Chemical Character of Surface Waters

of South Carolina 1945-47

BY

WILLIAM L. LAMAR

BULLETIN NO. 16

South Carolina Research, Planning and Development Board

Prepared in Cooperation with the Geological Survey of the United States Department of the Interior
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RESEARCH, PLANNING AND DEVELOPMENT BOARD
STATE OF SOUTH CAROLINA
COLUMBIA
July 1, 1948

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LETTER OF TRANSMITTAL

To His Excellency Governor J. Strom Thurmond:

The Research, Planning and Development Board presents this Bulletin on the "Chemical Character of Surface Waters of South Carolina" as a preliminary investigation on the chemical character of water in the State.

This Report is the second which has been prepared through this Agency in cooperation with the U. S. Department of the Interior, Geological Survey. Bulletin No. 15, "Ground Water Investigations in South Carolina," published in 1946, was the first of this series. Bulletin No. 17, "Surface Water Supply in South Carolina," will be available in printed form by September of this year.

These three reports will cover all phases of our waters, both ground and surface, and it is hoped that they will make possible a wider and more economical use of one of our most valuable natural resources.

Sincerely,

L. W. BISHOP, Director.

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By William L. Lamar

INTRODUCTION

Water is essential to human existence but the extent to which water meets essential needs depends upon its quality. Knowledge of the quantity and quality of water available is of fundamental importance. As growth and industrial development continue, the quantity and quality of water become increasingly more important. However, due to this growth and industrial development the quality of water may continually become poorer due to pollution. To meet this situation, wise planning through systematic basic information on quality and quantity of water is necessary.

The earth has a fixed total supply of water but the supply of water available at different locations at different times is constantly changing. The quality of water of the streams is also constantly changing. This is due to climatic conditions, diversions and impounding, inflow from other sources, and pollution from waste materials.

South Carolina has ample rainfall and in general relatively insoluble surface soils and rocks. The waters analyzed were soft and low in mineral content. These waters are attractive to industries for many purposes. However, as industrial development and population increase the quality of the streams may become poorer since the streams are the receivers of the waste materials. The prosperity of a state is advanced through its water facilities and then checked if adequate planning is not maintained through the study of chemical quality of water to assure its most advantageous use through ever-changing industrial development, growth, modern conveniences, and manner of waste disposal.

The investigation of the chemical character of surface waters of South Carolina was begun in 1945 by the Geological Survey of the United States Department of the Interior in cooperation with the South Carolina Research, Planning and Development Board. This report covers the period of two water years—October 1945 to September 1946 and October 1946 to September 1947. It contains a total of 148 analyses of surface waters. Analyses of 10-day composites of daily samples covering a period of a year are given for three stations on pages 14 to 19. At these points the temperature of the water was measured daily at the time the samples were collected and these results are given on pages 22 to 24. Analyses for 37 miscellaneous samples collected from streams throughout the State are given on pages 20 to 21. Nearly all of the samples were collected at points where gaging stations are maintained and discharge data as related to the analytical data are reported.

ACKNOWLEDGMENTS

Appreciation for cooperation in the operation of this investigation is expressed to the Director of the South Carolina Research, Planning and Development Board. Discharge records, as well as assistance in arrangements for the collection of the samples, were furnished by A. E. Johnson, District Engineer of the United States Geological Survey. The analytical work was performed by M. J. Carr, J. W. Crone, Jr., E. Holloman, J. E. James, F. H. Pauszek, W. T. Platt, and G. W. Whetstone, Chemists of the United States Geological Survey. The investigations were made under the direction of W. L. Lamar, District Chemist of the United States Geological Survey.

COLLECTION AND EXAMINATION OF SAMPLES

Analyses were made of 10-day composites of daily samples covering a period of a year for the Lynches River near Bishopville, Saluda River at Chappells, and Wateree River near Camden. The daily samples were collected in 12-ounce bottles and were poured into gallon bottles to make three composites as follows: Samples for the first 10 days, the next 10 days, and the rest of the month, except for February, when the composites consisted of 10, 9, and 9 samples respectively. For the three stations the temperature of the water was measured daily at the time the samples were collected. Spot samples were collected at gaging stations and other points on streams throughout the State.

