Quality of Surface Waters of the United States 1959

Parts 3 and 4. Ohio River Basin and St. Lawrence River Basin

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

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PREFACE

This report was prepared by the Geological Survey in cooperation with the States of Alabama, Georgia, Illinois, Indiana, Kentucky, Minnesota, New York, North Carolina, Ohio, Pennsylvania, West Virginia, and with other agencies by personnel of the Water Resources Division under the direction of L. B. Leopold, chief hydrologist, and S. K. Love, chief, Quality of Water Branch.

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

ILLUSTRATION

QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1959

PARTS 3 and 4

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 other Federal agencies deal with the amounts of matter in solution and in suspension in streams.

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

Publication of annual records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 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. The records were published in four volumes from 1950 to 1958 and beginning in 1959 they were published in five volumes. The drainage basins covered in the five volumes are shown in Figure 1. The samples for which data are given in this volume were collected from October 1, 1958, to September 30, 1959. The records are arranged by drainage basins according to Geological Survey practice in reporting records of streamflow: Stations on tributary streams are listed between stations on the main stem in the order in which those tributaries enter the main stem.

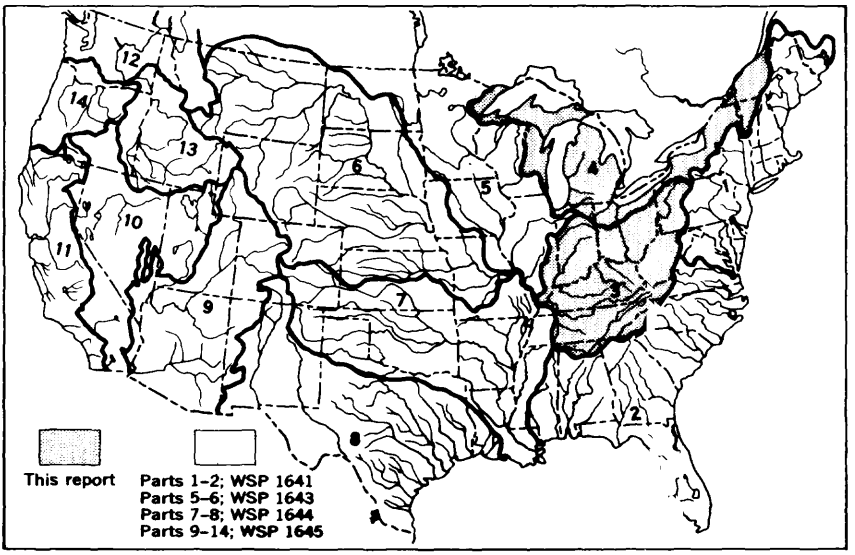

Figure 1.--Map of the United States showing basins covered by the five water-supply papers on quality of surface waters in 1959. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

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

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

During the water year ending September 30, 1959, the Geological Survey maintained 139 stations on 97 streams for the study of chemical and physical characteristics of surface water. Samples were collected daily or monthly at 61 of these locations for chemical-quality studies. Samples were also collected less frequently at many other points. Water temperatures were measured daily at 103 stations. Not all analyses of samples of surface water collected during the year have been included. Single analyses of an incomplete nature generally have been omitted. Also, analyses made of the daily samples before compositing have not been reported. The specific conductance of almost all daily samples was determined, and as noted in the table headings this information is available for reference at the district offices listed under Division of Work, on page 29.

Quantities of suspended sediment are reported for 18 stations during the year ending September 30, 1959. Sediment samples were collected one or more times daily during periods of significant flow at most of the continuous-record stations. Particle-size distributions of sediments were determined for 17 stations.

COLLECTION AND EXAMINATION OF SAMPLES

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

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

The nearly uniform dispersed ions of the solute move with the velocity of the transporting media. The mean section concentration of solutes determined from samples is a precise measure of the solute. The mean section concentration obtained from suspended-sediment samples is a less precise measure of the total sediment load, because sediment samplers did not traverse the bottom 0.4 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 suspended sediment loads presented in this report are usually less than the total sediment loads. For most streams the difference between the suspended and total sediment loads will be small, in the order of a few percent.

CHEMICAL QUALITY

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

TEMPERATURE

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

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

SEDIMENT

In general, suspended-sediment samples were collected daily with U. S. depth-integrating cable-suspended samplers (U. S. Interagency, 1948, p. 70-76 and U. S. Interagency, 1952, p. 86-90) from a fixed sampling point at one vertical in the cross section. The US DH-48 hand sampler was used at many stations during periods of low flow. Depth-integrated samples were collected periodically at three or more verticals in the cross section to determine the cross-sectional distribution of the concentration of suspended sediment with respect to that at the daily sampling vertical. In streams where transverse distribution of sediment concentration ranges widely, samples were taken at two or more verticals to define more accurately the average concentration of the cross section. During periods of high or rapidly changing flow, samples were taken two or more times throughout the day at most sampling stations.

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

For some periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and suspended-sediment loads for other periods of similar discharge. the estimates were further guided by weather conditions and sediment discharge for other stations.

In many instances where there were no observations for several days, the suspended-sediment loads for individual days are

not estimated, because numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates for individual days. However, estimated loads of suspended sediment for missing days in otherwise continuous period of sampling have been included in monthly and annual totals in order to provide a complete record. For some streams, samples were collected about weekly, monthly, or less frequently, and only rates of sediment discharge at the time of sampling are shown.

In addition to the records of quantities of suspended sediment transported, records of the particle sizes of sedimert are included. The particle sizes of the suspended sediments 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 accomodate such a wide range in particle size. Hence, it was necessary to separate most samples into two parts, one coarser than 0.062 mm and one finer than 0.062 mm. The separations were made by sieve or by a tube containing a settling medium of water. The coarse fractions were classified by sieve separation or by the visual accumulation tube (U.S. Interagency, 1957). The fine fractions were classified by the pipet method (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U.S. Interagency, 1943, p. 82-90).

EXPRESSION OF RESULTS

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

Chemical equivalence in equivalents per million (epm) can be obtained by (a) dividing the concentration in parts per million by the combining weight of that ion, or (b) multiplying the concentration (in ppm) by the reciprocal of the combining weights. The following table lists the reciprocals of the combining weights of cations and anions generally reported in water analyses.

The terms "equivalents per million" is a contraction which has been generally adopted for convenience. In more exact language, these units are "milligram equivalents per kilogram" if derived from part-per million data, or "milligram equivalents per

liter" if derived from data expressed in milligrams per liter. Equivalent weights may be computed for use with any of the systems of expression of data (Hem, 1959, p. 30-34).

In an analysis expressed in equivalents per million, unit concentrations of all ions are chemically equivalent.

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})	.14409
Bromide (Br^{-1})	.01251	Magnesium (Mg^{+2})	.08224
Calcium (Ca^{+2})	.04990	Manganese (Mn^{+2})	.03640
Carbonate (CO_3^{-2})	.03333	Nitrate (NO_3^{-1})	.01613
Chloride (Cl^{-1})	.02820	Phosphate (PO_4^{-3})	.03159
Chromium (Cr^{+6})	.11536	Potassium (K^{+1})	.02558
Copper (Cu^{+2})	.03148	Sodium (Na^{+1})	.04350
Fluoride (F^{-1})	.05263	Strontium (Sr^{+2})	.02282
Hydrogen (H^{+1})	.99206	Sulfate (SO_4^{-2})	.02082
Hydroxide (OH^{-1})	.05880	Zinc (Zn^{+2})	.03059
Iodide (I^{-1})	.00788		

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. 23) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, p. 427-428). A unit of color is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Hydrogen-ion concentration is expressed in terms of pH units. By definition the pH value of a solution is the negative logarithm of the concentration of gram ions of hydrogen. However, the pH meter that is generally used in Survey laboratories determines the activity of the hydrogen ions as distinguished from concentration.

An average of analyses for the water year is given for most daily sampling stations. Most of these averages are arithmetical or time-weighted; when analyses during a year are all on 10-day composites of daily samples with no missing days, the arithmetical and time-weighted averages are equivalent. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the river each day for the water year. 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 after thorough mixing in the reservoir. A discharge-weighted average is computed by multiplying the discharge for the sampling period by the concentrations of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. Discharge-weighted averages are usually lower than arithmetical averages for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

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

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

COMPOSITION OF SURFACE WATERS

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

The mineral constituents and physical properties of natural waters reported in the tables of analyses include those that have a practical bearing on the value of the waters for most purposes. The analyses generally include results for silica, iron, calcium, magnesium, sodium, potassium (or sodium and potassium together calculated as sodium), alkalinity as carbonate and bicarbonate, sulfate, chloride, fluoride, nitrate, boron, pH, dissolved solids and specific conductance. Aluminum, manganese, color, acidity, oxygen consumed, and other dissolved constituents and physical properties are reported for certain streams. Phenolic material and minor elements including strontium, chromium, nickel, copper, lead, zinc, cobalt, arsenic, cadmium, and others are occasionally determined for a few streams in connection with specific problems in local areas and the results are reported when appropriate. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs. The constituents are arranged in the order that they appear on standard analytical statement cards which are used to process the chemical quality data in this report.

MINERAL CONSTITUENTS IN SOLUTION

Silica (SiO_2)

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

Aluminum (Al)

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

Iron (Fe)

Iron is dissolved from many rocks and soils. On exposure to the air, normal basic waters that contain more than 1 part per million of iron soon become turbid with the insoluble reddish ferric oxide produced by oxidation. Surface waters, therefore, seldom contain as much as 1 part per million of dissolved iron, although some acid waters carry large quantities of iron in solution. Iron causes reddish-brown stains on white porcelain or enameled ware and fixtures and on fabrics washed in the water.

Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. It resembles iron in its chemical behavior and in its occurrence in natural waters. However, manganese in rocks is less abundant than iron. As a result the concentration of manganese is much less than that of iron and is not regularly determined in many areas. Waters impounded in large reservoirs may contain manganese that has been dissolved from the mud on the bottom of the reservoir by action of carbon dioxide produced by anaerobic fermentation of organic matter. It is especially objectionable in water used in laundry work and in textile

processing. Concentrations as low as 0.2 part per million may cause a dark-brown or black stain on fabrics and porcelain fixtures. Appreciable quantities of manganese are often found in waters containing objectionable quantities of iron.

Calcium (Ca)

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

Magnesium (Mg)

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

Strontium (Sr)

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

Sodium and potassium (Na and K)

Sodium and potassium are dissolved from practically all rocks. sodium is the predominant cation in some of the more highly mineralized waters found in the western United States. Natural waters that contain only 3 or 4 parts per million of the two together are likely to carry almost as much potassium as sodium. As the

total quantity of these constituents increases, the proportion of sodium becomes much greater. Moderate quantities of sodium and potassium have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 or 100 parts per million of the two may require careful operation of steam boilers to prevent foaming. More highly mineralized waters that contain a large proportion of sodium salts may be unsatisfactory for irrigation.

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

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, agriculture, and industrial user is usually dependent upon the nature of the cations (Ca, Mg, Na, K) associated with it. However, moderate amounts of alkalinity does not adversely affect most users.

Hydroxide may occur in water that has been softened by the lime process. Its presence in streams usually can be taken as an indication of contamination and does not represent the natural chemical character of the water.

Sulfate (SO_4)

Sulfate is dissolved from many rocks and soils--in especially large quantities from gypsum and from beds of shale. It is formed also by the oxidation of sulfides of iron and is therefore present

in considerable quantities in waters from mines. Sulfate in waters that contain much calcium and magnesium causes the formation of hard scale in steam boilers and may increase the cost of softening the water.

Chloride (Cl)

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

Fluoride (F)

Fluoride has been reported as being present in some rocks to about the same extent as chloride. However, the quantity of fluoride in natural surface waters is ordinarily very small compared to that of chloride. Recent investigations indicate that the incidence of dental caries is less when there are small amounts of fluoride present in the water supply than when there is none. However, fluoride in excessive concentrations is undesirable in waters used for drinking. It is stated in a comprehensive report by the California State Water Pollution Control Board (1952, p. 257) on water-quality standards"... that water containing less than 0.9 to 1.0 ppm of fluoride will seldom cause mottled enamel in children, and for adults concentrations less than 3 or 4 ppm are not likely to cause 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 methe-

moglobinemia ("blue babies") Faucett and Miller, 1946, p. 593), and more recent investigations conducted in Ohio show that drinking water containing nitrates in the range of 44 to 88 ppm or more (as NO_3) may cause methemoglobinemia (Waring, 1949). In a report published by the National Research Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding.

Phosphate (PO_4)

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

Boron (B)

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

Dissolved solids

The reported quantity of dissolved solids--the residue on evaporation--consists mainly of the dissolved mineral constituents in the water. It may also contain some organic matter and water of crystallization. Waters with less than 500 parts per million of dissolved solids are usually satisfactory for domestic and some industrial uses. Water containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where practices permit the removal of soluble salts through the application of large volumes of water on well-drained lands, but generally water containing more than about 2,000 ppm is considered to be unsuitable for long-term irrigation under average conditions.

Chromium (Cr)

Few if any waters contain chromium from natural sources. Natural waters can probably contain only traces of chromium as a cation unless the pH is very low. When chromium is present in water, it is usually the result of pollution by industrial wastes. Fairly high concentrations of chromate anions are possible in waters having normal pH levels. Concentrations of more than 0.05 ppm of Cr in the hexavalent form constitutes ground for rejection of a water for domestic use on the basis of the standards of the U.S. Public Health Service (1946).

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 (1946) recommends that copper should not exceed 3.0 ppm

in drinking and culinary water on carriers subject to Federal quarantine regulations.

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 0.1 ppm are significant, as this concentration is the upper limit for drinking water in the standards adopted by the U.S. Public Health Service (1946). Higher concentrations may be added to water through industrial and mine-waste disposal. Lead in the form of sulfate is reported to be soluble in water to the extent of 31 ppm (Seidell, 1940, p. 1409) at 25°C. In natural water this concentration would not be approached, however, since a pH of less than 4.5 would probably be required to 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 moderate concentrations is not known to have adverse physiological effects on man or stock, but zinc salts give water an unpleasant astringent taste and form a greasy film on boiling water (Howard, 1923, p. 411). The U.S. Public Health Service (1946, p. 13) recommends that the zinc content not exceed 15 ppm in drinking and culinary water on carriers subject to Federal quarantine regulations.

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 (1946) states that salts of barium, which have a deleterious physiological effect, must not be added to drinking and culinary water on carriers subject to Federal quarantine regulations.

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. Probably trace amounts of bromide are of frequent occurrence in surface water since compounds containing bromine are generally readily soluble. It resembles chloride in that it tends to be concentrated in sea water.

Iodide (I)

Iodine, like bromine, is a minor element and is normally present in natural 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 occurs in sea water to the extent of less than 1 ppm. Rankama and Sahama (1950, p. 767) report iodide present in rainwater to the extent of 0.001 to 0.003 ppm and in river water in about the same amount. Few waters will be found to 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. Water that has less than 60 parts per million of hardness is usually rated as soft and suitable for many purposes without further softening. Waters with hardness ranging from 61 to 120 parts per million may be considered moderately hard, but this degree of hardness does not seriously interfere with the use of water for many purposes except for use in high-pressure steam boilers and in some industrial processes. Waters with hardness ranging from 121 to 200 parts per million are considered hard, and laundries and industries may profitably soften such supplies. Water with hardness above 200 parts per million generally required some softening before being used for most purposes.

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 milliequiv-

alents 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 19, 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)

The specific conductance of a water is a measure of its capacity to conduct a current of electricity (see p. 8). The conductance varies with the concentration and degree of ionization of the different minerals in solution and with the temperature of the water. When considered in conjunction with results of determinations for other constituents, specific conductance is a useful determination and plays an important part in indicating changes in concentration of the total quantity of dissolved minerals in surface waters.

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 10 units generally passes unnoticed. Some swamp waters have natural color of 200 to 300 units or more.

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 impart a bad odor to textiles; concentrations for water used in beverages and brewing range from 0.5 to 5.0 ppm (California State Water Pollution Control Board, 1952, 1954).

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 pres-

ence 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 0.01 to 0.1 ppm.

Detergents (ABS). --The major type of detergents is the alkylbenzene-sulfonate group, which are highly resistant to biological degradation so that the effect of ABS in water persists over a long period of time. Waste water may carry these detergents to surface water supplies with resulting deterioration of water quality which includes unpleasant taste, odor, and foaming. Very little is known concerning the nature and the extent of occurrence and movement of detergents in waters or of the chemical and physical change that they may undergo after being added to surface waters (U.S. Geological Survey-Federal Housing, 1959).

Temperature

Temperature is an important factor in property determining the quality of water. This is very evident for such a direct use as an industrial coolant. Temperature is also important, but perhaps not so evident, for its indirect influence upon aquatic biota, concentrations of dissolved gases, and distribution of chemical solutes in lakes and reservoirs as a consequence of thermal stratification and variation.

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

Temperature variations which commonly occur during summer in lakes and reservoirs of temperate regions results in a separation of the water volume into a circulating upper portion and a non-circulating lower portion. Separating the two is a stratum of water of variable vertical thickness in which the temperature

PUBLICATIONS

Reports giving records of chemical quality and temperature of surface waters and suspended-sediment loads of streams in the area covered by this volume for the water years 1941-59, are listed below:

Numbers of water-supply papers containing records for Parts 3 and 4, 1941-59

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1946	1050	1951	1197	1956	1450
1942	950	1947	1102	1952	1250	1957	1520
1943	970	1948	1132	1953	1290	1958	1571
1944	1022	1949	1162	1954	1350	1959	1642
1945	1030	1950	1186	1955	1400		

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

PROFESSIONAL PAPER

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

BULLETINS

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

WATER-SUPPLY PAPERS

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

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

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

COOPERATION

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 p. 26 lists State and local agencies that cooperated in quality-of-water investigations in the drainage basins included in this volume, and the locations of quality-of-water district offices responsible for the data collected.

State	Cooperating agency	Drainage basin	District office
Alabama	Alabama Geological Survey, W. B. Jones, State Geologist.	Ohio River	Room 244 Federal Bldg. Ocala, Fla. 32670
Georgia	Department of Mines, Mining and Geology, Garland Peyton, director.		
Illinois	Ohio River Valley Water Sanitation Commission, Edward J. Cleary, executive director and chief engineer.	Ohio River	2822 E. Main Street Columbus, Ohio 43209
Indiana	Ohio River Valley Water Sanitation Commission, Edward J. Cleary, executive director and chief engineer.		
Kentucky[a]	Kentucky Department of Economic Development, George W. Hubley, Jr. commissioner.		
	University of Kentucky, F. C. Dickey, president, through State Geological Survey, W. W. Hagan, director and State Geologist.		

a Financial assistance was provided by the Agricultural Research Service and Soil Conservation Service of the United States Department of Agriculture for some of the sediment investigations.

State	Cooperating agency	Drainage basin	District office
Kentucky [a]	Ohio River Valley Water Sanitation Commission, Edward J. Cleary, executive director and chief engineer.	Ohio River	2822 E. Main Street Columbus, Ohio 43209
Minnesota	Minnesota Iron Range Resources and Rehabilitation Commission, Kaarlo J. Otava, commissioner.		Room 125 Nebraska Hall 901 N. 17th Street Lincoln, Nebr. 68508
New York	New York State Department of Commerce, Bureau of Industrial Development, Henry Gallien, Jr., director.	St. Lawrence River	Federal Bldg. Room 348 P.O. Box 948 Albany, N.Y. 12201
North Carolina	North Carolina Department of Conservation and Development, William P. Saunders, director,	Ohio River	Federal Bldg. P.O. Box 2857 Raleigh, N.C. 27602
Ohio	Department of Natural Resources, Herbert B. Eagon, director Ohio River Valley Water Sanitation Commission, Edward J. Cleary, executive director and chief engineer.	Ohio River St. Lawrence River Ohio River	2822 E. Main Street Columbus, Ohio 43209

a Financial assistance was provided by the Agricultural Research Service and the Soil Conservation Service of the United States Department of Agriculture for some of the sediment investigations.

State	Cooperating agency	Drainage basin	District office
Pennsylvania	State Department of Forests and Waters, Dr. Maurice K. Goddard, secretary. State Department of Agriculture, Dr. William L. Henning, secretary. Soil Conservation Commission, David Unger, director. City of Philadelphia Water Department, Richard Dilworth, mayor, Samuel S. Baxter, commissioner.	Ohio St. Lawrence River	Room 1302 U. S. Custom House 2nd and Chestnut Sts. Philadelphia, Pa. 19106
West Virginia	Ohio River Valley Water Sanitation Commission, Edward J. Cleary, executive director and chief engineer.	Ohio River	2822 E. Main Street Columbus, Ohio 43209

DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, L. B. Leopold, chief hydrologist and S. K. Love, chief, Quality of Water Branch. The records were collected and prepared for publication under the supervision of district engineers or district chemists as follows: In Pennsylvania, N. H. Beamer; in Minnesota, D. M. Culbertson; in North Carolina, G. A. Billingsley; in Alabama and Georgia, J. W. Guerin; in New York, F. H. Pauszek; in Illinois, Indiana, Kentucky, Ohio and West Virginia, G. W. Whetstone. Any additional information on file can be obtained by writing the responsible Survey district office.

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CHEMICAL ANALYSES, WATER TEMPERATURES, AND SEDIMENT

PART 3. OHIO RIVER BASIN

OHIO RIVER MAIN STEM

3-125. ALLEGHENY RIVER NEAR KINZUA, PA.

LOCATION.--At gaging station at center of Pennsylvania Railroad bridge, 0.5 mile upstream from Bent Run, 2 miles southwest of Kinzua, Warren County, and 2.3 miles downstream from Kinzua Creek.
DRAINAGE AREA.--2,179 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 24, 1958	1,060	1.2	0.04	25	3.9	32	1.6	60	20	58	0.1	0.2	184	78	30	327	7.4	7
Nov. 26	3,720	--	--	--	--	14	--	21	14	26	--	1.0	--	38	21	157	7.3	5
Dec. 31	1,700	--	--	--	--	33	--	54	28	52	--	1.5	--	76	32	302	7.3	5
Mar. 19, 1959	4,560	3.8	.00	12	2.9	13	1.5	26	14	22	.2	1.5	107	42	21	155	6.8	7
Apr. 23	2,540	--	--	--	--	24	--	38	22	38	--	.9	138	56	25	227	7.2	6
May 28	2,050	--	--	--	--	23	--	38	14	46	--	.4	154	60	29	245	7.2	7
July 9	865	4.7	.01	26	5.1	36	2.0	66	18	62	.0	1.0	244	86	32	353	7.5	7
Aug. 30	379	--	--	--	--	101	--	36	16	230	--	.6	--	152	123	840	6.6	4
Aug. 30a	379	--	--	--	--	68	--	38	17	150	--	1.6	--	114	83	569	6.5	8
Sept. 15	186	5.0	.03	65	10	130	5.0	83	27	265	.0	1.6	--	203	135	1,040	7.3	5

a Right center.

3-485. KISKIMINETAS RIVER AT VANDERGRIFT, PA.
(Formerly published as Kiskminetas River at Leechburg, Pa.)

LOCATION.--At raw water intake of West Leechburg plant at Allegheny-Ludlum Steel Corporation, 0.2 mile below Brady Run, Armstrong County, and 6.7 miles downstream from gaging station at Vandergrift.
DRAINAGE AREA.--1,860 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1951, October 1958 to July 1959.
Water temperatures: October 1946 to September 1951, October 1958 to July 1959.
EXTREMES, 1958-59.--Specific conductance: Maximum daily, 1,360 micromhos, July 8; minimum daily, 216 micromhos Jan. 26.
Water temperatures: Maximum, 84°F June 30 to July 1; minimum, freezing point on several days during December and January.
EXTREMES, 1946-51, October 1958 to July 1959.--Dissolved solids (1946-47): Maximum, 786 ppm Oct. 1-10, 1946; minimum, 183 ppm Jan. 1-10, 1947.
Hardness (1946-47, 1949-51): Maximum, 514 ppm Oct. 1-10, 1946; minimum, 76 ppm Dec. 14-18, 1949.
Specific conductance: Maximum daily, 5,420 micromhos Aug. 12, 1951; minimum daily, 178 micromhos July 22, 23, 1950.
Water temperatures: Maximum, 90°F July 25, 1950; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, October 1958 to July 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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
Oct.1-10,1958.	1,080	15	7.4	0.00	2.7	54	23	21	5.0	0	337	9.0	0.0	2.0	459	229	229	1.7	806	3.7	3
Oct. 11-20....	669	--	--	--	--	--	--	--	--	0	456	9.0	--	1.9	--	295	295	2.2	1,100	3.2	3
Oct. 21-31, Nov. 1-6....	784	20	11	.40	5.5	84	37	32	8.0	0	533	12	.2	1.8	724	362	362	2.6	1,220	3.4	5
Nov. 7-14.....	1,380	--	--	--	--	--	--	--	--	0	317	8.5	--	1.6	--	210	210	1.5	784	3.4	3
Nov. 15-30, Dec. 1-4....	1,700	--	--	--	--	--	--	--	--	0	278	7.6	--	.4	--	175	175	1.1	625	3.5	4
Dec. 5-13.....	3,200	--	--	--	--	--	--	--	--	0	175	6.8	--	.5	--	124	124	.6	437	3.8	2
Dec. 14-31, Jan. 1, 1959	1,430	15	2.2	.02	2.5	45	24	16	4.2	0	262	7.6	.3	.5	385	211	211	1.2	683	3.5	3
Jan. 2-3.....	3,130	--	--	--	--	--	--	--	--	0	222	--	--	--	--	--	--	.9	557	3.3	--
Jan. 4-8.....	3,310	--	--	--	--	--	--	--	--	0	144	5.0	--	3.3	224	112	112	.5	384	3.8	3
Jan. 9-12, 17.	2,810	--	--	--	--	--	--	--	--	0	226	7.4	--	2.8	335	130	130	.8	579	3.5	3
Jan. 19-20....	4,940	--	--	--	--	--	--	--	--	0	123	--	--	--	--	--	--	.5	341	3.4	--
Jan. 21-24, 26-27.....	9,910	--	--	--	--	--	--	--	--	0	196	4.0	--	4.8	153	92	92	.4	291	3.3	2
Jan. 29-31, Feb. 1-12...	3,810	--	--	--	--	--	--	--	--	0	180	6.8	--	3.1	279	136	136	.7	484	3.6	2

KISKIMINETAS RIVER BASIN--Continued

3-485. KISKIMINETAS RIVER AT VANDERGRIFT, PA.--Continued

Chemical analyses, in parts per million, October 1958 to July 1959--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Feb. 13-19, 1959.....	11,000	9.2	1.5	0.04	1.5	21	10	6.4	2.5	0	102	4.6	0.3	7.2	163	94	94	0.3	285	4.1	2
Feb. 20-27...	3,860	--	--	--	--	--	--	--	--	0	192	5.0	--	3.8	287	142	142	.7	504	3.6	1
Feb. 28, Mar. 1-7...	2,980	--	--	--	--	--	--	--	--	0	217	6.0	--	2.9	310	160	160	.8	564	3.6	2
Mar. 8-19....	5,540	--	--	--	--	--	--	--	--	0	142	5.0	--	3.4	214	112	112	.6	387	3.8	3
Mar. 20-29...	3,350	--	--	--	--	--	--	--	--	0	203	5.0	--	2.7	294	150	150	.8	515	3.6	1
Mar. 30-31, Apr. 1-3...	3,990	--	--	--	--	--	--	--	--	0	160	2.6	--	2.0	258	126	126	.6	430	3.9	3
Apr. 4-18....	5,300	--	--	--	--	--	--	--	--	0	144	2.2	--	2.3	237	116	116	.5	389	4.0	2
Apr. 19-28...	2,890	11	5.6	.05	3.0	36	12	11	4.1	0	200	4.0	.2	1.8	300	140	140	.9	506	3.5	2
Apr. 29-30...	5,100	--	--	--	--	--	--	--	--	--	135	--	--	--	--	--	--	.5	384	3.7	--
May 1-4.....	11,800	--	--	--	--	--	--	--	--	0	97	3.0	--	3.7	171	82	82	.4	293	3.8	2
May 5-10.....	4,080	--	--	--	--	--	--	--	--	0	184	4.0	--	2.8	304	132	132	.8	485	3.6	3
May 11-25....	2,750	--	--	--	--	--	--	--	--	0	215	6.0	--	1.8	350	150	150	.8	538	3.6	1
May 26-31, June 1-10..	1,480	15	5.6	.17	4.6	49	21	18	6.4	0	284	7.6	.4	.7	445	209	209	1.2	711	3.6	3
June 11-14...	842	--	--	--	--	--	--	--	--	0	394	11	--	1.4	551	270	270	1.6	934	3.4	5
June 15-30, July 1-14..	659	19	9.0	1.3	8.7	86	32	32	11	0	504	12	.4	.6	729	346	346	2.2	1,200	3.0	3
Time weighted average....	2.950	--	--	--	--	--	--	--	--	--	273	7.2	--	2.0	398	195	195	1.2	673	--	3
Analysis of additional sample																					
Apr. 23, 1959.	2,700	--	--	--	--	--	--	--	--	0	185	5.0	--	5.0	--	150	150	0.8	467	3.8	2

KISKIMINETAS RIVER BASIN--Continued

3-485. KISKIMINETAS RIVER AT VANDERGRIFT, PA.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

MONONGAHELA RIVER BASIN

3-504. TYGART RIVER AT ELKINS, W. VA.

LOCATION.--At city waterplant, at Elkins, Randolph County, 2.5 miles upstream from gaging station.
DRAINAGE AREA.--268 square miles upstream from waterplant; 272 square miles upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: January 1947 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 78°F Aug. 21, 22, 24-26; minimum, freezing point on several days during January.
EXTREMES, 1947-59.--Water temperatures: Maximum, 92°F July 22, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. No appreciable inflow between waterplant and gaging station except during periods of heavy local rains. During flood periods part of the flow is diverted around the waterplant in a flood by-pass channel.

Temperature (°F) of water, water year October 1958 to September 1959

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

MONONGAHELA RIVER BASIN--Continued

3-605. SALEM FORK AT SALEM, W. VA.

LOCATION.--At wire-weight gage at bridge, 0.4 mile downstream from gaging station, 0.6 mile downstream from Dog Run, 0.4 mile upstream from Cherrycamp Run, and 1.4 miles northeast of Salem, Harrison County.
DRAINAGE AREA.--8.32 square miles upstream from gaging station.
RECORDS AVAILABLE.--Sediment records: October 1954 to September 1959, periodic.
REMARKS.--This station is operated as part of the Soil Conservation Service Salem Fork watershed demonstration project. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Since September 1958, the flow above the station has been partly controlled by seven floodwater detention reservoirs with a total combined detention capacity of 376 acre-feet below the emergency spillways. There is also a municipal water-supply reservoir with a capacity of 155 acre-feet.

Periodic determinations of suspended-sediment discharge, water year October 1958 to September 1959

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
Oct. 2, 1958	1145		8.3	13	0.3
Oct. 10	1330		1.2	12	(t)
Oct. 13	1615		.6	30	(t)
Oct. 21	1235		.5	16	(t)
Oct. 29	0800		.8	31	.1
Nov. 7	1430		1.4	10	(t)
Nov. 10	1130		5.9	9	.1
Nov. 24	1115		2.7	11	.1
Dec. 3	1040		7.2	12	.2
Dec. 4	0950		35	217	20
Dec. 5	0915		30	90	7.3
Dec. 9	1025		6.9	13	.2
Dec. 19	1140		1.4	18	.1
Dec. 24	1150		7.8	28	.6
Dec. 30	1310		4.5	9	.1
Jan. 2, 1959	1300		39	48	5.0
Jan. 6	0955		5.0	60	.8
Jan. 13	1015		2.2	60	.4
Jan. 15	1445		167	684	308
Jan. 15	1640		208	1,280	719
Jan. 16	1340		63	78	13
Jan. 20	0935		22	88	5.2
Jan. 21	0910		106	103	29
Jan. 21	2330		265	1,480	1,060
Jan. 22	0130		262	334	236
Jan. 22	0330		198	326	174
Jan. 22	1055		102	110	30
Jan. 27	0945		10	16	.4
Feb. 3	0920		7.8	20	.4
Feb. 10	0920		27	176	13
Feb. 10	1400		270	4,240	3,090
Feb. 10	1530		270	1,040	758
Feb. 11	1030		56	112	17
Feb. 13	1020		54	120	17
Feb. 17	0935		18	34	1.6
Feb. 24	1005		23	28	1.7
Mar. 3	1330		8.3	16	.4
Mar. 6	0935		49	314	42
Mar. 10	1015		16	17	.7
Mar. 17	1030		7.5	9	.2
Mar. 23	1130		3.3	8	.1
Mar. 31	1025		5.9	10	.2
Apr. 7	0940		9.6	17	.4
Apr. 10	1345		425	783	898
Apr. 10	1545		338	409	373
Apr. 13	1100		22	58	3.4
Apr. 14	1025		29	31	2.4
Apr. 21	0930		5.2	16	.2
May 5	1125		63	104	18
May 12	1445		4.5	22	.3
May 15	1005		22	37	2.2
May 19	0415		3.8	20	.2
May 26	0445		1.0	26	.1
June 2	0210		35	442	42
June 9	0400		.3	21	(t)

t Less than 0.05 ton.

MONONGAHELA RIVER BASIN--Continued

3-605. SALEM FORK AT SALEM, W. VA.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1958 to September 1959--Continued

Date	Time (24 hr)	Water temperature (°F)	Discharge (cfs)	Suspended sediment	
				Mean concentration (ppm)	Discharge (tons per day)
June 16, 1959	1130		0.1	18	(t)
June 24	1320		.2	14	(t)
June 30	1615		.2	26	(t)
July 7	1725		.4	20	(t)
July 14	1145		.1	46	(t)
July 21	1530		.2	20	(t)
July 28	1315		.3	7	(t)
July 31	1345		3.3	26	0.2
Aug. 4	1630		3.3	58	.5
Aug. 12	0900		.8	10	(t)
Aug. 18	0800		.9	22	.1
Aug. 25	1350		.4	20	(t)
Sept. 1	1615		.2	20	(t)
Sept. 8	1710		.2	24	(t)
Sept. 15	1605		.3	10	(t)

t Less than 0.05 ton.

3-605. SALEM FORK AT SALEM, W. VA.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 15, 1959	1640			208	1,280		31	41	53	70	84	90	95	99	100		SBWC
Jan. 21	2330			265	1,480		24	33	49	65	77	86	95	99	100		SBWC
Feb. 10	1400			270	4,240		28	40	54	69	85	92	98	100	--		SBWC
Feb. 10	1400			270	4,240		19	31	49	67	86	91	98	100	--		SBN
Apr. 10	1345			425	783		34	46	56	69	82	88	96	100	--		SBWC

MONONGAHELA RIVER BASIN--Continued

3-630. MONONGAHELA RIVER AT LOCK AND DAM 8, AT POINT MARION, PA.

LOCATION.--About 750 feet upstream from dam, lock and dam 8 (mile 90.8) at Point Marion, Fayette County, and 1.5 miles upstream from Cheat River.
DRAINAGE AREA.--2,720 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1959.
Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 620 ppm July 21-27, 29-31; minimum, 118 ppm Jan. 22-31.
Hardness: Maximum, 280 ppm July 21-27, 29-31; minimum, 66 ppm Jan. 22-31.
Specific conductance: Maximum daily, 1,090 micromhos July 25; minimum daily, 163 micromhos Jan. 27-28.
Water temperatures: Maximum, 82°F on several days during July to September.
EXTREMES, 1955-59.--Dissolved solids: Maximum, 620 ppm July 21-27, 29-31, 1959; minimum, 100 ppm Aug. 2-7, 9-10, 1958.
Hardness: Maximum, 280 ppm July 21-27, 29-31, 1959; minimum, 54 ppm June 1-10, 1956.
Specific conductance: Maximum daily, 1,200 micromhos June 19, 1958; minimum daily, 124 micromhos Aug. 7, 1958.
Water temperatures: Maximum, 82°F on several days during July to September 1959; minimum, freezing point on many days during winter months.
REMARKS.--Acidity determined to pH 7.0. Specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Potential free acidity (H^+)	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 1, 4-10, 1958.....		8.6	2.0	0.52	0.87	43	12	19	2.2	0	203	3.0	0.2	0.7	310	157	157	0.4	482	3.95	5
Oct. 12-13, 15-20.....		10	2.5	.43	1.2	50	16	23	2.4	0	250	6.5	.5	.3	374	191	191	.7	592	3.70	1
Oct. 21-23, 25-31.....		11	2.6	.68	1.0	41	14	25	1.9	0	220	6.0	.2	.2	335	160	160	.6	547	3.60	2
Nov. 1-7,9-10		8.3	2.6	2.6	1.3	43	13	31	2.0	0	238	6.0	.4	.4	348	161	161	.5	564	3.60	3
Nov. 11-19...		7.0	1.9	1.2	1.0	36	10	21	1.9	0	182	6.0	.2	.4	273	131	131	.3	450	3.80	3
Nov. 21-30...		7.1	.5	1.1	.95	28	6.3	13	1.5	0	123	4.0	.1	.4	183	96	96	.2	309	4.10	3
Dec. 1-10....		6.5	.1	1.9	.70	28	6.9	11	1.5	2	112	4.0	.1	1.1	177	98	97	.0	271	5.4	3
Dec. 11-20...		6.2	.4	2.1	.18	20	5.5	4.8	.7	0	86	3.5	.2	.8	152	72	72	.1	228	4.6	3
Dec. 21-30...		7.0	1.1	4.8	.47	27	8.2	13	.6	0	140	5.5	.3	.7	238	101	101	.3	369	3.90	3
Jan.1-2,1959.		7.8	.3	.20	.07	40	12	23	1.8	0	191	9.0	.2	.9	314	150	150	.2	452	4.10	4
Jan. 12-14, 16-20.....		5.8	.0	.10	.15	22	6.1	7.5	1.4	0	93	4.0	.1	1.4	151	80	90	.1	243	4.5	3
Jan. 22-31...		9.2	.6	.94	.52	18	5.1	4.9	1.1	0	73	2.5	.1	1.2	118	66	66	.1	194	4.30	3
Feb. 1-5,7-10		6.2	1.2	1.8	.46	24	7.2	9.1	.9	0	112	3.0	.2	.8	166	90	90	.3	283	4.10	3
Feb. 11-16, 18-20.....		6.1	.4	1.6	.19	23	6.8	5.9	.8	0	96	2.5	.1	.9	155	86	86	.1	246	4.45	2
Feb. 21-28...		6.6	.7	4.4	.63	24	8.0	8.8	.7	0	123	2.5	.1	.2	178	93	93	.4	319	3.80	2
Mar. 1-10....		6.3	1.3	3.2	.35	25	8.4	9.6	.7	0	123	3.0	.1	.3	192	97	97	.3	314	4.00	2
Mar. 11-20...		5.7	1.1	3.2	.27	20	6.1	6.9	.9	0	93	2.5	.1	.4	138	75	75	.2	242	4.10	5
Mar. 22-26...		6.1	1.9	6.2	.56	25	7.7	11	.9	0	128	3.0	.1	.2	191	94	94	.4	340	3.85	1

Apr. 4-9, 1959		6.3	1.3	2.8	.63	31	9.0	12	1.2	0	142	1.0	.2	.7	219	115	115	.2	350	4.30	2
Apr. 11, 13-20		5.9	.7	2.2	.14	24	7.7	7.8	1.0	0	105	1.0	.1	.8	162	92	92	.1	269	4.45	1
Apr. 21-29....		7.3	2.0	3.6	.97	30	8.2	12	1.1	0	152	7.0	.1	.3	204	109	109	.5	393	3.70	0
May 1-6, 10...		8.2	2.5	1.5	.94	44	14	21	2.0	0	219	8.0	.3	.5	333	168	168	.5	508	3.90	4
May 11-20.....		7.1	1.6	1.4	.75	30	8.4	12	1.6	0	143	3.0	.2	.5	220	110	110	.3	363	3.95	4
May 21-31.....		7.0	2.0	1.8	.67	26	7.7	13	1.2	0	136	3.5	.2	.3	220	96	96	.5	362	3.85	3
June 1-9.....		6.5	.9	.74	.48	26	7.3	11	1.5	0	119	3.0	.2	.6	199	95	95	.2	302	4.30	4
June 12-20....		6.8	2.4	.88	.30	21	5.8	11	1.4	0	118	2.5	.1	.1	178	76	76	.6	324	3.70	4
June 21-24, 28-30.....		8.2	4.6	1.3	.99	32	10	18	1.6	0	210	4.0	.3	.2	312	121	121	1.1	582	3.30	4
July 3-10.....		8.0	3.6	.99	1.1	35	12	22	1.8	0	220	3.0	.2	.1	306	137	137	.9	581	3.40	3
July 11-14, 16-20.....		8.6	4.3	1.4	1.5	46	14	32	2.2	0	278	5.0	.3	.3	399	173	173	1.9	716	3.30	3
July 21-27, 29-31.....		11	6.1	1.3	.19	76	22	51	2.7	0	424	6.0	.6	.3	620	280	280	1.4	997	3.30	3
Aug. 1-5, 7, 9-10.....		9.3	5.1	1.0	.19	53	16	36	2.5	0	312	6.0	.4	.3	447	198	198	1.2	790	3.30	3
Aug. 12-17, 19-20.....		10	5.2	1.4	2.2	73	22	46	3.0	0	399	7.0	.4	.3	577	273	273	1.2	941	3.30	3
Aug. 21-22, 24-26.....		7.8	3.3	.96	1.7	59	16	31	2.8	0	312	11	.4	.3	442	213	213	1.0	768	3.45	3
Sept. 1, 3, 5-6, 8-10...		6.9	2.5	.81	1.1	36	16	24	2.0	0	206	6.5	.3	.2	287	156	156	.8	576	3.45	3
Sept. 12, 19..		6.5	2.1	.78	1.0	35	10	27	1.9	0	208	7.0	--	.7	262	129	129	.6	562	3.55	--
Sept. 21-30...		7.3	3.0	1.2	1.2	43	14	32	1.9	0	264	13	.4	.3	363	165	165	1.0	685	3.35	2
Time-weighted average [a]...		7.5	2.0	1.8	0.73	34	10	18	1.6	0	178	4.6	0.2	0.5	266	126	126	0.5	448	--	3

a Represents 82 percent of days.

MONONGAHELA RIVER BASIN--Continued

3-630. MONONGAHELA RIVER AT LOCK AND DAM 8, AT POINT MARION, PA.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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	--	--	50	50	47	47	48	48	49	--	46	46	--	48	46	47	48	49	48	46	46	46	--	46	45	45	44	44	43	43	47
November...	42	43	43	41	42	40	39	--	38	36	36	38	41	38	40	42	42	40	40	--	38	38	35	37	36	35	34	33	--	--	--	39
December...	--	--	--	--	--	--	--	--	--	--	34	34	34	34	32	35	34	33	35	34	34	34	34	34	34	34	37	34	37	35	--	--
January....	37	36	--	--	--	--	--	--	--	--	--	34	33	33	--	36	34	34	34	34	--	38	38	38	38	38	38	37	38	40	38	--
February...	38	37	37	41	38	--	36	39	39	48	42	43	42	42	44	42	--	42	42	38	38	40	40	40	40	38	40	38	--	--	--	40
March.....	40	40	40	40	40	40	42	46	41	42	41	42	40	40	46	42	41	41	44	43	--	42	44	42	44	48	--	--	--	--	--	42
April.....	--	--	--	52	52	52	55	52	52	--	47	--	48	47	50	52	56	54	55	55	54	54	54	56	58	57	58	58	60	--	--	--
May.....	60	60	63	62	62	63	--	--	--	64	63	68	67	64	64	62	58	58	62	63	64	64	66	65	66	66	67	70	67	72	72	64
June.....	72	72	74	74	72	72	68	70	70	--	72	72	73	70	72	70	70	68	70	69	66	76	69	72	--	--	--	76	77	80	--	72
July.....	--	--	78	77	80	78	78	80	81	80	80	78	78	78	--	79	78	80	80	79	78	78	78	80	80	80	80	--	82	80	80	79
August.....	77	79	82	80	80	--	80	--	80	79	--	79	79	79	80	79	81	--	80	80	80	81	--	82	82	82	--	--	--	--	--	--
September..	82	--	81	--	81	78	--	80	82	81	--	76	--	--	--	--	--	--	70	--	72	70	70	70	70	72	71	70	72	72	--	--

3-690. SHAVERS FORK AT PARSONS, W. VA.

LOCATION.--At intake to industrial water supply system of the Armour Leather Company plant at Parsons, Tucker County, 0.4 mile downstream from gaging station, and 0.3 mile upstream from confluence with Black Fork.
DRAINAGE AREA.--214 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1946 to December 1948, April to September 1949, January to September 1950, October 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 87°F Aug. 26; minimum, freezing point on several days during December.
EXTREMES, 1946-50, 1952-59.--Water temperatures: Maximum, 87°F Aug. 26, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October....	--	--	--	--	--	54	--	54	56	56	--	--	55	--	56	56	--	--	--	--	--	--	--	--	--	--	54	--	53	52	52	--
November...	--	--	49	46	44	44	43	--	--	44	45	46	46	45	--	--	51	51	49	49	50	--	--	48	46	48	--	--	--	--	--	--
December...	--	42	--	--	--	--	--	42	41	32	32	32	--	--	32	32	32	32	33	--	--	34	34	34	--	34	--	--	34	34	34	--
January....	--	34	--	--	34	34	34	34	34	--	--	34	34	34	34	34	--	--	34	34	35	40	40	--	--	36	36	36	37	38	--	--
February...	--	37	38	38	36	36	--	--	38	38	38	38	38	--	--	37	36	36	36	34	--	--	36	36	35	36	36	--	--	--	--	--
March.....	--	35	34	36	36	36	--	--	34	36	36	34	34	--	--	37	36	36	38	39	--	--	42	45	46	45	--	--	--	46	46	--
April.....	48	53	56	--	--	52	55	56	56	56	--	--	54	54	55	56	55	--	--	55	54	54	54	54	--	--	56	57	--	54	--	--
May.....	59	--	--	62	62	--	63	64	--	--	--	--	--	--	--	--	--	66	67	--	68	68	--	--	67	66	68	68	--	--	--	--
June.....	69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July.....	76	76	--	--	--	74	76	76	76	77	--	--	76	77	76	74	75	--	--	76	76	76	76	--	--	--	78	78	77	76	78	--
August.....	--	--	--	--	--	--	--	--	--	--	--	--	--	78	--	--	77	78	76	77	79	--	--	81	83	87	--	84	--	--	84	--
September..	85	85	82	--	--	--	--	84	86	86	--	--	--	84	82	75	71	61	--	--	61	65	68	68	69	--	--	70	71	68	--	--

MONONGAHELA RIVER BASIN--Continued

3-716. CHEAT RIVER AT LAKE LYNN, PA.

LOCATION.--At the Lake Lynn hydroelectric plant of the West Penn Power Company at Lake Lynn, Fayette County, 3 miles upstream from mouth, and 13.8 miles below discontinued gaging station on Cheat River near Pisgah, W. Va.
DRAINAGE AREA.--1,411 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 84°F Aug. 25; minimum, 33°F Dec. 23.
EXTREMES, 1948-59.--Water temperatures: Maximum, 85°F July 30, 1949, July 28, 1952, Aug. 6, 1955; minimum, 33°F on several days during winter months.
REMARKS.--Records furnished by the West Penn Power Company.

Temperature (°F) of water, water year October 1958 to September 1959

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....	68	68	67	--	--	65	67	67	66	66	--	66	66	66	66	65	65	--	--	64	64	66	66	64	--	--	62	62	62	60	60	--
November...	--	--	58	57	57	56	56	--	--	55	--	55	55	55	--	--	57	57	56	--	55	--	--	54	53	51	--	50	--	--	--	--
December...	--	--	--	--	--	--	--	36	36	36	36	37	--	--	35	34	34	34	35	--	--	34	33	34	--	34	--	35	--	--	--	--
January....	--	34	--	--	34	34	34	34	34	--	--	34	34	34	34	34	--	--	34	34	34	34	35	--	--	35	35	35	35	35	--	--
February...	--	35	35	36	36	36	--	--	37	38	37	38	42	--	--	42	42	42	41	41	--	--	--	40	39	38	38	--	--	--	--	--
March.....	--	37	36	36	37	37	--	--	37	37	38	38	38	--	--	38	38	40	40	42	--	--	45	45	47	46	--	--	46	46	48	--
April.....	50	48	46	--	--	46	48	50	50	50	--	--	51	51	52	53	53	--	--	53	52	55	56	--	--	--	57	57	57	58	--	--
May.....	58	--	--	62	64	66	68	67	--	--	70	70	68	68	62	--	--	68	70	72	72	72	--	--	68	--	73	74	--	--	--	--
June.....	74	76	--	77	77	--	--	78	78	79	80	78	--	--	72	70	72	72	71	--	--	74	74	72	76	76	--	--	79	81	--	--
July.....	81	80	--	--	--	80	80	81	81	80	--	--	78	77	80	80	80	--	--	81	81	82	82	80	--	--	80	82	82	82	82	--
August.....	--	--	80	80	80	81	81	81	80	79	80	--	--	82	--	--	81	80	81	79	80	--	--	82	84	82	82	82	--	--	80	--
September..	80	80	80	80	--	--	--	80	80	80	79	76	--	77	76	76	72	70	--	--	74	74	75	75	74	--	--	75	75	72	--	--

MONONGAHELA RIVER BASIN

3-835. YOUGHIOGHENY RIVER AT SUTERSVILLE, PA.

LOCATION.--At highway bridge, approximately 2 miles downstream from Sewickley Creek, Westmoreland County, and 500 feet downstream from gaging station at Sutersville.
DRAINAGE AREA.--1,715 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1950, October 1958 to September 1959.
Water temperatures: October 1947 to October 1950.
REMARKS.--Records of specific conductance and pH of daily samples available in district office at Philadelphia, Pa. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 27, 1958a	1,150	--	--	--	--	--	--	16	--	0	86	4.0	--	1.4	--	62	62	0.2	226	4.5	3
Oct. 27 b.....	1,150	--	--	--	--	--	--	--	--	0	206	7.0	--	.7	--	120	120	.5	553	3.6	3
Oct. 27 c.....	1,150	--	--	--	--	--	--	--	--	0	388	12	--	1.1	--	215	215	1.0	941	3.4	3
Nov. 21.....	1,400	--	--	--	--	--	--	--	--	0	103	4.0	--	1.0	--	74	74	.1	259	4.4	3
Dec. 21.....	1,300	--	--	--	--	--	--	--	--	0	359	6.0	--	.4	--	200	200	.4	904	3.4	3
Jan. 14, 1959.	1,300	--	--	--	--	--	--	--	--	0	91	4.0	--	1.3	--	72	72	.2	253	4.2	4
Feb. 6 d.....	2,920	--	--	--	--	--	--	8.5	--	2	68	3.5	--	3.8	153	62	61	--	178	5.2	7
Feb. 6 c.....	2,920	--	--	--	--	--	--	24	--	17	155	5.5	--	5.3	--	135	121	--	394	6.5	5
Apr. 13.....	4,640	5.2	--	0.00	0.05	13	4.3	3.5	1.0	10	42	5.0	0.2	2.7	100	50	42	--	131	6.1	5
Apr. 23.....	3,180	--	--	--	--	--	--	3.0	--	4	46	1.1	--	2.9	108	49	46	--	142	5.8	2
May 22.....	2,020	--	--	--	--	--	--	11	--	3	84	3.5	--	3.4	152	73	71	--	199	5.2	--
June 19.....	838	9.4	0.68	.02	.66	31	9.9	25	1.7	0	162	5.0	--	1.7	284	118	118	.2	418	3.9	3
July 28 e.....	793	--	--	--	--	--	--	--	--	0	128	5.0	--	2.3	209	86	86	.2	323	4.3	1
July 28 f.....	793	--	--	--	--	--	--	--	--	0	125	2.0	--	2.0	--	84	84	.2	342	4.2	5
Sept. 4.....	739	--	--	--	--	--	--	--	--	0	150	4.0	--	1.0	236	86	86	.4	340	3.8	0

a Left center.
b Center.
c Right center.
d Center and left center.
e Center and left side.
f Right side.

MONONGAHELA RIVER BASIN--Continued

3-850. MONONGAHELA RIVER AT BRADDOCK, PA.

LOCATION.--At gaging station, 380 feet upstream from dam at lock 2, at Braddock, Allegheny County, 1,700 feet downstream from Turtle Creek, and 11.2 miles upstream from confluence with Allegheny River.
DRAINAGE AREA.--7,337 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to August 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, October 1958 to August 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 13, 1958	2,500	9.2	--	0.06	1.2	46	12	37	4.0	3	213	15	0.3	2.3	346	165	162	--	517	6.5	2
Nov. 10.....	3,900	--	--	--	--	--	--	--	--	0	282	9.6	--	2.2	--	185	185	0.7	624	4.0	4
Jan. 20, 1959	18,000	11	0.4	.00	.00	51	8.4	26	3.8	52	134	27	.2	6.1	332	162	119	--	471	6.5	15
Feb. 17.....	31,300	--	--	--	--	--	--	9.9	--	5	95	4.0	--	3.7	179	90	86	--	232	5.8	9
Mar. 30.....	9,000	--	--	--	--	--	--	--	--	0	143	6.0	--	3.8	--	116	116	.3	368	4.5	3
May 4.....	12,100	14	--	.00	.38	57	12	30	4.5	58	163	28	.3	4.5	388	192	144	--	543	7.1	4
June 8.....	4,200	8.2	--	.02	.70	33	7.9	20	2.5	0	148	7.0	.0	3.5	284	115	115	.2	379	4.2	3
Aug. 15.....	2,040	11	.9	.01	1.4	59	18	56	4.0	0	301	14	.2	4.7	466	221	221	.3	694	4.3	3

3-940. MAHONING RIVER AT LEAVITTSBURG, OHIO

LOCATION.--Temperature recorder at gaging station at highway bridge at Leavittsburg, Trumbull County, 300 feet downstream from Duck Creek and 1.2 miles downstream from Eagle Creek.
DRAINAGE AREA.--580 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 79°F on several days during August and September; minimum, freezing point on many days during December to February.
EXTREMES, 1953-59.--Water temperatures: Maximum, 80°F Aug. 2, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

BEAVER RIVER BASIN--Continued

3-995. MAHONING RIVER AT LOWELLVILLE, OHIO

LOCATION.--At Washington Street Bridge at Lowellville, Mahoning County, 300 feet downstream from gaging station, 1 mile upstream from Ohio-Pennsylvania State line, and 3 miles downstream from Yellow Creek.
DRAINAGE AREA.--1,076 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953, October 1956 to September 1959.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 443 ppm Dec. 21, 23-30; minimum, 145 ppm Feb. 11, 13, 15, 17.
Hardness: Maximum, 234 ppm Dec. 21, 23-30; minimum, 96 ppm Feb. 11, 13, 15, 17.
Specific conductance: Maximum daily, 811 micromhos Apr. 17; minimum daily, 160 micromhos Feb. 11.
Water temperatures: Maximum, 100°F May 22, June 10, 11; minimum, 35°F Feb. 12.
EXTREMES, 1949-59.--Dissolved solids (1951-53, 1956-59): Maximum, 629 ppm Jan. 1-10, 1953; minimum, 145 ppm Feb. 11, 13, 15, 17, 1959.
Hardness (1951-53, 1956-59): Maximum, 328 ppm Jan. 1-10, 1953; minimum, 96 ppm Feb. 11, 13, 15, 17, 1959.
Specific conductance (1951-53, 1956-59): Maximum daily, 1,160 micromhos May 30, 1952; minimum daily, 160 micromhos Feb. 11, 1959.
Water temperatures: Maximum, 112°F Aug. 19, 1955; minimum, freezing point Dec. 5, 1950.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Water temperatures affected by cooling water return from steel mills. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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	Ammonia nitrogen as NH_4	Nitrite (NO_2)
Oct. 1-10, 1958	814	6.6	0.60	0.25	45	10	18	6.6	20	140	23	0.6	0.0	266	153	137	486	6.1	5	1.7	14
Oct. 11-20....	704	6.6	.33	.41	48	11	19	8.1	38	151	24	1.1	.0	285	165	134	528	6.4	7	4.1	16
Oct. 21-22, 24-31.....	588	7.3	.10	.44	53	12	22	10	16	176	29	.8	11	325	182	169	575	6.1	5	3.3	5.0
Nov. 1-10.....	462	7.8	.17	.00	57	13	24	11	8	181	32	1.1	.0	346	196	189	618	5.3	5	.5	25
Nov. 12-20....	1,163	9.2	.28	.33	53	12	20	9.4	32	154	25	.9	.0	306	182	156	548	6.5	7	.0	16
Nov. 21, 23-25, 27-28, 30...	633	9.0	.87	.00	51	13	20	9.0	13	162	27	.6	17	313	181	170	531	6.0	7	.0	.00
Dec. 1-5, 8-10.	756	9.3	2.2	.44	57	15	26	8.2	72	171	32	.6	.0	388	204	145	595	6.6	4	5.7	.16
Dec. 12, 14-17, 19-20.....	450	8.1	2.2	.91	62	17	28	9.8	39	220	31	.9	4.7	439	225	193	660	6.4	5	7.2	.00
Dec. 21,23-30.	492	8.1	1.9	.73	64	18	29	9.1	78	205	34	.7	.9	443	234	170	671	6.6	4	7.1	.07
Jan. 1-7, 10, 1959.....	1,182	9.8	2.1	.63	53	14	24	7.1	47	163	30	.7	1.2	329	190	151	555	6.8	6	4.7	.00
Jan. 11-15, 17-20.....	582	9.2	1.2	.76	62	18	30	9.3	63	204	34	.7	2.8	405	229	177	665	6.6	14	6.7	.06
Jan. 21-28, 30-31.....	7,672	6.8	.80	.29	38	10	11	4.6	66	84	14	.4	3.6	211	136	82	347	6.8	8	.5	.38
Feb. 1, 3-10.	3,119	8.4	1.4	.51	39	9.4	12	5.3	58	96	18	.6	.0	217	136	88	379	6.9	5	1.6	1.1
Feb. 11, 13, 15, 17.....	7,095	6.7	.40	.27	28	6.5	8.0	4.4	39	68	12	.4	2.8	145	96	64	271	7.0	20	.9	.60
Feb. 24-28...	2,786	8.2	1.3	.37	36	8.0	11	4.7	48	85	17	.5	.0	186	123	84	341	7.3	35	1.0	2.5

Mar. 1-5, 7-8, 10, 1959....	2,400	10	3.1	.49	37	9.2	11	4.6	55	93	17	.3	.0	226	131	86	353	6.6	3	3.2	.00
Mar. 11-16, 18-20.....	2,601	11	3.6	.55	38	9.6	12	4.7	55	98	19	.3	.4	236	135	90	368	6.5	3	3.7	.00
Mar. 21-25, 27-28, 30...	1,664	10	2.3	.59	41	10	14	5.2	55	112	22	.4	.6	252	143	98	404	6.5	4	2.0	.00
Apr. 2-7, 10..	1,690	9.8	.00	.61	46	13	16	6.1	65	122	22	.6	.0	284	169	116	458	6.7	6	3.4	.00
Apr. 11, 13-17 19.....	422	11	.06	.98	64	15	28	12	39	220	39	.8	.0	424	221	189	674	6.3	6	7.8	.02
Apr. 21-27, 29-30.....	1,680	11	.04	.83	58	14	25	10	40	199	31	1.0	.8	376	202	169	604	6.3	6	6.0	.04
May 1-10.....	1,276	9.0	.60	.58	46	9.6	17	7.3	46	137	22	.4	.0	271	155	117	461	6.7	7	3.7	.00
May 11-13, 15-17,19-20.	568	11	.04	.88	63	13	25	12	40	210	31	1.2	4.2	385	211	178	617	6.8	4	6.2	.09
May 21-26, 28-29, 31...	789	10	.11	.81	57	13	23	10	41	190	28	.6	3.2	351	196	162	585	6.7	7	5.7	.00
June 1-3, 5-10	802	12	1.5	.57	55	12	23	10	47	168	27	.8	3.0	328	187	148	546	6.7	7	4.3	.00
June 11-20....	695	9.7	3.9	.74	56	13	23	10	26	198	27	1.2	2.0	341	193	172	570	6.5	9	4.8	.00
June 21-25,27, 29-30.....	1,249	11	4.0	.57	48	10	17	8.5	72	126	18	.8	.6	269	161	102	471	7.0	5	4.7	.00
July 1,3,5-10.	746	11	2.4	.47	50	11	21	8.4	42	158	24	.8	1.0	291	170	136	504	6.8	25	3.7	.60
July 12-15, 17, 19-20...	1,057	9.2	2.2	.20	47	10	18	5.7	54	129	18	.9	2.0	260	158	114	444	6.8	9	2.1	.00
July 21-23, 26-27,29-31.	735	8.2	1.1	.03	42	9.9	19	4.7	98	84	17	.4	2.0	223	146	65	408	7.3	6	2.5	.00
Aug. 1,3-8, 10	972	7.6	.35	.09	40	12	16	4.2	104	84	18	.5	2.1	247	150	64	396	7.3	15	1.5	.00
Aug. 11-16, 18-19.....	739	8.0	.21	.16	42	12	19	4.2	92	92	21	.7	3.7	248	155	79	413	7.2	15	1.4	.21
Aug. 21, 23-27, 29.....	601	6.4	.22	.10	44	12	21	4.6	94	98	23	.8	7.0	259	160	82	436	7.3	11	2.0	.11
Sept. 2-6, 8-10.....	653	6.7	.37	.07	45	11	19	4.6	100	94	22	.7	2.9	258	157	75	429	7.2	17	3.2	2.6
Sept. 11-16, 18-19.....	498	6.7	.12	.10	45	12	19	4.7	102	96	20	.6	3.8	261	162	78	431	7.3	7	2.1	1.4
Sept. 21-22, 24-27, 29-30	480	7.4	.40	.07	48	12	21	5.1	120	98	22	.8	6.3	271	170	64	470	7.3	14	4.4	.0
Time-weighted average.....	1,349	8.8	1.2	0.44	49	12	20	7.4	55	143	24	0.7	2.4	300	172	127	501	--	8	3.5	2.7

BEAVER RIVER BASIN--Continued

3-995. MAHONING RIVER AT LOWELLVILLE, OHIO--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Phenols as C_6H_5OH	Date of collection	Phenols as C_6H_5OH
Oct. 5, 1958	0.020	Apr. 5, 1959	0.146
Oct. 15	.018	Apr. 15	.025
Oct. 25	.024	Apr. 25	.032
Nov. 5	.038	May 5	.057
Nov. 25	.524	May 15	.009
Dec. 5	.162	May 25	.014
Dec. 15	.400	June 5	.035
Dec. 25	.361	June 15	.016
Jan. 5, 1959	.249	June 25	.048
Jan. 15	.257	July 5	.007
Jan. 25	.232	July 15	.005
Feb. 5	.121	Aug. 5	.006
Feb. 15	.156	Aug. 15	.010
Feb. 25	.146	Aug. 25	.007
Mar. 5	.197	Sept. 5	.012
Mar. 15	.082	Sept. 15	.010
Mar. 25	.308	Sept. 25	.013

3-995. MAHONING RIVER AT LOWELLVILLE, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	76	76	75	75	75	73	76	78	79	79	77	74	73	78	82	82	82	81	78	77	78	78	81	81	81	79	78	75	77	77	76	78
Minimum.....	74	74	74	73	73	72	72	74	76	77	74	73	72	72	78	79	78	78	77	75	75	78	78	79	79	78	74	73	75	76	75	75
November																																
Maximum.....	76	75	77	77	80	80	79	77	75	73	78	81	81	85	85	80	79	66	65	68	68	67	67	67	68	69	68	66	63	59	--	73
Minimum.....	75	74	74	75	76	77	77	75	73	71	72	77	80	81	80	79	66	65	65	65	67	67	64	66	66	67	66	63	59	57	--	71
December																																
Maximum.....	61	65	65	65	61	52	48	52	56	58	58	60	60	59	61	64	65	67	67	67	63	62	63	63	60	57	60	61	66	66	63	61
Minimum.....	58	61	63	61	52	48	48	48	52	56	58	58	58	58	58	60	63	64	67	63	60	59	61	60	57	57	57	60	61	63	62	58
January																																
Maximum.....	62	58	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	57	39	38	37	40	41	41	41	41	41	41	--
Minimum.....	58	50	46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	39	38	37	36	37	40	41	41	41	41	39	--
February																																
Maximum.....	39	39	40	41	42	42	44	45	48	43	36	36	41	41	41	41	41	41	42	41	40	40	41	41	42	46	49	49	--	--	--	42
Minimum.....	38	38	39	40	41	42	42	43	43	36	36	35	36	41	41	41	41	41	41	40	40	40	40	41	41	42	46	48	--	--	--	40
March																																
Maximum.....	48	46	48	--	--	--	--	--	--	--	--	--	--	--	--	--	42	44	47	50	51	51	53	58	61	61	61	54	49	54	59	--
Minimum.....	46	46	46	--	--	--	--	--	--	--	--	--	--	--	--	--	42	42	44	47	50	50	50	53	58	61	54	49	48	49	54	--
April																																
Maximum.....	63	63	58	54	55	59	64	67	68	68	68	67	70	74	77	79	84	84	84	81	80	79	82	84	84	84	82	76	59	61	--	72
Minimum.....	59	58	54	54	53	55	59	64	67	68	67	66	66	70	74	77	79	84	81	80	78	77	77	81	84	82	76	59	58	59	--	69
May																																
Maximum.....	64	68	73	77	82	86	86	86	86	85	89	89	90	90	86	84	85	90	93	97	99	100	97	91	91	94	97	96	92	86	88	88
Minimum.....	61	64	68	73	77	81	86	83	83	83	83	89	89	86	84	83	84	85	90	93	96	97	91	89	89	91	93	92	86	85	86	85
June																																
Maximum.....	89	87	88	88	92	93	93	97	98	100	100	99	93	88	89	89	89	90	90	90	91	91	88	90	90	83	83	78	84	88	--	90
Minimum.....	87	87	86	86	88	91	91	92	94	96	97	91	88	86	87	87	87	88	89	90	90	86	85	87	81	81	77	77	78	84	--	87
July																																
Maximum.....	91	90	88	87	85	85	88	89	91	90	90	84	82	83	83	81	81	81	81	80	80	79	80	80	80	80	80	80	79	79	79	83
Minimum.....	88	87	87	85	85	84	85	87	88	88	84	81	81	81	81	80	80	81	80	80	79	79	79	79	79	79	79	79	79	79	79	82
August																																
Maximum.....	79	79	78	78	76	76	76	76	75	75	75	75	77	78	79	79	79	79	79	80	80	80	80	81	81	81	81	81	81	81	81	79
Minimum.....	79	78	78	76	76	76	76	75	75	75	75	75	75	77	78	79	79	79	79	79	80	80	80	80	80	81	81	81	81	81	80	78
September																																
Maximum.....	80	79	79	79	79	77	77	77	77	77	77	77	76	75	75	74	73	72	71	70	70	71	72	72	72	73	73	73	73	73	--	75
Minimum.....	79	79	79	79	77	77	77	77	77	77	77	76	75	75	74	73	72	71	70	70	70	70	71	72	72	72	73	73	73	72	--	74

OHIO RIVER MAIN STEM

3-1097. OHIO RIVER AT LOCK AND DAM 8, AT NEWELL, W. VA.

LOCATION.--About 1,000 feet upstream from dam, lock and dam 8 (mile 46.4) at Newell, Hancock County, 2,500 feet upstream from Rowes Run, and 3,300 feet downstream from Muckmores Run.
DRAINAGE AREA.--23,500 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 385 ppm Sept. 21-29; minimum, 124 ppm Apr. 1-10.
Hardness: Maximum, 194 ppm Sept. 11-20; minimum, 73 ppm Apr. 1-10.
Specific conductance: Maximum daily, 597 micromhos Sept. 28; minimum daily, 149 micromhos Jan. 25.
Water temperatures: Maximum, 81°F on several days during July to September; minimum, freezing point on many days December to February.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 504 ppm Oct. 21-23, 30-31, 1957; minimum, 113 ppm Jan. 1-10, 1955.
Hardness: Maximum, 246 ppm Oct. 20-23, 30-31, 1957; minimum, 65 ppm Apr. 1-10, 1958.
Specific conductance: Maximum daily, 797 micromhos Oct. 15, 1957; minimum daily, 149 micromhos Jan. 25, 1959.
Water temperatures: Maximum, 88°F July 31, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Acidity determined to pH 7.0. Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed: Filtered	Oxygen consumed: Unfiltered
Oct. 1-10, 1958.....		7.5	0.0	0.16	0.62	35	9.5	20	2.9		11		132	16	0.3	3.6	0.20	253	127	118		379	6.2	3		
Oct. 11-20..		6.8	.0	.18	.65	37	9.6	22	2.8		14		135	17	.4	4.7	.12	252	132	121		395	6.4	4		
Oct. 21-27..		6.8	.0	.12	.47	38	10	23	3.0		16		142	17	.4	4.1	.18	262	136	123		415	6.3	4		
Nov. 1-10...		6.8	.0	.03	.12	43	12	28	3.4		15		168	22	.4	5.1	.14	317	157	145		456	6.4	3		
Nov. 11-20..		7.2	.0	.06	.87	44	12	27	3.0		9		178	21	.3	4.0	.12	323	160	152		461	6.0	3		
Nov. 21-22, 27-30.....		6.7	.2	.05	.26	28	7.6	18	2.4		16		104	16	.2	2.1	.12	209	101	88		313	6.4	5		
Dec. 1-10...		7.7	.0	.05	.56	27	7.7	14	2.4		14		97	14	.2	2.9	.14	199	99	88		295	6.4	3		
Dec. 11-20..		7.1	.0	.05	.49	27	7.5	14	2.3		15		96	14	.2	3.4	.14	192	98	86		288	6.6	4		
Dec. 21-31..		7.5	.0	.04	.08	30	8.1	17	2.3		20		102	16	.2	3.8	.16	211	109	92		316	6.8	6		
Jan. 1-10, 1959.....		6.8	.1	.68	.04	29	7.9	17	2.4		16		99	16	.2	4.3	.20	185	105	92		309	6.1	6		
Jan. 11-20..		6.8	.0	.10	.09	29	8.4	16	2.1		18		103	15	.2	2.9	.12	187	107	92		309	6.5	4		
Jan. 21-31..		5.8	.1	.40	.08	22	5.7	11	1.9		12		74	11	.2	3.6	.12	143	78	68		235	6.5	6		
Feb. 1-10...		5.6	.0	.87	.53	23	6.9	10	1.7		15		81	10	.1	2.8	.24	154	86	74		252	6.5	3		
Feb. 11-15..		5.9	.0	1.2	.46	23	6.4	8.6	1.6		9		80	8.5	.1	2.8	.49	152	84	76		238	6.2	2		
Feb. 21-28..		6.0	.0	2.6	.70	26	7.3	11	1.6		7		95	10	.2	3.1	.39	172	95	90		272	6.0	3		

Mar. 1-10, 1959.....	6.6	.0	1.8	.46	26	6.5	11	1.7	12	90	11	.2	3.4	.16	161	92	82	266	6.4	3			
Mar. 11-20..	6.5	.0	.27	.36	23	7.6	10	1.7	13	79	9.5	.2	2.9	.08	146	88	78	243	6.6	3			
Mar. 21-31..	7.0	.0	.66	.13	22	6.9	9.7	1.7	15	74	9.5	.2	2.4	.20	144	84	72	232	6.6	3			
Apr. 1-10...	6.6	.0	.80	.25	18	6.8	8.7	1.4	12	68	9.0	.2	2.4	.15	124	73	63	209	6.4	4			
Apr. 11-20..	6.4	.0	.44	.06	23	6.6	10	1.5	12	84	9.0	.2	2.9	.20	150	84	74	242	6.5	5			
Apr. 21-30..	6.4	.0	.72	.53	23	7.6	11	1.6	13	86	9.0	.2	2.9	.20	152	88	78	254	6.4	5			
May 1-8.....	7.2	.0	.47	.10	23	5.4	9.8	1.7	13	77	8.0	.2	2.9	.10	151	80	69	234	6.4	4			
May 14-20...	6.9	.0	2.3	.78	31	7.8	15	2.3	12	114	11	.2	3.4	.20	213	110	100	323	6.6	3			
May 21-26...	5.8	.0	.50	.14	29	6.8	13	2.3	16	98	12	.2	3.8	.20	200	101	88	302	6.5	4			
June 1-10...	8.0	.0	.42	.85	34	9.6	19	2.1	14	131	14	.2	3.7	.19	237	125	113	366	6.2	1			
June 11-20..	9.8	.0	.36	.94	40	9.4	21	2.4	20	140	17	.4	5.0	.19	267	139	122	404	6.4	3			
June 21-30..	8.9	.0	.32	.86	41	11	24	2.7	22	150	20	.4	5.0	.19	280	147	129	433	6.6	3			
July 1-10...	8.6	.0	.40	.34	36	9.9	23	2.4	31	122	19	.3	2.7	.20	238	131	105	388	6.8	4			
July 11-20..	7.5	.0	.32	.46	39	9.7	23	2.5	28	134	19	.4	3.0	.18	253	138	115	404	6.6	4			
July 21-25..	7.6	.0	.16	.16	42	11	25	2.8	26	150	20	.3	4.2	.28	277	150	129	441	6.7	5			
Aug. 5-10...	9.0	.0	.24	.84	45	13	30	2.5	25	176	22	.4	3.2	.22	316	166	145	492	7.0	5			
Aug. 11-20..	9.4	.0	.13	.91	50	14	33	2.4	23	196	22	.3	4.6	.25	344	183	164	533	6.4	4			
Aug. 21-31..	8.6	.0	.22	.94	50	14	36	2.4	24	205	24	.4	2.8	.20	352	183	163	545	6.6	4			
Sept. 1-10..	8.9	.0	.19	.88	52	14	35	2.4	21	201	25	.3	5.0	.24	346	187	170	546	6.8	6			
Sept. 11-20.	8.7	.0	.32	.88	53	15	35	2.6	20	208	26	.3	5.2	.28	369	194	177	558	6.6	5			
Sept. 21-29.	11	.0	.19	.83	54	14	40	2.6	23	212	27	.4	5.9	.30	385	192	173	580	6.8	5			
Time-weighted average...	7.4	0.0	0.47	0.50	36	9.2	19	2.2	17	125	16	0.3	3.6	0.19	231	128	114	359	--	4			

OHIO RIVER MAIN STEM--Continued

3-1097. OHIO RIVER AT LOCK AND DAM 8, AT NEWELL, W. VA.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Chromium (Cr)		Nickel (Ni)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Cobalt (Co)	Arsenic (As)	Cadmiu (Cd)
	Hexa-valent	Total							
Oct. 1-10, 1958.....	0.00	0.00	0.07	0.00	0.00	0.04	0.01	0.00	0.0
Oct. 11-20.....	.00	.00	.04	.00	.00	.03	.01	.00	.0
Oct. 21-27.....	.00	.00	.03	.00	.00	.11	.00	.00	.0
Nov. 1-10.....	.00	.01	.00	.00	.00	.00	.00	.00	.0
Nov. 11-20.....	.00	.03	.04	.00	.00	.00	.01	.00	.0
Nov. 21-22, 27-30....	.01	.04	.00	.00	.00	.00	.00	.00	.0
Dec. 1-10.....	.01	.04	.00	.00	.00	.00	.00	.00	.0
Dec. 11-20.....	.00	.02	.00	.00	.00	.00	.00	.00	.0
Dec. 21-31.....	.00	.02	.00	.00	.00	.00	.00	.02	.0
Jan. 1-10, 1959.....	.00	.00	.06	.00	.00	.26	.01	.00	.0
Jan. 11-20.....	.00	.00	.17	.00	.00	.23	.01	.00	.0
Jan. 21-31.....	.00	.00	.09	.00	.00	.16	.01	.00	.0
Feb. 1-10.....	.00	.00	.00	.00	.00	.00	.01	.00	.0
Feb. 11-15.....	.00	.00	.00	.00	.00	.00	.01	.00	.0
Feb. 21-28.....	.00	.00	.04	.00	.00	.00	.01	.00	.0
July 1-10.....	.00	.00	.01	.00	.00	.00	.00	.00	.0
July 11-20.....	.01	.03	.01	.00	.00	.00	.00	.00	.0
July 21-25.....	.01	.03	.01	.00	.00	.00	.00	.00	.0
Aug. 5-10.....	.00	.00	.00	.00	.01	.00	.00	.00	.0
Aug. 11-20.....	.00	.00	.00	.00	.00	.00	.00	.00	.0
Aug. 21-31.....	.00	.01	.00	.00	.00	.00	.00	.00	.0
Sept. 1-10.....	.01	.01	.01	.00	.00	.00	.00	.00	.0
Sept. 11-20.....	.01	.04	.01	.00	.00	.00	.00	.00	.0
Sept. 21-29.....	.01	.01	.01	.00	.01	.00	.00	.00	.0

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Phenols as C_6H_5OH
Oct. 5, 1958.....	0.009
Oct. 15.....	.003
Oct. 25.....	.021
Nov. 5.....	.002
Nov. 15.....	.012
Nov. 25.....	.016
Dec. 5.....	.051
Dec. 15.....	.007
Dec. 25.....	.059
Jan. 5, 1959.....	.004
Jan. 15.....	.023
Jan. 25.....	.022
Feb. 5.....	.062
Feb. 16.....	.016
Feb. 25.....	.046
Mar. 5.....	.064
Mar. 15.....	.020
Mar. 25.....	.022
Apr. 5.....	.010
Apr. 15.....	.029
Apr. 25.....	.010
May 5.....	.000
May 15.....	.006
May 25.....	.009
June 5.....	.000
June 15.....	.000
July 5.....	.006
July 15.....	.000
July 25.....	.007
Aug. 5.....	.006
Aug. 15.....	.009
Aug. 25.....	.012
Sept. 5.....	.004
Sept. 15.....	.001
Sept. 25.....	.005

OHIO RIVER MAIN STEM--Continued

3-1097. OHIO RIVER AT LOCK AND DAM 8, AT NEWELL, W.VA.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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....	67	65	64	65	64	63	65	64	64	64	64	63	62	62	64	63	63	63	62	63	61	61	64	65	64	63	62	--	--	--	--	63
November...	63	62	62	62	57	55	53	54	53	53	53	54	52	54	52	55	53	54	54	45	43	53	--	--	--	--	42	42	42	41	--	52
December...	41	40	44	45	42	38	34	33	32	32	33	--	--	33	31	33	33	34	34	35	34	35	35	35	34	36	35	34	35	34	35	35
January....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	37	39	39	38	43	36	35	33	32	39	34	34
February...	35	35	38	37	33	36	34	35	34	35	40	32	32	32	32	--	--	--	--	--	38	37	37	36	36	36	38	42	--	--	--	35
March.....	36	38	40	40	40	39	40	39	40	39	39	37	41	38	41	40	39	41	39	40	40	39	39	40	39	43	43	42	41	40	41	40
April.....	41	50	46	40	40	41	46	46	46	48	50	49	49	48	54	56	53	56	54	56	56	57	57	58	58	58	56	55	56	57	--	51
May.....	56	60	60	59	--	--	--	--	--	--	--	--	--	63	64	63	64	68	69	67	68	68	68	68	65	66	--	--	--	--	--	--
June.....	73	74	73	74	76	76	78	78	77	78	79	76	75	74	74	72	72	74	72	72	73	72	73	73	77	76	78	76	74	79	--	75
July.....	70	76	76	80	80	80	78	81	79	78	81	77	80	78	77	80	78	79	79	79	79	79	79	78	77	--	--	--	--	--	--	78
August.....	--	--	--	--	78	77	78	78	78	79	79	78	--	80	76	77	77	78	78	75	80	80	--	--	81	79	80	81	80	79	81	--
September..	80	80	81	--	81	76	--	--	76	75	74	74	76	76	76	72	72	72	72	73	73	74	74	74	--	74	73	72	73	--	--	75

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MUSKINGUM RIVER BASIN

3-1290. TUSCARAWAS RIVER AT NEWCOMERSTOWN, OHIO

LOCATION.--At gaging station at highway bridge, 0.8 mile south of Newcomerstown, Tuscarawas County, 2 miles upstream from Buckhorn Creek, and 4 miles downstream from Dunlap Creek.
DRAINAGE AREA.--2,436 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1948, October 1955 to September 1959.
Daily chlorides: July 1946 to May 1949, October 1957 to September 1959.
Daily hardness: October 1957 to September 1959.
Water temperatures: July 1946 to May 1949, October 1955 to September 1959.
EXTREMES, 1958-59.--Hardness: Maximum, 1,030 ppm Aug. 29; minimum, 91 ppm Jan. 23.
Water temperatures: Maximum, 86°F Aug. 22; minimum, freezing point on many days during December to February.
EXTREMES, 1946-49, 1955-59.--Hardness (1946-48, 1955-59): Maximum, 1,780 ppm Oct. 20, 1955; minimum, 91 ppm Jan. 23, 1959.
Specific conductance (1946-48, 1955-57): Maximum daily, 6,530 micromhos Sept. 21, 1948; minimum daily, 232 micromhos May 9, 1947.
Water temperatures: Maximum, 86°F Aug. 22, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Ohio Canal diverts small amount of water from river at Portage Lake, 3 miles south of Akron. Part of diverted water goes into the Cuyahoga River basin. Flow regulated by 8 flood control reservoirs. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chloride and hardness, in parts per million, water year October 1958 to September 1959

Day	October		November		December		January	
	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$
1	270	443	800	940	310	494	545	676
2	330	500	800	938	320	508	380	484
3	330	506	710	864	360	541	240	360
4	380	562	680	830	475	569	88	227
5	280	463	700	854	435	598	83	226
6	330	515	460	628	305	480	141	277
7	360	540	470	644	174	325	141	287
8	390	574	530	696	151	305	168	322
9	430	605	640	794	166	322	240	383
10	--	--	730	870	196	359	260	418
11	370	553	780	922	215	400	265	401
12	380	578	630	770	230	421	290	445
13	510	682	570	718	285	464	340	490
14	430	607	630	772	290	482	360	501
15	380	560	610	746	320	510	450	555
16	360	541	900	988	300	498	245	394
17	340	534	450	634	330	523	250	356
18	340	531	670	838	340	528	97	242
19	320	511	600	732	385	558	147	290
20	310	490	540	654	350	514	225	363
21	300	492	310	502	365	525	111	211
22	320	501	260	436	430	577	21	100
23	280	465	340	514	410	557	14	91
24	370	572	470	622	430	592	14	101
25	450	610	480	632	360	529	53	149
26	520	698	390	576	390	542	45	118
27	620	744	380	564	500	640	45	126
28	580	750	390	566	605	728	50	137
29	710	862	400	570	680	760	60	147
30	850	968	470	616	710	794	66	160
31	780	920	--	--	635	738	94	179
Average	421	596	560	714	369	528	178	297

MUSKINGUM RIVER BASIN--Continued

3-1290. TUSCARAWAS RIVER AT NEWCOMERSTOWN, OHIO--Continued

Chloride and hardness, in parts per million, water year October 1958 to September 1958--Continued

Day	February		March		April		May	
	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$	Chloride (Cl)	Hardness as $CaCO_3$
1	141	214	118	273	173	334	41	167
2	112	187	158	309	284	412	53	180
3	80	168	186	327	108	249	63	192
4	68	169	186	324	74	207	80	215
5	71	180	126	279	98	232	95	244
6	91	200	152	302	76	222	133	295
7	89	200	212	357	90	241	170	326
8	91	201	111	254	150	294	180	338
9	80	198	105	252	145	300	192	360
10	53	156	124	276	172	324	205	377
11	94	179	189	326	190	344	193	372
12	38	126	155	292	183	339	222	379
13	32	132	135	286	178	338	230	390
14	39	142	202	350	188	355	312	425
15	53	157	110	257	211	379	190	338
16	68	175	76	198	228	389	184	344
17	61	176	38	160	186	366	190	366
18	55	170	77	208	212	386	204	364
19	66	189	93	242	288	454	194	370
20	79	204	114	265	278	444	272	432
21	78	201	190	348	366	522	258	422
22	74	198	116	311	250	414	318	465
23	75	207	164	321	209	370	300	466
24	86	222	144	310	250	418	218	394
25	120	243	152	322	286	467	242	384
26	81	209	228	386	390	562	200	364
27	88	229	248	398	298	470	191	369
28	103	248	292	427	99	251	144	322
29	--	--	148	287	51	182	288	437
30	--	--	139	290	39	169	280	396
31	--	--	172	318	--	--	225	362
Average	77	188	150	298	192	348	196	350

