--	--	--
Total	3284700	--	19490000	2745600	--	16500000	1296700	--	2489000

Total discharge for year (cfs-days)..... 12,712,800
Total load for year (tons)..... 58,238,800

A Computed from partly estimated-concentration graph.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2120. COPPER RIVER NEAR CHITINA, ALASKA--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 13, 1964.....	1815	51		116000	2000		13	20	26	35	46	57	71	90	99	100		SPWC
July 7.....	1200	49		95300	1100		20	28	37	47	53	60	70	88	99	100		SPWC
Aug. 30.....	1800	45		58600	890		19	31	36	45	52	58	65	84	99	100		SPWC
Sept. 28.....	1530	--		24400	230		--	--	--	--	--	51	58	82	99	100		S

15-2400. ANCHOR RIVER AT ANCHOR POINT, ALASKA

LOCATION.--At gaging station, near right bank on downstream side of Sterling Highway bridge at Anchor Point, 0.1 mile downstream from North Fork, and 1 mile upstream from mouth.
DRAINAGE AREA.--226 square miles.
RECORDS AVAILABLE.--Chemical analyses: May 1953 to September 1954, October 1957 to September 1964.
Water temperatures: May 1953 to September 1954, April 1959 to September 1964.
Sediment records: July 1953 to August 1954 (periodic).
EXTREMES, 1963-64.--Water temperatures: Maximum, 63°F July 31.
EXTREMES, 1959-64.--Water temperatures: Maximum, 69°F July 28, 1963.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 1-10, 1963.....	750	22	0.10	4.8	2.7	4.8	1.0	31	3.0	5.0	0.1	0.3	58	23	0	69	7.4	30
Oct. 11-20.....	582	22	.14	4.8	2.4	4.6	.9	28	2.0	5.0	.1	.3	56	22	0	64	7.3	30
Oct. 21-31.....	355	37	.12	5.0	3.3	5.3	1.1	36	2.0	5.0	.0	.4	77	26	0	75	7.1	20
Nov. 1-10.....	122	33	.14	5.6	3.9	5.5	1.4	41	2.0	5.5	.0	.3	77	30	0	84	7.4	10
Nov. 11-20.....	77	37	.14	6.6	4.3	6.7	1.8	49	1.0	5.5	.1	.4	88	34	0	98	7.3	10
Nov. 21-30.....	77	30	.14	5.6	2.9	5.3	1.4	36	1.0	5.5	.2	.2	70	26	0	81	7.2	20
Jan. 1-10, 1964.....	150	32	.03	7.6	3.2	6.1	--	46	1.0	5.0	.1	.4	78	32	0	88	7.2	15
Jan. 11-20.....	150	31	.03	8.0	3.2	6.2	--	49	1.0	5.0	.1	.8	79	33	0	97	7.3	10
Jan. 21-31.....	150	32	.03	7.2	3.4	5.0	--	44	1.0	5.0	.0	.5	76	32	0	85	7.4	15
Feb. 1-10.....	130	23	.03	6.0	2.9	5.2	--	34	1.5	6.5	.0	.4	62	27	0	73	7.4	15
Feb. 11-20.....	130	29	.10	7.2	3.2	6.6	--	41	1.5	6.5	.0	.3	74	31	0	94	7.4	20
Feb. 21-29.....	130	28	.09	8.0	3.6	6.9	--	51	1.0	5.0	.1	.4	78	35	0	102	7.6	15
Mar. 1-10.....	950	32	.13	8.4	4.1	6.4	--	54	1.0	6.0	.1	.5	85	38	0	105	7.5	15
Mar. 11-20.....	950	33	.09	9.2	3.6	6.6	--	55	1.0	5.5	.1	.6	87	38	0	106	7.7	15
Mar. 21-31.....	950	33	.07	9.6	4.1	7.7	--	59	1.0	6.5	.1	.6	92	41	0	120	7.5	15
Apr. 1-10.....	140	33	.07	10	4.6	7.8	--	62	1.0	6.5	.1	.4	94	44	0	123	7.5	15
Apr. 11-20.....	280	23	.12	8.4	3.4	6.8	--	49	1.5	7.0	.1	.4	75	35	0	104	7.3	25
Apr. 21-30.....	420	21	.28	7.2	3.6	6.0	--	44	2.0	6.5	.1	.4	69	33	0	93	7.7	25
May 1-12.....	909	15	.13	11	1.8	5.2	2.0	40	3.4	6.4	.0	.6	66	35	2	85	6.9	20
May 13-31.....	1570	12	.13	4.8	1.9	3.6	1.8	26	1.4	5.3	.0	.3	44	20	0	59	6.7	10
June 1-10.....	1390	17	.09	4.8	1.5	3.6	1.4	24	1.0	4.6	.0	.5	46	18	0	55	6.4	20
June 11-30.....	479	26	.11	6.4	4.1	5.4	1.5	43	1.0	5.3	.0	.3	71	35	0	83	7.0	10
July 1-31.....	366	24	.24	9.2	3.6	5.7	2.4	50	2.9	4.3	.1	.6	78	38	0	99	7.3	10
Aug. 1-31.....	230	26	.15	9.2	5.1	6.3	2.5	57	1.9	4.3	.1	.6	84	44	0	107	7.2	10
Sept. 1-30.....	188	27	.49	8.4	4.4	6.3	2.4	52	2.9	4.6	.1	.8	83	39	0	101	7.2	20

ALASKA WEST OF LONGITUDE 141°--Continued

15-2400. ANCHOR RIVER AT ANCHOR POINT, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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	41	42	42	40	41	40	40	39	40	40	40	39	40	40	39	39	37	45	44	46	37	32	32	32	32	32	32	32	32	32	32	38
November	32	32	32	33	32	32	32	32	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	32
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
April	32	32	32	32	32	32	33	34	34	34	34	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	32
May	32	32	32	32	32	32	32	33	33	33	33	34	35	35	36	37	37	34	32	--	--	40	--	--	--	--	40	40	43	51	42	36
June	48	42	34	44	--	42	42	43	34	42	40	45	43	46	45	42	--	--	--	45	49	--	46	47	43	53	53	42	--	--	--	--
July	--	48	46	47	49	47	50	55	52	55	53	50	55	48	52	53	55	54	58	60	61	62	56	51	55	54	53	56	58	61	63	54
August	60	62	54	57	58	59	60	60	60	60	57	55	58	60	59	56	53	53	52	53	55	51	50	51	52	55	50	53	54	55	55	56
September	55	54	54	53	54	51	52	52	51	52	52	51	52	50	50	50	50	49	49	48	43	44	42	44	45	40	42	42	43	--	--	49

ALASKA WEST OF LONGITUDE 141°--Continued

15-2416. NINILCHIK RIVER AT NINILCHIK, ALASKA

LOCATION.--At gaging station on downstream side of bridge, at mile post 137 Sterling Highway, at Ninilchik, and 1.1 miles upstream from mouth.
DRAINAGE AREA.--131 square miles.
RECORDS AVAILABLE.--Water temperatures: May to September 1963.
Sediment records: May 1963 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, 220 ppm May 5.
Sediment loads: Maximum daily, 240 tons May 8.
EXTREMES, May 1963 to September 1964.--Water temperatures (May to September 1963): Maximum, 62°F July 14, 1963.
Sediment concentrations: Maximum daily, 236 ppm Sept. 27, 1963.
Sediment loads: Maximum daily, 240 tons May 8, 1964.

Suspended sediment, water year October 1963 to September 1964
(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	114	17	5	94	2	0.5	C 47		0.8
2	108	17	5	70	2	.4	C 47		.8
3	97	14	4	C 43	6	.7	C 47		.8
4	88	11	3	C 43	--	.6	C 47		.8
5	80	11	2	C 43	--	.6	C 47		.8
6	247	59	39	C 43	--	.6	C 47		.8
7	394	60	64	C 43	--	.6	C 47		.8
8	334	33	30	C 43	--	.6	C 47		.8
9	230	24	15	C 43	--	.6	C 47		.8
10	201	22	12	C 43	--	.6	C 47		.8
11	177	11	5	C 43	--	.6	C 47		.8
12	135	19	7	C 43	--	.6	C 47		.8
13	116	35	11	C 43	--	.6	C 47		.8
14	128	43	15	C 43	--	.6	C 47		.8
15	137	41	15	C 43	--	.6	C 47		.8
16	256	22	15	C 34	--	.5	C 63		1
17	250	21	14	C 34	--	.5	C 63		1
18	217	16	9	C 34	--	.5	C 63		1
19	179	16	8	C 34	--	.5	C 63		1
20	137	15	6	C 34	--	.5	C 63		1
21	132	11	4	C 34	--	.5	C 63		1
22	124	11	4	C 34	--	.5	C 63		1
23	112	6	2	C 34	--	.5	C 63		1
24	108	7	2	C 34	--	.5	C 63		1
25	104	7	2	C 34	--	.5	C 63		1
26	87	4	.9	C 34	--	.5	C 63		1
27	74	6	1	C 34	--	.5	C 63		1
28	64	4	.7	C 34	--	.5	C 63		1
29	87	8	2	C 34	--	.5	C 63		1
30	87	13	3	C 34	--	.5	C 63		1
31	82	6	1	--	--	--	C 63		1
Total	4686	--	306.6	1233	--	16.3	1713	--	28

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2416. NINILCHIK RIVER AT NINILCHIK, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	C 64		1	C 67		0.9	C 62		0.7
2	C 64		1	C 67		.9	C 62		.7
3	C 64		1	C 67		.9	C 62		.7
4	C 64		1	C 67		.9	C 62		.7
5	C 64		1	C 67		.9	C 62		.7
6	C 64		1	C 67		.9	C 62		.7
7	C 64		1	C 67		.9	C 62		.7
8	C 64		1	C 67		.9	C 62		.7
9	C 64		1	C 67		.9	C 62		.7
10	C 64		1	C 67		.9	C 62		.7
11	C 64		1	C 67		.9	C 62		.7
12	C 64		1	C 67		.9	C 62		.7
13	C 64		1	C 67		.9	C 62		.7
14	C 64		1	C 67		.9	C 62		.7
15	C 64		1	C 67		.9	C 62		.7
16	C 58		.9	C 64		.9	C 50		.5
17	C 58		.9	C 64		.9	C 50		.5
18	C 58		.9	C 64		.9	C 50		.5
19	C 58		.9	C 64		.9	C 50		.5
20	C 58		.9	C 64		.9	C 50		.5
21	C 58		.9	C 64		.9	C 50		.5
22	C 58		.9	C 64		.9	C 50		.5
23	C 58		.9	C 64		.9	C 50		.5
24	C 58		.9	C 64		.9	C 50		.5
25	C 58		.9	C 64		.9	C 50		.5
26	C 58		.9	C 64		.9	C 50		.5
27	C 58		.9	C 64		.9	C 50		.5
28	C 58		.9	C 64		.9	C 50		.5
29	C 58		.9	C 64		.9	C 50		.5
30	C 58		.9	--		--	C 50		.5
31	C 58		.9	--		--	C 50		.5
Total	1888	--	29.4	1901	--	26.1	1730	--	18.5