The samples were filtered through fine diatomaceous filter cylinders and analyzed in accordance with methods[1] regularly used by the United States Geological Survey. Fluoride was determined by a modified zirconium-alizarin method.[2] The color of the water was measured by the commonly adopted platinum-cobalt standard. The unit of color is that produced by 1 milligram of platinum per liter, dissolved as platinic chloride, with the addition of enough cobalt chloride to give a color matching the shade of natural water. In order to show a rough indication of oxidizable matter at the daily stations, oxygen consumed was determined on unfiltered and filtered samples by the procedure in Standard Methods.[3]

The results for suspended matter are only approximations as the samples were collected primarily for the determination of the dissolved constituents. However, an attempt was made to get integrated samples from top to bottom at a point in the stream where there was good flow. The quantity of suspended matter was determined by filtering a suitable sample through an asbestos mat in a Gooch crucible and weighing the dried residue.

COMPOSITION OF SURFACE WATERS

The chemical character of surface waters will vary throughout the year from natural variation in climatic conditions, diversion and impounding, inflow from other sources, and pollution from waste materials. The natural mineral content is due to the solvent action of water on the rocks and soils and it will vary in accordance with the geology of the region.

The surface rocks and soils in South Carolina are generally relatively insoluble and the surface waters analyzed were soft and low in mineral content. These waters are attractive to many industries and are of good chemical quality for many purposes. However, the good quality of these waters may not always remain

[1] Collins, W. D., Notes on practical water analysis: U. S. Geological Survey Water-Supply Paper 596-H, pp. 235-261, 1928.

[2] Lamar, W. L., Determination of fluoride in water; a modified zirconium-alizarin method: End. Eng. Chem. Anal. Ed., Vol. 17, pp. 148-149, 1945.

[3] Am. Public Health Assoc., Standard methods for the examination of water and sewage, 8th Ed., pp. 136-139, 1936.

so. Pollution may affect the waters so that they will be unfit for use. Wise planning through the chemical examination of water is necessary in order that this natural resource may be used for the best benefit to all. Also, the knowledge that waters are soft and low in mineral content is not sufficient. Development in industry, including new processes and improvement in others, demands specific data on chemical quality since many industries have specific requirements.

The analyses in this report indicate that the dissolved solids ranged from 23 to 91 parts per million and the hardness ranged from 5 to 41 parts per million. Some of the waters originating in the Coastal Plain province are highly colored. Streams in the Piedmont province also flow through the Coastal Plain and usually increase in color from water contributed in the Coastal Plain.

Studies of the analyses show that the individual mineral constituents did not exceed, in parts per million, the following limits: Silica 20, iron 0.36, calcium 14, magnesium 3.6, sodium plus potassium 21, bicarbonate 49, sulfate 7.8, chloride 7.4, fluoride 0.5, nitrate 2.0, and suspended matter 66. The color of the water covered a range from 3 to 146.

SUSPENDED MATTER

The suspended matter carried by streams in South Carolina may vary widely for the same stream from time to time, and for streams draining areas of different topography and geology. It may vary widely and suddenly with variations in rainfall. A rain of high intensity will wash into a stream more suspended material than the same quantity of water falling as a gentle rain. Some of the suspended matter in many of the South Carolina streams is finely divided and stays in suspension almost indefinitely. The streams draining the Piedmont province are usually turbid from finely divided suspended matter. Streams originating in the Coastal Plain province usually carry very little suspended matter.

The suspended matter is reported on the 10-day composites for the three daily stations. These 108 analyses show that the 10-day mean suspended matter ranged from 5 to 66 parts per million.

OXYGEN CONSUMED

Oxygen consumed furnishes an approximate measure of the oxidizable matter in water. Oxygen consumed may be roughly proportional to the intensity of the color of natural waters, though water that is not noticeably colored may contain oxidizable material. Oxygen consumed gives a partial measure of polluting materials such as sewage and oxidizable industrial wastes. The oxygen consumed was determined on the unfiltered and filtered composites of the daily samples. It ranged from 2.0 to 12 parts per million on the unfiltered samples and from 1.1 to 8.8 parts per million on the filtered samples.