Day	June		July		August		September	
1	213	359	360	500	388	482	660	776
2	227	376	392	528	202	330	440	580
3	248	389	570	656	288	420	748	828
4	144	280	228	368	242	346	670	788
5	245	387	298	444	178	308	415	513
8	240	402	330	472	178	296	380	502
7	248	408	328	452	338	424	409	547
8	317	479	640	726	242	372	416	570
9	384	528	390	488	278	420	430	570
10	437	593	305	438	355	516	510	646
11	508	636	350	504	410	548	630	740
12	529	663	520	652	515	640	725	826
13	675	770	605	726	380	540	818	920
14	473	611	310	470	278	448	630	788
15	501	600	315	478	358	520	501	678
16	551	566	405	554	560	672	570	722
17	471	562	360	536	542	638	645	772
18	310	482	368	548	470	594	508	642
19	385	558	--	--	550	676	475	624
20	582	710	238	386	765	820	570	736
21	822	960	282	360	785	852	615	764
22	691	798	198	310	890	900	675	820
23	265	400	230	372	920	910	645	786
24	207	394	242	392	910	880	600	740
25	190	334	345	480	660	702	610	744
26	252	390	520	616	1,050	1,000	715	786
27	292	438	458	576	920	902	740	856
28	205	312	360	490	680	746	830	892
29	291	382	348	486	1,030	1,030	670	740
30	332	422	358	518	740	852	710	776
31	--	--	402	554	480	566	--	--
Average	374	506	368	503	535	624	599	722

MUSKINGUM RIVER BASIN--Continued

3-1290. TUSCARAWAS RIVER AT NEWCOMERSTOWN, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

3-1445. MUSKINGUM RIVER AT DRESDEN, OHIO

LOCATION.--At gaging station at bridge on State Highway 208, 0.5 mile east of Dresden, Muskingum County, and 0.5 mile downstram from Wakatomika Creek.
DRAINAGE AREA.--5,982 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1952 to September 1959.
Sediment: October 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 84°F Aug. 25-26; minimum, freezing point on many days during December and January.
Sediment concentrations: Maximum daily, not determined; minimum daily, 3 ppm Oct. 25.
Sediment loads: Maximum daily, not determined; minimum daily, 13 tons Oct. 25.
EXTREMES, 1952-59.--Water temperatures: Maximum, 88°F Aug. 4, 1955; minimum, freezing point on many days during winter months.
Sediment concentrations(1952-58): Maximum daily, 870 ppm Nov. 17, 1955; minimum daily, 1 ppm on several days during 1952, 1954, 1958.
Sediment loads(1952-58): Maximum daily, 45,500 tons Feb. 26, 1956; minimum daily, 3 tons on several days during 1952-54, 1956.
REMARKS.--Flow affected by ice Dec. 11-17, Jan. 8-13, 17-21. Flow regulated by 14 flood-control reservoirs. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October....	62	60	58	59	59	55	56	59	61	61	59	57	55	61	60	60	61	60	58	55	55	56	57	56	57	55	54	52	52	49	49	57
November...	49	50	50	50	53	51	51	50	48	46	48	49	52	51	49	56	57	60	57	55	51	49	50	47	45	46	42	38	36	34	--	49
December...	34	34	36	37	36	--	--	32	--	--	--	--	--	--	--	--	33	33	35	--	33	35	35	35	35	36	34	36	34	37	34	35	a34
January....	35	34	32	32	--	--	32	--	--	--	33	35	33	34	36	--	--	--	--	--	--	--	--	34	35	33	34	34	34	35	34	a33
February...	33	33	34	34	35	34	35	35	36	40	39	38	38	40	39	39	41	38	37	33	35	36	37	37	38	39	39	41	--	--	--	37
March.....	40	41	40	41	41	40	39	39	40	40	39	39	39	41	44	42	40	40	42	44	45	43	44	46	49	50	48	47	46	44	46	42
April.....	53	51	51	49	48	48	51	55	55	54	52	47	49	52	54	53	55	57	56	55	55	55	55	58	58	57	57	57	57	57	--	54
May.....	56	57	62	63	61	69	69	68	65	67	65	67	67	63	59	58	54	58	61	66	72	70	70	68	66	67	71	70	71	70	72	65
June.....	72	69	68	69	71	71	74	71	74	74	76	77	74	74	68	67	66	65	66	72	73	72	70	70	71	72	73	76	76	77	--	72
July.....	78	77	77	75	76	74	73	74	75	76	77	76	75	75	75	76	77	79	79	77	75	77	78	78	75	76	77	78	79	78	78	76
August.....	77	75	74	75	73	73	74	74	74	73	75	76	77	78	80	81	79	79	78	79	80	82	83	82	84	84	82	83	82	83	79	78
September..	80	79	77	75	75	78	79	78	80	80	75	70	69	68	69	68	65	62	61	63	64	67	69	70	70	72	72	72	73	72	--	72

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

MUSKINGUM RIVER BASIN--Continued

3-1445. MUSKINGUM RIVER AT DRESDEN, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedimer	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	3,180	24	206	1,560	19	80	1,900	10	
2...	3,010	22	179	1,560	18	76	2,100	12	
3...	3,060	21	174	1,570	18	68	2,180	11	
4...	2,900	17	133	1,580	26	107	2,270	7	
5...	2,730	16	118	1,570	19	80	2,890	8	
6...	2,580	12	84	1,570	16	68	5,010	60	a 8
7...	2,460	11	73	1,530	26	107	5,890	75	a 1,2
8...	2,380	9	58	1,500	31	126	5,430	56	8
9...	2,290	8	50	1,480	30	120	4,260		
10...	2,290	12	74	1,530	29	120	3,170		
11...	2,300	10	62	1,650	35	156	2,800	--	e 2
12...	2,260	10	61	1,710	43	198	2,500		
13...	2,180	8	47	1,740	45	211	2,650		
14...	2,100	7	40	1,690	35	160	2,530		
15...	2,040	9	50	1,450	29	114	2,430		
16...	1,990	10	54	1,830	29	143	2,350	15	
17...	1,930	11	57	2,000	27	146	2,300	10	
18...	1,930	9	47	2,300	28	174	2,310	9	
19...	2,060	6	33	2,760	24	179	2,310	4	
20...	2,040	5	28	2,870	27	209	2,320	4	a
21...	1,930	4	21	2,720	24	176	2,290	6	
22...	1,870	4	20	2,660	16	115	2,310	5	
23...	1,780	5	24	2,490	11	74	2,310	4	
24...	1,600	4	17	2,290	10	62	2,320	6	
25...	1,570	3	13	2,140	8	46	2,340	6	
26...	1,570	7	30	2,120	10	57	2,420	6	
27...	1,560	8	34	2,180	10	59	2,380	7	
28...	1,560	8	34	2,420	9	59	2,380	7	
29...	1,590	14	60	2,420	12	78	2,400	6	
30...	1,630	14	62	2,180	11	65	2,380	9	
31...	1,600	17	73	--	--	--	2,490	10	
Total	66,000	--	2,016	59,070	--	3,433	85,620	--	5,8

Day	January			February			March		
1...	2,920	15	118	28,700	158	12,200	16,700	111	5,0
2...	4,980	69	s 985	28,000	134	10,100	14,000	115	4,3
3...	9,080	221	s 5,990	27,000	130	9,480	14,300	92	3,5
4...	11,600	280	b 8,800	25,500	137	9,430	14,400	78	3,0
5...	9,570	170	a 4,400	24,400	132	8,700	14,400	85	3,3
6...	6,630	110	a 2,000	24,000	128	8,290	13,800	95	3,5
7...	4,940	65	867	23,000	125	7,760	14,000	118	4,4
8...	4,200	40	a 450	21,700	102	5,980	14,600	122	4,8
9...	3,900	30	a 320	21,200	90	5,150	13,300	112	4,0
10...	3,500	25	a 240	25,700	420	s 30,700	12,800	108	3,7
11...	3,150	19	162	27,700	500	37,400	13,500	88	3,2
12...	3,000	11	89	24,900	278	18,700	13,300	73	2,6
13...	2,800	12	91	27,300	198	14,600	12,300	60	1,9
14...	2,940	11	87	28,100	185	14,000	11,900	66	2,1
15...	3,320	19	170	27,700	158	11,800	14,800	175	6,9
16...	5,620			28,200	150	11,400	18,700	205	10,4
17...	7,000	--	e 550	28,800	127	9,880	20,500	165	9,1
18...	6,500			29,200	109	8,590	20,000	110	a 5,9
19...	5,600			29,100	94	7,380	16,800	65	2,9
20...	6,000	38	616	28,400	90	6,900	13,400	52	1,8
21...	17,400	660	s 42,300	27,700	87	6,510	11,600	58	1,8
22...	36,900	--	e 160,000	27,200	71	5,210	10,600	55	1,5
23...	33,800	--	e 91,000	27,100	71	5,200	9,480	50	1,2
24...	18,800	427	21,700	26,900	68	4,940	8,090	45	9
25...	19,200	320	16,600	26,800	60	4,340	7,380	45	8
26...	26,300	300	21,300	25,100	60	4,070	6,860	42	7
27...	27,400	240	17,800	22,500	65	3,950	6,960	46	8
28...	28,000	222	16,800	20,600	127	7,060	8,620	72	1,6
29...	28,300	213	16,300	--	--	--	9,480	29	2,3
30...	28,800	193	15,000	--	--	--	8,340	60	1,3
31...	29,100	184	14,400	--	--	--	7,540	42	8
Total	401,250	--	460,785	732,500	--	289,720	392,450	--	101,3

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

MUSKINGUM RIVER BASIN--Continued

3-1445. MUSKINGUM RIVER AT DRESDEN, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959--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	7,300	37	729	20,700	130	a 7,300	8,400	160	3,630
2	8,740	149	3,520	21,000	95	5,390	8,140	89	1,960
3	12,600	161	5,480	20,800	88	4,940	9,740	225	5,920
4	15,200	172	7,060	19,500	95	5,000	9,520	200	5,040
5	15,200	137	5,620	15,600	86	3,620	7,860	146	3,100
6	13,600	109	4,000	11,800	84	2,680	6,090	102	1,680
7	11,300	74	2,260	9,920	76	2,040	4,930	75	998
8	9,440	61	1,550	8,690	66	1,550	4,160	57	640
9	8,360	56	1,260	7,760	60	1,260	3,620	44	430
10	7,640	43	887	6,940	50	937	3,240	31	271
11	7,100	38	728	6,320	39	665	2,980	29	233
12	6,640	30	538	6,540	45	795	2,900	33	258
13	6,190	27	451	8,840	78	1,860	s 6,040	547	s 9,680
14	5,830	25	394	9,680	107	2,800	6,090	278	4,570
15	5,680	26	399	8,910	64	1,540	4,520	165	2,010
16	5,690	26	399	8,050	47	1,020	3,670	70	694
17	5,220	26	366	7,220	50	975	3,029	25	211
18	4,810	26	338	6,540	42	742	2,640	10	71
19	4,540	22	270	6,190	47	786	2,420	8	52
20	4,520	21	256	6,840	82	1,510	2,260	5	30
21	4,910	24	318	6,070	48	787	2,100	10	57
22	5,380	23	334	5,830	54	850	2,100	15	85
23	4,910	24	318	7,860	216	4,580	5,290	483	s 7,740
24	4,450	22	264	8,140	150	3,300	5,750	278	4,320
25	4,100	17	188	6,940	125	2,340	4,490	82	994
26	3,860	13	135	5,510	67	997	5,490	217	s 3,700
27	4,160	32	s 389	4,900	46	608	7,640	525	10,800
28	12,000	322	s 11,300	5,770	85	1,320	7,760	438	9,180
29	19,500	340	17,900	8,540	352	a 9,010	6,640	200	3,580
30	20,400	189	10,400	11,400	515	15,800	4,910	125	1,660
31	--	--	--	10,100	325	8,860	--	--	--
Total	249,270	--	78,051	298,900	--	95,862	154,510	--	83,694

Day	July			August			September		
1	4,180	89	1,000	4,130	66	736	2,100	32	181
2	4,300	82	952	3,650	60	591	2,260	44	268
3	4,520	115	1,400	2,930	38	301	2,710	58	424
4	3,810	85	874	3,680	88	s 1,040	2,960	70	559
5	3,160	63	538	5,220	240	3,380	2,440	50	329
6	2,810	37	281	5,580	150	2,260	1,950	32	168
7	2,710	23	168	4,520	128	1,560	1,610	26	113
8	2,990	53	428	3,460	70	654	1,420	21	80
9	2,960	45	360	2,930	40	316	1,290	18	63
10	2,470	43	287	2,710	32	234	1,240	17	57
11	2,140	32	185	2,390	24	155	1,220	15	49
12	2,100	32	181	2,060	22	122	1,240	17	57
13	2,750	38	282	1,910	17	88	1,250	18	61
14	2,610	39	275	1,810	18	88	1,180	24	76
15	2,130	33	190	1,690	18	82	1,110	29	87
16	1,870	26	131	1,580	17	72	1,060	30	86
17	1,720	25	116	1,560	15	63	1,030	20	56
18	1,660	25	112	1,470	14	56	1,010	21	57
19	1,770	40	191	1,440	19	74	990	17	45
20	4,760	422	5,420	1,430	25	96	980	17	45
21	5,060	378	5,160	1,400	22	83	962	25	65
22	3,750	179	1,810	1,350	24	87	944	20	51
23	2,820	87	662	1,280	20	69	935	20	50
24	2,810	73	554	1,260	21	71	935	17	43
25	3,160	216	1,840	1,300	23	81	899	16	39
26	2,540	86	590	1,370	24	89	926	11	28
27	2,280	48	295	1,460	24	95	890	9	22
28	2,420	40	261	1,840	30	149	890	10	24
29	2,180	33	194	1,690	30	137	908	15	37
30	3,040	131	s 1,160	1,500	25	101	1,050	21	60
31	4,040	108	1,180	1,650	21	94	--	--	--
Total	91,520	--	27,077	72,250	--	13,024	40,389	--	3,280

Total discharge for year (cfs-days)..... 2,643,729
Total load for year (tons)..... 1,164,164

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

MUSKINGUM RIVER BASIN--Continued

3-1445. MUSKINGUM RIVER AT DRESDEN, OHIO--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 24, 1959	1330			17,500	392		65	70	76	82	87	89	93	96	100		SBWC
Feb. 10	1730			28,900	584		46	55	67	83	92	96	98	100			SBWC
Apr. 28	1700			14,100	425		48	58	70	82	90	94	98	100			SBWC
Apr. 29	0830			19,400	361		47	57	65	77	86	90	93	100			SBWC
May 30	0830			11,700	546		63	70	81	91	96	98	100	--			SBWC
June 13	1100			6,940	1,200		47	59	70	89	97	99	100	--			SBWC
June 23	1830			6,320	837		56	66	78	93	97	99	100	--			SBWC
June 23	1830			6,320	837		18	30	64	94	98	98	100	--			SBN
July 20	1945			5,270	521		51	66	69	89	94	98	100	--			SBWC
July 20	1945			5,270	521		28	49	81	93	97	98	100	--			SBN

3-1500. MUSKINGUM RIVER AT McCONNELSVILLE, OHIO

LOCATION.--At bridge on State Highway 37 at McConnelsville, Morgan County, 0.5 mile upstream from gaging station and dam No. 7, and 3 miles downstream from Oilspring Run. Temperature recorder located at gaging station.
DRAINAGE AREA.--7,411 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951, October 1954 to September 1959.
Water temperatures: October 1950 to September 1951, July 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 837 ppm Aug. 29 to Sept. 7; minimum, 152 ppm Jan. 22-29.
Hardness: Maximum, 484 ppm Nov. 6-13; minimum, 109 ppm Jan. 22-29.
Specific conductance: Maximum daily, 1,720 micromhos Aug. 31; minimum daily, 242 micromhos Jan. 24.
Water temperatures: Maximum, 90°F Aug. 25; minimum, freezing point Jan. 8, 9, 21, 22.
EXTREMES, 1950-51, 1954-59.--Dissolved solids: Maximum, 2,070 ppm Oct. 13-15, 1954; minimum, 152 ppm Jan. 22-29, 1959.
Hardness: Maximum, 916 ppm Oct. 13-15, 1954; minimum, 109 ppm Jan. 22-29, 1959.
Specific conductance: Maximum daily, 3,410 micromhos Oct. 14, 1954; minimum daily, 242 micromhos Jan. 24, 1959.
Water temperatures: Maximum, 94°F Aug. 4, 1955; minimum, freezing point Feb. 2, 1951, Feb. 10, 11, 1955, Jan. 8, 9, 21, 22, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Values reported for water temperatures during September are once-daily measurements at 4 p.m. at the chemical sampling site. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow regulated by 14 flood-control reservoirs.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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 (calculated)			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. 1-6, 1958.	3,477	10	0.02	90	19	48	2.9	123		120	117	0.3	3.1		471		4,422	303	202		815	7.5	0
Oct. 7-13.....	2,747	9.4	.02	108	23	59	2.7	138		138	161	.4	3.7		573		4,250	364	251		997	7.5	1
Oct. 14-29.....	2,234	8.9	.15	124	22	71	2.8	147		146	189	.4	2.7		639		3,854	400	280		1,120	7.6	1
Oct. 30-Nov. 5.	1,897	7.3	.02	124	20	72	2.6	154		154	180	.6	5.1		640		3,278	392	266		1,110	7.2	6
Nov. 6-13.....	1,992	9.0	.02	161	20	98	3.0	163		158	300	.7	6.1		836		4,496	484	350		1,460	7.2	6
Nov. 14-25.....	2,758	9.6	.11	137	22	80	3.1	155		152	231	.6	6.2		718		5,347	433	306		1,270	7.2	6
Nov. 26-Dec. 5.	2,923	9.2	.01	102	20	37	2.8	120		131	132	.6	5.0		498		3,930	337	238		917	7.3	6
Dec. 6-10.....	5,266	8.6	.60	83	17	42	2.4	116		121	108	.5	4.1		444		6,313	277	182		768	7.2	6
Dec. 11-18.....	2,939	9.1	.00	73	17	30	3.6	122		116	69	.2	3.6		382		3,031	252	152		648	7.3	5
Dec. 19-22.....	2,782	11	.01	98	20	48	4.0	144		132	120	.4	6.4		511		3,838	327	209		873	7.3	5
Dec. 23-31.....	2,951	5.4	.02	101	20	55	3.9	138		129	141	.4	6.6		530		4,223	334	221		936	7.4	3
Jan. 1-3, 1959.	7,163	7.7	.04	96	20	59	3.8	120		106	169	.7	6.7		528		10,210	322	223		911	7.7	3
Jan. 4-11.....	6,531	8.0	.04	62	15	26	3.2	100		92	65	.6	4.0		325		5,731	216	134		566	7.5	5
Jan. 12-19.....	5,785	8.6	.04	79	17	41	3.1	117		100	104	.7	3.3		414		6,466	267	171		724	7.5	5
Jan. 20-21.....	17,740	6.6	.04	48	12	14	2.4	75		87	31	.2	3.2		241		11,540	170	108		410	7.5	10

MUSKINGUM RIVER BASIN--Continued

3-1500. MUSKINGUM RIVER AT McCONNELSVILLE, OHIO--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 (calculated)			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				
Jan. 22-29, 1959	36,880	6.1	0.14	29	8.9	7.4	3.3	56		48	18	0.4	3.2		152		15,140	109	63		263	7.3	15
Jan. 30-Feb. 11.	29,090	6.3	.17	38	10	14	3.0	66		58	35	.4	3.0		200		15,710	136	82		356	7.1	10
Feb. 12-20.....	32,020	7.9	.12	34	10	10	2.7	65		60	24	.4	3.2		184		15,910	126	73		316	7.2	8
Feb. 21-28.....	27,140	9.8	.02	46	12	15	2.4	79		75	36	.2	4.7		240		17,590	165	100		408	7.4	6
Mar. 1-14.....	15,780	9.9	.01	58	13	21	2.2	94		85	52	.2	4.9		292		12,440	198	121		508	7.4	6
Mar. 16-31.....	12,820	9.4	.02	64	14	25	2.3	100		94	66	.2	4.2		328		11,350	217	135		563	7.4	3
Apr. 1-12.....	11,420	11	.00	59	15	24	2.4	94		94	60	.2	3.7		316		9,744	209	132		545	7.5	4
Apr. 13-22.....	5,797	8.3	.00	75	17	33	2.7	116		113	80	.3	3.2		390		6,104	257	162		662	7.3	3
Apr. 23-25.....	5,107	8.6	.00	92	19	48	3.1	125		122	138	.3	3.4		496		6,839	308	205		853	7.1	5
Apr. 26-29.....	9,482	8.4	.00	78	18	38	2.9	125		112	100	.3	2.5		422		10,800	269	166		724	7.2	5
Apr. 30-May 5...	21,110	10	.01	42	11	11	1.8	81		72	24	.1	4.4		216		12,310	150	84		374	7.0	6
May 6-15.....	9,339	9.6	.02	61	15	25	2.6	106		91	60	.3	3.9		321		8,094	214	127		553	7.3	6
May 16-31.....	7,573	8.8	.02	70	14	31	2.6	105		94	81	.4	3.6		357		7,300	232	146		632	7.2	4
June 1-8.....	7,798	9.1	.02	66	12	27	2.6	104		82	76	.3	4.3		330		6,948	214	129		592	7.1	5
June 9-12.....	4,002	8.8	.03	81	15	34	2.9	131		101	92	.4	4.2		404		4,365	264	156		714	7.7	5
June 13-14.....	5,850	8.0	.02	101	17	50	3.8	132		129	141	.5	2.2		518		8,182	322	214		904	6.8	8
June 15-16.....	4,795	8.6	.02	70	14	32	3.4	98		90	89	.4	3.6		359		4,648	232	152		642	7.5	6
June 17-25.....	3,987	9.6	.01	94	16	54	4.1	126		110	143	.5	4.1		497		5,350	301	198		890	7.3	6
June 26-27.....	6,190	9.4	.02	83	16	44	3.9	96		135	109	.5	4.7		453		7,571	273	195		781	6.9	3
June 28-29.....	7,395	8.4	.02	55	13	25	3.9	96		78	59	.4	4.9		295		5,890	191	112		526	7.6	4
June 30-July 5..	4,627	12	.01	84	13	46	4.0	110		84	134	.4	4.9		436		5,447	263	173		797	7.1	5

July 7-21,1959.	3,115	11	.00	116	19	67	4.5	128		130	196	.5	2.7		610		5,130	368	263		1,080	7.4	4
July 22-30.....	3,293	11	.00	84	13	53	5.0	108		106	125	.4	2.6		453		4,028	263	175		836	7.0	3
July 31-Aug. 5.	3,930	14	.04	117	16	79	4.5	116		130	220	.4	2.2		640		6,791	358	263		1,140	7.3	4
Aug. 6-7.....	4,910	10	.00	60	13	28	4.5	96		91	70	.2	3.1		327		4,335	203	125		580	7.6	2
Aug. 8-14.....	2,941	11	.00	86	17	50	4.5	102		100	130	.2	2.7		452		3,589	285	201		821	7.2	4
Aug. 15-28.....	1,824	9.8	.03	105	22	74	5.0	130		137	190	.3	.8		608		2,994	353	246		1,060	7.3	5
Aug. 29-Sept. 7	2,490	5.2	.00	151	15	118	7.5	110		135	350	.3	.6		837		5,627	438	348		1,520	7.2	2
Sept. 8-9.....	1,700	2.9	.00	94	11	62	5.0	92		112	166	.4	2.4		501		2,300	280	204		968	7.3	2
Sept. 10-13....	1,500	3.0	.00	140	18	110	5.7	103		114	330	.4	2.1		774		3,135	424	339		1,440	7.1	1
Sept. 14-20....	1,300	8.3	.00	110	20	70	5.5	139		130	185	.3	2.5		600		2,106	357	243		1,060	7.4	3
Sept. 21-30....	1,130	3.9	.01	141	22	103	6.2	138		154	275	.4	1.6		775		2,364	443	330		1,370	7.5	2
Time-weighted average.....	8,279	8.8	0.04	88	16	48	3.5	114		110	129	0.4	3.6		463		7,072	286	192		816	--	5

3-1500. MUSKINGUM RIVER AT McCONNELSVILLE, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	69	68	67	66	66	64	63	64	64	65	65	64	64	63	64	64	65	66	64	64	64	63	63	63	62	61	60	59	57	57	56	63
Minimum.....	68	67	66	66	64	63	62	62	63	64	64	64	63	63	63	64	64	64	64	63	62	62	63	62	61	60	59	57	57	56	55	62
November	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	55	55	55	53	52	54	54	53	52	51	50	49	50	51	51	52	53	54	56	56	56	54	51	50	48	48	48	47	45	41	--	51
Minimum.....	55	55	53	52	52	52	53	52	51	50	49	49	49	49	50	51	52	53	54	56	54	51	50	48	48	48	47	45	41	41	--	50
December	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	41	39	37	37	37	37	36	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	34	35
Minimum.....	39	36	36	36	36	36	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	34
January	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	34	34	33	33	33	33	33	33	33	33	33	33	33	33	34	34	34	33	33	33	33	35	35	33	33	33	33	33	33	34	34	33
Minimum.....	34	33	33	33	33	33	33	32	32	33	33	33	33	33	33	34	33	33	33	33	32	32	33	33	33	33	33	33	33	33	34	33
February	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	34	34	34	35	35	35	35	35	35	40	40	40	38	39	40	40	40	40	40	38	37	36	37	37	37	37	37	38	39	--	--	37
Minimum.....	34	34	34	34	35	35	34	34	35	35	40	38	38	38	39	40	40	40	38	37	36	36	36	37	37	37	37	37	38	--	--	37
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	40	40	41	41	42	42	42	41	40	40	40	40	38	40	43	43	43	42	40	42	44	45	45	45	46	48	48	48	48	46	46	43
Minimum.....	39	40	40	41	41	42	41	40	40	40	40	38	38	38	40	43	42	40	40	40	42	44	45	45	45	46	48	48	46	46	46	42
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	48	50	50	50	49	50	50	52	54	54	54	53	50	50	50	52	55	56	57	57	57	55	55	56	56	57	57	58	58	56	--	54
Minimum.....	46	48	50	49	48	48	50	50	52	54	53	50	49	49	49	50	52	55	56	57	55	54	54	55	56	56	57	57	56	56	--	52
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	57	58	60	63	65	67	68	68	67	65	64	66	66	66	64	61	59	60	62	66	70	73	74	74	70	70	72	73	74	74	74	67
Minimum.....	56	57	58	60	63	65	67	67	65	64	64	64	66	64	61	59	59	59	60	62	66	70	73	70	69	69	70	71	73	74	73	65
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	74	74	74	72	72	73	74	75	77	79	79	78	78	78	76	73	73	72	72	73	76	78	78	78	77	77	79	79	80	82	--	76
Minimum.....	74	74	72	71	72	72	74	75	76	78	78	78	76	72	71	72	72	72	72	73	75	76	77	76	76	77	78	78	80	--	75	75
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	84	84	82	82	81	79	81	82	81	81	84	82	83	82	85	86	87	84	84	83	83	83	82	82	82	82	83	83	83	83	83	83
Minimum.....	82	82	81	80	79	79	79	79	81	81	81	81	82	81	82	82	82	82	83	83	82	81	81	81	82	82	81	81	81	82	82	81
August	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Maximum.....	83	83	82	81	81	81	80	80	80	80	81	83	84	86	85	86	85	84	85	87	86	86	88	88	90	88	88	88	88	87	88	85
Minimum.....	82	81	80	80	80	80	79	79	80	79	80	80	81	82	83	84	83	82	82	83	84	84	85	86	86	86	85	86	86	85	84	82
September	84	84	85	84	83	82	82	82	82	80	79	79	79	78	78	74	71	72	72	73	72	73	72	73	74	75	76	76	76	74	--	77
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

3-1520. LITTLE KANAWHA RIVER AT GLENVILLE, W. VA.

LOCATION.--At waterplant, at Glenville, Gilmer County, 0.5 mile upstream from gaging station, and 0.7 mile upstream from Sycamore Run.
DRAINAGE AREA.--386 square miles upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: October 1946 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F June 30, July 1; minimum, 33°F on several days during January.
EXTREMES, 1946-59.--Water temperatures: Maximum, 86°F Aug. 22, 1947, July 31, Aug. 1-6, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Temperature records furnished by West Virginia Water Service Company. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

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....	64	60	62	62	61	61	60	60	60	62	61	60	58	60	62	62	62	62	61	60	61	62	61	59	58	57	56	54	54	52	50	59
November...	50	50	50	50	48	48	50	48	48	48	48	48	48	49	51	52	54	53	52	50	48	45	44	40	38	37	36	36	35	34	--	46
December...	34	36	36	38	43	40	38	36	34	35	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	35	35	35	35	35	35	35
January....	36	35	34	33	33	33	33	34	33	33	34	34	34	35	35	35	34	34	35	36	40	43	37	37	37	38	39	38	40	40	40	36
February...	40	38	36	37	38	39	40	41	43	44	44	44	43	44	44	43	42	42	40	38	36	36	36	36	36	38	39	40	--	--	--	40
March.....	38	36	38	40	40	42	42	41	40	40	42	44	45	46	47	47	46	45	46	47	46	46	47	48	51	51	50	50	49	50	50	45
April.....	50	51	48	47	48	50	51	54	56	55	54	49	48	50	51	53	56	58	59	59	58	58	58	59	59	59	59	58	56	60	--	54
May.....	61	63	66	68	70	70	69	69	68	67	67	67	66	58	57	56	59	62	65	69	69	70	66	66	66	68	68	70	72	76	78	67
June.....	77	76	74	72	72	70	71	72	72	74	74	76	75	73	70	69	69	68	68	72	73	74	75	76	74	75	76	74	76	82	--	73
July.....	82	80	78	78	76	78	76	74	74	78	78	78	78	78	78	78	78	78	78	76	75	75	76	76	76	78	77	76	78	77	71	77
August.....	71	71	73	76	74	72	73	74	72	73	75	76	77	78	79	80	79	79	80	80	79	80	81	79	80	80	80	79	79	78	78	77
September..	77	77	76	75	74	74	75	75	76	74	72	70	69	67	66	65	65	64	63	63	64	64	63	65	66	67	67	68	68	68	--	69

HOCKING RIVER BASIN

3-1595. HOCKING RIVER AT ATHENS, OHIO.

LOCATION.--At gaging station at Mill Street Bridge, 0.8 mile east of business section at Athens, Athens County, and 3.5 miles downstream from Margaret Creek.
DRAINAGE AREA.--944 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
Sediment records: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 823 ppm Sept. 16-30; minimum, 157 ppm Jan. 22-24.
Hardness: Maximum, 446 ppm Sept. 16-30; minimum, 86 ppm Jan. 22-24.
Specific conductance: Maximum daily, 1,340 micromhos Aug. 31; minimum daily, 192 micromhos Jan. 22.
Water temperatures: Maximum, 80°F July 1, Aug. 22-24, 26; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 765 ppm Feb. 11; minimum daily, 1 ppm Nov. 4-6, 14, 15.
Sediment loads: Maximum daily, 21,200 tons Jan. 22; minimum daily, less than 0.5 ton on several days during September.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 1,320 ppm Oct. 4, 1957; minimum, 150 ppm Feb. 7-8, 1955.
Hardness: Maximum, 702 ppm Oct. 4, 1957; minimum, 86 ppm Jan. 22-24, 1959.
Specific conductance: Maximum daily, 1,680 micromhos Oct. 4, 1957; minimum daily, 192 micromhos Jan. 22, 1959.
Water temperatures: Maximum, 84°F Aug. 7, 1955; minimum, freezing point on several days during winter months.
Sediment concentrations (1956-59): Maximum daily, 1,320 ppm July 8, 1958; minimum daily, 1 ppm on several days each year.
Sediment loads (1956-59): Maximum daily, 21,200 tons Jan. 22, 1959; minimum daily, less than 0.5 ton on many days each year.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Some regulation of flow by Tom Jenkins Reservoir and mill above station. Flow affected by ice Dec. 1, 9-18, 21, 22, 26-28, 31, Jan. 2, 6-12, 16, 19.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-8, 1958	452	12		0.02	0.00	71	23	23	1.2	100	192	26	0.2	1.9	407	272	190		616	7.4	2
Oct. 9-31	266	9.8		.03	.00	80	31	37	2.4	115	246	34	.2	1.5	522	327	233		758	7.4	2
Nov. 1-17	252	8.5		.01	.01	83	37	37	3.2	96	286	45	.3	1.7	608	359	281		829	7.3	4
Nov. 18-21, 26, 29-Dec. 5	664	7.8		.02	.11	71	28	33	3.3	72	232	46	.4	1.8	508	292	233		711	7.2	3
Dec. 7-8	1,665	8.8		.01	.01	36	14	11	2.8	46	104	18	.2	2.3	258	148	110		370	7.2	4
Dec. 11-13, 15-18	408	9.7		.00	.06	59	23	22	2.0	80	178	29	.2	2.6	377	242	176		574	7.1	4
Dec. 19-31	369	9.1		.00	.31	63	26	24	2.0	88	192	32	.2	2.8	417	264	192		625	7.0	5
Jan. 4-15, 1959	710	8.9		.06	.32	54	22	19	1.9	87	148	27	.4	2.4	354	225	154		519	7.1	2
Jan. 16-20	2,504	8.0		.05	.02	36	15	11	2.2	48	105	17	.3	2.4	247	152	112		361	7.3	2
Jan. 22-24	13,010	6.1		.14	.00	21	8.2	4.6	3.0	36	54	9.0	.3	3.2	157	86	56		212	7.2	15
Jan. 25-Feb. 10	1,687	7.8		.08	.28	50	21	16	1.9	68	150	22	.4	2.8	344	212	156		479	7.3	3
Feb. 11-17	5,287	7.5		.07	.01	31	13	7.3	1.9	44	87	11	.2	2.5	221	131	95		300	7.3	4
Feb. 18-Mar. 11	1,417	8.6		.00	.05	49	22	16	2.0	62	162	21	.2	3.0	325	213	162		490	7.2	2
Mar. 12-14	2,060	7.9		.00	.01	39	16	12	1.7	52	122	16	.2	2.4	255	164	121		391	7.2	2
Mar. 15-18	3,390	8.3		.00	.01	34	14	9.4	1.5	46	105	12	.2	3.0	223	143	105		340	7.1	1

Mar. 19-Apr. 2, 1959.....	996	8.7		.14	.10	56	26	19	1.6	69	180	25	.1	2.6	373	247	190		545	7.0	2
Apr. 3-21.....	1,157	8.0		.01	.07	49	20	16	1.7	59	160	20	.2	1.9	325	204	156		479	7.1	3
Apr. 22-28.....	820	9.4		.03	.01	58	24	22	1.9	57	209	25	.2	1.7	403	243	197		580	7.4	4
Apr. 29-May 6.	1,505	8.4		.05	.00	42	16	15	1.8	46	140	16	.2	2.5	273	171	134		425	7.2	4
May 7-13.....	664	8.7		.38	.00	60	25	23	2.2	62	208	26	.2	1.8	413	253	202		603	7.3	3
May 14-23.....	706	10		.04	.00	58	24	23	2.2	63	200	24	.2	2.0	392	243	192		586	7.6	2
May 24-25.....	510	9.5		.05	.00	48	20	19	2.3	29	189	20	.3	2.2	298	202	178		510	6.5	1
May 26-June 6.	439	12		.04	.00	68	28	26	2.7	65	241	28	.2	3.2	460	285	232		672	7.3	2
June 7-20.....	191	11		.06	.00	82	33	36	3.1	100	281	35	.2	2.6	571	340	258		804	7.3	3
June 21-30....	150	10		.07	.00	95	37	48	3.4	102	343	42	.3	2.2	667	389	306		930	7.4	3
July 1-15.....	117	11		.00	.00	97	40	58	3.9	91	370	66	.1	2.1	703	407	332		1,000	7.5	3
July 16-31....	115	8.4		.00	.03	98	47	64	4.1	67	425	60	.2	1.6	757	438	383		1,040	7.2	1
Aug. 1-15.....	80.7	8.9		.01	.01	98	42	68	3.8	86	400	58	.2	1.3	780	417	347		1,060	7.3	3
Aug. 16-31....	77.8	3.6		.00	.14	93	37	80	4.1	74	407	58	.2	.8	730	384	324		1,100	7.2	3
Sept. 1-15....	74.7	5.7		.00	1.1	100	41	78	4.7	60	428	74	.3	2.4	787	418	369		1,130	7.1	3
Sept. 16-30...	58.7	9.6		.00	1.9	106	44	83	4.7	60	469	66	.2	4.4	823	446	397		1,200	7.1	1
Time-weighted average....	839	8.8		0.04	0.11	71	29	36	2.8	75	255	37	0.2	2.2	504	296	235		725	--	3

HOCKING RIVER BASIN--Continued

3-1595. HOCKING RIVER AT ATHENS, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 7 a.m.)

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

HOCKING RIVER BASIN--Continued

3-1595. HOCKING RIVER AT ATHENS, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959

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...	640	14	24	220	3	2	300	13	a 10
2...	585	13	20	223	3	2	329	12	a 11
3...	492	10	13	226	2	1	354	24	23
4...	444	8	10	233	1	1	967	124	s 382
5...	418	8	9	230	1	1	3,000	604	s 5,320
6...	375	7	7	223	1	1	4,010	276	s 3,170
7...	341	7	6	214	3	2	2,120	18	103
8...	324	6	5	204	3	2	1,210		
9...	320	8	7	204	2	1	900		
10...	332	8	7	220	2	1	600		
11...	341	7	6	250	2	1	550		
12...	320	6	5	250	2	1	490	--	e 25
13...	289	4	3	226	2	1	450		
14...	268	3	2	220	1	1	410		
15...	257	3	2	237	1	1	390		
16...	250	4	3	394	8	8	360		
17...	247	4	3	502	23	31	310		
18...	254	5	3	389	4	4	310	15	12
19...	257	5	3	433	7	8	312	19	16
20...	250	5	3	640	21	36	336	19	a 17
21...	233	4	2	574	28	43	340	20	a 18
22...	217	4	2	470	12	15	330	20	a 18
23...	226	3	2	413	9	10	324	26	23
24...	301	4	3	371	12	12	375	35	35
25...	261	4	3	341	5	5	480	34	44
26...	240	5	3	332	7	6	420	30	a 35
27...	247	5	3	336	13	12	390	30	a 30
28...	257	6	4	336	4	4	360	27	26
29...	264	2	1	345	11	10	366	27	27
30...	250	3	2	312	13	a 11	375	24	24
31...	226	3	2	--	--	--	390	23	24
Total	9,726	--	168	9,568	--	234	21,857	--	9,618

Day	January			February			March		
1...	639	58	s 111	1,680	117	531	1,270	68	233
2...	2,300	432	s 3,030	1,260	70	a 240	1,840	170	844
3...	2,480	383	s 2,740	1,050	60	a 170	1,610	128	556
4...	1,480	110	440	1,380	56	209	1,580	79	337
5...	1,000	40	a 110	1,450	64	250	1,320	58	207
6...	650	19	a 35	1,120	53	160	1,350	57	208
7...	600	17	28	912	43	106	1,500	73	296
8...	550			905	36	88	1,280	49	169
9...	490			886	33	79	1,160	41	128
10...	440	--	e 18	3,170	754	s 9,560	1,340	46	164
11...	390			7,470	765	15,400	1,580	63	269
12...	350			6,750	375	6,830	2,180	302	1,780
13...	328			4,870	228	3,000	1,940	108	566
14...	336	27	24	4,450	194	2,330	2,060	92	512
15...	1,900	--	e 3,300	5,830	300	4,720	4,410	564	6,720
16...	4,800	--	e 8,800	4,780	225	2,900	4,700	340	4,310
17...	3,180	--	e 1,000	2,860	156	1,170	2,690	188	1,360
18...	1,400	--	e 130	2,200	125	740	1,760	108	513
19...	1,100	--	e 90	1,890	125	638	1,460	76	300
20...	2,040	164	s 1,250	1,440	110	a 430	1,300	57	200
21...	8,630	541	12,600	1,160	70	a 220	1,260	57	194
22...	14,500	541	21,200	1,090	55	165	1,160	65	204
23...	14,900	400	a 16,000	1,180	57	182	989	43	115
24...	9,630	239	6,210	1,570	80	339	919	38	94
25...	3,470	246	2,300	1,410	88	335	853	33	76
26...	2,320	189	1,180	1,220	65	214	782	29	61
27...	2,140	--	e 700	1,140	53	163	808	27	59
28...	1,740	80	a 380	1,050	53	150	866	36	84
29...	1,400	60	227	--	--	--	769	31	64
30...	1,600	109	471	--	--	--	715	23	44
31...	2,200	202	1,200	--	--	--	703	23	44
Total	88,983	--	83,663	66,173	--	51,319	48,154	--	20,711

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

HOCKING RIVER BASIN--Continued

3-1595. HOCKING RIVER AT ATHENS, OHIO.--Continued

Suspended sediment, water year October 1958 to September 1959--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...	673	18	33	1,900	92	472	450	11	13
2...	1,680	186	s 1,020	1,850	98	490	426	16	18
3...	2,780	396	2,970	1,380	53	197	436	18	21
4...	1,940	200	1,050	1,100	41	122	341	10	9
5...	1,440	69	268	989	40	107	283	8	6
6...	1,160	47	147	840	37	84	256	6	4
7...	975	38	100	751	24	49	230	6	4
8...	872	28	66	638	18	31	216	7	4
9...	853	27	62	545	15	22	199	5	3
10...	1,030	38	106	512	14	19	190	4	2
11...	940	34	86	506	13	18	180	3	1
12...	860	26	60	589	20	32	177	3	1
13...	1,120	37	112	1,110	78	234	245	3	2
14...	1,530	68	281	1,520	92	378	260	5	4
15...	1,360	51	187	975	38	100	199	5	3
16...	1,060	32	92	763	28	58	168	5	2
17...	892	28	67	650	21	37	162	5	2
18...	788	30	64	584	18	28	157	5	2
19...	769	28	58	523	15	21	148	5	2
20...	788	32	68	485	13	17	148	5	2
21...	834	31	70	440	13	15	143	5	2
22...	745	29	58	413	12	13	140	5	2
23...	667	26	47	703	32	61	148	5	2
24...	622	19	32	589	13	21	159	5	2
25...	572	16	25	431	7	8	165	5	2
26...	545	12	18	418	9	10	145	7	3
27...	727	29	57	490	18	24	190	7	4
28...	1,860	216	s 1,200	616	71	118	148	6	2
29...	2,300	198	1,230	540	22	32	137	8	3
30...	1,680	90	408	408	8	9	123	6	2
31...	--	--	--	600	12	19	--	--	--
Total	34,062	--	10,042	23,858	--	2,846	6,369	--	129

	July			August			September		
1...	115	4	1	106	11	3	98	12	3
2...	120	5	2	95	8	2	91	16	4
3...	118	5	2	89	7	2	82	8	2
4...	113	4	1	82	7	2	72	2	(t)
5...	111	5	1	83	5	1	72	2	(t)
6...	118	6	2	85	4	1	69	4	1
7...	127	5	2	87	3	1	64	6	1
8...	143	7	3	87	3	1	60	7	1
9...	113	8	2	85	4	1	55	7	1
10...	104	8	2	80	5	1	81	8	2
11...	98	8	2	72	4	1	129	11	4
12...	98	10	3	65	4	1	72	10	2
13...	113	9	3	65	4	1	62	11	2
14...	154	9	4	65	3	1	58	9	1
15...	113	9	3	65	4	1	55	3	(t)
16...	102	9	2	64	7	1	55	2	(t)
17...	95	10	2	64	7	1	55	3	(t)
18...	98	11	3	76	7	1	52	3	(t)
19...	135	11	4	89	7	2	54	3	(t)
20...	130	12	4	83	7	2	54	2	(t)
21...	113	11	3	74	10	2	55	2	(t)
22...	104	11	3	69	11	2	55	3	(t)
23...	93	12	3	64	13	2	55	4	1
24...	100	11	3	58	18	3	57	7	1
25...	127	16	5	57	18	3	58	8	1
26...	127	10	3	57	14	2	57	5	1
27...	123	10	3	67	27	5	57	5	1
28...	113	10	3	89	20	5	60	4	1
29...	130	10	4	111	18	5	64	5	1
30...	127	10	3	100	14	4	93	7	2
31...	120	10	3	123	9	3	--	--	--
Total	3,595	--	84	2,456	--	63	2,001	--	37

Total discharge for year (cfs-days) 316,802
Total load for year (tons) 178,915

s Computed by subdividing day.
t Less than 0.5 ton.

HOCKING RIVER BASIN--Continued

3-1595. HOCKING RIVER AT ATHENS, OHIO.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Dec. 5, 1958	1100			2,780	542		44	54	67	78	93	96	98	100	--		SBWC
Jan. 21,1959	2225			11,000	632		41	55	67	79	86	92	96	99	100		SBWC
Jan. 21	2225			11,000	632		31	44	63	80	87	91	96	99	100		SBN
Jan. 22	1115			14,800	492		52	67	80	89	94	96	98	99	100		SBWC
Feb. 11	1600			7,810	724		61	72	84	91	95	96	98	100	--		SBWC
Mar. 15	1100			4,620	624		23	36	48	65	85	93	98	100	--		SBWC

OHIO RIVER MAIN STEM

3-1596. OHIO RIVER AT LOCK AND DAM 22, AT RAVENSWOOD, W. VA.

LOCATION.--About 650 feet upstream from dam, lock and dam 22 (mile 220.9) at Ravenswood, Jackson County, 450 feet downstream from Sandy Creek, and 7,600 feet downstream from Turkey Run.
DRAINAGE AREA.--39,840 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 570 ppm Sept. 21-30; minimum, 130 ppm Jan. 21, 24-28, 31.
Hardness: Maximum, 281 ppm Sept. 13-20; minimum, 74 ppm Feb. 12-18.
Specific conductance: Maximum daily, 1,050 micromhos Sept. 13; minimum daily, 163 micromhos Feb. 14.
Water temperatures: Maximum, 83°F Aug. 25; minimum, freezing point on several days during December to February.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 675 ppm Nov. 11-15, 17, 1957; minimum, 117 ppm Feb. 21-29, 1956.
Hardness: Maximum, 309 ppm Nov. 11-15, 17, 1957; minimum, 69 ppm Mar. 1-10, 1955.
Specific conductance: Maximum daily, 1,230 micromhos Oct. 1, 1957; minimum daily, 102 micromhos Apr. 29, 30, 1958.
Water temperatures: Maximum, 87°F Aug. 5-8, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed	
																			Calcium, magnesium	Noncarbonate					Filtered	Unfiltered
Oct. 1-5, 7-10, 1958		8.8		0.01	0.00	45	10	26	2.8		42		126	32	0.3	2 5	0.10	278	153	119		456	6.9	7		
Oct. 11-20..		8.3		.00	.01	50	12	31	2.9		41		139	41	.3	3.2	.14	317	175	141		513	6.7	4		
Oct. 21-31..		10		.04	.01	55	13	38	3.1		44		151	53	.3	3.7	.28	356	191	155		564	6.8	3		
Nov. 2-6, 9-10.....		10		.01	.00	55	13	39	3.3		48		163	49	.5	2.9	.16	360	191	151		588	6.8	5		
Nov. 11-20..		7.3		.02	.02	54	12	36	3.3		40		156	48	.4	4.6	.12	343	184	151		566	6.7	5		
Nov. 21-24, 26-30.....		7.0		.09	.01	44	9.2	26	2.5		34		126	33	.3	3.7	.12	263	148	120		449	6.7	4		
Dec. 1-10...		7.8		.01	.02	33	7.9	19	2.2		36		88	25	.2	2.8	.16	223	115	86		342	6.7	6		
Dec. 12-14, 19.....		9.0		.00	.03	38	8.1	17	2.1		51		84	26	.2	5.9	.12	238	129	86		358	7.1	6		
Dec. 21-31..		7.7		.03	.25	38	9.9	22	2.6		38		107	30	.3	4.5	.12	258	136	105		396	6.9	5		
Jan. 1-10, 1959.....		8.5		.00	.25	42	9.6	24	2.5		45		107	37	.3	4.2	.16	274	145	108		421	6.6	5		
Jan. 11-15, 18-20.....		8.2		.09	.12	35	9.4	19	2.2		38		99	22	.2	4.7	.10	216	126	95		355	6.6	3		
Jan. 21, 24-28, 31....		6.6		.11	.09	26	4.9	6.0	1.8		43		44	9.5	.2	5.7	.16	130	85	50		214	6.7	14		

Feb. 1-10, 1959.....		6.8		.03	.00	27	6.7	11	1.9		33		67	16	.2	2.9	.30	165	95	68		265	7.2	4
Feb. 12-18...		6.5		.06	.00	21	5.4	7.7	2.2		26		556	10	.2	2.9	.30	134	74	53		211	7.1	9
Feb. 21-28...		7.2		.03	.00	30	7.4	11	1.8		39		76	17	.2	3.1	.40	182	106	74		295	7.5	5
Mar. 1-10....		6.8		.05	.00	32	8.5	15	2.1		38		85	20	.2	3.1	.11	201	115	84		319	7.2	6
Mar. 11-17, 19-20.....		6.5		.02	.00	27	8.2	11	1.7		31		76	14	.1	2.7	.48	172	101	76		277	7.4	5
Mar. 22-31...		6.2		.02	.00	28	7.6	12	1.6		32		75	17	.2	2.6	.11	174	101	75		281	7.2	4
Apr. 1-6, 8-10.....		6.6		.13	.01	23	7.6	11	1.6		30		66	16	.2	2.6	.15	152	88	64		254	6.8	7
Apr. 16-20...		8.4		.06	.00	26	8.5	13	1.7		33		73	16	.2	2.7	.15	174	100	73		273	6.9	5
Apr. 21-30...		7.4		.03	.00	36	11	18	1.9		41		99	26	.2	3.2	.15	239	135	102		366	7.2	6
May 7-10.....		9.5		.00	.01	36	10	18	1.9		41		102	24	.3	2.6	.38	238	131	98		365	7.1	2
May 11-12, 14-17,19,20		8.6		.00	.01	34	9.4	15	1.9		40		96	19	.3	1.8	.32	219	124	90		336	6.7	3
May 21-23, 25 28-31.....		7.7		.06	.07	39	11	20	2.0		45		108	28	.3	1.5	.30	261	143	106		394	6.9	2
June 1,4-10..		11		.02	.02	41	10	20	2.2		48		105	31	,3	4.1	.13	262	143	104		405	7.3	2
June 11-20...		9.5		.02	.03	48	13	27	2.5		52		129	42	.3	3.1	.12	318	174	131		487	7.4	2
June 21-30...		11		.02	.03	56	13	32	2.9		46		150	52	.4	3.2	.20	352	193	156		553	7.0	2
July 1-10....		11		.03	.03	48	12	29	3.2		42		138	40	.4	3.5	.15	318	170	135		500	6.9	3
July 11-17...		5.1		.02	.03	54	13	35	2.9		58		124	60	.4	3.0	.15	339	188	141		561	7.1	3
July 21-25...		10		.02	.04	64	18	47	3.4		60		146	98	.4	1.9	.16	431	234	185		722	7.1	3
Aug. 2-10....		7.5		.02	.06	61	13	42	3.4		50		143	76	.4	3.2	.20	395	206	165		632	6.9	2
Aug. 11-20...		7.6		.02	.06	64	12	45	3.5		54		155	73	.4	3.2	.37	406	209	165		650	7.3	4
Aug. 21-31...		6.9		.02	.05	59	15	47	3.5		50		175	62	.4	2.7	.11	410	209	168		655	6.8	5
Sept. 1-10...		4.7		.49	.03	67	15	53	3.4		48		192	74	.4	2.5	.20	459	229	189		723	6.8	4
Sept. 13-20..		2.9		.04	.03	83	18	69	6.2		70		194	126	.4	2.2	.50	563	281	224		915	6.7	7
Sept. 21-30..		4.5		.01	.02	82	17	65	4.0		44		218	114	.4	3.8	.20	570	275	239		884	6.9	3
Time-weighted average.		7.7		0.05	0.04	45	11	28	2.7		43		120	42	0.3	3.2	0.20	294	157	122		467	--	4

3-1596. OHIO RIVER AT LOCK AND DAM 22, AT RAVENSWOOD, W. VA.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Mean discharge (cfs)	Chromium		Nickel (Ni)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Cobalt (Co)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Barium (Ba)	Beryllium (Be)	Ammonium (NH_4)	Hydroxide (OH)	Alkalinity as ($CaCO_3$)	Bromide (Br)	Iodide (I)	Nitrite (NO_2)	Cyanide (Cn)	Free carbon-dioxide (CO_2)	Turbidity	Density at 20°C	Hydrogen sulfide (H_2S)	Total chromium (Cr)
		Cr^3	Cr^6																						
Oct. 1-5, 7-10, 1958			0.00	0.02	0.00	0.00	0.00	0.01	0.00		0.0														0.00
Oct. 11-20			.00	.06	.00	.00	.00	.00	.00		.0														.02
Oct. 21-31			.00	.02	.00	.00	.00	.01	.00		.0														.02
Nov. 2-6, 9-10			.00	.04	.00	.00	.00	.01	.00		.0														.00
Nov. 11-20			.00	.07	.00	.01	.00	.01	.00		.0														.00
Nov. 21-24, 26-30			.00	.08	.00	.00	.00	.00	.00		.0														.00
Dec. 1-10			.00	.00	.00	.00	.00	.01	.00		.0														.00
Dec. 12-14, 19			.00	.00	.00	.00	.00	.00	.00		.0														.00
Dec. 21-31			.00	.00	.00	.00	.00	.00	.00		.0														.00
Jan. 1-10, 1959			.00	.00	.00	.00	.00	.01	.00		.0														.00
Jan. 11-15, 18-20			.00	.09	.00	.00	.03	.01	.00		.0														.00
Jan. 21, 24-28, 31			.00	.14	.00	.00	.08	.03	.00		.0														.00
Feb. 1-10			.00	.00	.00	.00	.00	.02	.00		.0														.00
Feb. 12-18			.00	.00	.00	.00	.00	.01	.00		.0														.00
Feb. 21-28			.00	.00	.00	.00	.00	.00	.00		.0														.00
Mar. 1-10			.00	.04	.00	.00	.00	.00	.00		.0														.01
Mar. 11-17, 19-20			.01	.03	.00	.00	.00	.00	.00		.0														.01
Mar. 22-31			.00	.00	.00	.00	.00	.00	.00		.0														.01
July 1-10			.00	.00	.00	.00	.00	.00	.00		.0														.00
July 11-17, 19, 20			.00	.00	.00	.00	.00	.00	.00		.0														.00
July 21-25			.00	.00	.00	.00	.01	.00	.00		.0														.00
Aug. 2-10			.00	.00	.00	.00	.00	.00	.00		.0														.00
Aug. 11-20			.00	.14	.00	.00	.00	.00	.00		.0														.00
Aug. 21-31			.00	.14	.00	.00	.11	.00	.00		.0														.00
Sept. 1-10			.00	.14	.00	.00	.19	.00	.00		.0														.00
Sept. 13-20			.00	.05	.00	.00	.04	.00	.00		.0														.00
Sept. 21-30			.00	.17	.00	.00	.00	.00	.00		.0														.00

OHIO RIVER MAIN STEM--Continued

3-1596. OHIO RIVER AT LOCK AND DAM 22, AT RAVENSWOOD, W. VA.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Phenols as C_6H_5OH
Oct. 5, 1958	0.000
Oct. 15	.001
Oct. 25	.001
Nov. 5	.008
Nov. 15	.002
Nov. 25	.005
Dec. 5	.002
Dec. 25	.000
Jan. 5, 1959	.000
Jan. 15	.000
Jan. 25	.004
Feb. 5	.017
Feb. 15	.001
Feb. 25	.023
Mar. 5	.000
Mar. 15	.002
Mar. 25	.001
Apr. 5	.000
Apr. 15	.001
Apr. 25	.000
May 15	.000
May 25	.000
June 5	.001
June 15	.000
June 25	.000
July 5	.001
July 25	.000
Aug. 5	.001
Aug. 15	.006
Aug. 25	.000
Sept. 5	.021
Sept. 15	.003
Sept. 25	.023

OHIO RIVER MAIN STEM--Continued

3-1596. OHIO RIVER AT LOCK AND DAM 22, AT RAVENSWOOD, W. VA.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement between 6 a.m. and 7 a.m.)

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	67	65	65	65	65	65	64	64	64	62	60	60	60	60	60	56	58	60	58	57	56	55	55	58	58	58	58	56	58	58	60
November...	--	58	48	48	56	52	56	56	56	56	58	58	52	52	54	62	68	62	61	51	52	48	47	48	--	55	49	46	45	40	--	53
December...	40	41	44	45	44	42	38	40	--	--	--	36	--	--	--	--	--	--	34	34	33	33	33	33	34	33	32	35	34	33	35	--
January....	35	32	32	37	33	32	33	34	35	32	32	33	34	34	35	--	--	37	37	37	39	--	--	36	36	36	38	32	--	--	37	35
February...	32	33	34	32	32	32	32	32	32	32	32	33	34	35	44	44	44	43	--	--	37	36	38	39	38	40	40	40	--	--	--	36
March.....	40	40	40	40	40	40	40	40	40	40	40	39	40	39	42	42	41	--	32	34	43	42	41	45	42	41	42	44	44	44	44	41
April.....	44	38	38	49	47	49	--	49	47	47	--	--	--	--	--	50	51	55	55	55	55	55	55	58	58	59	59	59	59	59	--	--
May.....	--	--	--	--	--	--	53	55	55	55	55	58	--	62	62	58	58	59	59	61	61	57	48	52	51	--	--	--	--	52	53	--
June.....	51	--	--	73	75	--	75	77	78	78	78	78	75	78	77	75	75	75	78	75	75	76	76	76	77	77	78	78	80	80	--	76
July.....	80	80	80	80	75	78	79	79	77	79	78	78	78	77	78	78	78	78	78	78	78	77	78	78	78	--	--	--	--	--	--	78
August.....	--	80	79	80	80	76	77	77	77	77	79	75	77	77	77	79	79	76	77	79	79	78	79	80	83	74	74	77	79	81	80	78
September..	78	82	80	81	82	80	79	80	79	80	--	--	76	75	75	71	71	70	70	70	70	69	69	69	70	72	72	71	71	70	--	74

3-1765. NEW RIVER AT GLENLYN, VA.

LOCATION.--At the Glenlyn steam electric plant of the Appalachian Electric Power Company, across the river from the gaging station, 0.3 mile upstream from East River and 6.3 miles downstream from Wolf Creek.
DRAINAGE AREA.--3,768 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1930 to March 1931, October 1949 to September 1950, October 1951 to September 1956. Water temperatures: October 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 81°F Aug. 24; minimum, freezing point on several days during December and January.
EXTREMES, 1951-59.--Water temperatures: Maximum, 84°F June 28, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

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....	67	64	61	61	64	63	61	63	64	64	67	--	62	62	64	63	64	66	--	62	60	59	60	62	62	--	58	55	55	54	51	61
November...	54	--	53	51	51	51	54	50	--	51	50	49	50	52	55	--	59	60	61	55	50	47	48	52	53	52	--	54	59	--	--	53
December...	54	37	37	39	41	--	--	32	33	37	36	36	35	34	35	35	36	38	39	41	--	41	40	41	36	35	36	38	44	46	45	38
January....	39	44	40	37	32	32	33	33	32	33	33	34	36	38	42	36	32	32	33	37	43	38	35	36	38	40	40	40	41	42	43	37
February...	40	39	40	40	41	40	40	41	42	47	43	43	43	46	44	43	44	43	38	37	37	38	44	43	44	43	44	46	--	--	--	42
March.....	44	45	41	42	41	42	40	42	42	41	42	40	40	43	48	46	42	42	43	47	49	46	48	51	53	53	48	45	43	45	49	45
April.....	52	49	52	48	50	52	52	59	60	62	60	62	53	51	55	57	58	--	63	64	62	51	50	52	54	57	58	58	59	59	--	56
May.....	60	62	67	67	66	68	66	65	63	65	68	61	67	60	57	55	61	62	68	65	68	68	69	68	67	67	65	70	69	72	71	65
June.....	69	68	65	65	66	66	67	70	72	72	72	74	74	69	68	69	65	66	64	63	63	66	69	70	70	71	71	73	74	76	--	69
July.....	76	77	73	72	71	72	70	70	70	74	73	70	70	72	74	72	72	72	--	70	76	--	--	71	72	--	71	72	74	73	73	72
August.....	--	--	75	75	74	72	74	--	--	74	73	75	75	76	77	78	78	79	77	77	78	--	--	81	79	79	79	77	77	75	76	76
September..	75	74	72	74	74	--	--	74	74	74	71	65	65	68	68	67	67	65	64	64	64	66	68	69	70	70	70	70	70	70	--	69

3-1800. NEW RIVER AT BLUESTONE DAM, W. VA.

LOCATION.--Temperature recorder at Bluestone Dam stilling basin, 1,000 feet upstream from gaging station, 0.9 mile upstream from mouth of Greenbrier River, and 2.2 miles upstream from Hinton, Summers County.
DRAINAGE AREA.--4,604 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 85°F Aug. 26; minimum, 33°F Jan. 11, 15.
EXTREMES, 1953-59.--Water temperatures: Maximum, 85°F Aug. 26, 1959; minimum, freezing point on several days during February 1958.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

3-1820. KNAPP CREEK AT MARLINTON, W. VA.

LOCATION--At city waterplant, at Marlinton, Pocahontas County, W. Va., 1 mile upstream from mouth and 2 miles downstream from discontinued gaging station.
DRAINAGE AREA.--108 square miles upstream from discontinued gaging station.
RECORDS AVAILABLE.--Water temperatures: October 1946 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F July 2; minimum, freezing point on several days during December and January.
EXTREMES, 1946-59.--Water temperatures: Maximum, 82°F July 24, 1952, July 2, 1959; minimum, freezing point on several days during winter months.

Temperature (°F) of water, water year October 1958 to September 1959

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

3-1930. KANAWHA RIVER AT KANAWHA FALLS, W. VA.

LOCATION.--Temperature recorder at gaging station, 150 feet downstream from toll bridge, 0.8 mile downstream from Kanawha Falls, Fayette County, and 2 miles downstream from the confluence of the New and Gauley Rivers at Gauley Bridge.
DRAINAGE AREA.--8,367 square miles.
RECORDS AVAILABLE.--Water temperatures: December 1957 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 83°F Aug. 20; minimum, freezing point on several days during December and January.
EXTREMES, 1957-59.--Water temperatures: Maximum, 83°F Aug. 20, 1959; minimum, freezing point on several days during December 1958 and January 1959.
REMARKS.--No temperature record Nov. 1-23; range, 47°F to 53°F for this period. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

3-1937.7. KANAWHA RIVER AT CABIN CREEK, W. VA.

LOCATION.--At the Appalachian Electric Power Company, Cabin Creek steam electric plant cooling water intakes, at Cabin Creek, Kanawha County.
DRAINAGE AREA.--8,661 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 92°F Aug. 25, 26; minimum, 33°F Jan. 10-12, 18, 19.
EXTREMES, 1950-59.--Water temperatures: Maximum, 92°F on several days during August 1955 and August 1959; minimum, freezing point Feb. 10, 1951, Feb. 14-16, 1958.
REMARKS.--Water temperature records furnished by the Appalachian Electric Power Company.

Temperature (°F) of water, water year October 1958 to September 1959

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....	72	71	71	71	70	70	68	68	69	68	68	66	66	67	67	68	68	68	68	68	68	69	68	66	65	65	63	63	62	59	60	67
November...	60	58	57	56	55	53	53	53	53	53	53	54	53	53	54	53	55	56	56	56	56	56	56	56	56	56	54	54	52	49	--	55
December...	46	47	45	44	44	41	41	40	39	39	38	37	36	37	37	37	37	37	37	37	37	37	38	38	38	37	39	39	38	39	42	39
January....	42	42	41	40	37	37	37	37	35	33	33	33	35	36	36	34	34	33	33	34	35	39	35	37	38	37	37	39	40	41	41	37
February...	41	40	40	40	40	39	39	40	41	42	42	43	44	45	44	44	44	43	41	39	38	37	38	39	40	41	40	41	--	--	--	41
March.....	41	43	44	44	44	44	41	41	41	42	42	41	41	43	44	45	45	43	43	42	45	45	47	48	49	49	50	49	47	47	48	44
April.....	48	51	51	51	50	51	51	53	55	57	57	55	51	49	49	52	54	55	57	58	57	56	56	56	56	56	56	59	61	61	--	54
May.....	63	--	--	68	70	71	73	72	--	--	71	71	72	65	62	--	--	62	64	67	68	70	--	--	74	73	74	75	75	--	--	--
June.....	77	72	71	70	68	--	--	74	75	76	78	79	--	--	80	80	79	78	79	--	--	80	79	79	79	81	--	--	84	85	--	--
July.....	86	87	85	--	--	85	86	87	86	86	--	--	83	87	87	88	88	--	--	88	88	88	87	86	--	--	84	84	86	86	86	--
August.....	--	--	85	85	82	75	76	--	--	80	83	84	84	85	--	--	85	85	85	85	89	--	--	90	92	92	91	89	--	--	87	--
September..	87	83	83	82	--	--	--	84	83	84	81	80	79	79	79	79	77	77	--	--	76	76	77	76	79	--	--	78	78	79	--	--

KANAWHA RIVER BASIN--Continued

3-1980. KANAWHA RIVER AT CHARLESTON, W. VA.

LOCATION.--Temperature recorder at gaging station at old lock 6, at Charleston, Kanawha County, 1.0 mile upstream from Davis Creek, 1.5 miles downstream from Twomile Creek, 2.0 miles downstream from Patrick Street Bridge, and 3.5 miles downstream from Elk River.
DRAINAGE AREA.--10,419 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 95°F Aug. 25, 26.
EXTREMES, 1953-59.--Water temperatures: Maximum, 95°F Aug. 25, 26, 1959; minimum (1953-58), 36°F Feb. 1, 1955, Jan. 31, Feb. 1, 1956, Feb. 18-20, 1958.
REMARKS.--No thermograph records Nov. 1, 1958 to February 1959. Once-daily temperature readings made for this period at the "Upper Pump House," 1.2 miles upstream from gaging station and furnished by Union Carbide Chemical Company of South Charleston. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	78	78	75	75	76	76	75	75	76	76	76	76	74	74	74	76	76	76	75	74	74	74	74	73	73	72	72	71	70	70	--	74
Minimum.....	78	75	74	74	75	74	74	74	75	75	75	74	74	73	73	73	74	75	74	74	74	74	73	73	72	72	71	70	70	68	--	73
November	59	59	59	57	57	57	56	54	54	52	52	50	52	55	57	59	59	58	59	57	57	52	52	55	54	55	52	52	52	52	--	55
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
December	50	51	47	47	48	47	40	44	43	43	43	38	40	41	40	39	42	40	38	37	37	39	39	45	40	41	39	39	39	39	42
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January	41	40	37	39	39	39	39	38	39	40	39	38	39	41	38	41	42	39	37	36	37	37	39	36	38	38	38	38	40	40	41	39
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February	40	39	39	41	42	41	41	41	42	42	42	44	44	49	47	45	44	44	40	38	46	45	46	47	46	46	46	48	--	--	--	43
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March																																
Maximum.....	--	48	50	50	50	50	50	47	46	47	47	46	45	46	47	48	48	48	48	49	50	50	51	51	52	53	54	54	53	51	51	49
Minimum.....	--	47	46	46	47	46	47	46	46	46	45	45	45	45	46	47	48	48	48	48	48	48	48	48	50	51	52	53	50	50	50	48
April																																
Maximum.....	53	53	54	54	53	53	55	56	56	59	60	59	58	53	53	52	55	56	58	59	60	59	59	58	57	58	60	60	63	64	--	57
Minimum.....	50	53	53	53	52	52	53	55	56	56	58	58	53	51	52	51	52	55	56	58	59	59	58	57	57	57	58	60	60	63	--	56
May																																
Maximum.....	64	66	67	67	68	70	71	71	71	71	71	71	71	71	71	66	65	64	63	64	65	68	70	71	71	72	74	74	75	76	76	70
Minimum.....	64	64	66	67	67	68	70	71	71	71	71	71	71	71	66	65	64	63	63	63	64	65	68	70	71	71	72	74	74	75	76	69
June																																
Maximum.....	76	75	75	73	71	70	71	71	73	74	75	76	77	77	80	81	79	79	78	80	79	82	82	81	81	81	84	86	85	87	--	78
Minimum.....	75	75	73	70	70	70	70	71	71	76	74	75	76	76	76	78	78	78	77	77	78	78	81	80	80	80	81	83	85	85	--	76
July																																
Maximum.....	88	86	85	85	85	85	86	85	85	85	86	86	86	86	86	87	88	87	87	87	87	88	88	88	88	88	88	86	86	86	88	87
Minimum.....	85	85	85	85	85	84	84	85	85	85	85	86	86	86	86	86	86	86	87	86	87	87	88	88	88	88	86	86	86	85	85	86
August																																
Maximum.....	87	87	87	87	88	88	86	83	81	80	81	83	84	84	87	88	89	89	89	89	89	89	89	91	95	95	94	94	92	91	92	88
Minimum.....	86	86	86	85	86	86	83	81	80	80	80	81	83	83	85	86	88	88	89	88	89	89	89	89	92	94	93	92	91	91	91	87
September																																
Maximum.....	92	92	91	90	88	86	86	86	86	86	85	85	84	83	84	83	81	80	79	78	77	77	77	77	77	76	77	77	78	78	--	83
Minimum.....	92	91	90	88	87	86	86	86	86	85	85	84	83	83	83	81	80	79	78	77	77	77	77	77	77	76	77	77	77	77	--	83

3-2013. KANAWHA RIVER AT WINFIELD DAM, AT WINFIELD, W. VA.

LOCATION.--About 1,200 feet upstream from Winfield Dam at Winfield, Putnam County, 2.6 miles downstream from Little Guano Creek, 4.7 miles downstream from Guano Creek, 0.7 mile upstream from Little Hurricane Creek, and 31.3 miles upstream from mouth.
DRAINAGE AREA.--11,809 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 311 ppm Oct. 21-31; minimum, 69 ppm Apr. 11-20.
Hardness: Maximum, 155 ppm Oct. 21-31; minimum, 42 ppm Mar. 11-20, Apr. 1-10.
Specific conductance: Maximum daily, 590 micromhos Oct. 31; minimum daily, 97 micromhos Jan. 24.
Water temperatures: Maximum, 88°F Sept. 2; minimum, 35°F Jan. 19.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 311 ppm Oct. 21-31, 1958; minimum, 63 ppm May 1-10, 1958.
Hardness: Maximum, 155 ppm Oct. 21-31, 1958; minimum, 37 ppm May 1-10, 1958.
Specific conductance: Maximum daily, 590 micromhos Oct. 31, 1958; minimum daily, 77 micromhos Jan. 31, 1957.
Water temperatures: Maximum, 88°F Sept. 2, 1958; minimum, freezing point Feb. 14, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Ammonia nitrogen as (NO_4)	Nitrite (NO_2)
Oct. 1-10, 1958.....		3.2		0.01	0.02	28	8.0	24	1.9		60		53	37	0.2	4.7		213	103	54		351	6.9	3	0.6	0.40
Oct. 11-20...		3.2		.10	.00	35	8.4	30	2.0		68		56	58	.2	2.8		257	122	66		429	6.8	6	2.4	.00
Oct. 21-31...		3.6		.12	.12	46	9.6	38	2.1		79		61	84	.2	3.4		311	155	90		541	6.7	7	3.9	.02
Nov. 1-10....		3.4		.03	.01	36	9.0	27	2.0		72		53	52	.2	5.2		246	127	68		414	6.9	6	1.4	1.0
Nov. 11-20...		4.5		.03	.01	28	7.3	21	1.9		54		44	38	.2	10		196	100	56		323	6.7	5	.8	.04
Nov. 21-30...		6.4		.00	.02	29	6.9	26	1.7		43		51	47	.2	3.8		234	101	66		362	7.1	6	.4	.03
Dec. 1-10....		4.0		.02	.01	25	7.0	19	1.8		46		45	31	.1	4.6		168	92	54		306	6.8	4	1.0	.02
Dec. 11-20...		3.6		.02	.02	20	6.0	17	1.4		46		36	26	.1	2.8		156	74	37		257	6.7	3	1.2	.04
Dec. 21-31...		3.8		.07	.02	25	6.1	23	1.4		52		46	38	.1	1.2		204	88	45		328	6.8	7	3.4	.00
Jan.1-10,1959		5.0		.04	.00	17	4.7	8.6	1.5		43		21	14	.1	4.1		94	62	27		179	7.2	5	.1	.00
Jan. 11-20...		5.7		.03	.02	19	4.4	13	1.4		36		30	23	.1	3.6		118	66	36		223	7.4	6	.8	2.0
Jan. 21-31...		5.6		.07	.01	12	3.2	6.4	1.3		23		21	10	.2	4.7		75	43	24		135	7.5	5	.0	.00
Feb. 1-10....		6.5		.00	.02	15	4.4	11	1.5		26		31	18	.1	5.1		100	56	34		186	6.5	3	.4	.01
Feb. 11-20...		6.2		.05	.01	13	3.9	8.3	1.5		26		28	13	.1	3.0		86	48	27		159	6.9	3	.4	.01
Feb. 21-28...		6.2		.01	.02	14	3.8	8.8	1.2		25		29	14	.1	4.4		90	50	30		165	6.6	1	.2	.03
Mar. 1-10....		6.1		.01	.01	16	3.9	9.9	1.4		27		30	17	.1	3.2		114	56	34		179	6.7	5	.2	.00
Mar. 11-20...		6.1		.01	.00	12	3.0	6.4	1.1		25		22	9.5	.1	4.1		88	42	22		133	6.7	6	.1	.00
Mar. 21-31...		6.5		.67	.17	15	3.9	8.8	1.4		46		21	14	.1	2.2		106	54	16		179	6.7	20	1.9	.00

3-2013. KANAWHA RIVER AT WINFIELD DAM, AT WINFIELD, W. VA.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	Ammonia nitrogen as (NO_4)	Nitrite (NO_2)
																			Calcium, magnesium	Noncarbonate						
Apr. 1-10, 1959.....		6.1		0.02	0.01	12	2.9	5.8	1.1		25		21	9.0	0.1	4.1		70	42	22		126	7.1	8	0.1	0.00
Apr. 11-20..		6.2		.03	.01	12	3.3	5.2	1.2		24		24	7.5	.1	4.1		69	44	24		125	6.9	8	.0	.00
Apr. 21-30..		7.0		.01	.01	13	3.8	6.4	1.2		33		24	8.5	.1	4.1		81	48	21		140	7.3	5	.1	.00
May 1-10....		6.8		.02	.05	15	3.8	8.3	1.4		30		27	12	.1	4.3		90	53	28		163	6.8	3	.1	.00
May 11-20...		6.6		.02	.03	15	3.7	9.5	1.2		34		27	13	.2	3.2		94	52	24		168	6.7	4	.1	.00
May 21-31...		6.8		.19	.04	19	3.7	12	1.5		38		30	18	.1	4.8		114	62	32		205	6.7	4	.2	.00
June 1-10...		7.2		.01	.00	16	3.6	8.1	1.0		36		23	13	.1	5.3		92	55	26		160	7.0	7	.1	.00
June 11-20..		7.2		.00	.00	23	4.0	17	1.5		34		31	32	.1	7.3		149	74	46		249	7.1	5	.0	.00
June 21-30..		8.6		.04	.09	32	5.4	28	1.8		63		42	57	.1	.5		209	102	50		384	7.0	7	3.0	.05
July 1-10...		6.0		.02	.09	38	6.2	30	1.7		46		48	63	.2	.0		250	121	83		436	6.7	7	.1	11
July 11-20..		3.9		.02	.14	43	6.9	34	1.9		80		54	71	.2	.3		262	136	70		485	7.2	7	4.5	.05
July 21-31..		3.8		.03	.01	44	9.0	35	2.0		84		55	71	.2	4.1		270	147	78		505	7.5	9	4.4	.00
Aug. 1-10...		3.8		.00	.01	26	6.8	20	1.4		55		38	32	.1	7.9		160	93	48		310	7.1	4	.0	.00
Aug. 11-20..		5.4		.01	.17	20	3.5	16	.8		24		33	32	.1	6.5		136	64	45		242	6.7	7	.0	.00
Aug. 21-31..		5.3		.03	.03	35	5.0	32	1.3		35		49	65	.2	13		241	108	80		426	6.6	9	.1	.00
Sept. 1-10..		4.7		.01	.01	33	6.5	26	1.7		56		42	48	.2	11		209	109	63		378	7.1	5	.0	.00
Sept. 11-20.		5.8		.02	.00	36	7.6	25	2.2		65		40	53	.2	11		228	121	68		402	7.0	6	.0	.00
Sept. 21-30.		6.4		.02	.14	38	7.2	33	2.2		52		50	66	.2	9.1		255	125	82		448	6.9	9	.0	.16
Time-weighted average		5 5		0.05	0.04	24	5.5	18	1.5		45		37	34	0.1	4.8		164	82	46		285	--	6	0.9	0.42

KANAWHA RIVER BASIN--Continued

3-2013. KANAWHA RIVER AT WINFIELD DAM, AT WINFIELD, W. VA.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily measurement between 7:30 a.m. and 9:30 a.m./

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....	76	74	75	73	72	71	71	71	71	71	70	70	69	69	69	70	70	70	69	69	69	68	69	69	68	69	69	68	67	67	66	70
November...	67	66	64	65	64	61	61	61	60	59	57	57	56	58	59	58	58	60	59	59	58	59	58	59	59	60	59	58	58	54	--	60
December...	53	54	53	51	51	49	47	48	45	45	44	41	42	40	39	40	42	42	42	42	40	42	44	44	42	42	42	44	--	45	44	45
January....	44	42	45	43	42	41	42	42	42	40	40	39	41	41	41	40	40	38	35	36	40	39	38	38	39	39	40	42	40	42	42	40
February...	42	42	43	44	45	44	44	44	45	46	46	41	47	49	47	47	47	47	45	45	42	42	44	45	43	43	43	44	--	--	--	44
March.....	45	45	45	47	46	46	46	42	46	46	45	45	45	48	46	45	46	45	45	46	47	46	46	47	49	51	50	53	52	50	52	47
April.....	51	53	53	53	51	51	53	53	56	56	56	55	56	51	49	50	52	54	56	56	56	57	57	58	57	57	58	58	61	61	--	55
May.....	62	63	64	66	67	68	70	71	71	72	--	73	73	72	62	63	61	62	63	63	65	70	69	73	73	73	74	76	76	76	79	69
June.....	78	78	76	76	72	70	70	70	73	75	75	75	77	76	76	77	77	77	77	77	79	79	79	79	79	81	80	82	84	84	--	77
July.....	85	84	84	83	84	84	83	83	84	85	83	84	84	82	85	84	84	84	85	84	84	84	84	85	85	85	85	85	86	86	85	84
August.....	85	85	86	86	86	86	85	86	85	86	82	82	82	82	83	82	82	82	83	84	85	85	86	87	87	87	87	87	87	87	86	85
September..	87	88	87	87	87	87	86	85	85	85	86	83	83	82	82	81	80	79	78	78	78	77	76	77	78	79	79	79	79	79	--	82

BIG SANDY RIVER BASIN

3-2115. JOHNS CREEK NEAR VAN LEAR, KY.

LOCATION.--Temperature recorder at gaging station, 100 feet upstream from Long Branch, 0.3 mile upstream from Daniels Creek, 0.7 mile downstream from Dewey Dam, and 2.5 miles southeast of Van Lear, Johnson County.
DRAINAGE AREA.--208 square miles.
RECORDS AVAILABLE.--Water temperatures: April 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 76°F July 1; minimum, 38°F Jan. 26, Feb. 4, 6.
EXTREMES, 1954-59.--Water temperatures: Maximum, 90°F July 3, 1956; minimum, 34°F Feb. 2, 6, 1955.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow regulated by Dewey Reservoir.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

3-2145. TUG FORK AT KERMIT, W. VA.

LOCATION.--At city waterplant, at Kermit, Mingo County, 0.8 mile downstream from Wolf Creek, and 3 miles downstream from gaging station near Kermit.
DRAINAGE AREA.--1,274 square miles at waterplant; 1,185 square miles upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: October 1946 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 83°F June 29 to July 1, Aug. 25; minimum, 35°F Dec. 14, Jan. 6, 7, 17, 18.
EXTREMES, 1946-59.--Water temperatures: Maximum, 90°F July 29, 1949; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959

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	64	64	64	65	66	61	61	64	61	60	56	57	62	60	62	64	66	64	60	60	59	61	60	58	55	52	55	54	52	51	60
November...	52	54	53	51	50	54	52	48	52	50	44	48	49	51	58	58	59	60	60	53	49	47	44	48	52	54	46	44	40	39	--	51
December...	38	38	40	44	46	42	38	38	37	36	36	37	38	35	36	36	36	36	36	38	36	37	39	40	38	37	36	38	38	41	45	38
January....	47	47	45	42	36	35	35	38	38	37	36	37	37	37	40	38	35	35	37	39	42	41	45	40	39	43	44	43	45	48	48	40
February...	45	42	40	44	44	48	42	46	46	49	50	45	49	50	52	49	48	50	46	42	38	38	44	45	45	44	45	47	--	--	--	45
March.....	49	47	47	44	46	46	48	44	45	45	46	46	45	45	49	49	48	44	46	48	49	47	47	50	52	55	55	50	50	48	47	48
April.....	50	52	54	52	51	54	54	57	60	62	60	57	52	49	50	54	55	58	59	62	60	58	55	55	55	59	62	64	65	62	--	57
May.....	64	65	68	71	72	73	73	72	70	69	72	74	76	78	67	69	62	62	64	70	73	74	75	76	74	74	75	76	76	78	77	72
June.....	77	78	68	68	70	72	74	74	76	77	78	79	77	74	71	71	70	68	68	69	72	74	77	74	76	78	79	80	83	83	--	75
July.....	83	82	74	75	78	77	78	77	74	76	77	76	76	77	79	79	79	77	79	79	77	78	77	78	79	77	80	76	78	80	79	78
August.....	80	78	77	78	76	78	78	80	76	76	76	75	75	76	78	78	78	77	79	79	82	80	81	82	83	82	78	77	78	77	79	78
September..	78	78	77	76	77	78	77	78	78	78	72	68	68	67	68	68	66	65	62	65	67	68	74	70	70	70	72	72	74	74	--	72

BIG SANDY RIVER BASIN--Continued

3-2157. BIG SANDY RIVER AT CATLETTSBURG, KY.