Day	APRIL			MAY			JUNE		
1	C 76	--	2	300	48	39	555	60	90
2	C 76	--	2	310	66	55	650	49	86
3	C 76	--	2	330	52	46	605	33	54
4	C 76	--	2	350	86	81	470	30	38
5	C 76	--	2	380	220	230	356	23	22
6	C 76	--	2	430	140	160	305	26	21
7	C 76	--	2	555	140	210	229	21	13
8	C 76	--	2	630	140	240	205	20	11
9	C 76	--	2	500	100	140	298	46	37
10	C 76	--	2	288	56	44	333	66	59
11	C 76	--	2	229	40	A 25	260	35	24
12	C 76	--	2	263	37	26	205	34	19
13	C 76	--	2	376	26	26	175	17	8
14	C 76	--	2	470	48	61	165	16	7
15	C 76	11	2	555	61	91	160	17	7
16	C 200	32	15	455	66	81	150	10	4
17	C 200	17	9	396	37	40	143	20	8
18	C 200	18	10	380	41	42	146	12	5
19	C 200	30	16	372	27	27	143	10	4
20	C 200	23	12	326	31	27	141	9	3
21	C 200	23	12	340	30	28	135	8	3
22	C 200	37	20	340	34	31	128	7	2
23	C 200	47	25	316	30	26	125	5	2
24	C 200	18	10	316	46	39	120	4	1
25	C 200	36	19	470	68	86	121	4	1
26	C 200	20	11	380	38	39	150	11	4
27	C 200	56	30	330	29	26	141	6	2
28	C 200	29	16	326	30	26	148	7	3
29	C 200	32	17	333	34	31	196	20	10
30	C 200	68	37	356	42	40	172	10	5
31	--	--	--	408	47	52	--	--	--
Total	4140	--	289	11810	--	2115	7130	--	553

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-2416. NINILCHIK RIVER AT NINILCHIK, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	165	8	4	91	C 10	2	111	C 25	7
2	150	6	2	91	C 10	2	100	C 25	7
3	143	6	2	96	C 49	13	90	C 25	6
4	158	6	3	111	C 49	15	88	C 27	6
5	148	6	2	113	C 49	15	90	C 27	7
6	137	7	3	113	C 32	10	86	C 27	6
7	125	6	2	113	C 32	10	83	13	3
8	118	7	2	105	C 32	9	83	3	.7
9	126	16	5	104	C 22	6	82	5	1
10	121	6	2	105	C 22	6	82	36	8
11	116	5	2	106	C 22	6	83	2	.4
12	113	6	2	105	260	74	93	8	2
13	110	6	2	102	250	69	91	9	2
14	106	25	7	99	270	72	87	2	.5
15	105	10	3	96	230	60	88	4	1
16	104	10	3	96	C 41	11	88	3	.7
17	102	13	4	95	C 41	11	90	2	.5
18	99	9	2	93	22	6	90	2	.5
19	99	10	3	93	C 16	4	96	4	1
20	98	9	2	104	C 16	4	98	2	.5
21	98	10	A 3	114	C 34	10	99	3	.8
22	104	21	6	118	C 34	11	102	10	3
23	106	19	5	121	35	11	114	20	6
24	114	14	4	132	60	21	139	8	3
25	110	16	5	121	C 18	6	132	15	5
26	104	12	3	111	C 18	5	150	19	8
27	99	14	4	128	C 30	10	137	10 E	4
28	95	14	4	146	C 30	12	126	10 E	3
29	93	C 21	5	132	C 14	5	126	10 E	3
30	93	C 21	5	121	C 14	5	114	10 E	3
31	92	C 21	5	116	13	4	--	--	--
Total	3551	--	106	3391	--	505	3038	--	99.6

Total discharge for year (cfs-days)..... 46,211
Total load for year (tons)..... 4,092.7

E Estimated.
A Computed from partly estimated-concentration graph.
C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2480. TRAIL RIVER NEAR LAWING, ALASKA

LOCATION.--At gaging station, near center of stream on downstream end of pier at bridge site on old 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 1964.
Water temperatures: April 1959 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 52°F on several days during July and August; minimum, freezing point on many days during winter months.
EXTREMES, 1959-64.--Water temperatures: Maximum, 54°F June 16-18, 1959, July 11, 12, 1960, July 28, 1962.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-10, 1963.....	777	2.7	0.08	11	0.4	1.8	0.3	26	8.0	1.5	0.0	0.5	39	28	7	68	7.0	5
Oct. 11-20.....	608	2.3	.08	10	1.2	1.8	.3	28	8.0	1.5	.0	.5	40	30	7	70	7.2	5
Oct. 21-31.....	467	2.5	.14	11	.7	1.8	.3	30	8.0	1.5	.0	.6	42	31	6	72	7.3	5
Nov. 1-10.....	350	2.3	.08	12	.7	1.8	.3	30	9.0	1.5	.0	.9	44	33	8	74	7.4	5
Nov. 11-20.....	213	2.7	.10	13	.5	1.8	.4	32	9.0	1.5	.0	.8	46	34	8	87	7.0	5
Nov. 21-30.....	134	3.4	.10	14	.7	1.9	.4	34	11	1.5	.0	.8	51	38	10	88	7.0	5
Dec. 1-10.....	245	3.2	.10	13	.7	2.3	.4	33	11	1.5	.0	1.0	49	36	9	85	7.2	5
Jan. 1-31, 1964.....	175	3.6	.02	16	1.7	1.3	.4	40	13	2.1	.0	.3	58	47	14	96	7.3	5
Feb. 1-29.....	127	3.6	.04	17	1.8	1.4	.4	41	13	2.5	.0	.3	60	50	16	98	7.2	5
Mar. 1-31.....	88.1	3.6	.02	17	.9	2.2	.4	41	12	2.5	.0	.3	59	46	12	99	7.1	5
Apr. 1-30.....	303	2.5	.04	18	1.0	1.5	.4	44	12	2.5	.0	.6	60	49	13	106	7.3	5
May 1-31.....	488	2.5	.00	18	1.5	1.6	.4	44	12	2.5	.0	.6	61	51	15	104	7.0	5
June 1-30.....	2340	2.6	.00	14	1.0	1.3	.4	37	11	1.8	.0	.5	58	39	9	84	7.1	5
July 1-31.....	2010	7.5	.02	11	1.6	1.8	.4	29	11	2.1	.0	.4	50	34	10	75	7.1	5
Aug. 1-31.....	2040	2.8	.06	11	2.3	1.2	--	27	12	1.8	.1	.5	45	37	15	72	7.1	10
Sept. 1-30.....	1090	2.7	.06	12	1.7	1.7	--	29	15	1.4	.1	.2	49	37	13	77	7.2	10

15-2480. TRAIL RIVER NEAR LAWING, ALASKA--Continued

Temperature (°F) of water, water year October 1963 to September 1964

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-2810. KNIK RIVER NEAR PALMER, ALASKA

LOCATION.--At gaging station near center of span on downstream side of bridge on Glenn Highway, and 7 miles south of Palmer.
DRAINAGE AREA.--1,180 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to August 1958, May to August 1964.
Water temperatures: May to September 1963.
Sediment records: July 1953 to August 1956, July, August 1961, May 1962 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, 4,100 ppm June 28.
Sediment loads: Maximum daily, 950,000 tons June 30.
EXTREMES, 1962-64.--Water temperatures (May to September 1963): Maximum, 46°F May 5, July 30, 1963.
Sediment concentrations: Maximum daily, 6,290 ppm June 27, 1962.
Sediment loads: Maximum daily, 950,000 tons June 30, 1964.

Chemical analyses, in parts per million, May to August 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
May 1-31, 1964.....	1130	5.1	0.04	40	6.6	4.6	0.9	102	43	2.8	0.0	1.2	154	127	77	252	8.0	5
June 1-24.....	4940	3.5	.04	31	3.8	2.4	.8	73	36	1.8	.0	.9	116	93	57	197	7.8	5
June 25-30.....	38350	4.2	.02	26	3.4	2.1	.6	65	28	1.8	.1	.6	99	79	47	163	7.5	5
July 1-31.....	26930	3.4	.02	19	3.0	2.0	.4	54	18	1.8	.1	.5	75	60	33	121	7.4	5
Aug. 1-31.....	18230	2.0	.02	17	3.0	1.7	1.4	46	15	1.4	.0	.4	65	55	32	106	7.2	5

ALASKA WEST OF LONGITUDE 141°--Continued

15-2810. KNIK RIVER NEAR PALMER, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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	8120		5500	2880		700	C 1300		110
2	7310		4900	2880		700	C 1300		110
3	6480		4400	2880		700	C 1300		110
4	5530		3700	2370		580	C 1300		110
5	4960		3300	C 1500		360	C 1300		110
6	5270		3600	C 1500		360	C 1300		110
7	6440		4300	C 1500		360	C 1300		110
8	6510		4400	C 1500		360	C 1300		110
9	6230		4200	C 1500		360	C 1300		110
10	5570		3800	C 1500		360	C 1300		110
11	4930		3300	C 1500		360	C 1300		110
12	4150		2800	C 1500		360	C 1300		110
13	3830		2600	C 1500		360	C 1300		110
14	3650		2500	C 1500		360	C 1300		110
15	4010		2700	C 1500		360	C 1300		110
16	4120		1700	C 730		140	C 1100		59
17	4010		1600	C 730		140	C 1100		59
18	3700		1500	C 730		140	C 1100		59
19	3520		1400	C 730		140	C 1100		59
20	3750		1500	C 730		140	C 1100		59
21	3540		1400	C 730		140	C 1100		59
22	3180		1300	C 730		140	C 1100		59
23	2920		1200	C 730		140	C 1100		59
24	2610		1100	C 730		140	C 1100		59
25	2450		990	C 730		140	C 1100		59
26	2290		930	C 730		140	C 1100		59
27	2570		1000	C 730		140	C 1100		59
28	2490		1000	C 730		140	C 1100		59
29	2590		1000	C 730		140	C 1100		59
30	2770		1100	C 730		140	C 1100		59
31	2920		1200	--		--	C 1100		59
Total	132420	--	75920	38460	--	8740	37100	--	2594

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 930		38	C 610		16	C 490		13
2	C 930		38	C 610		16	C 490		13
3	C 930		38	C 610		16	C 490		13
4	C 930		38	C 610		16	C 490		13
5	C 930		38	C 610		16	C 490		13
6	C 930		38	C 610		16	C 490		13
7	C 930		38	C 610		16	C 490		13
8	C 930		38	C 610		16	C 490		13
9	C 930		38	C 610		16	C 490		13
10	C 930		38	C 610		16	C 490		13
11	C 930		38	C 610		16	C 490		13
12	C 930		38	C 610		16	C 490		13
13	C 930		38	C 610		16	C 490		13
14	C 930		38	C 610		16	C 490		13
15	C 930		38	C 610		16	C 490		13
16	C 750		30	C 460		12	C 460		12
17	C 750		30	C 460		12	C 460		12
18	C 750		30	C 460		12	C 460		12
19	C 750		30	C 460		12	C 460		12
20	C 750		30	C 460		12	C 460		12
21	C 750		30	C 460		12	C 460		12
22	C 750		30	C 460		12	C 460		12
23	C 750		30	C 460		12	C 460		12
24	C 750		30	C 460		12	C 460		12
25	C 750		30	C 460		12	C 460		12
26	C 750		30	C 460		12	C 460		12
27	C 750		30	C 460		12	C 460		12
28	C 750		30	C 460		12	C 460		12
29	C 750		30	C 460		12	C 460		12
30	C 750		30	--		--	C 460		12
31	C 750		30	--		--	C 460		12
Total	25950	--	1050	15590	--	408	14710	--	387