COLOR

In water analysis the term "color" refers to the appearance of water that is free from suspended matter. Many turbid waters that appear yellow, brown, or red when viewed in the stream may show very little color after the suspended matter has been removed. Natural color in water is caused almost entirely by organic matter extracted from decomposed plant and animal residues. At some places color in water results from industrial waste and sewage. Water for domestic use and some industrial uses should be free from perceptible color. Many surface waters originating in the Coastal Plain province of South Carolina are highly colored. The analyses given in this report indicate that the color ranged from 3 to 146. The dissolved solids for the highly colored waters contain noticeable amounts of organic matter.

HYDROGEN-ION CONCENTRATION (pH)

The degree of acidity or alkalinity of water is indicated by the hydrogen-ion concentration. This hydrogen-ion concentration is commonly reported as pH. It represents the negative logarithm of the number of moles of ionized hydrogen per liter of water. A pH value of 7.0 indicates that the water is neither acid nor alkaline. Values lower than 7.0 denote increasing acidity, while values higher than 7.0 denote increasing alkalinity. The pH of water indicates its activity toward metal surfaces. As the pH increases the corrosive activity of the water decreases. pH is of importance in determining the corrosive properties of water and in the proper treatment for coagulation in water purification plants.

SILICA (SiO_2)

Silica is dissolved from practically all rocks. Silica affects the usefulness of water because it contributes to the formation of boiler scale. It is particularly troublesome in high-pressure boilers since the hard scale prevents rapid transfer of heat resulting in boiler-tube failure. It also forms deposits on the blades of steam turbines. The analyses show that the silica did not exceed 20 parts per million.

IRON (Fe)

Iron is dissolved from many rocks and soils and frequently from the iron pipes through which the water flows. Iron in water in the home is objectionable because it makes stains on porcelain or enameled fixtures and on clothing and other fabrics. Preferably water furnished to domestic consumers should not contain more than 0.3 part per million of iron. Many industries including those for the manufacture of food, carbonated beverages, beer, textiles, dyed fabrics, high-grade paper, and ice must have water practically free from iron. The analyses indicate that the iron content did not exceed 0.36 part per million and usually it was less than 0.1 part per million.

CALCIUM (Ca) AND MAGNESIUM (Mg)

Calcium is dissolved from practically all rocks, but it is usually found in greater quantities in waters in contact with limestone, dolomite, and gypsum. Calcium carbonate is appreciably soluble in waters containing carbon dioxide, although it is only slightly soluble in pure water. Magnesium is dissolved from many rocks, particularly from dolomitic rocks. Sea water contains large quantities of magnesium. Calcium and magnesium make waters hard and are largely responsible for the formation of boiler scale. For the analyses given in this report the calcium did not exceed 14 parts per million and the magnesium did not exceed 3.6 parts per million.

SODIUM (Na) AND POTASSIUM (K)

Sodium and potassium are dissolved from practically all rocks and soils. Some polluting materials may noticeably increase the sodium content of the waters. As sea water is largely a solution of common salt (sodium chloride) considerable quantities of sodium may be found in water which has contact with sea water or sea salts. Natural waters that contain less than 5 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 greater.

Moderate quantities of sodium and potassium have little effect on the suitability of the water for most purposes, but waters that carry more than 50 to 100 parts per million may cause foaming in steam boilers. Some waters may contain so much sodium that they are unfit for most uses. The sodium plus potassium content of the waters as shown by the analyses did not exceed 11 parts per million, except for one sample from the Reedy River near Ware Shoals which had 21 parts per million.

CARBONATE (CO_3) AND BICARBONATE (HCO_3)

Bicarbonate in natural waters results from the action of carbon dioxide in the water on carbonate rocks. Carbonate is not present in appreciable quantities in most natural surface waters and it is not present in waters having a pH of less than about 8.3. Bicarbonate or carbonate is useful in coagulation of water for the removal of suspended matter. In general bicarbonate is the principle anion of the natural surface waters, but some of the waters and particularly some of the colored waters originating in the Coastal Plain contain less than 10 parts per million of bicarbonate. The analyses indicate that the bicarbonate ranged from 6.0 to 49 parts per million.