LOCATION.--At the Carlettsburg, Kenova and Ceredo Water Company intake at Catlettsburg, Boyd County, 300 feet upstream from bridge on U.S. Highway 60, 0.3 mile upstream from Ice Dam Creek, and 0.9 miles upstream from mouth.
DRAINAGE AREA.--4,281 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 499 ppm Oct. 21-31; minimum, 103 ppm Jan. 21-30.
Hardness: Maximum, 208 ppm Nov. 2-10; minimum, 50 ppm Jan. 21-30.
Specific conductance: Maximum daily, 795 micromhos Oct. 25; minimum daily, 117 micromhos Apr. 16.
Water temperatures: Maximum, 88°F Aug. 25, 26; minimum, freezing point on several days during December and January.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 499 ppm Oct. 21-31, 1958; minimum, 88 ppm May 1-9, 1958.
Hardness: Maximum, 208 ppm Nov. 2-10, 1958; minimum, 44 ppm May 1-9, 1958.
Specific conductance: Maximum daily, 876 micromhos Sept. 10, 1957; minimum daily, 109 micromhos Apr. 10, 1957, Apr. 29, 1958.
Water temperatures: Maximum, 88°F Aug. 25, 26, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Ammonia nitrogen	Nitrite (NO_2)
																			Calcium, magnesium	Noncarbonate						
Oct. 1-4, 6-10, 1958		8.4		0.03	0.00	46	18	70	3.2		128		159	44	0.1	1.5		437	189	84		664	7.5	3	--	--
Oct. 11,13-20		6.6		.02	.00	48	18	72	3.0		138		170	40	.2	1.9		443	194	81		697	7.7	5	--	--
Oct. 21-31...		5.7		.03	.00	47	19	84	3.2		154		190	45	.2	2.0		499	195	69		771	7.7	3	--	--
Nov. 2-10....		6.8		.01	.00	47	22	77	3.8		148		183	44	.2	1.8		451	208	86		754	7.4	3	--	--
Nov. 11-20...		7.2		.01	..00	42	19	57	3.6		110		161	38	.2	1.2		375	183	93		631	7.5	3	--	--
Nov. 21-23, 25-26,28-29		6.3		.01	.00	39	18	57	3.3		104		134	46	.2	1.2		352	172	86		610	7.4	2	--	--
Dec. 1-6, 9-10.....		7.3		.01	.01	32	13	50	2.8		70		96	58	.1	1.8		300	134	76		522	7.2	5	--	--
Dec. 11-13, 15-17,19-20		8.4		.01	.01	30	14	35	2.3		64		104	36	.1	2.8		272	133	80		455	7.2	4	--	--
Dec. 21-31...		7.9		.06	.01	34	14	50	2.4		82		118	44	.1	3.1		313	143	76		528	7.1	4	--	--
Jan. 1-4, 7-10, 1959.		8.2		.03	.01	21	8.1	19	2.0		39		62	22	.1	3.7		169	86	54		278	6.9	5	--	--
Jan. 11-17,20		9.0		.04	.00	25	9.5	28	2.2		49		78	28	.2	3.7		205	102	62		348	7.0	5	--	--
Jan. 21-30...		7.2		.19	.00	12	4.8	8.8	1.9		21		37	9.0	.1	2.8		103	50	33		156	6.8	17	--	--

Feb. 2, 4-10, 1959	9.0		.02	.00	19	7.5	17	2.1		36	62	16	.1	2.8		166	78	49		258	7.1	4	--	--
Feb. 11-20	8.7		.05	.01	14	5.8	12	1.9		30	43	11	.1	2.4		128	59	34		200	7.2	5	.2	.00
Feb. 21-28..	8.3		.02	.01	16	6.7	14	1.7		34	56	12	.1	2.8		141	68	40		222	7.2	5	.1	.00
Mar. 1-6, 8-10.....	8.6		.08	.01	18	7.0	17	2.0		41	60	12	.1	2.2		150	74	40		245	7.2	5	--	--
Mar. 11-20..	7.4		.12	.01	14	5.6	12	1.7		30	48	9.5	.1	1.6		121	58	34		192	7.2	5	--	--
Mar. 21-31..	9.5		.13	.01	20	7.8	19	1.7		51	64	14	.1	1.9		164	82	40		269	7.2	5	--	--
Apr. 1-10...	8.6		.01	.01	14	5.5	11	1.2		31	46	9.4	.1	1.2		118	58	32		183	6.9	4	--	--
Apr. 11-20..	9.7		.05	.00	12	5.2	9.7	1.5		26	43	6.2	.1	2.6		112	52	30		167	7.1	8	--	--
Apr. 21-30..	9.1		.12	.00	16	7.4	12	1.7		35	58	7.8	.1	1.6		139	70	42		215	6.8	4	--	--
May 1-2,4-10	10		.02	.00	22	9.5	21	1.8		58	73	12	.2	1.8		177	95	46		308	7.4	4	--	--
May 11-20...	11		.01	.00	23	9.8	26	2.4		65	86	14	.1	1.6		195	98	45		327	7.5	4	--	--
May 21-29,31	9.0		.01	.03	22	8.6	25	1.7		59	70	16	.1	1.9		181	90	42		313	7.0	6	--	--
June 1-10...	11		.00	.03	16	8.5	16	2.4		44	58	12	.2	2.5		150	75	39		243	7.4	4	--	--
June 11-20..	11		.00	.02	27	12	36	2.6		82	98	22	.2	2.0		265	117	50		406	7.4	4	--	--
June 21-30..	8.6		.00	.03	35	17	53	3.1		116	134	30	.2	1.5		349	158	62		544	7.9	4	--	--
July 1-3, 5-10.....	6.9		.00	.01	35	13	48	3.3		100	132	27	.2	1.6		319	141	59		521	7.5	3	--	--
July 12-18, 20.....	7.6		.00	.03	40	18	73	4.2		138	166	44	.2	2.2		426	174	61		685	7.6	3	--	--
July 21-25, 27-31.....	6.7		.00	.03	38	17	73	4.0		120	165	42	.2	1.6		407	165	66		657	7.9	4	--	--
Aug. 1-10...	6.1		.00	.02	41	18	62	4.0		106	174	40	.2	1.6		406	176	89		649	7.4	4	--	--
Aug. 11-20..	6.6		.00	.02	40	16	60	4.0		110	157	39	.2	2.6		361	166	76		615	7.4	4	--	--
Aug. 21-22, 24-29, 31.	6.4		.00	.04	43	18	74	4.6		122	165	54	.2	2.9		436	181	81		696	7.6	3	--	--
Sept. 1-5, 7-10.....	6.6		.00	.02	40	19	62	4.4		106	175	37	.2	2.6		411	178	91		640	7.7	4	--	--
Sept. 11-12, 14-19....	7.0		.00	.01	38	16	58	4.1		90	141	44	.2	2.6		340	161	87		588	7.6	6	--	--
Sept. 21-26, 28-30.....	5.8		.00	.01	41	17	68	4.7		108	148	56	.2	3.1		388	172	84		668	7.5	7	--	--
Time-weighted average..	8 0		0.03	0.01	29	12	41	2 8		79	108	28	0.2	2.2		276	122	58		448	--	5	--	--

BIG SANDY RIVER BASIN--Continued

3-2157. BIG SANDY RIVER AT CATLETTSBURG, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 8 a.m.)

Montb	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....	65	62	64	62	--	62	59	62	65	67	60	--	59	59	59	61	62	65	62	59	60	63	63	61	--	60	58	52	55	52	51	60
November...	--	50	52	51	51	51	48	49	50	41	46	46	50	49	53	57	59	61	57	54	52	48	47	--	49	52	--	45	40	--	--	50
December...	35	37	42	41	42	40	--	--	35	34	32	32	32	--	32	32	34	--	34	35	33	35	38	37	35	32	34	36	40	38	37	36
January....	39	45	40	35	--	--	34	--	32	34	32	38	34	34	38	32	32	--	--	35	36	37	35	36	39	39	38	38	39	38	--	36
February...	--	38	--	38	38	40	37	37	42	50	45	47	48	45	46	45	47	41	40	40	37	42	44	40	42	40	43	38	--	--	--	42
March.....	45	48	46	45	45	44	--	43	44	44	44	44	44	45	47	46	46	43	44	46	48	45	45	47	--	50	55	45	48	50	48	46
April.....	50	53	53	52	52	51	52	55	58	55	54	50	47	48	48	50	55	55	60	58	54	56	56	54	55	55	58	65	60	62	--	54
May.....	60	63	--	68	70	74	74	64	57	65	70	74	72	69	64	60	65	60	65	70	71	73	75	70	73	75	73	74	78	--	75	69
June.....	77	74	70	69	69	74	74	74	75	76	78	79	77	76	75	75	74	73	72	75	75	79	76	76	76	80	78	84	84	85	--	76
July.....	85	84	80	--	81	78	78	80	80	83	--	82	79	82	83	84	80	81	--	83	80	83	83	83	83	--	83	82	83	83	80	82
August.....	82	80	80	80	80	81	82	81	80	80	80	80	80	83	83	82	84	83	--	84	85	86	--	87	88	88	85	84	84	--	83	83
September..	82	80	80	78	80	--	84	82	83	81	73	73	--	72	72	72	68	68	67	--	70	71	73	74	74	74	--	78	78	77	--	76

TYGARTS CREEK BASIN

3-2170. TYGARTS CREEK NEAR GREENUP, KY.

LOCATION.--At gaging station at bridge on State Highway, 7, 100 feet downstream from Lick Run, 0.4 mile upstream from Whiteoak Creek, and 6.5 miles west of Greenup, Greenup County.
DRAINAGE AREA.--241 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1959.
Sediment records: October 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 75°F June 9-10, 26-29; minimum, freezing point Jan. 5-6, 17.
Sediment concentrations: Maximum daily, 724 ppm Jan. 22; minimum daily, 1 ppm on many days during January and August.
Sediment loads: Maximum daily, 8,820 tons Jan. 22; minimum daily, less than 0.05 ton on many days during July to September.
EXTREMES, 1956-59.--Water temperatures: Maximum, 83°F July 16, 23, 31, 1957; minimum, freezing point on several days during January 1957 and January 1959.
Sediment concentrations: Maximum daily, 1,280 ppm July 16, 1958; minimum daily, 1 ppm on several days during each year.
Sediment loads: Maximum daily, 9,070 tons July 16, 1958; minimum daily, less than 0.05 ton on many days during each year.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Occasional regulation at low flow caused by withdrawing cooling water for gas transmission station.

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily measurement between 3 p.m. and 6 p.m./

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	63	61	60	62	62	63	63	60	60	60	60	62	65	65	65	65	65	65	60	60	55	55	54	54	55	55	50	50	60
November...	50	52	52	54	54	52	52	52	52	52	54	54	54	54	57	57	57	57	54	54	54	51	51	51	50	45	45	40	40	40	--	51
December...	40	40	40	40	40	36	36	36	35	35	35	35	35	35	35	35	37	40	40	37	37	37	35	35	35	35	37	37	39	37	37	37
January....	38	38	34	40	32	32	34	34	--	34	34	34	40	37	35	33	31	34	34	34	40	38	38	41	39	39	39	40	40	35	35	36
February...	35	36	37	37	37	40	40	45	45	45	45	45	45	44	45	45	46	--	34	34	37	37	39	39	44	44	46	46	--	--	--	41
March.....	44	44	44	45	45	43	43	42	42	41	41	42	42	48	--	46	45	45	47	47	47	50	50	50	51	51	50	50	50	50	50	46
April.....	52	54	54	60	60	62	62	65	65	52	52	45	45	54	54	57	57	57	56	56	54	54	58	58	58	65	68	68	54	58	--	57
May.....	58	68	68	68	68	68	69	69	67	68	68	66	58	60	60	60	60	60	68	67	66	68	68	66	66	70	70	70	70	71	71	66
June.....	70	65	64	67	69	69	67	64	75	75	74	74	70	66	66	64	60	60	65	68	69	69	67	69	69	75	75	75	72	--	--	69
July.....	72	72	72	72	72	72	70	70	71	71	70	70	68	70	70	70	70	70	73	73	73	68	68	69	69	70	70	70	70	70	73	70
August.....	73	69	69	72	72	72	72	72	72	72	72	72	72	66	66	62	62	--	69	69	69	71	70	70	70	70	69	69	69	67	67	70
September..	66	66	62	55	55	55	67	67	67	67	58	58	67	67	50	50	50	53	53	57	57	57	57	60	60	60	60	60	54	54	--	59

TYGARTS CREEK BASIN--Continued

3-2170. TYGARTS CREEK NEAR GREENUP, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedimer	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	82	13	2.9	27	2	0.1	234	21	13
2...	64	13	2.2	26	2	.1	192	15	7.
3...	51	13	1.8	30	3	.2	180	9	4.
4...	42	11	1.2	30	3	.2	306	18	15
5...	35	8	.8	30	2	.2	504	20	27
6...	31	7	.6	28	2	.2	684	19	35
7...	27	7	.5	25	2	.1	366	19	19
8...	24	6	.4	22	2	.1	249	18	12
9...	24	5	.3	20	3	.2	192	10	5.
10...	24	4	.2	19	2	.1	160	5	2.
11...	25	2	.1	18	3	.1	130	4	1.
12...	26	2	.1	17	3	.1	110	3	.
13...	25	3	.2	17	4	.2	90	4	1.
14...	24	3	.2	17	5	.2	80	4	.
15...	22	3	.2	18	6	.3	70	5	.
16...	20	2	.1	19	7	.4	60	5	.
17...	19	2	.1	28	7	.5	57	4	.
18...	20	5	.3	41	7	.8	52	7	1.
19...	20	5	.3	41	7	.8	49	8	1.
20...	18	4	.2	120	9	2.9	46	5	.
21...	17	4	.2	132	10	3.6	44	4	.
22...	16	3	.1	89	11	2.6	42	3	.
23...	17	2	.1	69	11	2.0	41	2	.
24...	17	3	.1	58	8	1.2	42	6	.
25...	18	4	.2	46	7	.9	44	5	.
26...	19	3	.2	46	7	.9	44	3	.
27...	20	2	.1	54	6	.9	44	5	.
28...	24	2	.1	91	14	sa 4	44	4	.
29...	27	2	.1	426	83	s 100	43	2	.
30...	28	1	.1	378	34	s 38	44	2	.
31...	28	2	.2	--	--	--	43	2	.
Total	854	--	14.2	1,982	--	161.9	4,286	--	154.
	January			February			March		
1...	54	22	s 3.6	172	9	4.2	198	11	5.
2...	348	--	e 55	148	10	4.0	222	10	6.
3...	354	4	3.8	132	10	3.6	204	11	6.
4...	234	10	6.3	160	10	4.3	186	10	5.
5...	180	13	6.3	291	16	12	165	10	4.
6...	140	13	4.9	264	13	9.3	180	9	4.
7...	110	5	1.5	204	13	7.2	204	8	4.
8...	100	1	.3	180	13	6.3	204	9	5.
9...	80	1	.2	180	10	4.9	180	7	3.
10...	70	3	.6	363	--	e 120	186	8	4.
11...	60	4	.6	597	--	e 230	210	7	4.
12...	56	5	.8	357	40	38	372	15	15
13...	60	4	.6	444	25	sb 40	456	18	22
14...	69	4	.7	1,210	--	e 700	360	11	11
15...	948	90	sb 360	2,460	--	e 2,500	294	11	8.
16...	2,380	240	sb 1,600	1,080	44	s 136	243	10	6.
17...	700	98	185	561	33	50	198	5	2.
18...	400	25	27	459	29	36	170	4	1.
19...	300	17	14	441	17	20	148	3	1.
20...	1,960	480	s 3,220	342	15	14	135	3	1.
21...	4,360	490	s 5,800	270	13	9.5	128	4	1.
22...	4,460	724	s 8,820	231	13	8.1	122	5	1.
23...	1,400	252	s 1,060	246	12	8.0	112	4	1.
24...	516	90	125	327	13	11	100	3	.
25...	393	25	26	285	12	9.2	91	4	1.
26...	336	20	18	243	11	7.2	87	4	.
27...	291	21	16	219	11	6.5	103	5	1.
28...	255	15	10	195	12	6.3	138	6	2.
29...	231	16	10	--	--	--	138	5	1.
30...	213	10	5.8	--	--	--	125	5	1.
31...	198	8	4.3	--	--	--	122	4	1.
Total	21,256	--	21,386.3	12,061	--	4,005.6	5,781	--	138

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

TYGARTS CREEK BASIN--Continued

3-2170. TYGARTS CREEK NEAR GREENUP, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--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	120	5	1.6	246	6	4.0	25	11	0.7
2	195	23	s 15	195	4	2.1	558	430	sb 700
3	363	44	43	165	4	1.8	168	170	sa 85
4	318	11	9.4	142	4	1.5	84	48	11
5	267	11	7.9	125	5	1.7	59	42	6.7
6	222	10	6.0	110	5	1.5	43	43	5.0
7	189	10	5.1	103	4	1.1	32	38	3.3
8	165	8	3.6	84	4	.9	24	36	2.3
9	178	14	s 9.4	73	4	.8	20	28	1.5
10	1,010	--	e 360	68	4	.7	17	32	1.5
11	996	--	e 370	62	4	.7	14	15	.6
12	627	48	81	56	4	.6	13	15	.6
13	978	37	98	80	4	.9	12	11	.4
14	1,330	25	90	118	4	1.3	10	12	.3
15	894	22	53	128	4	1.4	8.6	13	.3
16	540	13	19	102	8	2.2	8.0	11	.2
17	405	9	9.8	75	9	1.8	6.2	11	.2
18	360	10	9.7	64	8	1.4	6.2	12	.2
19	339	13	12	54	8	1.2	6.2	12	.2
20	342	12	11	48	9	1.2	5.0	9	.1
21	312	7	5.9	47	10	1.3	5.0	8	.1
22	252	9	6.1	48	11	1.4	3.7	10	.1
23	216	8	4.7	50	12	1.6	6.2	11	.2
24	183	7	3.4	43	12	1.4	8.2	12	.3
25	160	18	7.8	68	14	2.6	10	12	.3
26	145	23	9.0	58	12	1.9	12	9	.3
27	255	60	sb 70	56	13	2.0	10	8	.2
28	519	--	e 150	41	12	1.3	8.6	10	.2
29	417	27	30	36	10	1.0	8.6	7	.2
30	315	10	8.5	31	10	.8	14	9	.3
31	--	--	--	27	10	.7	--	--	--
Total	12,612	--	1,509.9	2,603	--	44.8	1,205.5	--	822.2

Day	July			August			September		
1	19	10	0.5	9.8	7	0.2	2.1	10	0.1
2	15	9	.4	6.8	7	.1	2.4	9	.1
3	12	7	.2	5.6	6	.1	2.1	9	.1
4	35	17	1.6	4.7	4	.1	1.0	8	(t)
5	32	18	1.6	4.4	3	(t)	1.3	8	(t)
6	25	15	1.0	4.0	4	(t)	1.3	8	(t)
7	17	6	.3	3.7	5	(t)	1.1	6	(t)
8	22	8	.5	3.4	4	(t)	1.1	11	(t)
9	36	11	1.1	3.1	2	(t)	1.0	11	(t)
10	36	13	1.3	3.1	1	(t)	1.1	6	(t)
11	23	11	.7	2.4	1	(t)	1.3	10	(t)
12	20	7	.4	2.1	1	(t)	3.7	10	.1
13	42	8	.9	4.4	1	(t)	6.8	8	.1
14	23	7	.4	5.6	3	(t)	4.4	9	.1
15	11	7	.2	4.7	4	.1	3.4	8	.1
16	4.7	6	.1	4.7	10	.1	2.8	7	.1
17	1.8	5	(t)	4.4	15	.2	2.1	6	(t)
18	6.2	4	.1	4.4	15	.2	1.1	7	(t)
19	5.6	4	.1	5.6	13	.2	1.3	7	(t)
20	2.4	4	(t)	15	12	.5	1.5	7	(t)
21	3.4	5	(t)	20	10	.5	1.5	6	(t)
22	3.7	7	.1	12	12	.4	.6	8	(t)
23	3.4	7	.1	6.8	10	.2	.4	8	(t)
24	3.1	6	.1	4.7	9	.1	1.0	5	(t)
25	2.8	7	.1	3.7	8	.1	1.0	5	(t)
26	2.8	10	.1	2.8	9	.1	1.1	6	(t)
27	7.7	11	.2	2.1	9	.1	1.1	13	(t)
28	14	18	.7	2.1	10	.1	1.0	12	(t)
29	17	22	1.0	1.8	12	.1	1.0	10	(t)
30	31	22	1.8	1.8	12	.1	1.5	12	(t)
31	17	12	.6	1.6	10	(t)	--	--	--
Total	494.6	--	16.3	161.3	--	3.9	53.1	--	1.4

Total discharge for year (cfs-days)..... 63,349.5
Total load for year (tons)..... 28,258.6

e Estimated.
g Computed by subdividing day.
t Less than 0.05 ton.
a Computed from estimated-concentration graph.
b Computed from partly estimated-concentration graph.

TYGARTS CREEK BASIN--Continued

3-2170. TYGARTS CREEK NEAR GREENUP KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment											Method of analysis
						Percent finer than size indicated, in millimeters											
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 20, 1959.....	1700			3,280	627		37	50	61	74	87	95	99	100			SBWC
Jan. 21.....	1420			4,340	397		44	55	67	80	91	95	98	100			SBWC
Jan. 21.....	1420			4,340	397		31	42	63	81	91	94	98	100			SBN

3-2255. OLENTANGY RIVER NEAR DELAWARE, OHIO

LOCATION.--Temperature recorder at gaging station, 500 feet upstream from highway bridge, 1,000 feet downstream from Delaware Dam, 1,300 feet upstream from Pennsylvania Railroad bridge, and 4 miles north of Delaware, Delaware County.
DRAINAGE AREA.--387 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1946 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 80°F July 8; minimum, freezing point Jan. 22, 23.
EXTREMES, 1946-59.--Water temperatures: Maximum, 93°F June 29, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

3-2268. OLENTANGY RIVER NEAR WORTHINGTON, OHIO

LOCATION.--Temperature recorder at gaging station, 30 feet downstream from Wilson Road Bridge, 1.5 miles northwest of Worthington, Franklin County, and 2.8 miles upstream from Rush Run.
DRAINAGE AREA.--493 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F Aug. 22, 23; minimum, freezing point on several days during January.
EXTREMES, 1955-59.--Water temperatures: Maximum, 86°F Aug. 22, 23, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

3-2315. SCIOTO RIVER AT CHILLICOTHE, OHIO

LOCATION.--Temperature recorder at gaging station at north end of Chillocothe, Ross County, 450 feet downstream from Bridge Street Bridge on U.S. Highway 23.
DRAINAGE AREA.--3,847 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
Water temperatures: October 1950 to September 1951, October 1953 to February 1959.
EXTREMES, 1958-59.--Water temperatures: Minimum, 34°F on many days during December to February.
EXTREMES, 1950-51, 1953-59.--Water temperatures: Maximum (1950-51, 1953-58), 89°F July 14, 1954, Aug. 2, 3, 1955; minimum, freezing point on several days during December 1950, January and February 1951.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, October 1958 to February 1959
/Continuous ethyl alcohol-actuated thermograph/

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

SCIOTO RIVER BASIN--Continued

3-2340. PAINT CREEK NEAR BOURNEVILLE, OHIO

LOCATION.--At gaging station at highway bridge, 1.2 miles southwest of Bourneville, Ross County, and 1.2 miles upstream from Upper Twin Creek.
DRAINAGE AREA.--808 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1959.
Sediment records: October 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 60°F June 30, July 1; minimum, freezing point on many days during December and January.
Sediment loads: Maximum daily, 77,900 tons Jan. 22; minimum daily, 2 tons on several days during October to December.
EXTREMES, 1956-59.--Water temperatures: Maximum, 80°F June 30, July 1, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 2,010 ppm Jan. 21, 1959; minimum daily, 2 ppm Nov. 26, Dec. 1, 4, 1956, Jan. 4-7, 1957.
Sediment loads: Maximum daily, 77,900 tons Jan. 22, 1959; minimum daily, less than 0.5 ton Nov. 26, Dec. 1, 4, 1956.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow regulated slightly by Rocky Fork Reservoir (capacity 34,100 acre-feet). Flow affected by ice Dec. 9-14, 26, Jan. 7-10.

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 7:00 a.m.)

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	55	55	56	58	54	53	60	62	64	56	54	53	55	56	58	59	58	54	52	52	56	58	54	54	53	53	50	48	47	46	55
November...	49	49	49	48	50	48	45	44	46	44	42	46	47	51	49	53	58	61	53	50	48	46	43	47	45	46	37	38	36	--	--	47
December...	33	34	34	36	36	--	--	33	--	--	--	--	--	--	--	--	33	33	34	--	--	33	35	34	--	--	35	35	34	34	34	33
January....	36	34	35	--	--	--	--	--	--	--	--	--	33	34	38	--	--	--	33	33	39	38	32	34	36	35	33	--	--	39	38	34
February...	34	--	--	35	34	34	33	38	38	47	42	36	41	44	42	39	40	41	--	--	--	35	38	39	36	38	40	42	--	--	--	38
March.....	42	38	41	40	40	41	37	38	41	40	39	35	38	41	42	41	37	35	38	41	45	42	39	41	45	48	51	43	42	45	45	41
April.....	49	53	50	49	50	50	50	57	58	54	51	46	45	45	48	51	54	59	59	54	50	50	50	52	55	60	60	60	56	57	--	53
May.....	59	60	61	66	68	69	70	66	62	67	67	68	68	61	55	52	58	58	63	67	70	70	70	69	65	70	70	70	71	73	75	66
June.....	75	72	67	68	67	69	70	71	71	71	74	74	75	69	65	67	68	64	64	67	71	71	71	--	74	74	74	78	79	80	--	71
July.....	80	74	71	71	75	71	71	70	72	74	73	72	69	70	71	73	74	73	74	75	74	74	74	73	74	74	74	72	76	77	78	73
August.....	76	76	72	74	73	74	75	75	72	70	68	73	73	74	76	78	76	76	75	76	77	78	79	79	79	78	76	78	75	76	75	75
September..	76	75	72	70	69	73	73	74	74	74	66	63	61	61	61	63	56	55	55	60	60	64	64	64	64	66	68	68	69	69	--	66

3-2340. PAINT CREEK NEAR BOURNEVILLE, OHIO.--Continued

Suspended sediment, water year October 1958 to September 1959

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...	206	27	15	92	20	5	119	9	3
2...	178	22	10	94	18	4	124	5	2
3...	162	27	12	94	17	4	124	9	3
4...	153	24	10	94	15	4	376	46	s 54
5...	140	22	8	92	22	5	1,100	180	sa 600
6...	129	20	7	92	18	4	1,250	--	e 390
7...	121	20	6	89	13	3	882	25	
8...	114	21	6	87	8	2	763	14	29
9...	119	22	7	89	8	2	600	--	e 25
0...	137	22	8	90	10	2	460		
1...	124	17	6	94	8	2	380		
2...	114	10	3	92	8	2	310		
3...	110	18	5	90	22	5	270	--	e 10
4...	108	20	6	89	27	6	240		
5...	103	17	5	130	24	8	220		
6...	101	16	4	216	12	7	210		
7...	98	14	4	181	15	7	200	9	5
8...	99	9	2	165	17	8	200	8	4
9...	96	8	2	206	17	9	195	7	4
0...	96	9	2	191	13	7	232	6	4
1...	96	9	2	168	11	5	256	5	b 3
2...	96	11	3	150	12	5	236	4	b 2
3...	99	24	6	131	8	3	228	4	2
4...	105	16	4	126	6	2	260	4	3
5...	105	12	3	121	5	2	264	4	b 3
6...	105	20	6	117	5	2	250	6	b 4
7...	103	18	5	114	5	2	240	7	4
8...	103	22	6	121	9	3	236	5	3
9...	101	31	8	142	10	4	228	5	3
0...	96	25	6	131	11	a 4	228	5	3
1...	94	20	5	--	--	--	213	6	3
Total	3,611	--	182	3,688	--	128	10,894	--	1,286

Day	January			February			March		
1...	442	24	s 40	2,200	58	344	1,410	45	171
2...	1,320	82	292	1,730	40	b 190	1,540	43	179
3...	1,280	108	373	1,460	35	b 140	1,410	23	88
4...	1,070	--	e 260	1,730	35	163	1,210	17	56
5...	770	--	e 100	1,630	47	207	1,030	12	33
6...	574	--	e 40	1,370	30	111	1,510	100	sa 470
7...	490			1,130	24	73	1,820	110	540
8...	420			1,060	21	60	1,560	33	139
9...	370			1,030	20	56	1,370	24	89
0...	320	--	e 18	5,850	1,280	s 26,900	1,430	23	89
1...	284			5,870	675	10,700	1,790	46	222
2...	292			4,160	510	5,730	1,780	24	115
3...	327	11	10	3,190	150	1,290	1,730	23	107
4...	340	15	14	4,350	421	s 6,650	3,000	--	e 5,300
5...	2,040	--	e 3,200	5,510	475	s 7,950	4,540	489	s 6,580
6...	2,480	--	e 2,100	3,670	120	1,190	3,490	170	1,600
7...	1,380	--	e 150	2,680	72	521	2,500	95	641
8...	1,120	--	e 75	2,260	60	366	1,810	48	234
9...	1,470	15	60	1,740	40	b 190	1,430	32	124
0...	2,120	600	sa 7,800	1,400	30	b 110	1,230	28	93
1...	13,800	2,010	s 69,400	1,150	25	b 75	1,080	22	64
2...	22,200	1,300	77,900	1,100	19	56	914	22	54
3...	18,300	750	37,000	1,150	21	65	765	22	45
4...	5,780	420	6,550	1,360	31	114	670	28	51
5...	3,480	201	1,890	1,330	25	90	609	24	39
6...	2,580	89	620	1,220	20	66	557	22	33
7...	2,200	59	350	1,110	20	60	684	19	35
8...	1,850	55	b 280	1,030	18	50	691	11	20
9...	1,640	50	b 220	--	--	--	595	11	18
0...	2,130	92	529	--	--	--	557	9	14
1...	2,550	107	737	--	--	--	539	13	19
Total	95,419	--	210,098	63,470	--	63,517	45,251	--	17,262

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

SCIOTO RIVER BASIN--Continued

3-2340. PAINT CREEK NEAR BOURNEVILLE, OHIO.--Continued

Suspended sediment, water year October 1958 to September 1959--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...	515	17	24	905	54	132	246	63	42
2...	2,550	410	s 3,530	635	62	106	389	140	sa 210
3...	2,140	153	884	487	40	52	466	102	s 138
4...	1,590	47	202	411	27	30	314	61	52
5...	1,260	26	88	360	22	21	261	54	38
6...	990	22	59	322	31	27	235	56	36
7...	780	18	38	295	25	20	206	51	38
8...	649	16	28	269	25	18	190	46	24
9...	622	18	30	242	22	14	173	44	20
10...	569	13	20	228	21	13	161	38	16
11...	509	12	16	250	26	18	148	43	17
12...	487	15	20	307	45	37	196	55	29
13...	504	37	50	1,030	114	s 553	210	78	44
14...	482	36	47	3,070	406	3,360	173	48	22
15...	435	36	42	2,240	143	865	145	42	16
16...	392	34	36	1,490	90	362	136	50	18
17...	365	29	28	1,030	72	200	185	53	26
18...	347	25	23	780	68	143	168	31	14
19...	347	26	24	635	76	130	120	29	9
20...	383	27	28	551	66	98	114	34	10
21...	369	25	25	482	62	81	114	31	10
22...	331	17	15	607	85	sa 160	112	44	13
23...	303	28	23	416	55	62	114	45	14
24...	280	37	28	406	53	58	120	49	16
25...	265	38	27	360	48	47	122	46	15
26...	250	36	24	343	41	38	125	46	16
27...	418	50	sb 85	339	41	38	145	47	18
28...	1,780	191	s 966	331	43	38	122	42	14
29...	1,750	104	491	299	51	41	114	37	11
30...	1,290	54	188	280	55	42	102	37	10
31...	--	--	--	261	50	35	--	--	--
Total	22,952	--	7,089	19,661	--	6,839	5,426	--	946

Day	July			August			September		
1...	94	33	8	272	28	20	89	56	13
2...	114	25	8	199	17	9	391	199	210
3...	106	22	6	148	22	9	131	211	75
4...	92	24	6	134	32	12	89	119	28
5...	129	39	s 18	411	83	s 121	65	100	18
6...	488	780	s 1,180	1,110	186	557	63	85	14
7...	161	180	78	466	103	130	52	63	9
8...	114	128	39	388	97	102	56	53	8
9...	94	120	30	307	105	87	52	47	6
10...	99	105	26	250	82	55	50	50	7
11...	87	106	25	203	80	44	48	58	8
12...	78	118	25	170	72	33	48	65	8
13...	74	90	18	142	63	24	48	74	10
14...	69	68	13	120	54	17	46	76	9
15...	67	76	14	109	56	16	46	80	10
16...	65	83	14	99	59	16	45	77	9
17...	63	68	12	92	55	14	42	71	8
18...	63	56	10	94	57	14	42	70	8
19...	94	49	12	94	68	17	43	76	9
20...	392	185	s 266	89	66	16	45	80	10
21...	120	67	22	87	53	12	45	71	9
22...	89	96	23	78	39	8	45	72	9
23...	87	103	24	74	38	8	43	70	8
24...	190	170	sb 110	69	40	7	38	68	7
25...	167	136	s 65	67	42	8	38	52	5
26...	112	50	15	65	45	8	38	48	5
27...	637	694	s 2,550	63	45	8	38	44	4
28...	844	691	1,570	63	42	7	37	42	4
29...	972	400	sa 1,300	63	38	6	37	66	6
30...	487	137	180	63	33	6	46	76	9
31...	356	66	63	142	71	s 30	--	--	--
Total	6,957	--	7,730	5,731	--	1,421	1,896	--	543

Total discharge for year (cfs-days)..... 284,596
Total load for year (tons)..... 317,041

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

SCIOTO RIVER BASIN--Continued

3-2340. PAINT CREEK NEAR BOURNEVILLE, OHIO--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 21, 1959	0700			12,400	2,620		35	44	54	71	85	91	94	97	99	100	SBWC
Jan. 21	1115			13,900	1,620		39	47	60	74	87	93	96	98	100		SBWC
Jan. 21	1115			13,900	1,620		22	32	48	69	91	94	97	98	100		SBN
Jan. 22	0900			24,100	1,300		43	51	63	76	88	92	96	98	100		SBWC
Feb. 10	1900			9,690	1,810		46	54	66	81	91	95	97	98	100		SBWC
Mar. 15	0700			4,720	570		44	50	61	77	90	95	98	98	100		SBWC
Apr. 2	1100			4,170	705		34	44	57	72	86	92	96	100	--		SBWC
July 27	1900			2,050	2,130		50	60	72	87	98	99	100	--	--		SBWC
July 27	1900			2,050	2,130		28	47	67	88	97	99	100	--	--		SBN

SCIOTO RIVER BASIN--Continued

3-2345. SCIOTO RIVER AT HIGBY, OHIO

LOCATION.--At gaging station at highway bridge, 0.8 mile downstream from Walnut Creek and 1.2 miles north of Higby, Ross County.
DRAINAGE AREA.--5,129 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1953 to September 1959.
Sediment records: October 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F June 28, Sept. 8, 9; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 1,630 ppm Feb. 11; minimum daily, 4 ppm Dec. 26, Sept. 2, 20, 25.
Sediment loads: Maximum daily, 550,000 tons Jan. 23; minimum daily, 4 tons Sept. 20, 25.
EXTREMES, 1953-59.--Water temperatures: Maximum, 84°F July 20, 1957; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 2,130 ppm July 21, 1954; minimum daily, 1 ppm on several days during 1955-56.
Sediment loads: Maximum daily, 550,000 tons Jan. 23, 1959; minimum daily, 1 ton on several days during 1955-56.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow slightly regulated by O'Shaughnessy, Griggs, Delaware, Hoover and Rocky Fork Reservoirs. Flow affected by ice Jan. 10.

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement between 3 p.m. and 7 p.m.)

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

SCIOTO RIVER BASIN--Continued

3-2345. SCIOTO RIVER AT HIGBY, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1,960	38	201	784	14	30	1,480	8	32
2	1,770	27	129	810	13	28	1,280	5	17
3	1,600	27	117	797	10	22	1,280	6	21
4	1,390	22	82	810	9	20	1,590	6	26
5	1,410	20	76	784	9	19	3,020	221	s 2,090
6	1,320	26	93	758	12	24	4,050	297	3,140
7	1,280	50	173	732	12	24	3,990	104	1,120
8	1,210	35	114	719	21	41	3,400	53	486
9	1,210	20	65	706	16	30	3,060	43	355
0	1,220	18	59	732	8	16	2,220	26	156
1	1,180	34	108	810	10	22	1,670	16	72
2	1,240	24	80	823	18	40	1,670	19	86
3	1,340	18	65	784	11	23	1,520	15	62
4	1,350	32	117	758	8	16	1,420	14	54
5	1,310	45	159	823	10	22	1,320	15	a 55
6	1,210	26	85	979	14	37	1,250	15	51
7	1,200	14	45	1,100	15	44	1,240	12	40
8	1,180	11	35	1,080	8	23	1,130	16	49
9	1,220	10	33	1,200	14	45	1,140	15	a 45
0	1,100	18	53	1,250	16	54	1,170	13	a 40
1	1,040	24	67	1,570	25	a 100	1,200	11	36
2	1,020	34	94	1,880	31	157	1,200	14	45
3	966	19	50	1,740	12	56	1,170	16	50
4	914	22	54	1,690	6	27	1,180	32	102
5	966	23	60	1,380	9	34	1,220	17	56
6	914	15	37	1,290	7	24	1,180	4	13
7	901	8	19	1,250	6	20	1,200	5	16
8	875	14	33	1,270	6	20	1,170	5	16
9	862	13	30	1,380	5	19	1,170	5	16
0	836	11	25	1,630	10	44	1,200	18	58
1	823	12	27	--	--	--	1,210	21	69
Total	36,817	--	2,385	32,319	--	1,081	52,000	--	8,474
	January			February			March		
1	1,590	96	s 558	16,200	180	a 7,900	5,970	70	1,130
2	3,890	412	4,330	14,900	149	5,990	6,880	80	1,490
3	6,070	273	4,470	13,200	133	4,740	7,400	77	1,540
4	5,730	116	1,790	12,600	177	6,020	7,230	58	1,130
5	4,440	87	1,040	11,500	157	4,870	6,480	48	840
6	3,080	52	432	10,000	107	2,890	6,230	58	976
7	2,480	47	315	6,610	90	1,610	7,630	90	1,850
8	2,370	40	256	5,570	89	1,340	9,540	136	3,500
9	2,080	33	185	5,210	81	1,140	8,060	90	1,960
0	1,800	52	253	11,600	1,520	s 70,700	7,250	71	1,390
1	1,690	32	146	26,300	1,630	116,000	7,320	68	1,340
2	1,660	28	125	36,200	880	86,000	7,360	58	1,150
3	1,660	27	121	41,900	704	79,600	7,210	55	1,070
4	1,600	22	95	31,500	275	23,400	8,830	69	s 1,910
5	3,570	268	s 3,430	31,300	324	27,400	16,000	650	b 28,000
6	6,710	284	5,140	27,200	235	17,200	16,600	258	11,600
7	6,950	148	2,780	25,000	170	11,500	15,100	156	6,360
8	6,130	79	1,310	19,400	142	7,440	11,000	98	2,910
9	4,760	68	874	15,300	130	5,370	7,670	88	1,820
20	6,080	215	s 4,590	9,890	128	3,420	5,940	85	1,360
21	24,800	1,500	100,000	7,030	108	2,050	5,290	108	1,540
22	45,900	1,260	156,000	6,150	83	1,380	4,930	92	1,220
23	127,000	1,600	a 550,000	5,690	86	1,320	4,530	75	917
24	106,000	830	238,000	6,250	90	1,520	4,130	66	736
25	52,200	455	64,100	6,900	83	1,550	3,850	57	592
26	28,600	308	23,800	6,840	72	1,330	3,660	43	425
27	19,900	243	13,000	6,440	63	1,100	3,640	43	423
28	18,300	194	9,580	5,610	52	788	3,730	32	322
29	15,700	178	7,540	--	--	--	3,690	30	a 300
30	14,300	195	7,530	--	--	--	3,540	35	334
31	15,300	200	8,260	--	--	--	3,410	35	322
Total	542,340	--	1,210,050	422,290	--	5,568	220,090	--	80,457

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

SCIOTO RIVER BASIN--Continued

3-2345. SCIOTO RIVER AT HIGBY, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959--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...	3,470	30	281	11,600	157	4,920	3,910	148	1,560
2...	6,820	508	s 10,600	10,600	148	4,240	3,120	110	927
3...	8,550	413	9,530	10,400	140	s 3,900	4,630	428	5,350
4...	6,530	163	2,870	9,690	133	3,480	3,600	209	2,030
5...	5,730	101	1,560	7,890	98	2,090	3,010	168	1,360
6...	5,110	52	717	4,850	78	1,020	2,430	81	531
7...	4,370	48	566	3,750	72	729	2,150	36	209
8...	3,950	41	437	3,180	41	352	1,990	31	166
9...	3,770	33	336	2,880	35	272	1,900	25	a 130
10...	3,640	37	364	2,690	26	189	1,760	23	109
11...	3,390	30	274	2,560	20	138	1,600	23	99
12...	3,220	18	156	2,700	28	204	1,590	17	73
13...	3,240	20	175	5,730	154	s 2,820	1,700	27	124
14...	3,160	19	162	11,200	338	10,200	1,660	28	125
15...	2,960	15	120	9,270	186	4,660	1,620	28	122
16...	2,780	29	218	6,880	90	1,670	1,550	32	134
17...	2,630	19	135	4,910	78	1,030	1,470	32	127
18...	2,520	19	129	3,970	68	729	1,480	28	112
19...	2,430	15	98	3,450	59	550	1,400	24	91
20...	2,510	15	102	3,310	66	590	1,350	29	106
21...	2,560	18	a 120	3,640	72	708	1,320	36	128
22...	2,430	14	92	3,140	68	576	1,300	33	116
23...	2,310	13	81	3,300	73	650	1,340	30	108
24...	2,260	15	92	4,870	144	1,890	1,520	26	107
25...	2,190	14	83	4,450	143	1,720	1,580	26	111
26...	2,070	16	89	3,430	111	1,030	1,510	25	102
27...	3,370	156	s 2,630	3,540	100	956	1,480	30	120
28...	6,340	445	7,620	3,330	100	899	2,630	82	582
29...	10,600	520	14,900	4,030	230	sb 2,600	2,240	30	181
30...	12,900	225	7,840	3,620	156	1,520	1,900	27	138
31...	--	--	--	4,550	243	2,980	--	--	--
Total	127,810	--	62,377	163,410	--	59,312	60,740	--	15,178

Day	July			August			September		
1...	1,630	37	163	1,650	51	227	926	10	25
2...	1,460	37	146	1,400	38	144	1,050	4	11
3...	1,940	38	199	1,210	26	85	1,010	9	24
4...	2,040	33	182	1,780	81	s 641	866	13	30
5...	2,010	42	228	2,780	228	1,710	770	8	17
6...	2,830	382	2,920	2,010	128	695	710	8	15
7...	2,120	172	984	1,860	54	271	638	8	14
8...	1,590	102	438	1,620	47	206	590	7	11
9...	1,350	77	281	1,470	50	198	590	7	11
10...	1,270	58	199	1,310	50	177	590	5	8
11...	1,170	69	218	1,200	46	149	566	7	11
12...	1,110	66	198	1,140	45	138	542	5	7
13...	1,070	56	162	1,110	42	126	530	15	21
14...	1,060	53	152	1,210	51	167	494	9	12
15...	1,010	62	169	1,230	56	186	482	6	8
16...	986	65	173	1,160	38	119	470	8	10
17...	1,010	77	210	1,070	28	81	470	9	11
18...	1,050	62	176	1,020	30	83	458	10	12
19...	1,080	27	79	1,010	35	a 95	434	10	12
20...	1,390	25	94	1,010	35	95	410	4	4
21...	1,220	23	76	974	38	100	410	7	8
22...	1,070	29	84	950	56	144	398	12	13
23...	1,010	43	117	926	43	108	362	13	13
24...	1,080	48	140	926	24	60	350	8	8
25...	1,320	51	182	914	17	a 40	350	4	4
26...	1,350	65	237	866	17	a 40	338	7	6
27...	1,630	110	s 552	842	16	a 35	326	6	5
28...	2,090	250	b 1,400	770	15	31	326	7	6
29...	2,140	180	a 1,000	746	19	38	302	11	9
30...	1,860	93	467	890	12	29	374	11	11
31...	1,860	75	a 380	818	14	31	--	--	--
Total	45,806	--	12,006	37,872	--	6,249	16,132	--	357

Total discharge for year (cfs-days)..... 1,757,626
Total load for year (tons)..... 1,953,494

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

SCIOTO RIVER BASIN--Continued

3-2345. SCIOTO RIVER AT HIGBY, OHIO--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 21, 1959	1645			30,900	1,790		38	48	62	80	90	95	98	100			SBWC
Jan. 21	1645			30,900	1,790		15	22	37	58	90	95	99	100			SBN
Jan. 24	0245			140,000	1,080		64	75	84	93	97	98	99	100			SBWC
Jan. 24	2030			77,100	660		63	73	83	91	95	96	97	98	100		SBWC
Jan. 25	1600			46,700	355		68	76	85	90	94	97	100	--			SBWC
Feb. 12	0700			32,000	870		59	66	84	89	95	97	98	100			SBWC
Mar. 15	1730			15,800	489		46	55	67	80	91	95	98	100			SBWC
Apr. 27	1830			7,140	412		54	71	88	95	96	97	100	--			SBWC

SCIOTO RIVER BASIN--Continued

3-2371. SCIOTO RIVER AT LUCASVILLE, OHIO

LOCATION.--At bridge on State Highway 348 at Lucasville, Scioto County, 0.4 mile downstream from Miller Run, and 4.9 miles upstream from Scioto Brush Creek.
DRAINAGE AREA.--6,176 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 442 ppm Nov. 1-10; minimum, 194 ppm Jan. 21-23, 30-31.
Hardness: Maximum, 329 ppm Nov. 1-10; minimum, 143 ppm Jan. 21-23, 30-31.
Specific conductance: Maximum daily, 744 micromhos Sept. 27, 29; minimum daily, 245 micromhos Jan. 23.
Water temperatures: Maximum, 81°F July 1; minimum, freezing point on many days during December to February.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 479 ppm Nov. 11-20, 1956; minimum, 194 ppm Jan. 21-23, 30-31, 1959.
Hardness: Maximum, 329 ppm Nov. 1-10, 1958; minimum, 143 ppm Jan. 21-23, 30-31, 1959.
Specific conductance: Maximum daily, 784 micromhos Nov. 19, 1956; minimum daily, 238 micromhos July 24, 1958.
Water temperatures: Maximum, 85°F July 22, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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
Oct. 1-10,1958		9.3		0.04	0.01	77	27	16	2.4	278	78	17	0.5	4.7	392	303	75		620	8.0	5
Oct. 11-20....		7.0		.02	.00	81	28	19	2.8	290	85	21	.5	4.3	401	317	80		658	8.0	5
Oct. 21-31....		6.1		.02	.01	79	30	22	2.4	294	85	21	.5	3.7	419	321	80		668	7.9	5
Nov. 1-10.....		6.7		.00	.01	84	29	24	3.4	304	88	26	.5	4.7	442	329	80		685	8.1	8
Nov. 11-20....		6.7		.02	.00	79	29	24	3.0	290	87	25	.5	5.0	434	316	78		673	7.8	9
Nov. 21-30....		5.8		.03	.00	73	28	22	3.0	259	92	23	.5	5.1	410	297	85		628	8.1	10
Dec. 1-10.....		8.4		.01	.01	62	23	17	2.6	214	79	20	.4	5.5	354	249	74		542	7.7	9
Dec. 11-20....		8.3		.01	.01	79	28	18	2.8	274	90	21	.4	6.7	428	312	88		641	7.8	11
Dec. 21-31....		8.0		.01	.01	80	30	20	2.2	290	89	22	.5	7.1	436	323	86		667	7.8	7
Jan. 1-10,1959		8.0		.01	.01	66	24	14	2.3	218	80	17	.3	7.1	336	263	84		550	7.8	8
Jan. 11-15, 17-19.....		9.1		.01	.00	68	25	14	2.2	232	81	17	.4	7.8	341	273	82		562	7.6	9
Jan. 21-23, 30-31.....		7.6		.10	.01	39	11	4.3	2.6	123	37	7.0	.3	5.0	194	143	42		303	7.5	25
Feb. 1-10.....		8.9		.01	.00	54	18	6.9	2.4	a180	53	11	.2	7.6	265	209	61		422	8.3	10
Feb. 11-20....		7.1		.03	.00	44	14	4.3	2.3	140	43	8.0	.2	7.6	226	168	53		342	8.0	22
Feb. 21-28....		7.5		.01	.01	64	22	6.8	2.0	217	63	13	.2	7.5	323	250	72		496	8.2	8

Mar.1-10,1959	9.4	.01	.01	62	22	8.5	2.1	206	70	12	.2	7.8	299	245	76	496	8.0	9
Mar. 11-20...	9.8	.01	.01	52	20	7.5	2.1	174	61	11	.2	8.2	259	212	69	436	7.9	10
Mar. 21-31...	9.2	.01	.01	64	23	9.0	2.4	226	65	11	.2	7.1	315	254	69	508	8.2	5
Apr. 1-10....	8.8	.03	.00	57	21	8.0	1.9	196	64	12	.2	6.4	305	229	68	463	7.7	8
Apr. 15-20...	11	.01	.02	57	22	9.8	2.0	204	69	13	.2	4.7	292	233	66	484	7.5	4
Apr. 21-30...	10	.01	.03	57	25	12	2.2	210	73	14	.3	5.0	303	245	73	502	7.8	6
May 1-10.....	11	.02	.04	57	21	8.5	2.2	184	66	12	.2	10	285	229	78	462	7.6	8
May 21-30....	8.2	.05	.01	67	23	9.9	2.2	226	70	14	.4	9.3	339	262	76	531	7.7	10
June 1-10....	12	.01	.03	76	18	12	2.6	236	71	14	.2	8.4	333	264	70	535	7.9	7
June 11-20...	11	.02	.05	73	28	17	2.7	266	78	20	.4	5.1	370	297	79	604	7.6	8
June 21-30...	8.6	.02	.03	69	27	19	3.2	248	83	23	.5	5.0	373	283	80	603	7.6	7
July 1-10....	8.8	.02	.05	60	24	15	3.0	210	79	17	.3	5.9	315	248	76	530	7.5	7
July 11-20...	10	.02	.05	57	27	16	2.8	220	76	18	.4	4.4	335	253	73	544	7.6	6
July 21-31...	11	.02	.05	58	21	17	3.3	200	68	20	.5	4.4	313	213	67	505	7.6	6
Aug. 1-10....	9.9	.01	.00	58	20	14	3.3	210	62	16	.5	4.0	279	227	54	494	7.7	8
Aug. 11-20...	9.9	.00	.00	73	26	20	3.8	262	83	23	.6	3.7	376	289	74	622	8.2	12
Aug. 21-31...	9.6	.00	.00	77	28	25	3.8	284	86	27	.8	3.0	392	307	74	670	7.9	12
Sept. 1-10...	12	.01	.00	75	26	30	4.7	262	95	30	.8	4.1	392	294	80	672	7.8	12
Sept. 11-20..	8.9	.00	.00	69	31	28	4.2	274	90	28	.7	3.0	392	300	75	668	8.1	12
Sept. 21-30..	7.4	.00	.00	83	27	33	4.7	282	108	33	.7	2.5	427	318	87	721	8.1	17
Time-weighted average	8.9	0.02	0.01	67	24	16	2.8	236	76	18	0.4	5.7	349	266	72	563	--	9

a Includes equivalent of 1 part per million of carbonate (CO_3).

SCIOTO RIVER BASIN--Continued

3-2371. SCIOTO RIVER AT LUCASVILLE, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 10:30 a.m.)

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

3-2495. LICKING RIVER AT FARMERS, KY.

LOCATION.--Temperature recorder at gaging station at bridge on U.S. Highway 60, 300 feet upstream from Chesapeake and Ohio Railroad bridge, 0.8 mile west of Farmers, Rowan County, and 1.1 miles upstream from Triplett Creek.
DRAINAGE AREA.--826 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1949 to August 1950.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 85°F on July 1; minimum, freezing point during January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 92°F July 19, 1951; minimum, freezing point on many days during winter months.
REMARKS.--Clock on thermograph stopped Jan. 10-31, Feb. 20-21, Mar. 8-12, time indeterminate. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

LICKING RIVER BASIN--Continued

3-2515. LICKING RIVER AT McKINNEYSBURG, KY.

LOCATION.--At gaging station at County highway bridge at McKinneysburg, Pendleton County, 6.5 miles southeast of Falmouth, 9.0 miles upstream from Blanket Creek, and 12.8 miles upstream from South Fork.
DRAINAGE AREA.--2,280 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1959.
Water temperatures: October 1952 to September 1959.
Sediment records: October 1952 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 195 ppm Jan. 4; minimum, 104 ppm Apr. 12-17, 19, June 5-10.
Hardness: Maximum, 149 ppm Jan. 4; minimum, 66 ppm June 5-10.
Specific conductance: Maximum daily, 304 micromhos Jan. 4; minimum daily, 135 micromhos Apr. 17.
Water temperatures: Maximum, 82°F Aug. 25-26; minimum, freezing point on many days during December and January.
Sediment concentrations: Maximum daily, 1,990 ppm June 26; minimum daily, 5 ppm Dec. 31.
Sediment loads: Maximum daily, 90,700 tons Jan. 22; minimum daily, 3 tons on several days during October.
EXTREMES, 1952-59.--Dissolved solids: Maximum, 218 ppm Dec. 21-31, 1955; minimum, 57 ppm Apr. 16-17, 1953.
Hardness: Maximum, 170 ppm Nov. 17-30, 1955; minimum, 42 ppm Mar. 8-12, 1955.
Specific conductance: Maximum daily, 377 micromhos Nov. 25, 1955; minimum daily, 90 micromhos Mar. 9, 1953.
Water temperatures: Maximum, 87°F July 31 to Aug. 1, 1953; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 4,230 ppm Feb. 25, 1956; minimum daily, 1 ppm on many days during 1952-56.
Sediment loads: Maximum daily, 223,000 tons Feb. 25, 1956; minimum daily, less than 0.5 ton on many days during 1952-56.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow affected by ice Dec. 13-18, 21-23, 25-29, Jan. 14-15.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 1-24, 1958....	127	--	--	30	7.2	7.1		111	18	7.0	--	0.7	142	105	14	234	7.4	7
Dec. 12-31.....	364	--	--	38	7.1	8.0		115	24	15	--	1.7	159	124	30	290	7.4	5
Jan. 4, 1959.....	2,480	--	--	--	--	--		136	--	--	--	--	195	149	38	304	7.3	5
Jan. 16-28.....	12,990	--	--	24	4.0	3.4		68	18	4.8	--	3.5	115	76	21	170	7.0	25
Jan. 29-Feb. 16....	3,915	10	0.03	32	5.6	5.5		97	23	7.3	0.1	3.4	147	103	24	228	7.3	7
Feb. 17-21, 23-27..	4,893	--	--	31	5.8	4.1		94	23	5.1	--	2.9	144	102	24	218	7.3	5
Mar. 10, 13-31.....	2,076	--	--	36	7.2	6.0		113	26	8.3	--	2.1	163	120	27	260	7.5	5
Apr. 1-11.....	3,249	--	--	33	6.0	6.2		104	24	6.5	--	1.6	146	107	22	235	7.6	10
Apr. 12-17, 19.....	9,066	--	--	20	5.0	3.9		64	19	3.5	--	1.8	104	70	18	157	7.7	10
Apr. 20-27, 29.....	2,563	--	--	26	5.8	6.4		86	22	6.0	--	1.1	135	89	18	203	7.6	7
Apr. 30-May 19.....	1,217	--	--	29	7.2	6.4		96	23	9.0	--	1.2	137	102	24	234	7.0	4
May 20-25, 27-29...	830	--	--	28	7.4	9.4		92	24	14	--	1.3	142	101	25	240	7.1	5
May 30-June 4.....	1,388	--	--	24	4.4	9.2		74	17	13	--	2.1	120	78	18	194	7.3	5
June 5-10.....	1,110	--	--	21	3.1	6.7		62	16	8.0	--	1.8	104	66	14	153	6.9	6
June 12-24, 26.....	594	--	--	26	3.7	8.0		76	17	12	--	1.0	120	80	18	191	7.2	4
June 27-30.....	3,183	--	--	28	3.4	5.3		83	15	6.0	--	4.5	126	84	16	186	6.9	16

July 1-18,20, 1959.	577	--	--	34	4.1	5.3		99	19	7.0	--	3.2	144	102	21	222	7.0	9
July 21-25.....	506	--	--	31	4.4	5.5		96	19	5.0	--	2.2	136	96	17	204	6.9	21
July 26-Aug. 15, 17-18.....	404	--	--	37	4.8	7.8		116	19	9.0	--	2.2	158	113	18	249	7.0	7
Aug. 19-31.....	193	--	--	35	4.9	6.2		116	16	5.0	--	3.1	148	108	13	229	7.1	10
Sept. 1-30.....	77.6	6.2	.01	38	4.6	6.0		126	18	7.0	.2	1.4	153	114	11	248	7.5	7
Time-weighted average [a].....	1,986	--	--	32	5.5	6.4		101	20	8.2	--	2.0	143	103	20	229	--	8

a Represents 78 percent of days and 84 percent of runoff.

LICKING RIVER BASIN--Continued

3-2515. LICKING RIVER AT McKINNEYSBURG, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

LICKING RIVER BASIN--Continued

3-2515. LICKING RIVER AT McKINNEYSBURG, KY.--Continued

Suspended sediment, water year October 1958 to September 1959
[Where no concentrations are reported, loads are estimated for monthly totals]

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...	253	36	24	70			1,410	--	--
2...	230	26	16	70			1,180	--	--
3...	200	28	15	75			1,490	--	--
4...	180	25	12	75			3,430	--	--
5...	160	23	10	80			6,230	--	--
6 ..	150	23	9	80			5,290	--	--
7 ..	140	25	a 9	82			3,850	--	--
8 ..	130	25	9	85			2,400	--	--
9 ..	125	30	10	90			1,580	--	--
0 ..	120	28	9	95			1,150	--	--
1 ..	120	31	10	95			920	--	--
2...	115	31	10	95			728	18	35
3...	115	29	9	95			650	17	30
4...	115	27	8	95			600	14	23
5...	110	25	a 7	271			530	12	a 17
6...	105	24	7	320			450	11	13
7...	100	19	5	250			400	9	10
8...	95	16	4	250			350	10	9
9...	90	15	4	300			310	8	7
0...	85	20	4	350			276	8	6
1...	85	20	4	250			250	8	5
2...	80	18	4	250			220	8	5
3...	80	16	3	350			200	8	4
4...	75	16	3	300			240	8	5
5...	75			300			270	6	4
6...	75			250			290	7	5
7...	75	--	e 3	250			300	7	6
8...	75			300			310	8	7
9...	75			350			330	7	6
0...	75			1,380			305	6	5
1...	70			--			271	5	4
Total	3,578	--	226	6,903		750	36,210	--	23,000

Day	January			February			March		
1...	1,310	225	s 1,310	2,030	29	159	4,310	380	b 4,400
2...	2,920	161	1,270	1,800	24	117	3,270	114	1,010
3...	2,910	95	a 750	1,570	23	97	2,880	67	521
4...	2,480	81	542	1,560	19	80	2,360	41	261
5...	1,610	47	204	1,740	20	94	2,050	38	210
6...	1,300	34	119	2,320	32	200	2,570	45	a 310
7...	1,100	28	83	2,360	30	a 190	2,550	52	358
8...	1,000	23	62	2,280	25	154	2,460	36	239
9...	1,000			2,070	19	106	2,280	24	148
0...	950			4,180	--	s 14,000	2,110	22	125
1...	800	--	e 35						
2...	750			4,950	850	sb 12,000	2,350	35	sb 240
3...	700			4,320	390	4,550	4,350	190	b 2,200
4...	900	--	e 90	4,430	68	813	4,480	130	1,570
5...	5,400	--	e 9,600	6,920	466	s 9,940	4,140	89	995
6...	8,560	750	b 17,000	12,000	723	23,400	3,300	44	392
7...	9,400	--	e 19,000	12,800	523	18,100	2,760	32	238
8...	6,000	160	sb 2,900	11,800	313	9,970	2,350	27	171
9...	3,080	120	998	8,910	168	4,040	2,020	16	87
0...	11,600	804	s 34,300	6,520	120	a 2,100	1,750	18	85
1...				4,640	98	1,230	1,580	18	77
2...	25,000	1,220	82,400	3,230	63	549	1,910	34	175
3...	32,600	1,030	90,700	2,580	54	376	1,790	58	280
4...	26,600	480	34,500	2,840	68	521	1,500	37	150
5...	17,700	340	16,200	3,170	51	436	1,420	22	84
6...	12,300	282	9,360	2,960	37	296	1,270	18	62
7...	7,960	213	4,580	2,610	37	261	1,230	24	80
8...	4,980	211	2,840	2,250	25	152	2,090	74	418
9...	3,050	140	1,150	2,010	25	sb 140	1,790	66	319
0...	2,510	73	495	--	--	--	2,110	59	336
1..	2,330	51	321	--	--	--	2,240	55	333
2..	2,210	36	215	--	--	--	2,090	65	a 370
Total	201,010	--	331,164	120,850	--	104,071	74,360	--	16,244

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

LICKING RIVER BASIN--Continued

3-2515. LICKING RIVER AT McKINNEYSBURG, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedimen	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	1,920	35	a 180	1,950	106	558	1,030	83	s 24
2...	4,470	500	sb 6,500	1,710	77	356	1,880	301	1,5
3...	3,490	176	1,660	1,560	54	227	1,640	185	81
4...	3,550	115	1,100	1,370	29	107	1,770	150	71
5...	3,100	95	795	1,220	13	43	1,880	213	1,08
6...	2,850	66	508	1,090	11	32	1,580	214	91
7...	2,750	55	408	980	13	34	1,170	120	37
8...	2,480	56	375	872	18	42	860	94	21
9...	2,190	65	384	776	13	27	650	107	18
10...	3,130	118	997	704	10	19	520	62	8
11...	5,810	222	3,480	635	12	a 20	430	35	a 4
12...	7,960	304	6,530	605	13	21	375	35	3
13...	9,790	290	7,660	752	17	34	332	37	3
14...	11,000	276	8,200	1,130	23	70	254	31	2
15...	11,300	165	5,030	1,250	35	118	212	14	
16...	10,200	157	4,320	1,500	37	150	182	18	
17...	8,740	155	3,660	1,440	51	198	171	25	1
18...	6,820	130	a 2,400	1,300	54	190	159	24	1
19...	4,470	86	1,040	1,030	36	100	152	23	
20...	3,080	58	482	836	28	63	140	23	
21...	3,290	89	790	812	22	48	126	20	a
22...	3,420	91	840	722	21	41	118	24	
23...	2,680	66	478	640	16	28	165	30	1
24...	2,360	42	268	565	13	20	224	265	16
25...	2,060	35	a 195	575	14	22	190	120	a 6
26...	1,830	42	208	836	--	e 330	5,710	1,990	s 43,50
27...	1,710	63	291	1,070	244	705	7,500	1,740	35,20
28...	2,030	70	a 380	956	146	377	3,400	1,180	10,80
29...	2,640	155	1,100	1,290	132	460	1,140	480	1,48
30...	2,470	150	1,000	1,120	68	206	692	195	36
31...	--	--	--	890	47	113	--	--	-
Total	133,590	--	61,259	32,186	--	4,759	34,652	--	97,95

	July			August			September		
1...	485	165	216	890	105	252	78	110	2
2...	824	--	e 1,400	635	77	132	76	94	1
3...	1,810	1,200	5,860	490	70	93	76	92	1
4...	1,580	519	s 2,390	314	66	56	116	86	2
5...	704	204	388	277	63	47	134	70	2
6...	674	123	224	251	52	35	107	66	1
7...	635	82	140	198	48	26	91	59	1
8...	716	105	203	152	45	18	82	56	1
9...	525	99	140	128	44	15	78	66	1
10...	314	89	75	110	43	13	76	69	1
11...	234	79	50	95	42	11	72	78	1
12...	585	87	137	87	42	10	71	64	1
13...	450	58	70	82	41	9	70	55	1
14...	244	53	35	79	38	8	69	57	1
15...	178	35	17	78	28	6	68	52	1
16...	157	29	12	434	--	e 340	68	54	1
17...	140	34	13	430	74	s 110	88	53	1
18...	128	24	8	178	49	24	85	50	a 1
19...	260	75	sa 80	244	62	41	78	49	1
20...	578	360	sb 650	248	103	69	74	47	
21...	248	172	115	167	102	46	72	44	
22...	161	87	38	182	105	52	70	43	
23...	156	70	29	165	79	35	69	46	
24...	1,280	--	e 2,500	134	76	27	68	50	
25...	686	437	s 848	110	65	19	67	52	
26...	1,040	190	534	270	--	e 450	66	45	
27...	645	85	148	341	382	s 375	66	34	
28...	582	--	e 240	155	113	47	65	30	a
29...	788	246	523	251	97	66	65	37	
30...	836	124	280	146	104	41	64	47	
31...	932	131	330	94	93	24	--	--	-
Total	18,575	--	17,693	7,415	--	2,497	2,329	--	37

Total discharge for year (cfs-days)..... 672,65
Total load for year (tons)..... 659,99

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

3-2515. LICKING RIVER AT McKINNEYSBURG, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 21, 1959.....	1515			27,200	1,460		44	54	65	80	95	98	100	--			SBWC
Feb. 11.....	1635			4,580	723		53	64	77	89	97	99	100	--			SBWC
Apr. 2.....	1700			4,740	514		62	70	80	90	96	98	99	100			SBWC
June 26.....	1510			8,960	3,260		44	54	69	86	97	99	100	--			SBWC
June 26.....	1510			8,960	3,260		21	33	51	78	98	99	100	--			SBN
July 3.....	0920			1,650	1,100		70	81	90	94	95	96	97	100			SBWC

3-2525. SOUTH FORK LICKING RIVER AT CYNTHIANA, KY.

LOCATION.--At gaging station at bridge on State Highways 356 and 36, at Cynthiana, Harrison County, 0.4 mile downstream from Grays Run, and in pool formed by old milldam 2.6 miles downstream.
DRAINAGE AREA.--615 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to August 1951.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F Aug. 25; minimum, freezing point probably on several days during December and January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 87°F June 30, 1952, July 14, 1954; minimum, freezing point on several days during winter months 1953, 1958, 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurements at approximately 7 a.m. and 6 p.m./

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																																
a.m.	61	58	58	59	58	57	58	62	65	67	63	57	56	58	59	59	60	59	58	56	55	56	58	58	56	56	55	53	51	49	48	58
p.m.	60	58	59	59	58	58	62	65	67	65	62	58	59	60	60	60	60	60	58	57	56	58	59	58	57	57	54	53	52	50	50	58
November																																
a.m.	50	51	50	50	50	49	48	47	47	46	45	45	47	50	52	53	55	58	54	49	49	48	44	45	45	45	42	41	37	33	-	48
p.m.	51	50	51	52	50	50	48	47	47	46	46	47	50	52	53	55	58	57	53	50	49	47	45	46	46	44	42	40	36	33	--	48
December																																
a.m.	33	33	35	36	36	35	34	34	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	34	35	36	37	35	34	34	35	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January																																
a.m.	34	35	34	34	--	--	33	34	--	--	33	34	35	36	37	36	34	34	34	35	36	35	34	34	37	38	38	38	39	39	39	35
p.m.	36	35	36	33	--	--	34	34	--	--	34	35	36	37	37	34	34	34	35	36	36	34	34	36	38	39	38	39	40	39	38	35
February																																
a.m.	37	35	34	35	35	34	36	38	39	41	40	42	44	46	47	45	45	46	43	40	37	35	37	36	37	39	42	46	--	--	--	40
p.m.	36	35	35	35	35	36	38	39	41	42	39	44	46	48	46	45	46	45	42	39	36	37	37	38	39	42	46	47	--	--	--	40
March																																
a.m.	44	41	42	42	43	42	39	40	42	41	41	39	39	40	42	41	40	38	39	42	44	43	42	45	50	55	55	46	48	48	51	43
p.m.	43	42	43	43	43	40	40	42	42	41	40	39	40	42	42	41	40	40	42	44	44	43	46	50	56	55	51	48	48	51	54	44
April																																
a.m.	54	55	55	53	53	54	55	60	62	60	60	51	46	44	49	52	55	58	58	59	57	54	53	54	57	60	63	63	62	63	--	56
p.m.	56	55	54	54	54	56	60	63	61	60	59	49	46	50	53	55	59	58	59	59	56	54	55	57	60	63	63	62	64	67	--	57
May																																
a.m.	66	68	69	69	72	72	72	71	70	70	71	72	72	68	62	60	60	61	62	65	70	72	70	70	69	72	74	74	73	74	74	69
p.m.	68	69	70	72	73	73	72	71	70	71	73	72	71	66	62	61	61	62	65	70	73	71	76	70	74	75	75	74	76	76	76	71
June																																
a.m.	75	74	73	73	73	74	73	72	73	74	75	75	75	72	70	71	70	69	68	70	72	72	74	75	76	76	72	73	75	76	--	73
p.m.	76	74	75	74	75	74	74	74	75	75	75	76	72	72	71	72	71	70	70	73	73	74	75	76	74	72	74	75	77	79	--	74
July																																
a.m.	78	79	79	79	75	77	78	78	77	78	79	77	76	76	79	78	79	78	77	78	78	78	78	78	74	71	72	73	74	76	78	77
p.m.	79	79	80	79	79	81	82	80	82	82	77	80	80	81	82	82	82	82	80	81	81	80	78	77	75	74	76	76	78	80	81	80
August																																
a.m.	79	78	76	--	--	--	78	78	76	75	73	74	76	78	79	78	77	76	78	78	78	79	79	82	83	84	81	79	80	78	77	78
p.m.	81	80	--	--	--	81	81	79	78	76	76	77	80	81	81	80	78	80	79	80	81	81	85	85	86	82	81	81	80	79	80	80
September																																
a.m.	79	78	77	76	76	76	77	79	80	78	74	71	69	68	67	68	67	66	67	66	67	68	70	71	70	72	70	70	72	70	--	72

3-2740. MIAMI RIVER AT HAMILTON, OHIO

LOCATION.--Temperature recorder at gaging station, 1,000 feet downstream from Columbia Bridge at Hamilton, Butler County, and 3 miles downstream from Talawanda Creek.
DRAINAGE AREA.--3,639 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951.
Water temperatures: October 1950 to September 1951, October 1957 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 93°F Aug. 23, 24; minimum, 34°F Jan. 24, 25.
EXTREMES, 1950-51, 1957-59.--Water temperatures: Maximum, 93°F Aug. 23, 24, 1959; minimum, freezing point on several days during December to February 1951.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

Month	Day																														Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	68	67	66	66	67	65	66	69	69	69	68	65	65	65	66	68	68	67	66	65	65	65	67	67	65	63	63	63	62	61	61	66
Minimum.....	67	66	66	65	65	65	64	66	69	68	65	64	64	64	65	66	67	66	65	64	63	64	65	65	63	63	63	61	61	61	60	65
November																																
Maximum.....	61	60	59	59	59	58	57	57	55	55	54	56	57	59	61	63	65	65	62	59	56	55	53	53	53	53	51	50	45	43	--	56
Minimum.....	60	59	59	58	58	57	57	55	55	54	54	54	56	57	59	61	63	62	59	56	55	53	53	53	53	51	50	45	43	41	--	55
December																																
Maximum.....	41	42	43	43	43	41	38	37	37	37	37	39	39	39	39	39	40	41	42	42	42	42	42	43	43	42	42	43	43	43	44	41
Minimum.....	41	41	42	43	41	38	37	37	37	37	37	37	39	39	39	38	39	40	41	42	41	41	42	42	42	41	42	42	43	43	43	40
January																																
Maximum.....	44	41	40	40	39	38	40	41	41	41	41	43	43	45	45	41	37	37	38	39	43	39	37	35	35	35	36	37	40	40	40	40
Minimum.....	41	40	40	38	37	37	38	40	41	41	41	41	43	43	41	37	36	36	37	38	36	37	35	34	34	35	35	36	37	40	40	38
February																																
Maximum.....	40	39	38	40	41	41	41	42	43	45	44	43	42	43	43	43	43	43	43	41	40	41	41	43	43	43	45	45	--	--	--	42
Minimum.....	39	38	38	38	40	41	41	41	42	43	43	41	41	42	43	42	43	43	41	40	39	40	41	41	43	43	43	45	--	--	--	41
March																																
Maximum.....	45	45	45	46	45	45	42	42	42	43	42	41	42	44	44	43	42	42	44	45	47	47	46	48	51	51	51	50	50	49	51	45
Minimum.....	45	45	45	45	45	42	41	41	42	42	41	40	41	42	43	41	41	41	42	44	44	46	45	46	48	51	50	48	48	48	49	44
April																																
Maximum.....	55	55	55	54	54	56	57	60	60	60	60	57	54	55	57	60	62	62	62	62	60	61	61	62	64	65	65	64	61	60	--	59
Minimum.....	51	55	54	53	53	54	55	57	60	60	57	54	53	53	55	57	60	62	62	60	59	60	60	61	62	64	64	61	58	59	--	58
May																																
Maximum.....	62	65	67	67	71	73	73	73	71	70	71	71	69	67	63	61	61	63	69	69	72	73	74	74	73	73	73	74	75	75	75	70
Minimum.....	60	62	64	65	67	71	72	71	69	69	70	69	67	63	61	60	60	61	63	68	69	72	73	73	72	72	73	72	74	74	74	68
June																																
Maximum.....	76	76	76	76	76	76	77	78	80	81	81	80	79	79	78	78	78	77	78	80	80	81	80	78	80	78	83	85	88	90	--	79
Minimum.....	75	75	75	75	75	75	76	77	78	80	80	78	79	78	77	76	76	75	75	77	79	78	77	78	78	75	78	83	85	87	--	78
July																																
Maximum.....	89	87	85	85	84	86	85	85	85	86	85	83	83	84	85	85	86	86	85	84	85	85	84	83	83	83	86	86	87	89	89	85
Minimum.....	87	84	82	83	84	83	83	82	83	83	83	81	81	82	82	84	85	84	83	83	82	84	82	82	82	82	83	84	84	87	87	83
August																																
Maximum.....	89	88	85	83	82	82	84	84	82	83	84	85	86	87	86	86	83	83	86	88	89	90	93	93	92	91	88	87	90	87	87	87
Minimum.....	86	85	83	82	79	79	82	82	81	81	81	82	83	85	85	83	82	81	82	85	87	88	89	89	89	82	85	86	86	85	83	84
Septemher																																
Maximum.....	86	81	84	84	84	85	85	87	88	86	83	80	80	80	79	76	71	71	73	74	75	78	79	81	81	79	79	81	82	79	--	80
Minimum.....	79	79	80	81	81	82	83	83	86	83	79	78	77	76	76	58	68	67	68	70	72	74	75	76	78	78	76	77	79	76	--	76

MIAMI RIVER BASIN--Continued

3-2766. MIAMI RIVER AT ELIZABETHTOWN, OHIO

LOCATION.--At Lost Bridge on Lawrenceburg Road, 0.6 mile southeast of Elizabethtown, Hamilton County, 0.9 mile downstream from Whitewater River, and 5.4 miles upstream from mouth.
DRAINAGE AREA.--5,385 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 461 ppm Sept. 21-30; minimum, 259 ppm Feb. 11-20.
Hardness: Maximum, 370 ppm Dec. 11-31; minimum, 224 ppm Feb. 11-20.
Specific conductance: Maximum daily, 781 micromhos Dec. 7; minimum daily, 331 micromhos Feb. 12.
Water temperatures: Maximum, 89°F June 29, Aug. 23, 24; minimum, freezing point Dec. 15, Jan. 6, 17, 18.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 519 ppm Oct. 21-31, 1956; minimum, 232 ppm June 11-20, 1958.
Hardness: Maximum, 372 ppm Oct. 21-31, 1956; minimum, 188 ppm June 11-20, 1958.
Specific conductance: Maximum daily, 852 micromhos Oct. 25, 1956; minimum daily, 303 micromhos July 20, 1958.
Water temperatures: Maximum, 89°F June 29, Aug. 23, 24, 1959; minimum, freezing point on several days during January 1957. February, December 1958 and January 1959
REMARKS.--Specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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
Oct. 1-10,1958		6.0		0.01	0.00	87	31	19	2.6	304	89	20	0.4	13	441	345	96		699	7.8	5
Oct. 11-20....		12		.01	.00	85	33	19	2.4	305	91	19	.4	10	440	348	98		700	7.7	5
Oct. 21-31....		5.8		.01	.00	86	33	19	2.7	299	96	21	.4	12	442	350	105		707	7.6	4
Nov. 1-10.....		7.9		.01	.01	87	34	19	2.8	305	102	23	.6	14	435	357	107		720	7.8	4
Nov. 11-20....		6.5		.01	.00	82	32	16	2.8	293	90	20	.6	13	405	336	96		677	7.9	5
Nov. 21-30....		10		.02	.00	84	32	14	2.6	298	86	19	.5	12	399	341	97		664	7.9	7
Dec. 1-10.....		9.1		.01	.01	85	30	19	2.1	298	77	27	.4	9.8	411	336	92		672	7.7	6
Dec. 11-20....		9.5		.01	.01	92	34	17	2.2	323	94	22	.4	13	452	370	105		729	7.9	5
Dec. 21-31....		8.8		.02	.00	92	34	18	2.3	322	96	23	.3	13	449	370	106		734	7.9	5
Jan. 1-10,1959		9.0		.02	.01	83	30	14	2.7	292	78	19	.2	11	390	331	92		649	7.5	5
Jan. 11-19....		9.1		.02	.01	84	29	14	2.4	292	79	19	.2	12	395	329	90		647	7.6	5
Jan. 30-31....		8.6		.01	.00	77	26	10	2.3	268	65	15	.2	10	340	299	80		587	7.5	5
Feb. 1-10.....		10		.03	.01	78	24	8.2	2.2	268	63	14	.2	11	333	293	74		580	7.9	5
Feb. 11-20....		11		.02	.01	60	18	5.3	2.4	208	43	9.5	.2	11	259	224	53		448	7.8	7
Feb. 21-28....		9.8		.02	.01	81	26	8.7	2.0	280	67	14	.2	12	367	309	80		606	7.8	5
Mar. 1-10.....		14		.02	.01	75	27	7.8	1.9	266	65	13	.2	12	356	298	80		579	7.7	4
Mar. 11-20....		11		.02	.01	71	23	7.9	1.6	252	55	15	.2	11	338	272	65		542	7.7	4
Mar. 21-31....		9.8		.02	.01	81	30	9.7	1.7	296	74	15	.2	11	396	326	93		634	7.7	4

Apr. 1-10,1959		7.9		.00	.00	76	30	10	2.0	276	74	16	.2	9.6	383	313	87		610	7.4	7
Apr. 11-15, 17-20.....		8.0		.00	.01	81	32	12	2.0	301	80	17	.3	8.3	409	334	87		651	7.6	7
Apr. 21-30....		6.4		.00	.02	77	30	13	2.2	284	76	17	.3	10	398	316	83		626	7.5	8
May 1-10.....		10		.04	.03	69	29	9.7	2.2	260	70	14	.3	11	349	291	78		581	8.0	7
May 11-20.....		12		.03	.03	72	32	10	1.9	274	67	14	.3	12	360	311	86		603	7.6	6
May 21-31.....		11		.01	.04	77	28	11	2.2	266	71	16	.3	11	361	307	89		603	7.9	5
June 1-10.....		12		.01	.05	75	30	12	2.6	272	80	17	.3	11	387	311	88		613	7.6	4
June 11-20....		12		.01	.05	76	30	16	2.6	272	84	19	.4	9.7	398	313	90		642	7.3	5
June 21-30....		10		.01	.03	71	26	14	2.7	246	80	17	.3	8.0	358	284	82		591	7.4	6
July 1-10.....		11		.00	.00	78	31	18	2.9	276	96	22	.4	11	411	322	96		670	8.1	6
July 11-20....		11		.00	.00	74	32	19	2.8	256	104	23	.3	10	407	316	106		654	8.2	8
July 21-31....		9.3		.00	.00	74	30	20	2.9	248	103	24	.4	10	405	308	105		652	8.1	6
Aug. 1-10.....		9.9		.02	.00	68	25	17	3.0	230	86	20	.3	6.0	351	273	84		582	7.7	7
Aug. 11-20....		12		.00	.00	72	31	21	2.8	246	110	24	.4	7.2	409	307	106		640	8.0	8
Aug. 21-31....		12		.00	.00	72	29	22	3.0	238	110	24	.4	3.2	400	299	104		644	7.8	6
Sept. 1-10....		14		.00	.01	71	27	20	2.8	238	98	23	.4	5.5	390	288	93		620	8.2	8
Sept. 11-16, 19-20.....		11		.00	.01	75	31	23	3.1	244	122	26	.4	6.3	429	315	115		680	7.7	5
Sept. 21-30...		12		.03	.01	80	32	28	3.2	248	135	31	.4	8.0	461	331	128		729	8.0	9
Time-weighted average....		10		0.01	0.01	71	30	15	2.5	274	85	19	0.3	10	393	318	94		639	--	6

MIAMI RIVER BASIN--Continued

3-2766. MIAMI RIVER AT ELIZABETHTOWN, OHIO--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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	63	65	64	63	63	68	65	69	67	64	65	63	64	67	68	68	67	65	63	64	64	66	64	62	60	60	60	58	58	58	64
November...	55	56	57	56	58	54	54	52	50	50	51	50	57	59	60	63	65	66	57	57	54	53	52	53	52	52	50	45	42	36	--	54
December...	38	39	40	43	42	38	35	35	34	34	34	36	35	34	32	35	36	36	38	38	38	38	42	42	44	40	42	42	44	43	42	38
January....	42	40	42	35	33	32	35	35	36	36	36	40	42	44	40	35	32	32	34	--	--	--	--	--	--	--	--	--	--	42	40	--
February...	36	35	36	39	40	40	40	42	44	47	44	40	42	44	44	42	42	42	38	37	37	40	43	42	42	45	46	46	--	--	--	41
March.....	44	46	46	47	45	43	42	42	43	44	43	41	43	48	45	44	42	43	44	46	50	46	49	51	54	54	53	51	49	51	51	46
April.....	53	57	57	53	55	57	59	63	61	59	57	53	53	55	57	60	63	63	63	60	60	59	60	61	65	66	64	60	58	60	--	59
May.....	62	66	67	68	68	77	75	71	72	73	73	71	68	63	60	60	62	65	70	72	74	78	78	76	75	75	74	77	79	79	79	71
June.....	79	78	78	78	78	79	80	82	81	81	80	80	80	78	74	77	76	76	77	78	80	79	77	78	79	79	81	85	89	88	--	80
July.....	86	83	82	84	83	85	84	84	85	86	84	83	81	80	83	85	84	85	85	83	85	85	83	81	83	83	84	81	86	88	86	84
August.....	87	85	80	79	82	85	84	82	78	82	82	84	84	85	86	84	81	82	83	83	86	88	89	89	88	87	85	82	85	85	--	84
September..	82	--	81	81	85	84	85	84	84	83	82	76	82	76	76	77	77	70	68	73	75	75	78	78	78	77	78	80	80	76	--	79

3-2772.05. OHIO RIVER AT LOCK AND DAM 39, NEAR FLORENCE, IND.