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2810. KNIK RIVER NEAR PALMER, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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..	C 1300		70	810	90	200	3080	990	8200
2..	C 1300		70	820	120 A	270	3460	1200	11000
3..	C 1300		70	820	140	310	3770	1200	12000
4..	C 1300		70	830	80	180	3570	1100	11000
5..	C 1300		70	850	90	210	3980	1700	18000
6..	C 1300		70	746	80	160	4000	3800	41000
7..	C 1300		70	820	60	130	3840	2500	26000
8..	C 1300		70	910	110	270	4450	1600	19000
9..	C 1300		70	850	120	280	4620	2200	27000
10..	C 1300		70	940	140	360	4450	1600	19000
11..	C 1300		70	800	80	170	4250	1200	14000
12..	C 1300		70	890	70	170	4950	1500	20000
13..	C 1300		70	980	130	340	5680	3300	51000
14..	C 1300		70	1000	130	350	6040	3200	52000
15..	C 1300		70	1040	120	340	5980	1900	31000
16..	C 1100		180	1080	130	380	5860	1800	28000
17..	C 1100		180	1120	150	450	5860	1600	25000
18..	C 1100		180	1110	150	450	6010	1700	28000
19..	C 1100		180	1190	140	450	6070	1600	26000
20..	C 1100		180	1210	170 A	560	5680	1500	23000
21..	C 1100		180	1190	150	480	5380	1500	22000
22..	C 1100		180	1130	130	400	5350	1300	19000
23..	C 1100		180	1150	120	370	5770	1800	28000
24..	C 1100		180	1180	120	380	6340	2100	36000
25..	C 1100		180	1180	120	380	6750	2000	36000
26..	C 1100		180	1230	100	330	6750	1700	31000
27..	C 1100		180	1300	170	600	7100	2200	36000
28..	C 1100		180	1440	310	1200	9970	4100	100000
29..	737		120	1820	1400	6900	46500	4000	500000
30..	782		130	2100	1400	7900	153000	2300	950000
31..	--		--	2460	630	4200	--	--	--
Total	35319	--	3640	34996	--	29170	348510	--	2248200

Day	JULY			AUGUST			SEPTEMBER		
1..	159000	1700	730000	22000	800 A	48000	13400	300	11000
2..	51800	1100	150000	21200	800	46000	12800	290	10000
3..	30400	960	79000	21300	700	40000	9600	300	7800
4..	22800	800	49000	20400	700	39000	12400	320	11000
5..	20100	720	40000	18900	660	34000	12000	350 A	11000
6..	17800	640	31000	19800	640	34000	11700	370	12000
7..	18000	720	32000	18300	590	29000	8720	320	7500
8..	19600	1000	53000	18400	580 A	29000	8880	300	7200
9..	20400	1000 A	55000	19300	670	35000	10700	310	9000
10..	20400	880	48000	19400	650	34000	11200	320	9700
11..	19400	800	42000	19700	540	29000	11300	310	9500
12..	18200	800	39000	19800	500	27000	10900	290 A	8500
13..	18400	720	36000	20400	520	29000	10600	260	7400
14..	20000	800	43000	20000	540	29000	10500	260	7400
15..	21600	1200	70000	18000	540 A	26000	10100	250	6800
16..	22800	1000	62000	18100	530	26000	9960	270	7300
17..	24900	1100	74000	18700	500	25000	9720	300	7600
18..	25500	1100	76000	19100	480 A	25000	9880	290	7700
19..	24200	960	63000	18000	450 A	22000	10600	280	8000
20..	22800	880	54000	17500	400	19000	10400	260	7300
21..	22400	1000	60000	17200	340	16000	9920	250	6700
22..	22900	1100	68000	14800	340	14000	9680	240	6300
23..	21400	880	51000	15400	460	19000	9400	240	6100
24..	19800	720	38000	17900	600	29000	8600	230	5300
25..	19200	800	41000	18600	620	31000	7760	210	4400
26..	19500	800	42000	18000	540	26000	7380	200	4000
27..	20600	880	49000	15500	430	18000	7340	190	3800
28..	21700	960	56000	15800	350	15000	6820	180	3300
29..	22400	1000	60000	15000	310	13000	6750	170	3100
30..	23200	1300	81000	14000	300	11000	6920	140 A	2600
31..	23600	1000	64000	14700	330	13000	--	--	--
Total	834800	--	2436000	565200	--	830000	295930	--	219300

Total discharge for year (cfs-days)..... 2,378,985
Total load for year (tons)..... 5,855,409

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

15-2810. KNIK RIVER NEAR PALMER, ALASKA--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 8, 1964.....	--	40		910	120		44	57	66	76	86	92	96	99	100	--		SBWC
May 22.....	1540	45		1090	120		57	67	76	82	85	93	95	98	100	--		SBWC
June 22.....	1145	45		5200	1200		28	49	64	79	86	94	97	99	100	--		SPWC
June 29.....	1200	40		50000	4500		9	14	20	28	41	66	83	90	97	99		SPWC
June 30.....	0730	40		122400	2200		10	11	22	29	39	54	71	81	92	99		SPWC
June 30.....	1315	37		157500	2100		14	19	22	33	43	57	67	78	91	98		SPWC
June 30.....	2200	37		209000	1800		12	16	22	29	36	47	59	70	90	97		SPWC
July 1.....	0915	38		200000	1700		15	22	31	42	52	61	69	77	95	99		SPWC
July 2.....	0900	38		54600	1200		22	32	45	55	66	76	90	97	100	--		SPWC
July 20.....	1030	40		22000	740		30	50	62	70	80	88	92	97	100	--		SPWC
Sept. 14.....	1230	45		10100	270		43	59	72	83	88	90	91	97	99	100		SPWC

ALASKA WEST OF LONGITUDE 141°--Conitnued

15-2840. MATANUSKA RIVER AT PALMER, ALASKA

LOCATION.--At gaging station on left bank, 100 feet downstream from bridge on Glenn Highway, and 1 mile east of Palmer.
DRAINAGE AREA.--2,070 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May 1949 to October 1950, April 1951 to July 1953, October 1957 to September 1964.
Water temperatures: March to August 1952, April to September 1953, December 1958 to September 1964.
Sediment records: April 1953 to September 1954, April 1958 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 58°F Aug. 25.
Sediment concentrations: Maximum daily observed, 5,300 ppm Aug. 2; minimum daily observed, 54 ppm Sept. 29, 30.
Sediment loads: Maximum daily, 380,000 tons Aug. 2; minimum daily, 34 tons Jan. 16 to 31.
EXTREMES, 1958-64.--Water temperatures: Maximum, 58°F Aug. 25, 1964.
Sediment concentrations: Maximum daily, 16,100 ppm Aug. 25, 1959.
Sediment loads: Maximum daily, 1,300,000 tons Aug. 25, 1959.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-7, 1963.....	2810	14	0.00	33	2.9	6.4	0.5	77	38	3.5	0.0	0.3	137	94	31	220	7.5	5
Jan. 15, 1964.....	610	5.5	.10	38	6.3	7.0	.7	94	45	7.5	.0	.9	157	122	45	282	8.0	10
Jan. 28.....	500	5.5	.05	38	5.8	7.0	.7	96	41	7.5	.0	.8	153	120	41	221	7.9	10
Apr. 8-30.....	1060	6.3	.02	44	5.1	8.4	.9	100	56	9.6	.0	1.7	181	131	82	296	7.6	5
May 8-31.....	1760	5.9	.02	37	6.9	8.7	.9	92	49	8.9	.0	1.3	164	121	76	276	7.4	5
June 1-30.....	17250	5.0	.02	26	4.9	3.9	.6	71	30	3.5	.0	1.0	110	85	50	177	7.3	5
July 1-31.....	12490	5.1	.02	30	4.4	4.5	1.4	76	32	4.3	.2	.3	119	93	31	188	7.4	10
Aug. 1-31.....	11210	3.5	.04	32	4.4	5.7	1.4	77	35	4.3	.2	.4	125	98	35	200	7.4	5
Sept. 1-16.....	5200	4.3	.04	31	2.8	5.9	1.4	71	37	5.7	.1	.3	124	89	31	202	7.5	5
Sept. 17-30.....	2850	5.7	.06	38	4.4	7.2	1.5	87	47	6.7	.1	.3	154	113	42	249	7.6	5

15-2840. **MATANUSKA RIVER AT PALMER, ALASKA--Continued**

Temperature (°F) of water, water year October 1963 to September 1964

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	43	--	--	--	--	--	--	--	33	33	--	34	--	--	34	33	33	--	--	--	--	--	33	--	--	--	33	--	33	35	--	--
May	35	--	35	34	34	35	--	--	--	--	42	45	39	39	41	41	44	--	42	42	40	46	45	41	43	44	47	48	49	49	49	42
June	48	50	45	47	47	47	50	47	45	46	--	54	51	48	50	50	53	49	45	48	51	51	55	52	--	54	50	50	45	44	--	49
July	--	50	49	--	51	49	50	51	50	49	48	53	55	55	56	56	--	--	55	--	48	48	45	52	51	53	50	53	50	48	--	51
August	46	--	48	55	50	47	49	--	49	56	49	--	--	55	50	50	50	50	45	45	50	47	49	50	58	50	48	--	--	50	45	50
September	50	50	50	--	--	50	49	50	47	50	50	--	45	45	50	50	50	45	--	46	50	45	45	44	44	--	44	--	--	41	--	--

ALASKA WEST OF LONGITUDE 141°--Continued

15-2840. MATANUSKA RIVER AT PALMER, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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	3200		690	909		120	C 670		54
2	2900		630	C 740		100	C 670		54
3	2710		590	C 740		100	C 670		54
4	2550		550	C 740		100	C 670		54
5	2370		510	C 740		100	C 670		54
6	2710		590	C 740		100	C 670		54
7	3220		700	C 740		100	C 670		54
8	2850		620	C 740		100	C 670		54
9	2550		550	C 740		100	C 670		54
10	2410		520	C 740		100	C 670		54
11	2220		480	C 740		100	C 670		54
12	2240		480	C 740		100	C 670		54
13	2310		500	C 740		100	C 670		54
14	2140		460	C 740		100	C 670		54
15	2070		450	C 740		100	C 670		54
16	2020		330	C 480		52	C 590		48
17	2010		330	C 480		52	C 590		48
18	1920		310	C 480		52	C 590		48
19	1800		290	C 480		52	C 590		48
20	1740		280	C 480		52	C 590		48
21	1700		280	C 480		52	C 590		48
22	1660		270	C 480		52	C 590		48
23	1610		260	C 480		52	C 590		48
24	1470		240	C 480		52	C 590		48
25	1420		230	C 480		52	C 590		48
26	1340		220	C 480		52	C 590		48
27	1140		180	C 480		52	C 590		48
28	1100		180	C 480		52	C 590		48
29	1060		170	C 480		52	C 590		48
30	1020		170	C 480		52	C 590		48
31	945		150	--		--	C 590		48
Total	62405	--	12210	18469	--	2300	19490	--	1578