SULFATE (SO_4)

Sulfate is dissolved from rocks and soils and in large quantities from areas containing gypsum and deposits of sodium sulfate. It is also formed by the oxidation of sulfides and is therefore present in noticeable quantities in waters from mines. Sulfate in waters that contain calcium and magnesium causes the formation of hard scale in steam boilers and may increase the cost of softening or influence the choice of the method of softening the water. The sulfate as shown by the analyses in this report did not exceed 7.8 parts per million.

CHLORIDE (Cl)

Chloride is dissolved from rocks and soils. Natural surface waters in South Carolina are usually low in chloride. Waters in contact with sea water or sea salts are likely to contain considerable chloride as sodium chloride is the abundant constituent of sea water. The chloride content of surface waters may be increased by pollution from sewage and some industrial wastes. Large quantities of chloride may affect the industrial use of water by increasing the corrosiveness of waters that contain large quantities of calcium and magnesium. The Public Health Service drinking water standards indicate that preferably the chloride content of water furnished by water-supply systems should not exceed 250 parts per million. The chloride content of the surface waters as shown by the analyses did not exceed 7.4 parts per million.

FLUORIDE (F)

Fluoride may be present in some rocks to about the same extent as chloride. However, it is present in much smaller quantities than chloride in most natural waters. Fluoride in water is associated with the dental defect known as mottled enamel if the water is used for drinking by young children during calcification or formation of the teeth. This condition becomes noticeable as the quantity of fluoride in water increases above 1 part per million. However, it is reported that the incidence of dental caries (decay of teeth) is decreased by small quantities of fluoride and that small quantities of fluoride in water are presumed beneficial when not sufficient to mottle the enamel during formation of the teeth. Natural surface waters in South Carolina rarely contain more than 0.3 part per million of fluoride.

NITRATE (NO_3)

Nitrate in water may indicate previous contamination by sewage or other organic matter as it represents the final stage of oxidation in the nitrogen cycle. The quantities of nitrate usually present in surface waters have no effect on the value of the water for ordinary uses, but it has been reported that sodium nitrate concentration above a certain limit inhibits intercrystalline cracking of boiler steel. Since the nitrate is concentrated in the boiler as little as 2 parts per million of nitrate in some feed waters may be sufficient to protect the boiler steel. The analyses show that the nitrate did not exceed 2.0 parts per million.

Dissolved Solids

The quantity reported as dissolved solids (the residue on evaporation) consists mainly of the dissolved mineral constituents in water. It may also contain some organic matter and water of crystallization. The quantity of dissolved solids is reported in parts per million, and it was determined by evaporating a given quantity of water and weighing the residue after it had been dried at 180°C. for one hour. In the evaporation of the water the bicarbonate is changed to carbonate as carbon dioxide is driven off. Therefore, in computing the sum of the mineral constituents for comparison with the dissolved solids it is necessary to convert the bicarbonate to carbonate. Since the highly colored waters contain organic matter the dissolved solids of these waters may be noticeably higher than the sum of the mineral constituents. The analyses given in this report show that the dissolved solids ranged from 23 to 91 parts per million.

Hardness

Hardness is caused by significant cations, such as calcium, magnesium, iron, manganese, aluminum, barium, strontium, and free acid. For the analyses of the surface waters given in this report the hardness was caused almost entirely by calcium and magnesium. The hardness is reported as calcium carbonate ($CaCO_3$) equivalent to the calcium and magnesium. It was calculated by multiplying the sum of the equivalents of calcium and magnesium by 50.