LOCATION.--About 1,100 feet upstream from dam, lock and dam 39 (mile 531.7) near Florence, Switzerland County, 1,350 feet upstream from Stevens Creek, and 8,100 feet downstream from Craigs Creek.
DRAINAGE AREA.--82,910 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 373 ppm Sept. 21-30; minimum, 143 ppm Jan. 21-25, 27-28, 30.
Hardness: Maximum, 204 ppm Sept. 21-30; minimum, 91 ppm Apr. 11-20.
Specific conductance: Maximum daily, 636 micromhos Sept. 27, 28; minimum daily, 204 micromhos Apr. 17.
Water temperatures: Maximum, 94°F Aug. 26-28; minimum, freezing point on several days during December and January.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 418 ppm Oct. 11-20, 1957; minimum, 114 ppm Feb. 1-2, 4-10, 1957.
Hardness: Maximum, 228 ppm Nov. 1-10, 1955; minimum, 70 ppm Feb. 1-2, 4-10, 1957.
Specific conductance: Maximum daily, 757 micromhos Oct. 30, 1957; minimum daily, 103 micromhos July 31, 1958.
Water temperatures: Maximum, 94°F Aug. 26-28, 1959; minimum, freezing point on many days during winter months 1955, 1956, and 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed: Filtered	Oxygen consumed: Unfiltered
Oct. 1-3, 5-10, 1958.		6.8		0.01	0.00	51	13	26	3.1		85		108	35	0.2	4.4	0.30	290	181	111		488	7.0	5		
Oct. 11-20...		13		.00	.00	52	14	25	3.1		98		109	31	.3	3.9	.30	287	187	107		492	7.2	5		
Oct. 21-22, 26-31.....		2.6		.02	.00	53	15	25	2.9		100		117	30	.3	4.1	.40	296	194	112		500	7.1	4		
Nov. 2, 4-7,9		7.0		.02	.01	55	14	30	2.9		90		120	40	.3	5.8	.30	318	195	121		539	7.0	5		
Nov. 11-16, 18-20.....		8.0		.17	.01	58	14	36	3.0		92		128	52	.3	7.0	.30	348	202	127		587	7.0	5		
Nov. 21-22, 24-30.....		7.6		.01	.01	57	14	34	3.1		76		145	42	.3	6.0	.20	344	200	138		568	7.1	5		
Dec. 1-10....		6.8		.02	.01	44	12	22	2.7		78		88	32	.2	4.1	.18	263	160	96		422	7.1	6		
Dec. 11-12, 15-19.....		7.0		.01	.01	41	11	18	2.5		76		86	24	.2	4.4	.12	246	147	85		391	7.4	5		
Dec. 21-29, 30-31.....		7.5		.05	.00	44	12	19	2.4		82		90	26	.2	4.7	.20	255	160	92		408	7.4	5		
Jan. 1-9, 1959.....		7.2		.01	.00	42	11	20	2.3		74		90	27	.2	5.0	.10	251	150	90		404	7.3	5		
Jan. 11-20...		7.1		.07	.01	42	10	16	2.1		80		74	25	.2	5.7	.20	224	146	80		375	7.0	5		
Jan. 21-25, 27-28, 30..		6.0		.13	.19	27	6.6	6.1	2.4		57		46	9.5	.1	4.2	.10	143	94	48		233	6.9	7		

OHIO RIVER MAIN STEM--Continued

3-2772.05. OHIO RIVER AT LOCK AND DAM 39, NEAR FLORENCE, IND.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--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 $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color	Oxygen consumed	
																			Calcium, magnesium	Noncarbonate					Filtered	Unfiltered
Feb. 1-6, 8-10, 1959.		6.9		0.02	0.00	34	9.1	8.9	1.9		72		59	14	0.2	4.9	0.30	186	123	64		295	7.2	5		
Feb. 11-13, 15-17,18-20		7.0		.05	.01	36	7.7	7.3	1.9		79		51	11	.2	3.8	.35	176	122	57		284	7.3	6		
Feb. 21-28...		7.6		.02	.00	34	9.0	8.3	1.7		72		58	12	.2	3.9	.35	181	122	63		288	7.3	6		
Mar. 1-10....		8.3		.01	.00	44	12	11	1.7		111		69	16	.2	4.4	.13	235	160	68		374	7.9	5		
Mar. 11-18,20		7.3		.02	.00	38	11	12	1.7		88		66	17	.2	4.2	.14	216	140	68		341	7.8	6		
Mar. 22-31...		6.5		.01	.00	36	11	11	1.7		77		70	15	.2	4.0	.18	208	135	72		328	7.8	5		
Apr. 1-10....		7.4		.00	.01	32	8.9	12	1.8		64		62	16	.2	4.2	.20	192	117	64		294	7.1	5		
Apr. 11-20...		8.2		.01	.01	25	6.9	9.2	1.5		50		53	11	.1	3.1	.10	154	91	50		237	7.4	6		
Apr. 21-30...		7.6		.00	.01	30	9.0	10	1.8		70		58	12	.1	3.8	.25	182	112	54		283	7.2	6		
May 1-10.....		7.8		.00	.00	35	9.4	12	2.1		64		74	16	.3	4.2	.24	213	126	74		322	7.0	2		
May 11-20....		8.9		.00	.00	36	10	12	2.2		80		68	15	.2	4.1	.32	207	131	66		325	7.1	3		
May 21-23, 25-31.....		7.7		.00	.00	41	11	16	2.1		75		87	18	.3	4.2	.35	233	147	86		373	7.1	3		
June 1-10....		12		.02	.03	40	11	16	2.0		78		80	24	.2	4.6	.19	241	145	81		378	7.4	3		
June 11-15, 17-20.....		8.6		.03	.03	41	10	16	2.9		88		72	26	.2	4.4	.32	232	143	71		377	7.5	4		
June 21-22, 24-30.....		5.3		.02	.04	44	12	18	2.4		96		80	26	.2	4.5	.25	259	160	81		409	7.4	3		
July 1-10....		4.4		.01	.01	52	13	28	2.8		83		116	41	.2	3.1	.20	292	183	115		513	7.3	6		
July 11-19...		4.1		.01	.00	55	14	30	2.8		86		124	43	.3	4.3	.20	314	195	124		539	7.0	5		
July 22-31...		4.9		.02	.00	50	14	27	3.1		90		110	36	.3	4.6	.20	297	183	109		502	7.5	5		
Aug. 1-8.....		4.0		.01	.00	52	12	30	3.5		90		98	48	.3	4.4	.15	299	179	105		513	7.3	6		
Aug. 12-14, 17-18.....		5.3		.01	.00	58	13	38	2.9		94		111	60	.3	5.6	.20	346	198	121		587	7.2	4		
Aug. 24, 26-28, 31.....		3.0		.01	.00	50	12	34	3.4		98		98	46	.3	3.6	.40	302	175	94		519	7.5	5		
Sept. 2-7, 9, 10.....		7.2		.01	.00	54	13	36	3.1		94		109	50	.3	4.8	.35	329	188	111		541	7.0	5		
Sept. 11-20..		4.4		.01	.00	57	14	39	3.7		92		128	50	.3	4.1	.35	350	200	124		579	7.4	5		
Sept. 21-30..		2.8		.01	.00	57	15	42	4.5		92		142	52	.3	4.1	.35	373	204	128		616	7.2	4		
Time-weighted average....		6.9		0.02	0.01	44	11	21	2.5		82		90	28	0.2	4.4	0.24	256	155	88		418	--	5		

3-2772.05. OHIO RIVER AT LOCK AND DAM 39, NEAR FLORENCE, IND.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Chromium		Nickel (Ni)	Copper (Cu)	Lead (Pb)	Zinc (Zn)	Cobalt (Co)	Arsenic (As)	Selenium (Se)	Cadmium (Cd)	Total	Beryllium (Be)	Ammonium (NH_4)	Hydroxide (OH)	Alkalinity as ($CaCO_3$)	Bromide (Br)	Iodide (I)	Nitrite (NO_2)	Cyanide (Cn)	Free carbon-dioxide (CO_2)	Turbidity	Density at 20°C	Hydrogen sulfide (H_2S)	Total chromium (Cr)
		Cr^3	Hexavalent																						
Oct. 1-3, 5-10, 1958			0.00	0.04	0.00	0.01	0.00	0.02	0.00		0.0	0.01													0.01
Oct. 11-20			.00	.00	.00	.01	.00	.02	.00		.0	.01													.01
Oct. 21-22, 26-31			.01	.02	.00	.01	.00	.01	.00		.0	.02													.02
Nov. 2, 4-7, 9			.00	.04	.00	.00	.00	.02	.00		.0	.00													.00
Nov. 11-16, 18-20			.00	.04	.00	.00	.00	.02	.00		.0	.00													.00
Nov. 21-22, 24-30			.00	.03	.00	.00	.00	.02	.00		.0	.00													.00
Jan. 11-20, 1959			.00	.04	.00	.00	.00	.03	.00		.0	.01													.01
Jan. 21-25, 27-28, 30			.00	.04	.00	.01	.00	.03	.00		.0	.00													.00
Feb. 1-6, 8-10			.00	.00	.00	.00	.00	.02	.00		.0	.00													.00
Feb. 11-13, 15-17, 19-20			.00	.00	.00	.00	.00	.01	.00		.0	.00													.00
Feb. 21-28			.00	.00	.00	.00	.00	.02	.00		.0	.00													.00
Mar. 1-10			.01	.03	.00	.00	.00	.00	.00		.0	.02													.02
Mar. 11-18, 20			.01	.02	.00	.00	.00	.00	.00		.0	.01													.01
Mar. 22-31			.01	.00	.00	.00	.00	.00	.00		.0	.01													.01
July 1-10			.00	.05	.00	.00	.00	.01	.00		.0	.00													.00
July 11-19			.00	.00	.00	.01	.02	.00	.00		.0	.00													.00
July 22-31			.00	.00	.00	.00	.56	.00	.00		.0	.00													.00
Aug. 1-8			.00	.00	.00	.00	.00	.01	.00		.0	.00													.00
Aug. 12-14, 17-18			.00	.00	.00	.00	.00	.01	.00		.0	.00													.00
Aug. 24, 26-28, 31			.00	.00	.00	.00	.00	.01	.00		.0	.00													.00
Sept. 2-7, 9, 10			.00	.00	.00	.00	.01	.00	.00		.0	.00													.00
Sept. 11-20			.00	.00	.00	.00	.17	.01	.00		.0	.00													.00
Sept. 21-30			.00	.00	.00	.00	.00	.00	.00		.0	.00													.00

OHIO RIVER MAIN STEM--Continued

3-2772.05. OHIO RIVER AT LOCK AND DAM 39, NEAR FLORENCE, IND.--Continued

Temperature (F) of water, water year October 1958 to September 1959

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....	72	72	70	--	68	68	69	68	67	67	68	67	68	68	65	65	70	70	69	67	70	70	--	--	66	66	66	--	--	64	64	68
November...	--	64	--	59	58	58	56	--	56	--	55	55	55	54	56	55	56	56	56	56	--	--	--	56	55	55	54	53	48	46	--	--
December...	45	46	45	45	45	42	42	40	38	38	39	35	--	--	32	32	35	35	35	--	35	36	36	36	37	32	32	33	--	36	36	38
January....	36	36	36	36	36	39	36	36	36	--	42	43	43	40	39	33	32	31	31	32	32	35	35	35	35	35	35	35	35	35	35	36
February...	36	35	34	33	33	33	--	40	40	40	40	40	41	--	39	40	40	40	39	39	39	39	40	40	40	40	40	41	--	--	--	38
March.....	41	43	43	43	43	38	38	38	38	38	38	41	41	41	44	44	44	44	--	41	--	40	45	46	46	47	47	47	47	48	48	43
April.....	50	51	50	49	50	50	53	54	53	53	54	54	53	54	55	55	55	56	55	56	56	56	57	61	59	59	60	60	60	60	--	55
May.....	62	62	66	66	66	67	65	63	63	63	64	64	61	61	61	61	61	67	68	68	68	68	68	--	72	71	71	71	71	71	72	66
June.....	72	71	71	71	72	72	74	75	78	78	78	78	78	78	75	--	77	76	76	76	78	78	--	78	80	79	80	80	83	--	--	76
July.....	82	82	80	82	83	--	82	84	82	83	83	84	85	--	86	86	86	87	87	--	--	86	85	84	85	86	85	85	85	85	86	84
August.....	86	85	85	84	84	84	86	84	--	--	--	--	--	--	--	--	84	84	--	--	--	--	--	88	--	94	94	94	--	--	87	--
September..	--	--	--	--	--	85	85	--	85	84	84	82	80	80	78	76	75	74	73	--	75	75	75	75	74	75	75	76	75	74	--	--

KENTUCKY RIVER BASIN

3-2773. NORTH FORK KENTUCKY RIVER AT WHITESBURG, KY.

LOCATION.--At bridge on State Highway 15 at Whitesburg, Letcher County, 0.6 mile downstream from Solomon Branch.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1, 1958a	42	8.1	--	0.04	--	71	34	79	6.9	138	364	6.5	0.2	2.3	660	317	204		908	7.3	4
Jan. 28, 1959..	58	9.3	0.1	.30	0.65	46	22	26	3.5	52	208	5.0	.1	5.0	356	206	163		524	6.8	4
Mar. 17.....	78	8.5	.1	.04	.41	42	21	34	3.1	78	188	6.0	.2	2.5	343	192	128		513	7.1	3
Mar. 26b.....	--	--	.2	.15	.59	--	--	--	--	112	268	4.6	--	--	504	260	168		702	7.5	--
Apr. 29.....	114	9.8	.0	.07	.50	46	24	32	3.8	89	200	3.8	.1	.3	350	214	141		558	7.3	1
June 10.....	29	--	--	--	--	--	--	--	--	--	248	--	--	--	--	--	--		777	7.3	--
July 22.....	10	7.6	.1	.05	.20	68	36	62	6.6	178	289	8.5	.2	1.5	570	318	172		846	7.6	2
Aug. 26.....	8.3	3.1	.2	.16	.23	71	39	84	8.2	186	352	10	.2	.6	692	338	185		972	7.5	6
Sept. 29.....	3.8	2.1	.2	.01	.00	95	48	92	8.4	149	464	17	.4	.7	800	435	313		1,140	7.5	3

a Phenols as C_6H_5OH, 0.000; dissolved oxygen, 9.1 parts per million; percent saturation, 91.
b Phenols as C_6H_5OH, 0.000; dissolved oxygen, 9.9 parts per million; percent saturation, 88.

KENTUCKY RIVER BASIN--Continued

LEATHERWOOD CREEK AT CORNETTSVILLE, KY.

LOCATION.--At bridge on State Highway 7, approximately 200 feet from mouth, 0.7 mile southwest of Cornettsville, Perry County.
RECORDS AVAILABLE.--Chemical analyses: August 1957 to September 1959.

Chemical analyses, in parts per million, August 1957 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Aug. 10, 1957.	--	--	--	--	--	--	--	--	--	130	154	--	--	--	386	240	134		592	8.1	--
Jan. 29, 1958.	--	--	--	--	--	--	--	--	--	28	31	--	--	--	81	49	26		135	7.1	--
Mar. 11.....	73	--	--	--	--	--	--	--	--	22	33	--	--	--	105	48	30		127	6.9	--
Mar. 12.....	--	--	--	--	--	--	--	--	--	28	35	--	--	--	89	59	36		140	7.1	--
Oct. 2 a.....	7.0	5.2	--	0.02	--	35	9.4	8.8	3.6	64	87	4.5	0.2	0.9	200	126	74		308	7.2	6
Jan. 28, 1959.	40	5.8	0.2	.58	0.08	21	6.6	6.0	2.4	38	55	4.5	.1	2.1	137	80	48		207	6.9	5
Mar. 18.....	52	5.7	.1	.06	.00	13	4.6	3.6	1.6	28	33	3.0	.1	.7	82	52	28		132	6.9	6
Mar. 26 b.....	--	--	--	--	--	--	--	--	--	38	51	1.0	--	--	118	76	45		182	7.1	--
Apr. 29.....	57	7.2	.0	.10	.01	15	7.8	3.7	2.1	30	51	2.0	.0	1.6	92	70	45		162	7.0	3
June 10.....	23	6.5	.1	.04	.92	35	11	6.8	4.0	60	93	3.5	.1	1.8	209	133	84		308	7.4	10
July 22.....	3.9	5.9	.0	.00	.01	46	14	11	4.7	91	108	7.5	.1	1.1	235	173	98		395	7.4	2
Aug. 26.....	.82	3.2	.1	.00	.04	59	17	17	6.2	111	146	12	.2	.7	323	217	126		505	7.2	5
Sept. 30.....	13	3.3	.1	.23	.10	49	14	17	5.2	104	114	15	.2	.7	261	180	94		450	7.5	4

a Phenols as C_6H_5OH, 0.002; dissolved oxygen, 7.3 parts per million; percent saturation, 71.
b Dissolved oxygen, 10.7 parts per million; percent saturation, 97.

CARR FORK AT SCUDDY, KY.

LOCATION.--At Louisville and Nashville Railway Bridge at Scuddy, Perry County, 0.1 mile downstream from Scuddy Branch, and 1.6 miles southwest of Vicco.
RECORDS AVAILABLE.--Chemical analyses: January to October 1959.

Chemical analyses, in parts per million, January to October 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Jan. 27, 1959.	94	8.6	2.3	7.7	1.8	17	7.2	7.3	1.7	0	99	3.0	0.1	0.5	150	72	72	0.4	250	4.10	3
Mar. 18.....	69	7.1	.1	1.4	.15	14	6.4	8.9	1.4	7	66	6.5	.1	.7	119	62	56	.1	186	6.0	5
Mar. 26 a.....	--	--	.0	3.6	.54	--	--	--	--	10	90	4.4	--	--	156	84	76	--	253	6.4	--
Apr. 28.....	126	9.0	1.7	2.9	.64	15	7.6	6.4	1.9	0	93	6.5	.1	.4	132	68	68	.2	237	4.20	1
June 9.....	10	9.1	.0	.32	.55	29	11	19	2.7	20	131	7.5	.1	.6	232	118	101	--	313	7.0	4
July 21.....	6.1	10	10	8.4	2.2	53	17	33	4.4	0	390	18	.4	.3	546	202	202	2.4	1,080	2.90	2
Aug. 25.....	.48	26	28	24	7.3	106	41	58	7.3	0	860	15	1.2	2.3	1,130	433	433	6.6	1,900	2.65	8
Oct. 1.....	14	12	18	61	3.4	66	14	34	5.3	0	525	36	.5	1.2	618	222	222	5.8	1,570	2.75	1

a Dissolved oxygen, 10.2 parts per million; percent saturation, 90.

KENTUCKY RIVER BASIN--Continued

3-2775. NORTH FORK KENTUCKY RIVER AT HAZARD, KY.

LOCATION.--At gaging station at Woodland Park bridge at eastern limits of Hazard, Perry County, 150 feet upstream from city waterworks dam, and 4.0 miles upstream from Lotts Creek.
DRAINAGE AREA.--466 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1949 to August 1950, August 1957 to September 1959.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 91°F June 30; minimum, freezing point on many days in December and January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 93°F Aug. 1, 1953; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, August 1957 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Aug. 1, 1957..	11	8.4	--	0.04	0.00	51	20	56	5.3	64	251	9.0	0.2	0.6	440	209	157		668	6.9	3
Jan. 29, 1958.	560	7.4	--	.09	.09	14	6.5	5.9	2.3	15	60	3.5	.1	1.8	111	62	50		179	6.5	8
July 22.....	--	--	--	6.2	--	--	--	--	--	17	53	2.0	.6	8.7	--	58	44		179	6.9	--
Oct. 3.....	--	5.0	--	.14	--	49	21	56	5.0	70	263	9.5	.2	.3	449	209	151		654	7.1	4
Jan. 27, 1959.	506	7.4	0.1	.99	.15	18	7.5	8.2	1.8	15	74	4.0	.1	2.3	134	76	64		211	6.4	3
Mar. 17.....	558	7.0	.1	.23	.24	15	6.5	8.4	1.5	23	59	3.0	.2	.9	116	64	45		184	6.8	5
Mar. 26 a.....	--	--	.1	.30	.26	--	--	--	--	40	95	3.0	--	--	184	100	67		283	7.1	--
Apr. 29.....	670	7.8	.0	.37	.37	19	8.8	11	1.9	24	84	2.5	.1	1.2	139	84	64		239	6.7	1
June 9.....	162	--	--	--	--	--	--	--	--	54	79	--	--	--	--	101	7		289	7.6	--
July 21.....	85	4.2	.0	.20	.56	35	14	31	4.2	65	150	7.0	.1	.9	269	145	92		445	7.1	4
Aug. 25.....	10	3.1	.1	.22	.16	54	23	42	5.5	102	225	12	.1	.3	431	229	146		643	7.4	4
Sept. 30.....	34	2.9	.1	.16	.00	37	14	33	4.2	72	149	11	.2	.5	272	150	91		458	7.4	3

a Phenols as C_6H_5OH, 0.000.

3-2775. NORTH FORK KENTUCKY RIVER AT HAZARD, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurements at approximately 7 a.m. and 5 p.m./

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																																
a.m.	62	60	59	58	61	60	59	58	64	66	63	60	58	57	61	61	60	61	58	59	58	58	57	56	56	54	51	47	49	48	48	58
p.m.	63	61	60	59	62	61	60	65	67	68	64	61	59	62	63	62	62	62	60	60	59	58	57	58	57	53	49	50	50	49	50	59
November																																
a.m.	51	51	49	48	47	47	46	48	48	47	46	45	45	47	46	48	48	47	46	52	50	47	45	45	44	44	43	42	39	37	--	46
p.m.	52	52	50	49	48	49	50	50	49	48	47	46	46	47	47	49	49	49	47	51	51	48	46	46	45	45	44	41	40	38	--	47
December																																
a.m.	36	34	34	34	34	34	35	34	34	33	33	33	32	32	--	32	32	32	32	33	32	32	32	32	32	32	32	33	32	33	34	32
p.m.	37	35	35	37	39	37	36	35	35	34	34	33	33	32	32	32	33	34	34	34	33	32	32	32	32	32	32	34	35	35	35	34
January																																
a.m.	34	34	32	32	32	32	33	34	32	32	--	--	--	34	36	34	32	32	32	32	38	34	33	34	34	36	36	--	--	--	--	--
p.m.	35	34	35	34	32	32	35	33	32	32	--	--	32	36	38	32	32	34	33	36	37	36	36	36	37	38	--	--	--	--	--	--
February																																
a.m.	--	--	--	--	--	--	--	--	--	--	--	44	45	45	50	49	48	50	46	45	44	35	38	40	41	42	42	43	--	--	--	--
p.m.	--	--	--	--	--	--	--	--	--	--	--	46	46	47	51	51	52	49	46	46	45	36	42	42	43	43	45	45	--	--	--	--
March																																
a.m.	41	40	40	39	42	40	39	39	40	40	41	41	40	43	41	40	40	41	40	42	44	46	45	48	49	53	50	49	42	45	44	43
p.m.	43	44	41	45	43	42	40	42	41	41	44	41	42	45	42	41	42	42	43	44	47	47	49	50	56	52	51	50	46	47	54	45
April																																
a.m.	50	51	53	50	48	50	55	57	61	60	59	59	58	36	37	43	46	55	57	54	54	50	48	48	51	62	63	60	60	63	--	53
p.m.	58	52	51	51	52	56	59	65	62	61	62	60	41	39	45	48	58	57	55	56	52	49	50	56	57	64	65	62	64	64	--	56
May																																
a.m.	62	61	69	64	71	78	76	72	73	70	75	70	69	70	65	57	55	54	62	66	70	73	70	70	73	73	78	78	82	80	70	70
p.m.	65	66	66	73	82	84	84	81	80	76	81	76	74	69	62	59	56	65	68	72	76	75	72	74	80	80	84	84	86	84	76	75
June																																
a.m.	74	73	74	72	74	75	71	73	76	79	80	81	81	72	74	76	77	76	77	75	75	76	78	80	79	80	81	85	84	87	--	77
p.m.	75	74	76	76	76	78	74	79	80	81	83	78	78	78	78	79	82	80	77	79	78	80	82	82	82	83	85	87	89	91	--	80
July																																
a.m.	88	85	80	84	79	81	82	83	84	82	82	78	80	84	86	82	84	83	78	81	84	86	84	86	80	79	80	79	80	84	85	82
p.m.	90	84	85	88	84	83	85	88	89	84	88	84	88	89	87	89	85	81	82	86	87	86	88	82	83	83	82	84	87	88	89	86
August																																
a.m.	84	78	80	81	80	81	82	80	78	79	80	81	82	83	84	76	80	80	81	82	80	81	84	83	82	83	81	--	--	--	--	81
p.m.	85	84	82	83	84	85	83	82	81	84	85	86	87	86	87	83	84	86	84	86	85	86	87	86	87	88	--	--	--	--	--	85
September																																
a.m.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

KENTUCKY RIVER BASIN--Continued

3-2875. KENTUCKY RIVER AT LOCK 4, AT FRANKFORT, KY.

LOCATION.--At gaging station at Broadway Street Bridge, at Frankfort, Franklin County, 300 feet upstream from Benson Creek, and 0.9 mile upstream from lock 4.
DRAINAGE AREA.--5,412 square miles (includes that of Benson Creek), of which about 120 square miles does not contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1959.
Water temperatures: October 1949 to September 1959.
Sediment records: October 1952 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 201 ppm Dec. 1-20; minimum, 92 ppm Jan. 24-26.
Hardness: Maximum, 134 ppm Dec. 1-20; minimum, 61 ppm Jan. 24-26.
Specific conductance: Maximum daily, 442 micromhos Dec. 9; minimum daily, 124 micromhos Apr. 16.
Water temperatures: Maximum, 87°F July 21, Aug. 24, 25; minimum, 34°F Jan. 6-9, 19, 20.
Sediment concentrations: Maximum daily, 954 ppm Jan. 24; minimum daily, 3 ppm on several days during November, December, and August.
Sediment loads: Maximum daily, 102,000 tons Jan. 24; minimum daily, 2 tons Aug. 16.
EXTREMES, 1949-59.--Dissolved solids: Maximum, 224 ppm Nov. 21-30, 1949; minimum, 65 ppm Feb. 1-5, 1957.
Hardness: Maximum, 154 ppm Jan. 16-25, 27-30, 1956; minimum, 42 ppm May 10-13, 1953, Mar. 3, 1955.
Specific conductance: Maximum daily, 555 micromhos Dec. 7, 1952; minimum daily, 80 micromhos Feb. 4, 1951.
Water temperatures: Maximum, 88°F July 22, 1957; minimum, 34°F on several days during 1951, 1958 and 1959.
Sediment concentrations (1952-59): Maximum daily, 2,420 ppm Jan. 31, 1956; minimum daily, 1 ppm on many days during 1952-56.
Sediment loads (1952-59): Maximum daily, 248,000 tons Feb. 2, 1957; minimum daily, 1 ton on many days during 1952-56.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge including flow of Benson Creek, for water year October 1958 to September 1959 given in WSP 1625. Flow regulated by Herrington Lake and by hydroelectric plant at lock 7 on Kentucky River.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct.2-30,1958.	490	9.4		0.01		36	6.8	6.7		122	18	10	0.2	1.6	154	118	18		265	7.5	3
Nov. 1-30.....	906	--		--		38	7.8	7.8		126	25	10	--	1.0	164	127	24		282	7.5	3
Dec. 1-20.....	2,846	--		--		38	9.4	19		102	49	28	--	1.2	201	134	50		348	7.6	5
Dec. 21-31....	960	--		--		35	5.9	11		97	33	14	--	1.6	161	112	32		279	7.4	5
Jan. 1-23,1959	8,981	--		--		33	6.9	8.7		92	30	15	--	3.1	156	111	36		264	7.6	3
Jan. 24-26....	34,030	--		--		18	3.9	4.4		49	21	4.5	--	2.7	92	61	21		146	7.6	20
Jan. 29-Feb.17	9,468	--		--		26	5.6	4.6		74	24	7.0	--	2.9	119	88	28		202	7.6	6
Feb. 18-25....	9,898	8.9		.04		22	4.3	4.4		63	20	6.0	.1	2.4	102	72	21		167	7.4	9
Feb. 26-28, Mar. 3-10...	4,955	10		.04		29	5.4	5.8		87	24	7.0	.1	2.8	124	94	23		213	7.7	4
Mar. 12-24, 28-31.....	5,470	--		--		29	6.4	8.5		86	31	9.5	--	2.0	139	99	28		231	7.8	4
Apr. 1-10.....	8,662	--		--		25	5.8	8.5		74	30	9.0	--	1.5	140	86	26		214	7.8	6
Apr. 11-21....	20,370	--		--		20	3.9	4.8		58	20	5.0	--	1.4	105	66	18		157	7.5	6
Apr. 24-May 8.	5,083	--		--		20	5.6	7.4		56	31	7.0	--	1.4	106	73	27		177	7.1	2

May 10-22, 1959.....	2,862	--	--		21	6.4	8.3		59	35	7.9	--	1.3	117	79	30		193	7.0	3
May 25-29, June 2-11...	4,247	9.4	.01		24	6.6	9.2		66	34	13	.2	1.4	132	87	33		222	6.9	4
June 12-30....	834	--	--		22	6.3	8.5		62	32	9.9	--	1.4	121	81	34		203	7.0	3
July 1-31.....	727	--	--		25	6.0	8.7		76	33	6.0	--	1.5	126	87	25		213	7.1	4
Aug. 1-31.....	982	--	--		29	6.5	6.2		93	22	8.9	--	1.4	132	99	23		224	7.1	3
Sept. 1-30....	420	10	.07		31	7.2	11		97	26	19	.2	1.8	162	107	28		269	7.3	4
Time-weighted average....	4,042	--	--		29	6.5	8.4		88	28	11	--	1.7	140	99	27		237	--	4

KENTUCKY RIVER BASIN--Continued

3-2875. KENTUCKY RIVER AT LOCK 4, AT FRANKFORT, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	70	69	68	67	68	69	68	68	69	69	68	67	66	66	66	66	67	66	66	65	66	65	65	64	64	63	62	62	60	59	59	66
Minimum.....	69	68	67	66	66	66	66	67	68	68	66	66	63	64	65	66	65	66	64	63	63	64	64	64	63	62	62	60	59	58	57	64
November																																
Maximum.....	58	58	58	58	57	57	56	56	54	54	53	53	53	54	54	55	56	56	56	55	55	54	54	53	53	53	53	51	50	49	--	55
Minimum.....	58	58	58	57	57	56	55	54	54	53	52	52	52	53	53	54	55	56	55	55	54	53	53	53	53	53	51	50	49	48	--	54
December																																
Maximum.....	48	47	47	46	45	45	45	45	43	43	42	41	41	40	40	39	37	38	37	38	38	38	37	38	38	38	37	37	36	36	37	41
Minimum.....	46	46	46	45	45	45	45	43	43	42	41	41	40	39	39	37	36	36	36	37	38	36	37	37	37	37	36	35	35	35	36	40
January																																
Maximum.....	36	37	37	37	37	36	34	35	35	35	35	--	35	35	37	37	37	36	36	36	42	42	41	40	42	42	42	42	41	41	41	37
Minimum.....	35	36	35	36	35	34	34	34	34	35	35	--	35	35	35	37	36	36	34	34	36	40	40	39	40	41	42	41	41	41	41	36
February																																
Maximum.....	42	42	41	41	41	41	41	40	40	42	43	43	44	45	45	46	47	47	47	47	46	45	44	44	44	45	45	46	--	--	--	44
Minimum.....	41	41	40	40	41	40	40	40	40	40	42	42	43	44	45	45	46	47	47	46	45	44	44	44	44	44	45	45	--	--	--	43
March																																
Maximum.....	45	45	45	46	46	46	45	45	45	45	45	45	45	46	46	46	46	46	46	46	46	46	46	48	49	49	50	50	50	49	50	47
Minimum.....	45	45	45	45	45	45	45	44	44	45	45	44	44	44	46	45	46	46	46	46	46	46	46	46	48	49	49	49	49	48	49	46
April																																
Maximum.....	52	52	53	53	54	54	56	56	56	56	56	54	54	54	52	51	51	51	52	52	53	53	54	54	56	58	59	60	60	61	--	55
Minimum.....	50	52	52	53	52	54	54	56	56	56	54	54	54	52	51	49	50	51	51	52	52	52	53	54	54	56	57	59	60	60	--	54
May																																
Maximum.....	62	64	65	65	66	67	68	68	69	69	70	70	70	68	68	67	66	66	68	69	69	70	72	71	72	73	73	74	74	74	75	69
Minimum.....	61	62	64	65	65	66	67	67	67	68	68	68	68	68	67	66	66	65	65	68	68	69	70	70	70	72	72	71	73	74	74	68
June																																
Maximum.....	75	75	75	75	75	74	75	76	76	77	78	81	81	79	78	77	78	78	78	79	80	79	79	78	80	80	83	81	86	85	--	78
Minimum.....	74	74	74	74	74	73	74	74	75	75	76	76	78	76	76	77	76	76	75	75	76	78	77	77	77	78	79	80	80	82	--	76
July																																
Maximum.....	85	84	83	83	82	84	86	84	84	86	84	84	84	84	86	83	84	83	83	83	87	84	83	82	82	84	83	82	82	85	83	84
Minimum.....	82	81	80	80	81	80	80	80	80	82	81	82	81	80	80	81	80	82	82	81	81	82	82	82	81	82	82	80	80	81	82	81
August																																
Maximum.....	83	82	81	81	81	82	82	82	81	83	81	83	84	83	82	82	80	82	84	84	84	84	85	87	87	86	84	84	82	82	79	83
Minimum.....	81	80	80	80	79	80	81	80	80	79	79	80	80	80	80	80	79	79	81	81	81	82	82	83	83	83	83	82	82	79	79	81
September																																
Maximum.....	79	76	78	76	78	80	82	82	82	82	78	76	76	77	75	75	73	73	74	73	73	74	74	74	74	73	73	74	76	74	--	76
Minimum.....	76	74	74	74	76	77	78	80	80	78	76	75	74	74	73	73	72	72	71	71	71	71	72	72	72	72	72	72	73	73	--	74

KENTUCKY RIVER BASIN--Continued

3-2875. KENTUCKY RIVER AT LOCK 4, AT FRANKFORT, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	900	25	a 60	290	8	6	6,490	21	368
2...	528	22	31	445	8	10	5,790	14	219
3...	546	23	34	672	8	14	4,550	6	74
4...	497	25	34	484	8	10	4,090	11	121
5...	546	22	32	528	8	11	4,500	13	158
6...	564	22	34	510	10	14	4,340	13	152
7...	564	21	32	546	10	a 15	4,090	12	a 130
8...	654	18	32	618	9	a 15	3,640	10	98
9...	728	16	31	582	8	12	3,240	3	26
0...	900	15	36	528	6	8	2,660	3	22
1...	861	15	35	510	5	7	2,300	4	25
2...	564	12	18	406	3	3	2,070	5	28
3...	528	13	18	600	4	6	1,690	4	18
4...	510	13	18	582	5	8	1,370	4	15
5...	546	12	18	672	5	9	1,160	4	12
6...	445	13	16	600	5	8	1,130	4	12
7...	393	13	14	582	5	8	1,080	4	a 12
8...	300	12	10	654	5	9	960	4	10
9...	370	11	11	766	9	19	880	4	10
0...	350	10	9	654	10	18	880	5	12
1...	370	11	11	960	11	a 30	880	5	12
2...	564	13	20	1,600	9	39	823	6	13
3...	330	15	13	1,630	4	18	920	5	12
4...	272	12	9	1,430	4	15	1,400	5	19
5...	330	13	12	1,370	4	15	980	6	a 16
6...	393	13	14	1,180	5	16	940	7	a 18
7...	393	14	15	1,080	5	a 14	920	8	20
8...	419	17	19	1,160	5	a 16	880	6	14
9...	380	17	17	1,970	5	a 25	880	7	17
0...	380	14	14	3,560	6	58	940	7	18
1...	546	11	a 16	--	--	--	1,000	9	24
Total	15,671	--	683	27,169	--	456	67,473	--	1,705

Day	January			February			March		
1...	3,400	15	138	6,140	136	5,360	5,360	30	a 430
2...	5,320	18	258	5,530	120	a 1,800	5,400	23	335
3...	4,500	17	206	5,100	84	1,160	5,060	21	287
4...	3,640	16	a 160	4,890	77	1,020	4,550	18	221
5...	3,400	15	138	5,360	69	998	4,290	17	197
6...	3,200	14	121	6,800	52	955	5,360	21	304
7...	2,440	10	66	7,340	37	733	4,930	19	253
8...	2100	11	62	6,670	25	a 450	4,720	13	166
9...	1,780	13	62	6,050	25	a 410	4,720	12	153
0...	1,630	11	a 50	5,960	21	338	4,930	12	160
1...	1,630	9	40	6,050	24	392	5,190	14	a 200
2...	1,480	11	44	6,890	21	391	5,920	17	272
3...	1,540	12	a 50	8,300	23	515	6,890	18	335
4...	1,720	11	51	11,300	100	s 3,670	6,840	18	332
5...	2,970	25	sa 230	21,100	213	12,100	7,790	20	421
6...	8,640	60	a 1,400	26,800	298	21,600	7,610	21	431
7...	9,840	60	a 1,600	26,000	312	21,900	6,670	18	324
8...	9,360	49	1,240	20,700	211	11,800	5,830	16	252
9...	7,480	47	949	14,800	157	6,270	4,890	18	238
0...	19,000	237	a 15,300	10,900	88	2,590	4,380	19	a 220
1...	32,200	681	59,200	8,400	53	1,200	4,590	19	235
2...	41,600	648	72,800	6,230	56	942	4,500	18	219
3...	37,700	674	68,600	6,050	50	817	3,960	16	171
4...	39,500	954	102,000	6,400	46	795	3,600	14	136
5...	38,400	692	71,700	5,700	44	677	3,480	13	a 120
6...	24,200	420	27,400	5,580	35	527	3,080	14	a 120
7...	12,500	360	a 12,000	5,400	34	496	3,360	14	a 130
8...	9,220	310	a 7,700	4,970	35	470	4,290	15	174
9...	8,210	271	6,010	--	--	--	4,930	17	226
0...	7,750	160	3,350	--	--	--	5,150	17	236
1...	7,120	164	3,150	--	--	--	5,150	17	236
Total	353,470	--	456,075	261,410	--	97,266	157,420	--	7,534

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

KENTUCKY RIVER BASIN--Continued

3-2875. KENTUCKY RIVER AT LOCK 4, AT FRANKFORT, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	4,930	18	240	5,320	20	287	3,280	20	a 180
2...	5,620	18	273	4,890	22	290	4,000	23	24
3...	6,540	22	388	4,250	25	a 290	3,760	26	264
4...	6,980	22	415	3,640	27	265	4,550	20	246
5...	8,740	52	1,230	3,200	27	233	10,400	60	s 1,760
6...	12,400	62	2,080	2,770	18	135	8,880	87	2,080
7...	12,800	58	2,000	2,440	16	105	4,800	54	700
8...	10,100	56	1,530	2,240	11	66	3,000	37	300
9...	8,110	38	832	1,820	10	a 59	2,340	51	32
10...	10,400	37	1,040	1,630	9	40	1,720	49	22
11...	17,400	83	3,900	1,460	10	39	1,370	43	159
12...	24,400	196	12,900	1,240	15	50	1,130	43	131
13...	25,800	223	15,500	1,970	--	e 360	1,080	45	a 130
14...	31,100	242	20,300	2,340	74	468	1,040	45	a 130
15...	34,900	299	28,200	4,720	14	178	880	43	10
16...	29,800	343	27,600	5,360	12	174	728	25	4
17...	18,200	203	9,980	4,590	12	149	785	10	2
18...	12,800	136	4,700	3,600	15	146	804	8	1
19...	10,500	103	2,920	2,850	22	169	690	9	1
20...	9,550	76	1,960	2,440	21	138	618	5	
21...	9,600	52	1,350	2,300	18	112	546	6	
22...	9,360	45	a 1,100	2,700	56	408	600	10	1
23...	8,830	30	a 700	2,770	19	142	709	7	1
24...	7,700	27	561	2,810	17	a 130	546	4	
25...	7,660	33	682	3,000	17	138	1,060	7	
26...	8,400	42	952	4,000	23	248	340	6	
27...	7,250	25	489	5,150	30	a 420	612	5	
28...	6,010	26	422	3,840	14	145	1,540	11	4
29...	5,190	25	350	2,890	15	117	1,180	12	3
30...	5,280	23	328	2,340	16	a 100	960	12	a 3
31...	--	--	--	2,300	17	a 110	--	--	--
Total	376,350	--	144,922	96,870	--	5,702	63,948	--	7,28

Day	July			August			September		
1...	747	11	22	1,570	7	30	1,570	13	5
2...	672	9	16	1,720	7	32	900	12	2
3...	546	11	16	1,430	9	35	766	8	1
4...	582	11	a 17	1,020	14	a 40	728	6	1
5...	582	11	17	690	12	22	406	5	a
6...	600	10	16	471	5	6	471	5	
7...	471	7	9	804	5	11	406	6	
8...	419	7	8	600	5	8	360	11	1
9...	380	7	7	546	5	7	406	20	2
10...	471	12	15	709	5	10	264	21	1
11...	406	13	14	564	8	12	240	19	1
12...	360	12	12	564	5	8	240	18	1
13...	290	12	9	497	7	9	310	18	1
14...	240	12	8	360	7	7	471	17	2
15...	172	11	5	3360	3	3	636	20	a 3
16...	842	12	27	300	3	2	432	25	2
17...	250	12	8	380	3	3	432	129	3
18...	220	13	8	340	4	4	419	36	4
19...	220	10	6	350	4	a 4	340	37	3
20...	250	10	7	406	4	4	330	32	2
21...	250	8	5	445	4	5	340	29	2
22...	322	8	7	370	4	4	272	31	2
23...	804	8	17	380	5	5	280		
24...	1,600	11	48	330	6	5	290		
25...	1,880	14	71	300	6	5	248		
26...	1,260	17	58	310	7	6	224	--	e 1
27...	1,110	--	e 80	272	5	4	186		
28...	1,880	--	e 900	360	11	11	179		
29...	1,310	127	449	4,160	--	e 2,600	224		
30...	1,970	56	298	7,020	--	e 3,800	216		
31...	1,430	20	77	2,810	29	s 246	--	--	-
Total	22,536	--	2,257	30,438	--	6,948	12,586	--	62

Total discharge for year (cfs-days)..... 1,485,34
Total load for year (tons)..... 731,45

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

3-2875. KENTUCKY RIVER AT LOCK 4 AT FRANKFORT, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment										Method of analysis
							Percent finer than size indicated, in millimeters										
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 23, 1959.....	1600			36,800	766		43	54	67	82	92	95	98	100				SBWC
Jan. 25.....	1615			37,700	568		50	65	82	93	98	99	100					SBWC

KENTUCKY RIVER BASIN--Continued

3-2915. EAGLE CREEK AT GLENCOE, KY.

LOCATION.--At gaging station at bridge on State Highway 16, at Gallatin-Owen County line, 0.5 mile south of Glencoe, Gallatin County, 5.9 miles downstream from Tenmile Creek, and 22 miles upstream from mouth.
DRAINAGE AREA.--437 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 91°F July 18; minimum, freezing point on many days in December and January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 93°F Sept. 1, 2, 1953; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurements at approximately 8 a.m. and 6 p.m./

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																																
a.m.	60	63	65	64	65	63	58	62	64	61	56	63	60	59	58	57	54	49	50	48	62	64	59	60	57	50	48	48	48	41	45	57
p.m.	65	67	68	67	68	65	62	65	66	63	60	66	65	64	62	61	55	54	53	63	72	70	66	65	55	53	46	55	50	45	50	61
November																																
a.m.	49	47	50	48	48	45	46	47	39	43	45	47	50	52	59	60	55	53	45	46	46	47	54	55	57	58	54	--	--	34	--	49
p.m.	48	47	--	50	49	47	51	43	40	47	49	51	54	61	64	63	59	50	47	50	51	52	55	59	60	61	52	--	--	35	--	52
December																																
a.m.	35	36	37	37	36	33	33	33	--	32	32	33	32	--	32	33	33	33	33	33	--	33	33	35	--	33	35	34	33	34	37	34
p.m.	38	38	39	37	37	33	33	33	--	32	33	33	32	--	33	34	34	35	33	35	33	34	35	35	--	36	36	35	36	37	39	35
January																																
a.m.	37	37	37	--	32	32	33	32	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	39	39	37	--	32	33	34	33	33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February																																
a.m.	--	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March																																
a.m.	--	--	--	--	--	--	--	--	40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April																																
a.m.	--	--	--	--	--	--	--	--	--	--	--	--	43	58	58	59	61	64	59	57	55	55	57	58	60	64	64	66	67	67	--	--
p.m.	--	--	--	--	--	--	--	--	--	--	--	--	--	59	61	61	67	62	59	58	55	57	61	63	65	67	65	67	68	73	--	--
May																																
a.m.	72	76	78	73	74	73	72	69	73	75	70	68	66	63	62	62	61	60	64	72	70	70	70	72	72	71	71	73	74	74	77	70
p.m.	77	80	81	80	80	79	77	75	79	77	72	70	64	65	63	64	64	65	70	73	73	73	73	76	77	75	73	79	80	81	82	74
June																																
a.m.	76	75	70	74	75	76	77	78	78	79	79	80	80	74	74	73	71	71	72	74	80	83	79	76	77	80	81	84	83	81	--	77
p.m.	81	79	78	80	81	83	83	84	85	84	86	87	84	80	81	79	78	77	79	83	85	86	79	82	83	83	86	85	85	83	--	82
July																																
a.m.	80	81	75	79	81	80	80	80	80	79	79	76	74	82	86	83	80	84	82	85	85	83	85	85	80	80	82	75	--	--	--	81
p.m.	78	79	81	82	83	86	85	84	84	83	82	81	83	86	86	85	90	91	86	88	88	87	86	87	84	85	79	79	--	--	--	84
August																																
	--	--	76	--	77	79	80	79	76	76	75	75	75	77	78	79	78	77	79	79	80	80	81	81	81	81	80	80	79	79	78	78
	--	--	78	--	80	81	81	79	77	81	81	82	84	83	81	80	79	84	84	85	85	87	88	87	88	84	84	81	82	--	82	83
September																																

3-2975. PLUM CREEK AT WATERFORD, KY.

LOCATION.--At gaging station, 0.7 mile downstream from Little Plum Creek, 1.0 mile south of Waterford, Spencer County, and 3.2 miles upstream from Salt River.
DRAINAGE AREA.--31.9 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1954 to September 1959.
Sediment records: October 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 90°F July 31; minimum, freezing point Nov. 29, 30.
Sediment concentrations: Maximum daily, 2,350 ppm Jan. 21; minimum daily, no flow on many days during June to September.
Sediment loads: Maximum daily, 21,100 tons Jan. 21; minimum daily, 0 tons on many days during June to September.
EXTREMES, 1954-59.--Water temperatures: Maximum, 92°F July 19, 1957; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 2,350 ppm Jan. 21, 1959; minimum daily, no flow on many days during 1955-59.
Sediment loads: Maximum daily, 21,100 tons Jan. 21, 1959; minimum daily, 0 tons on many days during 1955-59.
REMARKS.--This station is operated as a part of the Soil Conservation Service Demonstration project. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow affected by ice Dec. 7-8, 11-14, 17, Jan. 6-8, 16-19.

Temperature (°F) of water, water year October 1958 to September 1959

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	50	65	--	65	68	70	62	45	54	60	64	66	66	66	60	60	63	63	64	--	60	50	55	55	55	54	53	52	59
November...	49	50	51	46	50	50	47	47	50	50	52	52	54	55	--	56	58	55	54	55	50	40	50	--	50	44	40	35	32	32	--	48
December...	35	35	36	36	35	33	35	35	34	33	33	34	34	35	36	36	37	37	38	36	35	37	38	38	36	36	37	39	39	37	37	36
January....	39	39	38	36	34	36	37	36	36	34	35	36	37	38	35	34	33	35	40	36	40	39	36	36	37	36	36	37	38	36	34	36
February...	34	37	38	39	39	39	36	39	40	40	38	40	40	44	50	45	50	45	39	35	36	38	37	--	39	40	41	41	--	--	--	40
March.....	39	40	41	42	42	40	40	41	42	43	40	41	43	41	43	34	42	44	44	44	44	44	45	48	50	50	50	42	48	50	52	44
April.....	54	56	56	50	56	56	57	59	57	57	52	50	62	62	64	67	68	66	--	67	66	67	67	66	60	70	69	68	70	71	--	62
May.....	72	63	78	78	80	80	81	81	80	81	81	79	72	62	64	60	70	70	71	71	74	76	71	74	76	76	72	74	76	74	76	74
June.....	72	--	71	76	74	72	84	80	81	82	82	84	84	80	78	--	80	79	78	69	81	81	82	80	83	84	75	80	81	82	--	79
July.....	82	82	81	81	82	81	82	84	84	--	85	82	84	85	85	85	84	76	82	82	84	81	78	79	74	80	81	82	86	83	90	82
August.....	86	87	86	84	85	--	86	84	86	86	86	85	87	86	86	80	76	84	86	87	88	77	85	86	87	87	88	74	75	77	77	84
September..	77	81	80	80	71	81	81	80	80	84	71	71	73	75	74	--	70	70	70	71	71	70	71	71	--	70	72	73	73	73	--	74

SALT RIVER BASIN--Continued

3-2975. PLUM CREEK AT WATERFORD, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	4.0	7	0.1	1.7	5	(t)	7.1	13	0.2
2...	3.0	6	(t)	2.2	5	(t)	8.9	25	.6
3...	2.2	4	(t)	1.9	5	(t)	45	40	s 5.8
4...	2.2	5	(t)	1.5	6	(t)	44	20	2.4
5...	1.5	3	(t)	1.3	5	(t)	242	800	sa 1,200
6...	1.3	3	(t)	1.3	6	(t)	47	25	s 3.4
7...	1.0	3	(t)	1.0	6	(t)	30	28	2.3
8...	1.0	4	(t)	1.8	4	(t)	20	23	1.2
9...	58	120	sa 70	2.2	6	(t)	13	33	1.2
10...	77	120	sa 45	1.5	7	(t)	10	32	.9
11...	14	15	.6	1.3	12	(t)	9.0	20	.5
12...	8.4	6	.1	1.0	6	(t)	7.0	12	1 .2
13...	6.0	7	.1	.8	4	(t)	6.0	18	.3
14...	4.4	7	.1	.7	6	(t)	5.5	27	.4
15...	3.3	6	.1	51	--	e 40	5.2	24	.3
16...	3.0	4	(t)	15	52	s 2.5	4.4	17	.2
17...	2.7	3	(t)	9.0	12	.3	4.6	14	.2
18...	2.7	4	(t)	26	--	e 4	4.8	10	.1
19...	2.4	3	(t)	33	25	sa 2	6.5	10	.2
20...	2.2	4	(t)	15	14	.6	5.4	3	(t)
21...	1.9	3	(t)	11	7	.2	3.9	7	.1
22...	1.9	3	(t)	9.0	4	.1	3.8	8	.1
23...	4.0	4	(t)	7.4	8	.2	7.0	18	.3
24...	3.3	3	(t)	6.5	9	.2	7.7	10	.2
25...	2.7	3	(t)	5.2	5	.1	4.4	8	.1
26...	3.0	3	(t)	6.0	7	.1	4.1	9	.1
27...	2.7	4	(t)	4.8	4	.1	4.6	6	b .1
28...	2.2	3	(t)	6.0	6	.1	4.8	7	.1
29...	1.7	2	(t)	8.4	8	.2	4.4	5	.1
30...	1.5	3	(t)	5.5	9	.1	4.8	8	.1
31...	1.5	4	(t)	--	--	--	4.8	4	.1
Total	226.7	--	116.6	239.0	--	51.1	579.7	--	1,221.1

	January			February			March		
1...	78	98	s 27	20	25	1.4	41	15	1.7
2...	46	17	s 2.2	15	32	s 1.6	30	16	1.3
3...	28	12	.9	24	33	s 2.5	27	9	.6
4...	16	11	.5	44	43	5.1	21	13	.7
5...	11	10	.3	28	39	2.9	58	--	e 30
6...	14	11	.4	21	27	1.5	139	75	sa 40
7...	16	6	.2	20	21	1.1	51	17	2.3
8...	14	6	.2	20	13	.7	38	11	1.1
9...	9.0	3	.1	20	37	2.0	41	11	1.2
10...	8.0	2	(t)	51	--	e 30	37	8	.8
11...	6.0	4	.1	33	88	7.8	35	11	1.0
12...	8.0	5	.1	28	62	4.7	37	6	.6
13...	11	6	.2	63	67	11	33	9	.8
14...	17	5	.2	301	441	s 657	30	7	.6
15...	361	564	s 899	120	110	s 45	24	6	.4
16...	90	45	11	65	35	6.1	19	11	.6
17...	40	25	2.7	47	50	b 6	17	7	.3
18...	35	32	3.0	40	62	6.7	14	8	.3
19...	35	18	1.7	35	51	4.8	13	4	.2
20...	1,260	1,360	s 8,960	23	36	2.2	14	15	.6
21...	1,770	2,350	s 21,100	21	49	s 3.1	15	12	.3
22...	130	361	s 178	20	16	.9	12	4	.2
23...	51	132	18	112	120	sa 50	11	6	.2
24...	40	149	16	47	21	2.7	9.6	5	.1
25...	34	73	6.7	37	18	1.8	9.6	5	.1
26...	33	81	7.2	33	15	1.3	15	13	.3
27...	31	64	5.4	24	10	.6	22	15	.3
28...	28	66	5.0	29	7	.5	13	9	.3
29...	30	54	4.4	--	--	--	15	6	.2
30...	33	42	3.7	--	--	--	18	7	.3
31...	26	33	2.3	--	--	--	15	17	.7
Total	4,309.0	--	31,256.5	1,341	--	861.0	874.2	--	88.1

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.

SALT RIVER BASIN--Continued

3-2975. PLUM CREEK AT WATERFORD, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	19	20	sa 2	3.6	8	0.1	1.3	16	0.1
2...	56	--	e 7	2.7	20	.1	1.3	18	b.1
3...	27	10	.7	2.2	10	.1	.8	13	(t)
4...	19	8	.4	1.9	8	(t)	.5	18	(t)
5...	16	5	.2	1.5	10	(t)	5.8	--	e 19
6...	13	6	.2	1.2	15	(t)	11	--	e 19
7...	12	6	.2	1.0	13	(t)	1.9	60	.3
8...	11	6	.2	.9	17	(t)	.9	25	.1
9...	12	11	.4	.7	15	(t)	.4	34	(t)
0...	11	21	.6	.8	26	.1	.3	29	(t)
1...	9.6	16	.4	.9	20	(t)	.3	35	(t)
2...	14	8	.3	1.8	24	.1	.2	29	(t)
3...	13	16	.6	15	50	sa 4	.1	41	(t)
4...	9.6	13	.3	21	51	s 3.4	.1	35	(t)
5...	8.4	13	.3	6.5	27	.5	0	--	0
6...	7.0	10	.2	4.0	14	.2	0	--	0
7...	6.5	17	.3	3.0	8	.1	0	--	0
8...	10	15	.4	4.4	8	.1	0	--	0
9...	12	8	.2	4.4	17	.2	0	--	0
0...	10	10	.3	3.6	16	.2	0	--	0
1...	8.0	7	.2	9.9	27	.7	0	--	0
2...	6.5	8	.1	8.0	18	.4	0	--	0
3...	5.6	8	.1	4.8	19	.2	0	--	0
4...	4.8	15	.2	2.7	13	.1	.3	21	(t)
5...	4.0	15	.2	1.7	16	.1	.2	24	(t)
6...	3.6	11	.1	1.3	20	.1	0	--	0
7...	4.0	20	.2	20	127	s 15	0	--	0
8...	4.8	26	.3	14	46	1.7	0	--	0
9...	3.6	21	.2	5.2	42	.6	0	--	0
0 ..	3.0	13	.1	3.0	28	.2	0	--	0
1 ..	--	--	--	1.7	11	.1	--	--	--
Total	344.0	--	16.9	153.4	--	28.7	25.4	--	38.8

Day	July			August			September		
1...	0	--	0	0.1	28	(t)	58	268	s 107
2...	0	--	0	.1	53	(t)	18	134	s 8.1
3...	0	--	0	0	--	0	2.7	48	.3
4...	0	--	0	.1	36	(t)	1.0	21	.1
5...	0	--	0	0	--	0	.6	29	(t)
6...	0	--	0	4.6	300	sa 9	.3	22	(t)
7...	0	--	0	.4	60	.1	.2	47	(t)
8...	0	--	0	.2	48	(t)	.1	70	(t)
9...	10	--	e 20	.1	47	(t)	.6	55	a .1
0...	15	--	e 11	0	--	0	.3	28	(t)
1...	1.0	43	.1	0	--	0	.1	30	(t)
2...	.2	26	(t)	0	--	0	.1	33	(t)
3...	0	--	0	0	--	0	.1	26	(t)
4...	0	--	0	0	--	0	.1	20	(t)
5...	0	--	0	0	--	0	0	--	0
6...	0	--	0	0	--	0	0	--	0
7...	.3	70	.1	.4	17	(t)	0	--	0
8...	.1	43	(t)	.2	15	(t)	0	--	0
9...	.6	28	(t)	.1	33	(t)	0	--	0
0...	.3	27	(t)	0	--	0	0	--	0
1...	.1	20	(t)	0	--	0	0	--	0
2...	.1	25	(t)	0	--	0	0	--	0
3...	3.0	38	.3	0	--	0	0	--	0
4...	4.8	37	.5	0	--	0	0	--	0
5...	10	300	sa 25	0	--	0	0	--	0
6...	2.1	108	.6	0	--	0	0	--	0
7...	1.0	28	.1	0	--	0	0	--	0
8...	.6	25	(t)	.9	41	.1	0	--	0
9...	.3	36	(t)	.6	21	(t)	0	--	0
0...	1.9	229	s 2.5	50	112	s 645	0	--	0
1...	.4	62	.1	7.0	318	6.0	--	--	--
Total	51.8	--	60.5	64.8	--	660.3	82.2	--	115.8

Total discharge for year (cfs-days)..... 8,291.2
Total load for year (tons)..... 34,516.9

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.

SALT RIVER BASIN--Continued

3-2975. PLUM CREEK AT WATERFORD, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Dec. 5, 1958	0650			510	2,400		35	43	55	72	94	98	100	--			SBWC
Jan. 15, 1959	0855			756	1,760		38	46	56	71	92	98	99	100			SBWC
Jan. 20	1050			3,704	5,280		30	37	47	65	85	95	99	100			SBWC
Jan. 21	1415			6,540	10,500		33	42	54	72	89	98	99	100			SBWC
Jan. 21	1415			6,540	10,500		19	25	40	57	89	97	99	100			SBN
Feb. 14	1535			796	1,390		45	52	64	78	95	98	99	100			SBWC
May 27	1405			34	658		63	76	88	97	99	100	--	--			SBWC
July 9	1915			--	2,260		59	71	82	94	99	100	--	--			SBWC
July 9	1915			--	2,260		21	30	57	96	99	99	100	--			SBN
July 30	1605			6.0	1,140		86	96	98	99	99	100	--	--			SBWC

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.

LOCATION.--At gaging station at bridge on State Highway 61, at Shepherdsville, Bullitt County, 500 feet downstream from Louisville and Nashville Railroad bridge and 2.5 miles downstream from Floyds Fork.
DRAINAGE AREA.--1,230 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1950, October 1952 to September 1959 (discontinued).
Water temperatures: October 1952 to September 1959.
Sediment records: October 1952 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 289 ppm Dec. 12-31; minimum, 137 ppm Jan. 21-25.
Hardness: Maximum, 276 ppm Dec. 12-31; minimum, 101 ppm July 12-14.
Specific conductance: Maximum daily, 559 micromhos Dec. 20; minimum daily, 178 micromhos Jan. 23, July 29.
Water temperatures: Maximum, 84°F July 24, Aug. 30; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 1,390 ppm Jan. 21; minimum daily, 2 ppm Jan. 11.
Sediment loads: Maximum daily, 89,700 tons Jan. 22; minimum daily, less than 0.5 ton on many days during July and September.
EXTREMES, 1952-59.--Dissolved solids: Maximum, 304 ppm Dec. 17-31, 1955; minimum, 95 ppm Sept. 20-21, 1954.
Hardness: Maximum, 276 ppm Dec. 12-31, 1958; minimum, 77 ppm Nov. 19-21, 1957.
Specific conductance: Maximum daily, 559 micromhos Dec. 20, 1958; minimum daily, 138 micromhos Nov. 20, 1957.
Water temperatures: Maximum, 92°F June 27, 1954; minimum, freezing point on many days during winter months 1957-59.
Sediment concentrations: Maximum daily, 2,860 ppm May 14, 1955; minimum daily, no flow on many days during September to November 1953, and September 1954.
Sediment loads: Maximum daily, 103,000 tons Mar. 4, 1953; minimum daily, 0 tons on many days during September to November 1953, and September 1954.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Temperatures for periods June 13 to July 23, Aug. 9-29, Sept. 8-30 are once-daily measurements at approximately 8 a.m. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow affected by ice Dec. 11-15, Jan. 5-6, 9-10.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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, 1958.....	219	12	0.01	57	12	4.6		210	21	5.5	0.2	1.9	226	192	20	376	7.9	8
Oct. 11-14.....	374	--	--	45	9.6	5.5		163	20	5.0	--	2.5	194	152	18	307	7.7	25
Oct. 15-Nov. 11.....	58.6	--	--	65	14	7.1		241	27	6.0	--	1.1	250	220	22	433	7.8	6
Nov. 12-Dec. 5.....	472	--	--	69	15	6.7		250	31	7.0	--	1.0	261	234	28	459	7.9	7
Dec. 6-11.....	1,431	--	--	64	12	6.7		224	29	5.0	--	4.0	240	209	26	418	7.8	8
Dec. 12-31.....	212	--	--	86	15	5.5		291	37	5.5	--	4.0	289	276	38	526	7.6	4
Jan. 1-15, 1959.....	795	--	--	77	14	6.0		253	40	7.0	--	4.3	280	250	42	476	7.9	3
Jan. 16-20.....	4,380	--	--	61	10	6.0		194	32	5.0	--	7.8	224	193	34	388	8.0	5
Jan. 21-25.....	17,410	11	.05	36	5.0	3.9		110	18	2.0	--	7.4	137	111	20	234	7.9	12
Jan. 26-Feb. 14.....	1,781	--	--	71	12	5.1		232	33	5.0	--	7.3	249	227	36	429	7.9	6
Feb. 15-18.....	5,565	--	--	58	9.1	3.9		185	27	3.5	--	7.6	214	182	30	356	8.1	6
Feb. 19-Mar. 6.....	1,691	--	--	72	12	5.3		234	34	5.5	--	6.0	249	229	37	432	8.0	3

SALT RIVER BASIN--Continued

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Mar. 7-31, 1959.....	1,091	--	--	71	14	3.0		235	37	5.0	--	3.4	252	235	42	438	8.2	6
Apr. 1-30.....	695	--	--	73	12	8.3		238	44	5.0	--	1.6	280	232	36	454	8.0	5
May 1-14.....	212	--	--	77	16	8.3		260	49	8.0	--	1.5	288	258	45	500	7.6	3
May 15-27.....	358	10	0.00	58	13	5.8		200	39	8.0	0.4	2.9	230	198	34	403	8.0	5
May 28-29.....	882	--	--	42	8.8	4.8		144	24	3.1	--	5.2	170	141	23	294	7.5	11
May 30-June 3.....	416	--	--	61	10	6.7		198	32	5.9	--	4.3	229	193	31	385	7.9	8
June 4-30.....	79.9	--	--	47	8.9	5.8		158	26	5.0	--	3.1	187	154	24	312	7.8	8
July 12-14.....	11.7	--	--	33	4.4	3.9		104	17	2.0	--	4.2	139	101	16	379	7.3	16
July 29-Aug. 3.....	306	--	--	56	11	6.9		196	24	9.0	--	1.6	235	185	24	219	7.8	6
Aug. 4-Sept. 2.....	73.4	9.7	.00	47	6.7	6.4		148	28	4.5	.3	3.2	197	145	24	302	7.4	9
Sept. 3-15.....	50.8	--	--	38	6.0	5.8		129	18	4.0	--	3.3	168	120	14	261	7.4	11
Time-weighted average.....	928	--	--	63	12	6.0		214	32	5.5	--	3.3	238	207	31	403	--	7

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

SALT RIVER BASIN--Continued

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedime	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	116	62	19	34	15	1	400	10	
2...	92	57	14	36	14	a 1	385	20	2
3...	70	52	10	36	14	a 1	506	14	1
4...	60	46	7	36	12	1	1,540	46	s 19
5...	52	39	5	38	9	1	2,900	245	s 1,92
6...	46	24	3	38	11	a 1	3,550	449	4,30
7...	42	16	2	36	13	1	1,920	133	68
8...	38	11	1	36	15	1	1,190	48	15
9...	76	19	a 4	36	25	2	877	29	6
10...	1,600	--	e 700	38	18	2	600	21	
11...	680	103	s 189	40	9	1	450	18	2
12...	351	57	54	50	8	1	350	12	1
13...	250	47	32	47	10	1	300	12	1
14...	216	49	28	42	14	2	250	12	
15...	195	52	27	212	44	s 25	230	10	
16...	150	44	18	380	54	55	212	10	
17...	116	35	11	242	44	29	202	14	
18...	90	20	5	258	46	32	195	9	
19...	75	46	9	736	55	109	188	12	
20...	60	45	7	931	54	136	198	11	
21...	50	24	3	537	46	67	188	13	
22...	46	20	a 2	375	37	37	174	13	
23...	46	21	3	310	28	23	181	10	
24...	48	22	3	258	26	18	242	8	
25...	62	20	a 3	216	32	19	223	7	
26...	62	19	a 3	192	38	20	188	7	
27...	58	18	a 3	167	37	17	192	10	
28...	54	17	2	170	28	13	192	13	
29...	48	15	2	206	18	10	184	11	
30...	42	18	2	274	13	10	178	10	
31...	35	16	2	--	--	--	167	8	
Total	4,926	--	1,173	6,007	--	637	18,552	--	7,55

Day	January			February			March		
1...	556	55	s 82	2,030	48	263	1,530	40	16
2...	2,160	138	805	1,310	65	230	1,680	38	17
3...	1,740	116	545	778	40	84	1,440	33	12
4...	1,650	35	156	1,120	73	221	1,240	22	7
5...	500	16	22	1,440	72	280	1,120	33	s 10
6...	400	12	13	1,140	53	163	3,090	357	2,98
7...	470	8	10	922	32	80	3,310	408	3,65
8...	551	8	12	850	25	57	2,150	137	79
9...	450	4	5	823	32	71	1,780	80	38
10...	350	3	3	1,190	125	402	1,650	39	17
11...	284	2	2	2,490	438	2,940	1,470	38	15
12...	254	3	2	1,840	279	1,390	1,530	25	10
13...	274	6	4	1,900	194	995	1,620	22	9
14...	310	9	8	4,120	358	s 3,980	1,470	25	9
15...	1,970	162	s 862	10,200	905	24,900	1,300	41	14
16...	6,370	698	12,000	6,320	380	6,480	1,080	27	7
17...	3,500	255	s 2,410	3,350	133	1,200	922	16	4
18...	2,000	110	a 600	2,390	73	471	787	13	2
19...	1,460	40	158	1,880	48	244	696	14	2
20...	8,570	468	s 10,800	1,870	33	167	640	21	3
21...	23,600	1,390	88,600	1,680	33	150	656	27	4
22...	28,400	1,170	89,700	1,330	35	126	616	23	3
23...	20,400	852	46,900	1,870	92	s 464	530	19	2
24...	9,590	365	9,450	2,600	179	1,260	530	20	2
25...	5,080	160	2,190	1,870	120	606	470	22	2
26...	1,680	80	363	1,480	51	204	464	25	3
27...	1,380	48	179	1,260	34	116	787	32	6
28...	2,410	31	202	1,110	30	90	832	29	6
29...	2,710	28	205	--	--	--	632	24	4
30...	3,050	31	255	--	--	--	696	22	4
31...	2,440	29	191	--	--	--	656	20	3
Total	134,559	--	266,734	61,163	--	47,634	37,374	--	9,87

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

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

	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
...	632	24	41	238	12	8	212	43	25
...	1,630	160	sb 700	226	23	14	374	83	s 84
...	1,850	175	874	206	17	9	966	181	s 472
...	1,300	71	249	178	17	8	262	50	a 35
...	967	29	76	160	14	6	156	40	17
...	787	27	51	142	16	6	153	45	sa 19
...	648	32	56	125	19	6	640	140	242
...	565	26	40	107	20	6	250	93	63
...	518	24	34	90	19	5	139	100	38
...	544	25	37	82	20	4	92	102	25
...	728	23	45	75	24	5	70	74	14
...	841	23	52	75	25	5	54	72	10
...	1,140	22	68	150	29	12	44	74	9
...	1,110	25	75	1,120	110	sb 380	36	60	6
...	940	27	68	886	87	s 208	31	39	3
...	712	26	50	410	48	53	26	19	1
...	572	28	43	279	55	41	24	20	1
...	518	26	36	230	58	36	20	20	1
...	586	25	40	216	52	30	18	15	1
...	664	22	39	250	42	28	15	37	1
...	616	27	45	324	54	47	13	30	a 1
...	500	25	34	422	63	72	12	25	1
...	428	19	22	434	51	60	11	27	1
...	370	20	20	342	43	40	13	30	a 1
...	328	20	18	250	40	27	14	32	1
...	292	21	16	230	38	24	16	30	1
...	270	20	14	384	69	s 72	15	47	2
...	266	23	16	1,220	226	s 744	13	50	a 2
...	270	24	17	544	93	136	11	45	1
...	246	24	16	306	63	52	9.0	39	1
...	--	--	--	223	37	22	--	--	--
...l	20,838	--	2,892	9,924	--	2,166	3,709.0	--	1,079

	July			August			September		
...	8.1	31	1	206	218	121	254	51	35
...	6.4	35	a 1	150	146	59	422	87	99
...	4.8	34	(t)	107	104	30	230	100	62
...	3.5	39	(t)	78	86	18	110	80	24
...	3.5	55	1	85	66	15	70	59	11
...	2.6	60	(t)	150	65	s 26	58	46	7
...	2.0	62	(t)	125	53	18	41	51	6
...	1.7	48	(t)	62	41	7	31	46	4
...	1.7	49	(t)	40	39	4	25	48	3
...	1.7	35	(t)	32	40	a 3	21	49	3
...	3.5	32	(t)	32	37	3	17	38	2
...	15	34	1	32	38	3	17	34	2
...	12	32	1	23	33	2	16	30	
...	8.1	35	a 1	21	13	1	13		
...	4.8	38	(t)	20	14	1	11		
...								--	e 1
...	2.6	37	(t)	21	19	1	9.0		
...	2.0	37	(t)	34	21	2	6.4		
...	1.7	45	(t)	46	22	3	4.8	29	(t)
...	2.3	44	(t)	47	20	2	3.5	27	(t)
...	2.6	43	(t)	47	17	2	3.0	30	(t)
...	2.6	34	(t)	47	21	3	2.6	26	(t)
...	3.5	29	(t)	40	38	4	2.0	21	(t)
...	21	39	2	33	35	a 3	2.0	18	(t)
...	440	98	s 116	33	37	3	1.4	19	(t)
...	452	101	123	32	36	3	1.2	20	(t)
...	1,320	197	702	27	36	3	1.0	21	(t)
...	510	150	206	24	36	2	.9	23	(t)
...	1,070	618	s 1,780	25	34	2	.7	24	(t)
...	920	998	s 2,480	33	29	2	.6	25	(t)
...	216	500	292	76	35	a 7	.6	25	(t)
...	234	318	201	262	30	21	--	--	--
...l	5,279.7	--	5,910	1,990	--	374	1,375.7	--	265

...al discharge for year (cfs-days)..... 305,697.4
...tal load for year (tons)..... 346,294

Estimated.
Computed by subdividing day.
less than 0.5 ton.

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

SALT RIVER BASIN--Continued

3-2985. SALT RIVER AT SHEPHERDSVILLE, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment											Method of analysis
						Percent finer than size indicated, in millimeters											
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Dec. 6, 1958	0850			4,040	578		50	60	70	84	96	99	100				SBWC
Jan. 21, 1959	0810			22,000	1,490		44	54	62	82	95	99	100				SBWC
Jan. 21	0810			22,000	1,490		32	43	59	79	96	99	100				SBN
Jan. 23	0810			22,300	960		72	81	92	97	99	100	--				SBWC
Feb. 15	1430			10,700	1,030		47	56	69	85	97	99	100				SBWC
Mar. 7	0805			3,750	486		59	68	77	88	97	99	100				SBWC
May 28	0625			1,620	286		79	88	94	97	98	99	99	100			SBWC
June 3	0645			1,360	254		77	87	95	98	99	99	100				SBWC
July 29	0450			1,730	1,390		73	85	95	98	99	99	100				SBWC
July 29	0450			1,730	1,390		68	81	95	98	99	99	100				SBN

3-3015. ROLLING FORK NEAR BOSTON, KY.

LOCATION.--At gaging station at bridge on U.S. Highway 62 and State Highway 61, 0.4 mile downstream from Beech Fork, and 2.3 miles southwest of Boston, Nelson County.
DRAINAGE AREA.--1,290 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F Aug. 26, Sept. 4; minimum, freezing point on several days during December to February.
EXTREMES, 1949-59.--Water temperatures: Maximum, 87°F July 4, 1950, June 22, 25, 28, 1954; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurements at approximately 7 a.m. and 5 p.m./

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																																
a.m.	62	60	60	61	60	60	60	60	61	61	59	58	58	59	61	60	60	61	59	61	61	60	59	58	56	49	48	48	46	45	45	57
p.m.	62	62	63	62	60	60	61	63	62	59	62	62	63	62	63	62	63	62	62	65	59	59	59	57	51	50	47	48	45	46	48	58
November																																
a.m.	50	49	49	47	50	49	45	46	44	45	45	46	44	47	45	45	46	47	44	45	43	46	47	48	49	45	41	42	36	35	--	45
p.m.	49	48	50	52	48	47	45	45	46	44	45	45	45	46	46	48	52	46	46	42	49	49	50	50	51	47	46	40	38	35	--	46
December																																
a.m.	34	34	37	35	36	34	32	--	--	--	--	34	--	--	--	--	--	--	--	32	--	--	33	33	--	--	--	33	32	33	35	33
p.m.	35	38	37	36	35	35	34	32	--	--	35	33	--	--	--	--	--	--	--	--	--	34	34	32	--	--	32	35	33	32	33	33
January																																
a.m.	35	32	35	--	--	--	32	--	--	--	--	--	34	35	40	36	34	33	34	33	34	--	--	34	38	36	35	--	37	34	34	34
p.m.	34	33	35	34	--	33	32	--	--	--	--	32	38	37	38	34	36	36	35	36	36	33	--	39	40	38	37	35	36	36	38	35
February																																
a.m.	37	36	35	37	36	34	37	37	35	42	35	33	35	38	38	36	37	34	--	--	--	--	35	34	32	--	32	33	37	--	--	35
p.m.	39	39	39	39	37	35	37	41	40	38	36	35	36	40	35	34	37	32	--	--	--	34	36	34	34	34	34	35	35	--	--	36
March																																
a.m.	33	33	35	35	33	34	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
p.m.	34	34	34	34	37	35	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April																																
a.m.	49	44	47	52	55	56	55	57	56	57	58	48	42	45	42	46	48	57	59	57	50	57	55	52	59	60	61	63	59	60	--	54
p.m.	46	49	49	57	57	57	58	59	58	56	55	46	44	47	49	49	49	58	61	54	55	59	59	57	63	64	65	67	64	65	--	56
May																																
a.m.	60	59	69	70	72	62	61	69	64	64	71	73	65	49	40	41	41	58	61	67	65	63	64	62	68	69	68	69	71	73	71	63
p.m.	66	65	72	75	77	79	74	72	68	75	74	68	61	47	43	44	49	65	68	67	67	66	65	70	70	71	71	73	77	76	74	67
June																																
a.m.	72	70	71	70	71	70	73	71	70	72	75	73	73	72	74	75	74	70	71	70	71	72	70	73	77	76	77	78	79	79	--	73
p.m.	74	75	76	75	77	75	76	75	76	78	77	79	78	79	76	77	75	73	75	76	76	75	75	76	74	75	75	76	78	77	--	76
July																																
a.m.	75	75	76	75	73	72	74	76	75	74	76	75	73	74	70	73	75	72	74	75	74	76	75	73	71	78	70	73	74	73	76	74
p.m.	77	75	76	78	79	79	81	82	81	82	83	79	77	77	79	79	79	79	78	77	80	78	78	78	77	76	78	79	77	79	79	79
August																																
a.m.	76	75	75	74	76	74	79	77	74	76	76	74	76	75	74	73	75	76	75	74	75	73	74	74	73	78	76	75	74	71	74	75
p.m.	80	79	78	80	79	78	80	79	80	79	79	80	79	79	79	79	79	80	79	78	79	80	80	81	85	86	83	80	79	79	79	80
September																																
a.m.	73	74	75	76	77	75	76	74	75	74	71	70	70	70	71	70	64	62	61	66	62	64	66	65	65	67	67	72	70	74	--	70
p.m.	76	79	80	86	79	79	79	80	79	76	75	76	76	77	78	76	66	64	65	65	66	69	69	66	70	68	69	75	75	77	--	74

GREEN RIVER BASIN

3-3065. GREEN RIVER AT GREENSBURG, KY.

LOCATION.--At gaging station on left bank 75 feet downstream from bridge on U.S. Highway 68, 300 feet upstream from Clover Lick Creek, 0.2 mile south of Greensburg, Green County, and 2.6 miles upstream from Russell Creek.
DRAINAGE AREA.--736 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 85°F June 29 to July 2; minimum, freezing point Jan. 10, 14.
EXTREMES, 1949-59.--Water temperatures: Maximum, 89°F July 1, 2, 23, Aug. 4, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurements at approximately 8 a.m. and 5 p.m./

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																																
a.m.	67	65	63	62	61	60	60	61	64	61	59	57	59	60	60	62	63	62	61	59	60	61	61	60	58	56	55	54	55	53	53	60
p.m.	67	65	64	62	61	61	61	62	64	61	60	59	60	61	62	64	63	62	62	60	61	62	62	61	58	57	56	55	55	53	54	60
November																																
a.m.	54	51	50	50	--	--	48	48	48	47	46	46	46	47	49	56	60	62	56	58	58	54	54	50	48	47	44	41	37	34	--	50
p.m.	54	51	52	--	--	--	49	48	48	48	48	47	47	49	52	59	62	58	58	60	58	58	54	51	48	47	44	40	37	35	--	50
December																																
a.m.	36	38	40	42	38	37	34	35	34	34	34	34	34	33	33	33	34	34	--	--	33	35	35	36	36	35	36	38	38	38	40	36
p.m.	36	40	42	42	40	39	40	35	34	34	35	34	34	33	33	34	34	34	--	--	33	37	35	36	36	36	37	38	39	40	42	37
January																																
a.m.	39	36	35	34	33	33	33	33	33	32	33	33	33	32	33	34	34	34	34	34	35	33	33	34	34	35	36	36	36	35	35	34
p.m.	41	37	35	34	33	33	33	33	33	33	33	34	34	33	35	35	36	35	35	34	35	34	34	35	35	36	37	37	36	36	36	35
February																																
a.m.	35	36	37	36	35	34	35	36	35	34	36	36	37	36	35	34	34	36	--	--	35	36	35	35	36	36	37	37	--	--	--	36
p.m.	36	37	38	37	37	35	38	37	35	35	37	38	37	36	34	35	35	36	--	--	35	36	35	36	37	35	39	38	--	--	--	36
March																																
a.m.	--	--	--	--	--	--	--	37	38	39	40	42	43	44	45	46	45	46	47	45	47	48	--	--	--	--	55	56	54	56	56	--
p.m.	--	--	--	--	--	--	--	38	40	40	42	43	44	44	45	46	46	47	47	47	48	49	--	--	--	--	56	56	55	57	56	--
April																																
a.m.	56	57	58	53	54	57	59	61	63	69	54	49	49	46	50	51	55	59	59	59	59	59	54	55	59	62	64	64	59	59	--	57
p.m.	57	60	59	55	58	59	62	65	65	58	54	49	49	54	53	57	59	60	60	65	61	61	60	61	64	65	66	65	62	66	--	60
May																																
a.m.	65	68	72	70	69	74	74	72	70	72	73	74	71	65	68	60	60	61	64	69	69	67	68	70	69	71	72	71	72	73	74	69
p.m.	68	74	75	76	78	78	74	76	76	75	78	76	75	67	67	63	63	67	71	70	71	71	71	71	73	74	74	76	75	76	76	73
June																																
a.m.	74	73	71	70	70	72	72	71	71	74	72	75	76	75	73	72	73	73	73	71	72	74	72	73	74	74	76	79	80	82	--	74
p.m.	75	76	75	75	76	77	77	77	78	77	77	78	78	78	77	77	77	77	77	75	77	76	77	75	76	79	80	82	85	85	--	78
July																																
a.m.	82	81	78	78	78	77	78	79	79	79	79	79	78	79	79	79	78	78	78	78	76	75	76	74	74	75	75	78	78	79	80	78
p.m.	85	85	81	81	80	81	82	82	84	84	84	84	83	83	83	82	82	82	82	82	80	80	80	79	79	79	79	82	82	83	84	82
August																																
a.m.	80	80	79	79	77	76	76	75	75	74	74	74	75	75	76	79	78	78	78	78	78	79	79	79	79	78	78	78	78	78	79	77
p.m.	84	84	82	83	80	79	79	79	79	78	78	78	79	80	80	83	82	82	82	82	82	82	82	81	82	81	81	81	81	82	82	81
September																																

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.