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 610		41	C 530		36	C 530		43
2	C 610		41	C 530		36	C 530		43
3	C 610		41	C 530		36	C 530		43
4	C 610		41	C 530		36	C 530		43
5	C 610		41	C 530		36	C 530		43
6	C 610		41	C 530		36	C 530		43
7	C 610		41	C 530		36	C 530		43
8	C 610		41	C 530		36	C 530		43
9	C 610		41	C 530		36	C 530		43
10	C 610		41	C 530		36	C 530		43
11	C 610		41	C 530		36	C 530		43
12	C 610		41	C 530		36	C 530		43
13	C 610		41	C 530		36	C 530		43
14	C 610		41	C 530		36	C 530		43
15	C 610		41	C 530		36	C 530		43
16	C 500		34	C 530		36	C 530		110
17	C 500		34	C 530		36	C 530		110
18	C 500		34	C 530		36	C 530		110
19	C 500		34	C 530		36	C 530		110
20	C 500		34	C 530		36	C 530		110
21	C 500		34	C 530		36	C 530		110
22	C 500		34	C 530		36	C 530		110
23	C 500		34	C 530		36	C 530		110
24	C 500		34	C 530		36	C 530		110
25	C 500		34	C 530		36	C 530		110
26	C 500		34	C 530		36	C 530		110
27	C 500		34	C 530		36	C 530		110
28	C 500		34	C 530		36	C 530		110
29	C 500		34	C 530		36	C 530		110
30	C 500		34	--		--	C 530		110
31	C 500		34	--		--	C 530		110
Total	17150	--	1159	15370	--	1044	16430	--	2405

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2840. MATANUSKA RIVER AT PALMER, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	740	470	940	1040	350	980	15300	3000	120000
2	740	330	660	1100	380 A	1100	14900	2200	88000
3	740	140	280	1200	580	1900	17000	2800	128000
4	740	200 A	400	1160	500	1600	13900	2200	82000
5	740	200 A	400	1160	550	1700	16700	2300	100000
6	740	210	420	1220	500	1600	20000	2300	120000
7	740	140	280	1230	460	1500	18800	2700	140000
8	740	330	660	1200	380	1200	26600	3400	240000
9	740	320	640	1070	330 A	950	20500	2700	150000
10	740	440	880	1100	330 A	980	16600	2000	90000
11	1100	450 A	1300	1050	400	1100	12300	1500 A	50000
12	1100	400	1200	1110	580	1700	13000	1500	46000
13	1100	360	1100	1230	460	1500	18700	2000	100000
14	1100	290	860	1360	370	1400	22200	2500	150000
15	1100	320	950	1320	340	1200	26000	3600	250000
16	1100	370	1100	1190	340	1100	15300	2700	110000
17	1100	260	770	1220	670	2200	13200	2100	75000
18	1100	320	950	1260	420	1400	18100	1800	88000
19	1100	630	1900	1360	750	2800	20700	2200	120000
20	1100	390	1200	1470	580	2300	15700	1900	80000
21	1100	500	1500	1380	450	1700	12000	1400	45000
22	1230	280	930	1340	350	1300	12500	1200	40000
23	1210	320	1000	1180	340	1100	12800	1200	41000
24	1160	230	720	1340	990	3600	16200	1400	61000
25	1220	430	1400	1360	410	1500	22000	2200	130000
26	1100	280 A	830	1320	290	1000	18600	2200	110000
27	1060	310	890	1270	580	2000	17600	1800	86000
28	1050	320	910	1580	1100	4700	18500	1800	90000
29	981	320	850	2220	1500	9000	16600	1700	76000
30	1050	490	1400	4400	2200	26000	15100	1500	61000
31	--	--	--	8900	3000	72000	--	--	--
Total	29561	--	27320	50340	--	154110	517400	--	3067000

Day	JULY			AUGUST			SEPTEMBER		
1	11900	1300 A	42000	23500	4700	300000	5460	700	10000
2	11500	1200	37000	26700	5300	380000	5820	810	13000
3	10300	1200	33000	18800	4200	210000	5540	860	13000
4	9900	1100	29000	16100	2500	110000	6060	720	12000
5	11000	1400	42000	14200	2500	96000	5900	680 A	11000
6	14800	1800	72000	12500	2500	84000	5700	600	9200
7	17700	2400	110000	12900	2200	77000	5300	580	8300
8	16500	2200	98000	12700	2100 A	72000	5380	540	7800
9	14700	1600	64000	12800	2000	69000	5090	550	7600
10	13000	1700	60000	12000	2000	65000	5120	500	6900
11	15600	2000	84000	12100	2100	69000	5030	410	5600
12	13500	1700	62000	11600	1800 A	56000	4700	400 A	5100
13	11100	1400	42000	10900	1500 A	44000	4400	380	4500
14	12400	1500	50000	9100	1400	34000	4640	440	5500
15	13800	1700	63000	9050	1200	29000	4490	410	5000
16	13900	1900	71000	7450	1400	28000	4580	470	5800
17	13700	2000	74000	10100	1600	44000	4280	320	3700
18	12000	1900	62000	11200	1300	39000	3500	320	3000
19	11800	2000	64000	6540	900	16000	3500	330 A	3100
20	9850	2000 A	53000	6260	900	15000	3500	250	2400
21	9550	2000 A	52000	9250	900	22000	3180	180	1500
22	9900	2200	59000	9960	990	27000	2880	170	1300
23	6950	1500	28000	9100	900	22000	2750	160	1200
24	6020	1400	23000	9150	680	17000	2630	130	920
25	6060	1200	20000	9900	720	19000	2450	110	730
26	6580	1100	20000	9800	770	20000	2450	90 A	600
27	8250	2100	47000	8400	760 A	17000	2290	99	610
28	16700	2900	130000	6100	720	12000	2160	72	420
29	17900	2800	140000	6000	740 A	12000	2140	54	310
30	19100	4300	220000	5980	720	12000	2220	54	320
31	21200	5000	290000	7400	820	16000	--	--	--
Total	387160	--	2241000	5 347540	--	2033000	123140	--	150410

Total discharge for year (cfs-days)..... 1,604,455
Total load for year (tons)..... 7,693,536

A Computed from partly estimated-concentration graph.

ALASKA WEST OF LONGITUDE 141°--Continued

15-2840. MATANUSKA RIVER AT PALMER ALASKA--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 8, 1964.....	1745	40		1210	440		--	--	--	--		18	28	56	94	100		S
May 22.....	1400	43		1340	290		--	--	--	--		24	30	56	89	100		S
June 1.....	1630	48		15300	2800		16	22	32	42	48	58	71	89	98	100		SBWC
June 22.....	1000	46		12800	1800		12	22	35	45		59	67	82	96	99		SPWC

15-3040. KUSKOKWIM RIVER AT CROOKED CREEK, ALASKA

LOCATION.--At gaging station on right bank at village of Crooked Creek, 0.2 mile upstream from Crooked Creek.
DRAINAGE AREA.--31,000 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May 1957 to September 1964.
Water temperatures: May 1957 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 62°F Aug. 12.
EXTREMES, 1957-64.--Water temperatures: Maximum, 68°F June 28, 1959, June 22, 1960, July 15, 1961.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-12, 1963.....	73570	6.4	0.00	26	5.4	1.1	0.7	90	16	1.5	0.2	0.3	102	88	14	170	7.4	30
June 8-30, 1964.....	199600	10	.04	20	4.4	1.2	.8	66	11	1.4	.1	.5	82	68	14	133	7.4	30
July 1-15.....	95040	6.5	.00	26	5.8	1.8	.6	84	17	1.8	.1	.1	101	89	20	171	7.5	20
July 16-31.....	72050	6.6	.00	29	7.7	2.0	.8	100	21	1.4	.1	.1	118	104	22	206	7.2	10
Aug. 1-31.....	54450	7.2	.00	31	7.9	3.0	1.1	107	23	2.1	.3	.3	129	110	22	216	7.8	5
Sept. 1-30.....	44590	7.4	.02	30	7.5	2.1	1.0	106	22	2.1	.3	.4	125	106	19	206	7.8	10

Temperature (°F) of water, water year October 1963 to September 1964

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-3560. YUKON RIVER AT EAGLE, ALASKA

LOCATION.--At gaging station at Eagle on left bank, 0.1 mile upstream from Mission Creek, 1.1 miles downstream from Castalia Creek, and 11 miles downstream from the international boundary.
DRAINAGE AREA.--113,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: April to October 1951, June to September 1952, July 1953 to November 1957, October 1961 to September 1962.
Water temperatures: May to October 1951, June to August 1952, October 1961 to September 1963.
Sediment records: October 1961 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily observed, 1,800 ppm Aug. 4; minimum daily observed, 30 ppm Sept. 25, 27-30.
Sediment loads: Maximum daily, 1,200,000 tons Aug. 4.
EXTREMES, 1951-52, 1961-64.--Water temperatures (1951-52, 1961-63): Maximum, 65°F Aug. 1, 2, 1962.
Sediment concentrations (1961-64): Maximum daily, 2,480 ppm July 15, 1963.
Sediment loads (1961-64): Maximum daily, 1,850,000 tons July 15, 1963.