Hard water is objectionable in the home because of its soap consuming capacity. It is recognized by the quantity of soap required to produce a lather and by the formation of insoluble curd which is objectionable in all washing processes. For economical and satisfactory operation commercial laundries require soft water. Hard water is not satisfactory for many industrial processes such as in the bleaching, dyeing, rayon, high-grade light paper, and soap industries. Particularly, hard water is objectionable because of the formation of scale in boilers, water heaters, radiators, and pipes, with the resultant loss in heat transfer, boiler failure, and loss of flow. However, some calcium carbonate in water does have the advantage of tending to make the water less corrosive and it may produce a protective coating on pipes and other equipment.

Waters of hardness in the range of 0 to 60 parts per million are usually considered soft and this range is considered satisfactory for domestic uses. In certain industries the requirements for soft water are more specific. Waters of hardness in the range of 61 to 120 parts per million may be considered moderately hard. Waters with hardness ranging from 121 to 200 parts per million may be considered hard. Waters with hardness above 200 parts per million usually require softening for satisfactory use in many processes. The analyses given in this report indicate that the hardness ranged from 5 to 41 parts per million.

CHEMICAL ANALYSES

A total of 148 analyses of surface waters are given for the water years October 1945 to September 1946 and October 1946 to September 1947 in the following tables on pages 14 to 21. These include 108 analyses of 10-day composites of daily samples covering a period of a year for three stations on streams in South Carolina and the yearly averages of the analyses for each of the stations. These tables are arranged in alphabetical order by the names of the streams. The table of miscellaneous analyses, pages 20 to 21, includes 37 analyses of samples collected from streams throughout the State and the three yearly averages for the daily stations. In this table the names of the streams are arranged in alphabetical order.

The mineral constituents are reported in parts per million, and for calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, fluoride, and nitrate equivalents per million are also reported. Hardness is reported in parts per million as calcium carbonate ($CaCO_3$) equivalent to the calcium and magnesium. Results in parts per million may be converted to grains per United States gallon by dividing the parts per million by 17.12. Hydrogen-ion concentration is reported as pH, which is the negative logarithm of the number of moles or ionized hydrogen per liter. Color is expressed as units of the commonly adopted platinum-cobalt standard.

WATER TEMPERATURE

Data on water temperature is necessary for certain industrial processes. The temperature of the water was measured daily for a period of a year at the time the samples were collected for the Lynches River near Bishopville, Saluda River at Chappells, and the Wateree River near Camden. The daily water temperatures are reported in the tables on pages 22 to 24. The average water temperatures for the composite analysis periods are reported with the chemical analyses on pages 14 to 19.

CHEMICAL ANALYSES
AND
WATER TEMPERATURES

LYNCHES RIVER NEAR BISHOPVILLE, S. C.

Location.—At gaging station at bridge on U. S. Highway 15, 1 mile upstream from Seaboard Airline Railroad bridge, 2.9 miles northeast of Bishopville, Lee County, and 3.3 miles downstream from Bells Branch.
Drainage Area.—675 square miles.
Records Available.—Chemical analyses and water temperatures: October 1945 to September 1946.
Extremes.—Dissolved solids: Maximum, 41 parts per million October 1-10, December 1-10; minimum, 26 parts per million September 1-10.

Total Hardness: Maximum, 10 parts per million December 1-10, January 21-31, Feburary 11-28, March 1-10, April 1-30, May 1-10, July 21-31; minimum, 7 parts per million November 11-30, August 21-31, September 1-10, 21-30.

Water Temperatures: Maximum, 78°F. June 23, July 11, 12, 14, 17; minimum, 36°F. December 20-22.

Chemical analyses, in parts per million, water year October 1945 to September 1946