LOCATION.--At gaging station at bridge on U.S. Highway 31W, at Munfordville, Hart County.
DRAINAGE AREA.--1,673 square miles, of which about 180 square miles does not contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1959.
Water temperatures: October 1950 to September 1959.
Sediment records: April 1951 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 2,700 ppm July 7-10; minimum, 137 ppm Feb. 16-18.
Hardness: Maximum, 594 ppm July 7-10; minimum, 80 ppm Feb. 16-18.
Specific conductance: Maximum daily, 5,320 micromhos July 10; minimum daily, 191 micromhos Feb. 17.
Water temperatures: Maximum, 78°F July 1, 24, Aug. 23; minimum, freezing point Dec. 16, Jan. 11.
Sediment concentrations: Maximum daily, 1,580 ppm July 24; minimum daily, 2 ppm Jan. 13, June 13.
Sediment loads: Maximum daily, 46,000 tons Jan. 22; minimum daily, 2 tons Oct. 21, 25.
EXTREMES, 1950-59.--Dissolved solids: Maximum, 2,700 ppm July 7-10, 1959; minimum, 73 ppm Feb. 19-21, 1956.
Hardness: Maximum, 594 ppm July 7-10, 1959; minimum, 44 ppm Jan. 30 to Feb. 2, 1957.
Specific conductance: Maximum daily, 5,320 micromhos July 10, 1959; minimum daily, 59 micromhos Mar. 25, 1952.
Water temperatures: Maximum, 82°F July 20, 1957; minimum, freezing point on several days during winter months 1957-59.
Sediment concentrations (1951-59): Maximum daily, 3,180 ppm June 14, 1952; minimum daily, 1 ppm on many days during 1952-57.
Sediment loads (1951-59): Maximum daily, 153,000 tons Mar. 23, 24, 1952; minimum daily, less than 0.5 ton on many days during 1953-56.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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, 1958.....	315	--	--	61	14	96	--	148	13	200	--	2.4	504	210	88	922	7.6	5
Oct. 8-22.....	316	--	--	67	16	137	--	148	15	278	--	2.0	686	233	112	1,180	7.4	3
Oct. 23-28.....	238	--	--	77	19	175	--	154	16	360	--	1.3	866	270	144	1,470	7.5	3
Oct. 29-Nov. 7.....	299	--	--	86	22	214	--	144	17	450	--	1.3	1,070	305	187	1,790	7.5	3
Nov. 8-18.....	292	--	--	71	18	167	--	142	17	340	--	1.3	830	251	135	1,380	7.6	3
Nov. 19-21.....	859	--	--	88	24	251	--	144	24	510	--	1.6	1,060	318	200	1,940	7.5	3
Nov. 22-25.....	954	--	--	46	11	70	--	118	20	138	--	.8	467	160	64	643	7.5	3
Nov. 26-29.....	1,038	--	--	56	14	122	--	125	18	242	--	1.1	546	197	94	992	7.5	3
Nov. 30-Dec. 3.....	2,785	--	--	39	8.3	46	--	106	15	90	--	1.8	279	132	44	535	7.4	3
Dec. 4-12.....	1,650	--	--	43	11	63	--	116	17	125	--	1.6	352	152	57	630	7.4	4
Dec. 13-20.....	590	--	--	60	15	122	--	132	21	245	--	2.2	590	211	103	1,040	7.4	4
Dec. 21-31.....	530	--	--	69	18	167	--	132	20	340	--	2.1	784	246	138	1,370	7.4	4
Jan. 1-3, 1959.....	974	--	--	70	20	194	--	126	23	390	--	3.1	864	257	154	1,490	7.5	5
Jan. 4-7.....	1,386	--	--	48	11	83	--	108	18	168	--	2.9	410	165	76	756	7.3	5
Jan. 8-14, 16.....	1,305	--	--	64	15	136	--	122	19	280	--	3.3	676	221	121	1,180	7.4	5
Jan. 17-21.....	6,968	--	--	34	7.9	39	--	86	15	80	--	3.0	245	118	47	453	7.2	20

GREEN RIVER BASIN--Continued

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Jan. 22-25, 1959....	18,400	--	--	26	4.4	16	--	74	10	32	--	3.1	159	83	22	252	7.3	25
Jan. 26-Feb. 1.....	3,350	--	--	42	8.2	51	--	104	13	104	--	4.6	293	139	54	536	7.3	7
Feb. 2-11.....	2,289	--	--	48	10	73	--	110	15	150	--	4.6	390	161	71	702	7.5	5
Feb. 12-15.....	6,088	--	--	36	7.2	40	--	98	14	78	--	2.2	252	120	39	434	7.6	7
Feb. 16-18.....	14,430	--	--	24	4.8	16	--	72	10	30	--	2.3	137	80	21	238	7.5	18
Feb. 3-Mar. 3.....	3,304	--	--	41	8.2	50	--	106	13	100	--	4.1	299	136	48	528	7.5	5
Mar. 4-17.....	3,501	--	--	40	8.7	53	--	102	14	107	--	2.4	318	136	52	542	7.5	4
Mar. 18-27.....	1,828	--	--	50	10	89	--	108	16	179	--	3.8	458	166	78	784	7.6	4
Mar. 28-Apr. 4.....	1,962	--	--	54	12	105	--	116	18	210	--	3.4	526	184	89	900	7.6	4
Apr. 5-11.....	2,896	--	--	48	11	97	--	106	17	190	--	3.1	484	165	78	813	7.5	4
Apr. 12-16.....	5,840	--	--	34	7.4	44	--	88	14	88	--	1.0	275	116	44	459	7 5	5
Apr. 17-21.....	2,810	--	--	48	11	92	--	104	15	186	--	4.0	476	165	80	796	7.6	5
Apr. 22-26.....	2,170	--	--	51	10	100	--	114	15	194	--	2.4	464	168	74	833	7.6	6
Apr. 27-May 4.....	1,205	--	--	63	14	138	--	122	18	280	--	2.5	664	215	115	1,160	7.7	6
May 5-15.....	639	8.0	0.03	84	21	244	3.4	136	18	490	0.2	3.1	1,070	296	185	1,800	7.9	7
May 16-21.....	1,081	--	--	71	18	203	--	114	18	410	--	3.8	896	251	158	1,520	7.8	7
May 22-27.....	2,507	--	--	59	12	114	--	124	15	230	--	3.5	606	197	95	1,010	7.7	8
May 28-30.....	1,597	--	--	73	17	184	--	134	17	370	--	3.6	878	252	142	1,450	7.5	5
May 31-June 7.....	2,069	--	--	55	15	102	--	131	15	209	--	4.6	506	199	91	913	7.5	6
June 8.....	1,010	--	--	90	28	307	--	130	25	620	--	--	1,310	340	233	2,230	7.5	6
June 9-12.....	787	--	--	62	16	158	--	131	17	310	--	4.0	712	221	113	1,230	7.5	4
June 13-19.....	399	--	--	91	27	299	--	147	18	600	--	4.5	1,320	338	218	2,190	7.8	4
June 20-26.....	386	--	--	115	34	410	--	150	29	824	--	4.7	1,780	427	304	2,870	7.5	5
June 27-July 6.....	446	--	--	96	28	322	--	137	23	650	--	4.0	1,400	355	243	2,300	7.6	6
July 7-10.....	263	--	--	152	52	656	--	138	11	1,340	--	5.7	2,700	594	480	4,270	7.5	5
July 11-18.....	216	--	--	120	35	441	--	144	12	900	--	4.5	1,930	444	326	3,040	7.6	4
July 19-22.....	1,151	--	--	123	36	505	--	112	16	1,020	--	8.5	1,960	455	363	3,420	6.6	7
July 23-29.....	2,392	--	--	55	12	136	--	102	13	270	--	6.2	618	187	103	1,070	7.0	6

July 30-Aug. 6,1959.	1,009	--	--	79	19	234	--	120	17	470	--	6.4	1,040	275	177	1,770	7.4	7
Aug. 7-12.....	1,080	--	--	60	14	158	--	114	14	310	--	5.8	730	207	114	1,240	7.7	8
Aug. 13-18.....	330	--	--	92	22	280	--	139	19	560	--	6.8	1,260	320	206	2,020	7.4	5
Aug. 19-Sept. 8.....	362	6.6	.03	114	32	440	5.8	130	29	880	.1	5.6	1,920	416	310	3,020	7.4	7
Sept. 9-11.....	488	--	--	78	19	238	--	130	17	470	--	5.0	1,060	273	166	1,740	7.6	7
Sept. 14-30.....	157	--	--	130	37	489	--	151	14	990	--	6.0	2,160	477	353	3,370	7.4	4
Time-weighted average.....	1,738	--	--	70	18	192	--	124	17	387	--	3.6	886	249	147	1,470	--	5

GREEN RIVER BASIN--Continued

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 7 a.m.)

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

GREEN RIVER BASIN--Continued

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

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	372	5	5	240	7	4	3,310	88	786
2	344	15	14	272	10	7	2,450	30	198
3	324	9	8	316	10	8	1,950	23	121
4	312	7	6	356	10	10	1,860	20	100
5	296	9	7	380	6	6	2,200	17	101
6	282	14	11	376	4	4	2,370	19	122
7	276	14	10	352	4	a 4	2,100	22	125
8	262	16	11	324	5	4	1,720	25	116
9	258	18	12	308	5	4	1,440	22	86
0	293	16	13	293	5	4	1,220	18	59
1	515	32	44	279	5	4	1,040	5	14
2	398	15	16	265	6	4	905	5	a 12
3	380	10	10	262	9	6	804	7	15
4	384	11	11	258	9	6	670	5	9
5	368	4	4	272	6	4	560	5	8
6	328	9	a 8	290	21	16	506	11	15
7	296	14	11	308	9	7	595	6	10
8	276	17	13	352	16	15	551	6	9
9	262	6	4	456	4	5	528	17	24
0	248	4	3	792	10	21	510	36	50
1	237	3	2	1,330	25	90	479	24	31
2	234	7	4	1,360	15	55	430	15	17
3	234	8	5	1,010	19	52	456	5	6
4	237	8	5	787	25	53	502	5	7
5	240	3	2	660	10	18	551	5	7
6	240	6	4	590	12	19	605	5	8
7	240	18	12	560	9	14	615	7	12
8	240	18	12	620	9	a 15	585	8	13
9	237	19	12	2,380	100	sb 800	551	10	15
0	230	18	11	3,430	141	1,300	533	10	14
1	227	5	3	--	--	--	520	11	15
Total	9,070	--	293	19,478	--	2,559	33,116	--	2,125

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	542	14	20	2,410	20	130	2,550	27	186
2	809	10	22	2,130	32	184	2,970	33	265
3	1,570	30	s 138	1,910	20	103	2,930	31	245
4	2,020	68	371	1,930	20	104	2,720	15	110
5	1,630	29	128	2,450	23	152	2,570	18	125
6	989	20	53	2,710	26	190	3,730	110	sb 1,400
7	905	16	39	2,450	21	139	5,320	213	3,060
8	917	12	30	2,130	20	115	5,000	104	1,400
9	814	7	15	1,960	22	116	4,070	82	901
0	760	5	10	1,910	24	124	3,540	69	660
1	721	4	8	3,310	137	1,220	3,290	57	506
2	700	3	6	3,440	157	1,460	3,200	44	380
3	748	2	4	3,060	120	991	3,320	34	305
4	743	3	6	4,950	257	s 4,070	3,760	27	274
5	870	10	s 26	12,900	614	21,400	3,290	20	178
6	5,040	371	s 5,800	16,100	320	13,900	2,790	15	113
7	7,520	345	7,000	16,300	205	9,020	2,410	12	78
8	6,790	195	3,570	10,900	67	1,970	2,080	10	56
9	3,770	89	906	5,220	42	592	1,820	8	39
0	4,260	97	s 1,330	3,680	41	407	1,650	7	31
1	12,500	610	20,600	2,890	41	320	1,610	7	30
2	20,500	831	46,000	2,430	40	a 260	1,890	7	36
3	22,700	410	25,100	2,430	65	s 445	2,110	6	34
4	19,500	166	8,740	4,050	148	1,620	2,060	5	28
5	10,900	96	2,820	4,460	89	1,070	1,770	6	29
6	4,800	92	1,190	3,680	75	745	1,600	5	22
7	3,710	59	591	3,030	54	442	1,690	6	27
8	3,380	43	392	2,630	28	199	1,880	6	30
9	3,310	39	348	--	--	--	1,790	5	24
0	3,100	57	477	--	--	--	1,720	5	23
1	2,740	26	192	--	--	--	1,820	9	44
Total	149,258	--	125,932	127,450	--	61,488	82,950	--	10,639

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

GREEN RIVER BASIN--Continued

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedime	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	1,840	14	70	1,200	11	36	2,180	184	1,080
2...	1,850	21	105	1,060	7	20	2,540	142	974
3...	2,150	25	145	953	6	15	2,240	202	1,220
4...	2,650	22	157	858	9	21	1,580	53	226
5...	2,590	28	196	782	8	17	1,140	25	77
6...	2,280	30	185	716	4	8	1,350	100	b 380
7...	1,960	19	100	660	3	5	1,380	170	b 650
8...	1,720	11	51	645	5	9	1,010	51	139
9...	1,590	6	26	551	6	9	1,020	26	72
10...	3,310	46	s 519	524	9	13	792	32	68
11...	6,820	198	3,640	492	9	12	675	7	13
12...	7,640	174	3,590	492	8	11	660	3	5
13...	6,490	61	1,070	585	6	9	560	2	3
14...	5,870	45	713	738	11	22	470	3	4
15...	5,070	48	657	848	55	126	425	5	6
16...	4,130	44	491	1,060	137	392	380	4	4
17...	3,340	36	325	792	104	222	340	4	4
18...	2,790	24	181	738	60	120	320	7	6
19...	2,520	18	122	905	32	78	300	4	3
20...	2,500	21	142	1,350	28	102	282	8	6
21...	2,900	23	180	1,640	156	s 879	265	11	8
22...	2,850	26	200	3,510	518	4,910	265	16	11
23...	2,430	20	131	3,300	265	2,360	282	16	12
24...	2,110	14	80	3,020	198	1,610	320	15	13
25...	1,840	10	50	2,220	105	629	430	18	21
26...	1,620	7	31	1,610	64	278	860	--	e 230
27...	1,460	14	55	1,380	35	130	738	30	60
28...	1,390	6	22	1,280	6	21	610	17	28
29...	1,390	6	22	1,350	4	14	542	20	29
30...	1,330	9	32	2,160	385	s 3,180	456	19	23
31...	--	--	--	4,140	1,190	13,300	--	--	--
Total	88,430	--	13,288	41,559	--	28,558	24,412	--	5,375

	July			August			September		
1...	389	7	7	881	34	81	368	25	25
2...	434	9	10	650	27	47	881	50	119
3...	352	12	11	528	20	28	575	27	42
4...	304	13	11	492	15	20	448	21	25
5...	286	15	12	905	200	sb 1,100	398	15	16
6...	344	21	20	2,620	750	b 5,300	324	13	11
7...	312	12	10	2,390	601	3,880	376	10	10
8...	268	17	12	1,320	178	634	286	11	8
9...	237	22	14	941	89	226	262	13	sb 11
10...	234	10	6	765	78	161	765	--	e 150
11...	227	12	7	585	49	77	438	65	77
12...	206	7	4	484	29	38	296	21	17
13...	194	9	5	412	20	22	248	24	16
14...	179	11	5	356	17	16	224	11	7
15...	173	12	6	320	14	12	212	14	8
16...	173	13	6	293	12	9	197	15	8
17...	203	27	15	286	10	8	182	15	7
18...	372	66	s 129	316	12	10	173	23	11
19...	2,100	995	s 6,080	372	20	20	161	14	6
20...	1,420	324	s 1,330	320	21	18	155	14	6
21...	650	35	61	360	22	21	152	16	6
22...	434	25	29	452	22	27	146	15	6
23...	815	302	s 1,070	356	21	20	143	15	6
24...	3,370	1,580	14,400	279	20	15	140	16	6
25...	4,180	895	10,100	251	24	16	138	19	7
26...	3,260	595	5,240	230	19	12	135	15	5
27...	2,080	198	1,110	218	23	14	132	19	7
28...	1,690	130	593	224	20	12	130	22	8
29...	1,350	135	492	251	18	12	125	20	7
30...	1,090	52	153	268	20	14	122	12	4
31...	905	30	73	376	25	25	--	--	--
Total	28,231	--	41,021	18,501	--	11,895	8,332	--	642

Total discharge for year (cfs-days)..... 630,787
Total load for year (tons)..... 303,815

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

3-3085. GREEN RIVER AT MUNFORDVILLE, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 22, 1959	1200			20,800	861		49	59	71	86	95	98	99	100			SBWC
May 22	0700			3,540	783		54	65	77	92	97	99	100				SBWC
May 31	0700			4,480	1,870		41	65	85	97	99	100	--				SBWC
May 31	0700			4,480	1,870		23	31	54	83	97	99	100				SBN
July 24	0700			2,710	2,200		49	57	72	91	97	99	100				SBWC
July 24	0700			2,710	2,200		27	34	62	90	98	99	100				SBN

GREEN RIVER BASIN--Continued

3-3145. BARREN RIVER AT BOWLING GREEN, KY.

LOCATION.--At bridge on U.S. Highways 31W and 68, 600 feet upstream from gaging station on College Street Bridge at Bowling Green, Warren County, 6 miles downstream from Drakes Creek, and 8.9 miles upstream from Jennings Creek.
DRAINAGE AREA.--1,848 square miles, of which about 490 square miles do not contribute directly to surface runoff.
RECORDS AVAILABLE.--*Chemical analyses:* October 1949 to September 1950.
Water temperatures: October 1949 to September 1959.
Sediment records: November 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 84°F Aug. 25; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 950 ppm Feb. 12; minimum daily, 3 ppm Dec. 26, 27, 29, 30, Jan. 2.
Sediment loads: Maximum daily, 43,900 tons Jan. 22; minimum daily, 4 tons Dec. 26, 27, 29.
EXTREMES, 1949-59.--Water temperatures: Maximum, 87°F July 1, 2, 22, 29, 1952; minimum, freezing point on several days during 1951, 1958 and 1959.
Sediment concentrations (1952-59): Maximum daily, 1,880 ppm June 17, 1953; minimum daily, 1 ppm on many days during 1952, 1953, and 1955.
Sediment loads (1952-59): Maximum daily, 107,000 tons Jan. 30, 1957; minimum daily, less than 0.5 ton on several days during 1953 and 1956.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Twice-daily temperature measurements at 6:30 a.m. and 5 p.m.)

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																																
a.m.	63	59	60	60	60	58	61	62	65	64	59	60	58	59	61	61	59	62	60	56	57	57	59	56	58	56	54	52	51	50	50	58
p.m.	67	64	63	63	63	67	66	65	66	66	63	63	63	62	63	65	63	64	62	61	61	61	60	61	59	60	60	56	56	55	56	62
November																																
a.m.	53	52	51	50	52	50	48	49	50	47	45	46	48	52	55	58	58	60	55	51	51	49	59	50	50	48	48	46	42	39	--	50
p.m.	54	53	53	54	54	53	52	52	52	50	51	51	52	59	61	63	61	58	58	56	57	58	61	57	54	50	51	47	44	42	--	54
December																																
a.m.	40	39	41	40	40	42	39	39	38	36	35	35	34	33	32	32	32	33	33	34	33	33	35	35	35	34	36	37	38	39	39	36
p.m.	43	41	43	45	43	43	42	41	39	39	40	39	35	34	35	35	35	35	36	35	35	36	39	36	37	38	39	41	40	40	43	39
January																																
a.m.	40	39	39	39	35	33	39	34	33	32	32	32	37	38	41	32	38	37	36	39	47	47	44	42	42	44	44	42	43	45	45	39
p.m.	42	42	41	38	35	35	41	39	34	36	35	36	39	40	37	39	38	39	38	39	45	47	45	42	44	45	45	45	47	46	45	41
February																																
a.m.	42	42	41	43	41	39	39	42	45	50	47	47	47	49	49	47	48	44	45	42	40	42	44	42	45	45	44	47	--	--	--	44
p.m.	44	43	44	43	42	41	44	44	47	49	51	49	49	50	50	50	51	47	46	43	45	45	44	47	47	47	48	49	--	--	--	46
March																																
a.m.	48	46	46	45	47	46	45	45	47	47	46	47	42	48	48	45	46	44	44	49	49	45	45	46	50	53	55	49	51	48	50	47
p.m.	49	48	49	48	50	44	47	49	48	50	48	48	49	50	49	48	49	50	50	50	50	50	51	52	54	56	55	53	53	53	55	50
April																																
a.m.	53	53	58	53	55	56	56	61	59	58	55	50	48	48	48	52	55	59	63	60	59	56	54	54	58	62	63	63	60	62	--	56
p.m.	56	58	57	57	60	60	62	63	61	59	56	49	51	49	54	56	56	61	64	62	60	58	58	59	62	64	61	63	64	65	--	59
May																																
a.m.	65	66	70	69	71	72	70	68	69	71	70	71	70	66	63	60	63	60	64	67	68	69	69	70	70	72	70	69	70	70	69	68
p.m.	67	70	73	73	74	74	73	72	72	72	73	72	71	70	65	65	60	63	67	68	70	69	70	71	71	73	69	73	71	71	71	70
June																																
a.m.	70	69	68	66	68	68	70	70	70	70	72	72	74	72	70	71	75	70	70	70	75	72	73	73	73	75	75	79	78	78	--	72
p.m.	68	70	70	70	70	71	72	72	72	71	73	75	75	71	74	75	74	74	75	75	76	75	75	75	77	77	78	80	82	83	--	74

July																															
a.m.....	80	75	75	76	76	75	75	76	77	78	76	76	75	75	75	76	77	77	78	74	75	77	76	77	75	78	76	77	77	78	80	76
p.m.....	82	80	79	80	78	80	81	80	80	81	79	80	80	79	80	80	81	81	80	80	80	80	79	78	79	79	81	79	81	82	81	80
August																															
a.m.....	79	78	78	78	79	74	72	72	73	72	72	72	73	75	76	77	77	76	76	78	79	78	81	79	79	80	80	80	78	81	78	77
p.m.....	83	82	83	80	76	73	75	74	74	74	75	77	78	79	79	80	78	79	80	81	81	83	83	83	84	82	83	81	82	83	82	80
September																															
a.m.....	77	74	73	70	73	75	74	75	74	73	67	67	68	67	67	66	64	65	64	67	66	67	67	69	68	70	73	72	72	73	--	70
p.m.....	75	75	74	76	75	77	77	76	76	73	71	70	70	71	70	70	69	77	69	70	70	71	71	72	72	73	73	73	73	74	--	73

GREEN RIVER BASIN--Continued

3-3145. BARREN RIVER AT BOWLING GREEN, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

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...	337	21	19	225	8	5	2,130	58	334
2...	323	21	18	246	7	5	1,530	27	112
3...	312	21	18	309	10	8	1,260	23	78
4...	295	20	16	358	11	11	1,180	17	54
5...	284	28	21	346	13	12	1,380	14	52
6...	274	57	42	316	14	12	1,370	10	37
7...	267	15	11	295	11	9	1,150	10	31
8...	260	21	15	278	13	10	955	9	23
9...	246	14	9	267	10	7	850	8	18
10...	260	18	13	260	16	11	780	7	15
11...	260	16	11	253	11	8	723	7	14
12...	267	14	10	250	10	7	660	6	11
13...	288	15	12	246	10	7	615	6	10
14...	274	15	11	242	10	6	584	7	11
15...	253	24	16	253	10	7	518	7	10
16...	239	13	8	256	11	8	474	10	13
17...	232	13	8	281	11	8	510	11	15
18...	222	11	6	354	14	13	474	8	10
19...	218	12	7	421	13	15	466	6	8
20...	208	11	6	552	15	22	462	5	6
21...	204	13	7	910	14	34	454	4	5
22...	214	11	6	838	18	41	442	7	8
23...	225	12	7	655	23	41	438	16	19
24...	222	13	8	562	10	15	446	5	6
25...	222	14	8	490	11	14	486	5	6
				453					
26...	232	15	9	454	12	15	530	3	4
27...	228	13	8	429	10	12	526	3	4
28...	225	17	10	457	8	10	502	4	5
29...	222	12	7	892	25	s 84	498	3	4
30...	218	15	9	2,700	76	554	584	3	5
31...	214	13	8	--	--	--	664	4	7
Total	7,745	--	364	14,396	--	1,011	23,641	--	935

Day	January			February			March		
1...	651	5	9	1,980	17	91	2,580	19	132
2...	705	3	6	1,770	11	52	2,920	20	158
3...	1,170	4	13	1,610	8	35	2,800	21	159
4...	1,370	7	26	1,620	9	39	2,650	22	157
5...	1,140	4	12	1,910	10	52	2,530	23	157
6...	835	4	9	2,120	12	69	3,340	37	s 358
7...	732	4	8	1,860	12	60	5,890	163	2,590
8...	718	5	10	1,650	13	58	5,080	97	1,330
9...	728	6	12	1,580	13	55	4,090	44	486
10...	741	4	8	1,590	17	73	3,530	33	314
11...	728	4	8	4,920	374	s 5,360	3,060	36	297
12...	678	5	9	4,340	950	11,100	2,860	20	154
13...	642	5	9	3,310	145	1,300	3,010	22	179
14...	584	7	11	6,060	210	s 3,940	2,960	24	192
15...	660	8	14	17,100	475	21,900	2,720	25	184
16...	2,600	107	s 1,190	20,400	243	13,400	2,450	19	126
17...	5,350	259	3,740	17,000	118	5,420	2,130	18	104
18...	3,980	95	1,020	9,290	73	1,830	1,890	19	97
19...	2,660	37	266	5,490	58	860	1,700	20	92
20...	2,520	34	s 246	4,130	34	379	1,580	18	77
21...	7,850	364	s 8,930	3,300	26	232	1,560	11	46
22...	17,400	934	43,900	2,720	21	154	1,710	14	65
23...	19,800	540	28,900	2,690	35	254	1,700	18	83
24...	12,900	161	5,610	4,090	43	475	1,530	12	50
25...	6,050	101	1,650	4,120	32	356	1,430	12	46
26...	4,380	59	698	3,490	30	283	1,380	15	56
27...	3,650	39	384	3,040	33	271	1,500	13	53
28...	3,250	32	2[illegible]1	2,690	20	145	2,230	15	90
29...	2,890	24	187	--	--	--	2,180	16	94
30...	2,550	21	144	--	--	--	1,990	22	118
31...	2,250	19	115	--	--	--	2,020	20	109
Total	112,162	--	97,425	135,870	--	68,243	73,000	--	8,153

s Computed by subdividing day.

GREEN RIVER BASIN--Continued

3-3145. BARREN RIVER AT BOWLING GREEN, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	2,000	15	81	1,360	12	44	1,540	78	324
2...	1,960	16	85	1,200	11	36	3,090	418	s 4,100
3...	2,000	15	81	1,170	13	41	3,940	360	3,830
4...	2,100	16	91	1,060	13	37	2,620	247	1,750
5...	1,970	13	69	965	15	39	1,800	123	598
6...	1,790	12	58	900	18	44	1,420	80	307
7...	1,640	12	53	845	16	36	1,310	58	205
8...	1,520	13	53	785	20	42	1,130	52	159
9...	1,470	14	56	736	22	44	920	51	127
0...	1,910	19	98	705	16	30	795	52	112
1...	4,880	85	1,120	682	18	33	728	48	94
2...	5,080	68	933	696	21	39	755	55	112
3...	4,660	42	528	865	33	77	795	38	82
4...	4,680	41	518	1,220	26	86	790	37	79
5...	3,910	25	264	1,110	57	171	728	55	108
6...	3,180	20	172	900	57	138	606	42	69
7...	2,690	27	196	765	41	85	538	43	62
8...	2,310	17	106	710	32	61	494	42	56
9...	2,070	15	84	674	30	54	462	39	49
0...	2,000	16	86	664	23	41	434	38	44
1...	3,160	31	264	656	25	44	406	37	40
2...	3,250	56	491	700	23	43	386	36	38
3...	2,480	67	449	955	26	67	370	33	33
4...	2,080	27	152	1,020	36	99	430	24	28
5...	1,820	18	88	880	28	66	570	31	48
6...	1,640	18	80	1,270	--	e 2,200	900	30	73
7...	1,500	18	73	2,270	650	sa 4,200	780	28	59
8...	1,440	13	50	2,320	150	940	664	30	54
9...	1,490	15	60	2,130	158	909	526	30	43
0...	1,550	18	75	1,850	125	624	454	32	39
1...	--	--	--	1,740	175	822	--	--	--
Total	74,230	--	6,514	33,803	--	11,192	30,381	--	12,722

Day	July			August			September		
1...	418	30	34	378	40	41	2,810	335	s 3,390
2...	394	36	38	326	40	35	5,480	905	13,400
3...	522	37	52	290	39	30	4,360	515	6,060
4...	446	28	34	274	35	26	2,540	223	s 1,640
5...	390	28	29	2,630	524	s 5,760	1,570	87	369
6...	350	28	26	3,710	882	s 9,290	1,080	42	122
7...	326	27	24	2,210	225	1,340	855	36	83
8...	306	28	23	1,900	78	400	805	35	76
9...	290	26	20	1,320	56	200	674	31	56
10...	282	21	16	890	52	125	1,010	27	74
11...	354	28	27	682	46	85	965	35	91
12...	298	16	13	562	40	61	850	52	119
13...	262	15	11	474	35	45	790	45	96
14...	243	13	8	414	31	35	620	40	67
15...	232	11	7	370	28	28	518	44	62
16...	262	12	8	334	30	27	458	56	69
17...	254	13	9	314	28	24	406	57	62
18...	286	17	13	318	23	20	370	53	53
19...	354	20	19	310	30	25	334	46	41
20...	394	17	18	490	30	40	306	49	40
21...	370	19	19	518	27	38	282	49	37
22...	338	21	19	410	25	28	262	41	29
23...	378	22	22	338	24	22	246	43	28
24...	628	32	54	294	23	18	232	44	28
25...	1,020	53	s 164	262	24	17	222	38	23
26...	1,290	160	557	378	24	24	215	38	22
27...	800	212	458	374	18	18	201	44	24
28...	728	74	145	326	18	16	190	36	18
29...	710	56	107	298	17	14	184	33	16
30...	562	45	68	478	23	30	180	35	17
31...	438	40	47	852	32	s 82	--	--	--
Total	13,925	--	2,089	22,724	--	17,944	29,015	--	26,212

Total discharge for year (cfs-days) 576,892
Total load for year (tons) 252,804

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

GREEN RIVER BASIN--Continued

3-3145. BARREN RIVER AT BOWLING GREEN, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Jan. 22, 1959	0630			15,300	856		40	50	68	89	97	98	99	100			SBWC
Jan. 22	0630			15,300	856		22	35	59	88	98	99	100	--			SBN
Jan. 22	1700			19,600	1,070		46	57	73	90	98	99	100	--			SBWC
Feb. 12	0630			4,620	1,290		59	73	88	97	99	99	100	--			SBWC
Feb. 15	1700			19,600	486		36	48	65	86	97	98	99	100			SBWC
May 27	0630			2,430	905		60	74	87	94	95	98	98	100			SBWC
Aug. 5	1700			4,350	938		43	59	77	93	99	99	100	--			SBWC
Sept. 2	0630			5,740	1,000		45	60	75	93	98	99	100	--			SBWC
Sept. 2	0630			5,740	1,000		24	41	67	92	98	99	100	--			SBN

3-3155. GREEN RIVER AT LOCK 4, AT WOODBURY, KY.

LOCATION.--Temperature recorder at gaging station, 0.1 mile upstream from lock 4, at Woodbury, Butler County, 0.4 mile downstream from Barren River.
DRAINAGE AREA.--5,403 square miles, of which about 1,360 square miles does not contribute directly to surface runoff.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 87°F Aug. 25; minimum, 37°F Dec. 25-27, Jan. 11-13.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	--	--	--	--	--	--	--	70	72	71	68	67	67	68	67	67	68	67	65	65	65	67	66	65	64	63	62	62	61	61	60	--
Minimum.....	--	--	--	--	--	--	--	68	69	68	67	66	66	66	66	65	65	65	64	64	64	64	65	64	63	62	62	61	61	60	59	--
November																																
Maximum.....	60	59	59	58	58	58	57	57	56	56	55	55	54	55	56	56	57	57	57	56	56	55	54	54	55	55	54	53	51	49	--	56
Minimum.....	59	59	58	58	58	57	57	56	56	55	54	54	54	54	55	56	56	57	56	56	55	54	53	53	54	54	53	51	49	48	--	55
December																																
Maximum.....	48	47	45	44	44	44	44	44	44	44	43	43	42	41	40	40	39	38	39	39	39	39	39	39	39	38	38	39	39	39	40	41
Minimum.....	47	45	44	44	44	44	44	44	44	43	43	42	41	40	39	39	38	38	38	38	38	39	39	39	37	37	37	38	38	39	39	41
January																																
Maximum.....	42	41	41	41	--	--	--	--	--	39	38	38	38	39	39	39	41	42	42	41	41	50	50	48	46	45	46	47	47	48	48	45
Minimum.....	40	41	41	40	--	--	--	--	--	38	37	37	37	38	39	38	38	41	41	40	41	47	48	46	45	45	45	46	47	47	48	44
February																																
Maximum.....	48	48	47	46	46	45	45	45	45	46	47	49	50	50	52	--	--	--	--	--	46	46	46	45	45	46	46	47	--	--	--	47
Minimum.....	48	47	46	46	45	45	45	45	45	45	46	47	49	50	50	--	--	--	--	--	46	46	45	45	45	45	46	46	--	--	--	46
March																																
Maximum.....	47	47	47	47	47	47	47	47	47	47	47	47	47	47	48	48	49	49	49	49	49	49	49	49	51	52	52	52	52	52	53	49
Minimum.....	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	48	48	49	49	49	49	49	49	49	49	51	52	52	52	52	52	49
April																																
Maximum.....	55	55	55	55	56	57	58	59	59	59	59	59	56	54	53	54	54	56	57	58	60	60	60	61	62	62	62	62	63	65	--	58
Minimum.....	53	54	54	55	55	56	57	58	59	59	59	56	54	53	53	53	54	54	56	57	58	60	60	60	61	62	62	62	62	63	--	57
May																																
Maximum.....	66	68	69	71	74	74	75	75	75	75	76	76	75	75	73	71	70	70	70	70	71	70	69	69	68	68	69	69	70	70	70	71
Minimum.....	65	66	68	69	71	72	73	73	73	74	75	75	75	73	71	70	68	68	68	69	70	68	68	68	67	68	68	69	69	70	70	70
June																																
Maximum.....	70	70	70	69	68	69	70	71	71	72	73	75	77	76	77	79	78	78	79	81	82	80	80	77	78	79	78	81	83	85	--	76
Minimum.....	70	70	69	68	68	68	69	70	71	71	72	73	74	75	74	74	70	76	76	76	77	78	76	77	76	76	77	78	79	79	--	74
July																																
Maximum.....	85	81	82	84	82	84	84	86	86	84	84	83	83	84	85	83	84	83	83	81	81	80	79	77	75	73	74	74	75	78	80	81
Minimum.....	81	79	79	79	79	79	80	80	81	80	79	79	79	80	80	81	82	82	81	80	79	79	77	75	73	72	73	74	74	75	77	78
August																																
Maximum.....	78	79	80	79	81	80	75	74	73	73	76	78	81	79	82	79	78	80	85	85	85	86	86	86	87	86	85	83	83	82	82	81
Minimum.....	76	76	77	79	79	74	74	73	71	71	70	74	75	77	77	77	77	77	77	79	81	81	82	82	82	80	83	83	82	81	81	78
September																																
Maximum.....	81	80	77	75	--	--	--	--	78	78	76	75	74	74	75	76	74	72	73	72	74	75	75	75	73	73	75	75	76	75	--	75
Minimum.....	80	77	75	74	--	--	--	--	78	76	75	74	73	73	73	72	72	71	71	71	71	71	72	72	72	72	72	74	74	73	--	73

GREEN RIVER BASIN--Continued

3-3195. ROUGH RIVER AT DUNDEE, KY.

LOCATION.--Auxiliary gaging station at bridge on State Highway 69, at Dundee, Ohio County, 7.1 miles downstream from Caney Creek, and 5.6 miles downstream from gaging station near Dundee.
DRAINAGE AREA.--770 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F Aug. 26; minimum, freezing point on many days during December and January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 89°F Aug. 3, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Discharge records for gaging station near Dundee for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
((Twice-daily measurements at approximately 7 a.m. and 5 p.m.)

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																																
a.m.	64	60	58	57	56	58	58	60	60	63	60	58	57	57	57	59	59	60	59	57	57	57	57	58	56	55	55	53	52	50	49	57
p.m.	65	59	57	58	57	59	60	58	61	62	59	59	58	59	58	60	61	61	59	59	58	57	59	57	56	55	54	54	53	51	50	58
November																																
a.m.	49	50	50	49	50	49	46	48	48	46	45	44	46	49	50	54	56	56	54	51	56	52	54	49	49	49	46	45	38	37	--	49
p.m.	51	49	51	50	51	48	47	49	47	45	46	45	47	50	52	55	57	57	55	52	56	53	52	50	50	48	47	44	37	37	--	49
December																																
a.m.	36	37	39	39	38	37	35	37	34	--	--	--	--	--	--	--	--	--	--	--	--	--	33	32	--	--	--	32	32	34	35	34
p.m.	37	38	40	41	37	36	36	36	33	--	--	--	--	--	--	--	--	--	--	--	--	--	34	32	32	--	--	32	33	34	36	34
January																																
a.m.	37	35	36	32	--	--	--	--	--	--	--	--	33	32	34	35	34	32	33	35	36	34	35	38	41	42	42	41	40	42	42	35
p.m.	36	37	35	32	--	--	--	--	--	--	--	32	33	33	36	33	32	33	34	36	40	33	38	39	42	44	43	41	42	41	42	36
February																																
a.m.	41	40	39	39	38	36	37	39	41	43	45	47	49	48	47	45	45	46	43	41	39	39	40	40	40	41	43	44	--	--	--	42
p.m.	41	40	39	38	37	38	38	40	42	45	47	48	47	49	46	46	47	45	43	41	40	40	39	40	41	42	44	45	--	--	--	42
March																																
a.m.	43	42	43	42	45	45	43	43	45	44	44	43	42	45	46	45	45	43	44	45	47	45	45	46	49	52	53	50	49	50	50	46
p.m.	44	44	44	44	46	44	45	44	45	43	45	44	44	46	45	46	45	44	45	46	46	46	47	48	51	54	55	48	49	51	52	46
April																																
a.m.	53	53	55	55	55	55	56	59	59	57	57	55	54	52	52	52	56	59	59	60	58	58	56	57	60	62	62	63	60	63	--	57
p.m.	54	53	54	55	56	57	58	60	59	58	56	55	53	53	53	55	58	59	60	60	59	59	57	59	61	63	63	62	62	64	--	58
May																																
a.m.	63	67	68	68	70	72	71	69	68	69	71	73	71	69	65	62	61	63	64	65	67	68	67	68	68	69	70	71	69	68	69	68
p.m.	66	68	69	70	73	73	72	71	69	70	72	72	71	67	64	63	62	64	66	67	69	69	69	69	69	71	72	70	69	70	70	69
June																																
a.m.	70	69	68	67	66	67	68	69	70	70	70	72	73	70	70	71	71	71	70	69	70	71	72	73	73	74	74	76	77	78	--	71
1 p.m.	71	69	68	67	68	68	69	71	71	72	73	74	73	71	72	73	72	71	72	71	72	71	73	74	74	75	76	76	78	79	--	72
July																																
a.m.	79	77	74	73	74	74	75	75	76	76	75	74	75	75	75	75	77	77	77	76	75	78	77	75	76	77	76	76	77	76	77	76
p.m.	79	76	75	75	75	76	74	77	78	78	77	76	75	76	77	76	77	77	78	77	77	79	76	77	77	78	77	76	78	78	80	77
August																																
a.m.	79	77	78	79	78	77	77	76	75	75	74	74	75	76	76	76	76	73	74	75	77	78	78	79	80	80	80	79	78	77	76	77
p.m.	79	78	79	78	79	78	78	76	76	76	75	76	77	78	77	77	75	74	76	77	79	80	80	81	81	82	81	80	79	80	78	78
September																																
a.m.	76	74	75	74	74	74	75	75	73	75	72	69	66	66	66	66	66	65	63	64	65	65	66	67	68	69	70	70	71	71	--	70

GREEN RIVER BASIN--Continued

3-3211. POND RIVER NEAR SACRAMENTO, KY.

LOCATION.--At bridge on State Highway 85, 12 miles upstream from mouth, 3.0 miles southwest of Sacramento, McLean County, 3.9 miles downstream from Log Creek, and 45.5 miles downstream from gaging station near Apex.
DRAINAGE AREA.--523 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1959.
REMARKS.--Stream receives drainage from strip mine area. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Potential free acidity H^+[1]	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 22, 1958.		24	46	15	21	218	117	78	5.2	0	1,430	16	5.8	1.3	2,010	1,030	1,030	6.4	2,360	3.0	3
Dec. 4.....		19	18	2.1	12	141	73	39	4.2	0	792	30	1.8	.5	1,180	653	653	2.9	1.580	3.2	4
Jan. 14, 1959.		9.5	.3	1.6	4.3	84	36	24	1.1	9	363	20	.4	.3	594	358	350	.1	775	5.8	4
Feb. 24.....		7.9	.1	.77		27	8.5	6.2	1.3	26	86	5.0	.3	.8	176	103	81	.0	258	6.8	8
Apr. 1.....		6.4	.1	1.5	1.7	53	18	14	1.4	34	188	10	.3	.6	312	206	178	.0	477	6.9	2
Apr. 29.....		6.7	.0	.15	3.4	68	24	18	1.6	57	231	14	.3	.8	390	268	222	.0	593	6.8	1
June 1.....		8.2	.3	1.0	.38	29	7.0	7.1	1.5	34	76	8.0	.1	1.5	182	102	74	.0	260	6.6	24
July 6.....		7.5	1.2	.16	.11	82	35	28	3.0	12	382	13	.4	.7	593	349	339	.2	787	5.0	4
Aug. 18.....		8.2	4.1	.13	2.5	40	15	11	2.3	0	195	4.5	.5	.2	297	162	162	1.0	468	3.8	3
Sept. 21.....		14	12	1.9	9.6	103	52	28	3.6	0	614	14	.4	.2	930	471	471	2.0	1,220	3.6	2

GREEN RIVER BASIN--Continued

3-3215. GREEN RIVER AT LOCK AND DAM 1, AT SPOTTSVILLE, KY.

LOCATION.--At lock and dam 1, at Spottsville, Henderson County, 9.1 miles upstream from mouth.
DRAINAGE AREA (revised).--9,181 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 425 ppm July 21-31; minimum, 144 ppm Jan. 21-31.
Hardness: Maximum, 218 ppm Dec. 1-10; minimum, 84 ppm Jan. 21-31.
Specific conductance: Maximum daily, 1,320 micromhos July 28; minimum daily, 180 micromhos Jan. 31 to Feb. 1.
Water temperatures: Maximum, 83°F July 28; minimum, 34°F Dec. 27.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 425 ppm July 21-31, 1959; minimum, 88 ppm Nov. 21-30, 1957.
Hardness: Maximum, 218 ppm Dec. 1-10, 1958; minimum, 58 ppm Nov. 21-30, 1957.
Specific conductance: Maximum daily, 1,320 micromhos July 28, 1959; minimum daily, 113 micromhos Nov. 25, 1957.
Water temperatures: Maximum, 83°F July 28, 1959; minimum, 34°F Dec. 27, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-10, 1958.....		11		0.01	0.00	46	9.1	13	2.2	120	54	19	0.2	2.0	218	153	54		369	7.2	5
Oct. 11-14, 16-20.....		9.1		.00	.01	42	9.0	11	1.8	123	38	20	.2	1.8	200	142	41		347	7.2	4
Oct. 21-31...		10		.02	.00	48	8.6	15	1.4	145	30	27	.2	1.9	228	156	36		380	7.4	4
Nov. 1-10....		8.3		.01	.00	51	11	33	1.6	145	31	65	.2	1.9	259	172	53		503	7.5	4
Nov. 11-20...		7.8		.01	.00	43	9.6	38	2.2	117	31	72	.2	1.9	251	147	50		491	7.4	4
Nov. 21-30...		7.8		.01	.00	44	10	27	2.0		43	46	.2	1.8	228	151	50		434	7.5	4
Dec. 1-10....		8.2		.00	.01	61	16	61	2.1	144	63	112	.2	1.4	414	218	100		722	7.5	4
Dec. 11-20...		7.8		.00	.01	53	12	51	1.7	128	51	94	.2	1.2	359	182	76		620	7.5	4
Dec. 21-31...		8.6		.00	.01	46	10	37	1.6	119	42	69	.2	1.6	297	156	58		510	7.6	4
Jan.1-10,1959		8.9		.01	.00	47	12	31	1.4	120	54	56	.1	2.0	265	167	68		479	7.3	5
Jan. 11-20...		7.7		.01	.01	51	12	43	1.2	122	55	80	.1	2.0	313	177	76		568	7.3	5
Jan. 21-31...		6.1		.16	.00	25	5.4	13	2.0	66	21	25	.1	3.1	144	84	30		250	7.0	18
Feb. 1-10....		6.7		.11	.00	27	6.0	9.2	2.0	60	40	18	.1	2.5	157	92	43		248	7.5	28
Feb. 11-20...		7.6		.03	.01	37	7.2	17	1.4	93	36	34	.1	2.5	207	122	46		332	7.8	7
Feb. 21-28...		7.6		.06	.01	29	6.6	9.7	1.2	78	31	19	.1	2.6	152	100	36		248	7.7	17
Mar. 1-10....		13		.01	.01	35	8.3	16	1.1	92	38	29	.1	2.4	193	122	46		325	7.9	1
Mar. 11-20...		12		.02	.02	34	7.6	15	1.0	92	34	27	.1	2.1	183	116	40		309	7.7	1
Mar. 21-31...		9.9		.01	.02	39	11	21	1.0	106	35	40	.1	2.4	213	143	56		370	7.6	1

Apr.1-10, 1959	9.3	.02	.01	38	9.2	25	1.1	100	40	44	.1	1.8	219	133	51	388	7.4	1
Apr. 11-20....	8.6	.01	.01	41	11	36	1.0	112	30	69	.1	1.6	250	147	55	465	7.5	1
Apr. 21-30....	9.5	.01	.01	38	8.3	26	1.0	106	29	47	.1	1.6	220	129	42	386	7.5	1
May 1-10.....	8.4	.01	.00	42	9.8	34	1.5	122	29	63	.1	2.2	263	146	46	467	7.3	2
May 11-20.....	7.3	.01	.00	42	9.0	34	1.6	116	29	66	.1	2.5	267	142	47	467	7.3	2
May 21-31.....	8.7	.03	.00	35	8.5	38	2.1	86	33	70	.2	2.8	247	123	52	448	7.5	4
June 1-10.....	11	.21	.00	30	6.4	21	2.1	82	27	38	.2	2.3	182	102	34	322	7.2	4
June 11-20....	9.9	.04	.00	32	7.9	20	2.0	96	29	34	.2	2.9	195	113	34	331	7.4	5
June 21-24, 26-30.....	11	.07	.00	42	9.5	27	2.0	119	34	49	.1	2.8	248	144	46	422	7.6	5
July 1-10.....	11	.02	.00	44	10	34	1.9	119	39	61	.1	2.8	278	151	54	471	7.3	4
July 11-20....	10	.03	.00	45	12	45	2.0	100	57	81	.2	2.8	314	162	80	548	7.6	3
July 21-31....	8.6	.03	.00	53	12	77	2.5	120	39	151	.1	2.2	425	182	83	763	7.4	4
Aug. 1-10.....	10	.05	.00	38	8.7	69	2.8	82	28	129	.2	2.4	367	131	64	620	7.3	3
Aug. 11-20....	13	.03	.00	36	9.3	27	2.4	70	64	43	.2	2.0	266	128	70	408	7.3	5
Aug. 21-31....	7.8	.03	.00	35	9.7	30	2.4	56	69	56	.2	1.8	253	128	82	420	7.3	5
Sept. 1-10....	10	.02	.00	40	10	39	2.9	79	60	70	.2	2.4	294	141	76	493	7.2	4
Sept. 11-20...	10	.03	.00	37	9.0	31	2.6	86	47	56	.2	2.2	253	130	59	419	7.6	6
Sept. 21-30...	7.6	.05	.00	36	9.0	25	2.7	86	49	47	.2	1.9	240	127	56	389	7.4	5
Time-weighted average.....	9.2	0.03	0.00	41	9.5	31	1.8	104	40	57	0.2	2.2	252	141	56	438	--	5

GREEN RIVER BASIN--Continued

3-3215. GREEN RIVER AT LOCK AND DAM 1, AT SPOTTSVILLE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at 8 a.m.)

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	--	67	67	68	68	67	67	70	67	67	66	66	66	--	--	67	67	65	65	64	65	65	64	64	62	63	65	63	60	60	65
November...	60	60	58	58	58	56	56	53	57	57	55	56	55	58	58	58	60	60	58	57	57	57	56	57	56	56	55	55	52	52	--	57
December...	52	51	53	50	50	49	47	47	42	42	42	38	38	40	36	38	39	38	38	38	38	38	38	38	37	35	34	38	37	38	39	41
January....	39	37	38	37	36	36	37	38	37	37	37	36	37	37	37	35	36	36	36	36	38	37	38	39	41	43	44	44	43	44	44	38
February...	42	42	42	42	40	44	40	40	41	44	43	43	45	45	45	45	46	46	46	47	45	46	46	46	44	45	44	44	--	--	--	44
March.....	45	45	46	45	45	47	47	47	47	47	46	46	47	47	48	47	46	47	47	48	48	48	48	50	51	54	51	52	52	52	52	48
April.....	53	53	55	55	55	57	57	58	58	58	58	58	58	57	57	58	58	59	59	59	59	58	58	58	59	59	60	60	60	60	--	58
May.....	63	65	65	66	68	65	68	68	68	68	70	70	70	68	67	67	66	65	68	69	69	68	68	70	70	71	71	70	71	71	71	68
June.....	72	71	72	72	72	72	72	73	74	74	73	73	73	73	73	74	75	75	74	75	76	76	76	76	76	78	78	78	79	80	--	74
July.....	82	82	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	82	82	82	82	82	82	83	82	82	82	81
August.....	80	81	81	81	81	79	79	78	78	76	76	77	78	78	78	78	78	76	76	76	78	79	81	81	81	81	81	80	80	80	80	79
September..	80	80	81	82	81	82	80	80	80	80	77	76	76	75	75	75	74	74	73	74	74	74	74	74	75	75	73	74	75	74	--	76

3-3355. WABASH RIVER AT LAFAYETTE, IND.

LOCATION.--Temperature recorder at gaging station 20 feet downstream from Brown Street Bridge in Lafayette, Tippecanoe County, and 5.1 miles downstream from Wildcat Creek.
DRAINAGE AREA.--7,247 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F July 30, 31, Aug. 24, 25; minimum, freezing point on several days during January and February.
EXTREMES, 1954-59.--Water temperatures: Maximum, 90°F July 30, 31, 1954; minimum, freezing point on many days during winter months.
REMARKS.--Some regulation at low stages caused by powerplants above station. Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

3-3369. SALT FORK NEAR ST. JOSEPH, ILL.

LOCATION.--Temperature recorder at gaging station at township highway bridge, 0.2 mile downstream from Spoon River, and 2.5 miles north of St. Joseph, Champaign County.
DRAINAGE AREA.--134 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 96°F July 30; minimum, freezing point Feb. 9, 10.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	70	71	71	69	64	63	62	60	56	62	59	50	49	52	56	55	55	56	--
Minimum.....	--	--	--	--	--	--	--	--	--	--	--	--	--	57	54	55	54	50	48	47	49	53	48	46	48	47	45	41	42	41	41	--
November																																
Maximum.....	48	51	54	56	56	52	51	48	49	51	52	54	59	58	58	58	63	61	48	50	47	47	49	47	47	47	44	44	40	37	--	51
Minimum.....	46	45	42	42	44	40	38	42	41	39	40	48	49	54	57	55	58	46	42	43	42	41	40	44	42	44	43	40	37	36	--	44
December																																
Maximum.....	39	38	42	44	42	36	36	36	36	36	36	36	36	36	37	36	36	36	36	36	35	35	34	34	34	35	34	34	34	33	33	36
Minimum.....	36	37	38	40	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35	35	35	34	34	34	34	34	34	34	34	33	33	35
January																																
Maximum.....	33	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	35	35	35	34	34	34	34	34	34	33	33	33	33	33	33	34
Minimum.....	33	33	33	34	34	34	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	34
February																																
Maximum.....	33	33	33	33	33	33	33	33	33	33	33	34	34	36	36	39	39	36	35	35	34	34	36	40	41	42	45	45	--	--	--	36
Minimum.....	33	33	33	33	33	33	33	33	32	32	33	33	34	34	35	35	36	35	34	34	33	33	34	34	36	39	39	40	--	--	--	34
March																																
Maximum.....	44	42	41	40	41	41	41	40	39	42	41	43	43	44	44	42	42	44	49	49	47	45	50	52	52	49	49	46	45	47	53	45
Minimum.....	38	38	37	35	37	37	35	38	38	36	38	39	38	39	39	38	36	37	39	43	42	37	38	42	46	46	44	40	42	42	44	39
April																																
Maximum.....	52	52	50	54	51	55	58	56	47	44	50	50	50	55	57	60	57	58	54	46	54	56	58	60	62	58	58	57	58	59	--	54
Minimum.....	47	44	47	43	45	44	47	47	44	43	41	43	43	43	46	47	52	54	46	45	43	44	46	48	53	53	52	52	48	50	--	47
May																																
Maximum.....	62	70	70	74	75	71	66	63	62	68	65	64	64	56	55	62	60	65	78	70	71	69	61	65	66	71	72	78	79	79	80	68
Minimum.....	50	55	60	61	63	63	56	54	54	57	59	56	56	52	51	49	52	54	59	66	66	61	58	56	58	63	65	65	67	68	68	59
June																																
Maximum.....	75	75	76	79	80	80	83	84	82	78	73	79	73	76	79	82	79	75	81	84	88	86	86	89	90	89	88	92	94	95	--	82
Minimum.....	66	61	61	65	66	66	67	68	69	70	70	68	63	59	66	67	62	65	66	68	70	72	67	72	74	75	75	74	75	71	--	68
July																																
Maximum.....	85	87	88	84	91	89	92	92	89	90	87	86	85	89	89	85	88	83	92	92	87	87	86	93	91	86	87	94	95	96	92	89
Minimum.....	76	64	66	68	69	69	67	70	72	67	69	64	66	68	69	70	73	74	72	68	71	74	75	73	69	70	74	74	77	78	74	71
August																																
Maximum.....	92	84	75	83	86	76	79	76	81	84	86	86	86	82	79	78	76	86	84	84	86	84	84	86	81	80	77	79	79	77	76	82
Minimum.....	68	66	68	70	69	72	68	64	60	60	62	62	64	66	66	65	64	64	65	66	65	65	63	63	64	63	60	62	60	58	56	64
September																																
Maximum.....	57	69	72	76	76	78	80	75	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78	72	73	77	74	75	--	--
Minimum.....	54	52	48	49	52	56	57	58	58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	67	64	62	68	63	58	--	--

3-3420. WABASH RIVER AT RIVERTON, IND.

LOCATION.--Temperature recorder at gaging station at Illinois Central Railroad bridge at Riverton, Sullivan County, 0.6 mile downstream from Turtle Creek.
DRAINAGE AREA.--13,100 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F Aug. 22-28; minimum, freezing point on several days during January and February.
EXTREMES, 1954-59.--Water temperatures: Maximum, 91°F July 20, Aug. 29, 1954; minimum, freezing point on many days during winter months 1958-59.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

WABASH RIVER BASIN--Continued

3-3490. WHITE RIVER AT NOBLESVILLE, IND.

LOCATION.--Temperature recorder at gaging station at Logan Street Bridge in Noblesville, Hamilton County, 1.5 miles upstream from Cicero Creek and 3.5 miles below dam at Clare.
DRAINAGE AREA.--837 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 88°F June 29, 30, Aug. 23, 25; minimum, freezing point on many days during January to March.
EXTREMES, 1952-59.--Water temperatures: Maximum, 94°F Aug. 1, 1953; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow regulated by powerplant above station.

Temperature (°F) of water, water year October 1958 to September 1959
(continuous ethyl alcohol-actuated thermograph)

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

3-3510. WHITE RIVER NEAR NORA, IND.

LOCATION.--Temperature recorder at gaging station at bridge on State Highway 100, 2 miles east of Nora, Marion County, and 14 miles upstream from Fall Creek.
DRAINAGE AREA.--1,200 square miles.
RECORDS AVAILABLE.--Water temperatures: June 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F Aug. 24; minimum, freezing point on many days during December to February.
EXTREMES, 1954-59.--Water temperatures: Maximum, 89°F July 14, 1954; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

WABASH RIVER BASIN--Continued

3-3655. EAST FORK WHITE RIVER AT SEYMOUR, IND.

LOCATION.--Temperature recorder at gaging station, 1,700 feet downstream from highway bridge, 1 mile north of Seymour, Jackson County, and 9.6 miles downstream from Sand Creek.
DRAINAGE AREA.--2,333 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F June 30, July 1, Aug. 22-25; minimum, freezing point on several days during December and January.
EXTREMES, 1954-59.--Water temperatures: Maximum, 84°F Aug. 2-7, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Regulation at low flow by pumping plant, 1,200 feet upstream from recorder.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

3-3788. WABASH RIVER NEAR NEW HAVEN, ILL.

LOCATION.--At bridge connecting Illinois State Highway 141 and Indiana State Highway 762, 5.2 miles northeast of New Haven, Gallatin County, 2.1 miles upstream from Mackeys Ferry, and 9.2 miles upstream from Little Wabash River.
DRAINAGE AREA.--29,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 425 ppm Dec. 21-31; minimum, 187 ppm Jan. 21-31.
Hardness: Maximum, 323 ppm Dec. 21-31; minimum, 128 ppm Feb. 11-20.
Specific conductance: Maximum daily, 703 micromhos Nov. 18; minimum daily, 191 micromhos Feb. 23.
Water temperatures: Maximum, 88°F Aug. 22, 24, 25, 28, 30; minimum, freezing point on several days during January and February.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 455 ppm Nov. 21-27, 29-30, 1956; minimum, 176 ppm Dec. 21-31, 1957.
Hardness: Maximum, 326 ppm Feb. 21-28, 1958; minimum, 126 ppm July 1, 3-10, 1957.
Specific conductance: Maximum daily, 797 micromhos Nov. 26, 1956; minimum daily, 191 micromhos Feb. 23, 1959.
Water temperatures: Maximum, 88°F Aug. 22, 24, 25, 28, 30, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-10,1958		11		0.16	0.00	69	21	14	1.5	244	63	16	0.2	2.7	324	259	58		533	7.9	3
Oct. 11-20....		8.8		.31	.00	66	24	18	2.1	237	71	21	.2	2.5	335	263	69		561	7.8	3
Oct. 21-31....		8.3		.02	.00	71	26	16	2.1	262	71	18	.2	2.5	360	284	70		585	7.9	3
Nov. 1-10.....		11		.01	.00	72	27	16	1.8	270	73	20	.2	3.3	365	291	70		610	7.6	6
Nov. 11-20....		6.6		.02	.00	68	27	22	2.1	253	78	28	.3	2.4	372	281	73		620	7.6	7
Nov. 21-30....		12		.04	.00	54	18	9.6	2.9	188	53	15	.3	4.2	280	209	54		453	7.7	18
Dec. 1-10.....		13		.06	.01	58	20	11	1.9	202	57	16	.3	6.6	314	227	61		470	7.5	7
Dec. 11-20....		11		.00	.01	69	22	12	1.4	242	62	16	.3	5.4	355	263	64		527	7.9	6
Dec. 21-31....		12		.00	.01	85	27	16	1.2	303	72	21	.2	6.1	425	323	74		639	7.8	4
Jan. 1-10,1959		11		.01	.00	80	25	18	1.6	274	72	24	.2	5.9	386	303	78		622	7.6	4
Jan. 11-20....		8.7		.01	.01	68	21	16	2.1	224	69	22	.2	6.4	344	256	72		546	7.5	5
Jan. 21-31....		8.7		.06	.01	35	10	7.3	2.7	112	34	10	.2	7.5	187	129	36		297	7.6	10
Feb. 1-4,6-10.		6.7		.08	.01	38	10	6.8	2.5	123	37	10	.2	4.3	212	136	35		303	8.0	17
Feb. 11-20....		6.5		.05	00	35	9.7	5.8	2.1	112	33	10	.1	5.0	190	128	36		279	8.0	23
Feb. 21-28....		7.2		.05	.01	36	11	4.9	2.0	120	32	9.0	.1	5.6	196	135	36		291	8.0	18
Mar. 2-10.....		12		.01	.00	57	19	9.3	1.8	192	56	14	.2	7.3	290	220	62		451	7.4	8
Mar. 11-20....		11		.02	.00	56	19	9.3	1.7	180	55	13	.2	8.3	289	218	70		441	7.5	9
Mar. 21-31....		12		.05	.01	67	20	10	1.5	224	60	15	.2	8.5	324	249	66		507	7.5	8

WABASH RIVER BASIN--Continued

3-3788. WABASH RIVER NEAR NEW HAVEN, ILL.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Apr.1-10, 1959		10		0.01	0.01	60	20	8.9	1.5	203	60	12	0.2	7.4	287	232	65		476	8.0	6
Apr. 11-20....		13		.04	.01	70	22	11	1.8	238	62	14	.2	7.4	329	265	70		530	7.8	6
Apr. 21-30....		11		.00	.01	66	21	11	1.7	224	63	15	.2	7.0	322	251	68		520	7.7	4
May 1-10.....		13		.00	.01	53	14	6.0	2.2	176	42	10	.2	8.6	240	190	46		400	7.9	8
May 11-20.....		12		.01	.00	64	19	9.3	1.9	217	49	16	.2	7.4	294	238	60		492	7.8	7
May 21-31.....		13		.01	.00	65	20	11	1.5	219	50	18	.2	7.3	323	244	64		503	7.9	5
June 1-10.....		13		.00	.00	62	18	9.4	2.6	216	46	14	.2	6.9	293	229	52		481	8.0	8
June 11-20....		13		.04	.00	64	20	10	2.4	227	56	14	.2	4.8	292	242	56		496	7.6	7
June 21-30....		11		.01	.00	68	23	15	2.3	248	65	19	.2	2.5	326	264	61		548	7.7	6
July 1-10.....		11		.00	.03	57	22	12	2.0	208	53	16	.2	5.5	288	233	62		478	8.0	4
July 11-20....		12		.00	.05	60	26	15	2.0	230	64	16	.2	2.2	321	257	68		516	7.9	5
July 21-31....		9.6		.00	.03	62	25	19	2.0	228	76	26	.2	2.0	341	258	70		561	8.1	4
Aug. 1-10.....		8.6		.00	.05	49	17	17	2.2	170	57	21	.2	2.6	258	192	52		444	7.2	5
Aug. 11-20....		11		.00	.04	52	21	17	2.2	192	62	22	.1	2.4	286	216	58		480	7.7	5
Aug. 21-31....		7.2		.00	.03	56	22	20	2.8	198	70	23	.2	1.7	301	230	68		503	8.0	4
Sept. 1-10....		9.2		.00	.05	56	26	20	1.9	228	66	22	.2	1.7	313	247	60		533	7.8	4
Sept. 11-20...		5.6		.00	.05	56	25	23	3.1	208	71	28	.2	1.8	333	243	72		551	7.6	5
Sept. 21-30...		6.3		.00	.05	54	24	22	2.3	209	70	24	.2	2.3	306	233	62		517	7.8	5
Time-weighted average.....		10		0.03	0.01	60	21	13	2.0	212	59	18	0.2	4.9	307	236	63		496	--	7

WABASH RIVER BASIN--Continued

3-3788. WABASH RIVER NEAR NEW HAVEN, ILL.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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....	--	65	64	70	64	66	65	70	70	65	70	60	60	60	61	62	61	63	67	60	62	62	60	60	58	60	58	59	55	55	54	62
November...	60	55	50	50	50	50	49	50	48	--	50	50	52	54	56	58	56	60	56	56	58	56	54	56	54	49	45	45	45	40	--	52
December...	40	40	42	50	50	40	38	37	35	--	35	34	34	33	33	34	33	33	33	34	34	35	34	33	36	33	34	36	36	38	38	36
January....	39	34	36	32	32	32	33	43	31	32	32	33	35	35	33	34	35	33	33	35	36	37	33	36	40	40	34	36	40	39	32	35
February...	34	33	32	33	--	36	38	38	39	40	40	42	43	43	45	46	38	38	32	32	33	33	32	33	34	37	38	36	--	--	--	37
March.....	--	38	39	36	35	37	38	45	43	44	43	43	45	46	48	46	43	43	44	45	44	45	45	48	49	48	48	49	49	50	48	44
April.....	55	50	54	50	54	52	54	59	58	54	52	50	49	52	53	54	55	58	59	58	58	56	56	58	59	59	59	58	58	60	--	55
May.....	64	65	67	66	67	70	72	69	68	69	70	70	71	69	68	67	67	69	68	69	70	69	69	68	70	70	70	70	70	70	74	69
June.....	71	74	73	74	73	74	74	74	73	74	75	75	74	75	77	76	74	73	74	76	78	69	73	74	75	74	75	75	74	76	--	74
July.....	75	73	74	85	84	85	75	76	75	80	79	78	80	80	78	--	80	80	79	79	80	79	80	80	80	80	81	81	79	82	81	79
August.....	81	81	82	82	81	82	80	80	82	80	81	77	78	78	80	79	78	78	86	82	86	88	86	88	88	--	86	88	86	88	84	82
September..	83	83	82	81	83	84	83	82	84	72	72	72	70	70	70	70	70	68	70	69	71	70	72	75	74	75	73	74	70	70	--	75

TRADEWATER RIVER BASIN

3-3830. TRADEWATER RIVER AT OLNEY, KY.

LOCATION.--At gaging station at highway bridge at Olney, Hopkins County, 1.1 miles from Cave Creek, 5.1 miles downstream from Flynn Creek, and 9.5 miles northeast of Princeton.
DRAINAGE AREA.--255 square miles, of which 9.0 square miles is noncontributing .
RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1950, October 1951 to September 1959.
Water temperatures: October 1951 to September 1959.
Sediment records: October 1952 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 1,700 ppm Nov. 22-24; minimum, 97 ppm Jan. 22-23.
Hardness: Maximum, 1,000 ppm Nov. 22-24; minimum, 40 ppm Jan. 22-23.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 23; minimum daily, 85 micromhos Jan. 22.
Water temperatures: Maximum, 82°F June 29, 30, July 31; minimum, freezing point on several days during December and January.
Sediment concentrations: Maximum daily, 376 ppm June 11; minimum daily, 1 ppm on several days during year.
Sediment loads: Maximum daily, 2,220 tons Jan. 22; minimum daily, less than 0.05 ton many days during October to November, and September.
EXTREMES, 1951-59.--Dissolved solids: Maximum, 1,700 ppm Nov. 22-24, 1958; minimum, 54 ppm Sept. 21-30, 1954.
Hardness: Maximum, 1,000 ppm Nov. 22-24, 1958; minimum, 31 ppm Sept. 21-30, 1954.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 23, 1958; minimum daily, 51 micromhos Mar. 23, 1952.
Water temperatures: Maximum, 87°F July 26, 29, 1952; minimum, freezing point on many days during winter months.
Sediment concentrations (1952-59): Maximum daily, 764 ppm June 5, 1954; minimum daily, no flow on many days during 1952-57.
Sediment loads (1952-59): Maximum daily, 2,220 tons Jan. 22, 1959; minimum daily, 0 tons on many days during 1952-57.
REMARKS.--Records of specific conductance and pH of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow affected by ice Dec. 10-16, Jan. 9-12.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-15,1958	5.35	16	9.9	0.24	9.3	74	48	9.6	3.2	0	434	6.0	0.6	0.2	678	382	382	1.3	825	3.85	1
Oct. 16-Nov.10	4.74	20	14	.21	15	92	77	12	3.7	0	633	6.5	1.2	.1	946	546	546	1.8	1,090	4.00	1
Nov. 11-21....	45.5	1.8	11	.71	22	108	94	16	4.7	0	740	5.0	.9	.2	1,050	657	657	2.0	1,240	3.90	3
Nov. 22-24....	71.0	26	30	5.7	36	154	150	21	4.3	0	1,180	7.5	1.5	.5	1,700	1,000	1,000	3.8	1,880	3.30	3
Nov. 25-30....	37.2	21	13	4.1	22	102	93	15	3.6	0	750	5.0	.9	.2	1,060	638	638	2.6	1,370	3.30	4
Dec. 1-7.....	77.0	18	6.6	1.2	15	89	60	12	3.0	0	528	6.0	1.0	.1	776	469	469	1.4	1,000	3.70	4
Dec. 8-31.....	37.2	23	7.6	.26	.17	71	52	8.2	1.3	0	442	6.0	.9	.2	685	391	391	1.0	831	4.40	3
Jan. 3-15,1959	75.1	--	4.4	.00	6.7	57	37	10	1.6	0	330	5.0	.4	.2	480	294	294	.7	644	4.6	2
Jan. 16-21....	661	--	.8	.09	3.6	32	18	6.1	1.7	2	162	4.0	.2	.9	240	154	153	.2	368	5.1	3
Jan. 22-23....	2,905	--	.0	1.8	.77	10	3.7	2.5	2.5	12	34	1.0	.2	1.9	97	40	30	.0	112	6.4	--
Jan. 24-28....	1,820	--	.4	.25	.19	18	9.1	3.4	2.1	4	80	2.5	.2	1.3	136	82	80	.1	204	5.7	15
Jan. 29-Feb. 3	244	10	.4	.23	.06	31	20	5.8	1.3	3	163	2.0	.2	1.0	242	160	157	.1	363	5.4	3
Feb. 4-14.....	196	10	.5	.25	4.2	38	23	7.1	1.1	4	193	2.0	.2	.8	287	190	187	.1	422	5.8	3
Feb. 15-17....	1,387	8.0	.3	.32	.60	16	6.3	3.5	1.4	12	60	2.0	.2	1.1	115	66	56	.0	174	6.5	12

Feb. 18-24, 1959.....	592	9.3	.2	.24	.14	25	13	5.3	1.1	8	110	3.0	.1	.9	178	116	110	.0	273	6.2	5
Feb. 25-27....	569	8.4	.1	.47	1.7	22	10	4.8	.9	7	95	2.5	.2	1.0	156	96	90	.0	238	6.4	6
Feb. 28-Mar.13	411	8.9	.2	.23	.05	24	12	5.0	.8	12	106	3.5	.1	.7	176	110	100	.0	269	6.4	6
Mar. 14-24....	97.1	9.7	.2	.30	.08	32	18	6.1	.9	12	148	3.5	.2	.4	235	154	144	.0	350	6.4	5
Mar. 25-Apr. 2	173	9.3	.1	.18	3.7	35	19	6.4	1.4	10	163	4.0	.2	.5	268	166	158	.0	369	6.5	3
Apr. 3-24.....	149	9.4	.1	.18	3.2	31	16	6.1	1.1	14	143	3.0	.2	.2	240	144	132	.0	335	6.7	3
Apr. 25-May 15	50.4	9.5	.1	.19	4.9	42	25	7.7	1.4	11	204	8.5	.2	.5	323	208	199	.0	450	6.5	3
May 16-25.....	112	8.4	.2	.29	3.4	27	16	4.9	1.4	10	128	2.5	.2	1.2	214	134	126	.0	308	6.2	4
May 26-28.....	203	12	1.8	.37	4.7	37	22	6.8	1.6	1	195	4.0	.3	.3	307	183	182	.3	429	4.7	4
May 29-June 4.	324	11	.1	.48	2.6	24	12	5.2	1.4	13	108	2.5	.1	1.3	193	110	99	.1	270	6.4	6
June 5-10.....	47.7	7.4	.3	.98	1.0	18	7.1	3.7	2.1	24	59	1.5	.1	2.0	132	74	54	.0	184	6.8	9
June 11-12....	765	6.7	.9	.88	.40	13	2.3	2.2	1.9	28	22	1.0	--	2.3	--	42	19	.0	103	6.8	35
June 13-18....	178	11	.1	.23	.78	25	10	5.3	1.4	12	100	3.0	--	1.4	172	104	94	.0	248	6.6	6
June 19-July 15.....	11.2	9.9	.0	.27	2.1	29	14	6.4	1.7	20	119	3.5	.2	.9	208	130	114	.0	302	6.9	10
July 16-24....	16.2	--	.2	.14	.27	28	15	7.5	2.0	28	114	4.5	.2	1.5	206	132	109	.1	313	6.6	4
July 25-27....	133	--	.3	.64	.54	21	8.9	4.0	2.2	32	65	1.0	.2	1.8	149	89	63	.0	212	6.9	26
July 28-Aug. 6	56.3	--	.2	.18	.62	38	26	5.8	2.4	16	190	2.5	.2	2.4	303	202	189	.1	440	6.3	5
Aug. 7-9.....	1,157	--	.3	.51	1.6	17	6.6	2.4	2.1	10	64	.0	.2	1.4	127	70	62	.0	174	6.6	25
Aug. 10-17....	195	12	1.8	.19	.12	37	23	6.0	2.2	0	198	2.5	.3	.3	307	187	187	.2	433	4.6	4
Aug. 18-19....	868	7.7	.1	.75	.13	17	8.0	3.0	2.1	10	69	1.0	--	1.7	113	76	68	.1	188	6.2	--
Aug. 20-Sept.1	97.4	14	1.6	.16	.04	40	24	6.4	2.0	1	210	2.5	.3	.4	312	199	198	.3	455	4.7	3
Sept. 2-5.....	97.0	18	8.2	.39	.02	67	53	8.7	2.7	1	432	2.0	.7	.4	640	385	384	1.2	824	4.10	3
Sept. 6-12....	50.8	10	1.2	.26	.00	39	22	5.2	2.2	2	192	2.0	.3	.4	301	188	187	.2	426	4.9	6
Sept. 13-30...	16.3	13	4.3	.34	.33	59	30	7.3	2.6	0	300	3.0	.1	.4	477	271	271	.7	616	4.5	4
Time-weighted average [a]..	182	12	3.5	0.4	4.6	48	32	7.6	2.0	8	272	4.0	0.4	0.6	421	252	245	0.5	544	--	5

a Represents 100 percent of days and 100 percent of discharge.

TRADEWATER RIVER BASIN--Continued

3-3830. TRADEWATER RIVER AT OLNEY, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Twice-daily measurements at approximately 8 a.m. and 5:30 p.m.)

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																																
a.m.	62	58	58	57	58	58	59	61	63	62	59	56	57	58	59	59	59	61	59	57	57	58	57	57	54	56	54	53	52	51	51	57
p.m.	62	59	59	59	59	61	63	64	63	63	61	60	61	60	59	61	62	62	59	60	60	59	58	58	57	56	55	54	54	53	54	59
November																																
a.m.	52	51	49	51	52	50	48	49	49	47	47	48	48	51	51	55	54	57	51	53	51	49	48	49	49	49	47	45	39	36	--	49
p.m.	53	52	52	53	53	51	50	49	50	49	49	50	52	53	56	57	61	55	54	54	52	50	51	49	52	49	47	43	40	38	--	51
December																																
a.m.	36	36	38	39	42	38	35	34	34	33	33	33	32	33	33	32	33	32	35	35	33	33	36	35	33	32	33	35	35	36	36	35
p.m.	37	37	40	42	42	38	36	35	34	33	33	33	32	33	32	33	34	34	36	35	34	36	37	35	34	33	34	35	34	36	37	35
January																																
a.m.	36	37	36	32	32	32	32	32	32	32	32	33	35	36	36	35	32	32	35	35	44	40	37	37	38	39	38	38	39	41	40	36
p.m.	37	38	36	32	32	32	33	32	32	32	33	34	36	36	36	37	32	34	35	39	40	39	38	38	39	39	39	38	41	41	40	36
February																																
a.m.	38	38	36	38	37	35	35	36	41	46	43	42	46	48	47	45	44	45	42	38	35	38	39	38	39	42	42	45	--	--	--	41
p.m.	39	36	38	38	37	37	38	40	45	47	44	44	48	47	46	45	46	43	41	39	38	40	40	42	43	43	46	45	--	--	--	42
March																																
a.m.	42	42	42	42	46	45	44	42	45	45	46	44	44	47	47	45	45	44	45	48	49	48	47	48	50	56	56	51	53	51	53	47
p.m.	44	44	44	46	47	45	45	45	46	46	46	46	47	48	48	47	47	47	49	50	51	49	50	52	55	58	55	52	53	54	57	49
April																																
a.m.	57	55	57	56	57	58	59	62	59	57	54	55	51	50	52	53	57	59	59	60	57	57	56	57	61	62	65	64	63	64	--	56
p.m.	57	57	56	58	60	61	63	65	60	53	56	54	52	52	54	57	59	60	61	60	59	59	60	61	64	65	65	65	66	67	--	60
May																																
a.m.	66	68	70	70	72	72	72	69	68	71	72	72	69	65	63	61	61	61	64	66	67	70	69	68	69	69	70	69	72	69	70	68
p.m.	67	72	72	74	75	74	73	72	72	73	75	72	72	66	64	63	62	64	67	68	70	71	69	70	69	70	70	71	69	71	70	70
June																																
a.m.	70	70	69	69	68	68	69	70	70	70	70	72	72	69	66	68	70	70	70	70	71	73	73	74	74	76	76	78	78	79	--	71
p.m.	71	71	70	70	69	70	72	73	72	72	72	72	72	71	70	72	73	73	73	74	74	75	75	76	78	78	78	80	82	82	--	74
July																																
a.m.	80	76	78	76	75	75	75	75	76	76	76	75	69	75	75	75	76	76	77	77	77	77	76	76	75	76	75	75	76	78	78	76
p.m.	81	78	78	78	77	79	80	80	78	78	78	78	72	77	78	78	78	79	79	79	79	78	78	78	78	77	76	77	79	80	82	78
August																																
a.m.	78	78	78	79	79	77	74	73	73	72	72	73	73	74	75	76	75	--	73	75	75	76	76	77	78	78	78	78	78	79	78	76
p.m.	80	80	60	80	79	75	74	74	74	73	73	74	75	76	77	78	75	--	75	76	77	78	79	79	80	80	80	80	80	80	79	77
Septemher																																
a.m.	78	77	76	75	75	75	75	75	76	77	70	68	68	67	67	67	66	66	65	66	67	69	68	68	68	69	70	72	71	70	--	71
p.m.	79	78	77	76	77	77	77	77	76	75	71	69	71	69	68	68	67	67	67	69	70	71	70	70	70	70	72	74	73	72	--	72

TRADEWATER RIVER BASIN--Continued

3-3830. TRADEWATER RIVER AT OLNEY, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

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
...	12	1	(t)	2.9	1	(t)	49	2	0.3
...	8.8	2	(t)	3.8	3	(t)	62	1	.2
...	6.0	2	(t)	3.5	7	0.1	80	2	.4
...	4.8	1	(t)	3.5	6	.1	89	2	.5
...	3.5	2	(t)	3.2	2	(t)	92	2	.5
...	2.7	2	(t)	3.2	2	(t)	87	1	.2
...	2.5	3	(t)	3.8	3	(t)	80	1	.2
...	2.1	2	(t)	4.4	2	(t)	66	1	.2
...	2.1	1	(t)	4.8	2	(t)	58	2	.3
...	1.6	2	(t)	5.7	2	(t)	50	5	.7
...	1.4	2	(t)	6.0	3	(t)	40	5	.5
...	1.4	1	(t)	14	2	.1	35	5	.5
...	6.4	2	(t)	15	2	.1	31	5	.4
...	12	3	0.1	14	1	(t)	26	4	.3
...	13	4	.1	20	2	.1	23	4	.2
...	12	3	.1	26	1	.1	20	3	.2
...	12	3	.1	42	2	.2	18	5	.2
...	10	3	.1	65	5	.9	17	2	.1
...	8.4	6	.1	80	5	1.1	16	3	.1
...	5.7	4	.1	113	2	.6	15	3	a .1
...	5.4	2	(t)	106	2	.6	17	3	.1
...	5.1	3	(t)	88	3	.7	18	6	.3
...	4.8	6	.1	70	2	.4	21	2	.1
...	3 8	3	(t)	55	4	.6	22	2	.1
...	3.2	3	(t)	46	5	.6	36	2	a .2
...	2.5	2	(t)	39	4	.4	57	2	a .3
...	2.3	2	(t)	34	2	.2	63	2	a .3
...	2.1	3	(t)	33	2	.2	65	2	.4
...	1.9	2	(t)	33	4	.4	63	2	.3
...	2.5	2	(t)	38	2	.2	59	2	.3
...	2.7	2	(t)	--	--	--	58	2	.3
Total	164.7	--	1.2	975.8	--	8.0	1,433	--	8.8

Day	January			February			March		
...	61	3	0.5	141	7	2.7	386	14	14
...	94	8	2.0	113	8	2.4	545	27	40
...	137	6	2.2	95	3	.8	494	27	36
...	140	2	.8	102	8	2.2	419	15	17
...	106	3	.8	130	11	3.9	384	12	12
...	83	3	.7	130	12	4.2	521	29	41
...	64	4	.7	112	10	3.0	686	42	78
...	56	3	.4	96	9	2.3	535	27	39
...	50	4	.5	94	17	4.3	398	12	13
...	47	8	1.0	114	16	4.9	354	7	6.7
...	46	5	.6	170	8	3.7	321	5	4.3
...	45	5	.6	180	13	6.3	258	2	1.4
...	44	2	.2	198	15	8.0	206	2	1.1
...	47	2	.2	829	82	s 218	173	2	.9
...	111	16	s 4.8	1,420	159	610	150	2	.8
...	381	10	10	1,380	80	a 300	132	2	.7
...	488	8	10	1,360	37	136	110	1	.3
...	340	3	2.8	1,200	25	81	93	3	.8
...	162	7	3.1	787	19	40	79	2	.4
...	694	108	s 176	506	7	9.6	72	2	.4
...	1,900	349	1,790	224	4	2.4	70	3	.6
...	3,050	270	2,220	143	3	1.2	68	2	.4
...	2,760	78	581	393	50	s 75	63	2	.3
...	2,570	56	388	894	88	212	58	2	.3
...	2,400	30	194	777	68	143	55	2	.3
...	1,960	17	90	560	25	38	67	8	1.4
...	1,360	14	51	370	14	14	200	6	3.2
...	811	11	24	252	8	5.4	261	9	6.3
...	578	8	12	--	--	--	208	7	3.9
...	345	7	6.5	--	--	--	166	6	2.7
...	192	8	4.1	--	--	--	158	2	.8
Total	21,122	--	5,578.5	12,770	--	1,934.3	7,690	--	328.0

: Computed by subdividing day.
. Less than 0.05 ton.
a Computed from estimated-concentration graph.

TRADEWATER RIVER BASIN--Continued

3-3830. TRADEWATER RIVER AT OLNEY, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedime	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	155	3	1.2	58	2	0.3	132	9	
2...	291	18	s 15	52	2	.3	82	9	
3...	398	45	48	47	1	.1	142	9	
4...	376	8	8.1	41	2	.2	200	55	sb 2
5...	239	6	3.9	36	2	.2	88	152	3
6...	168	4	1.8	32	2	.2	55	86	1
7...	136	2	.7	29	2	.2	40	60	
8...	117	2	.6	26	2	.1	31	43	
9...	118	4	1.3	23	2	.1	27	30	
10...	165	7	3.1	21	2	.1	45	38	s
11...	173	7	3.3	19	1	.1	686	376	s 74
12...	150	3	1.2	19	2	.1	844	152	34
13...	153	2	.8	43	2	.2	560	40	6
14...	161	3	1.3	174	6	2.8	248	22	1
15...	144	2	.8	111	21	6.3	100	13	
16...	120	4	1.3	61	36	5.9	64	11	
17...	104	5	1.4	44	7	.8	49	10	
18...	92	2	.5	35	4	.4	47	8	
19...	84	2	.4	29	3	.2	31	7	
20...	82	2	.4	28	3	.2	25	10	
21...	80	2	a .4	29	4	.3	20	9	
22...	78	2	a .4	38	10	1.0	16	5	
23...	73	2	.4	242	22	s 15	14	6	
24...	66	2	.4	413	18	20	16	14	
25...	61	2	.3	197	5	2.6	12	16	
26...	56	1	.2	95	3	.8	10	11	
27...	53	2	.3	140	3	1.1	10	9	
28...	51	2	.3	373	59	s 83	10	18	
29...	52	2	.3	747	356	718	9.6	19	
30;..	55	2	.3	623	119	s 221	8.0	11	
31...	--	--	--	339	11	s 11	--	--	
Total	4,051	--	98.4	4,164	--	1,092.6	3,621.6	--	1,28

Day	July			August			September		
1...	6,4	7	0.1	22	9	0,5	44	2	
2...	5.1	5	.1	18	11	.5	76	3	
3...	4.1	7	.1	18	7	.3	82	3	
4...	3.8	10	.1	17	6	.3	124	4	
5...	5.4	8	.1	18	8	.4	106	2	
6...	5.1	12	.2	294	77	s 104	59	3	
7...	4.1	13	.1	1,220	228	751	41	2	
8...	3.8	6	.1	1,180	108	344	35	1	
9...	3.5	8	.1	1,070	48	139	31	4	
10...	2.9	7	.1	693	12	22	31	5	
11...	3.8	8	.1	390	3	3.2	80	3	
12...	18	7	.3	113	6	1.8	79	7	
13...	25	8	.5	62	5	.8	53	5	
14...	17	7	.3	45	2	.2	37	4	
15...	12	8	.2	35	2	.2	28	8	
16...	8.4	8	.2	27	5	.4	22	10	
17...	6.0	6	.1	192	--	e 30	17	8	
18...	5.7	7	.1	902	130	b 310	14	3	
19...	8.4	5	.1	834	125	281	12	3	
20...	19	6	.3	555	12	s 19	11	5	
21...	12	5	.2	232	5	3.1	10	2	
22...	14	12	.4	102	1	.3	10	3	
23...	28	10	.8	65	2	.4	9.2	5	
24...	44	27	3.2	51	4	.6	8.8	2	(t
25...	174	--	e 60	42	2	.2	8.0	2	(t
26...	134	121	44	35	3	.3	8.4	8	
27...	92	48	12	30	2	.2	9.6	12	
28...	67	45	8.1	26	2	.1	10	10	
29...	47	31	3.9	25	1	.1	11	10	
30...	35	27	2.6	31	2	.2	14	7	
31...	27	13	.9	28	3	.2	--	--	
Total	841.5	--	139.4	8,372	--	2,014.3	1,081.0	--	1.