Chemical analyses, in parts per million, water year October 1963 to September 1864

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Aug. 7-31, 1964.....	168000	8.1	0.07	30	7.1	3.7	1.9	93	29	1.1	0.2	0.5	129	104	28	207	7.8	20
Sept. 1-30.....	116400	6.5	.07	30	8.5	3.2	1.8	98	32	1.4	.2	.8	132	110	40	216	7.9	10

ALASKA WEST OF LONGITUDE 141°--Continued

30-3560. YUKON RIVER AT EAGLE, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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..	118000	53	17000	C 56000		3000	C 26000		700
2..	117000	47	15000	C 56000		3000	C 26000		700
3..	120000	64	21000	C 56000		3000	C 26000		700
4..	122000	71	23000	C 56000		3000	C 26000		700
5..	119000	70	22000	C 56000		3000	C 26000		700
6..	118000	69	22000	C 56000		3000	C 26000		700
7..	116000	63	20000	C 56000		3000	C 26000		700
8..	114000	60	18000	C 56000		3000	C 26000		700
9..	112000	56	17000	C 56000		3000	C 26000		700
10..	110000	--	12000	C 56000		3000	C 26000		700
11..	108000	--	12000	C 56000		3000	C 26000		700
12..	107000	--	12000	C 56000		3000	C 26000		700
13..	105000	--	11000	C 56000		3000	C 26000		700
14..	103000	--	11000	C 56000		3000	C 26000		700
15..	101000	--	11000	C 56000		3000	C 26000		700
16..	99400	--	6700	C 35000		1400	C 26000		700
17..	99100	--	6700	C 35000		1400	C 26000		700
18..	97000	--	6500	C 35000		1400	C 26000		700
19..	96200	--	6500	C 35000		1400	C 26000		700
20..	93600	--	6300	C 35000		1400	C 26000		700
21..	92600	--	6300	C 35000		1400	C 26000		700
22..	93400	--	6300	C 35000		1400	C 26000		700
23..	92400	--	6200	C 35000		1400	C 26000		700
24..	91900	--	6200	C 35000		1400	C 26000		700
25..	86300	--	5800	C 35000		1400	C 26000		700
26..	84500	--	5700	C 35000		1400	C 26000		700
27..	82000	--	5500	C 35000		1400	C 26000		700
28..	80000	--	5400	C 35000		1400	C 26000		700
29..	76000	--	5100	C 35000		1400	C 26000		700
30..	73000	--	4900	C 35000		1400	C 26000		700
31..	70000	--	4700	--		--	C 26000		700
Total	3094400	--	338800	1365000	--	66000	806000	--	21700

Day	JANUARY			FEBRUARY			MARCH		
1..	C 23000		500	C 22000		360	C 19000		310
2..	C 23000		500	C 22000		360	C 19000		310
3..	C 23000		500	C 22000		360	C 19000		310
4..	C 23000		500	C 22000		360	C 19000		310
5..	C 23000		500	C 22000		360	C 19000		310
6..	C 23000		500	C 22000		360	C 19000		310
7..	C 23000		500	C 22000		360	C 19000		310
8..	C 23000		500	C 22000		360	C 19000		310
9..	C 23000		500	C 22000		360	C 19000		310
10..	C 23000		500	C 22000		360	C 19000		310
11..	C 23000		500	C 22000		360	C 19000		310
12..	C 23000		500	C 22000		360	C 19000		310
13..	C 23000		500	C 22000		360	C 19000		310
14..	C 23000		500	C 22000		360	C 19000		310
15..	C 23000		500	C 22000		360	C 19000		310
16..	C 23000		500	C 22000		360	C 19000		310
17..	C 23000		500	C 22000		360	C 19000		310
18..	C 23000		500	C 22000		360	C 19000		310
19..	C 23000		500	C 22000		360	C 19000		310
20..	C 23000		500	C 22000		360	C 19000		310
21..	C 23000		500	C 22000		360	C 19000		310
22..	C 23000		500	C 22000		360	C 19000		310
23..	C 23000		500	C 22000		360	C 19000		310
24..	C 23000		500	C 22000		360	C 19000		310
25..	C 23000		500	C 22000		360	C 19000		310
26..	C 23000		500	C 22000		360	C 19000		310
27..	C 23000		500	C 22000		360	C 19000		310
28..	C 23000		500	C 22000		360	C 19000		310
29..	C 23000		500	C 22000		360	C 19000		310
30..	C 23000		500	--		--	C 19000		310
31..	C 23000		500	--		--	C 19000		310
Total	713000	--	15500	638000	--	10440	589000	--	9610

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

30-3560. YUKON RIVER AT EAGLE, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--Contirued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 18000		290	C 21000		3400	384000	--	620000
2	C 18000		290	C 21000		3400	429000	--	690000
3	C 18000		290	C 21000		3400	450000	--	730000
4	C 18000		290	C 21000		3400	497000	--	810000
5	C 18000		290	C 21000		3400	516000	--	840000
6	C 18000		290	C 21000		3400	503000	--	810000
7	C 18000		290	C 21000		3400	509000	--	820000
8	C 18000		290	C 21000		3400	512000	--	830000
9	C 18000		290	C 21000		3400	516000	--	840000
10	C 18000		290	C 21000		3400	523000	--	850000
11	C 18000		290	C 21000		3400	536000	--	870000
12	C 18000		290	C 21000		3400	545000	--	880000
13	C 18000		290	C 21000		3400	534000	--	870000
14	C 18000		290	C 21000		3400	521000	--	840000
15	C 18000		290	C 21000		3400	509000	--	820000
16	C 18000		290	C 100000		27000	494000	--	800000
17	C 18000		290	C 100000		27000	482000	--	780000
18	C 18000		290	C 100000		27000	460000	--	750000
19	C 18000		290	C 100000		27000	426000	--	690000
20	C 18000		290	C 100000		27000	408000	--	660000
21	C 18000		290	C 100000		27000	390000	--	630000
22	C 18000		290	C 100000		27000	378000	--	610000
23	C 18000		290	C 100000		27000	402000	600	650000
24	C 18000		290	C 100000		27000	412000	550	620000
25	C 18000		290	C 100000		27000	414000	480	540000
26	C 18000		290	C 100000		27000	424000	480	550000
27	C 18000		290	C 100000		27000	423000	390	450000
28	C 18000		290	C 100000		27000	396000	--	420000
29	C 18000		290	C 100000		27000	367000	390	390000
30	C 18000		290	C 100000		27000	344000	430	400000
31	--		--	C 100000		27000	--	--	--
Total	540000	--	8700	1915000	--	483000	13704000	--	21060000

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	323000	350	310000	193000	290	150000	141000	--	38000
2	297000	350	280000	202000	410	220000	144000	90	35000
3	276000	370	280000	229000	880	540000	144000	80	31000
4	262000	--	240000	251000	1800	1200000	146000	90	35000
5	248000	320	210000	247000	1400	930000	147000	160	64000
6	240000	300	190000	235000	910	580000	142000	130	50000
7	240000	280	180000	225000	760	460000	134000	80	29000
8	253000	310	210000	220000	580	340000	133000	80	29000
9	259000	480	340000	216000	430	250000	130000	--	28000
10	258000	600	A 420000	209000	360	200000	126000	80	27000
11	270000	620	A 450000	201000	290	160000	123000	70	23000
12	303000	670	A 550000	193000	280	150000	119000	60	19000
13	308000	600	A 500000	186000	270	140000	116000	60	19000
14	300000	530	A 430000	182000	220	110000	112000	60	18000
15	284000	410	310000	183000	--	120000	110000	60	18000
16	262000	370	260000	186000	260	130000	111000	50	15000
17	240000	390	250000	183000	220	110000	110000	60	18000
18	232000	--	240000	183000	200	99000	110000	70	21000
19	260000	370	260000	186000	210	110000	115000	70	22000
20	257000	400	280000	185000	200	100000	114000	60	18000
21	245000	380	250000	180000	200	97000	116000	40	13000
22	233000	380	240000	172000	180	84000	106000	40	11000
23	218000	410	240000	170000	160	73000	102000	40	11000
24	210000	400	230000	160000	140	60000	99800	40	11000
25	212000	370	210000	156000	120	51000	97200	30	7900
26	215000	--	210000	148000	--	52000	94600	40	10000
27	209000	350	200000	146000	140	55000	91600	30	7400
28	208000	320	180000	141000	130	49000	88600	30	7200
29	202000	--	170000	137000	100	37000	86200	30	7000
30	198000	300	160000	138000	120	45000	84400	30	6800
31	193000	280	150000	138000	130	48000	--	--	--
Total	7715000	--	8430000	5781000	--	6750000	3493400	--	649300

Total discharge for year (cfs-days)..... 40,353,800
Total load for year (tons)..... 37,843,050

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

15-4680. YUKON RIVER AT RAMPART, ALASKA

LOCATION.--At gaging station on left bank at Rampart, 0.8 mile downstream from Squaw Creek, 1.2 miles downstream from Minook Creek, and 3.5 miles upstream from Russian Creek.
DRAINAGE AREA.--199,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1964.
Water temperatures: June 1954 to September 1964.
Sediment records: June 1962 to September 1963.
EXTREMES, 1954-56, 1960-63.--Water temperatures: Maximum, 67°F July 21, 1960.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
June 1-15, 1964.....	816200	4.0	0.06	22	6.1	2.6	1.0	73	18	2.8	0.1	0.1	93	80	20	150	7.2	50
June 16-30.....	739300	5.8	.13	26	7.3	2.2	.6	85	24	1.4	.1	.2	110	95	25	186	7.2	40
July 1-31.....	433800	5.0	.08	31	12	3.6	.4	101	46	1.4	.1	.2	150	126	43	252	7.4	30
Aug. 1-31.....	290900	5.2	.04	31	10	3.8	.9	105	39	2.1	.2	.9	145	119	33	239	7.6	40
Sept. 1-30.....	203800	5.8	.07	32	9.2	2.8	1.6	109	28	1.4	.2	.4	136	118	29	233	7.7	20

Temperature (°F) of water, water year October 1963 to September 1964

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	
August.....	53	52	51	53	54	54	53	53	54	52	53	54	54	54	54	53	53	54	54	53	52	52	52	52	51	50	50	51	50	49	--	52
September.....	46	46	43	42	42	41	41	40	40	40	40	40	41	41	41	41	40	39	40	40	40	40	40	40	40	39	39	39	39	38	--	41

Periodic particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 26, 1964.....	1715	57		608000	420		21	26	33	44	55	74	87	98	100			SBWC

15-4760. TANANA RIVER NEAR TANACROSS, ALASKA

LOCATION.--At gaging station on right bank, 0.2 mile downstream from unnamed tributary, 0.2 mile north of Cathedral Rapids, 9 miles upstream from Robertson River, and 13 miles west of Tanacross.
DRAINAGE AREA.--8,550 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1953 to October 1954, January to September 1955, May 1956, March 1957 to September 1964.
Water temperatures: June to September 1954, May 1957 to September 1964.
Sediment records: October 1953 to September 1956 (periodic), May 1957 to September 1964 (daily).
EXTREMES, 1963-64.--Water temperatures: Maximum, 60°F July 16, 17, 18.
Sediment concentrations: Maximum daily observed, 2,800 ppm June 25, 26; minimum daily observed, 54 ppm May 14.
Sediment loads: Maximum daily, 240,000 tons June 25, 26.
EXTREMES, 1953-64.--Water temperatures (1954, 1957-64): Maximum, 65°F June 2, 7, July 3, 1958.
Sediment concentrations: Maximum daily, 5,370 ppm June 17, 1961.
Sediment loads: Maximum daily, 340,000 tons Aug. 28, 1963.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color
May 1-7, 1964.....	2200	16	0.04	35	8.4	5.2	1.1	129	26	2.1	0.1	0.5	158	122	16	245	7.8	5
May 8-17.....	2620	14	.00	47	8.9	5.8	1.5	160	28	2.8	.1	.5	188	154	23	310	7.2	5
May 18-24.....	3880	15	.00	42	7.1	6.0	1.4	146	19	2.8	.1	.5	166	134	14	275	7.4	5
May 25-31.....	7710	12	.00	36	7.8	5.5	1.2	127	22	2.5	.1	.6	151	122	18	266	6.9	10
June 1-11.....	24890	7.2	.02	31	5.5	4.6	1.1	101	20	2.8	.1	.6	123	100	17	201	7.2	20
June 12-23.....	21190	8.8	.00	30	5.6	6.0	1.1	102	18	4.3	.1	.5	124	98	14	205	7.4	20
June 24-30.....	31390	9.1	.02	30	6.1	5.3	1.1	102	19	2.1	.1	.8	124	100	16	206	7.4	40
July 1-31.....	25250	9.6	.07	32	5.4	5.1	1.9	106	21	2.8	.2	.3	130	102	15	205	7.5	30
Aug. 1-31.....	20240	9.6	.11	34	4.9	5.1	1.9	111	21	3.9	.3	.5	136	105	14	221	7.4	20
Sept. 1-25.....	10090	10	.09	36	6.6	6.9	1.6	124	24	5.3	.2	.4	152	117	15	250	7.8	10
Sept. 26-30.....	7290	11	.08	21	5.7	4.7	1.1	74	20	3.5	.1	.3	104	76	15	160	8.1	10