Total discharge for year (cfs-days)..... 66,28
Total load for year (tons)..... 12,49

e Estimated.
s Computed by subdividing day.
t Less than 0.05 ton.
a Computed from estimated-concentration graph.
b Computed from partly estimated-concentration graph.

TRADEWATER RIVER BASIN--Continued

3-3830. TRADEWATER RIVER AT OLNEY, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 21, 1959.....	0735			1,480	558		43	54	71	88	98	100	--					SBWC
May 29.....	0820			748	409		71	85	93	98	99	99	100					SBWC
June 11.....	1205			858	550		59	69	85	95	98	99	100					SBWC
June 11.....	1205			858	550		65	67	78	93	97	98	100					SBWC
Aug. 7.....	0730			978	302		72	73	84	95	98	99	100					SBWC

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OHIO RIVER MAIN STEM

3-3845. OHIO RIVER AT LOCK AND DAM 51, AT GOLCONDA, ILL.

LOCATION (revised).--About 950 feet upstream from dam and gaging station at lock and dam 51, at Golconda, Pope County, 0.5 mile upstream from McGilligan Creek, 0.7 mile downstream from Lusk Creek, and at mile 903.1.
DRAINAGE AREA.--143,900 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 356 ppm Sept. 21-30; minimum, 159 ppm Jan. 21-31.
Hardness: Maximum, 214 ppm Nov. 1-10; minimum, 105 ppm Feb. 1-10.
Specific conductance: Maximum daily, 612 micromhos Aug. 2; minimum daily, 216 microhmos Feb. 3.
Water temperatures: Maximum, 85°F Aug. 5; minimum, freezing point Jan. 6.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 356 ppm Sept. 21-30, 1959; minimum, 132 ppm Feb. 1-10, 1957.
Hardness: Maximum, 228 ppm Oct. 21-31, 1957; minimum, 88 ppm Feb. 1-10, 1957.
Specific conductance: Maximum daily, 662 micromhos Oct. 30, 1957; minimum daily, 129 micromhos Feb. 19, 1958.
Water temperatures: Maximum, 89°F July 31 to Aug. 3, Aug. 5, 1955; minimum, freezing point Jan. 28, 1955, Feb. 16-19, 23, 1958, Jan. 6, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge over 100,000 cfs for water year October 1958 to September 1959 given in WSP 1625.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed: Filtered	Oxygen consumed: Unfiltered
Oct. 1-3, 5-10, 1958.	--	6.2		0.01	0.01	55	14	19	2.8		135		86	24	0.3	1.4	0.20	271	195	84		471	7.3	4		
Oct. 11-20...	--	3.2		.00	.01	57	14	21	2.7		130		94	30	.3	1.3	.18	283	200	93		496	7.2	8		
Oct. 21-31...	--	3.4		.04	.00	58	15	22	2.8		140		88	31	.3	2.1	.35	281	206	92		504	7.4	5		
Nov. 1-10....	--	4.0		.01	.00	56	18	23	2.4		146		88	32	.4	2.6	.47	312	214	94		526	7.3	5		
Nov. 11-19...	--	3.0		.01	.00	56	17	24	2.6		140		95	33	.4	2.8	.28	327	210	95		526	7.2	5		
Nov. 23-28,30	--	8.2		.02	.00	55	15	22	2.1		135		87	34	.4	3.6	.30	331	199	88		507	7.5	11		
Dec. 1-9.....	--	8.8		.01	.01	58	16	26	3.2		138		100	36	.3	5.5	.25	335	211	98		524	7.5	9		
Dec. 11-19...	--	9.5		.01	.00	50	13	18	2.5		126		69	28	.2	3.7	.20	273	179	76		430	7.4	8		
Dec. 21-31...	--	9.5		.01	.01	54	15	19	2.2		140		75	30	.2	4.6	.20	288	196	82		460	7.4	5		
Jan. 2-10, 1959.....	104,600	8.0		.02	.01	54	14	20	2.7		122		87	30	.2	4.7	.20	281	192	92		478	7.4	5		
Jan. 11-20...	96,400	7.8		.25	.01	48	13	19	2.3		114		76	28	.2	5.0	.20	254	174	80		441	7.4	5		
Jan. 21-31...	504,800	6.2		.19	.00	32	6.9	9.1	2.5		80		40	14	.2	3.6	.25	159	109	43		273	7.4	25		
Feb. 1-10....	532,300	6.4		.08	.01	30	7.3	6.7	2.4		80		41	9.5	.1	4.2	--	160	105	40		256	7.5	18		
Feb. 11-20...	365,800	6.8		.04	.01	37	10	9.6	2.1		98		52	13	.1	4.7	--	194	134	53		313	7.5	8		
Feb. 21-28...	543,400	6.5		.28	.01	32	8.3	6.3	2.2		86		42	9.0	.1	4.9	--	167	114	44		265	7.5	23		
Mar. 1, 3-10.	276,700	8.4		.04	.00	41	12	10	2.2		118		55	14	.1	4.1	.40	223	152	55		351	7.8	6		
Mar. 11-20...	277,500	9.0		.01	.00	47	14	13	2.0		126		68	18	.2	4.8	.56	246	175	72		403	7.8	5		
Mar. 21-25, 28-31.....	232,400	8.7		.01	.00	45	14	11	1.8		126		63	16	.1	4.9	.30	235	170	66		385	7.7	5		

Apr. 1, 3-8, 10, 1959...	213,000	8.9		.03	.01	46	13	12	1.9		124		65	18	.2	4.8	.30	245	169	67		383	7.4	7
Apr. 11-20...	282,800	8.6		.02	.00	39	10	11	2.1		105		55	16	.2	4.6	.25	223	139	52		332	7.5	6
Apr. 21-29...	211,200	8.6		.00	.01	36	10	11	1.7		102		51	14	.2	4.2	.25	212	131	48		315	7.8	7
May 3-10.....	220,900	9.0		.01	.00	40	12	10	1.9		108		58	14	.3	4.9	.26	219	150	61		341	7.4	3
May 11-15, 18-20.....	179,600	8.7		.01	.00	42	12	12	2.1		110		63	16	.3	4.5	.27	227	155	64		362	7.1	2
May 21-27, 29-31.....	172,400	8.4		.00	.01	44	12	13	2.0		108		64	20	.3	4.2	.27	237	160	71		377	7.1	2
June 1-10....	130,800	11		.01	.00	47	12	14	1.5		136		63	18	.2	3.6	.15	237	167	55		396	7.7	4
June 11, 14-20.....	--	9.0		.01	.00	51	14	17	1.4		144		64	22	.2	4.0	.20	262	185	66		432	7.7	4
June 21-30...	--	6.4		.01	.00	49	13	15	1.4		132		66	22	.2	3.8	.20	250	176	68		420	7.6	5
July 1-10....	--	4.2		.01	.01	48	12	16	1.4		126		64	23	.2	3.6	.15	238	170	66		412	7.6	5
July 12-20...	--	6.7		.01	.00	49	14	18	1.4		136		68	24	.2	3.4	.15	258	180	68		434	7.7	6
July 21-31...	--	8.2		.01	.01	51	14	23	2.0		124		82	34	.2	2.5	.25	282	185	83		480	7.6	4
Aug. 2-10....	--	6.4		.01	.02	50	15	32	2.9		110		81	52	.3	2.9	.33	326	187	96		526	7.4	5
Aug. 11-18,20	--	6.3		.01	.03	43	12	26	2.7		90		76	40	.3	2.8	.25	274	157	82		445	7.5	6
Aug. 21-31...	--	4.5		.01	.02	40	13	20	2.6		94		74	30	.3	2.4	.20	256	154	76		404	7.3	5
Sept. 1-4, 6-10.....	--	5.9		.02	.03	46	13	26	2.9		98		86	43	.3	2.6	.30	300	169	88		474	7.4	4
Sept. 11-20..	--	2.9		.01	.03	54	15	31	2.9		111		88	57	.3	3.3	.25	331	196	105		545	7.3	6
Sept. 21-30..	--	3.0		.01	.03	55	17	34	2.9		108		98	58	.3	1.8	.18	356	207	119		570	7.2	5
Time-weighted average.....	--	6.9		0.03	0.01	47	13	18	2.3		118		72	26	0.2	3.6	0.26	260	171	74		424	--	7

OHIO RIVER MAIN STEM--Continued

3-3845. OHIO RIVER AT LOCK AND DAM 51, AT GOLCONDA, ILL.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
[Once-daily measurement between approximately 5 a.m. and 8 a.m.]

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	68	68	--	68	68	58	62	70	65	65	68	67	52	53	67	66	65	65	65	66	66	65	61	65	63	55	57	57	56	61	63
November...	60	60	54	55	56	56	57	55	55	54	53	52	53	56	57	58	58	58	42	--	--	--	54	55	54	50	55	55	--	40	--	54
December...	42	46	42	48	48	47	38	40	38	--	38	38	38	36	35	33	35	35	35	--	36	37	38	38	38	38	39	34	38	38	38	39
January....	38	37	38	35	35	32	34	34	35	34	34	34	36	38	38	37	35	34	35	36	45	39	37	37	36	40	38	36	38	39	39	36
February...	39	35	35	35	34	36	37	42	44	40	35	40	42	45	43	44	44	44	42	41	40	40	41	42	43	44	42	43	--	--	--	40
March.....	42	--	44	44	45	43	44	46	45	46	41	47	46	46	47	45	44	45	46	46	46	45	46	47	48	--	--	45	50	51	50	46
April.....	50	--	55	55	54	55	56	54	55	55	55	54	53	54	54	56	55	57	57	55	55	56	56	57	58	59	60	58	58	--	--	56
May.....	--	--	66	--	67	66	64	65	64	64	65	67	66	63	66	--	--	65	60	59	59	68	67	59	62	70	68	--	71	73	73	--
June.....	73	73	74	74	74	74	75	76	--	74	75	--	--	76	76	75	78	77	--	--	77	77	78	78	78	--	--	76	80	79	--	--
July.....	80	82	80	80	80	81	80	80	80	80	--	78	79	80	80	81	82	82	81	79	81	82	82	83	82	--	82	84	83	84	82	81
August.....	--	84	84	84	85	84	80	81	77	78	80	80	80	80	82	82	81	78	--	79	82	82	82	84	84	84	84	83	83	84	84	82
September..	83	83	82	81	--	83	83	84	83	83	78	76	76	76	75	75	73	72	72	72	74	74	74	74	75	75	74	73	77	74	--	77

3-4035. CUMBERLAND RIVER AT BARBOURVILLE, KY.

LOCATION.--At gaging station at bridge on State Highway 11, at Barbourville, Knox County, 0.4 mile upstream from Richland Creek.
DRAINAGE AREA.--960 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1950.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 86°F June 30, July 31, Aug. 1, 22, 25, Sept. 2; minimum, freezing point on many days during December and January.
EXTREMES, 1949-59.--Water temperatures: Maximum, 91°F June 28, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Temperature (°F) of water, water year October 1958 to September 1959
[Twice-daily measurements made at approximately 8 a.m. and 5 p.m.]

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																																
a.m.	64	60	62	60	63	62	65	64	64	65	62	59	57	58	60	61	61	62	59	60	58	61	60	59	58	57	56	55	56	52	49	60
p.m.	66	63	63	64	65	66	66	66	66	66	64	62	60	62	64	66	64	65	64	64	64	62	62	61	58	60	57	57	59	54	54	62
November																																
a.m.	53	52	52	51	51	52	51	49	50	50	45	47	48	50	54	55	55	58	56	54	49	47	44	53	52	52	45	44	39	35	--	50
p.m.	55	56	53	52	53	54	54	52	53	49	50	52	53	52	56	56	57	59	58	55	54	50	52	55	53	50	47	42	44	40	--	52
December																																
a.m.	36	36	41	40	43	40	36	36	35	35	35	33	33	32	32	32	32	32	33	33	33	32	36	34	36	34	34	35	42	43	44	36
p.m.	41	40	42	44	45	36	38	36	36	33	34	35	33	32	33	32	33	33	35	34	36	37	37	34	37	36	36	36	41	42	45	37
January																																
a.m.	45	43	41	32	32	32	33	32	33	32	33	32	34	35	38	--	35	32	34	36	38	35	36	35	36	40	42	44	43	44	43	37
p.m.	48	45	43	33	33	33	34	34	34	34	33	32	35	37	39	33	33	33	36	37	37	36	37	37	41	44	43	45	45	46	47	38
February																																
a.m.	43	40	42	45	43	41	39	40	43	44	44	42	47	46	47	46	46	38	38	38	36	35	38	39	38	41	45	44	--	--	--	42
p.m.	45	42	43	46	45	43	41	45	46	49	48	48	48	48	49	47	50	40	41	39	38	42	42	40	45	45	46	40	--	--	--	44
March																																
a.m.	42	44	45	42	43	42	41	37	44	43	44	41	40	44	48	47	45	41	41	44	48	45	44	47	50	53	54	49	48	48	48	45
p.m.	45	47	46	46	45	45	45	41	45	45	45	43	43	46	49	50	48	47	47	49	45	47	48	54	54	55	52	51	47	54	52	48
April																																
a.m.	51	50	53	49	49	54	56	56	61	60	59	50	46	46	48	51	54	53	57	59	60	54	50	51	55	59	57	53	59	61	--	54
p.m.	54	55	57	50	54	58	57	64	62	63	58	54	48	49	52	56	59	54	56	60	58	55	54	58	61	64	59	65	64	62	--	57
May																																
a.m.	61	64	62	69	69	72	71	70	69	72	71	75	74	66	59	59	59	60	64	68	68	68	69	71	72	72	72	71	74	75	71	68
p.m.	69	74	75	75	76	76	77	74	74	74	74	76	74	65	68	64	65	67	70	70	71	73	75	73	76	76	76	76	78	76	75	73
June																																
a.m.	66	69	65	65	65	67	70	71	71	72	75	76	76	73	72	70	71	70	70	70	75	74	76	77	75	75	76	79	82	82	--	72
p.m.	70	71	70	69	68	70	78	76	78	77	78	78	77	75	76	75	76	75	75	77	78	80	80	78	76	77	80	85	85	86	--	76

CUMBERLAND RIVER BASIN--Continued

3-4035. CUMBERLAND RIVER AT BARBOURVILLE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959--Continued
(Twice-daily measurements made at approximately 8 a.m. and 5 p.m.)

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	
July																																
a.m.	83	79	77	77	79	75	76	77	80	80	78	77	78	80	80	78	79	79	80	79	77	78	79	80	78	78	80	79	80	79	81	79
p.m.	85	83	81	82	80	79	80	83	83	81	80	84	84	83	82	84	84	82	83	82	82	80	82	83	81	82	83	82	83	84	86	82
August																																
a.m.	83	80	85	79	80	79	80	79	79	80	77	79	79	79	80	80	79	80	79	61	82	82	80	82	82	82	84	81	80	80	82	80
p.m.	86	84	84	81	62	81	81	82	81	81	80	65	83	84	83	83	82	84	84	65	85	86	85	85	86	85	85	85	83	84	85	84
September																																
a.m.	82	81	80	79	79	80	77	77	79	78	74	71	73	70	68	68	68	69	67	70	67	67	73	66	69	70	70	72	72	73	--	73
p.m.	84	86	84	81	83	81	82	80	83	77	75	75	74	72	71	72	74	71	74	71	75	74	75	72	75	74	75	76	75	74	--	76

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.

LOCATION.--At gaging station at bridge on U.S Highway 25W and State Highway 92 at Williamsburg, Whitley County, and 2.1 miles downstream from Clear Fork.
DRAINAGE AREA.--1,607 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1959.
Water temperatures: October 1951 to September 1959.
Sediment records: October 1953 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 258 ppm Oct. 1-31; minimum, 66 ppm Jan. 19-27.
Hardness: Maximum, 98 ppm Nov. 1-23; minimum, 32 ppm Feb. 16-20.
Specific conductance: Maximum daily, 472 micromhos Sept. 20; minimum daily, 84 micromhos Jan. 25.
Water temperatures: Maximum, 87°F Aug. 25; minimum, 33°F on several days during December and January.
Sediment concentrations: Maximum daily, 1,590 ppm Jan. 23; minimum daily, 1 ppm on many days during October and November.
Sediment loads: Maximum daily, 113,000 tons Jan. 23; minimum daily, less than 0.5 ton on many days during October to November, and September.
EXTREMES, 1951-59.--Dissolved solids: Maximum, 409 ppm Dec. 9-14, 1953; minimum, 55 ppm Jan. 1-2, 1955.
Hardness: Maximum, 126 ppm Dec. 9-14, 1953; minimum, 26 ppm Jan. 26 to Feb. 5, 1957.
Specific conductance: Maximum daily, 754 micromhos Dec. 11, 1953; minimum daily, 60 micromhos Mar. 24, 25, 1952.
Water temperatures: Maximum, 91°F on several days during June and July 1952; minimum, freezing point Jan. 9, 1958.
Sediment concentrations (1953-59): Maximum daily, 1,590 ppm Jan. 23, 1959; minimum daily, 1 ppm on many days 1953-59.
Sediment loads (1953-59): Maximum daily, 113,000 tons Jan. 23, 1959; minimum daily, less than 0.5 ton on many days 1953-59.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1626. Flow affected by ice Dec. 15-18, 21, 22, 26, 27, Jan. 10-12.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 1-31, 1958....	169	5.3	0.02	22	9.8	53		130	86	12	0.2	0.4	258	96	0	411	7.3	4
Nov. 1-23.....	213	--	--	23	10	53		128	86	14	--	.3	240	98	0	417	7.2	8
Nov. 24-30.....	665	--	--	17	7.4	37		92	62	9.0	--	.7	171	73	0	309	7.1	5
Dec. 1-29.....	835	--	--	13	5.4	20		54	43	6.0	--	1.2	118	54	10	205	7.1	5
Dec. 30-31.....	7,195	--	--	9.8	3.6	12		33	31	3.0	--	1.9	86	40	12	144	7.0	10
Jan. 1-5, 1959.....	2,028	--	--	8.3	3.6	9.2		24	28	4.0	--	2.0	74	36	16	119	7.1	6
Jan. 6-18.....	1,978	--	--	11	4.7	12		35	35	4.5	--	1.4	94	47	18	153	7.1	4
Jan. 19-27.....	12,900	8.3	.05	7.5	3.6	6.4		21	24	4.0	.1	2.0	66	34	16	106	6.7	32
Jan. 28-Feb. 1.....	1,862	--	--	12	5.5	14		33	45	4.5	--	2.4	98	52	26	172	7.1	6
Feb. 2-15.....	2,358	--	--	12	5.5	16		40	45	5.0	--	1.8	118	52	20	185	7.1	5
Feb. 16-20.....	7,560	--	--	6.8	3.6	7.4		21	25	3.0	--	1.3	67	32	15	105	7.0	16
Feb. 21-Mar. 5.....	2,246	--	--	11	4.7	12		34	37	4.0	--	1.1	92	47	19	153	7.1	5
Mar. 6-13.....	3,129	--	--	11	5.2	16		41	40	5.0	--	1.2	100	49	16	172	7.2	5
Mar. 14-18.....	4,870	--	--	8.4	3.1	8.5		25	26	3.0	--	1.1	72	34	14	112	7.2	9
Mar. 19-29.....	3,033	--	--	10	4.8	14		36	38	3.5	--	.9	100	45	16	155	7.1	5

CUMBERLAND RIVER BASIN--Continued

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Mar. 30-Apr. 12, 1959	3,912	--	--	9.0	4.2	7.4		23	31	3.0	--	0.7	90	40	20	133	6.8	5
Apr. 13-17	9,468	--	--	7.9	3.4	9.0		27	26	2.0	--	1.1	84	34	12	113	7.1	16
Apr. 18-30	3,481	--	--	9.4	4.9	13		36	36	3.0	--	1.2	92	44	14	146	7.1	3
May 1-20	1,164	--	--	13	7.2	22		59	52	4.5	--	1.3	135	62	14	223	7.0	4
May 21-31	1,762	--	--	11	5.3	14		46	36	3.7	--	1.4	104	50	12	166	7.1	5
June 1-7	6,204	8.6	0.02	8.7	3.2	7.8		28	26	2.8	0.1	1.5	76	34	12	122	6.8	6
June 8-11	1,323	--	--	11	4.9	14		42	35	4.0	--	1.2	98	48	13	156	7.1	4
June 12-18	602	--	--	14	6.1	22		56	52	4.1	--	1.4	123	60	14	214	7.0	3
June 19-July 20	308	--	--	16	8.1	32		80	64	7.0	--	.9	161	74	8	283	7.0	3
July 21-Aug. 8	340	--	--	20	11	46		118	82	9.5	--	.8	223	95	0	387	7.4	4
Aug. 9-13	225	--	--	18	9.3	38		88	80	7.5	--	.8	203	83	11	336	6.8	5
Aug. 14-Sept. 3	143	--	--	18	8.4	36		90	69	8.5	--	.7	178	80	6	316	7.0	5
Sept. 4-16	238	--	--	22	9.1	44		104	86	10	--	.6	219	92	8	376	7.1	4
Sept. 17-30	76.5	6.2	.02	20	10	58		136	91	12	.2	.6	257	91	0	443	7.3	4
Time-weighted average	1,822	--	--	15	6.9	28		71	56	6.9	--	1.0	152	68	8	256	--	6

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Twice-daily measurements at 7:30 a.m. and 5 p.m.)

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																																
a.m.	65	62	62	62	62	63	63	63	65	66	62	60	59	60	62	62	63	63	62	61	60	61	62	59	58	57	58	54	53	52	52	60
p.m.	66	63	63	65	66	67	67	66	67	67	64	62	64	64	66	66	66	65	65	65	65	65	63	63	60	58	56	56	57	56	57	63
November																																
a.m.	53	54	53	52	52	53	51	50	50	50	48	49	49	51	54	56	56	59	58	53	62	62	49	50	50	53	47	46	46	42	--	52
p.m.	55	54	55	54	56	55	54	52	52	52	52	52	53	56	57	57	60	61	59	55	65	66	51	52	53	52	47	46	45	43	--	54
December																																
a.m.	40	40	41	42	43	41	40	38	38	36	35	34	34	34	33	33	33	33	33	35	33	33	35	35	34	33	34	35	37	42	43	36
p.m.	42	42	43	44	44	43	41	40	40	38	37	37	37	35	35	35	36	36	36	37	35	36	36	37	36	36	35	37	39	47	44	39
January																																
a.m.	44	48	43	43	36	33	34	34	33	33	33	33	34	35	37	37	35	34	34	34	40	45	44	43	--	41	41	42	43	46	46	39
p.m.	45	45	45	41	38	36	36	35	34	34	34	35	36	37	39	37	37	35	36	37	44	46	44	43	--	42	42	44	46	47	47	40
February																																
a.m.	45	43	43	44	42	42	41	42	43	46	46	46	46	48	50	46	47	46	44	42	40	39	39	42	43	43	44	45	--	--	--	44
p.m.	46	44	45	44	45	44	44	43	45	48	48	48	48	50	50	49	48	47	45	44	42	40	43	44	45	46	47	48	--	--	--	46
March																																
a.m.	46	45	46	45	45	45	46	43	45	43	44	43	42	43	46	46	47	45	44	45	47	46	46	48	49	53	54	50	49	48	48	46
p.m.	46	48	48	48	47	43	46	46	45	46	45	44	45	45	48	49	49	48	48	48	48	49	52	53	55	54	53	53	48	50	50	48
April																																
a.m.	50	53	54	51	50	52	53	56	59	59	59	56	50	48	48	50	53	56	57	58	59	58	54	54	55	57	60	61	61	62	--	55
p.m.	54	55	55	53	54	54	57	60	60	60	59	54	52	50	51	54	56	57	58	61	60	58	57	57	58	60	61	64	65	65	--	57
May																																
a.m.	63	64	66	67	69	71	71	71	71	72	72	74	73	72	67	64	62	62	64	64	67	67	69	68	70	71	72	71	71	72	73	70	69
p.m.	67	70	71	72	75	75	76	75	75	75	77	76	76	70	68	61	65	66	69	68	69	70	72	73	73	74	74	76	75	76	73	72
June																																
a.m.	71	68	68	65	66	67	68	70	70	71	71	74	74	73	72	72	73	72	71	71	73	75	76	77	75	75	76	78	79	80	--	72
p.m.	74	69	69	66	68	70	71	74	75	75	76	76	78	77	76	76	77	76	76	77	77	80	79	77	77	79	81	81	84	84	--	76
July																																
a.m.	82	80	77	78	80	78	60	76	78	80	78	80	80	81	80	79	80	79	80	80	79	79	79	79	79	78	79	77	79	80	80	79
p.m.	85	82	82	82	82	83	83	83	83	80	82	84	84	84	82	84	83	82	83	83	83	82	82	83	83	81	80	82	83	85	86	83
August																																
a.m.	82	60	80	80	79	83	78	78	78	76	77	77	78	78	80	78	80	78	78	80	81	82	83	81	80	82	82	81	80	80	80	80
p.m.	85	85	83	80	80	80	79	80	81	80	82	82	82	84	64	83	84	83	83	84	84	85	85	84	87	86	84	82	83	83	83	83
September																																
a.m.	80	80	79	78	78	78	79	77	79	79	73	70	71	70	69	69	70	69	68	69	70	69	70	70	71	71	72	73	74	74	--	73
p.m.	83	82	80	82	81	81	80	82	82	--	78	76	75	74	72	73	73	73	71	72	71	76	76	77	76	76	77	79	78	76	--	77

CUMBERLAND RIVER BASIN--Continued

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sedime	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	138	2	1	132	3	1	2,080	84	4
2...	147	2	1	129	2	1	1,320	80	2
3...	278	2	2	159	2	1	1,010	35	
4...	395	2	2	208	2	1	912	29	
5...	350	2	2	220	2	1	1,040	28	
6...	281	2	2	214	1	1	1,100	18	
7...	230	1	a 1	201	1	a 1	1,030	13	
8...	204	1	a 1	186	1	1	888	8	
9...	186	1	a 1	174	2	1	780	9	
10...	174	5	2	159	1	(t)	708	16	
11...	162	1	(t)	150	2	1	618	15	
12...	168	1	(t)	147	1	(t)	525	30	
13...	177	1	(t)	144	1	(t)	460	8	
14...	177	1	(t)	141	1	(t)	415	5	
15...	168	1	(t)	141	1	(t)	375	5	
16...	147	1	(t)	141	2	1	335	5	
17...	135	1	(t)	144	2	1	300	4	
18...	123	1	(t)	153	3	1	280	3	
19...	117	1	(t)	211	2	1	273	4	
20...	114	1	(t)	285	2	2	281	4	
21...	117	1	(t)	546	6	9	265	4	
22...	138	1	(t)	515	7	10	250	3	
23...	141	1	(t)	400	8	9	258	3	
24...	132	1	(t)	333	6	5	258	3	
25...	129	1	(t)	285	5	4	289	4	
26...	123	2	1	262	4	3	330	7	
27...	120	2	1	240	4	3	315	5	
28...	117	1	(t)	258	5	3	1,030	96	s 5
29...	120	1	(t)	790	27	s 85	6,500	900	sb 17,0
30...	120	1	(t)	2,490	137	921	8,630	800	18,6
31...	117	1	(t)	--	--	--	5,760	330	5,1
Total	5,245	--	24	9,558	--	1,070	38,615	--	42,5
	January			February			March		
1...	2,900	172	1,350	1,400	18	68	2,050	17	
2...	2,200	60	356	1,250	17	57	1,930	15	
3...	1,920	39	202	1,150	13	40	1,740	14	
4...	1,680	36	163	1,180	20	64	1,650	11	
5...	1,440	33	128	1,540	28	116	1,540	12	
6...	1,120	29	88	2,070	46	257	1,560	14	
7...	834	23	52	2,190	36	213	1,910	16	
8...	942	16	41	1,970	36	191	2,120	27	1
9...	1,340	21	76	1,840	34	169	2,120	20	1
10...	1,560	24	101	1,770	28	134	2,050	19	1
11...	1,400	21	79	2,050	74	410	2,000	16	
12...	1,230	15	50	2,490	176	1,180	4,240	106	s 1,3
13...	1,210	15	49	2,210	73	436	9,030	218	5,3
14...	1,140	15	46	2,980	81	s 731	7,940	165	3,5
15...	1,220	18	59	8,330	352	7,920	5,490	72	1,0
16...	2,780	69	s 560	13,100	326	11,500	4,420	41	4
17...	5,920	213	3,400	11,200	163	4,930	3,530	26	2
18...	5,020	259	3,510	6,500	62	1,090	2,970	18	
19...	3,070	111	920	4,000	43	464	2,490	11	
20...	2,850	42	323	3,000	35	284	2,130	13	
21...	5,310	187	s 3,470	2,200	27	160	1,970	9	
22...	19,200	1,470	s 80,700	1,800	19	92	1,910	9	
23...	26,400	1,590	113,000	2,000	26	140	1,720	7	
24...	23,400	579	36,600	2,970	49	393	1,510	7	
25...	20,000	318	17,200	3,390	47	430	1,370	10	
26...	11,900	182	5,850	3,030	47	384	1,310	16	
27...	3,980	128	1,380	2,630	26	185	3,540	63	s 6
28...	2,540	53	363	2,270	23	141	8,330	--	e 6,8
29...	2,060	36	200	--	--	--	7,080	380	sb 7,5
30...	1,750	29	137	--	--	--	4,800	69	8
31...	1,560	21	88	--	--	--	3,750	34	3
Total	159,876	--	270,541	92,510	--	32,179	100,200	--	29,7

s Computed by subdividing day.
t Less than 0.5 ton.
a Computed from estimated-concentration graph.
b Computed from partly estimated-concentration graph.

CUMBERLAND RIVER BASIN--Continued

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--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...	3,080	25	208	1,520	17	70	4,450	--	e 12,000
2...	2,780	33	248	1,370	12	44	4,880	319	4,200
3...	3,330	33	297	1,310	13	46	9,090	655	s 17,400
4...	4,890	57	752	1,400	13	49	11,900	1,200	38,600
5...	6,390	83	1,430	1,180	9	29	7,490	174	s 3,840
6...	5,800	59	924	1,010	7	19	3,200	117	1,010
7...	4,260	30	345	906	8	20	2,420	85	555
8...	3,150	24	204	802	6	13	1,820	81	398
9...	2,560	18	124	726	6	12	1,400	89	336
0...	2,310	16	100	636	3	5	1,130	37	113
1...	3,060	60	496	576	2	3	942	23	58
2...	4,610	115	s 1,560	546	3	4	798	12	26
3...	11,600	400	b 12,000	642	6	10	720	12	23
4...	14,200	285	10,900	1,490	20	s 87	690	8	15
5...	11,100	88	2,640	1,900	84	431	618	8	13
6...	6,140	56	928	1,560	145	611	540	6	9
7...	4,300	41	476	1,240	60	201	455	7	8
8...	3,340	24	216	1,100	37	110	390	7	7
9...	3,250	24	211	1,320	56	200	350	8	8
0...	4,000	39	421	2,040	80	441	313	6	5
1...	5,370	83	1,200	2,060	80	445	285	7	5
2...	5,480	52	769	1,950	63	332	265	6	4
3...	4,740	42	538	1,900	88	451	248	4	3
4...	4,070	35	385	1,870	90	454	254	4	3
5...	3,650	30	296	1,870	65	328	425	8	9
6...	3,000	25	202	1,700	80	367	978	17	45
7...	2,490	19	128	1,590	63	270	876	10	24
8...	2,170	15	88	1,450	90	352	684	10	18
9...	1,950	14	74	1,140	40	123	485	9	12
0...	1,740	13	61	996	32	86	363	8	8
1...	--	--	--	2,860	--	e 6,200	--	--	--
Total	138,810	--	38,221	42,660	--	11,813	58,459	--	78,755

Day	July			August			September		
1...	297	8	6	281	12	9	244	9	6
2...	254	5	3	262	11	8	227	7	4
3...	224	5	3	254	7	5	192	9	5
4...	208	8	4	227	12	7	162	8	3
5...	201	9	5	251	16	11	144	6	2
6...	293	11	9	350	13	12	138	3	1
7...	490	12	16	425	15	17	129	3	1
8...	325	26	23	485	22	29	108	3	1
9...	237	11	7	333	22	20	94	3	1
0...	198	7	4	254	14	10	132	19	7
1...	180	7	3	214	13	8	672	147	267
2...	168	5	2	177	10	5	420	103	117
3...	159	3	1	147	11	4	321	77	67
4...	153	2	1	129	9	3	309	34	28
5...	144	2	1	120	8	2	265	18	13
6...	132	5	2	123	8	3	201	10	5
7...	141	3	1	129	8	3	162	9	4
8...	180	5	2	132	12	4	135	7	2
9...	171	7	3	117	15	5	111	7	2
0...	186	4	2	117	13	4	96	7	2
1...	317	2	2	99	9	2	85	7	2
2...	305	2	2	103	7	2	79	6	1
3...	269	2	1	117	6	2	71	7	1
4...	227	2	1	99	9	2	65	5	1
5...	289	5	4	117	5	2	61	5	1
6...	475	7	9	120	6	2	55	3	(t)
7...	515	13	18	111	7	2	45	5	1
8...	425	30	34	138	7	3	38	5	1
9...	386	28	29	162	10	4	32	5	(t)
0...	358	23	22	208	22	12	36	8	1
1...	350	19	18	201	13	7	--	--	--
Total	8,257	--	238	6,002	--	209	4,829	--	548

Total discharge for year (cfs-days)..... 665,021
Total load for year (tons)..... 505,928

e Estimated.
s Computed by subdividing day.
t Less than 0.5 ton.
b Computed from partly estimated-concentration graph.

CUMBERLAND RIVER BASIN--Continued

3-4040. CUMBERLAND RIVER AT WILLIAMSBURG, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 30, 1958.....	0730			8,560	931		41	56	74	90	96	98	99	100				SBWC
Jan. 23, 1959.....	0730			26,500	1,760		43	58	76	92	97	99	100	--				SBWC
Jan. 23.....	0730			26,500	1,760		37	52	75	92	97	99	100	--				SBN
Feb. 15.....	0730			7,060	338		44	57	71	88	95	98	99	100				SBWC
June 3.....	1415			9,720	590		46	60	77	90	96	98	99	100				SBWC
June 3.....	1415			9,720	590		37	51	65	89	95	97	99	100				SBN

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.

LOCATION.--At gaging station, 2,100 feet upstream from confluence with West Fork, 2.5 miles northeast of Parkers Lake, and 2.6 miles east of Greenwood, McCreary County.
DRAINAGE AREA.--0.67 square mile.
RECORDS AVAILABLE.--Chemical analyses: January 1956 to September 1959.
Water temperatures: October 1956 to September 1959.
Sediment records: January 1956 to September 1959.
EXTREMES, 1958-59.--Sediment concentrations: Minimum daily, 5 ppm on several days.
Sediment loads: Maximum daily, 164 tons July 19; minimum daily, less than 0.005 ton on many days, October to January, May to September.
EXTREMES, 1956-59.--Water temperatures (1956-58): Maximum, 75°F July 29, 1957; minimum, freezing point on several days during winter months.
Sediment concentrations (1956-58): Maximum daily, 3,800 ppm Apr. 24, 1958; minimum daily, 1 ppm on many days during 1956-57.
Sediment loads: Maximum daily, 520 tons Apr. 24, 1958; minimum daily, less than 0.005 ton on many days.
REMARKS.--Published and unpublished data on file at the district office in Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1625. Flow affected by ice Dec. 7-15, Jan. 5-6, 8-13, 16-18.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Time (24 hr)	Discharge (cfs)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Potential free acidity (H^+)	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Nov. 1,1958..	5:00 a.m.	1.39	--	--	--	--	--				515				--	182	172	5.6	1,200	2.90	
Nov. 1.....	6:00 a.m.	1.02	--	--	--	--	--				636				--	170	170	8.7	1,420	2.85	
Nov. 1.....	7:00 a.m.	1.14	--	--	--	--	--				602				--	107	107	8.3	1,360	2.85	
Nov. 1.....	8:00 a.m.	.67	--	--	--	--	--				464				--	160	160	6.4	1,160	2.90	
Nov. 1.....	9:00 a.m.	.81	--	--	--	--	--				492				--	111	111	6.7	1,220	2.90	
Nov. 1.....	11:00 a.m.	.34	--	--	--	--	--				424				--	80	80	5.4	1,130	2.80	
Nov. 10.....	11:50 a.m.	.06	--	--	--	--	--				290				--	79	79	--	811	3.10	
Nov. 11.....	9:45 a.m.	.05	--	--	--	--	--				280				--	137	137	2.4	793	3.00	
Nov. 16.....	3:10 p.m.	1.73	--	--	--	--	--				201				--	93	93	2.1	618	3.40	
Nov. 16.....	3:45 p.m.	8.2	--	--	--	--	--				294				--	110	110	3.5	818	3.00	
Nov. 16.....	5:00 p.m.	2.4	--	--	--	--	--				235				--	86	86	2.7	701	3.10	
Nov. 19.....	8:30 a.m.	.86	--	--	--	--	--				317				--	57	57	--	925	2.85	
Nov. 28.....	10:15 a.m.	2.3	--	--	--	--	--				336				--	84	84	--	932	3.00	
Nov. 28.....	4:15 p.m.	3.9	--	--	--	--	--				291				--	48	48	--	820	3.00	
Nov. 29.....	11:45 a.m.	.71	--	--	--	--	--				135				--	38	38	--	440	3.30	
Dec. 2.....	9:45 a.m.	.25	--	--	--	--	--				370				--	90	90	--	1,180	2.80	
Dec. 16.....	10:00 a.m.	.10	--	--	--	--	--				298				--	89	89	--	804	3.15	
Dec. 23.....	10:15 a.m.	.12	--	--	--	--	--				270				--	114	114	2.0	692	3.10	
Dec. 23.....	3:15 p.m.	.67	--	--	--	--	--				220				--	104	104	1.7	582	3.25	
Dec. 23.....	4:45 p.m.	.63	--	--	--	--	--				252				--	94	94	1.8	614	3.25	
Jan. 1, 1959.	9:10 a.m.	.56	--	--	--	--	--				160				--	76	76	1.4	493	3.30	
Jan. 1.....	10:15 a.m.	1.14	--	--	--	--	--				182				--	82	82	1.6	538	3.20	
Jan. 1.....	12:30 p.m.	2.6	--	--	--	--	--				356				--	102	102	4.1	903	3.00	
Jan. 1.....	2:40 p.m.	1.87	--	--	--	--	--				436				--	110	110	5.7	1,080	2.90	
Jan. 2.....	10:50 a.m.	.81	--	--	--	--	--				130				--	53	53	1.4	387	3.50	

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Time (24 hr)	Discharge (cfs)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Potential free acidity (H^+)	Specific conductance (micromhos at 25°C)	pH	Color
Jan. 8, 1959.	10:00 a.m.	0.42	--	--	--	--	--				197				--	45	45	1.9	627	3.10	
Jan. 8.....	2:00 p.m.	1.33	--	--	--	--	---				456				--	94	94	5.4	1,200	2.90	
Jan. 8.....	3:00 p.m.	1.27	--	--	--	--	--				426				--	53	53	5.0	1,140	2.90	
Jan. 13.....	10:00 a.m.	.45	--	--	--	--	--				156				--	46	46	1.4	487	3.20	
Jan. 15.....	9:45 a.m.	.67	--	--	--	--	--				145				--	42	42	1.4	437	3.40	
Jan. 15.....	10:45 a.m.	1.39	--	--	--	--	--				152				--	40	40	1.4	447	3.40	
Jan. 15.....	1:00 p.m.	2.02	--	--	--	--	--				432				--	77	77	5.5	1,040	3.05	
Jan. 15.....	3:00 p.m.	1.87	--	--	--	--	--				388				--	69	69	5.0	994	3.10	
Jan. 15.....	6:00 p.m.	1.87	--	--	--	--	--				220				--	46	46	2.6	655	3.30	
Jan. 20.....	10:00 a.m.	1.94	--	--	--	--	--				146				--	62	62	1.6	411	3.50	
Jan. 20.....	3:30 p.m.	1.80	--	--	--	--	--				162				--	67	67	1.8	461	3.40	
Jan. 21.....	9:30 a.m.	1.47	--	--	--	--	--				219				--	82	82	2.6	690	3.20	
Jan. 21.....	3:20 p.m.	2.6	--	--	--	--	--				178				--	64	64	2.0	560	3.30	
Jan. 21.....	4:00 p.m.	8.6	--	--	--	--	--				180				--	69	69	2.0	466	3.50	
Jan. 21.....	4:30 p.m.	8.2	--	--	--	--	--				316				--	96	96	3.9	826	3.15	
Jan. 21.....	5:00 p.m.	9.2	--	--	--	--	--				266				--	86	86	3.2	732	3.10	
Jan. 22.....	10:00 a.m.	3.5	--	--	--	--	--				66				--	33	33	.6	228	3.65	
Jan. 23.....	10:00 a.m.	--	--	--	--	--	--				65				--	34	34	.6	220	3.60	
Feb. 3.....	9:20 a.m.	.29	--	--	--	--	--				172				--	79	79	1.5	476	3.20	
Feb. 10.....	9:00 a.m.	.59	--	--	--	--	--				101				--	64	64	.8	313	3.40	
Feb. 10.....	11:20 a.m.	5.3	--	--	--	--	--				77				--	53	53	.6	222	3.75	
Feb. 10.....	11:55 a.m.	5.0	--	--	--	--	--				89				--	61	61	.7	240	3.80	
Feb. 10.....	1:15 p.m.	4.9	--	--	--	--	--				132				--	84	84	1.8	455	3.35	
Feb. 10.....	4:00 p.m.	3.8	--	--	--	--	--				106				--	58	58	1.1	343	3.40	
Feb. 11.....	11:30 a.m.	1.87	--	--	--	--	--				90				--	49	49	.9	288	3.55	
Feb. 13.....	2:00 p.m.	1.87	--	--	--	--	--				179				--	84	84	2.0	578	3.15	
Feb. 13.....	3:00 p.m.	1.87	--	--	--	--	--				212				--	76	76	2.3	676	3.10	
Feb. 13.....	4:00 p.m.	2.10	--	--	--	--	--				216				--	70	70	2.5	697	3.10	
Feb. 14.....	8:45 a.m.	4.0	--	--	--	--	--				159				--	46	46	1.8	493	3.30	
Feb. 14.....	9:45 a.m.	4.50	--	--	--	--	--				154				--	39	39	1.8	476	3.30	

Feb. 14, 1959	3:20 p.m.	4.5	--	--	--	--	--				91				--	44	44	1.0	311	3.45
Feb. 14.....	5:25 p.m.	4.6	--	--	--	--	--				72				--	38	38	.7	241	3.60
Feb. 15.....	11:30 a.m.	4.7	--	--	--	--	--				70				--	36	36	.7	233	3.65
Feb. 24.....	10:00 a.m.	1.20	--	--	--	--	--				116				--	46	46	1.0	348	3.30
Mar. 1.....	10:00 a.m.	.86	--	--	--	--	---				114				--	50	50	1.1	363	3.40
Mar. 3.....	10:40 a.m.	.71	--	--	--	--	--				168				--	67	67	1.7	520	3.20
Mar. 9.....	9:20 a.m.	.91	--	--	--	--	--				126				--	66	66	1.2	387	3.35
Mar. 23.....	3:05 p.m.	.42	7.2	6.2	--	--	--				143				--	46	46	1.3	460	3.30
Mar. 24.....	11:00 a.m.	.39	5.7	5.8	--	--	--				132				--	64	64	1.2	424	3.35
Mar. 25.....	9:05 a.m.	.36	--	--	--	--	--				140				--	56	56	1.4	446	3.30
Mar. 26.....	12:30 p.m.	.81	--	--	--	--	--				136				--	46	46	1.3	424	3.30
Mar. 26.....	1:30 p.m.	1.08	--	--	--	--	--				140				--	44	44	1.4	447	3.20
Mar. 26.....	3:00 p.m.	1.14	--	--	--	--	--				203				--	74	74	2.0	619	3.05
Mar. 26.....	6:45 p.m.	2.4	--	--	--	--	--				154				--	54	54	1.7	492	3.20
Mar. 26.....	7:15 p.m.	2.8	--	--	--	--	--				164				--	64	64	1.8	500	3.20
Mar. 27.....	9:30 a.m.	1.59	--	--	--	--	--				98				--	48	48	1.0	340	3.30
Apr. 2.....	7:30 a.m.	2.4	--	--	--	--	--				143				--	50	50	1.8	481	3.20
Apr. 3.....	10:30 a.m.	1.47	--	--	--	--	--				91				--	44	44	.9	325	3.35
Apr. 3.....	2:30 p.m.	2.10	--	--	--	--	--				98				--	50	50	1.0	350	3.35
Apr. 3.....	4:00 p.m.	2.6	--	--	--	--	--				140				--	47	47	1.6	470	3.20
Apr. 3.....	5:00 p.m.	2.8	--	--	--	--	--				154				--	44	44	1.8	504	3.15
Apr. 7.....	12:15 p.m.	.86	--	--	--	--	--				107				--	44	--	1.0	380	3.30
Apr. 10.....	6:00 a.m.	2.18	--	--	--	--	--				164				--	68	68	1.8	496	3.25
Apr. 10.....	7:00 a.m.	2.3	--	--	--	--	--				176				--	45	45	2.2	585	3.05
Apr. 10.....	10:45 a.m.	2.02	--	--	--	--	--				127				--	35	35	1.4	438	3.15
Apr. 10.....	2:30 p.m.	2.6	--	--	--	--	--				172				--	43	43	2.0	565	3.00
Apr. 10.....	4:00 p.m.	2.6	--	--	--	--	--				145				--	36	36	1.8	502	3.10
Apr. 10.....	7:00 p.m.	3.5	--	--	--	--	--				139				--	38	38	1.6	460	3.20
Apr. 11.....	12:00 m.	3.3	--	--	--	--	--				78				--	35	35	.8	280	3.20
Apr. 11.....	3:00 p.m.	3.0	--	--	--	--	--				77				--	37	37	.8	278	3.30

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Time (24 hr)	Discharge (cfs)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Potential free acidity (H^+)	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Apr. 12, 1959	11:30 a.m.	11.8	--	--	--	--	--				92				--	32	32	1.0	314	3.30	
Apr. 12	12:30 p.m.	11.8	--	--	--	--	--				80				--	35	35	.9	278	3.35	
Apr. 12	3:30 p.m.	9.6	--	--	--	--	--				71				--	32	32	.8	252	3.40	
Apr. 25	2:00 p.m.	.56	4.7	7.4	4.9	15	4.4				142				--	55	56	1.5	493	3.10	
Apr. 28	9:00 a.m.	.91	--	--	--	--	--				148				--	44	44	1.5	508	3.10	
May 5	3:15 p.m.	.25	--	8.6	9.0	25	4.7				245				--	82	82	2.4	762	2.90	
May 7	--	--	--	--	--	--	--				265				--	134	--	2.4	837	3.00	
May 12	9:00 a.m.	.14	--	--	--	--	--				242				--	77	--	2.2	740	3.00	
May 13	9:20 a.m.	.45	--	--	--	--	--				178				--	43	--	1.9	616	3.00	
May 13	6:30 p.m.	3.4	--	--	--	--	--				170				--	53	--	1.6	506	3.30	
May 13	7:30 p.m.	.96	--	--	--	--	--				218				--	66	--	1.8	539	3.40	
May 18	9:00 a.m.	.45	--	--	--	--	--				222				--	69	--	2.0	648	3.05	
May 18	9:30 a.m.	4.4	--	--	--	--	--				165				--	50	--	1.5	522	3.20	
May 18	10:50 a.m.	5.2	--	--	--	--	--				190				--	64	--	1.8	541	3.20	
May 18	1:20 p.m.	1.39	--	--	--	--	--				152				--	42	--	1.7	534	3.10	
May 19	9:30 a.m.	.29	--	--	--	--	--				186				--	52	--	1.8	613	3.05	
May 20	12:00 m.	.36	--	--	--	--	--				228				--	77	--	2.2	733	3.00	
May 20	3:00 p.m.	.34	--	--	--	--	--				217				--	109	--	1.6	634	3.20	
May 24	5:07 p.m.	.10	7.9	9.8	13	--	--				256				--	130	130	2.2	830	3.00	
May 25	3:20 p.m.	.86	--	--	--	--	--				272				--	81	--	2.3	815	2.95	
May 26	9:20 a.m.	.14	--	--	--	--	--				274				--	77	--	2.6	868	2.85	
May 26	11:40 a.m.	.14	8.7	13	12	--	--				266				--	125	125	2.5	889	2.95	
May 28	10:35 a.m.	.13	8.8	9.3	14	--	--				282				--	120	120	2.6	900	2.90	
June 2	1:15 p.m.	.59	--	--	--	--	--				160				--	45	--	1.6	542	3.05	
June 2	2:15 p.m.	1.80	--	--	--	--	--				172				--	54	--	1.6	533	3.10	
June 5	3:20 p.m.	.39	--	--	--	--	--				193				--	57	--	1.7	626	3.00	
June 5	4:00 p.m.	.86	--	--	--	--	--				182				--	53	--	1.6	598	3.00	
June 9	11:15 a.m.	.10	--	--	--	--	--				224				--	65	--	2.0	733	2.90	
June 12	1:20 p.m.	5.0	--	--	--	--	--				234				--	106	--	1.2	514	3.55	
June 12	1:50 p.m.	11.3	--	--	--	--	--				374				--	156	--	4.0	923	3.05	

June 12, 1959.	3:00 p.m.	4.9	--	--	--	--	--				208			--	76	--	2.2	671	3.10
June 16.....	4:00 p.m.	.08	7.5	9.1	12	--	--				234			--	146	146	2.2	695	3.15
June 23.....	9:00 a.m.	.08	--	--	--	--	--				222			--	116	116	2.3	764	3.10
June 24.....	8:50 a.m.	.42	--	2.0	--	--	--				177			--	67	67	1.5	557	3.25
June 24.....	9:25 a.m.	3.6	14	12	--	--	--				353			--	143	143	3.6	950	3.00
June 24.....	9:30 a.m.	3.3	--	6.2	--	--	--				377			--	135	135	3.7	1,000	2.95
June 24.....	9:35 a.m.	2.8	--	11	--	--	--				533			--	128	128	6.1	1,300	2.85
June 24.....	9:55 a.m.	1.47	--	16	--	--	--				599			--	130	130	7.4	1,440	2.80
June 24.....	10:15 a.m.	.91	--	20	--	--	--				577			--	111	111	7.4	1,420	2.80
June 24.....	11:00 a.m.	.67	--	14	--	--	--				445			--	95	95	6.1	1,240	2.80
June 24.....	12:00 m.	1.47	--	4.1	--	--	--				304			--	89	89	3.2	841	3.10
June 24.....	12:55 p.m.	.71	--	7.3	--	--	--				360			--	109	109	4.4	1,010	2.95
June 24.....	1:45 p.m.	.63	--	15	--	--	--				442			--	162	162	6.1	1,220	2.85
June 30.....	9:25 a.m.	.08	--	--	--	--	--				320			--	190	190	3.0	962	2.90
July 1.....	4:40 p.m.	13.0	37	--	10	--	--				488			--	196	196	7.0	1,040	3.10
July 1.....	5:10 p.m.	19.4	31	--	8.0	--	--				402			--	158	158	5.4	1,010	2.90
July 1.....	5:45 p.m.	10.8	27	--	7.5	--	--				388			--	155	155	4.9	1,040	2.85
July 1.....	7:00 p.m.	3.6	16	--	6.0	--	--				260			--	133	133	3.2	772	3.00
July 17.....	5:25 p.m.	.06	--	--	--	--	--				270			348	120	120	3.0	828	3.05
July 17.....	6:00 p.m.	7.6	--	--	--	--	--				292			412	150	150	3.2	711	3.25
July 17.....	6:30 p.m.	7.8	--	--	--	--	--				771			1,020	150	150	11	1,570	2.90
July 17.....	6:55 p.m.	3.2	--	--	--	--	--				632			858	190	190	8.8	1,460	2.85
July 19.....	3:25 p.m.	.09	--	--	--	--	--				608			800	202	202	8.0	1,520	2.80
July 19.....	3:50 p.m.	3.9	--	--	--	--	--				432			617	163	163	5.5	1,230	2.80
July 19.....	4:00 p.m.	17.7	--	--	--	--	--				319			451	115	115	3.6	768	3.35
July 19.....	4:15 p.m.	19.8	--	--	--	--	--				296			420	116	116	3.8	760	3.15
July 19.....	5:40 p.m.	16.5	--	--	--	--	--				200			277	89	89	2.4	592	3.40
July 19.....	8:00 p.m.	4.3	--	--	--	--	--				169			240	88	88	1.7	518	3.40
July 29.....	9:35 a.m.	.16	22	17	13	--	--				332			474	86	86	3.2	947	2.90
Aug. 6.....	1:15 p.m.	.10	--	--	--	--	--				230			339	102	102	--	588	3.25
Aug. 6.....	1:45 p.m.	13.0	--	--	--	--	--				640			891	206	206	--	1,510	2.70

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Time (24 hr)	Discharge (cfs)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Potential free acidity (H^+)	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Aug. 6, 1959..	2:20 p.m.	7.4	--	--	--	--	--				464				644	162	162	--	1,230	2.80	
Aug. 6.....	2:50 p.m.	10.5	--	--	--	--	--				382				529	146	146	--	1,000	2.90	
Aug. 6.....	5:30 p.m.	3.6	--	--	--	--	--				190				287	96	96	--	604	3.15	
Aug. 10.....	9:30 a.m.	.16	12	12	14	--	--				298				472	138	--	--	923	2.90	
Aug. 17.....	11:25 a.m.	6.0	26	25	14	--	--				380				551	102	--	--	880	3.30	
Aug. 17.....	11:55 a.m.	3.0	90	175	20	--	--				1,020				1,460	193	--	--	1,920	2.70	
Aug. 17.....	12:40 p.m.	1.73	86	15	16	--	--				970				1,380	170	--	--	1,940	2.70	
Aug. 17.....	4:30 p.m.	.29	34	45	11	--	--				492				736	147	--	--	1,310	2.95	
Aug. 17.....	5:30 p.m.	.91	30	36	11	--	--				417				644	79	--	--	1,150	3.00	
Aug. 18.....	9:30 a.m.	.10	18	16	15	--	--				373				659	87	--	--	1,070	2.95	
Sept. 29.....	9:00 a.m.	.07	--	--	--	--	--				264				378	--	--	--	776	3.15	

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959

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...	0.14	13		0.41	438	s 1.04	0.34	13	b 0.0
2...	.085	--		.12	71	.02	.29	38	.0
3...	.085	--		.10	40	.01	.36		
4...	.075	--		.068	22	(t)	.34		
5...	.075	--	(t)	.068			.27	--	e .0
6...	.075	--		.060			.19		
7...	.068	10		.055			.15		
8...	.068	--		.071			.15		
9...	.068	--		.075	--	(t)	.13		
10...	.20	110	a 0.06	.064			.12		
11...	.075	--		.050			.11	--	(t)
12...	.075	--		.050			.11		
13...	.068	--		.050			.10		
14...	.068	7	(t)	.050			.10		
15...	.075	--		.090	--	e .01	.10		
16...	.085	--		.78	1,480	s 21.5	.13	20	a .0
17...	.085	--		.29	33	.02	.16		
18...	.12	--	e .01	.32	65	a .06	.13		
19...	.10	--		.85	--	e .5	.14		
20...	.085	--		.27	--	e .01	.14	--	(t)
21...	.085	5		.19	--	e .01	.10		
22...	.10	--	(t)	.18			.12		
23...	.12	--		.16	--	(t)	.33	17	.0
24...	.13	--		.14			.29	--	e .0
25...	.10	--		.13			.14		
26...	.42	--		.18	--	e .01	.14	--	(t)
27...	.33	1,230	s 4.69	.12	--	(t)	.18		
28...	.15	--	e 50	1.66	334	s 2.27	.48	50	.0
29...	.068	--	.01	.79	18	.04	.34	6	b .0
30...	.068	--	(t)	.39	10	b .01	.27	5	(t)
31...	.068	--	(t)	--	--	--	.27	5	(bt)
Total	3.114	--	54.81	7.84	--	25.55	6.21	--	0.5

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1...	1.09	662	s 3.26	0.34	25	b 0.02	0.91	33	
2...	.76	40	.08	.29	20	b .02	.67	--	
3...	.45	10	b .01	.45	25	a .03	.67	29	e 0.0
4...	.31	8	b .01	1.5	74	.30	.56	--	
5...	.20	8	(bt)	1.0	29	.08	.63	--	
6...	.25	8	.01	.75	38	.08	s 1.00	45	sa .1
7...	.30	8	b .01	.65	35	b .06	.67	19	b .0
8...	.25	90	.06	.60	25	b .04	.67	17	b .0
9...	.23	25	.02	.59	17	b .03	.76	28	.0
10...	.22	10	b .01	2.07	1,950	s 26.2	.67	19	.0
11...	.23	10	b .01	1.94	225	s 1.24	1.15	--	e 2.9
12...	.25	--	e .03	1.53	65	a .25	2.02	--	e 2.4
13...	.30	16	.01	1.59	110	sa .50	1.66	35	.1
14...	.42	15	b .02	4.2	800	sa 11	1.39	--	
15...	1.24	596	s 3.07	4.9	--	e 6.0	1.33	--	
16...	.9	50	.12	2.55	85	b .60	.91	--	
17...	.7	--	(t)	1.73	29	.14	.76	30	
18...	.5	--	(t)	1.39		.07	.63	--	e .0
19...	.73	--	e .2	.91		.04	.56	--	
20...	2.09	--	e 2.0	.67	--	e .04	.59	--	
21...	4.4	2,250	s 12.9	.59			.67	46	
22...	3.6	76	s .83	.56			.52	--	
23...	2.0	24	.13	1.69	468	s 2.23	.42	--	e .0
24...	1.3	--	e 3.1	1.27	70	.24	.39	12	
25...	.86	40	b .09	1.14			.36	--	
26...	.71	25	b .05	.96	--	e .07	1.03	708	s 4.2
27...	.59	18	.03	.81			1.72	1,450	s 18.2
28...	.52	13	b .01	.81			1.20	30	b .1
29...	.45	10	b .01	--	--	--	1.20	49	.1
30...	.49	355	s .99	--	--	--	.96	25	b .
31...	.46	294	s 1.16	--	--	--	.86	15	.
Total	26.80	--	28.24	37.48	--	49.54	27.54	--	29.

e Estimated.
s Computed by subdividing day.
t Less than 0.005 ton.
a Computed from estimated-concentration graph.
b Computed from partly estimated-concentration graph.

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
...	0.76	8	b 0.02	0.48			0.18	25	b 0.01
...	1.69	--	e 1.1	.39			.77	650	sa 3.10
...	1.80	234	s 1.46	.34	--	e 0.04	.27	40	b .03
...	1.73	140	b .65	.34			.14	25	b .01
...	1.39	95	b .40	.27	21	.02	.24	270	sa .55
...	1.08	50	b .15	.20	10	b .01	.18	--	e .02
...	.86	16	.04	.19	6	(t)	.10	--	
...	.76	10	b .02	.19	--	(t)	.085	--	
...	.90	--	e .09	.25	--	e .04	.10	5	(t)
...	2.4	323	s 2.24	.18	--	e .01	.085	--	
...	3.2	85	.73	.16	--	(t)	.075	--	
...	7.2	776	s 19.8	.29	--	e 3.1	.96	1,410	s 20.6
...	4.2	101	s 1.26	.71	1,800	sa 6.9	.25	--	e .06
...	2.6	28	.20	.29			.12	--	e .01
..	2.1	--	e .1	.18	--	e .03	.15	--	e .02
...	1.33			.14			.10	15	
...	1.02	--	e .04	.13			.085	--	
...	.96			.76	447	s 3.23	.075	--	
...	.91			.25	20	.01	.075	--	
...	1.06	--	e 1.1	.31	85	a .07	.068	--	(t)
...	.86			.22			.068	--	
...	.81			.18	--	e .01	.068	--	
...	.76			.14			.068	11	
...	.81	--	e .02	.12			.46	1,180	s 4.20
...	.59			.16	62	.03	.31	1,220	s 3.14
...	.52			.14	20	.01	.14	--	e .03
...	.45			.13			.10	--	e .01
...	1.01	650	sa 3.0	.10	--	(t)	.085	--	
...	.63	--	e .1	.10			.085	--	(t)
...	.52	--	e .05	.12			.068	8	
...	--	--	--	.31	190	sa .45	--	--	--
Total	44.91	--	32.81	7.77	--	14.22	5.560	--	31.82

	July			August			September		
...	1.50	3,200	s 106	0.10			0.11	320	sa 0.60
...	.33	--	e .04	.09	--	(t)	.08		
...	.16	--	e .01	.08			.08		
...	.12	--		.10	--	e 0.02	.07	--	(t)
...	.10	--		.09	--	(t)	.07		
...	.08	--		1.96	2,540	s 66.1	.09	--	e .02
...	.08	10		.46	55	b .07	.07	--	
...	.06	--		.47	--	e 2.2	.06	10	(at)
...	.06	--	(t)	.19	--		.06	--	
...	.06	--		.13	--	e .02	2.3	4,890	s 150
...	.06	--		.10	22		.24	30	b .02
...	.05	--		.09			.13	--	
...	.05	--		.08			.10	--	
...	.05	5		.07	--	(t)	.10	--	
...	.19	968	s 4.49	.07			.09	10	
...	.06	50	b .01	.07			.09	--	
...	.52	2,680	s 33.9	.46	1,870	s 12.9	.08	--	
...	.13	70	b.02	.10	25	.01	.08	--	
...	2.9	3,340	s 164	.08	--		.08	--	
...	.60	160	sb .35	.07	--		.08	--	
...	.18	36	.02	.08	--		.08	5	
...	.23	30	.02	.07	--	(t)	.08	8	(t)
...	.18	--	e .01	.07	--		.08	--	
...	.45	550	sa 1.8	.07	--		.08	--	
...	.32	50	b.03	.06	10		.08	--	
...	.40	434	s 1.49	,06	10		.08	--	
...	.25	120	b .08	.44	2,700	s 18.7	.08	--	
..	.18	14	.01	.15	679	s .80	.08	--	
...	.13	10	(t)	.09			.08	5	
...	.12	--	(t)	.08	--	(t)	.08	--	
...	.12	--	(t)	.08			.08	--	--
Total	9.72	--	312.31	6.03	--	100.91	4.82	--	150.69

Total discharge for year (cfs-days)..... 187.71
Total load for year (tons)..... 830.84

e Estimated.
s Computed by subdividing day.
t Less than 0.005 ton.

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

CUMBERLAND RIVER BASIN--Continued

3-4071. CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 28, 1958.....	1600			0.20	112,000		48	57	73	91	97	99	100	--				SBWC
Nov. 1.....	0800			.67	798		68	79	89	95	98	99	100	--				SBWC
Jan. 1, 1959.....	1440			1.87	2,430		69	80	93	98	99	100	--	--				SBWC
Jan. 21.....	1600			8.6	11,200		27	38	71	80	86	95	98	100				SBWC
Jan. 21.....	1600			8.6	11,200		--	1	1	42	93	94	99	100				SBN
Feb. 10.....	1120			5.0	4,040		38	48	63	77	95	98	100	--				SBWC
Mar. 26.....	1915			2.8	4,820		61	74	89	97	98	99	100	--				SBWC
Mar. 26.....	1915			2.8	4,820		--	1	2	39	97	99	100	--				SBN
Apr. 3.....	1700			2.8	1,150		63	76	89	96	98	99	100	--				SBWC
Apr. 28.....	1315			1.73	5,160		61	72	85	97	98	99	100	--				SBWC
Apr. 28.....	1315			1.73	5,160		4	4	5	31	98	99	100	--				SBN
June 2.....	1415			1.73	2,280		56	68	81	94	98	99	100	--				SBWC
June 25.....	1625			.20	4,170		52	63	78	92	98	99	100	--				SBWC
June 25.....	1625			.20	4,170		3	4	6	39	98	99	100	--				SBN
Aug. 17.....	1145			4.2	21,600		52	62	76	92	97	99	100	--				SBWC

CUMBERLAND RIVER BASIN--Continued

3-4072. WEST FORK CANE BRANCH NEAR PARKERS LAKE, KY.

LOCATION.--At gaging station, 2,900 feet upstream from mouth and 2.2 miles northeast of Parkers Lake, McCreary County.
DRAINAGE AREA.--0.26 square mile, approximately.
RECORDS AVAILABLE.--Chemical analyses: July 1956 to September 1959.
Water temperatures: October 1958 to September 1959.
REMARKS.--Published and unpublished records on file in district office at Columbus, Ohio. Discharge records for this station are unpublished.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Time	Bicarbonate (HCO_3)	Sulfate (SO_4)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
				Calcium, magnesium	Noncarbonate		
Oct. 7, 1958....	8:40 a.m.	10	4.8	9	1	32	5.9
Nov. 3.....	8:15 a.m.	9	5.6	10	2	37	5.8
Nov. 15.....	9:50 a.m.	9	6.0	13	6	43	5.3
Nov. 16.....	1:50 p.m.	10	3.6	10	2	36	5.3
Nov. 16.....	3:00 p.m.	4	4.0	5	2	23	5.3
Nov. 17.....	10:00 a.m.	4	5.6	8	4	26	5.4
Nov. 18.....	9:00 a.m.	5	5.8	8	4	27	5.5
Nov. 19.....	7:00 a.m.	4	5.4	7	4	25	5.7
Nov. 28.....	11:30 a.m.	5	5.0	7	3	27	6.1
Nov. 28.....	3:00 p.m.	5	5.4	7	3	23	5.7
Nov. 28.....	9:00 a.m.	4	5.2	6	2	22	5.6
Nov. 29.....	10:45 a.m.	4	4.8	6	2	20	5.8
Dec. 16.....	9:10 a.m.	--	6.0	8	--	28	5.9
Jan. 1, 1959....	8:00 a.m.	--	6.0	8	--	24	6.2
Jan. 1.....	11:00 a.m.	--	6.0	6	--	21	5.6
Jan. 1.....	1:35 p.m.	--	5.6	7	--	22	6.1
Jan. 15.....	8:20 a.m.	--	5.2	6	--	20	a 6.0
Jan. 15.....	10:15 a.m.	--	4.6	6	--	20	6.1
Jan. 15.....	1:45 p.m.	--	5.4	6	--	21	6.0
Jan. 15.....	4:45 p.m.	--	5.6	6	--	21	a 5.7
Jan. 21.....	8:00 a.m.	--	4.4	6	--	18	6.1
Jan. 21.....	2:00 p.m.	--	4.0	5	--	18	a 5.8
Jan. 21.....	4:30 p.m.	--	5.2	6	--	21	a 5.5
Jan. 22.....	8:40 a.m.	--	4.8	5	--	18	6.0
Feb. 3.....	8:10 a.m.	3	5.2	6	4	21	5.9
Feb. 10.....	8:00 a.m.	3	4.4	5	2	19	5.8
Feb. 10.....	10:00 a.m.	3	6.0	5	2	18	5.6
Feb. 10.....	12:10 p.m.	3	5.2	4	1	21	a 5.5
Feb. 10.....	1:10 p.m.	3	4.8	4	1	19	a 5.6
Feb. 10.....	2:45 p.m.	3	4.8	6	4	21	6.1
Feb. 14.....	7:10 a.m.	4	4.8	5	2	19	5.7
Feb. 14.....	9:25 a.m.	3	4.4	5	2	19	5.7
Feb. 14.....	2:00 p.m.	4	5.2	5	2	18	5.9
Feb. 14.....	4:00 p.m.	3	4.4	5	2	18	5.7
Mar. 26.....	11:30 a.m.	3	5.2	6	4	20	6.2
Mar. 26.....	1:00 p.m.	4	5.4	6	3	21	6.0
Mar. 26.....	2:30 p.m.	4	4.8	6	3	22	6.1
Mar. 26.....	5:30 p.m.	4	5.6	6	3	21	6.0
Mar. 26.....	6:15 p.m.	3	4.8	6	4	22	5.4
Apr. 7.....	3:30 p.m.	4	4.8	5	2	18	6.2
Apr. 10.....	4:30 a.m.	4	6.2	5	2	20	6.0
Apr. 10.....	6:30 a.m.	4	5.2	6	3	20	6.2
Apr. 10.....	9:30 a.m.	3	4.6	6	4	19	6.1
Apr. 10.....	1:15 p.m.	4	5.0	6	3	20	6.2
Apr. 10.....	3:30 p.m.	3	5.2	5	2	20	6.0
Apr. 10.....	5:30 p.m.	4	4.8	5	2	20	6.2
Apr. 11.....	10:20 a.m.	4	4.4	6	3	19	6.4
Apr. 11.....	1:00 p.m.	4	6.0	5	2	18	6.2
Apr. 12.....	10:00 a.m.	3	6.0	6	4	21	5.7
Apr. 12.....	11:45 a.m.	3	4.8	5	2	20	6.1
Apr. 12.....	2:00 p.m.	4	6.0	5	2	19	6.0
May 12.....	8:25 a.m.	9	5.2	8	1	25	6.3
May 13.....	9:00 a.m.	6	6.0	6	1	23	6.4
May 13.....	5:00 p.m.	6	4.6	6	1	23	5.8
May 13.....	6:40 p.m.	5	4.8	7	3	24	6.0

a Immediate acidity H^{+1}, ph 7.0-0.1 ppm and potential free acidity H^{+1}, ph 7.0-0.0 ppm.

CUMBERLAND RIVER BASIN--Continued

3-4072. WEST FORK CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Time	Bicarbonate (HCO_3)	Sulfate (SO_4)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	
				Calcium, magnesium	Noncarbonate		
May 18, 1959....	7:30 a.m.	7	4.4	7	2	22	6.4
May 18.....	8:40 a.m.	5	4.8	8	4	31	5.7
May 18.....	9:30 a.m.	5	3.6	6	2	20	5.8
May 18.....	1:00 p.m.	5	4.8	7	3	23	6.5
June 2.....	9:00 a.m.	7	5.0	7	2	24	6.1
June 2.....	1:30 p.m.	4	5.0	6	3	21	5.7
June 2.....	2:30 p.m.	5	4.0	6	2	20	6.0
June 5.....	2:00 p.m.	2	5.2	5	4	20	5.3
June 5.....	3:20 p.m.	2	5.4	5	4	22	5.0
June 16.....	9:00 a.m.	8	4.6	7	1	24	6.4
July 1.....	3:20 p.m.	3	6.2	5	2	32	5.3
July 1.....	4:20 p.m.	2	5.8	5	4	29	5.2
July 1.....	5:20 p.m.	5	5.8	6	2	25	5.8
July 17.....	3:45 p.m.	11	5.0	9	0	28	6.5
July 17.....	4:50 p.m.	3	6.2	4	2	21	5.5
July 17.....	5:40 p.m.	5	6.8	6	2	25	5.7
July 19.....	3:20 p.m.	3	4.0	3	1	16	5.9
July 19.....	3:50 p.m.	4	4.2	3	0	17	5.7
July 19.....	4:30 p.m.	3	4.6	3	1	17	5.5
July 19.....	6:45 p.m.	10	6.8	10	2	29	6.1

CUMBERLAND RIVER BASIN--Continued

3-4072. WEST FORK CANE BRANCH NEAR PARKERS LAKE, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

CUMBERLAND RIVER BASIN--Continued

3-4073. HELTON BRANCH AT GREENWOOD, KY.

LOCATION.--At gaging station, 250 feet upstream from Little Hurricane Fork, and 1 mile northeast of Greenwood, McCreary County.
DRAINAGE AREA.--0.85 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1956 to September 1959.
Water temperatures: October 1956 to September 1958.
Sediment records: January 1956 to September 1958.
REMARKS.--Published and unpublished records on file in district office at Columbus, Ohio. Records of discharge given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 14, 1958.	0.18									9	1.4					7	0		20	6.6	
Nov. 4.....	.20									9	2.6					8	1		22	6.3	
Nov. 28.....	.82									12	5.6					13	3		36	6.1	
Jan. 2, 1959..	1.06									--	13					26	--		68	5.8	
Feb. 3.....	.40									13	7.6					17	6		46	6.6	
Mar. 20.....	.61									11	6.2					15	6		39	6.5	
Apr. 7.....	.92									13	8.0					16	6		43	6.8	
Apr. 14.....	2.8									10	8.8					15	7		42	6.8	
May 7.....	.34									12	4.0					12	2		33	6.6	
May 26.....	.29									15	5.6					15	3		39	6.7	
June 2.....	9.6									8	7.8					12	6		35	6.6	
June 2.....	9.9									8	7.6					13	6		36	6.5	

LOCATION.--At Neelys Ferry on State Highway 61, 0.5 mile downstream from Raft Creek, 3.2 miles south of Burkesville, Cumberland County, and about 37 miles downstream from gaging station near Rowena.
DRAINAGE AREA.--6,050 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1952 to September 1954.
Water temperatures: October 1949 to September 1951 (at Burkesville), January 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 66°F Sept. 21; minimum, 43°F Jan. 2, 5-6.
EXTREMES, 1949-59.--Maximum, 84°F July 30, 1956; minimum, 34°F Feb. 2-4, 1951, Jan. 22, 1956.
REMARKS.--No discharge records available at this station.

Temperature (°F) of water, water year October 1958 to September 1959
[Twice-daily measurements at approximately 7 a.m. and 3 p.m.]

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																																
a.m.	56	55	57	57	58	58	57	57	56	60	58	57	57	58	58	59	59	60	59	58	58	58	59	58	57	57	56	56	55	56	55	57
p.m.	56	56	58	58	59	59	58	58	59	60	59	58	58	58	59	60	60	60	60	60	59	60	60	58	58	57	57	56	56	57	57	58
November																																
a.m.	56	56	55	55	55	55	54	53	52	52	52	52	52	53	54	57	58	57	56	55	53	52	51	52	53	53	52	51	51	50	--	54
p.m.	56	56	56	56	55	55	54	53	54	53	53	53	53	54	56	58	59	58	57	56	53	53	52	54	54	53	52	51	51	50	--	54
December																																
a.m.	50	51	52	52	51	50	50	51	50	48	49	50	49	48	48	50	50	51	51	50	51	49	50	50	50	49	50	50	48	49	49	50
p.m.	51	52	53	52	51	50	50	51	50	48	49	50	49	48	48	51	50	51	51	51	51	49	50	51	50	50	51	50	48	49	49	50
January																																
a.m.	48	43	48	48	43	43	48	48	50	50	50	50	49	48	50	51	50	50	50	53	51	50	50	50	50	50	49	50	50	52	53	49
p.m.	48	43	48	46	43	43	48	50	50	50	51	48	50	49	50	49	50	51	50	53	52	50	51	51	51	51	50	50	51	53	53	50
February																																
a.m.	51	50	50	46	50	48	45	45	46	45	46	48	50	50	50	52	53	55	54	54	55	52	53	54	56	55	55	54	--	--	--	51
p.m.	52	51	51	50	51	48	45	46	47	46	47	50	51	52	51	53	54	55	55	55	56	53	54	55	56	56	56	55	--	--	--	52
March																																
a.m.	56	55	50	50	50	50	48	46	48	48	49	46	47	45	45	46	47	48	47	46	46	48	50	50	50	48	48	50	50	48	50	49
p.m.	56	55	50	50	51	48	50	49	48	48	50	48	48	46	46	47	48	48	48	46	48	50	51	51	51	50	50	51	51	50	50	49
April																																
a.m.	--	50	50	50	50	50	50	48	48	50	50	50	48	47	47	46	47	48	48	50	49	50	48	48	50	50	48	47	46	46	--	49
p.m.	50	51	51	50	51	51	50	49	50	51	52	51	48	48	47	48	48	48	50	50	50	50	48	50	50	50	48	46	46	47	--	49
May																																
a.m.	46	46	48	48	50	50	50	50	50	50	50	50	51	52	53	52	53	53	54	53	53	54	54	54	52	53	53	54	55	54	55	52
p.m.	46	48	48	50	51	51	52	52	52	52	52	53	53	53	53	53	53	54	54	54	54	54	54	54	53	53	54	55	55	55	55	53
June																																
a.m.	55	55	55	55	55	55	55	54	55	53	54	54	54	54	55	55	54	55	55	55	55	56	54	53	52	54	54	55	52	53	--	54
1 p.m.	56	56	56	55	55	56	55	55	55	54	54	54	54	55	55	55	55	55	56	55	56	56	54	54	54	54	55	56	53	54	--	55
July																																
a.m.	54	54	55	56	57	54	54	54	54	56	57	57	55	56	56	57	57	58	59	60	60	58	59	59	58	59	59	57	56	56	56	57
p.m.	55	55	55	57	57	55	54	54	55	57	57	57	55	56	57	58	58	59	60	62	59	59	59	59	59	59	57	57	57	56	56	57
August																																
a.m.	56	56	55	55	55	56	57	57	57	58	56	56	56	56	56	56	55	53	54	54	54	54	55	56	54	54	55	55	55	56	57	55
p.m.	56	56	55	55	56	57	57	57	58	56	56	56	56	56	56	56	53	54	54	55	55	55	56	54	55	55	55	56	56	57	55	56
September																																
a.m.	54	55	55	55	56	56	54	55	55	55	55	56	55	62	63	64	64	63	63	64	65	56	54	54	54	55	57	57	57	56	--	57
p.m.	55	56	56	56	56	56	55	55	55	55	55	56	55	63	64	65	64	64	64	65	66	56	55	55	55	57	58	58	58	57	--	56

CUMBERLAND RIVER BASIN--Continued

3-4385. CUMBERLAND RIVER AT SMITHLAND, KY.

LOCATION.--At gaging station at bridge on U.S. Highway 60 at Smithland, Livingston County, 1 mile downstream from McCormick Creek, and 2.8 miles upstream from mouth.
DRAINAGE AREA.--18,080 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1950, October 1956 to September 1959.
Water temperatures: October 1949 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 152 ppm Mar. 11-20; minimum, 92 ppm Nov. 1-10.
Hardness: Maximum, 119 ppm Mar. 21-31; minimum, 74 ppm Nov. 1-10.
Specific conductance: Maximum daily, 265 micromhos Mar. 26; minimum daily, 156 micromhos Oct. 19.
Water temperatures: Maximum, 84°F Aug. 3, 24; minimum, 36°F Jan. 5, 6, 10.
EXTREMES, 1949-59.--Dissolved solids (1949-50, 1956-59): Maximum, 164 ppm Sept. 21-30, 1950; minimum, 77 ppm Feb. 11-20, 1950.
Hardness (1949-50, 1956-59): Maximum, 132 ppm Sept. 21-30, 1950; minimum, 53 ppm Feb. 11-20, 1950.
Specific conductance (1949-50, 1956-59): Maximum daily, 277 micromhos Apr. 1, 1958; minimum daily, 112 micromhos Feb. 13, 1950.
Water temperatures: Maximum, 90°F Aug. 3, 1955; minimum, 34°F on several days during February 1951 and February 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Total acidity as H^{+1}	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-10,1958	17,540	6.5		0.17	0.00	23	4.8	4.0	0.6	76	17	2.5	0.1	1.5	110	78	16		174	7.4	0
Oct. 11-20....	15,820	6.7		.02	.00	21	5.9	3.8	.7	76	17	3.0	.1	1.5	114	76	14		170	7.4	3
Oct. 21-31....	7,612	5.5		.60	.01	22	5.2	4.3	.6	74	19	3.0	.1	1.0	98	76	16		172	7.4	5
Nov. 1-10.....	5,232	6.3		.01	.00	22	4.5	5.0	.9	72	19	3.5	.2	1.2	92	74	14		182	7.2	3
Nov. 11-20....	5,025	11		.01	.00	23	5.0	6.4	.8	79	22	3.5	.2	1.0	105	78	14		186	7.1	4
Nov. 21-30....	9,883	5.5		.01	.01	24	4.4	5.7	.8	78	22	4.0	.2	1.4	98	78	14		187	7.4	4
Dec. 1-10.....	19,170	5.4		.01	.01	27	4.6	5.0	.9	86	20	3.0	.2	1.3	109	86	16		196	7.3	4
Dec. 11-20....	21,450	5.7		.01	.01	28	4.3	3.8	.9	90	17	2.5	.2	1.5	108	88	14		190	7.2	5
Dec. 21-31....	14,130	5.6		.02	.01	24	4.0	3.9	.6	78	17	2.2	.2	1.0	98	76	12		172	7.2	5
Jan. 1-10,1959	14,700	5.1		.01	.01	25	3.9	4.6	.9	78	20	2.0	.1	.8	98	78	14		178	7.0	4
Jan. 11-20....	21,660	5.7		.02	.01	28	4.0	4.0	.9	86	20	2.0	.1	1.1	104	86	16		189	7.1	5
Jan. 21-31....	37,740	6.7		.09	.00	31	3.8	3.0	1.2	96	14	2.0	.1	3.2	120	93	14		199	7.3	10
Feb. 1-10....	25,550	8.1		.06	.00	37	4.6	3.8	1.2	114	18	3.0	.1	3.7	146	112	18		236	7.6	4
Feb. 11-20...	49,160	7.7		.03	.00	34	4.0	3.0	1.2	107	15	2.0	.2	3.8	137	102	14		217	7.5	6
Feb. 21-28...	34,350	10		.01	.00	39	4.6	3.4	1.2	124	14	3.0	.1	4.1	150	117	15		240	7.8	5
Mar. 1-10....	26,530	9.3		.09	.01	41	3.9	3.4	1.0	127	15	3.0	.2	4.2	148	118	14		247	7.5	5
Mar. 11-20...	23,430	9.0		.08	.01	40	4.4	3.7	1.0	126	16	3.0	.2	3.3	152	118	15		245	7.7	5
Mar. 21-31...	28,470	8.1		.09	.01	40	4.6	3.3	.8	130	16	4.0	.2	3.0	146	119	12		250	7.6	5

Apr. 1-10, 1959.....	25,310	8.9		.01	.01	37	5.4	3.5	1.0	122	17	3.8	.1	1.7	138	115	14		234	7.7	1
Apr. 11-20...	37,490	10		.00	.01	37	4.9	3.1	1.1	122	17	3.8	.1	1.7	132	113	12		236	7.5	1
Apr. 21-30...	30,260	9.6		.01	.01	32	4.8	3.8	1.1	106	19	3.7	.1	1.7	127	100	13		214	7.6	1
May 1-10.....	17,630	8.4		.00	.00	30	4.5	5.0	.8	96	19	3.0	.2	1.9	116	94	15		206	7.8	3
May 11-20....	11,030	6.9		.00	.00	30	4.6	4.8	1.0	96	20	3.0	.2	1.4	113	94	16		208	7.4	3
May 21-30....	15,920	7.4		.00	.00	30	4.4	4.7	1.1	95	20	3.5	.2	2.0	116	93	15		208	7.3	3
June 1-10....	21,540	9.8		.00	.00	30	3.9	3.1	1.0	99	16	3.0	.2	2.5	116	91	10		202	7.7	3
June 11-20...	19,410	7.3		.00	.00	30	3.7	3.7	1.1	96	16	2.5	.2	2.4	114	90	12		199	7.6	3
June 21-30...	10,270	9.1		.00	.00	32	4.3	3.7	1.0	104	17	3.0	.2	2.3	122	98	12		214	7.9	2
July 1-10....	6,887	11		.00	.00	31	4.6	4.9	.9	100	19	5.0	.2	1.7	124	96	14		214	7.3	4
July 11-20...	5,785	9.5		.00	.00	30	4.5	5.5	1.0	98	20	3.5	.2	2.0	127	94	13		215	7.6	3
July 21-31...	11,460	9.9		.00	.00	27	3.9	5.5	1.6	86	22	4.0	.2	2.2	118	84	13		201	7.6	4
Aug. 1-10....	17,420	7.8		.00	.00	27	3.9	5.9	1.3	86	23	3.0	.2	2.4	114	84	13		200	7.6	3
Aug. 11-20...	11,940	9.2		.00	.00	29	3.4	4.1	1.4	94	18	2.5	.2	2.2	112	86	10		196	7.7	4
Aug. 21-31...	13,860	7.2		.00	.00	28	3.9	4.7	1.3	88	20	3.5	.2	2.2	112	86	14		199	7.8	3
Sept. 1-10...	12,850	8.2		.00	.00	27	4.0	4.7	1.1	88	19	3.0	.2	2.1	110	84	12		195	7.6	3
Sept. 11-20..	11,080	14		.00	.00	28	4.0	5.6	1.2	92	20	3.0	.2	1.9	120	86	11		200	7.3	3
Sept. 21-30..	8,415	10		.00	.00	28	4.0	5.6	1.0	90	22	3.5	.2	2.0	118	86	12		202	7.6	4
Time-weighted average..	18,420	8.1		0.04	0.00	30	4.4	4.3	1.0	96	18	3.1	0.2	2.1	119	93	14		204	--	4

CUMBERLAND RIVER BASIN--Continued

3-4385. CUMBERLAND RIVER AT SMITHLAND, KY.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Twice-daily measurements at approximately 8 a.m. and 5 p.m.)

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																																
a.m.	68	67	67	66	67	66	68	69	69	67	66	65	64	65	65	65	64	65	64	61	62	63	62	62	62	62	60	60	59	59	59	64
p.m.	70	69	69	70	69	69	70	70	70	69	68	67	67	67	66	67	67	66	65	65	65	64	64	64	63	62	61	61	59	61	61	66
November																																
a.m.	60	59	57	58	59	57	55	57	56	55	54	55	55	56	57	58	59	59	58	57	56	56	56	56	56	54	51	51	49	48	--	56
p.m.	59	59	60	60	59	57	57	57	57	56	57	57	57	57	58	59	60	59	59	58	58	58	57	56	57	54	57	49	51	50	--	57
December																																
a.m.	50	49	50	50	49	46	45	45	43	41	42	41	38	38	38	39	40	39	42	41	40	39	41	41	39	39	41	42	42	42	42	42
p.m.	51	49	50	51	49	46	46	45	44	42	43	41	39	39	40	42	41	42	43	42	42	42	42	41	41	42	42	43	42	42	42	43
January																																
a.m.	42	40	40	38	36	36	40	40	37	36	38	39	40	41	41	38	37	37	40	40	44	40	41	44	44	45	43	43	44	45	43	40
p.m.	42	43	40	37	37	38	40	40	38	40	40	41	41	42	40	38	37	39	40	42	44	42	44	45	45	44	43	44	47	44	43	41
February																																
a.m.	42	41	41	42	42	40	41	43	44	45	42	43	46	47	46	47	49	49	45	45	45	46	47	45	45	46	46	47	--	--	--	45
p.m.	43	42	43	43	42	42	43	44	45	45	45	45	46	47	46	50	50	48	47	46	48	47	47	46	46	47	47	46	--	--	--	46
March																																
a.m.	46	47	47	46	49	48	47	47	47	49	48	47	47	49	49	48	48	49	49	50	50	49	49	50	52	53	53	51	52	52	54	49
p.m.	47	49	49	49	50	48	49	49	49	49	48	48	49	50	49	49	50	50	51	51	50	51	52	53	54	54	52	53	53	54	55	50
April																																
a.m.	55	54	55	55	56	56	57	59	57	58	57	57	56	55	55	55	56	57	57	57	56	56	55	56	58	59	59	59	59	60	--	57
p.m.	55	56	56	57	57	57	59	60	58	58	57	57	57	57	57	57	57	58	58	57	57	57	57	58	59	60	60	60	61	62	--	58
May																																
a.m.	61	63	64	64	65	67	67	66	67	68	69	69	69	68	68	67	67	67	68	69	69	69	70	70	74	71	73	71	72	72	--	68
p.m.	63	65	66	67	68	68	68	68	69	69	70	69	70	69	67	68	68	69	70	70	71	71	71	72	72	73	72	73	74	73	--	69
June																																
a.m.	72	71	70	70	70	70	70	71	71	72	72	71	71	71	71	71	72	74	74	74	75	75	75	76	75	77	77	78	78	79	--	73
p.m.	73	72	72	72	71	72	72	73	73	72	72	73	73	73	73	74	75	76	75	77	77	77	77	76	76	78	79	80	81	81	--	75
July																																
a.m.	80	78	78	78	79	78	79	78	79	79	80	80	80	79	79	79	80	80	81	80	80	81	81	80	79	78	77	77	79	80	81	79
p.m.	81	79	80	81	80	81	81	81	81	83	82	81	82	81	81	81	81	82	83	83	81	81	81	81	80	78	79	80	81	82	82	81
August																																
a.m.	81	81	82	83	82	82	80	79	77	77	77	77	77	78	79	79	79	77	78	79	80	80	80	81	81	81	80	80	80	81	80	80
p.m.	82	83	84	83	82	81	80	79	78	79	79	79	80	81	80	80	79	79	80	81	83	83	83	84	83	81	81	80	81	81	82	81
September																																
a.m.	80	79	78	77	77	77	78	78	78	76	75	74	74	73	74	73	72	71	72	72	72	72	73	73	72	73	73	74	74	73	--	75
p.m.	80	79	80	79	79	79	79	80	78	76	76	76	75	76	75	75	73	73	74	73	74	74	74	74	74	73	75	75	74	74	--	76

3-4390. FRENCH BROAD RIVER AT ROSMAN, N. C.

LOCATION.--At U. S. Highway Bridge 178 at Rosman, Transylvania County, 1.0 mile upstream from East Fork.
DRAINAGE AREA.--67.9 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 3, 1958	127	8.9	0.02	1.8	0.1	1.3	0.7	9	1.2	0.9	0.0	0.3	21	5	0	18	6.3	10
Nov. 6	85	9.7	.02	1.6	1.2	.8	.4	8	1.9	.7	.0	.4	27	9	2	20	6.5	15
Dec. 3	87	7.8	.02	1.4	.4	1.4	.4	7	.1	1.3	.0	.2	18	5	0	16	6.2	10
Jan. 12, 1959	115	7.4	.02	.8	.5	1.1	.3	6	.4	1.0	.1	.2	18	4	0	14	5.5	10
Feb. 6	177	6.8	.01	1.2	.4	1.2	.2	6	1.1	.7	.0	.2	16	5	0	14	5.9	5
Mar. 9	244	7.4	.03	1.6	.2	1.0	.3	7	.6	.8	.1	.2	18	5	0	16	6.4	5
Apr. 6	210	7.4	.01	1.3	.3	1.0	.3	7	1.0	.2	.0	.2	16	4	0	15	6.6	10
May 5	219	8.2	.00	1.1	.1	1.3	.5	7	.3	.5	.0	.1	17	3	0	15	6.1	10
June 11	266	7.8	.02	1.0	.2	1.3	.2	7	.3	.7	.0	.0	15	3	0	13	6.4	3
July 2	186	7.9	.01	1.1	.3	1.3	.4	7	2.1	.2	.0	.3	17	4	0	14	6.8	10
Aug. 4	132	8.6	.00	1.3	.2	1.4	.4	8	.9	.7	.0	.4	18	4	0	16	6.7	20
Sept. 2	122	8.9	.01	1.0	.4	1.3	.4	9	1.2	.9	.0	.2	20	4	0	17	6.8	10

TENNESSEE RIVER BASIN--Continued

3-4414.82. LITTLE RIVER NEAR CEDAR MOUNTAIN, N. C.

LOCATION.--Approximately 5 miles northeast of Cedar Mountain, Transylvania County, and 200 yards downstream from Grassy Creek about half-way between High Falls and Triple Falls on Little River.
DRAINAGE AREA.--33.0 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1957 to August 1959.
REMARKS.--Records of suspended matter, Aluminum (Al), Manganese (Mn), Zinc (Zn), Ammonium (NH_4), Nitrite (NO_2), Phosphate (PO_4) available in district office at Raleigh, N. C. No discharge records available for this station.

Chemical analyses, in parts per million, October 1958 to August 1959

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. 2, 1958		9.7	0.03	3.4	0.4	1.4	0.6	8	0.9	4.5	0.1	0.4	26	10	4	26	6.4	20
Oct. 16		11	.04	4.6	.5	1.5	.7	8	1.3	7.8	.0	.4	37	14	7	37	6.4	18
Nov. 3		11	.04	3.3	.9	1.1	.7	8	.4	5.3	.0	.5	29	12	5	30	6.5	10
Nov. 14		11	.02	4.0	.4	1.4	.6	8	1.0	5.3	.1	.4	30	12	5	31	6.5	5
Dec. 2		10	.06	2.8	.5	1.1	.2	8	1.2	3.7	.0	.4	27	9	2	27	6.5	10
Dec. 16		11	.00	1.2	.2	2.2	.2	8	.4	.9	.0	.2	a20	4	0	16	6.6	10
Dec. 31		7.7	.00	1.6	.1	1.8	.2	6	.2	1.7	.0	.2	a17	5	0	16	6.4	10
Jan. 15, 1959		9.1	.03	1.4	.9	.8	.1	6	.6	3.0	.0	.2	19	7	2	20	6.6	10
Feb. 16		6.9	.01	.8	.2	1.3	.1	5	.8	1.8	.1	.2	18	3	0	14	6.5	5
Apr. 15		7.6	.00	.6	.4	1.1	.1	5	.4	2.0	.1	.4	17	3	0	14	6.5	10
June 15		9.1	.00	1.4	.2	1.2	.1	8	.9	.8	.0	.1	20	5	0	15	6.8	5
Aug. 19		9.7	.10	1.0	.6	1.3	.3	8	.4	1.3	.1	.3	20	5	0	16	7.1	17

a Calculated from determined constituents.

3-4430. FRENCH BROAD RIVER AT BLANTYRE, N. C.

LOCATION.--At highway bridge, 700 feet east of Blantyre Railroad station, Transylvania County, 3.5 miles downstream from Little River.
DRAINAGE AREA.--296 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953, October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 7, 1958.....	419	11	0.07	6.0	0.7	26	1.5	23	46	6.4	0.1	0.6	117	18	0	170	6.2	50
Nov. 7.....	353	11	.12	5.8	.6	32	1.0	31	53	6.5	.0	1.0	135	17	0	200	6.5	75
Dec. 4.....	358	9.1	.07	6.8	.5	28	1.3	30	41	6.9	.1	.7	129	19	0	183	6.2	70
Jan. 12, 1959.....	483	6.3	.05	5.0	.9	23	.9	28	29	6.6	.1	.6	104	16	0	145	6.1	60
Feb. 10.....	606	7.9	.09	4.0	.6	21	.8	21	35	5.5	.0	.7	92	13	0	132	6.0	30
Mar. 9.....	1,020	7.7	.05	4.2	.4	10	1.0	14	17	5.3	.1	.4	74	12	1	108	6.3	5
Apr. 8.....	796	8.3	.06	3.5	.3	16	.7	18	27	4.0	.0	.5	76	10	0	110	6.9	30
May 8.....	888	9.0	.00	2.4	.8	13	.6	15	18	2.7	.1	.4	64	9	0	90	6.2	22
June 12.....	1,160	8.7	.07	2.2	.8	11	.7	13	15	2.8	.1	.1	57	9	0	81	6.2	7
July 6.....	590	9.5	.00	3.2	1.0	14	.5	8	31	2.2	.0	1.0	68	12	5	103	6.2	10
Aug. 4.....	588	9.6	.05	3.4	.8	21	.8	14	40	4.5	.0	.6	96	12	1	142	6.2	30
Sept. 2.....	1,270	8.3	.05	3.4	.7	10	.8	12	18	4.1	.1	.7	61	12	2	83	6.4	30

TENNESSEE RIVER BASIN--Continued

3-4480. FRENCH BROAD RIVER AT BENT CREEK, N. C.

LOCATION.--At gaging station on left bank 50 feet downstream from Bent Creek, 6.2 miles upstream from Hominy Creek, 6.7 miles south of Asheville, Buncombe County.
DRAINAGE AREA.--676 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 15, 1958	600	12	0.12	4.8	1.0	21	1.5	26	31	5.5	0.0	0.4	100	16	0	134	6.4	45
Nov. 18	590	12	.11	5.2	1.0	24	1.1	27	39	5.5	.0	.6	119	17	0	145	7.0	50
Dec. 19	590	10	.05	5.5	.6	20	.9	26	26	5.0	.1	.7	89	16	0	129	6.0	30
Jan. 14, 1959	884	8.0	.06	2.2	.3	4.0	.4	12	3.5	1.8	.0	.2	32	7	0	34	6.5	20
Feb. 17	1,500	7.7	.03	1.8	.6	4.4	.4	12	4.1	1.8	.1	.4	32	7	0	36	6.2	10
Mar. 11	1,450	8.2	.02	1.8	.4	3.3	.4	11	3.5	1.8	.1	.1	28	6	0	31	6.4	5
Apr. 20	3,470	8.2	.00	1.6	.5	2.7	.6	9	4.1	.7	.1	.3	27	6	0	27	6.0	9
May 19	1,370	10	.02	2.0	.5	5.4	.7	14	4.7	2.0	.0	.2	39	7	0	43	6.1	10
June 17	1,420	9.7	.04	2.5	.7	11	.4	15	15	2.7	.0	.5	52	9	0	76	6.5	11
July 14	1,240	9.5	.01	2.5	.6	6.7	.6	13	9.7	1.2	.0	.5	42	9	0	50	6.1	20
Aug. 26	757	10	.07	4.2	1.9	15	1.0	25	24	3.2	.1	.3	74	18	0	109	6.9	30
Sept. 17	1,270	10	.01	2.7	.6	8.0	.6	17	13	2.3	.0	.4	46	10	0	64	6.6	10

3-4515. FRENCH BROAD RIVER AT ASHEVILLE, N. C.

LOCATION.--At gaging station on right bank at downstream side of Pearson Bridge at Asheville, Buncombe County, 2.3 miles downstream from Southern Railway station, 3.2 miles downstream from Swannanoa River.
DRAINAGE AREA.--945 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951, October 1956 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 15, 1958.....	675	12	0.07	5.6	1.2	34	2.3	35	49	9.7	0.1	2.9	139	19	0	221	6.1	35
Nov. 18.....	675	13	.02	5.6	1.5	33	1.8	30	52	9.5	.0	3.7	141	20	0	207	6.5	20
Dec. 19.....	688	11	.04	5.6	1.7	36	1.7	40	49	8.8	.1	2.9	145	21	0	216	6.6	30
Jan. 14, 1959.....	1,090	7.8	.03	4.0	1.5	30	1.4	31	33	11	.1	2.7	109	16	0	172	6.5	20
Feb. 17.....	1,870	8.1	.03	3.6	.8	12	.9	21	16	4.8	.1	1.4	64	12	0	94	6.0	10
Mar. 18.....	2,060	8.8	.06	4.0	.6	13	.9	22	16	4.5	.1	.5	64	13	0	95	6.6	10
Apr. 24.....	2,900	9.1	.04	2.8	.8	11	.9	18	10	5.0	.1	.8	54	10	0	76	6.1	10
May 19.....	1,550	11	.01	2.9	.7	17	.9	30	15	4.1	.1	.4	74	10	0	109	6.6	17
June 22.....	1,510	10	.06	3.0	.8	14	.6	22	16	2.9	.2	.3	65	11	0	96	6.5	10
July 14.....	1,460	11	.01	3.7	1.2	21	1.2	26	27	5.9	.1	1.5	88	14	0	130	6.3	10
Aug. 26.....	930	10	.03	4.2	1.8	22	1.9	29	36	6.3	.1	.4	97	18	0	152	6.6	20
Sept. 17.....	1,500	11	.01	3.7	1.3	20	1.1	24	28	8.0	.0	.4	87	14	0	142	6.4	10

TENNESSEE RIVER BASIN--Continued

3-4535. FRENCH BROAD RIVER AT MARSHALL, N. C.

LOCATION.--At gaging station on right bank, 0.7 miles upstream from Hayes Creek, 1.0 mile downstream from Ivy River, and 1.5 miles southeast of Marshall, Madison County.
DRAINAGE AREA.--1,332 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1959.
Water temperatures: October 1957 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 118 ppm Nov. 11-20; minimum, 44 ppm Mar. 7-10.
Hardness: Maximum, 24 ppm Dec. 20-28, 30; minimum, 12 ppm June 11-20.
Specific conductance: Maximum daily, 204 micromhos Oct. 22; minimum daily, 51 micromhos Apr. 11.
Water temperatures: Maximum, 75°F Aug. 15-17, 22, 28; minimum, freezing point on several days during winter months.
EXTREMES, 1957-59.--Dissolved solids: Maximum, 118 ppm Nov. 11-20, 1958; minimum, 42 ppm Apr. 11-20, 1958.
Hardness: Maximum, 26 ppm Oct. 12, 1957; minimum, 12 ppm Apr. 11-20, 1958, June 11-20, 1959.
Specific conductance: Maximum daily, 219 micromhos Oct. 12, 1957; minimum daily, 49 micromhos Apr. 17, 1958.
Water temperatures: Maximum, 76°F Aug. 2, 3, 1958; minimum, freezing point on several days during winter months.
REMARKS.--Records of suspended matter of composite samples and specific conductance of samples collected from October 1957 to September 1959 available in district office at Raleigh, N. C. Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1956 to September 1959

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, 1958.....	1,201	11	0.06	5.5	2.0	20	1.4	24	37	4.9	0.1	1.9	104	22	2	139	7.0	15
Oct. 11-20.....	861	12	.04	5.9	1.8	26	1.6	30	43	6.1	.1	2.1	115	22	0	166	7.0	25
Oct. 21-31.....	827	11	.08	5.2	2.4	25	1.7	32	43	5.7	.1	2.1	112	23	0	165	6.8	20
Nov. 1-10.....	1,129	13	.10	5.7	1.6	22	1.7	29	32	6.3	.1	2.0	99	21	0	132	6.7	20
Nov. 11-20.....	829	13	.17	6.7	.9	25	1.4	32	42	6.5	.1	1.8	118	20	0	157	7.1	20
Nov. 21-30.....	911	13	.14	5.5	1.3	26	1.4	32	38	7.2	.0	1.6	115	19	0	149	7.3	20
Dec. 20-28, 30.....	1,807	14	.11	4.9	2.9	25	1.3	30	41	6.7	.0	1.0	117	24	0	170	6.9	30
Dec. 29, 31.....	6,760	--	--	5.2	1.5	5.5	1.8	14	9.2	2.8	--	--	--	19	8	68	6.2	--
Jan. 1-10, 1959.....	2,070	11	.02	4.0	1.6	10	1.0	17	18	3.0	.1	2.5	64	16	3	88	6.6	20
Jan. 11-20.....	1,549	12	.05	4.5	1.5	12	1.0	20	23	4.3	.1	2.3	72	17	1	103	7.1	15
Jan. 21-31.....	3,653	11	.00	4.2	1.9	8.3	1.0	17	14	2.5	.2	2.8	56	18	4	78	6.5	15
Feb. 1-10.....	1,716	12	.03	4.2	1.5	12	1.0	21	18	3.3	.0	2.4	70	17	0	97	6.8	15
Feb. 11-20.....	2,459	13	.03	4.8	1.3	9.9	1.2	21	16	3.4	.1	2.4	63	17	0	86	6.8	15
Feb. 21-28.....	1,665	12	.03	4.8	1.2	13	1.0	25	19	3.0	.2	2.1	75	17	0	109	6.9	25
Mar. 1-6.....	1,982	12	.12	5.9	1.4	12	1.0	22	18	4.0	.0	2.2	75	20	2	106	7.2	30
Mar. 7-10.....	3,232	10	.02	3.6	.9	6.6	.9	17	8.8	2.9	.1	1.9	a44	13	0	62	6.6	14
Mar. 11-20.....	2,057	11	.01	3.2	1.5	11	.9	20	18	3.2	.1	1.4	a61	14	0	88	7.0	15
Mar. 21-26.....	1,682	11	.08	4.4	1.6	12	.7	19	18	3.5	.0	1.9	69	17	2	99	7.1	20

Mar. 27-31, 1959....	3,036	12	.05	5.0	.9	5.7	1.2	19	8.5	1.8	.0	2.7	a47	16	1	67	6.4	--
Apr. 1-10.....	2,439	11	.01	3.5	2.9	3.8	.7	16	8.7	2.5	.2	1.5	53	21	8	67	7.3	20
Apr. 11-13, 17-20...	4,534	13	.01	3.8	1.8	4.8	.9	17	5.8	2.2	.1	2.4	48	17	3	63	7.1	15
Apr. 14-16.....	5,453	12	.02	4.2	1.3	11	1.0	21	18	4.3	.0	1.8	a64	16	0	92	6.6	--
Apr. 21-30.....	3,549	12	.01	3.7	1.5	6.3	1.1	18	9.1	2.8	.1	1.6	51	15	1	68	7.0	20
May 1-10.....	2,220	11	.02	3.3	1.7	9.8	.8	20	12	2.3	.1	1.5	62	15	0	86	7.2	20
May 11-20.....	2,338	12	.01	3.4	1.9	8.2	1.1	18	12	2.2	.1	2.8	59	16	2	84	6.9	20
May 21-31.....	4,889	11	.06	3.0	1.8	6.2	1.0	17	6.3	2.5	.0	2.8	48	15	1	57	6.5	20
June 1-10.....	4,031	11	.01	3.8	1.1	8.4	.8	18	15	2.0	.1	1.2	a53	14	0	76	6.9	20
June 11-20.....	1,999	11	.01	3.6	.8	11	.7	16	19	1.8	.1	1.0	64	12	0	90	6.9	25
June 21-30.....	1,721	11	.04	4.4	.4	14	.8	19	23	3.0	.1	1.4	74	13	0	106	6.8	25
July 1-10.....	1,396	13	.04	4.2	1.6	13	1.2	16	27	2.5	.0	2.0	76	17	4	110	7.0	20
July 11-20.....	1,708	12	.02	3.8	1.5	15	1.4	20	24	3.1	.0	2.3	76	16	0	112	6.9	35
July 21-31.....	1,975	12	.12	4.1	1.7	17	1.3	17	32	3.2	.0	1.9	84	17	3	126	7.2	30
Aug. 1-10.....	1,361	10	.17	4.5	1.8	19	1.7	22	32	3.9	.0	1.9	88	19	1	129	6.7	25
Aug. 11-20.....	1,035	6.7	.03	4.8	2.2	23	1.7	29	38	4.8	.0	1.0	96	21	0	156	6.8	25
Aug. 21-31.....	1,417	7.1	.03	4.8	1.4	25	1.6	26	43	5.8	.0	1.8	108	18	0	169	7.1	25
Sept. 1-10.....	3,448	11	.01	4.2	1.2	9.7	.9	17	17	2.2	.1	2.5	57	15	2	84	7.1	10
Sept. 11-16.....	2,553	11	.02	3.6	1.2	8.1	1.1	17	11	2.5	.1	1.8	a48	14	0	80	7.2	--
Sept. 17-20.....	1,610	12	.03	5.1	1.0	15	1.1	22	25	4.0	.1	.2	a75	17	0	122	7.0	--
Sept. 21-30.....	2,194	12	.08	5.2	.5	18	1.0	25	28	3.5	.1	1.4	a82	15	0	133	7.2	25
Time-weighted average.....	2,093	11	0.05	4.4	1.6	14	1.2	22	24	3.7	0.1	1.9	76	17	1	109	--	21

a Calculated from determined constituents.

TENNESSEE RIVER BASIN--Continued

3-4535. FRENCH BROAD RIVER AT MARSHALL, N. C.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily measurement at approximately 7:30 a.m./

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

3-4545. FRENCH BROAD RIVER AT HOT SPRINGS, N. C.

LOCATION.--At Hot Springs, Madison County, at bridge on U. S. Highways 25 and 70, a quarter of a mile upstream from Spring Creek.
DRAINAGE AREA.--1,567 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1957 to September 1959.
REMARKS.--No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 15, 1958.....		12	0.16	5.8	1.4	21	1.8	24	35	5.2	0.1	1.0	96	20	0	147	6.5	30
Nov. 17.....		13	.05	4.6	2.1	26	1.4	35	39	8.5	.0	.5	118	20	0	170	6.5	35
Dec. 16.....		11	.03	5.2	1.7	21	1.3	28	33	4.8	.1	.6	100	20	0	143	6.6	30
Jan. 19, 1959.....		11	.02	5.6	1.6	9.3	1.2	20	16	3.5	.1	1.0	66	20	4	92	6.1	20
Feb. 16.....		9.7	.03	4.0	.7	7.6	1.0	19	10	2.8	.0	.8	53	13	0	72	6.3	10
Mar. 16.....		11	.03	4.4	.8	15	1.0	20	25	3.5	.1	.9	a72	14	0	86	7.0	5
Apr. 16.....		11	.01	2.4	1.3	5.5	1.0	10	9.9	3.0	.1	1.4	44	11	3	56	6.7	10
May 16.....		10	.00	3.6	.8	10	1.0	21	12	2.2	.1	.5	61	12	0	81	6.4	15
June 17.....		11	.06	2.8	1.3	11	.6	18	16	2.9	.1	.3	63	12	0	92	6.6	5
July 16.....		11	.02	3.6	1.1	13	1.3	18	19	3.3	.0	.7	69	13	0	91	6.6	20
Aug. 17.....		11	.04	4.6	1.7	21	1.3	21	36	4.9	.1	1.3	96	19	1	143	6.4	15
Sept. 16.....		11	.04	3.5	1.4	11	.9	14	21	3.7	.0	.5	60	15	3	93	6.8	20

a Calculated from determined constituents.

TENNESSEE RIVER BASIN--Continued

3-4565. EAST FORK PIGEON RIVER NEAR CANTON, N. C.

LOCATION.--Temperature recorder at gaging station on right bank 800 feet upstream from U. S. Highway 276, 0.3 mile downstream from Dix Creek, 1.7 miles upstream from confluence with West Fork Pigeon River, and 5.2 miles southwest of Canton, Haywood County.
DRAINAGE AREA.--51.5 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 80°F Aug. 8; minimum, 33°F on many days during December, January and February.
EXTREMES, 1954-59.--Water temperatures: Maximum, 84°F July 15, 20, 30, Aug. 16, 1954; minimum, freezing point on several days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

3-4570. PIGEON RIVER AT CANTON, N. C.

LOCATION.--At gaging station, 0.5 mile upstream from U. S. Highways 19 and 23 at Canton, Haywood County.
DRAINAGE AREA.--133 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 9, 1958.....	89	8.2	0.01	2.2	0.7	1.2	0.9	10	1.7	1.2	0.1	0.2	a21	8	0	22	6.3	10
Nov. 5.....	83	8.3	.02	2.8	.2	1.0	.6	11	1.9	.7	.0	.3	23	8	0	24	6.4	15
Dec. 5.....	101	7.1	.02	2.2	.3	1.4	.5	9	.2	1.3	.0	.2	22	6	0	21	5.9	10
Jan. 13, 1959.....	159	6.5	.02	1.2	.7	1.1	.4	7	1.7	1.5	.0	.3	22	6	0	18	5.8	10
Feb. 9.....	210	6.6	.02	1.6	.5	1.0	.4	6	1.6	1.2	.1	.6	21	6	1	18	6.6	5
Mar. 6.....	994	5.9	.05	1.3	.6	1.0	.5	7	.7	1.2	.1	.9	18	6	0	18	6.3	10
Apr. 9.....	310	6.8	.01	1.1	.6	1.2	.4	8	.4	.8	.1	.4	18	5	0	17	6.9	10
May 7.....	330	7.6	.00	1.6	.2	1.6	.6	9	.9	.4	.0	.5	20	5	0	18	6.2	7
June 9.....	390	7.3	.01	1.1	.5	.7	.4	8	.1	.1	.0	.2	16	5	0	17	6.5	2
July 7.....	143	8.2	.01	1.8	.7	1.5	.6	10	2.1	.7	.0	.5	22	8	0	22	6.4	10
Aug. 11.....	79	8.7	.01	1.6	.8	1.6	.6	11	1.6	.9	.0	.4	21	7	0	22	6.5	5
Sept. 4.....	253	8.1	.01	1.8	1.0	1.7	.8	11	2.6	.7	.0	.3	23	8	0	25	6.6	20

a Calculated from determined constituents.

TENNESSEE RIVER BASIN--Continued

3-4595. PIGEON RIVER NEAR HEPCO, N. C.

LOCATION.--At gaging station on left bank, 0.8 mile downstream from Jonathan Creek, 2.0 miles south of Hepco, Haywood County, and 2.4 miles upstream from Fines Creek.
DRAINAGE AREA.--350 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1956, October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 8, 1958	225	12	0.42	33	3.1	87	3.6	99	31	127	0.5	1.7	406	94	13	630	6.5	400
Nov. 6	234	12	.25	32	3.1	130	3.4	139	66	132	.4	3.4	520	92	0	803	6.8	360
Dec. 4	272	10	.25	37	2.7	66	2.2	78	36	107	.2	.4	358	104	40	545	6.4	320
Jan. 13, 1959	353	9.0	.12	30	1.9	46	1.6	64	23	78	.0	.4	261	84	32	390	6.4	180
Feb. 11	525	8.5	.18	26	1.0	32	1.3	47	15	60	.2	.5	205	68	30	318	6.3	100
Mar. 10	637	9.1	.13	21	.6	27	1.2	46	14	44	.2	.4	172	54	16	253	6.5	80
Apr. 9	725	9.3	.14	21	1.2	25	1.1	56	20	33	.2	.5	162	58	12	240	6.9	120
May 13	913	8.7	.15	16	1.0	22	1.1	29	9.5	40	.2	.3	142	44	20	207	6.2	85
June 9	725	9.8	.16	18	1.2	29	1.3	28	20	48	.2	.4	182	49	26	267	6.5	100
July 8	322	12	.28	32	1.4	60	2.2	110	32	76	.4	.8	315	85	3	477	6.6	--
Aug. 11	225	13	.70	62	3.7	86	2.5	115	27	158	.2	1.6	537	169	75	739	6.7	--
Sept. 3	298	13	.63	33	2.6	105	2.8	175	32	104	.3	.8	438	92	0	640	7.1	400

3-4607.66. PIGEON RIVER AT WATERVILLE, N. C.

LOCATION.--From tailrace of Carolina Power and Light Power Plant about 7 miles below Waterville Lake at Waterville, Haywood County.
DRAINAGE AREA.--536 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1959.
REMARKS.--No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 14, 1958.....		13	0.30	31	2.4	52	3.2	86	14	89	0.3	0.8	281	88	16	439	6.5	240
Nov. 18.....		12	.41	37	2.4	83	3.1	111	22	112	.3	3.3	375	102	12	568	6.8	360
Dec. 15.....		10	.32	37	1.7	78	2.7	93	29	118	.4	.8	378	99	23	563	7.1	240
Jan. 19, 1959.....		8.0	.24	20	1.8	33	1.5	36	27	50	.0	.4	183	57	28	282	6.5	100
Feb. 18.....		7.8	.12	12	.8	16	.9	30	12	23	.1	.8	98	33	8	150	6.3	50
Mar. 17.....		8.9	.22	14	1.2	21	1.0	38	11	31	.2	.4	124	40	9	190	6.6	60
Apr. 18.....		8.5	.06	10	.4	11	.8	32	6.5	16	.1	.8	80	27	1	119	7.1	50
May 18.....		10	.14	19	1.0	22	1.3	44	12	34	.2	.3	149	52	16	218	6.4	80
June 20.....		9.7	.14	16	1.8	22	1.1	36	8.4	37	.1	.3	141	48	18	213	6.8	80
July 18.....		11	.23	26	1.5	50	1.9	78	21	67	.3	1.5	246	76	13	381	6.7	200
Aug. 18.....		11	.59	27	3.1	45	1.8	77	20	65	.3	.4	236	81	18	367	6.8	--
Sept. 14.....		11	.28	20	2.7	31	1.6	55	17	46	.0	.7	176	61	16	275	6.8	120

TENNESSEE RIVER BASIN--Continued

3-4633. SOUTH TOE RIVER NEAR CELO, N. C.

LOCATION.--Temperature recorder at gaging station on right bank 800 feet upstream from county road bridge, 0.3 mile downstream from Whiteoak Creek, 1.9 miles southeast of Celo, Yancey County.
DRAINAGE AREA.--43.4 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 76°F June 30; minimum, freezing point on several days during December, January and February.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

3-4855. DOE RIVER AT ELIZABETHTON, TENN.

LOCATION.--Temperature recorder at gaging station on left bank 1,500 feet upstream from bridge on State Highway 91 at Elizabethton, Carter County, and 1 mile upstream from mouth.
DRAINAGE AREA.--137 square miles.
RECORDS AVAILABLE.--Water temperatures: February 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 78°F June 30, July 1; minimum, freezing point on several days during January.
EXTREMES, 1954-59.--Water temperatures: Maximum, 82°F July 14, 1954; minimum, freezing point on several days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

TENNESSEE RIVER BASIN--Continued

3-5105. TUCKASEGEE RIVER AT DILLSBORO, N. C.

LOCATION.--At gaging station on left bank, 0.4 mile downstream from Scott Creek and 0.5 mile downstream from U. S. Highway 23 at Dillsboro, Jackson County.
DRAINAGE AREA.--347 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 30, 1958	451	8.1	0.03	2.4	0.3	4.4	0.9	14	4.9	0.9	0.1	0.6	34	7	0	35	6.3	40
Nov. 6	398	8.4	.08	2.0	.8	18	.8	28	24	.2	.1	1.7	98	8	0	100	6.3	140
Dec. 5	421	7.4	.02	2.0	.5	1.8	.6	7	3.8	.7	.0	.1	25	7	1	23	5.9	15
Jan. 14, 1959	441	6.1	.04	2.1	.4	9.9	.6	16	14	.7	.2	.7	54	7	0	57	5.8	50
Feb. 6	655	7.4	.03	2.4	.3	2.1	.5	10	1.3	1.0	.0	.8	26	7	0	27	6.0	10
Mar. 3	658	8.3	.02	2.0	.2	1.7	.6	11	1.0	1.2	.1	.3	22	6	0	22	6.5	5
Apr. 3	902	8.6	.04	2.4	.2	6.3	.5	16	9.3	1.2	.1	.7	46	7	0	42	7.1	40
May 26	1,330	8.3	.00	1.7	.3	1.3	.6	9	2.2	.2	.0	.2	22	6	0	20	6.5	10
June 4	1,340	7.7	.00	1.6	.3	1.7	.5	8	4.5	.7	.0	.7	32	5	0	25	6.0	5
July 10	815	7.7	.01	1.2	.7	2.4	.7	11	3.0	.1	.0	.6	33	6	0	27	6.3	30
Aug. 26	374	9.9	.37	2.6	.9	34	1.2	54	37	1.7	.2	.9	188	10	0	177	6.7	180
Sept. 23	300	9.6	.12	2.4	.9	21	1.0	34	23	.8	.1	.6	119	10	0	109	6.8	140

3-5130. TUCKASEGEE RIVER AT BRYSON CITY, N. C.

LOCATION.--At bridge on State Highway 288, at Bryson City, Swain County, 400 feet upstream from gaging station, and 0.6 mile downstream from Deep Creek.
DRAINAGE AREA.--655 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1951, October 1957 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 13, 1958.....	419	10	0.13	2.4	0.7	19	1.5	34	14	3.4	0.2	1.7	104	9	0	100	6.1	280
Nov. 14.....	551	10	.05	3.0	.6	9.4	1.1	21	12	1.7	.0	.9	60	10	0	67	6.1	50
Dec. 31.....	1,130	7.3	.05	2.4	.1	8.2	.8	14	12	.6	.0	.8	49	6	0	58	5.7	50
Jan. 20, 1959.....	1,160	7.4	.01	2.0	.2	1.6	.5	8	1.6	1.0	.0	.2	21	6	0	21	5.7	10
Feb. 25.....	1,290	7.6	.04	2.0	.5	4.6	.6	12	7.4	1.6	.0	.7	40	7	0	36	7.1	30
Mar. 19.....	1,570	7.3	.07	1.6	.7	6.2	.5	14	8.4	1.1	.1	.2	38	7	0	42	6.6	40
Apr. 8.....	1,400	7.9	.05	2.1	.2	6.2	.5	14	9.4	1.0	.1	.7	42	6	0	40	6.8	40
May 28.....	2,440	7.9	.05	1.8	.9	5.5	.7	11	8.4	.5	.1	.7	42	8	0	44	6.0	27
June 26.....	2,200	7.4	.02	2.4	.3	6.0	.8	12	9.4	.4	.1	.7	42	7	0	46	6.0	30
July 29.....	1,260	9.4	.01	1.3	.7	8.2	.8	16	11	1.0	.0	.5	53	6	0	57	6.3	70
Aug. 31.....	844	8.8	.04	1.6	.6	4.7	.8	15	5.5	.9	.0	.4	35	6	0	40	6.4	30
Sept. 17.....	582	9.2	.03	2.7	.3	13	1.1	24	15	1.2	.2	.3	73	8	0	77	6.2	80

TENNESSEE RIVER BASIN--Continued

3-6095. TENNESSEE RIVER AT KENTUCKY DAM, NEAR PADUCAH, KY.

LOCATION.--At tailrace of powerplant at Kentucky Dam at Gilbertsville, Marshall County, 3,500 feet upstream from gaging station, 3.0 miles upstream from Shadie Creek, and 16 miles east of Paducah, McCracken County.
DRAINAGE AREA.--40,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to August 1950, October 1951 to September 1954, October 1956 to September 1959.
Water temperatures: October 1952 to September 1954, October 1956 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 119 ppm Feb. 11-20; minimum, 83 ppm May 11-20.
Hardness: Maximum, 80 ppm Dec. 21 to Jan. 20, Feb. 1-10; minimum, 62 ppm July 11-19.
Specific conductance: Maximum daily, 218 micromhos Nov. 14; minimum daily, 145 micromhos June 29, July 8, 19.
Water temperatures: Maximum, 87°F Sept. 6, 7; minimum, 34°F Jan. 9, 10.
EXTREMES, 1952-54, 1956-59.--Dissolved solids: Maximum, 127 ppm Dec. 11-20, 1956; minimum, 63 ppm May 21-31, 1953.
Hardness: Maximum, 86 ppm Jan. 1-10, 1954; minimum, 48 ppm Mar. 11-20, Apr. 2-10, 1953.
Specific conductance: Maximum daily, 228 micromhos Dec. 16, 1956; minimum daily, 107 micromhos Apr. 9-10, 1953.
Water temperatures: Maximum, 88°F June 11, 1958; minimum, freezing point Feb. 20, 1958.
REMARKS.--Prior to 1952, chemical-quality samples were collected at auxiliary gaging station 17.0 miles downstream. Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge from October 1958 to September 1959 given in WSP 1626.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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
Oct. 1-10,1958	47,370	7.7		0.02	0.00	21	5.2	5.2	0.5	76	10	10	0.1	0.7	106	74	12		174	7.4	0
Oct. 12-20....	40,360	14		.08	.00	22	4.4	6.9	.8	77	14	10	.1	.8	110	73	10		180	7.4	0
Oct. 21-31....	40,800	10		.04	.00	21	5.0	5.8	.6	77	11	10	.1	.7	106	73	10		175	7.4	0
Nov. 1-10.....	40,110	8.0		.01	.01	23	3.8	5.6	.5	76	11	10	.2	.8	112	73	11		179	7.0	3
Nov. 11-15, 17-20.....	41,930	8.7		.01	.01	23	4.8	5.9	.9	77	12	12	.2	.6	112	78	14		190	7.0	3
Nov. 21-29....	40,400	6.5		.01	.01	24	4.4	5.8	.8	76	12	14	.2	.8	114	78	16		194	7.0	3
Dec. 1-10.....	48,440	8.8		.08	.01	24	4.5	7.4	.7	75	11	15	.1	1.0	113	78	17		198	7.2	5
Dec. 11-19....	30,060	6.6		.01	.01	24	4.5	7.4	.7	74	12	14	.1	.9	112	78	18		198	7.2	5
Dec. 21-31....	26,570	5.6		.01	.01	24	4.7	8.0	.7	76	12	14	.1	.6	112	80	18		196	7.1	5
Jan. 1-10,1959	44,860	4.6		.00	.00	24	4.9	7.7	1.0	75	15	14	.2	.7	110	80	18		200	7.2	5
Jan. 11-20....	48,760	5.1		.00	.01	24	4.9	7.9	.8	78	15	14	.1	.5	111	80	16		200	7.2	4
Jan. 21-31....	118,100	5.5		.03	.01	24	4.1	7.4	.9	74	13	13	.2	1.0	113	77	16		194	7.2	9
Feb. 1-10.....	46,710	7.2		.02	.00	26	3.5	7.2	.9	77	14	14	.2	1.1	118	80	16		196	7.8	5
Feb. 11-20....	115,200	5.8		.02	.00	23	5.0	6.3	1.1	74	14	14	.1	1.2	119	78	18		191	7.8	6
Feb. 21-28....	68,580	6.7		.06	.00	22	3.5	6.3	1.2	66	12	12	.2	1.7	108	70	16		172	7.7	18
Mar. 1-9.....	63,030	7.8		.04	.01	23	3.1	6.5	1.2	63	13	12	.2	2.1	112	70	19		175	7.5	9
Mar. 11-20....	55,250	9.0		.03	.00	22	4.2	6.6	1.2	72	12	12	.2	2.0	117	72	13		179	7.4	10
Mar. 21-27, 29-31.....	45,390	7.0		.03	.00	21	4.0	5.6	1.0	68	12	10	.1	1.8	108	69	14		169	7.4	5

Apr. 1-5, 7-10, 1959..	47,430	6.1		.02	.01	22	3.6	5.4	1.0	66	12	10	.1	1.7	95	70	16		171	7.1	2
Apr. 11-20....	40,280	6.5		.09	.01	22	3.6	5.9	1.1	68	12	10	.1	1.5	94	70	14		173	7.0	4
Apr. 21-30....	65,980	7.6		.02	.01	21	3.3	5.5	1.1	68	12	9.2	.1	1.3	89	66	10		167	7.1	3
May 1, 3-10...	36,720	4.7		.01	.00	21	2.7	5.4	.7	70	7.4	7.0	.1	1.0	86	64	6		157	7.4	4
May 11-20.....	33,980	6.2		.00	.01	21	3.6	4.0	.8	70	8.4	7.0	.1	1.0	83	68	10		154	7.1	3
May 21-31.....	40,000	6.2		.01	.00	21	3.2	5.5	1.0	70	9.6	6.0	.1	1.4	86	66	8		155	7.3	4
June 1-10.....	43,510	6.4		.01	.00	22	2.9	4.9	1.4	74	7.0	6.0	.1	1.5	89	67	6		158	7.5	2
June 11-20....	50,040	4.7		.01	.01	21	4.4	3.8	.9	72	9.2	6.0	.1	1.5	84	70	12		153	7.5	3
June 21-30....	39,030	4.7		.03	.00	21	3.3	4.6	1.2	72	8.6	7.0	.1	.8	87	66	7		154	7.3	4
July 1-10.....	34,610	6.0		.00	.00	21	3.0	3.8	1.0	68	9.6	6.0	.1	.7	86	65	10		150	7.2	4
July 11-19....	34,820	15		.01	.00	20	3.0	3.9	.9	68	9.6	7.0	.1	.9	97	62	7		150	6.8	5
July 21-31....	45,570	8.3		.01	.00	21	3.1	4.1	.5	68	9.6	7.0	.2	.8	93	66	10		153	7.6	5
Aug. 1-10.....	37,720	6.2		.00	.03	20	4.5	4.8	.3	70	8.8	8.0	.1	1.4	90	68	11		159	7.3	3
Aug. 11-20....	35,380	14		.00	.04	20	5.8	6.7	.8	78	9.6	9.0	.1	1.3	112	74	10		177	7.2	3
Aug. 21-31....	35,560	8.2		.00	.03	21	4.9	5.0	1.0	74	11	9.0	.1	1.2	98	72	12		172	7.3	2
Sept. 1-9.....	37,170	7.8		.00	.04	23	3.3	5.2	.7	74	11	9.0	.1	1.1	108	71	10		173	7.3	2
Sept. 11-20...	33,970	5.1		.00	.03	22	5.0	8.8	.8	82	12	10	.1	1.0	107	76	8		188	7.1	3
Sept. 21-30...	33,480	5.8		.00	.03	22	5.5	6.0	.8	74	13	10	.1	1.4	108	78	17		180	7.2	2
Time-weighted average....	46,950	7.3		0.02	0.01	22	4.1	5.9	0.9	73	11	10	0.1	1.1	103	72	12		175	--	4

TENNESSEE RIVER BASIN--Continued

3-6095. TENNESSEE RIVER AT KENTUCKY DAM NEAR PADUCAH, KY--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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....	71	68	68	67	71	71	70	70	68	68	--	58	--	--	--	70	70	70	71	68	68	68	69	69	69	69	68	65	64	60	68	68
November...	68	60	60	60	60	60	60	60	59	60	64	64	59	58	60	58	60	58	57	58	58	58	58	58	57	57	56	55	54	48	--	59
December...	48	50	50	50	48	48	48	--	45	45	45	45	43	43	42	42	42	42	42	41	41	41	40	40	40	40	40	39	42	42	42	44
January....	40	45	46	38	37	40	41	38	34	34	35	35	35	36	36	36	36	36	36	43	41	36	36	35	40	40	41	40	40	40	41	38
February...	39	39	40	40	40	40	40	41	40	40	40	45	46	46	46	46	44	44	44	44	44	46	46	44	44	46	46	46	--	--	--	43
March.....	46	48	44	45	47	48	46	48	48	--	48	48	48	48	48	49	46	46	49	46	49	49	53	53	53	49	49	--	50	49	53	48
April.....	53	55	55	56	56	-	62	62	58	58	58	58	58	58	57	58	58	58	57	57	58	59	58	59	59	59	59	62	62	62	--	58
May.....	62	--	63	66	--	74	72	73	73	72	73	72	72	72	72	71	70	70	70	71	72	71	73	73	73	--	--	80	80	80	76	72
June.....	76	74	75	75	75	76	78	79	78	78	80	80	79	80	84	82	82	81	81	81	82	81	82	82	83	83	83	84	82	82	--	80
July.....	83	84	84	84	84	85	84	84	84	84	83	--	--	85	85	82	82	83	85	--	83	83	82	82	83	82	82	84	84	83	83	83
August.....	83	83	83	86	86	83	83	83	83	83	85	85	84	84	84	83	83	86	86	82	82	82	85	84	86	84	84	84	83	84	84	84
September..	84	84	82	82	84	87	87	84	84	--	84	84	79	82	80	80	76	76	76	76	76	76	76	78	78	76	78	78	76	76	--	80

3-6115 (revised). OHIO RIVER AT METROPOLIS, ILL.

LOCATION.--Temperature recorder at gaging station at Paducah and Illinois Railroad bridge at Metropolis, Massac County, 9.5 miles downstream from Tennessee River, and 37 miles upstream from mouth.
DRAINAGE AREA.--203,000 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.
Water temperatures: March 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 84°F July 30 to Aug. 6, Aug. 23-27, 30; minimum, 34°F Dec. 17-22, Jan. 10-14, 18-21.
EXTREMES, 1954-59.--Water temperatures: Maximum, 88°F Aug. 3-6, 1955; minimum, freezing point Feb. 20-24, 1958.
REMARKS.--Records of water discharge for water year October 1958 to September 1959 given as station No. 3-3870 in WSP 1625.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

OHIO RIVER MAIN STEM

3-6125 (revised), OHIO RIVER AT LOCK AND DAM 53, NEAR GRAND CHAIN, ILL.

LOCATION.--About 1,500 feet upstream from dam, lock and dam 53 (mile 962.6) near Grand Chain, Pulaski County, 7,300 feet downstream from Bledsoe Creek, 18.5 miles downstream from gage at Metropolis, and 29.7 miles downstream from Tennessee River.
DRAINAGE AREA.--203,100 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1959.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 310 ppm Dec. 1-9; minimum, 156 ppm Feb. 1-10.
Hardness: Maximum, 192 ppm Dec. 1-9; minimum, 100 ppm Aug. 22-31.
Specific conductance: Maximum daily, 563 micromhos Dec. 8, 9; minimum daily, 217 micromhos Feb. 4.
Water temperatures: Minimum, freezing point Dec. 21-25.
EXTREMES, 1954-59.--Dissolved solids: Maximum, 310 ppm Dec. 1-9, 1958; minimum, 128 ppm Mar. 11-20, 1955.
Hardness: Maximum, 192 ppm Dec. 1-9, 1958; minimum, 84 ppm Mar. 11-20, 1955, Feb. 11-20, 1957.
Specific conductance: Maximum daily, 577 micromhos Dec. 19, 1956; minimum daily, 170 micromhos Feb. 9, 1957.
Water temperatures: Maximum (1954-58), 87°F Aug. 5, 1955; minimum, freezing point on several days during February and December 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Columbus, Ohio. Records of discharge for gaging station at Metropolis for water year October 1958 to September 1959 given in WSP 1625. No appreciable inflow between gage and station.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Phosphorus as PO_4	Specific conductance (micromhos at 25°C)	pH	Color
																Calcium, magnesium	Noncarbonate				
Oct. 1-8, 10, 1958.....	120,900	5.2		0.01	0.00	39	9.5	12	2.1	105	51	18	0.3	1.9	185	137	50	0.40	337	7.3	4
Oct. 11-20....	100,600	7.3		.01	.00	36	9.7	13	2.1	95	51	17	.3	1.6	179	130	52	.40	325	7.3	5
Oct. 21-31....	88,640	4.6		.01	.00	36	8.8	13	1.9	98	47	19	.2	1.2	170	126	46	.30	319	7.4	5
Nov. 1-10.....	90,000	4.0		.01	.01	39	9.8	14	1.8	104	52	21	.3	1.6	204	138	53	.29	316	7.2	5
Nov. 11-20....	99,410	4.7		.01	.01	35	9.7	11	1.5	100	42	18	.2	1.4	181	128	46	.24	349	7.2	5
Nov. 21-30....	146,200	5.4		.02	.01	50	13	20	1.8	123	78	30	.4	3.4	296	179	78	.20	460	7.4	9
Dec. 1-9.....	183,700	8.2		.01	01	54	14	23	2.9	128	86	34	.3	4.6	310	192	87	.20	494	7.7	6
Dec. 11-20....	151,300	7.7		.01	.01	46	14	18	2.4	122	66	27	.3	3.5	254	173	72	.20	421	7.7	5
Dec. 21-22, 24-29.....	96,940	7.9		.01	.01	46	11	15	1.9	120	58	24	.2	2.9	235	160	62	.25	390	7.5	6
Jan. 1-10,1959	164,600	8.2		.02	.00	48	12	18	2.0	120	69	27	.2	4.2	246	170	71	.25	424	7.5	8
Jan. 11-20....	166,600	6.7		.01	.01	44	11	17	1.9	106	63	24	.2	4.1	219	155	68	.20	392	7.3	5
Jan. 21-23, 25-31.....	607,100	6.6		.19	.01	31	7.0	9.4	2.6	78	41	14	.2	4.2	164	107	42	.25	273	7.2	37
Feb. 1-10.....	606,000	6.8		.10	.02	28	7.8	6.7	2.3	76	39	9.5	.1	4.3	156	102	40	--	248	7.4	22
Feb. 11-20....	497,700	7.3		.06	.01	36	9.9	9.1	1.9	92	51	14	.1	4.6	197	131	55	--	309	7.5	9
Feb. 21-28....	632,200	7.0		.09	.01	32	8.3	6.6	2.0	84	42	9.9	.1	4.6	170	114	45	--	266	7.6	20
Mar. 1-10.....	386,000	8.2		.01	.00	40	12	9.7	2.2	111	53	14	.1	4.4	214	150	58	.19	338	7.6	8
Mar. 11-20....	352,100	8.0		.04	.00	44	13	12	1.8	118	61	16	.1	4.8	237	164	67	.64	373	7.9	7
Mar. 21, 23-31.	313,700	8.0		.02	.00	43	13	11	1.7	117	61	16	.2	5.0	227	161	64	.38	366	7.8	6

Apr. 1-10,1959	292,200	9.5		.00	.00	43	11	12	1.6	114	62	16	.2	4.5	235	152	58	.25	362	7.5	5
Apr. 11-18, 20	356,800	7.4		.01	.01	38	9.8	10	1.5	96	54	15	.2	4.0	206	136	57	.25	318	7.3	5
Apr. 21-30....	319,600	8.4		.00	.01	32	8.8	9.3	1.5	88	46	12	.2	3.2	176	116	44	.25	278	7.4	5
May 1-10.....	268,500	9.0		.00	.01	38	11	11	2.0	102	55	14	.3	3.9	208	140	56	.30	325	7.2	2
May 11-20.....	234,100	9.6		.00	.00	41	12	12	2.3	106	66	16	.3	4.3	240	152	64	.28	360	7.2	3
May 21-31.....	244,400	9.7		.03	.00	39	11	13	2.1	105	54	17	.3	3.6	225	143	56	.30	344	7.1	4
June 1-10.....	200,700	9.8		.01	.07	43	11	13	1.7	110	58	20	.2	4.1	234	152	62	.20	367	7.4	4
June 11-20....	135,500	7.0		.01	.04	40	10	11	1.3	112	50	16	.2	3.3	216	141	49	.20	342	7.4	4
June 21-30....	108,200	6.6		.01	.05	39	9.4	11	1.6	110	46	16	.2	3.6	208	136	46	.16	323	7.6	5
July 1-10.....	102,000	6.6		.01	.05	40	10	13	1.6	110	51	20	.3	2.8	218	141	51	.20	350	7.7	4
July 11-20....	79,750	6.7		.01	.05	33	7.8	9.8	1.0	98	38	15	.3	2.4	179	115	34	.25	287	7.7	4
July 21-31....	113,900	5.9		.01	.05	37	9.9	13	1.8	97	52	20	.2	2.0	212	133	54	.20	331	7.7	4
Aug. 1, 3-10..	121,200	6.2		.01	.05	42	11	25	1.9	96	66	40	.3	2.3	275	150	72	.18	425	7.4	4
Aug. 11-20....	99,830	7.9		.01	.05	30	9.0	15	1.9	80	46	25	.2	1.7	195	112	46	.20	308	7.3	4
Aug. 22-31....	86,620	7.2		.01	.06	28	7.3	11	1.6	76	40	17	.2	1.6	171	100	38	.11	265	7.4	4
Sept. 1-10....	93,850	3.4		.00	.00	31	9.5	13	2.0	82	46	23	.2	1.7	177	117	50	.19	305	7.5	4
Sept. 11-20...	68,560	6.4		.00	.00	30	10	13	2.0	82	41	23	.2	1.5	174	116	49	.20	298	7.5	4
Sept. 21-30...	58,530	6.0		.00	.00	29	7.4	12	2.1	80	36	21	.3	1.6	168	103	38	.23	273	7.5	5
Time-weighted average.....	214,300	7.1		0.02	0.02	38	10	13	1.9	101	53	19	0.2	3.2	210	136	53	0.25	340	--	7

OHIO RIVER MAIN STEM--Continued

3-6125. OHIO RIVER AT LOCK AND DAM 53, NEAR GRAND CHAIN, ILL.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

MISCELLANEOUS ANALYSES OF STREAMS IN OHIO RIVER BASIN

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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
POTATO CREEK BASIN																					
COLE CREEK ON STATE HIGHWAY 446, AT FARMERS VALLEY, PA.																					
Sept. 3, 1959a								342		122	18	740		0.8	1,450	420	320		2,540	7.2	2
Sept. 3b.....								169		87	16	365		.8	746	235	164		1,340	7.9	1

a above refinery.
b below refinery.

KANAWHA RIVER BASIN IN NORTH CAROLINA

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color
3A-1603.1. HOWARD CREEK AT SANDS																		
June 23, 1959.....	9.46	15	0.02	3.4	1.4	1.9	0.5	16	0.2	1.9	0.0	1.2	35	14	0	41	6.5	
Sept. 17.....	15.9	11	.03	3.3	1.1	1.5	.5	17	1.0	1.2	.0	.7	28	13	0	35	6.6	
3A-1610. SOUTH FORK NEW RIVER NEAR JEFFERSON																		
Dec. 16, 1958.....	220	8.7	0.05	1.5	0.6	1.4	0.5	9	0.1	0.6	0.0	1.0	18	6	0	19	6.3	12
July 21, 1959.....	218	10	.04	2.5	.9	1.7	.7	16	1.0	.8	.0	1.0	27	10	0	30	7.2	4
3A-1622.2. HORSE CREEK AT BINA																		
June 23, 1959.....	23.4	12	0.01	4.3	1.0	2.6	1.2	20	0.2	2.5	0.1	1.1	35	15	0	48	6.6	
Sept. 17.....	18.9	11	.04	4.2	1.1	2.6	1.4	24	.1	2.5	.1	.9	36	15	0	46	7.3	
3A-1625. NORTH FORK NEW RIVER AT CRUMPLER																		
Jan. 11, 1959.....	536	15	0.05	3.6	1.1	2.9	0.9	15	1.5	2.1	0.0	4.0	38	13	1	42	6.7	7

MISCELLANEOUS ANALYSES OF STREAMS IN OHIO RIVER BASIN--Continued

TENNESSEE RIVER BASIN IN NORTH CAROLINA AND GEORGIA

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
3B-4410. DAVIDSON RIVER NEAR BREVARD, N. C.																		
Oct. 3, 1958.....	80	7.4	0.00	1.2	0.4	1.2	0.4	8	1.0	0.1	0.0	0.1	16	5	0	14	6.3	10
Apr. 8, 1959.....	109	7.2	.01	1.0	.2	1.0	.3	7	.1	.2	.0	.2	13	3	0	12	6.3	3
3B-4460. MILLS RIVER NEAR MILLS RIVER, N. C.																		
Oct. 7, 1958.....	56	8.0	0.00	1.6	0.4	1.4	0.5	8	0.6	0.3	0.0	0.6	17	6	0	18	5.7	10
Apr. 7, 1959.....	167	6.4	.01	.9	.2	1.2	.3	6	.1	.5	.0	.4	13	3	0	13	6.2	4
3B-4485. HOMINY CREEK AT CANDLER, N. C.																		
Oct. 13, 1958.....	41	15	0.04	3.2	1.6	2.8	1.2	20	3.4	2.8	0.0	0.9	41	14	0	44	6.5	5
Apr. 9, 1959.....	74.6	12	.04	2.7	.8	2.6	1.1	16	2.0	1.0	.0	.8	31	10	0	36	6.5	6
3B-4489.1. SWANNANOA RIVER AT GROVESTONE AT SWANNANOA, N. C.																		
Nov. 10, 1958.....	11.4			3.0	0.8	2.6	1.2	17	1.2	2.4		0.6		11	0	35	6.5	
June 18, 1959.....	27.1	9.7	0.06	4.9	1.8	6.7	.4	35	.2	3.0	0.0	.7	44	19	0	65	7.0	
3B-4500. BEETREE CREEK NEAR SWANNANOA, N. C.																		
Oct. 8, 1958.....	1.2	10	0.00	1.5	0.5	1.6	0.5	9	1.1	0.6	0.0	0.3	20	6	0	20	6.2	5
Apr. 8, 1959.....	12.5	7.3	.00	1.3	.3	1.3	.5	7	2.0	.6	.0	.1	16	5	0	17	6.6	4
3B-4510. SWANNANOA RIVER AT BILTMORE, N. C.																		
Oct. 7, 1958.....	35	13	0.07	3.8	1.6	11	1.5	31	5.7	5.3	0.0	1.6	59	16	0	80	6.5	4
Apr. 7, 1959.....	181	8.4	.04	2.1	.8	10	1.1	24	9.3	1.3	.0	1.5	47	8	0	72	6.4	5
3B-4530. IVY RIVER NEAR MARSHALL, N. C.																		
Oct. 17, 1958.....	34	17	0.08	5.9	2.5	4.2	2.0	37	1.4	1.5	0.1	0.4	53	25	0	66	6.6	9
Apr. 10, 1959.....	150	13	.03	3.8	1.6	3.0	1.2	23	2.1	1.1	.0	1.2	38	16	0	48	6.8	5
3B-4540. BIG LAUREL CREEK NEAR STACKHOUSE, N. C.																		
Oct. 17, 1958.....	42	13	0.05	4.4	1.5	2.9	1.1	25	2.2	2.1	0.0	0.5	40	17	0	45	6.7	4
Apr. 8, 1959.....	201	10	.01	3.0	.9	1.8	.8	15	1.8	.6	.0	1.1	27	11	0	35	6.5	2
BUBBLING SPRINGS AT HOT SPRINGS, N. C.																		
Apr. 14, 1959.....		12	0.00	18	10	0.3	1.9	104	1.3	1.4	0.2	0.9	a97	66	1	168	7.7	5

CASCADE BRANCH AT HOT SPRINGS, N. C.

Apr. 14, 1959.....		11	0.01	0.8	0.6	1.6	1.1	6	3.6	1.5	0.1	0.2	a27	5	0	22	6.5	10

3B-4555. WEST FORK PIGEON RIVER ABOVE LAKE LOGAN NEAR HAZELWOOD, N. C.

Oct. 13, 1958.....	29	6.2	0.00	1.2	0.2	1.0	0.4	7	0.7	0.1	0.0	0.1	13	4	0	13	5.9	12
Apr. 7, 1959.....	98.9	5.6	.00	1.6	.2	.9	.5	6	2.6	.2	.0	.4	15	5	0	17	5.9	2

3B-4560. WEST FORK PIGEON RIVER BELOW LAKE LOGAN NEAR WAYNESVILLE, N. C.

Oct. 13, 1956.....	41	6.2	0.07	5.1	1.0	1.0	0.5	7	0.7	8.4	0.0	0.3	26	17	11	45	5.7	15
Apr. 8, 1959.....	183	5.9	.04	1.0	.2	.8	.4	6	.2	.2	.0	.5	12	3	0	13	6.2	2

3B-4575. ALLEN CREEK NEAR HAZELWOOD, N. C.

Oct. 13, 1958.....	10	9.1	0.01	1.6	0.6	1.2	0.4	10	0.6	0.2	0.0	0.3	19	7	0	17	6.3	6
Apr. 8, 1959.....	44.4	7.6	.00	1.3	.2	.9	.6	8	.1	.2	.0	.4	15	4	0	15	6.3	2

3B-4590. JONATHAN CREEK NEAR COVE CREEK, N. C.

Oct. 13, 1958.....	42	12	0.02	4.1	0.7	2.5	0.9	14	4.3	1.5	0.0	1.2	34	13	2	40	6.2	2
Apr. 9, 1959.....	154	8.9	.02	1.7	.3	1.5	.7	10	1.3	.5	.0	.9	21	6	0	22	6.4	3

ROUGH CREEK AT CANTON, N. C.

Nov. 11, 1958.....		15	0.01	3.2	1.0	2.0	0.8	20	0.9	0.5	0.0	0.1	a34	12	0	36	7.4	3

PIGEON RIVER AT CANTON, N. C.

Nov. 11, 1958.....		8.2	0.01	2.1	0.8	1.1	0.7	12	2.0	0.5	0.0	0.2	a23	8	0	27	6.6	3

3B-4640. CANE RIVER NEAR SIOUX, N. C.

Oct. 9, 1958.....	72	14	0.06	3.7	1.3	3.3	1.3	22	1.7	1.5	0.0	1.4	39	14	0	45	6.7	6
Apr. 17, 1959.....	395	9.7	.01	2.5	.9	1.4	.4	13	1.3	.7	.0	1.4	24	10	0	31	6.7	3

WINKLERS CREEK NEAR BOONE, N. C.

Apr. 15, 1959.....		5.6	0.02	1.4	0.3	1.2	0.2	8	0.8	0.7	0.1	0.4	a20	5	0	15	6.6	10

a Dissolved solids (residue at 180°C).

MISCELLANEOUS ANALYSES OF STREAMS IN OHIO RIVER BASIN--Continued

TENNESSEE RIVER BASIN IN NORTH CAROLINA AND GEORGIA--Continued

Chemical analyses, in parts per million, water year October 1958 to September 1959--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
3B-4790. WATAUGA RIVER NEAR SUGAR GROVE, N. C.																		
Oct. 9, 1956.....	31	12	0.05	4.4	1.6	2.6	1.0	24	2.0	3.0	0.0	0.7	39	17	0	46	6.7	3
3B-5000. LITTLE TENNESSEE RIVER NEAR PRENTISS, N. C.																		
Oct. 15, 1958.....	122	11	0.06	1.6	0.9	3.8	0.8	12	2.0	3.8	0.0	1.2	31	8	0	32	6.3	4
May 18, 1959.....	251	8.6	.07	1.6	.2	1.4	.5	9	.4	.7	.0	.4	18	5	0	16	6.5	5
3B-5005. CULLASAJA RIVER AT HIGHLANDS, N. C.																		
Oct. 7, 1958.....	14	5.1	0.16	1.0	0.5	1.4	0.5	8	0.1	0.6	0.0	0.6	14	5	0	16	6.2	27
May 6, 1959.....	43.2	4.7	.04	1.1	.1	1.0	.3	6	.3	.1	.0	.3	11	3	0	11	6.2	2
3B-5010. CULLASAJA RIVER AT CULLASAJA, N. C.																		
Oct. 7, 1956.....	60	9.4	0.11	1.9	0.4	1.8	0.6	11	0.5	2.0	0.0	0.3	22	7	0	21	6.5	4
May 6, 1959.....	157	6.9	.01	1.4	.3	1.2	.4	8	.3	.6	.0	.2	15	5	0	16	6.7	4
3B-5030. LITTLE TENNESSEE RIVER AT NEEDMORE, N. C.																		
Oct. 14, 1958.....	339	8.3	0.04	1.8	0.9	1.9	0.7	13	0.7	1.0	0.0	0.3	22	6	0	23	6.5	7
May 13, 1959.....	624	7.2	.06	1.4	.6	1.5	.6	10	.1	1.4	.0	.6	16	6	0	20	6.7	3
3B-5040. NANTAHALA RIVER NEAR RAINBOW SPRINGS, N. C.																		
Oct. 17, 1958.....	54	8.7	0.01	1.3	0.7	1.2	0.4	11	0.5	0.2	0.0	0.0	16	6	0	17	6.3	10
Apr. 15, 1959.....	301	5.7	.01	1.4	.1	1.0	.3	7	.3	.2	.0	.3	12	4	0	14	6.2	4
3B-5055. NANTAHALA RIVER AT NANTAHALA, N. C.																		
Oct. 27, 1958.....	600	6.6	0.00	1.4	0.5	0.9	0.3	9	0.5	1.3	0.0	0.2	14	5	0	15	6.3	7
May 1, 1959.....	645	5.3	.04	1.2	.3	1.1	.5	8	.2	.7	.0	.6	14	4	0	15	6.2	5
3B-5080. TUCKASEGEE RIVER AT TUCKASEGEE, N. C.																		
Oct. 6, 1958.....	10	8.9	0.05	2.1	0.6	1.6	0.6	10	2.1	2.6	0.0	0.7	24	6	0	25	6.4	2
Apr. 17, 1959.....	621	6.4	.05	1.4	.3	1.3	.5	8	.7	.8	.0	.3	16	5	0	16	6.3	3
3B-5090. SCOTT CREEK ABOVE SYLVA, N. C.																		
Oct. 6, 1958.....	46	12	0.01	2.6	0.9	1.9	0.8	16	0.8	0.4	0.0	0.5	28	10	0	28	6.6	4
Apr. 17, 1959.....	147	8.9	.01	1.9	.7	1.5	.6	12	1.3	.8	.0	.7	22	8	0	24	6.3	3

3B-5113.6. SOCO CREEK NEAR CHEROKEE, N. C.

June 18, 1959.....	59.3	11	0.00	2.1	0.6	1.3	0.4	10	0.1	1.0	0.0	0.7	22	6	0	21	6.2	

3B-5120. OCONALUFTEE RIVER AT BIRDTOWN, N. C.

Oct. 13, 1958.....	148	9.2	0.01	1.5	0.3	1.6	0.5	10	0.9	0.4	0.0	0.3	20	5	0	17	6.5	3
June 2, 1959.....	800	6.0	.07	1.3	.2	1.0	.6	7	1.4	.6	.0	.6	15	4	0	17	6.5	7

3B-5135. NOLAND CREEK NEAR BRYSON CITY, N. C.

Oct. 22, 1958.....	9.0	7.4	0.01	1.0	0.2	1.1	0.4	7	2.0	0.2	0.0	0.3	16	3	0	12	6.4	5
May 25, 1959.....	41.5	5.1	.00	1.0	.2	.8	.4	6	.7	.6	.0	.2	12	3	0	11	6.5	7

3B-5450. HIWASSEE RIVER AT PRESLEY, GA.

Oct. 24, 1956.....	35	9.5	0.02	1.2	0.3	1.4	0.7	9	0.2	0.4	0.0	0.1	16	4	0	16	6.4	11
Apr. 15, 1959.....	185	6.5	.01	.9	.2	1.0	.4	7	.1	.9	.0	.2	13	3	0	13	6.3	2

3B-5480. HIWASSEE RIVER BELOW HAYESVILLE, N. C.

Oct. 24, 1958.....	10	6.4	0.00	2.0	0.5	1.4	0.7	11	0.7	0.3	0.0	0.5	18	7	0	21	6.3	2
Apr. 15, 1959.....	1,500	5.1	.04	1.6	.4	1.3	.7	10	.8	.9	.0	.6	16	6	0	21	6.3	8

3B-5465. HIWASSEE RIVER ABOVE MURPHY, N. C.

Oct. 27, 1956.....	218	12	0.04	2.7	0.4	1.8	0.8	14	1.4	0.3	0.0	0.3	27	8	0	25	6.5	10
Apr. 16, 1959.....	578	6.3	.04	1.4	.8	1.2	.5	10	.2	1.5	.0	.6	16	7	0	21	6.6	3

3B-5500. VALLEY RIVER AT TOMOTLA, N. C.

Oct. 27, 1956.....	54	7.6	0.04	5.7	1.1	1.4	0.6	24	1.3	0.4	0.0	0.4	31	19	0	42	6.5	9
Apr. 16, 1959.....	346	6.2	.00	2.8	.6	1.0	.4	13	1.4	.7	.0	.4	20	10	0	25	6.8	2

3B-5505. NOTTELY RIVER NEAR BLAIRSVILLE, GA.

Oct. 24, 1958.....	46	12	0.07	1.8	0.6	2.1	0.8	13	0.6	0.4	0.0	0.5	25	7	0	23	6.4	4
Apr. 16, 1959.....	199	7.7	.02	1.1	.3	1.3	.5	7	.2	1.6	.0	.3	16	4	0	16	6.7	4

3B-5535. NOTTELY RIVER AT NOTTELY DAM NEAR IVYLOG, GA.

Oct. 24, 1958.....	12	9.1	0.04	2.0	0.9	1.7	0.8	12	1.1	0.3	0.0	0.7	23	9	0	24	6.2	10
Apr. 16, 1959.....	1,700	6.4	.01	1.8	.4	1.6	.6	9	1.0	1.2	.0	1.0	20	6	0	22	6.7	2

PART 4. ST. LAWRENCE RIVER BASIN

STREAMS TRIBUTARY TO LAKE SUPERIOR

4-155. SECOND CREEK NEAR AURORA, MINN.

LOCATION.--At bridge at mouth, 0.4 mile downstream from gaging station, 0.5 mile downstream from First Creek, and 2.1 miles east of Aurora, St. Louis County.
DRAINAGE AREA.--26.3 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
Water temperatures: April 1956 to September 1959 (discontinued).
EXTREMES, 1958-59.--Dissolved solids: Minimum, 131 ppm May 1-31.
Hardness: Minimum, 76 ppm May 1-31.
Specific conductance: Minimum daily, 169 micromhos May 5.
Water temperatures: Maximum, 82°F July 27-28; minimum, freezing point on many days during December to March.
EXTREMES, 1956-59.--Dissolved solids (1957-59): Minimum, 104 ppm June 5-8, 1958.
Hardness (1957-59): Minimum, 44 ppm June 5-8, 1958.
Specific conductance (1957-59): Minimum daily, 110 micromhos June 7-8, 1958.
Water temperatures: Maximum, 82°F July 27-28, 1959; minimum, freezing point on many days during winter months each year.
REMARKS.--Records of specific conductance of daily samples available in district office in Lincoln, Nebr. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity: Maximum	Turbidity: Minimum
Oct. 1-31, 1958	15.3	14	0.04	--	25	11	9.4	--	75	40	17	0.3	0.9	187	0.25	7.72	108	46	0.4	249	6.7	45	2	2
Oct. 1 b.....	23	--	.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	231	--	--	--	--
Nov. 1-30.....	17.0	15	.07	--	22	11	7.2	2.3	71	34	15	.3	1.9	171	.23	7.85	99	41	.3	244	6.8	45	9	1
Jan. 24, 1959..	3.5	21	.01	--	28	14	9.2	--	114	29	16	.3	.1	191	.26	1.80	127	34	.4	289	7.2	14	.9	.9
Feb. 27.....	2.8	19	.03	--	33	16	15	--	112	36	35	.4	1.0	261	.35	1.97	149	57	.5	370	7.1	21	1	1
Mar. 15-22.....	3.96	16	.03	--	31	15	13	3.6	91	42	35	.5	3.9	255	.35	2.73	139	64	.5	356	7.0	17	9	9
Mar. 23-29.....	5.13	14	.02	--	26	13	13	--	84	34	27	.4	1.5	203	.28	2.81	117	48	.5	294	6.9	18	25	25
Mar. 30-Apr. 30	23.0	11	.15	--	17	9.4	8.1	--	60	27	14	.3	1.1	140	.19	8.69	81	32	.4	204	7.0	28	3	3
May 1-31.....	32.5	7.6	.03	--	16	8.8	6.3	2.0	58	25	11	.3	1.1	131	.18	11.5	76	28	.3	187	6.9	45	4	1
June 1-30.....	28.5	9.6	.10	--	22	10	13	--	77	34	16	.5	3.0	170	.23	13.1	97	34	.6	247	7.1	70	20	1
June 3 a.....	26	--	.36	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July 1-31.....	22.1	13	.05	--	25	13	13	--	102	34	16	.5	.7	192	.26	11.5	116	32	.5	284	7.4	65	2	1
Aug. 1-31.....	14.5	14	.03	--	26	14	12	--	106	40	11	.4	1.2	193	.26	7.56	121	34	.5	287	6.7	41	1	.4
Sept. 1-30.....	23.6	16	.82	.00	22	12	9.7	3.0	79	47	9.3	.4	2.1	194	.26	12.4	106	41	.4	257	6.5	70	1	.5
Weighted average b..	20.9	12	--	--	21	11	11	--	76	34	14	0.4	1.6	169	0.23	9.54	98	36	0.5	240	--	--	--	--
Weighted average c..	16.4	13	--	--	22	11	11	--	79	34	14	0.4	1.5	172	0.23	7.62	101	36	0.5	246	--	--	--	--

a Not included in weighted average.
b Represents 92 percent of runoff for water year.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-155. SECOND CREEK NEAR AURORA, MINN.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement between 12 m. and 4 p.m.)

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October....	48	47	51	52	47	47	50	54	47	48	48	48	48	50	53	53	54	55	51	51	51	51	48	48	47	47	43	43	45	45	41	49
November...	44	44	42	42	38	38	38	38	33	35	38	40	40	37	37	39	39	35	35	33	35	35	35	33	33	33	33	33	33	33	--	37
December...																																e32
January....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	e32
February...	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	e32
March.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32	32	31	32	32	31	32	32	34	34	34	34	34	34	34	34	34	--
April.....	36	36	36	36	38	38	35	36	37	36	36	40	44	45	45	42	42	44	44	45	45	46	48	48	48	44	44	45	45	43	--	42
May.....	56	57	58	58	58	47	45	58	58	54	55	48	47	45	45	56	56	55	55	52	52	54	54	59	59	65	65	60	60	55	55	55
June.....	62	63	59	59	74	75	78	78	74	74	70	64	63	63	67	68	67	68	72	72	67	65	64	64	67	67	70	70	57	57	--	67
July.....	63	64	69	69	64	65	65	65	64	63	66	66	68	69	68	68	73	73	75	75	78	78	67	67	73	73	82	82	79	77	68	70
August.....	78	78	78	72	73	70	68	66	66	68	68	64	64	69	69	68	69	70	70	72	72	68	68	69	67	67	65	71	71	65	65	69
September..	64	64	62	66	64	68	67	66	64	60	58	63	62	58	53	54	53	55	53	58	64	60	59	58	55	58	55	54	53	--	--	60

e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-160. PARTRIDGE RIVER NEAR AURORA, MINN.

LOCATION.--At gaging station at highway bridge, 1,000 feet downstream from Second Creek, 2.5 miles east of Aurora, St. Louis County, and 2.8 miles upstream from mouth.
DRAINAGE AREA.--156 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
Water temperatures: April 1956 to September 1959 (discontinued).
EXTREMES, 1958-59.--Dissolved solids: Minimum, 76 ppm May 8-31.
Hardness: Minimum, 32 ppm May 8 to June 22.
Specific conductance: Minimum daily, 53 micromhos June 8.
Water temperatures: Maximum, 82°F July 27-29; minimum, freezing point on many days during December to March.
EXTREMES, 1956-59.--Dissolved solids (1957-59): Minimum, 76 ppm May 8-31, 1959.
Hardness (1957-59): Minimum, 30 ppm June 11-17, 1958.
Specific conductance (1957-59): Minimum, 56 micromhos June 8, 1959.
Water temperatures: Maximum, 82°F June 10, 1956, July 29, 1957, July 27-29, 1959; minimum, freezing point on many days during winter months each year.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					Maximum	Minimum
Oct. 1-31, 1958	95.0	11	0.28	9.0	4.8	2.6	--	28	18	3.0	0.2	1.3	112	0.15	28.7	42	19	0.2	95	6.1	190	4	2
Oct. 1 a	198	--	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	81		--	--	--
Nov. 1-30	94.4	12	.29	11	5.2	3.9	1.0	34	22	4.8	.2	1.7	115	.16	29.3	49	21	.2	115	6.5	160	4	4
Jan. 24, 1959	14	15	.19	13	6.2	4.2	--	52	17	3.9	.2	1.0	124	.17	4.69	58	15	.2	129	6.9	120	--	1
Feb. 27	8.5	16	.21	19	9.6	7.5	--	71	22	14	.3	1.9	159	.22	3.65	87	29	.3	208	7.0	80	1	1
Mar. 15-22	14.5	14	.19	19	9.9	7.6	2.1	63	25	18	.3	4.0	162	.22	6.34	88	36	.4	222	6.9	65	6	5
Mar. 23-31	32.4	12	.14	17	8.4	7.0	--	58	23	13	.3	2.0	136	.18	11.9	77	29	.3	190	6.9	50	--	--
Apr. 1-30	50.2	11	.25	13	5.7	5.8	--	45	19	7.2	.2	1.5	112	.15	15.2	56	19	.3	141	6.8	70	4	4
May 1-7	76.3	6.8	.09	10	5.6	4.9	--	42	15	4.8	.4	1.2	89	.12	18.3	48	14	.3	119	6.8	60	--	--
May 8-31	245	5.4	.10	7.3	3.4	2.8	.8	26	12	2.0	.2	1.4	76	.10	50.3	32	11	.2	79	6.6	100	5	4
June 1-22	236	4.0	.15	6.6	3.8	2.6	--	26	14	.1	.3	1.3	94	.11	53.5	32	11	.2	74	6.6	140	1	1
June 3 a	222	--	.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June 23-28	85.5	7.2	.19	12	5.8	6.1	--	44	19	6.5	.4	1.4	120	.16	27.7	54	18	.4	131	6.9	160	--	--
June 29-July 4	110	6.9	.20	10	5.6	5.1	--	42	17	3.7	.4	.8	114	.16	33.9	48	14	.3	114	6.8	170	b5	b5
July 5-31	55.5	8.3	.19	12	7.3	4.9	--	52	20	4.2	.3	.8	124	.17	18.6	60	17	.3	137	7.1	150	c1	c1
Aug. 1-31	37.4	9.5	.08	14	7.1	3.2	--	57	21	.2	.3	1.5	124	.17	12.5	64	17	.2	149	6.5	110	.5	.5
Sept. 1-30	134	11	d.16	11	5.0	3.9	1.2	35	21	1.2	.2	1.9	123	.17	44.5	48	19	.2	111	6.2	180	3	1
Weighted average e	103	8.1	--	9.5	4.7	4.0	--	34	17	2.6	0.2	1.4	102	0.14	28.4	43	15	0.3	102	--	--	--	--
Weighted average f	80.0	8.5	--	9.8	5.0	4.1	--	35	17	2.9	0.2	1.5	104	0.14	22.5	44	15	0.3	105	--	--	--	--

a Not included in weighted average.
b On July 2.
d Includes 0.00 parts per million of manganese (Mn).
e Represents 93 percent of runoff for water year.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-160. PARTRIDGE RIVER NEAR AURORA, MINN.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement between 11 a.m. and 3 p.m.)

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October....	55	55	56	57	54	54	56	57	51	52	52	52	50	50	56	56	55	54	54	54	54	54	52	52	48	48	45	45	46	46	45	52
November...	47	47	49	49	42	42	40	40	44	46	49	42	42	39	40	41	41	39	39	37	37	37	37	35	35	34	34	34	34	33	--	40
December...	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	e32
January....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	e32
February...	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	e32
March.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33	32	33	33	33	32	33	33	34	34	33	34	34	34	34	36	36	--
April.....	36	36	37	37	40	40	37	36	40	39	39	43	44	46	46	45	44	45	45	45	45	50	52	50	50	45	46	47	47	43	--	43
May.....	56	58	58	60	60	51	49	58	61	53	53	52	52	50	50	60	60	58	58	52	52	53	53	60	60	64	64	63	64	56	56	57
June.....	67	67	67	67	76	76	78	78	75	75	73	70	64	64	71	71	70	72	73	73	70	69	67	68	69	70	72	72	63	62	--	70
July.....	65	66	72	72	67	67	67	67	65	65	69	69	70	71	72	72	74	74	76	76	79	79	67	67	75	75	82	82	82	79	72	72
August.....	80	80	79	72	72	70	69	70	70	72	72	66	66	70	70	69	69	69	69	73	73	72	72	73	69	70	69	74	74	68	68	71
September..	68	68	62	70	68	70	70	70	68	65	66	68	67	65	58	60	58	62	65	64	68	64	63	63	58	60	58	58	55	--	--	64

e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-165. ST. LOUIS RIVER NEAR AURORA, MINN.

LOCATION.--At gaging station at highway bridge, 0.8 mile downstream from Partridge River and 1.5 miles south of Aurora, St. Louis County.
DRAINAGE AREA.--312 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	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	Color	Turbidity
Oct. 1, 1958..	346	9.1	0.85	0.00	7.5	3.7	2.0	0.7	25	18	0.4	0.2	1.0	95	0.13		34	13	0.1	67.2	6.1	180	2
Oct. 27.....	138	--	--	--	--	--	3.4	--	24	26	1.9	--	--	--	--		42	22	.2	86.6	6.6	200	1
Nov. 24.....	285	9.7	.10	--	5.6	3.4	1.8	.2	22	10	.1	.2	.7	78	.11		28	10	.1	56.0	6.4	160	.6
Dec. 20.....	95	--	--	--	--	--	.9	--	34	11	.5	--	--	101	.14		38	10	.1	70.7	7.3	160	2
Jan. 24, 1959	41	14	.18	--	12	4.9	2.6	.9	54	11	.1	.2	1.4	109	.15		50	6	.2	97.0	6.9	140	.5
Feb. 28.....	26	15	.23	--	15	5.5	3.0	.7	65	11	.4	.2	1.6	117	.16		60	7	.2	120	7.0	110	1
Apr. 3.....	124	10	.12	--	9.5	4.7	2.7	1.0	43	13	.5	.2	.3	80	.11		43	8	.2	100	7.0	55	.6
May 25.....	724	3.5	.11	--	4.6	2.6	1.6	.4	20	9.3	.1	.3	.2	64	.09		22	6	.1	48.8	6.6	140	.5
June 3.....	579	3.4	.33	.00	4.8	3.2	2.0	.2	21	9.0	.1	.2	.8	71	.10		25	8	.2	53.6	6.5	130	.7
July 30.....	53	8.4	.17	--	12	5.8	2.9	.7	58	8.3	.1	.2	1.0	98	.13		54	6	.2	113	7.1	110	.2
Aug. 19.....	59	--	--	--	--	--	2.8	--	53	10	.1	--	--	98	.13		48	5	.2	106	7.0	100	.6
Sept. 3.....	351	8.8	1.0	.00	8.5	4.3	2.6	1.0	34	14	.1	.3	2.2	105	.14		39	11	.2	85.9	6.9	160	2

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-170. EMBARRASS RIVER AT EMBARRASS, MINN.