Temperature (°F) of water, water year October 1963 to September 1964

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	
May.....	36	38	39	40	40	38	35	32	32	34	38	38	39	38	40	37	35	38	37	35	36	35	38	38	--	37	41	40	48	54	48	38
June.....	--	50	50	52	52	--	54	58	52	--	--	57	59	58	57	--	59	59	59	59	59	56	53	--	49	50	--	54	55	55	--	--
July.....	57	55	56	57	55	55	58	54	54	54	--	53	54	57	--	60	60	60	56	57	57	55	57	55	56	57	--	58	58	56	56	56
August.....	--	53	57	--	54	55	55	55	53	56	57	54	55	53	55	54	54	54	52	52	52	50	50	50	--	47	47	49	48	48	47	52
September.....	--	47	--	45	44	47	47	45	45	47	--	47	48	--	44	43	46	44	44	--	43	44	40	42	40	40	38	41	37	39	--	43

ALASKA WEST OF LONGITUDE 141°--Continued

15-4760. TANANA RIVER NEAR TANACROSS, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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..	6860		5900	C 3000		1200	C 2300		190
2..	7080		6100	C 3000		1200	C 2300		190
3..	7140		6200	C 3000		1200	C 2300		190
4..	7110		6100	C 3000		1200	C 2300		190
5..	6940		6000	C 3000		1200	C 2300		190
6..	6750		5800	C 3000		1200	C 2300		190
7..	6670		5800	C 3000		1200	C 2300		190
8..	6540		5600	C 3000		1200	C 2300		190
9..	6460		5600	C 3000		1200	C 2300		190
10..	6460		5600	C 3000		1200	C 2300		190
11..	6410		5500	C 3000		1200	C 2300		190
12..	6310		5500	C 3000		1200	C 2300		190
13..	6120		5300	C 3000		1200	C 2300		190
14..	5970		5200	C 3000		1200	C 2300		190
15..	5840		5000	C 3000		1200	C 2300		190
16..	5710		3900	C 2200		480	C 2300		190
17..	5470		3700	C 2200		480	C 2300		190
18..	5330		3600	C 2200		480	C 2300		190
19..	5260		3600	C 2200		480	C 2300		190
20..	4800		3200	C 2200		480	C 2300		190
21..	4670		3200	C 2200		480	C 2300		190
22..	4690		3200	C 2200		480	C 2300		190
23..	4650		3100	C 2200		480	C 2300		190
24..	4760		3200	C 2200		480	C 2300		190
25..	4650		3100	C 2200		480	C 2300		190
26..	4340		2900	C 2200		480	C 2300		190
27..	4200		2800	C 2200		480	C 2300		190
28..	4100		2800	C 2200		480	C 2300		190
29..	3900		2600	C 2200		480	C 2300		190
30..	3800		2600	C 2200		480	C 2300		190
31..	3700		2500	--		--	C 2300		190
Total	172690	--	135200	78000	--	25200	71300	--	5890

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	C 2500		200	C 2300		120	C 2100		110
2..	C 2500		200	C 2300		120	C 2100		110
3..	C 2500		200	C 2300		120	C 2100		110
4..	C 2500		200	C 2300		120	C 2100		110
5..	C 2500		200	C 2300		120	C 2100		110
6..	C 2500		200	C 2300		120	C 2100		110
7..	C 2500		200	C 2300		120	C 2100		110
8..	C 2500		200	C 2300		120	C 2100		110
9..	C 2500		200	C 2300		120	C 2100		110
10..	C 2500		200	C 2300		120	C 2100		110
11..	C 2500		200	C 2300		120	C 2100		110
12..	C 2500		200	C 2300		120	C 2100		110
13..	C 2500		200	C 2300		120	C 2100		110
14..	C 2500		200	C 2300		120	C 2100		110
15..	C 2500		200	C 2300		120	C 2100		110
16..	C 2500		200	C 2300		120	C 2100		110
17..	C 2500		200	C 2300		120	C 2100		110
18..	C 2500		200	C 2300		120	C 2100		110
19..	C 2500		200	C 2300		120	C 2100		110
20..	C 2500		200	C 2300		120	C 2100		110
21..	C 2500		200	C 2300		120	C 2100		110
22..	C 2500		200	C 2300		120	C 2100		110
23..	C 2500		200	C 2300		120	C 2100		110
24..	C 2500		200	C 2300		120	C 2100		110
25..	C 2500		200	C 2300		120	C 2100		110
26..	C 2500		200	C 2300		120	C 2100		110
27..	C 2500		200	C 2300		120	C 2100		110
28..	C 2500		200	C 2300		120	C 2100		110
29..	C 2500		200	C 2300		120	C 2100		110
30..	C 2500		200	--		--	C 2100		110
31..	C 2500		200	--		--	C 2100		110
Total	77500	--	6200	66700	--	3480	65100	--	3410

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-4760. TANANA RIVER NEAR TANACROSS, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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..	C 2100		340	C 2200	320	1900	15800	1900	81000
2..	C 2100		340	C 2200	220	1300	20000	2100	110000
3..	C 2100		340	C 2200	130	770	21500	1600	93000
4..	C 2100		340	C 2200	90	530	22700	1400	86000
5..	C 2100		340	C 2200	90	530	25700	1700	120000
6..	C 2100		340	C 2200	90	530	29300	2000	160000
7..	C 2100		340	C 2200	110	650	28000	1700	130000
8..	C 2100		340	C 2200	110	650	29700	1600	130000
9..	C 2100		340	C 2200	140	830	29100	1600	130000
10..	C 2100		340	C 2200	90	530	26800	1400	100000
11..	C 2100		340	C 2800	72	540	25200	1300	A 88000
12..	C 2100		340	C 2800	72	540	23800	1200	77000
13..	C 2100		340	C 2800	72	540	22300	1100	66000
14..	C 2100		340	C 2800	54	410	21200	990	57000
15..	C 2100		340	C 2800	90	680	21000	990	56000
16..	C 2100		450	C 2800	610	4600	21400	1100	64000
17..	C 2100		450	C 2800	290	2200	21200	1100	63000
18..	C 2100		450	C 2800	470	3600	19800	990	53000
19..	C 2100		450	C 2800	510	3900	18900	990	51000
20..	C 2100		450	C 2800	200	1500	19200	1100	57000
21..	C 2100		450	4150	110	1200	20100	1400	76000
22..	C 2100		450	4380	200	2400	22300	1500	90000
23..	C 2100		450	4850	310	4100	23100	1400	87000
24..	C 2100		450	5400	360	5200	27800	2000	A 150000
25..	C 2100		450	5500	340	5000	31800	2800	240000
26..	C 2100		450	5680	500	7700	31800	2800	240000
27..	C 2100		450	6320	560	9600	31500	2200	A 190000
28..	C 2100		450	8140	1200	26000	32400	1400	120000
29..	C 2100		450	7780	1100	23000	32600	1200	110000
30..	C 2100		450	8740	1100	26000	31800	1200	100000
31..	--		--	11800	1400	45000	--	--	--
Total	63000	--	11850	122740	--	181930	747800	--	3175000

Day	JULY			AUGUST			SEPTEMBER		
1..	29300	1200	95000	21700	800	A 47000	11700	610	A 19000
2..	26700	990	71000	24000	1100	71000	11400	590	18000
3..	24100	900	59000	30000	2100	170000	11600	640	20000
4..	22200	860	52000	31200	2100	180000	11500	580	18000
5..	20300	830	45000	28300	1400	110000	11300	550	17000
6..	19200	780	40000	27700	1300	97000	11400	560	17000
7..	20900	860	49000	27600	990	74000	11400	580	18000
8..	25000	1200	81000	27400	900	67000	11200	500	15000
9..	28300	1800	140000	26500	880	63000	11000	460	14000
10..	28200	1500	110000	25000	810	55000	10500	500	14000
11..	28800	1300	100000	23600	810	52000	9970	--	12000
12..	33200	1500	130000	22600	770	47000	9520	380	9800
13..	34500	2300	210000	22000	790	47000	9250	380	9500
14..	30300	1500	120000	21500	790	46000	9160	--	9200
15..	28200	990	75000	20800	770	43000	9700	360	9400
16..	28100	860	65000	19600	760	40000	9550	360	9300
17..	27800	750	56000	19100	760	39000	9640	360	9400
18..	27000	900	66000	18500	740	37000	9400	340	8600
19..	26000	1100	77000	18100	710	35000	9190	340	8400
20..	25900	990	69000	18000	710	34000	9160	340	8400
21..	25900	900	63000	17200	710	33000	9160	320	7900
22..	25400	900	62000	15900	770	33000	9010	290	7100
23..	25200	990	67000	14800	760	30000	9100	290	7100
24..	24700	1100	73000	13900	680	26000	9100	280	6900
25..	23200	990	62000	13400	620	22000	8350	260	5900
26..	21800	900	53000	13400	580	21000	7420	290	5800
27..	20900	880	A 50000	13600	610	22000	7280	270	5300
28..	20400	820	45000	13700	700	26000	7100	220	4200
29..	20500	780	43000	13400	720	26000	7300	240	4700
30..	20400	770	42000	12800	630	22000	7350	220	4400
31..	20500	760	42000	12100	600	20000	--	--	--
Total	782900	--	2312000	627400	--	1635000	288710	--	323300

Total discharge for year (cfs-days)..... 3,163,840
Total load for year (tons)..... 7,818,460

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

ALASKA WEST OF LONGITUDE 141°--Continued

15-4760. TANANA RIVER NEAR TANACROSS, ALASKA--Continued

Particle-size analyses of suspended sediment, water year October 1963 to September 1964
(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: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
June 10, 1964.....	1900	54		25900	1500		14	21	30	41	50	68	80	86	93	99		SBWC
July 8.....	1830	54		26400	1300		13	17	24	33	44	63	78	97	100			SPWC
Sept. 26.....	1120	38		7350	290		--	--	--	--	--	56	76	95	100			S

ALASKA WEST OF LONGITUDE 141°--Continued

15-5140. CHENA RIVER AT FAIRBANKS, ALASKA

LOCATION.--At gaging station near center on downstream side of bridge on Steese Highway (U.S. Highway 97) in Fairbanks, 0.15 mile upstream from Noyes Slough, 11 miles upstream from mouth, and 11 miles downstream from Chena Slough.
DRAINAGE AREA.--1,980 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May to September 1953, January 1954 to September 1955, October 1957 to May 1958, June to September 1964.
Water temperatures: May to September 1953, May 1962 to September 1963.
Sediment records: January 1954 to September 1955, May 1962 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations Maximum daily observed, 500 ppm May 30; minimum daily observed, 3 ppm Sept. 22.
Sediment loads: Maximum daily, 13,000 tons May 31.
EXTREMES, 1962-64.--Water temperatures (1962-63): Maximum, 66°F June 17, 1962.
Sediment concentrations: Maximum daily, 510 ppm May 17, 1962.
Sediment loads: Maximum daily, 14,600 tons May 18, 1962.

Chemical analyses, in parts per million, June to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
June 10-30, 1964....	4660	8.0	0.06	16	5.1	2.3	2.2	51	17	2.1	0.2	1.5	80	61	19	121	7.4	50
July 1-31.....	2500	10	.15	22	6.1	3.0	2.2	72	18	2.5	.2	1.6	101	80	21	158	7.4	30
Aug. 1-31.....	2070	10	.11	22	6.8	3.5	2.4	76	20	2.5	.2	1.7	106	83	21	158	7.5	20
Sept. 1-23.....	2850	8.5	.22	23	4.5	2.3	.9	70	18	2.1	.3	1.1	95	76	19	152	7.4	20

ALASKA WEST OF LONGITUDE 141°--Continued

15-5140. CHENA RIVER AT FAIRBANKS, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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	1340	18	65	C 560	--	14	C 440		6
2	1340	18	65	C 560	--	14	C 440		6
3	1380	13	48	C 560	8	12	C 440		6
4	1400	12	45	C 560	6	9	C 440		6
5	1400	13	49	C 560	--	10	C 440		6
6	1440	16	62	C 560	--	12	C 440		6
7	1480	10	40	C 560	9	14	C 440		6
8	1570	14	59	C 560	--	14	C 440		6
9	1630	14	62	C 560	--	15	C 440		6
10	1590	11	47	C 560	13	20	C 440		6
11	1540	17	71	C 560	6	9	C 440		6
12	1460	12	47	C 560	--	10	C 440		6
13	1420	15	58	C 560	8	12	C 440		6
14	1390	9	34	C 560	--	9	C 440		6
15	1320	--	28	C 560	--	9	C 440		6
16	1280	7	24	C 560	--	9	C 440		6
17	1230	10	33	C 560	--	9	C 440		6
18	1190	--	42	C 560	--	9	C 440		6
19	1080	16	47	C 560	--	9	C 440		6
20	876	--	31	C 560	--	9	C 440		6
21	840	11	25	C 560	--	9	C 440		6
22	800	8	17	C 560	--	9	C 440		6
23	760	7	14	C 560	--	9	C 440		6
24	720	8	16	C 560	--	9	C 440		6
25	690	--	17	C 560	--	9	C 440		6
26	660	--	16	C 560	--	9	C 440		6
27	640	--	16	C 560	--	9	C 440		6
28	610	--	15	C 560	--	9	C 440		6
29	590	--	14	C 560	--	9	C 440		6
30	572	10	15	C 560	--	9	C 440		6
31	572	--	15		--	--	C 440		6
Total	34810	--	1137	16800	--	318	13640	--	186

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 310		3	C 240		3	C 210		2
2	C 310		3	C 240		3	C 210		2
3	C 310		3	C 240		3	C 210		2
4	C 310		3	C 240		3	C 210		2
5	C 310		3	C 240		3	C 210		2
6	C 310		3	C 240		3	C 210		2
7	C 310		3	C 240		3	C 210		2
8	C 310		3	C 240		3	C 210		2
9	C 310		3	C 240		3	C 210		2
10	C 310		3	C 240		3	C 210		2
11	C 310		3	C 240		3	C 210		2
12	C 310		3	C 240		3	C 210		2
13	C 310		3	C 240		3	C 210		2
14	C 310		3	C 240		3	C 210		2
15	C 310		3	C 240		3	C 210		2
16	C 310		3	C 240		3	C 210		2
17	C 310		3	C 240		3	C 210		2
18	C 310		3	C 240		3	C 210		2
19	C 310		3	C 240		3	C 210		2
20	C 310		3	C 240		3	C 210		2
21	C 310		3	C 240		3	C 210		2
22	C 310		3	C 240		3	C 210		2
23	C 310		3	C 240		3	C 210		2
24	C 310		3	C 240		3	C 210		2
25	C 310		3	C 240		3	C 210		2
26	C 310		3	C 240		3	C 210		2
27	C 310		3	C 240		3	C 210		2
28	C 310		3	C 240		3	C 210		2
29	C 310		3	C 240		3	C 210		2
30	C 310		3		--	--	219		2
31	C 310		3		--	--	215		2
Total	9610	--	93	6960	--	87	6524	--	62

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-5140. CHENA RIVER AT FAIRBANKS, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	224	--	6	378	11	11	11600	350	11000
2	229	--	6	394	16	17	12800	280	9700
3	215	--	6	472	9	11	14100	250	9500
4	219	--	6	533	10	14	14100	220	8400
5	215	--	6	552	10	15	11800	220	7000
6	215	--	6	650	20	35	8430	220	5000
7	224	11	7	734	28	55	6240	180	3000
8	219	12	7	685	24 A	44	5110	100	1400
9	229	--	7	706	26 A	50	4250	77	880
10	224	8	5	671	22	40	3830	31	320
11	229	6	4	685	25	46	3950	67	710
12	248	8	5	664	16	29	7490	310	6300
13	239	--	6	624	24	40	6830	260	4800
14	234	--	6	624	--	42	4850	100	1300
15	234	--	6	650	22	39	4470	80	960
16	215	--	6	678	22	40	4480	65	790
17	215	18	10	706	16	30	4000	50	540
18	229	10	6	755	--	51	4010	42	450
19	239	10	6	846	50	110	3430	38	350
20	234	12	8	924	20	50	3600	30	290
21	243	10	6	1030	20	56	5410	200	290
22	239	10	6	1200	28	91	4850	160	210
23	243	9	6	1360	30	110	3530	38	360
24	243	8	5	1510	39	160	2990	22	180
25	248	9	6	1590	40	170	3510	74	700
26	277	8	6	2010	48	260	7830	300	6300
27	263	8	6	3490	140	1300	7240	250	4900
28	272	7	5	4960	300	4000	4610	80	1000
29	281	9	7	6450	420	7300	3720	45	460
30	351	9	8	8560	500	12000	3230	29	240
31	--	--	--	10600	460	13000	--	--	--
Total	7194	--	186	55691	--	39216	186290	--	87330

Day	JULY			AUGUST			SEPTEMBER		
1	3120	34	290	2010	32	170	1720	10	46
2	2950	22	180	1870	62	310	1870	8	40
3	2670	32	230	2860	36	280	2140	6	35
4	2430	22	140	2450	15	99	2560	23	160
5	2210	19	110	2150	10	58	3640	87	860
6	2140	14	81	1990	9	48	3950	83	880
7	2110	9	51	1950	11	58	4750	140	1800
8	2140	10	58	1900	8	41	4730	120	1500
9	2140	15	87	1860	17	85	4170	60	680
10	2250	13	79	1790	19	92	3780	32	330
11	2490	17	110	1710	7	32	3460	22	200
12	4560	210	2600	1630	16	70	3180	29	240
13	5500	190	2800	1590	13	56	2950	25	200
14	4300	78	900	1730	74	340	2790	16	120
15	3540	45	430	1970	79	420	2640	13	93
16	3070	22	180	2090	37	210	2500	12	81
17	2620	12	85	2440	24	160	2380	7	45
18	2470	14	93	3180	94	810	2270	7	43
19	2670	33	240	3030	58	470	2160	9	52
20	2740	24	180	2650	39	280	2080	11	62
21	2520	15	100	2430	38	250	2010	6	32
22	2260	18	110	2250	21	130	1930	3	16
23	2010	9	49	2130	21	120	1860	4	20
24	1850	12	60	2010	13	70	1800	11	53
25	1710	16	74	1900	--	77	1730	--	47
26	1590	8	34	1830	--	74	1680	--	45
27	1540	7	29	1780	20	96	1630	--	44
28	1470	6	24	1750	9	42	1610	--	43
29	1430	5	19	1750	10	47	1570	--	42
30	1440	5	19	1740	7	33	1540	--	42
31	1500	7	28	1730	10	47	--	--	--
Total	77440	--	9470	64150	--	5075	77080	--	7851

Total discharge for year (cfs-days)..... 556,189
Total load for year (tons)..... 151,011

A Computed from partly estimated-concentration graph.

15-5180. NENANA RIVER NEAR HEALY, ALASKA

LOCATION.--At gaging station on right bank, 0.5 mile upstream from Healy Creek, 1.1 miles southeast of Healy, and 1.2 miles upstream from railroad bridge.
DRAINAGE AREA.--1,910 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: June to December 1949, October 1953 to October 1954, May to September 1955, May to October 1956, January 1957 to September 1964.
Water temperatures: June to October 1949, August 1957 to September 1964.
Sediment records: June 1953 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 54°F July 15.
Sediment concentrations: Maximum daily observed, 3,800 ppm July 10, 11; minimum daily observed, 70 ppm Sept. 30.
Sediment loads: Maximum daily, 220,000 tons July 11.
EXTREMES, 1953-64.--Water temperatures (1957-64)): Maximum, 56°F Aug. 9, 1957.
Sediment concentrations: Maximum daily, 8,330 ppm July 11, 1963.
Sediment loads: Maximum daily, 585,000 tons June 25, 1953.