LOCATION.--At gaging station at highway bridge at Embarrass, St. Louis County, 70 feet upstream from railroad bridge.
DRAINAGE AREA.--93.8 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
Water temperatures: April 1956 to September 1957.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1, 1958..	52	12	1.0	0.00	9.0	2.8	1.6	0.4	25	17	0.4	0.2	1.0	100	0.14		34	13	0.1	62.2	6.0	160	3
Oct. 26.....	25	--	--	--	--	--	1.8	--	40	--	--	--	--	--	--		36	3	.1	68.2	6.7	140	--
Nov. 23.....	93	13	.15	--	6.8	2.2	1.5	.3	18	11	.2	.2	.8	90	.12		26	11	.1	53.9	6.5	160	.6
Dec. 19.....	9.3	17	.16	--	12	4.4	2.5	.7	50	9.3	.1	.2	1.1	97	.13		48	7	.2	98.8	7.4	80	1
Jan. 22, 1959.	4.6	19	.07	--	15	2.6	1.9	.4	56	4.8	.1	.1	.5	90	.12		48	2	.1	102	7.1	45	.7
Feb. 26.....	3.0	20	.26	--	19	5.0	3.0	1.2	83	6.0	.2	.1	1.1	108	.15		68	0	2	142	7.8	43	.6
Apr. 3.....	41	10	.11	--	6.8	2.4	1.6	1.2	28	6.8	.1	.1	2.4	61	.08		27	4	.1	65.2	6.9	50	.7
May 24.....	218	5.1	.14	--	5.5	2.0	1.4	.6	19	9.8	.1	.2	.3	76	.10		22	6	.1	45.9	6.7	150	1
June 3.....	109	--	.46	.00	--	--	2.0	--	26	7.5	.1	.2	.8	71	.10		26	5	.2	55.2	6.3	130	.8
July 29.....	4.2	11	.40	--	14	4.1	2.3	.6	59	6.3	.1	.2	1.6	99	.13		52	4	.1	101	6.9	110	.6
Aug. 19.....	3.4	--	--	--	--	--	3.6	--	71	5.8	.2	.2	.9	99	.13		58	0	.2	119	7.2	65	.8
Sept. 3.....	127	11	1.0	.00	6.5	3.8	1.5	.5	24	12	.1	.3	1.0	120	.16		32	12	.1	59.7	6.4	260	1

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STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-180. EMBARRASS RIVER NEAR McKINLEY, MINN.

LOCATION.--At gaging station at highway bridge, 0.9 mile downstream from outlet of Esquagama Lake and 4.5 miles southeast of McKinley, St. Louis County.
DRAINAGE AREA.--171 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1, 1958..	118	8.7	0.28	0.00	15	5.2	2.6	1.2	55	15	1.2	0.2	1.5	100	0.14		59	14	0.1	120	6.7	70	1
Oct. 28.....	67	--	--	--	--	--	1.4	--	58	15	.6	--	--	--	--		61	13	.1	125	7.0	80	1
Nov. 25.....	147	--	--	--	--	--	1.1	--	58	13	.2	--	--	107	.15		59	11	.1	126	6.9	60	1
Dec. 21.....	a 40	12	.11	--	16	5.9	3.0	1.1	60	15	1.8	.2	1.0	118	.16		64	15	.2	133	6.9	90	.1
Jan. 22, 1959.	a 22	14	.07	--	18	4.6	3.2	.8	62	15	2.2	.2	.4	125	.17		64	13	.2	135	7.1	90	.2
Feb. 28.....	a 26	--	--	--	--	--	.9	--	66	14	1.7	--	--	128	.17		69	15	.0	142	7.4	90	.2
Apr. 4.....	78	12	.09	--	15	5.0	2.7	1.1	59	12	.3	.1	1.2	101	.14		58	10	.2	127	7.1	70	.8
May 26.....	337	11	.12	--	15	4.5	2.9	1.0	55	13	.6	.1	.7	100	.14		56	11	.2	125	7.1	70	.9
June 3.....	254	9.4	.46	.00	14	3.9	2.9	.9	50	13	.1	.1	2.1	100	.14		51	10	.2	115	7.0	80	.6
July 31.....	28	--	--	--	--	--	2.1	--	47	11	.5	--	--	87	.12		46	7	.1	104	7.2	65	.2
Aug. 19.....	19	--	--	--	--	--	2.8	.8	48	9.5	.4	--	--	88	.12		50	11	.2	109	6.9	55	.4
Sept. 4.....	207	--	.26	.00	--	--	1.0	--	47	12	.8	--	--	100	.14		50	11	.1	107	7.2	75	.9

a Daily mean.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-189. EAST TWO RIVER NEAR IRON JUNCTION, MINN.

LOCATION.--At bridge on State Highway 216, 1 mile south and about 2.7 miles west of Iron Junction, St. Louis County.
RECORDS AVAILABLE.--Chemical analyses: November 1957 to November 1958, May to September 1959 (discontinued).
REMARKS.--Partial records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1, 1958..	--	8.6	0.19	0.00	44	21	14	3.4	152	76	19	0.2	3.4		276	0.38		197	72	0.4	433	7.0	50	5
Oct. 25.....	14.8	--	--	--	--	--	16	--	171	--	--	--	--		--	--		222	82	.5	496	7.3	25	--
Nov. 23.....	56.6	9.6	.03	--	34	18	11	2.8	118	58	14	.2	5.0		236	.32		157	60	.4	356	7.0	42	.4
May 1, 1959...	23.8	6.2	.01	--	39	19	13	2.7	135	65	18	.4	5.8		264	.36		174	63	.4	404	7.5	19	1
May 26.....	77.8	4.9	.06	--	27	11	8.6	2.3	97	39	10	.3	2.9		173	.24		114	34	.3	267	7.1	65	5
June 4.....	--	3.0	.21	.00	28	11	8.4	1.7	100	39	11	.2	3.6		184	.25		116	34	.3	273	7.1	80	1
Aug. 3.....	9.8	3.6	.01	--	41	21	16	3.2	171	57	21	.3	.6		261	.35		188	48	.5	435	7.3	19	1
Aug. 25.....	20.2	6.8	.04	--	34	17	14	3.7	140	49	18	.3	2.5		232	.32		156	41	.5	377	7.3	31	30
Sept. 4.....	--	7.3	.15	.00	34	16	12	2.9	127	49	14	.3	3.3		228	.31		149	45	.4	339	7.4	55	9

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-190. WEST TWO RIVER NEAR IRON JUNCTION, MINN.

LOCATION.--At gaging station at bridge on State Highway 216, 5 miles southwest of Iron Junction, St. Louis County, and 9.2 miles upstream from St. Louis River.
DRAINAGE AREA.--68.4 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1959 (discontinued).
Water temperatures: April 1956 to September 1957.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1, 1958..	41	8.4	0.49	0.00	18	8.5	3.7	1.7	83	23	0.1	0.2	1.5	121	0.16		80	12	0.2	167	6.8	80	4
Oct. 24.....	17	--	--	--	--	--	4.6	--	95	--	--	--	--	--	--		86	8	.2	181	7.1	50	--
Nov. 22.....	138	9.9	.07	--	12	5.4	2.9	1.6	52	15	.4	.2	.4	101	.14		52	9	.2	116	6.8	80	3
Dec. 19.....	9.4	15	.02	--	25	12	5.8	2.0	122	18	1.9	.2	1.6	158	.21		110	10	.2	234	7.1	35	2
Jan. 23, 1959.	7.7	--	--	--	--	--	7.8	--	154	20	7.2	--	--	195	.27		140	14	.3	315	6.9	23	3
Feb. 25.....	a 8.4	--	--	--	--	--	7.4	--	152	18	5.1	--	--	186	.25		134	9	.3	302	7.0	26	1
Mar. 25.....	39	11	.02	--	20	7.8	6.1	3.6	94	15	5.2	.2	1.8	121	.16		82	5	.3	201	7.1	22	3
May 1.....	34	6.4	.04	--	15	6.7	3.7	1.5	72	13	.1	.2	.7	93	.13		65	6	.2	146	7.2	40	1
May 26.....	120	6.1	.10	--	13	4.5	2.8	1.2	54	13	.1	.2	1.1	92	.13		51	7	.2	114	6.9	75	15
June 4.....	71	6.2	.39	.00	12	4.9	2.8	1.1	54	12	.1	.2	1.3	90	.12		50	6	.2	112	6.9	85	2
Aug. 3.....	10	6.4	.02	--	21	9.4	4.6	1.5	110	12	.3	.3	.5	125	.17		91	1	.2	196	7.4	35	.2
Aug. 25.....	45	--	--	--	--	--	3.6	--	100	15	1.6	--	--	128	.17		92	10	.2	201	6.6	28	35
Sept. 4.....	118	10	.49	.00	14	6.6	3.5	1.2	63	13	.1	.2	1.9	121	.16		62	10	.2	128	7.0	85	8

a Daily mean.

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-200. SWAN RIVER NEAR TOIVOLA, MINN.

LOCATION.--At gaging station at bridge on County Highway 5, 0.4 mile downstream from confluence of East Swan and West Swan Rivers, 3.5 miles upstream from mouth, and 5.8 miles north of Toivola, St. Louis County.
DRAINAGE AREA.--254 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1958 to September 1959 (discontinued).
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 25, 1958..	86	9.8	0.06	--	30	13	8.2	1.4	133	27	7.7	0.3	0.4	183	0.25		127	18	0.3	280	7.0	55	1
Nov. 23.....	226	10	.07	--	14	6.6	3.9	1.2	58	17	3.2	.3	.5	111	.15		62	14	.2	138	6.9	80	1
Dec. 20.....	34.3	15	.03	--	39	17	12	2.3	177	32	9.8	.3	3.9	234	.32		168	23	.4	369	7.2	22	1
Jan. 23, 1959..	30.0	17	.01	--	43	21	14	2.7	190	37	14	.2	9.4	274	.37		194	38	.4	429	7.0	7	1
Feb. 26.....	35.6	17	.01	--	45	20	15	3.0	189	37	16	.2	13	287	.39		194	39	.5	440	6.7	8	2
Mar. 25.....	61.3	13	.01	--	31	14	9.4	3.7	138	29	11	.2	4.1	183	.25		134	21	.4	309	7.1	21	1
May 1.....	136	6.6	.06	--	18	7.1	5.2	1.5	77	15	3.5	.2	2.1	115	.16		74	11	.3	168	7.1	55	3
May 27.....	642	4.7	.19	--	14	5.1	3.0	1.5	56	14	.1	.2	1.5	103	.14		56	10	.2	116	6.9	140	25
June 5.....	426	4.6	.36	0.00	14	5.6	3.2	.6	59	13	.1	.2	2.0	113	.15		58	10	.2	119	6.9	170	8
Aug. 3.....	37	8.6	.03	--	35	16	11	2.5	164	28	10	.3	3.6	211	.29		154	20	.4	342	7.1	31	1
Aug. 25.....	50	10	.02	--	34	16	12	2.8	160	27	11	.3	2.8	203	.28		150	19	.4	342	7.0	25	10
Sept. 5.....	573	7.8	.51	.00	14	6.1	3.3	.8	53	16	.0	.2	2.8	133	.18		60	17	.2	118	6.9	230	30

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

4-240. ST. LOUIS RIVER AT SCANLON, MINN.

LOCATION.--At gaging station at bridge on U.S. Highway 61 at Scanlon, Carlton County, 0.6 mile downstream from Minnesota Power and Light Co. powerplant, 3 miles upstream from Thomson Reservoir, and 3.2 miles upstream from Midway River.
DRAINAGE AREA.--3,430 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: July 1958 to September 1959 (discontinued).
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 28, 1958..	1,100	8.6	0.16	--	22	7.1	7.5	0.8	74	23	8.4	0.3	0.8	170	0.23		84	23	0.4	190	7.0	180	1
Nov. 25.....	1,550	10	.14	--	17	5.7	5.5	.9	52	21	6.7	.3	.5	146	.20		66	23	.3	147	6.8	180	.9
Dec. 21.....	1,490	8.7	.10	--	21	3.6	5.4	.7	57	19	7.4	.2	.7	137	.19		67	20	.3	154	7.0	100	2
Jan. 19, 1959..	1,260	9.5	.08	--	24	4.9	6.3	.7	73	19	8.8	.3	.5	153	.21		80	20	.3	184	6.9	110	1
Mar. 1.....	1,230	9.9	.12	--	22	5.6	8.3	1.0	67	21	10	.3	.5	158	.21		78	23	.4	185	6.8	110	1
Apr. 4.....	1,720	7.8	.11	--	23	6.5	7.4	2.2	88	25	8.2	.2	1.3	146	.20		84	12	.4	218	6.9	70	20
May 26.....	4,940	5.0	.13	--	13	4.3	3.4	.8	49	18	1.6	.2	1.8	114	.16		50	10	.2	113	6.8	130	9
June 2.....	12,200	5.5	.37	0.00	18	3.2	2.5	.8	58	15	.1	.2	2.1	117	.16		58	10	.1	118	6.7	170	35
July 23.....	1,320	6.3	.69	--	25	6.2	6.9	.8	105	12	6.5	.3	.9	173	.24		88	2	.3	198	6.9	140	2
Sept. 1.....	1,780	6.3	.30	.00	26	8.8	10	1.2	110	24	9.4	.3	1.4	188	.26		101	11	.4	237	6.9	90	4

4-310. BLACK RIVER NEAR BESSEMER, MICH.

LOCATION.--Temperature recorder at gaging station, 450 feet downstream from bridge on county highway, 500 feet downstream from Powder Mill Creek, and 2.5 miles north of Bessemer, Gogebic County.
DRAINAGE AREA.--202 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Minimum, freezing point on many days during winter months.
EXTREMES, 1954-59.--Water temperatures: Maximum 83°F Aug. 2, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 are given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

STREAMS TRIBUTARY TO LAKE MICHIGAN

4-460. BLACK RIVER NEAR GARNET, MICH.

LOCATION.--Temperature recorder at gaging station, 10 feet upstream from highway bridge, 15 feet downstream from tributary entering from right, 3.5 miles upstream from Lake Michigan, and 4 miles southwest of Garnet, Mackinac County.
DRAINAGE AREA.--28 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 64°F July 5; minimum, freezing point on many days during December to February.
EXTREMES, 1951-59.--Water temperatures: Maximum, 68°F July 21,22, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
[Continuous ethyl alcohol-actuated thermograph]

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

4-585. EAST BRANCH ESCANABA RIVER AT GWINN, MICH.

LOCATION.--Temperature recorder at gaging station in county park at Gwinn, Marquette County, 1 mile upstream from mouth.
DRAINAGE AREA.--125 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 77°F July 29, 30; minimum, freezing point on many days during December to April.
EXTREMES, 1954-59.--Water temperatures: Maximum, 79°F July 4, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued

4-595. FORD RIVER NEAR HYDE, MICH.

LOCATION.--Temperature recorder at gaging station, 40 feet downstream from county highway bridge, 1.4 miles downstream from Tenmile Creek, and 1.5 miles north of Hyde, Delta County.
DRAINAGE AREA.--450 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 85°F July 30; minimum, freezing point on many days during December to April.
EXTREMES, 1956-59.--Water temperatures: Maximum, 86°F July 19, Aug. 2, 1957, minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-655. STURGEON RIVER NEAR FOSTER CITY, MICH.

LOCATION.--Temperature recorder at gaging station, 30 feet downstream from bridge on County Highway 569, 1.8 miles downstream from confluence of East and West Branches, and 4 miles south of Foster City, Dickinson County.
DRAINAGA AREA.--244 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum recorded, 83°F July 30; minimum, freezing point on many days during winter months.
EXTREMES, 1956-59.--Water temperatures: Maximum recorded, 83°F July 19, 29, Aug. 2, 1957, July 30, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl-alcohol actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued

4-1215. MUSKEGON RIVER AT EVART, MICH.

LOCATION.--Temperature recorder at gaging station, 500 feet downstream from bridge on U.S. Highway 10 at Evart, Osceola County, 0.4 mile upstream from Twin Creek.
DRAINAGE AREA.--1,450 square miles.
RECORDS AVAILABLE.--Water temperatures: November 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 80°F Aug. 24; minimum, freezing point on many days during November to March.
EXTREMES, 1956-59.--Water temperatures: Maximum, 80°F Aug. 24, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1235. MANISTEE RIVER NEAR GRAYLING, MICH.

LOCATION.--Temperature recorder at gaging station, 25 feet upstream from bridge on State Highway 72, 2.5 miles downstream from Goose Creek, and 6.5 miles northwest of Grayling, Crawford County.
DRAINAGE AREA.--159 square miles.
RECORDS AVAILABLE.--Water temperatures: May 1957 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 72°F June 28, July 9, Sept. 8; minimum, freezing point on many days during during December to February.
EXTREMES, 1957-59.--Water temperatures: Maximum, 73°F June 22, July 20, Aug. 3, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued

4-1245. EAST BRANCH PINE RIVER NEAR TUSTIN, MICH.

LOCATION (revised).--Temperature recorder at gaging station 75 feet downstream from highway bridge, 1.6 miles upstream from North Branch, 3.0 miles west of Tustin, Osceola County, and 5.5 miles northwest of Le Roy.
DRAINAGE AREA.--63 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 66°F many days during January and August; minimum, freezing point Feb. 24-26.
EXTREMES, 1952-59.--Water temperatures: Maximum, 73°F July 4, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1250. PINE RIVER NEAR LE ROY, MICH.

LOCATION (revised).--Temperature recorder at gaging station, 15 feet downstream from highway bridge, 5.1 miles downstream from East Branch, 5.0 miles northwest of Le Roy, and 5.3 miles southwest of Tustin, Osceola County.
DRAINAGE AREA.--118 square miles.
RECORDS AVAILABLE.--Water temperatures: January 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 67°F June 28-29; minimum freezing point on many days during December to April.
EXTREMES, 1953-59.--Water temperatures: Maximum, 69°F July 22, 1953, Aug. 1, 2, 5, 6, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued

4-1255. PINE RIVER NEAR HOXEYVILLE, MICH.

LOCATION(revised).--Temperature recorder at gaging station, 500 feet upstream from bridge on State Highway 37, 4.2 miles northwest of Hoxeyville, Wexford County, 8.0 miles east of Wellston, and 8 miles upstream from mouth.
DRAINAGE AREA.--251 square miles.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1959.
EXTREMES, 1956-59.--Water temperatures: Maximum, 65°F June 27, 28, Aug. 24, 25; minimum, 33°F on several days during December.
EXTREMES, 1952-59.--Water temperatures: Maximum, 68°F Aug. 1, 1955; minimum, freezing point on several days during January 1955 and February 1958.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
/Continuous ethyl alcohol-actuated thermograph/

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

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4-1262. LITTLE MANISTEE RIVER NEAR FREESOIL, MICH.

LOCATION (revised).--Temperature recorder at gaging station, 25 feet upstream from Sixmile bridge, 5.8 miles north of Freesoil, Mason County, 7.4 miles upstream from mouth, and 9.0 miles southeast of Manistee.
DRAINAGE AREA.--200 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 69°F June 27, Aug. 23; minimum, 33°F on many days during December to February.
EXTREMES, 1956-59.--Water temperatures: Maximum, 72°F June 17, 18, 1957; minimum, freezing point Dec. 10-16, 1957.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE HURON

4-1280. STURGEON RIVER NEAR WOLVERINE, MICH.

LOCATION.--Temperature recorder at gaging station, 1.8 miles north of Wolverine, Cheboygan County, 2.8 miles downstream from West Branch. and 9 miles upstream from mouth.
DRAINAGE AREA.--170 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 73°F June 28; minimum, 33°F on several days during December to March.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1290. PIGEON RIVER NEAR VANDERBILT, MICH.

LOCATION (revised).--Temperature recorder at gaging station at Pigeon River Fisheries Experiment Station, 11.1 miles east of Vanderbilt, Otsego County.
DRAINAGE AREA.--63 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 77°F June 9, 28, July 22; minimum, freezing point on many days during November to April.
EXTREMES, 1950-59.--Water temperatures: Maximum, 81°F Aug. 1, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE HURON--Continued

4-1355. AU SABLE RIVER AT GRAYLING, MICH.

LOCATION.--Temperature recorder at gaging station, 65 feet upstream from bridge on U.S. Highway 27 at Grayling, Crawford County, 0.8 mile upstream from East Branch.
DRAINAGE AREA.--110 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 77°F Aug. 24-26; minimum, freezing point on many days during December to March.
EXTREMES, 1953-59.--Water temperatures: Maximum, 80°F on several days during 1953 and 1955; minimum freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1365. AU SABLE RIVER AT MIO, MICH.

LOCATION.--Temperature recorder at gaging station, 150 feet upstream from bridge on State Highway 33 at Mio, Oscoda County, 10 miles downstream from Big Creek, and 80 miles upstream from mouth.
DRAINAGE AREA.--1,100 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 73°F June 11; minimum, 33°F on many days during January to March.
EXTREMES, 1952-59.--Water temperatures: Maximum, 77°F Aug. 4, 1955; minimum, freezing point on several days during January 1953, January and February 1956.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	56	54	52	51	51	50	51	52	52	52	51	52	51	51	51	51	52	52	52	52	52	51	51	51	50	50	51	49	49	48	48	51
Minimum	54	52	51	51	50	50	50	50	52	51	51	51	51	50	49	51	51	51	51	52	51	50	50	50	50	50	49	49	48	47	47	50
November																																
Maximum	47	46	45	45	46	45	44	42	43	43	42	42	42	43	43	43	44	46	45	44	44	43	42	40	40	39	38	37	37	36	--	43
Minimum	46	45	45	45	45	44	42	42	42	42	41	42	42	42	43	43	43	44	44	44	43	42	40	40	39	38	37	37	36	36	--	42
December																																
Maximum	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	36	36	35	36	35	36	35	35	35	35	35	36
Minimum	36	35	35	35	35	36	36	36	36	36	35	35	36	35	36	36	35	35	35	36	36	35	34	35	35	35	35	35	35	35	35	35
January																																
Maximum	35	35	35	36	36	36	36	36	35	35	35	35	35	35	35	35	34	34	34	33	33	33	34	33	33	34	33	33	33	33	34	34
Minimum	35	35	35	35	36	36	36	35	35	35	35	35	35	35	35	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	33	34
February																																
Maximum	34	34	33	33	33	33	33	34	34	34	35	34	34	34	35	34	34	34	35	35	34	35	34	34	34	34	34	33	--	--	--	34
Minimum	33	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	--	--	--	34
March																																
Maximum	34	34	33	34	34	34	35	35	35	37	36	35	36	35	35	36	37	38	36	35	36	38	39	38	38	38	39	40	39	39	39	36
Minimum	33	33	33	33	34	34	34	34	35	35	35	35	35	35	35	35	36	36	34	34	35	36	38	37	36	37	38	39	39	38	39	35
April																																
Maximum	39	41	39	39	38	40	40	40	40	40	40	41	42	44	45	48	49	50	50	49	47	47	48	48	49	48	49	48	48	48	--	44
Minimum	39	39	39	38	38	38	40	40	40	40	40	40	41	42	44	45	48	49	49	47	46	46	47	47	48	48	47	47	47	47	--	44
May																																
Maximum	50	52	53	56	59	62	62	62	62	60	60	59	59	57	56	53	52	54	55	57	62	62	62	63	62	63	65	65	68	67	68	60
Minimum	48	49	51	53	56	58	60	59	59	58	58	58	57	56	53	52	50	50	52	54	57	60	61	59	60	60	62	63	64	66	66	57
June																																
Maximum	66	65	67	66	66	66	69	71	72	72	73	72	70	68	67	66	65	65	67	66	67	67	67	65	66	67	69	72	71	70	--	68
Minimum	65	64	63	63	64	64	65	67	68	69	69	70	67	67	65	64	63	63	64	65	65	65	65	64	64	64	64	67	69	69	--	66
July																																
Maximum	89	69	70	69	69	70	70	71	71	71	70	70	70	68	67	68	69	68	--	--	--	--	--	--	--	--	--	--	71	71	72	--
Minimum	68	67	67	66	67	67	67	68	69	69	69	68	67	65	65	65	66	64	--	--	--	--	--	--	--	--	--	--	68	69	69	--
August																																
Maximum	70	71	69	69	68	67	66	67	67	68	68	70	68	70	68	68	70	69	70	72	70	70	70	69	71	70	71	72	69	72	70	69
Minimum	68	68	67	67	67	65	65	66	66	66	68	66	66	67	67	67	68	67	67	67	69	68	60	67	67	68	68	69	69	68	68	67
September																																
Maximum	68	67	67	65	64	66	68	69	69	69	67	66	65	63	60	59	56	55	53	53	55	55	57	59	58	59	60	60	60	59	--	62
Minimum	67	66	65	64	63	64	65	66	66	66	65	65	62	60	59	56	55	53	52	52	53	54	55	57	57	58	59	58	59	58	--	60

STREAMS TRIBUTARY TO LAKE HURON--Continued

4-1380. EAST BRANCH AU GRES RIVER AT McIVOR, MICH.

LOCATION.--Temperature recorder at gaging station, 25 feet downstream from highway bridge at McIvor, Iosco County, 1.1 miles east of National City, and 9 miles southwest of Tawas City.
DRAINAGE AREA.--84 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 75°F June 28; minimum, freezing point on many days during December to March.
EXTREMES, 1951-59.--Water temperatures: Maximum, 76°F Aug. 3, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1385. AU GRES RIVER NEAR NATIONAL CITY, MICH.

LOCATION.--Temperature recorder at gaging station, 1.5 miles upstream from Elm Creek, 4 miles southwest of National City, Iosco County, 12.5 miles southwest of Tawas City, and 15.5 miles upstream from mouth.
DRAINAGE AREA.--169 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 82°F June 29, July 30; minimum, freezing point on many days during November to April.
EXTREMES, 1951-59.--Water temperatures: Maximum, 84°F Aug. 1, 4, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped July 25-27; range, 63°F to 76°F. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE HURON--Continued

4-1390. HOUGHTON CREEK NEAR LUPTON, MICH.

LOCATION.--Temperature recorder at gaging station, 0.5 mile upstream from mouth, 3 miles downstream from Wilkins Creek, and 3 miles southwest of Lupton, Ogemaw County.
DRAINAGE AREA.--27 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 66°F June 28, 29; minimum, freezing point on several days during February.
EXTREMES, 1950-59.--Water temperatures: Maximum, 69°F June 25, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped Oct. 15-21; range, 46°F to 55°F. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

4-1395. RIFLE RIVER AT "THE RANCH" NEAR LUPTON, MICH.

LOCATION.--Temperature recorder at gaging station, 0.2 mile downstream from Houghton Creek, and 3 miles southwest of Lupton, Ogemaw County.
DRAINAGE AREA.--54 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: July 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 70°F June 28, 29; minimum, freezing point Jan. 28-30.
EXTREMES, 1950-59.--Water temperatures: Maximum, 72°F on several days during June 1952, July and August 1955; minimum, freezing point on many days during winter months.
REMARKS.--Temperature bulb covered with sand Apr. 16 to May 20; range 43°F to 64°F. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE HURON--Continued

4-1400. PRIOR CREEK NEAR SELKIRK, MICH.

LOCATION.--Temperature recorder at gaging station, 0.2 mile upstream from mouth, 0.5 mile downstream from Ammond Creek, and 1.5 miles north of Selkirk, Ogemaw County.
DRAINAGE AREA.--19 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 72°F June 28, 29, Sept. 8; minimum, 33°F on many days during December to April.
EXTREMES, 1950-59.--Water temperatures: Maximum, 76°F Aug. 1, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped Dec. 21-29, Apr. 5-16; range, 33°F and 34°F to 53°F respectively. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl-alcohol-actuated thermograph)

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

4-1405. RIFLE RIVER AT SELKIRK, MICH.

LOCATION.--Temperature recorder at gaging station at highway bridge at Selkirk, Ogemaw County, 1.5 miles downstream from Prior Creek.
DRAINAGE AREA.--110 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 75°F June 28; minimum, freezing point on several days during February and March.
EXTREMES, 1950-59.--Water temperatures: Maximum, 78°F Aug. 1, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Recorder stopped Dec. 20-28; temperature 33°F. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE HURON--Continued

4-1415. WEST BRANCH RIFLE RIVER NEAR SELKIRK, MICH.

LOCATION.--Temperature recorder at gaging station, 0.5 mile downstream from Campbell Creek, 3.5 miles upstream from mouth, 4 miles southwest of Selkirk, Ogemaw County, and 6.5 miles southeast of town of West Branch.
DRAINAGE AREA.--52 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: May 1952 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 79°F June 28; minimum, freezing point on many days during November to April.
EXTREMES, 1952-59.--Water temperatures: Maximum, 79°F June 28, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

LOCATION.--At gaging station at bridge on State Highway 64, at Waterville, Lucas County, 3 miles downstream from Tontogany Creek.
DRAINAGE AREA.--6,314 square miles.
RECORDS AVAILABLE.--Chemical analyses: March 1950 to February 1952.
Water temperatures: March 1950 to September 1959.
Sediment records: April 1950 to September 1959.
EXTREMES, 1958-1959.--Water temperatures: Maximum, 92°F Aug. 25; minimum, freezing point on many days during December to February.
Sediment concentrations: Maximum daily, 961 ppm Feb. 12; minimum daily, 2 ppm Dec. 30, Sept. 24.
Sediment loads: Maximum daily, 208,000 tons Feb. 12; minimum daily, 1 ton Sept. 16, 24.
EXTREMES, 1950-59.--Water temperatures: Maximum, 92°F Aug. 25, 1959; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 2,240 ppm Mar. 26, 1954; minimum daily, 1 ppm on many days during 1953, 1955, and 1956.
Sediment loads: Maximum daily, 208,000 tons Feb. 12, 1959; minimum daily, less than 0.5 ton on several days during October to December 1953, and September 1955.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627. Low flow slightly regulated by powerplants above station. Flow affected by ice Dec. 7 to Jan. 2, Jan. 5-24, Feb. 12.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	63	62	62	62	62	60	61	63	64	64	63	59	59	60	60	62	63	62	60	59	58	58	59	58	56	55	54	53	53	52	51	59
Minimum	61	59	60	60	59	57	58	61	63	63	57	54	57	57	58	60	62	59	57	56	56	57	58	56	55	54	53	52	51	51	50	57
November																																
Maximum	51	50	50	50	50	50	48	47	46	46	45	45	47	49	50	51	52	53	53	52	52	50	49	47	47	45	43	41	41	38	--	48
Minimum	50	50	49	49	49	48	46	46	45	45	44	45	45	47	49	50	51	52	51	52	50	49	47	47	45	43	41	41	38	35	--	47
December																																
Maximum	35	35	35	35	35	35	34	34	34	34	34	34	34	34	34	34	34	34	34	32	32	33	33	33	33	33	33	33	33	33	33	34
Minimum	35	35	35	35	35	34	34	34	34	34	34	34	34	34	34	34	34	34	32	32	32	32	33	33	33	33	33	33	33	33	33	34
January																																
Maximum	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	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	32	32	32	32	32	32	32	32	33
February																																
Maximum	32	33	33	33	33	33	33	33	33	33	32	32	32	33	33	33	34	34	34	34	34	34	34	34	34	34	34	36	--	--	--	33
Minimum	32	32	33	33	33	33	33	33	33	32	32	32	32	33	33	33	33	34	34	34	33	33	34	34	33	33	34	34	--	--	--	33
March																																
Maximum	37	38	38	38	38	38	38	37	37	37	37	38	38	38	40	40	40	40	42	42	42	42	43	46	47	47	45	46	45	45	46	41
Minimum	36	37	38	38	38	38	37	37	37	37	37	37	38	38	38	39	40	40	40	41	42	41	42	43	46	45	45	45	44	44	45	40
April																																
Maximum	49	49	50	51	51	51	53	53	53	54	53	52	52	53	55	56	59	60	60	57	56	57	59	60	61	61	59	58	58	56	--	55
Minimum	46	49	49	50	50	50	51	53	53	53	52	51	50	51	52	54	56	59	57	55	54	56	57	59	60	59	57	57	55	56	--	54
May																																
Maximum	57	59	63	66	69	72	73	73	72	72	72	73	73	73	69	66	65	68	72	75	75	77	76	73	73	73	69	70	71	71	72	70
Minimum	56	57	59	63	65	69	72	72	71	71	72	72	73	69	66	64	64	65	68	72	75	75	73	72	72	68	67	69	70	71	71	68
June																																
Maximum	73	73	73	75	76	76	78	77	80	81	80	79	79	75	73	73	72	71	73	76	78	76	74	74	74	76	78	78	80	80	--	76
Minimum	72	71	71	73	74	73	75	76	77	77	79	77	75	72	70	70	68	68	68	70	72	76	71	72	73	74	76	78	78	77	--	73
July																																
Maximum	79	79	79	79	81	81	83	83	82	83	83	83	85	84	83	84	81	80	83	80	83	83	83	83	81	81	82	83	84	86	87	82
Minimum	77	77	78	79	79	79	78	79	79	77	77	77	76	77	75	77	77	79	78	78	79	80	81	79	78	76	79	81	82	82	82	78
August																																
Maximum	85	83	79	80	83	84	80	80	80	80	81	82	85	86	86	83	81	84	86	87	86	87	89	91	92	90	88	88	88	87	86	85
Minimum	80	77	78	77	77	78	79	77	75	74	75	77	77	79	80	79	78	78	77	80	83	83	84	85	85	85	83	83	84	83	82	80
September																																
Maximum	83	83	82	81	82	83	84	88	87	84	76	76	78	78	77	69	66	69	70	73	76	77	77	77	76	73	74	76	76	73	--	77
Minimum	79	80	79	79	80	79	81	81	82	76	70	68	71	70	69	63	59	61	62	67	69	72	71	74	71	72	71	73	73	70	--	72

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-1935. MAUMEE RIVER AT WATERVILLE, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959

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...	725	40	78	323	20	17	4,930	90	1,200
2...	657	45	80	392	15	16	3,410	82	755
3...	657	37	66	413	10	11	3,440	52	483
4...	698	35	66	529	17	24	3,080	22	183
5...	413	34	38	505	21	29	3,530	43	410
6...	459	27	33	411	14	16	3,90 0	41	432
7...	470	24	30	262	14	10	4,800	31	402
8...	725	30	59	323	20	17	3,500	25	236
9...	567	23	35	529	20	28	2,500	21	142
10...	698	13	24	516	20	28	1,800	20	97
11...	323	10	9	352	15	14	1,500	18	73
12...	287	12	9	392	15	16	1,500	14	57
13...	402	7	8	402	18	a 20	1,400	14	a 55
14...	618	13	22	529	20	28	1,300	13	46
15...	840	23	52	643	24	42	1,200	17	55
16...	541	22	32	1,180	30	96	1,100	12	36
17...	352	20	a 19	1,640	30	133	950	10	26
18...	372	18	18	8,330	74	s 1,760	900	10	24
19...	382	12	a 12	19,400	229	12,000	850	10	23
20...	372	6	6	20,700	324	18,100	750	7	14
21...	402	8	9	15,100	238	9,700	850	7	16
22...	402	9	10	10,600	140	4,010	750	7	14
23...	448	10	12	7,620	91	1,870	750	7	14
24...	684	16	30	5,840	65	1,020	700	6	11
25...	505	16	a 20	4,270	52	600	650	6	10
26...	470	15	19	6,750	52	948	600	6	10
27...	493	13	17	11,100	68	2,040	800	5	11
28...	580	10	16	14,400	214	8,320	700	6	11
29...	436	10	12	10,900	197	5,800	500	6	8
30...	753	13	26	7,350	123	2,440	650	2	4
31...	470	10	13	--	--	--	700	5	9
Total	16,201	--	880	151,701	--	69,253	53,990	--	4,867

Day	January			February			March		
1...	800	5	11	25,200	85	5,780	13,400	76	2,750
2...	1,500	7	28	21,500	85	4,930	13,900	65	2,440
3...	4,960	12	161	15,100	99	4,040	14,200	60	2,300
4...	5,770	14	218	9,610	80	2,080	12,800	52	1,800
5...	4,500	15	182	8,230	70	1,560	11,800	45	1,430
6...	2,900	17	133	7,770	92	1,930	16,400	114	s 5,620
7...	2,300	20	124	6,490	40	701	21,600	386	22,500
8...	2,200	23	137	3,840	30	311	21,000	380	21,500
9...	2,000	21	113	3,530	44	419	19,600	256	13,500
10...	1,800	23	112	25,800	251	s 22,500	21,200	232	13,300
11...	1,500	30	122	49,800	580	78,000	20,400	200	a 11,000
12...	1,300	34	119	80,000	961	208,000	16,900	137	6,250
13...	1,100	29	86	79,700	795	171,000	13,000	98	3,440
14...	1,000	32	86	69,600	550	103,000	9,660	67	1,750
15...	1,200	20	65	60,600	410	67,100	11,000	60	1,780
16...	1,600	13	56	49,000	342	45,200	14,400	105	4,080
17...	2,600	11	77	39,400	295	31,400	15,600	146	6,150
18...	2,300	10	62	30,200	222	18,100	12,900	136	4,740
19...	1,900	10	51	23,800	177	11,400	9,870	117	3,120
20...	1,700	6	28	16,200	107	4,680	8,030	142	3,080
21...	5,000	40	s 677	11,400	58	1,780	7,900	92	1,960
22...	12,000	92	2,980	8,660	57	1,330	7,060	64	1,220
23...	28,000	119	9,000	10,600	42	1,200	5,850	59	932
24...	36,000	378	36,700	17,600	125	5,940	4,790	58	750
25...	31,700	509	43,600	19,000	165	8,460	4,230	42	480
26...	28,500	202	15,500	16,400	180	7,970	4,350	36	423
27...	22,900	144	8,900	13,800	161	6,000	13,000	88	s 3,390
28...	17,300	89	4,160	12,600	118	4,010	18,600	280	14,100
29...	13,200	85	3,030	--	--	--	16,100	320	13,900
30...	13,600	104	3,820	--	--	--	12,600	192	6,530
31...	21,000	79	4,480	--	--	--	10,600	125	3,580
Total	274,130	--	134,818	735,430	--	818,821	402,740	--	179,795

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

4-1935. MAUMEE RIVER AT WATERVILLE, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1...	9,500	97	2,490	48,600	345	45,300	3,480	81	761
2...	13,800	108	4,020	36,400	249	24,500	3,290	73	648
3...	22,700	437	26,800	27,900	207	15,600	2,560	66	456
4...	24,000	592	38,400	20,900	187	10,600	1,720	52	241
5...	19,200	370	19,200	14,200	142	5,440	1,750	41	194
6...	14,600	273	10,800	9,580	78	2,020	904	35	a 85
7...	12,000	195	6,320	5,930	48	768	904	30	73
8...	10,100	150	4,090	4,270	32	369	904	28	68
9...	10,500	122	3,460	3,060	27	223	872	45	106
0...	11,000	100	2,970	3,020	25	204	756	45	92
1...	9,710	89	2,330	2,730	29	214	596	33	53
2...	8,660	82	1,920	4,350	40	470	770	32	66
3...	6,930	76	1,420	7,400	48	959	742	16	32
4...	5,600	54	816	7,480	40	808	742	14	28
5...	4,590	40	496	5,480	42	621	635	15	26
6...	4,030	40	435	2,730	33	243	635	20	34
7...	3,100	35	293	1,920	37	192	546	20	29
8...	2,700	34	248	2,040	42	231	450	8	10
9...	2,040	30	165	2,530	40	273	450	10	12
0...	1,990	29	156	1,860	50	251	450	11	13
1...	2,430	25	164	2,100	51	289	384	14	14
2...	2,330	21	132	3,060	45	372	522	10	14
3...	2,460	25	166	9,580	73	s 2,070	812	15	33
4...	2,530	45	307	12,800	126	4,350	798	20	43
5...	2,210	33	197	14,500	190	7,440	2,150	50	s 359
6...	1,370	36	133	12,400	228	7,630	4,990	46	620
7...	1,940	45	236	8,780	205	4,860	4,350	34	s 421
8...	15,500	150	s 8,950	7,020	160	a 3,000	7,100	96	1,840
9...	45,400	630	77,200	5,200	112	1,570	4,310	77	896
0...	52,200	650	91,600	4,030	99	1,080	2,400	72	466
1...	--	--	--	3,990	92	991	--	--	--
Total	325,120	--	305,914	295,840	--	142,938	50,972	--	7,733

Day	July			August			September		
1 ..	1,920	70	363	373	18	18	304	27	22
2...	2,660	88	632	362	25	24	384	33	34
3...	2,950	95	757	498	28	38	534	31	s 50
4...	2,400	92	596	450	22	27	2,130	105	604
5 ..	1,920	83	430	313	19	16	1,360	62	228
6 ..	1,220	60	198	469	18	23	687	38	70
7 ..	756	45	92	609	21	34	570	37	57
8 ..	635	40	68	395	23	24	268	21	15
9 ..	570	46	71	295	22	18	304	15	12
0 ..	486	68	89	259	22	15	250	17	11
1...	417	48	54	259	23	16	142	11	4
2...	439	41	48	313	23	19	271	15	11
3...	351	23	22	243	22	14	230	12	7
4...	268	12	9	208	24	13	170	9	4
5...	236	24	15	187	25	13	145	6	2
6...	243	31	20	208	28	16	114	4	1
7...	391	16	17	250	28	19	130	5	2
8...	718	35	68	259	33	23	145	5	2
9...	538	59	86	322	30	26	126	5	2
0...	840	76	172	395	31	33	130	5	2
1...	872	50	118	534	44	63	155	7	3
2...	534	28	40	609	42	69	140	6	2
3...	798	26	56	546	29	43	130	5	2
4...	648	35	61	428	33	38	135	2	1
5...	648	37	65	322	35	30	199	12	6
6...	609	36	59	286	31	24	322		
7...	936	38	96	268	33	24	236		
8...	1,090	40	118	277	30	22	215	21	15
9...	622	25	42	268	26	19	259		
0...	522	19	27	286	30	23	286		
1...	439	17	20	295	30	24	--	--	--
Total	27,676	--	4,509	10,786	--	808	10,471	--	1,229

Total discharge for year (cfs-days)..... 2,355,057
Total load for year (tons)..... 1,671,565

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

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-1935. MAUMEE RIVER AT WATERVILLE, OHIO--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Sampling point	Water temperature (°F)	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Feb. 11, 1959.....	0740			51,300	442		68	76	84	88	91	92	94	100				SBWC
Feb. 12.....	1205			88,000	1,050		63	70	75	82	84	86	91	100				SBWC
Feb. 12.....	1205			88,000	1,050		44	55	68	74	76	79	86	100				SBN
Feb. 13.....	1640			81,100	800		67	74	82	86	91	92	95	100				SBWC
Mar. 8.....	1100			21,200	421		82	87	93	96	98	99	100	--				SBWC
Apr. 3.....	0700			25,000	757		70	75	84	93	97	99	100	--				SBWC
Apr. 30.....	1230			52,800	650		77	81	86	88	89	91	100	--				SBWC
Apr. 30.....	1230			52,800	650		69	73	82	89	91	92	100	--				SBN

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4-1990. HURON RIVER AT MILAN, OHIO

LOCATION.--Temperature recorder at gaging station, 500 feet downstream from bridge on U.S. Highway 250, 0.2 mile northwest of Milan, Erie County, and 2 miles downstream from confluence of East and West Branches.
DRAINAGE AREA.--363 square miles.
RECORDS AVAILABLE.--Chemical analyses: March 1950 to February 1952
Water temperatures: March to August 1950, July 1953 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 89°F June 29, Aug. 23; minimum, freezing point on many days during November to January.
EXTREMES, 1953-59.--Water temperatures: Maximum, 91°F July 27, Aug. 4, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Continuous ethyl alcohol-actuated thermograph)

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

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2080. CUYAHOGA RIVER AT INDEPENDENCE, OHIO

LOCATION.--At gaging station at bridge on Rockside Road, 1 mile northeast of Independence, Cuyahoga County, and 3 miles downstream from Tinkers Creek.
DRAINAGE AREA.--709 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949.
Water temperatures: October 1948 to September 1949, October 1952 to September 1958, August to September 1959.
Sediment: October 1950 to September 1959.
EXTREMES, 1958-59.--Sediment concentrations: Maximum daily, 1,200 ppm May 28; minimum daily, 3 ppm Nov. 4.
Sediment loads: Maximum daily, 29,700 tons Jan. 21; minimum daily, 2 tons Nov. 4.
EXTREMES, 1948-49, 1950-59.--Water temperatures (1948-49, 1952-59): Maximum 88°F Aug. 18, 1949; minimum, freezing point on many days during winter months.
Sediment concentrations (1950-59): Maximum daily, 2,860 ppm Apr. 24, 1957; minimum daily, 1 ppm Sept. 4, 10, 1955.
Sediment loads: Maximum daily, 34,000 tons Mar. 25, 1954; minimum daily, less than 0.5 ton on several days during August to September 1954, and September 1955.
REMARKS.--Thermograph element buried Oct. 1 to Aug. 10; temperature record unreliable. Records of discharge for water year October 1958 to September 1959 given in WSP 1627. Flow affected by ice Jan. 6-7.

Temperature (°F) of water, August to September 1959
(Continuous ethyl alcohol-actuated thermograph)

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
August																																
Maximum	--	--	--	--	--	--	--	--	--	--	75	78	79	82	82	82	82	80	81	81	83	81	82	84	84	83	80	81	80	79	76	--
Minimum	--	--	--	--	--	--	--	--	--	--	72	74	77	78	80	80	77	77	77	78	79	77	81	81	80	80	78	80	78	76	74	--
September																																
Maximum	76	74	74	75	75	75	77	78	78	78	72	68	68	68	68	67	64	62	62	65	69	71	73	73	72	72	72	74	74	73	--	72
Minimum	74	72	72	72	72	72	73	75	76	72	68	66	66	66	66	64	62	59	59	61	65	68	70	71	70	71	71	71	72	67	--	69

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2080. CUYAHOGA RIVER AT INDEPENDENCE, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959

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...	532	62	89	2888	8	6	620	27	45
2...	442	51	61	253	5	3	620	36	60
3...	404	41	45	259	4	3	628	36	61
4...	394	21	22	275	3	2	1,160	33	103
5...	372	17	17	250	8	5	1,310	30	106
6...	338	28	26	235	27	17	1,010	27	74
7...	338	34	31	206	36	20	768	18	37
8...	338	23	21	215	40	23	680	20	37
9...	338	17	16	226	27	16	656	54	96
0...	304	18	15	259	6	4	580	78	122
1...	229	13	8	282	24	18	568	88	135
2...	209	15	8	275	40	30	552	73	109
3...	195	18	9	328	31	27	520	57	80
4...	218	21	12	397	35	38	468	32	40
5...	204	23	13	688	--	e 600	456	25	31
6...	193	36	19	1,160	450	sa 1,600	450	26	32
7...	238	39	25	3,650	474	s 5,720	428	23	26
8...	275	18	13	3,040	428	s 3,250	418	22	25
9...	218	9	5	1,960	223	1,180	428	21	24
20...	195	11	6	1,520	157	644	428	28	32
21...	215	8	5	1,400	112	423	408	29	32
22...	238	10	6	1,280	55	190	408	32	35
23...	215	8	5	1,120	52	157	425	29	33
24...	229	10	6	972	26	68	472	22	28
25...	232	15	9	876	34	80	450	22	27
26...	275	9	7	1,320	90	a 320	414	26	29
27...	241	16	10	908	46	113	439	30	36
28...	362	21	20	752	37	75	418	27	30
29...	304	18	15	724	38	74	425	29	33
30...	314	13	11	660	26	46	540	65	95
31...	304	11	9	--	--	--	476	76	98
Total	8,903	--	564	25,778	--	14,752	17,617	--	1,751

Day	January			February			March		
1...	850	--	e 950	1,940	30	157	2,040	61	336
2...	1,980	--	e 1,400	1,550	73	306	2,120	134	767
3...	1,250	43	145	1,340	57	206	2,340	143	903
4...	1,100	43	128	1,620	45	108	2,370	114	729
5...	824	42	93	1,380	73	272	1,940	72	377
6...	700	42	79	1,120	52	157	2,260	65	397
7...	650	51	90	980	32	85	2,060	65	362
8...	584	46	72	926	30	75	1,660	83	372
9...	544	41	60	892	30	72	2,140	112	647
10...	484	38	50	12,000	281	s 9,650	2,480	112	750
11...	446	38	46	10,900	228	6,710	1,980	76	406
12...	422	51	58	6,780	90	1,650	1,620	52	227
13...	428	48	55	5,370	157	2,280	1,500	70	284
14...	408	44	48	5,420	334	4,890	1,540	90	374
15...	1,030	240	667	7,040	233	4,430	3,960	898	9,600
16...	916	100	247	4,590	121	1,500	3,950	145	s 1,800
17...	728	40	79	3,540	115	1,100	2,750	36	267
18...	692	37	69	2,920	50	390	2,180	45	265
19...	652	32	56	2,380	80	510	2,120	49	280
20...	627	65	110	1,760	110	520	2,000	39	211
21...	10,000	955	s 29,700	1,400	95	360	1,750	36	170
22...	16,700	380	sb 19,000	1,320	115	410	1,510	37	151
23...	8,820	105	2,500	2,260	--	e 1,900	1,320	38	135
24...	5,800	97	1,520	2,800	--	e 3,300	1,200	60	194
25...	5,100	95	1,310	1,990	230	1,240	1,080	132	385
26...	4,200	50	567	1,820	91	447	1,250	90	304
27...	3,000	163	1,320	2,100	54	306	1,860	36	181
28...	2,200	290	1,720	1,930	73	380	1,580	30	128
29...	1,820	187	919	--	--	--	1,280	57	197
30...	3,770	371	s 4,080	--	--	--	1,180	44	140
31...	2,640	206	s 1,590	--	--	--	1,110	28	84
Total	79,365	--	68,728	90,068	--	43,500	60,130	--	21,423

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

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2080. CUYAHOGA RIVER AT INDEPENDENCE, OHIO--Continued

Suspended sediment, water year October 1958 to September 1959--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...	1,020	21	58	3,740	49	495	3,290	837	s 13,200
2...	1,290	29	101	3,090	34	284	2,780	109	s 1,010
3...	1,480	58	232	2,490	53	356	1,400	39	147
4...	1,490	62	249	2,010	52	282	1,010	31	84
5...	1,270	24	82	1,580	32	136	809	18	39
6...	1,160	13	41	1,270	25	86	755	58	118
7...	1,040	11	31	1,060	31	89	714	57	110
8...	1,050	35	99	890	24	58	593	17	27
9...	1,360	112	411	746	19	38	529	14	20
10...	1,170	42	133	665	28	50	453	22	27
11...	998	25	67	710	24	46	408	20	22
12...	890	31	74	1,160	--	e 450	397	27	29
13...	827	49	109	1,000	75	202	397	24	26
14...	768	43	89	782	16	34	311	23	19
15...	674	31	56	706	10	19	269	18	13
16...	692	18	34	701	18	34	256	12	8
17...	609	40	66	657	20	35	241	20	13
18...	481	28	36	597	23	37	244	24	16
19...	641	15	26	732	24	47	223	20	12
20...	791	65	s 147	605	10	16	206	19	10
21...	732	34	67	545	16	24	193	24	12
22...	653	39	69	573	16	25	376	--	e 130
23...	665	53	95	674	60	sa 120	501	150	sa 220
24...	601	46	75	557	27	41	278	28	21
25...	565	43	66	533	25	36	311	32	27
26...	657	74	131	577	23	36	899	--	e 310
27...	2,550	296	s 2,280	1,300	97	s 987	1,020	--	e 280
28...	5,370	560	s 10,200	6,100	1,200	sa 17,000	701	33	62
29...	6,000	159	s 2,810	2,090	239	s 1,480	561	77	117
30...	5,010	94	1,270	1,920	170	881	473	97	124
31...	--	--	--	1,280	40	138	--	--	--
Total	42,504	--	19,204	41,340	--	23,562	20,598	--	16,253

Day	July			August			September		
1...	397	42	45	453	18	22	474	350	sa 570
2...	786	--	e 240	345	20	19	2,450	--	e 6,600
3...	557	23	34	308	17	14	958	78	202
4...	383	42	43	1,430	261	s 1,490	678	69	126
5...	414	--	e 470	966	149	389	529	21	30
6...	2,420	--	e 6,300	661	82	146	433	10	12
7...	922	26	65	529	62	88	362	26	25
8...	497	32	43	854	205	e 550	331	28	25
9...	345	24	22	593	57	91	301	19	15
10...	331	8	7	525	44	62	352	30	sa 35
11...	298	9	7	505	50	68	348	44	41
12...	637	--	e 250	485	37	48	304	28	23
13...	366	23	23	376	29	29	278	31	23
14...	304	14	11	328	27	24	266	39	28
15...	314	20	17	295	33	26	269	28	20
16...	311	17	14	321	72	62	275	22	16
17...	288	15	12	418	321	s 453	215	24	14
18...	335	35	sb 50	376	116	s 140	201	42	23
19...	1,130	766	s 2,650	288	23	18	159	35	15
20...	489	230	304	212	26	15	154	21	9
21...	425	140	b 160	204	20	11	161	18	8
22...	376	120	b 120	449	57	e 90	172	16	7
23...	457	457	s 732	362	16	16	172	17	8
24...	380	146	150	247	38	25	168	14	6
25...	386	46	48	198	48	26	185	13	6
26...	288	46	36	190	35	18	170	11	5
27...	278	103	77	247	35	23	165	11	5
28...	311	61	51	345	63	59	157	18	8
29...	489	128	s 194	256	41	28	157	22	9
30...	1,060	--	e 550	272	80	sa 120	951	243	s 2,070
31...	653	20	35	517	240	sa 380	--	--	--
Total	16,627	--	12,760	13,555	--	4,550	11,795	--	9,984

Total discharge for year (cfs-days)..... 428,280
Total load for year (tons)..... 237,031

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

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2080. CUYAHOGA RIVER AT INDEPENDENCE, OHIO--Continued

Particle-size analyses of suspended sediment, water year October 1958 to September 1959
(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)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
						0.001	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Nov. 17, 1958.....	1730			5,350	831		39	49	63	79	92	97	99	100	--		SBWC
Nov. 17.....	1730			5,350	831		22	32	52	78	93	97	99	100	--		SBN
Jan. 21, 1959.....	1530			12,800	1,360		39	52	66	84	96	99	100	--	--		SBWC
Jan. 30.....	1800			4,610	571		34	46	63	84	98	99	100	--	--		SBWC
Mar. 15.....	1100			3,530	1,130		27	35	54	69	85	90	96	99	100		SBWC
Apr. 27.....	1011			3,470	560		68	76	90	97	98	99	100	--	--		SBWC
Apr. 28.....	2000			7,890	996		52	64	80	95	98	99	100	--	--		SBWC
Apr. 28.....	2120			8,060	1,010		41	51	65	81	90	94	96	98	100		SBWC
Apr. 28.....	2120			8,060	1,010		29	37	56	77	89	93	96	97	100		SBN
June 1.....	2050			7,350	1,670		52	63	80	95	99	100	--	--	--		SBWC
July 23.....	1830			621	1,420		52	65	81	95	98	100	--	--	--		SBWC
Sept. 2.....	1415			1,760	1,270		31	41	55	76	92	96	99	100	--		SBWC

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2135. CATTARAUGUS CREEK AT GOWANDA, N.Y.

LOCATION.--At bridge at Gowanda, Erie County, 380 feet upstream from gaging station and 4.2 miles downstream from South Branch.
DRAINAGE AREA.--428 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 354 ppm Sept. 8-17; minimum, 145 ppm Mar. 21-31.
Hardness: Maximum, 292 ppm July 13; minimum, 85 ppm Feb. 1.
Specific conductance: Maximum daily, 952 micromhos Oct. 7; minimum daily, 166 micromhos Feb. 1.
Water temperatures: Maximum, 78°F Aug. 3; minimum, freezing point on many days during November to February.
REMARKS.--Records of specific conductance and pH of daily samples available in district office in Albany, N.Y. Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed: Filtered	Oxygen consumed: Unfiltered
Oct. 1-6, 1958...	410	6.8	0.26	51	9.2	12	0.6	146	42	16	0.4	8.8	237	165	46	393	7.2	5	2	--
Oct. 7.....	252	--	.16	--	--	--	--	326	--	142	--	1.2	--	252	0	952	6.5	--	--	--
Oct. 8-20.....	288	6.1	.10	52	10	16	.6	151	47	23	.2	4.2	251	171	47	419	6.8	5	2	--
Oct. 21-31.....	301	5.9	.18	52	10	17	.6	144	54	22	.1	5.8	253	171	53	426	6.7	5	2	--
Nov. 1-10.....	271	6.6	.12	53	9.3	14	1.3	150	48	18	.1	5.4	242	170	47	407	7.0	5	--	--
Nov. 11-14.....	622	--	.20	--	--	13	--	142	50	17	--	5.8	--	168	52	384	7.1	3	--	--
Nov. 15-20.....	1,441	7.3	.31	40	5.8	4.4	1.7	111	30	6.5	.1	2.3	169	124	33	262	7.1	5	--	--
Nov. 21-30.....	681	7.2	.16	42	6.8	7.7	1.1	116	36	10	.0	4.1	180	133	38	297	7.0	3	--	--
Dec. 1-20.....	726	7.0	.07	41	7.5	8.5	1.1	117	40	11	.0	3.4	183	134	38	292	7.2	5	--	--
Dec. 21-31.....	505	8.8	.04	46	8.2	12	1.1	131	40	15	.1	5.8	212	149	41	338	7.2	3	--	--
Jan. 1-5, 1959...	574	--	.04	--	--	9.9	--	126	32	10	--	1.7	--	131	28	288	7.2	3	--	--
Jan. 6.....	450	--	.23	--	--	16	--	123	64	29	--	12	--	183	82	474	6.8	--	--	--
Jan. 7-20.....	547	7.5	.06	43	7.9	13	1.2	120	40	16	.0	6.3	209	140	42	332	7.0	4	1	5
Jan. 21-31.....	3,534	13	.08	36	5.8	5.4	1.7	107	29	7.0	.1	2.5	166	114	27	255	7.5	4	1	2
Feb. 1.....	1,570	--	.59	--	--	2.8	--	75	18	5.6	--	3.7	--	85	24	166	7.9	--	--	--
Feb. 2-19.....	1,521	7.2	.15	38	6.4	5.9	1.4	104	29	9.0	.0	5.8	165	122	37	255	7.4	5	--	--
Feb. 20-28.....	647	7.0	.20	46	7.6	9.6	1.3	132	38	14	.1	5.3	211	147	39	327	7.1	5	--	--
Mar. 1-6.....	1,089	7.5	.47	46	7.2	9.6	1.4	126	40	15	.1	6.4	211	145	41	328	7.2	4	--	--
Mar. 7-8.....	1,660	--	.28	--	--	3.4	--	92	22	5.1	--	3.7	--	101	26	203	7.5	--	--	--
Mar. 9-10.....	884	--	.07	--	--	12	--	116	49	17	--	4.7	--	147	52	331	6.9	--	--	--
Mar. 11-20.....	1,363	9.7	.22	42	6.9	8.7	1.4	116	35	12	.0	5.9	190	134	39	294	7.1	3	--	--
Mar. 21-31.....	2,522	9.1	.35	34	5.2	3.8	1.4	97	24	5.1	.1	4.4	145	107	27	216	7.6	3	--	--
Apr. 1-10.....	3,951	10	.30	34	5.1	3.5	1.5	102	22	4.0	.3	2.5	178	106	23	223	7.4	5	1	7
Apr. 11-20.....	916	6.1	.08	40	7.1	6.2	1.5	118	28	10	.2	4.4	194	129	33	283	7.4	5	1	4
Apr. 21-30.....	649	5.1	.06	44	8.3	9.2	1.5	128	37	14	.2	4.6	222	144	39	332	7.1	5	1	7
May 1-31.....	440	5.7	.10	51	8.5	12	1.7	140	40	18	.1	5.3	227	162	48	336	7.2	5	--	--

June 1-25, 1959..	226	6.5	.16	59	9.9	18	2.0	154	57	26	.1	5.5	286	188	62	476	7.0	4	--	--
June 26-30.....	301	--	.50	--	--	11	--	151	37	16	--	4.3	--	164	41	370	7.3	--	--	--
July 1-12.....	181	9.0	.04	64	10	18	1.9	195	44	24	.1	2.4	278	201	41	483	6.9	5	--	--
July 13.....	123	--	.79	--	--	54	--	376	64	24	--	.0	--	292	0	708	7.1	--	--	--
July 14-18.....	117	--	.19	--	--	24	--	183	80	28	--	3.9	--	223	73	532	6.9	--	--	--
July 19-23.....	127	23	.14	45	15	11	1.9	169	38	12	.1	3.1	242	174	36	382	7.3	12	--	--
July 24-26.....	122	--	.06	--	--	9.0	--	178	65	16	--	1.7	--	218	72	461	6.9	--	--	--
July 27-31.....	107	--	.29	--	--	29	--	236	62	29	--	.1	--	236	43	567	7.0	--	--	--
Aug. 1-3.....	95	--	.23	--	--	30	--	218	52	15	--	.5	--	189	11	488	7.0	--	--	--
Aug. 4-9.....	106	--	.12	--	--	44	--	293	64	37	--	.6	--	263	23	732	6.9	--	--	--
Aug. 10-21.....	95	8.0	.25	62	12	23	2.2	157	73	33	.1	.9	318	204	76	573	6.8	12	--	--
Aug. 22-24.....	118	--	.31	--	--	21	--	110	68	29	--	6.4	--	161	71	400	6.3	--	--	--
Aug. 25.....	92	--	.14	--	--	83	--	248	108	84	--	1.3	--	256	53	801	6.7	--	--	--
Aug. 26-31.....	261	6.4	.14	41	24	12	2.3	151	72	17	.1	4.1	260	201	78	260	6.8	10	--	--
Sept. 1-7.....	142	12	.12	58	12	12	2.3	160	51	18	.1	10	264	194	63	436	7.1	6	--	--
Sept. 8-17.....	82	6.8	.38	85	13	23	2.3	279	52	24	.1	.0	354	266	37	682	6.9	17	--	--
Sept. 18-21.....	86	--	.11	--	--	9.0	--	202	39	9.6	--	4.9	--	204	39	429	7.0	--	--	--
Sept. 22.....	85	--	.25	--	--	66	--	384	83	18	--	.0	--	284	0	810	7.0	--	--	--
Sept. 23-28.....	88	6.0	.21	62	12	14	1.9	172	51	18	.1	15	266	204	63	481	7.0	10	--	--
Sept. 29-30.....	105	--	.40	--	--	51	--	192	94	58	--	23	--	244	87	713	7.4	--	--	--
Time-weighted average.....	755	7.7	0.17	49	8.9	12	1.5	147	44	18	0.1	4.6	226	164	44	384	--	5	--	--

STREAMS TRIBUTARY TO LAKE ERIE--Continued

4-2135. CATTARAUGUS CREEK AT GOWANDA, N.Y.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily measurement at approximately 7:30 a.m./

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

4-2160. NIAGARA RIVER AT NIAGARA FALLS, N.Y.

LOCATION.--City intake from west channel near Navy Island, approximately 1.6 miles offshore from Niagara Falls, Niagara County.
DRAINAGE AREA.--263,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 203 ppm Mar. 1-12, 14-15, 17-20; minimum, 179 ppm Nov. 21-25, 27-29.
Hardness: Maximum, 144 ppm Aug. 1-11, 13-31; minimum, 124 ppm Apr. 1-30.
Specific conductance: Maximum daily, 333 micromhos Sept. 27; minimum daily, 269 micromhos May 2.
Water temperatures: Maximum, 76°F Aug. 30, 31; minimum, freezing point on many days during January to May.
REMARKS.--Record of specific conductance and pH of daily samples available in district office at Albany, N.Y. Records of discharge for gaging station at Buffalo for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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	Oxygen consumed: Filtered	Oxygen consumed: Unfiltered
Oct. 7-15, 18-20, 1958.....	175	6.6	0.08	40	9.0	9.7	0.5	125	23	22	0.2	0.0	188	137	35	311	7.3	3	2	--
Oct. 21-31.....	169	8.5	.07	38	8.0	10	.5	123	22	21	.2	.0	187	128	27	309	7.4	3	2	--
Nov. 1-5, 11, 13-17, 20.....	167	7.3	.06	41	8.2	9.0	1.0	125	24	22	.3	.0	185	136	34	312	7.3	5	--	--
Nov. 21-25,27-29	178	4.7	.07	41	8.0	8.6	1.0	122	24	22	.2	.0	179	136	36	308	7.7	5	--	--
Dec. 8,9,18, 20,	163	4.3	.08	40	7.8	11	1.2	119	26	25	.1	.3	187	132	35	316	7.4	3	--	--
Dec. 21-23,26-31	159	4.3	.03	38	9.4	10	1.2	121	27	22	.2	.2	186	134	35	306	7.7	3	--	--
Jan. 6-10,12-14, 18, 20, 1959..	153	5.4	.03	39	8.3	11	1.3	125	22	23	.4	.2	197	132	29	311	7.6	5	1	1
Jan. 21-31.....	167	5.1	.04	39	8.2	11	1.2	122	24	20	.4	.3	195	131	31	308	7.7	6	1	1
Feb. 1-20.....	164	3.8	.07	39	9.6	11	1.1	123	25	22	.3	5.2	181	137	36	305	7.6	3	--	--
Feb. 21-28.....	169	5.6	.06	40	9.5	9.8	1.1	124	25	22	.3	5.8	186	139	38	305	7.8	2	--	--
Mar. 1-12,14-15, 17-20.....	176	6.8	.03	41	8.3	10	1.3	126	21	23	.1	.6	203	137	33	303	7.8	2	--	--
Mar. 22-31.....	175	4.7	.03	41	8.3	9.3	1.3	122	24	22	.1	1.2	194	137	37	303	7.6	2	--	--
Apr. 1-30.....	186	4.6	.03	37	7.5	9.0	1.3	110	24	20	.1	1.4	191	124	34	295	7.8	3	2	5
May 1-5, 7-27...	196	5.1	.05	37	8.0	9.2	1.3	113	22	22	.1	.2	187	126	33	293	7.7	5	--	--
June 4-30.....	196	6.4	.02	39	8.1	11	1.5	120	23	25	.1	.4	192	131	33	310	7.7	2	--	--
July 1-7, 9-31..	188	7.7	.01	40	8.0	11	1.3	120	25	24	.1	.2	195	133	35	315	7.5	2	--	--
Aug. 1-11, 13-31	182	--	.02	--	--	5.8	--	122	23	23	--	.1	--	144	44	315	7.5	3	--	--
Sept. 1-22,24-27	176	9.5	.02	39	8.7	12	1.5	122	26	23	.2	.8	182	134	34	318	7.6	5	--	--
Time-weighted average [a]...	179	6.2	0.04	39	8.3	10	1.2	120	24	22	0.2	0.9	190	133	35	308	--	3	--	--

a Represents 83 percent of days and 83 percent of runoff.

ST. LAWRENCE RIVER MAIN STEM--Continued

4-2160. NIAGARA RIVER AT NIAGARA FALLS, N.Y.--Continued

Temperature (°F) of water, water year October 1958 to September 1959

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

STREAMS TRIBUTORY TO NIAGARA RIVER

4-2195.2. BARGE CANAL AT ROCHESTER, N.Y.

LOCATION.--At west gate, 600 yards west of Genesee River, at Rochester, Monroe County.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
REMARKS.--Discharge records from Erie (Barge) Canal at lock 30, Macedon, Wayne County, N.Y.; about 19 miles east of Rochester, N.Y. for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

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. 6, 1958.....	354	2.2	0.03	50	10	13	2.3	130	55	24	0.2	1.2	236	166	60	391	7.1	3
Nov. 5.....	347	.8	.09	51	10	12	1.7	126	48	26	.1	2.1	226	168	65	387	6.9	5
Dec. 1.....	344	2.6	.13	56	11	12	2.0	131	62	25	.2	2.9	254	185	77	410	6.8	5
Jan. 5, 1959.....	17	4.1	.17	70	14	32	2.5	156	86	59	.2	1.7	383	232	104	595	6.9	10
Feb. 2.....	27	4.2	1.1	38	7.7	12	2.4	81	47	24	.1	3.4	192	127	60	307	6.9	10
Mar. 2.....	30	4.5	.14	56	12	20	2.7	124	71	38	.1	3.2	311	189	88	461	6.9	5
Apr. 6.....	51	4.1	.39	42	9.6	7.9	2.3	110	45	16	.2	.9	234	145	55	330	7.1	10
May 8.....	89	2.9	.04	68	12	14	2.2	146	89	26	.2	2.4	320	219	100	501	6.9	5
June 1.....	260	.4	.00	57	11	13	2.1	144	62	25	.0	2.3	275	187	69	438	7.1	6
July 8.....	397	1.2	.03	50	10	14	2.1	124	49	29	.3	4.2	227	166	65	390	7.2	6
Aug. 3.....	415	1.4	.06	46	8.1	13	2.8	125	42	25	.1	3.5	213	149	46	372	6.9	6
Sept. 8.....	385	1.1	.06	46	8.4	14	2.2	114	49	26	.1	2.1	216	150	56	380	7.2	5

STREAMS TRIBUTARY TO NIAGARA RIVER--Continued

4-2196. BARGE CANAL AT LOCK 35, LOCKPORT, N.Y.

LOCATION.--At lock in Lockport, Niagara County.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
REMARKS.--Discharge records from Erie (Barge) Canal at Lock 30, Macedon, Wayne County, N.Y., about 82 miles east of Lockport for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses in parts per million, water year October 1958 to September 1959

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. 6, 1958.....	354	1.2	0.14	42	9.1	12	1.8	121	39	23	0.3	1.3	200	143	44	339	7.1	3
Nov. 6.....	353	.8	.19	48	9.7	12	1.6	126	40	26	.1	2.8	214	160	57	371	6.9	5
Dec. 4.....	353	2.4	.42	58	11	14	2.2	131	66	29	.2	4.1	267	190	82	432	6.7	3
Jan. 5, 1959.....	17	6.0	.09	91	16	14	2.1	198	121	24	.1	4.1	393	293	131	601	7.2	5
Feb. 9.....	5.2	5.9	.21	66	13	14	2.9	142	87	29	.2	7.1	318	218	102	494	7.0	5
Mar. 4.....	43	2.0	.53	60	13	100	4.5	141	42	185	.3	6.2	531	203	88	917	6.6	5
Apr. 6.....	51	4.8	.17	48	13	7.3	3.0	118	58	18	.3	4.4	276	174	77	375	7.0	25
May 5.....	98	2.0	.05	56	12	12	1.8	130	68	24	.0	2.4	264	189	83	424	6.9	6
June 1.....	260	1.1	.10	48	9.6	12	2.1	125	47	26	.0	2.6	231	160	57	378	7.0	6
July 9.....	409	1.5	.10	48	9.6	13	1.8	120	50	26	.3	3.3	224	160	61	371	6.8	3
Aug. 3.....	415	1.4	.14	41	7.9	12	1.7	118	34	22	.2	2.8	195	135	39	338	7.3	3
Sept. 14.....	394	1.4	.36	45	8.1	13	1.8	119	44	25	.1	2.2	207	146	49	363	7.2	3

4-2320. GENESEE RIVER AT ROCHESTER, N.Y.

LOCATION.--On right bank at Rochester, Monroe County at plant 5, of Rochester Gas and Electric Corp., 40 feet upstream from gaging station, and 60 feet upstream from Driving Park Bridge.
DRAINAGE AREA.--2,467 square miles.
RECORDS AVAILABLE.--Chemical analysis: October 1954 to September 1955.
Water temperatures: October 1954 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 79°F July 30, 31, Aug. 16, 20; minimum, 33°F on several days during February.
EXTREMES, 1954-59.--Water temperatures: Maximum, 83°F Aug. 4-6, 1955; minimum, freezing point March 1955, December 1956.
REMARKS.--Record of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
(Twice-daily measurements at approximately 10 a.m. and 4 p.m.)

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

STREAMS TRIBUTARY TO LAKE ONTARIO

4-2375. SENECA RIVER AT LOCK 24, BALDWINSVILLE, N.Y.

LOCATION.--At lock 24, Baldwinsville, Onondaga County and about 350 feet upstream from gaging station.
DRAINAGE AREA.--3,130 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1958.
Water temperatures: October 1957 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 80°F July 30, 31, Aug. 1; minimum, freezing point Jan. 5, 6.
EXTREMES, 1957-59.--Water temperatures: Maximum, 80°F July 30, 31, Aug. 1, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Record of discharge for water year October 1958 to September 1959 given in WSP 1627.

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily measurement at approximately 8:30 a.m./

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

STREAMS TRIBUTARY TO LAKE ONTARIO--Continued

4-2571.5. BEAVER RIVER AT MOSHIER FALLS, N.Y.

LOCATION.--At the Niagara-Mohawk Moshier Falls Power Station, which is at the confluence of Beaver River and Sunday Creek near Number Four, Lewis County.
DRAINAGE AREA.--184 square miles.
RECORDS AVAILABLE.--Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 73°F Aug. 21; minimum, 34°F on many days during December to April.
EXTREMES, 1955-59.--Water temperatures: Maximum, 71°F Aug. 4, 1957; minimum, 34°F on many days during winter months.
REMARKS.--Measurements made by plant employees five feet below water surface in the tailrace of the Moshier Falls hydroelectric station.

Temperature (°F) of water, water year October 1958 to September 1959
[Once-daily temperature measurement at approximately 9 a.m.]

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

STREAMS TRIBUTARY TO LAKE ONTARIO

4-2605. BLACK RIVER AT WATERTOWN, N.Y.

LOCATION.--At dam at Watertown Municipal Power Plant, Watertown, Jefferson County, and about 1.6 miles upstream from gaging station.
DRAINAGE AREA.--1,876 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1956.
Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 78°F June 29, July 5, 18, 19; minimum, freezing point on many days during November to March.
EXTREMES, 1955-59.--Water temperatures: Maximum, 78°F June 29, July 5, 18, 19, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analysis in parts per million, September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Sept. 21, 1959.....	725	5.3	0.17	11	1.5	3.1	0.9	26	15	2.7	0.2	1.2	80	34	12	93	6.3	32

Temperature (°F) of water, water year October 1958 to September 1959
/Once-daily temperature measurement at approximately 7:00 a.m./

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

4-2607.2. ST. LAWRENCE RIVER AT THOUSAND ISLAND PARK, N.Y.

LOCATION.--At Thousand Island Park Public Water Supply pumping station.
DRAINAGE AREA.--296,500 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 77°F Sept. 10; minimum, 33°F on many days during December to April.
EXTREMES, 1955-59.--Water temperatures: Maximum, 77°F Sept. 10, 1959; minimum, freezing point on many days during winter months.

Chemical analysis in parts per million, October 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 7, 1958.....		1.1		36	8.3	11	1.5	114	26	23	0.2	0.1	170	124	31	297	7.3	2

Temperature (°F) of water, water year October 1958 to September 1959
(Once-daily measurement at approximately 10 a.m.)

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

ST. LAWRENCE RIVER MAIN STEM

4-2608. ST. LAWRENCE RIVER AT ALEXANDRIA BAY, N.Y.

LOCATION.--Off pier behind post office at river-stage gage at Alexandria, Jefferson County.
DRAINAGE AREA.--296,500 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1955 to September 1959.
EXTREMES, 1958-59.--Water temperatures: Maximum, 75°F Aug. 30, 31, Sept. 1,2, 6, 8-10.
EXTREMES, 1955-59.--Water temperatures: Maximum, 75°F Aug. 30, 31, Sept. 1,2,6,8-10,1959; minimum, freezing point on many days during winter months.
REMARKS.--River frozen Dec. 21 to Mar. 31.

Chemical analysis in parts per million, September 1959

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			
Sept. 21, 1959...		1.3		38	8.3	9.8	1.2	110	24	24	0.1	0.5	180	129	39	306	6.9	2

4-2608. ST. LAWRENCE RIVER AT ALEXANDRIA BAY, N.Y.--Continued

Temperature (°F) of water, water year October 1958 to September 1959
/Twice-daily measurement at 8 a.m. and 4 p.m./

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

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER

4-2735. SARANAC RIVER AT PLATTSBURG, N.Y.

LOCATION.--At foot bridge, 0.2 mile upstream from mouth in Plattsburg, Clinton County, and 2.8 miles downstream from gaging station.
DRAINAGE AREA.--608 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1959.
REMARKS.--Records of discharge for water year October 1958 to September 1959 given in WSP 1627.

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 8, 1958	306	4.4	0.03	9.4	2.7	1.7	0.7	33	9.0	0.4	0.1	0.6	51	35	8	72	7.1	18
Nov. 1	1,200	6.5	.43	8.0	2.4	1.5	.6	26	7.6	1.0	.1	.9	53	30	9	68	6.5	40
Dec. 1	761	8.0	.30	10	2.9	2.0	.9	32	9.0	2.0	.2	1.8	61	37	11	78	6.4	20
Jan. 2, 1959	680	8.2	.17	8.6	2.2	1.9	.5	29	7.8	2.5	.1	1.2	53	31	7	69	6.7	15
Feb. 3	248	9.0	.27	11	2.6	2.0	.6	35	8.5	1.0	.1	1.6	59	38	10	82	7.1	10
Mar. 3	a 760	7.8	.26	8.0	2.5	2.0	.8	28	8.3	2.5	.1	1.6	55	31	8	69	6.6	10
Apr. 1	1,040	7.4	.12	10	3.8	2.2	1.0	37	9.7	3.0	.2	1.4	62	41	10	90	7.0	15
May 4	1,740	5.5	.06	5.8	1.3	1.4	.6	16	8.0	1.4	.0	1.4	40	20	7	51	6.7	15
June 1	582	4.3	.18	7.3	2.1	1.9	.6	24	8.3	.8	.0	3.9	45	27	7	66	6.9	11
July 2	695	3.1	.78	7.4	2.2	1.9	.7	28	6.5	1.0	.1	2.7	45	28	5	67	7.2	15
Aug. 3	270	3.1	.24	10	2.1	2.0	.7	30	8.6	1.0	.1	2.2	49	34	9	74	6.5	17
Sept. 8	582	6.4	.24	9.7	2.6	2.2	.9	39	5.7	1.1	.1	2.6	59	35	3	85	6.7	22

a Daily mean discharge.

MISCELLANEOUS ANALYSES OF STREAMS IN ST. LAWRENCE RIVER BASIN

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
STREAMS TRIBUTARY TO LAKE SUPERIOR																							
4-187.7. ELBOW CREEK NEAR IRON JUNCTION, MINN.																							
Aug. 3, 1959..	1.0	14	0.03		29	16	9.6	2.5	128	40	6.4	0.3	0.8	197	0.27		137	32	0.4	304	7.3	36	0.1
Aug. 26.....	11.0	15	.09		23	11	6.0	2.0	75	43	1.5	.3	1.9	172	.23		101	39	.3	230	7.0	65	.1
Sept. 4.....	--	13	.24	0.00	20	10	6.0	1.7	79	32	3.5	.3	1.6	163	.22		91	26	.3	202	7.1	80	.6
4-195. EAST SWAN RIVER NEAR TOIVOLA, MINN.																							
June 5, 1959..	186	4.7	0.33	0.00	16	6.3	4.7	0.9	64	14	1.4	0.2	2.6	125	0.17		66	14	0.3	142	6.8	140	20
Sept. 5.....	252	8.4	.49	.00	17	7.7	4.3	1.0	65	22	2.1	.3	2.8	149	.20		74	21	.2	156	7.0	160	30
FLOODWOOD RIVER NEAR FLOODWOOD, MINN.																							
June 5, 1959..		3.3	0.30	0.00	14	4.1	1.9	0.4	54	11	0.1	0.3	1.1	108	0.15		52	8	0.1	94.7	6.7	170	3
Sept. 5.....		7.8	.46	.02	15	5.0	1.6	1.4	55	9.3	.0	.3	2.9	122	.17		58	13	.1	108	6.9	160	15
WHITEFACE RIVER NEAR MEADOWLANDS, MINN.																							
June 5, 1959..		3.8	0.42	0.00	10	3.7	1.7	0.5	38	9.5	0.1	0.3	1.3	99	0.13		40	9	0.1	76.7	6.6	200	7
Sept. 5.....		6.5	.65	.00	13	5.2	2.0	.4	49	11	.0	.3	4.2	132	.18		54	14	.1	99.7	6.9	220	50
STREAMS TRIBUTARY TO ST. LAWRENCE RIVER																							
4-2965. CLYDE RIVER AT NEWPORT, VT.																							
Nov. 12, 1958.	417	4.9	0.11		18	1.4	3.4	1.4	56	7.5	5.0	0.0	1.1	80			51	5		124	7.6	13	
Dec. 11.....	376	5.6	.11		19	1.9	2.6	1.3	56	9.1	4.7	.1	.7	77			56	10		116	6.6	10	
Apr. 7, 1959..	1,220	4.5	.02		17	2.3	1.8	1.0	48	11	3.7	.0	1.4	74			52	13		108	6.8	8	

MISCELLANEOUS ANALYSES OF STREAMS IN ST. LAWRENCE RIVER BASIN

Chemical analyses, in parts per million, water year October 1958 to September 1959

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color	Turbidity
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
STREAMS TRIBUTARY TO LAKE SUPERIOR																								
4-187.7. ELBOW CREEK NEAR IRON JUNCTION, MINN.																								
Aug. 3, 1959	1.0	14	0.03		29	16	9.6	2.5	128	40	6.4	0.3	0.8		197	0.27		137	32	0.4	304	7.3	36	0.1
Aug. 26.....	11.0	15	.09		23	11	6.0	2.0	75	43	1.5	.3	1.9		172	.23		101	39	.3	230	7.0	65	.1
Sept. 4.....	--	13	.24	0.00	20	10	6.0	1.7	79	32	3.5	.3	1.6		163	.22		91	26	.3	202	7.1	80	.6
4-195. EAST SWAN RIVER NEAR TOIVOLA, MINN.																								
June 5, 1959	186	4.7	0.33	0.00	16	6.3	4.7	0.9	64	14	1.4	0.2	2.6		125	0.17		66	14	0.3	142	6.8	140	20
Sept. 5.....	252	8.4	.49	.00	17	7.7	4.3	1.0	65	22	2.1	.3	2.8		149	.20		74	21	.2	156	7.0	160	30
FLOODWOOD RIVER NEAR FLODDWOOD, MINN.																								
June 5, 1959.		3.3	0.30	0.00	14	4.1	1.9	0.4	54	11	0.1	0.3	1.1		108	0.15		52	8	0.1	94.7	6.7	170	3
Sept. 5.....		7.8	.46	.02	15	5.0	1.6	1.4	55	9.3	.0	.3	2.9		122	.17		58	13	.1	108	6.9	160	15
WHITEFACE RIVER NEAR MEADOWLANDS, MINN.																								
June 5, 1959.		3.8	0.42	0.00	10	3.7	1.7	0.5	38	9.5	0.1	0.3	1.3		99	0.13		40	9	0.1	76.7	6.6	200	7
Sept. 5.....		6.5	.65	.00	13	5.2	2.0	.4	49	11	.0	.3	4.2		132	.18		54	14	.1	99.7	6.9	220	50
STREAMS TRIBUTARY TO ST. LAWRENCE RIVER																								
4-2965. CLYDE RIVER AT NEWPORT, VT.																								
Nov. 12,1958.	417	4.9	0.11		18	1.4	3.4	1.4	56	7.5	5.0	0.0	1.1		80			51	5		124	7.6	13	
Dec. 11.....	376	5.6	.11		19	1.9	2.6	1.3	56	9.1	4.7	.1	.7		77			56	10		116	6.6	10	
Apr. 7, 1959.	1,220	4.5	.02		17	2.3	1.8	1.0	48	11	3.7	.0	1.4		74			52	13		108	6.8	8	

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