Chemical analyses, in parts per million, water year October 1963 to September 1964

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 (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-10, 1963.....	3300	6.1	0.01	32	6.8	3.3	1.5	89	39	2.0	0.1	0.4	135	109	36	232	7.6	5
May 29-31, 1964.....	1400	4.6	.07	16	6.3	3.9	2.1	56	24	2.5	.2	.4	88	66	20	141	7.4	30
June 1-15.....	12670	3.6	.07	17	3.8	2.0	1.9	50	18	1.4	.1	.3	73	58	17	117	7.2	20
June 16-30.....	11890	4.6	.02	22	5.1	2.7	2.0	56	31	1.4	.2	.2	97	76	30	155	7.1	5
July 1-31.....	10260	4.9	.03	24	5.8	2.2	2.0	65	32	1.4	.2	.3	105	84	31	177	7.2	5
Aug. 1-31.....	6570	5.0	.05	27	5.0	2.4	2.0	65	36	1.4	.2	.2	111	88	35	187	7.5	5
Sept. 1-30.....	3610	5.6	.07	32	7.3	4.4	2.0	83	40	3.9	.1	.1	136	110	42	233	7.5	5

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	42	40	40	39	38	38	38	36	37	36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	38	37	39	--
June.....	39	40	39	39	40	42	45	48	48	46	46	47	48	46	43	46	45	48	47	46	--	47	48	46	48	47	48	50	48	48	--	45
July.....	46	45	46	49	48	50	50	48	46	46	48	48	51	52	54	52	50	52	52	50	50	50	50	50	52	50	52	52	50	50	52	50
August.....	50	49	48	48	50	48	48	48	46	46	46	46	44	46	44	44	44	44	46	44	46	46	48	48	46	46	44	44	44	46	44	46
September.....	44	46	44	42	44	--	--	--	42	--	--	--	--	--	--	--	40	42	--	44	41	41	41	40	40	40	40	40	38	38	--	--

ALASKA WEST OF LONGITUDE 141°--Continued

15-5180. NENANA RIVER NEAR HEALY, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964
(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	C 3300		1100	C 1600		260	C 580		31
2	C 3300		1100	C 1600		260	C 580		31
3	C 3300		1100	C 1600		260	C 580		31
4	C 3300		1100	C 1600		260	C 580		31
5	C 3300		1100	C 1600		260	C 580		31
6	C 3300		1100	C 1600		260	C 580		31
7	C 3300		1100	C 1600		260	C 580		31
8	C 3300		1100	C 1600		260	C 580		31
9	C 3300		1100	C 1600		260	C 580		31
10	C 3300		1100	C 1600		260	C 580		31
11	C 3300		1100	C 1600		260	C 580		31
12	C 3300		1100	C 1600		260	C 580		31
13	C 3300		1100	C 1600		260	C 580		31
14	C 3300		1100	C 1600		260	C 580		31
15	2770		900	C 1600		260	C 580		31
16	C 2400		520	C 850		92	C 580		31
17	C 2400		520	C 850		92	C 580		31
18	C 2400		520	C 850		92	C 580		31
19	C 2400		520	C 850		92	C 580		31
20	C 2400		520	C 850		92	C 580		31
21	C 2400		520	C 850		92	C 580		31
22	C 2400		520	C 850		92	C 580		31
23	C 2400		520	C 850		92	C 580		31
24	C 2400		520	C 850		92	C 580		31
25	C 2400		520	C 850		92	C 580		31
26	C 2400		520	C 850		92	C 580		31
27	C 2400		520	C 850		92	C 580		31
28	C 2400		520	C 850		92	C 580		31
29	C 2400		520	C 850		92	C 580		31
30	C 2400		520	C 850		92	C 580		31
31	C 2400		520				C 580		31
Total	87370	--	24620	36750	--	5280	17980	--	961

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 580		23	C 420		17	C 360		14
2	C 580		23	C 420		17	C 360		14
3	C 580		23	C 420		17	C 360		14
4	C 580		23	C 420		17	C 360		14
5	C 580		23	C 420		17	C 360		14
6	C 580		23	C 420		17	C 360		14
7	C 580		23	C 420		17	C 360		14
8	C 580		23	C 420		17	C 360		14
9	C 580		23	C 420		17	C 360		14
10	C 580		23	C 420		17	C 360		14
11	C 580		23	C 420		17	C 360		14
12	C 580		23	C 420		17	C 360		14
13	C 580		23	C 420		17	C 360		14
14	C 580		23	C 420		17	C 360		14
15	C 580		23	C 420		17	C 360		14
16	C 580		23	C 420		17	C 360		14
17	C 580		23	C 420		17	C 360		14
18	C 580		23	C 420		17	C 360		14
19	C 580		23	C 420		17	C 360		14
20	C 580		23	C 420		17	C 360		14
21	C 580		23	C 420		17	C 360		14
22	C 580		23	C 420		17	C 360		14
23	C 580		23	C 420		17	C 360		14
24	C 580		23	C 420		17	C 360		14
25	C 580		23	C 420		17	C 360		14
26	C 580		23	C 420		17	C 360		14
27	C 580		23	C 420		17	C 360		14
28	C 580		23	C 420		17	C 360		14
29	C 580		23	C 420		17	C 360		14
30	C 580		23				C 360		14
31	C 580		23				C 360		14
Total	17980	--	713	12180	--	493	11160	--	434

C Composite period.

ALASKA WEST OF LONGITUDE 141°--Continued

15-5180. NENANA RIVER NEAR HEALY, ALASKA--Continued

Suspended sediment, water year October 1963 to September 1964--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	C 430		16	C 620		33	C 12000	1100	36000
2	C 430		16	C 620		33	C 12000	1900	62000
3	C 430		16	C 620		33	C 12000	2300	75000
4	C 430		16	C 620		33	C 12000	1900	62000
5	C 430		16	C 620		33	C 12000	1890	61000
6	C 430		16	C 620		33	C 12000	1300	42000
7	C 430		16	C 620		33	C 12000	1700	55000
8	C 430		16	C 620		33	C 12000	1800	58000
9	C 430		16	C 620		33	C 12000	1600	52000
10	C 430		16	C 620		33	C 12000	2000	65000
11	C 430		16	C 690		110	C 14000	1400	53000
12	C 430		16	C 690		110	C 14000	2000	76000
13	C 430		16	C 690		110	C 14000	2000	76000
14	C 430		16	C 690		110	C 14000	1400	53000
15	C 430		16	C 690		110	C 14000	930	35000
16	C 580		22	C 690		110	C 14000	1200	45000
17	C 580		22	C 690		110	C 14000	1700	64000
18	C 580		22	C 690		110	C 14000	1400	53000
19	C 580		22	C 690		110	C 14000	670	25000
20	C 580		22	C 690		110	C 14000	1400	53000
21	C 580		22	C 1400		760	11100	2100	A 63000
22	C 580		22	C 1400		760	9980	1600	43000
23	C 580		22	C 1400		760	10600	1100	31000
24	C 580		22	C 1400		760	11900	900	29000
25	C 580		22	C 1400		760	11600	660	21000
26	C 580		22	C 1400		760	11200	1100	33000
27	C 580		22	C 1400		760	10600	1500	43000
28	C 580		22	C 1400		760	10100	1100	30000
29	C 580		22	C 1400		760	10500	1000	28000
30	C 580		22	C 1400		760	10700	1300	38000
31	--		--	C 1400		760	--	--	--
Total	15150	--	570	28500	--	9790	368280	--	1460000

Day	JULY			AUGUST			SEPTEMBER		
1	10800	770	22000	8370	1500	34000	5350	490	7100
2	9620	1000	26000	7950	1300	28000	4970	380	5100
3	9740	1300	34000	7340	1200	24000	4810	410	5300
4	9620	1100	29000	7480	1400	28000	4760	640	8200
5	10400	1200	34000	7370	1700	34000	4420	440	5300
6	12400	3000	100000	7500	1400	28000	4300	350	A 4100
7	11200	1900	57000	7240	1300	25000	4200	290	A 3300
8	11600	2100	66000	7100	1200	23000	4100	240	A 2700
9	14200	3300	130000	6910	1000	19000	3990	200	2200
10	13100	3800	130000	6750	930	17000	3900	200	A 2100
11	21900	3800	220000	6510	830	15000	3800	210	A 2200
12	19600	2600	140000	6460	1000	17000	3700	210	A 2100
13	13100	1500	53000	7050	1100	21000	3700	200	A 2000
14	10800	1100	32000	6860	680	13000	3560	200	A 1900
15	10100	910	25000	6860	540	10000	3890	210	A 2200
16	10300	870	24000	6750	700	13000	3910	220	A 2300
17	9800	820	22000	6910	510	9500	3470	200	1900
18	9680	870	23000	6880	450	8400	3130	120	1000
19	8930	1000	24000	6670	490	8800	3070	100	830
20	8090	1100	24000	6400	430	7400	3000	150	1200
21	8100	1000	22000	6220	450	7600	2930	170	1300
22	7820	1100	23000	5660	530	8100	2870	150	1200
23	7370	1100	22000	6070	750	12000	2830	170	1300
24	7050	960	18000	6510	940	17000	2990	210	1700
25	6910	780	15000	6200	500	8400	2890	140	1100
26	6910	740	14000	6020	340	5500	2830	120	920
27	6830	900	17000	5660	320	4900	2800	130	980
28	6940	770	14000	5160	130	1800	2720	120	880
29	7890	870	19000	4970	180	2400	2700	90	660
30	8510	900	21000	4990	280	3800	2670	70	500
31	8820	1500	36000	4940	300	4000	--	--	--
Total	318170	--	1436000	203760	--	458600	108260	--	73570

Total discharge for year (cfs-days)..... 1,225,540
Total load for year (tons)..... 3,471,031

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

MISCELLANEOUS ANALYSES OF STREAMS IN ALASKA

ALASKA WEST OF LONGITUDE 141°

Periodic determinations of suspended-sediment discharge and particle size, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
15-2004. GULKANA RIVER AT GULKANA, ALASKA																		
June 3, 1964.....	1930		40	16300	4000		18	29	42	51	60	69	79	89	96	100		SPWC
July 6.....	1400		59	2780	55							76	81	88	96	100		S
15-2020. TAZLINA RIVER NEAR GLENNALLEN, ALASKA																		
June 3, 1964.....	1630		44	2690	370							78	90	96	98	100		S
Sept. 4.....	0800		50	11600	190							86	94	97	99	100		S
15-2820. CARIBOU CREEK NEAR SUTTON, ALASKA																		
June 2, 1964.....	1100		38	2780	1800		16	23	33	44	58	68	78	89	97	100		SBWC
July 7.....	0745		42	940	610							74	79	85	93	100		S
15-2910. SUSITNA RIVER NEAR DENALI, ALASKA																		
June 19, 1964.....	1800		39	11300	1600		14	17	23	31	38	52	68	89	99	100		SPWC
July 10.....	1240		43	9290	1300		10	14	20	25	33	50	70	88	98	100		SPWC
Sept. 21.....	1530		37	2140	590		--	--	--	--	--	16	20	34	56	100		S
15-2912. MACLAREN RIVER NEAR PAXSON, ALASKA																		
June 19, 1964.....	1530		39	5070	760		10	20	25	40	49	55	73	88	96	100		SPWC
July 10.....	1700		42	2720	350		19	24	34	42	53	62	74	88	97	100		SBWC
15-2915. SUSITNA RIVER NEAR CANTWELL, ALASKA																		
June 2, 1964.....	1530		50	41700	1600							38	56	75	93	100		S
July 20.....	1020		48	16800	720		16	19	28	37	45	55	65	87	98	100		SBWC
Sept. 9.....	1220		42	5250	200							43	51	72	94	100		S
15-4700. CHISANA RIVER AT NORTHWAY JUNCTION, ALASKA																		
June 12, 1964.....	1730		57	7850	1300		17	24	32	39	52	69	82	97	100			SBWC
July 8.....	1130		53	7400	1800		25	36	45	58	69	82	92	98	100			SPWC
Aug. 31.....	1630		48	3100	580		--	--	--	--	--	58	84	99	100			S
Sept. 26.....	0830		38	2340	200		--	--	--	--	--	47	71	98	99	100		S

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