DATE	Mean discharge (second-feet)	Temperature (°F.)	Suspended matter	Oxygen Consumed: Unfiltered	Oxygen Consumed: Filtered	Color	pH	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	Total hardness as $CaCO_3$
Oct. 1-10, 1945..	916	67	25	12	8.8	45	6.2	8.0	0.03	1.8	1.0	3.3	0.7	10	3.2	3.5	0.0	0.2	41	9
Oct. 11-20.......	629	57	15	8.6	4.4	17	6.1	8.4	.05	1.6	.9	2.9		7.0	2.9	3.5	.0	.4	32	8
Oct. 21-31.......	663	60	16	9.2	5.6	22	6.0	8.4	.14	1.8	.9	2.6		7.0	3.0	3.4	.0	.2	33	8
Nov. 1-10.......	610	56	11	9.0	4.1	22	6.4	7.9	.02	1.7	.8	3.4		7.0	3.0	3.8	.2	.3	33	8
Nov. 11-20.......	566	57	8	7.0	5.0	24	6.2	7.9	.03	1.6	.8	3.8		7.0	3.7	3.6	.2	.3	33	7
Nov. 21-30.......	540	50	6	5.2	3.9	15	6.2	8.0	.01	1.6	.7	4.0		8.0	2.9	3.8	.2	.2	29	7
Dec. 1-10.......	976	47	..	..	..	35	6.1	7.5	.21	1.9	1.2	5.4		9.0	7.8	4.0	.1	.3	41	10
Dec. 11-20.......	930	42	6	3.9	3.9	15	6.0	7.8	.01	1.8	1.0	3.4		6.0	4.4	4.2	.1	.3	33	9
Dec. 21-31.......	1,626	41	11	7.1	5.3	19	6.2	7.1	.01	1.9	1.0	3.4		6.0	4.9	4.2	.1	.2	35	9
Jan. 1-10, 1946..	1,994	48	16	6.9	5.5	20	6.0	6.7	.01	1.9	1.0	3.3	1.2	7.0	5.3	4.0	.1	.2	34	9
Jan. 11-20.......	1,228	48	11	7.0	5.3	20	6.1	7.1	.01	1.9	1.0	3.1		6.0	4.2	4.2	.1	.2	34	9
Jan. 21-31.......	1,279	42	13	5.8	4.0	20	6.3	7.4	.01	2.2	1.0	3.0		7.0	4.9	3.5	.0	.3	33	10
Feb. 1-10.......	860	46	13	5.5	3.8	19	6.1	7.0	.01	2.0	1.0	4.1		8.0	4.6	4.4	.1	.3	33	9
Feb. 11-19.......	1,128	48	18	5.8	5.2	15	..	6.9	.02	2.1	1.1	4.2		9.0	4.5	4.5	.1	.2	36	10
Feb. 20-28.......	967	48	14	5.1	4.8	15	6.1	6.0	.01	2.0	1.1	3.5		8.0	3.8	4.4	.1	.1	33	10
Mar. 1-10.......	707	54	9	5.2	3.2	22	6.2	6.7	.03	2.2	1.0	3.2		8.0	4.0	3.6	.1	.5	33	10
Mar. 11-20.......	849	56	17	6.0	4.1	20	6.2	6.4	.01	1.8	1.0	4.3		8.0	4.2	4.6	.1	.4	36	9
Mar. 21-31.......	1,039	59	14	6.6	4.5	25	6.1	6.7	.01	1.8	1.1	3.9		8.0	4.8	3.8	.1	.4	37	9
April 1-10.......	733	63	13	6.0	5.0	24	6.2	7.4	.02	1.9	1.2	3.1	.4	9.0	3.4	3.9	.0	.2	35	10
April 11-20.......	926	58	19	6.2	4.4	28	6.1	6.8	.02	2.0	1.1	2.8		8.0	3.7	3.5	.0	.3	34	10
April 21-30.......	1,118	62	16	6.9	..	33	6.1	7.1	.20	2.2	1.0	3.2		9.0	3.8	3.6	.0	.3	38	10
May 1-10.......	1,530	62	..	7.3	5.8	34	6.2	7.8	.01	2.4	.9	2.4		8.0	3.2	3.4	.0	.3	37	10
May 11-20.......	775	68	19	5.4	4.3	24	6.3	7.6	.02	1.7	.8	3.6		8.0	3.1	3.8	.0	.3	34	8
May 21-31.......	682	69	20	6.0	5.1	27	6.3	7.8	.02	1.9	.9	3.4		9.0	2.9	3.8	.0	.2	36	8
June 1-10.......	424	69	11	3.2	2.6	20	6.7	7.4	.09	1.8	1.0	2.7		8.0	3.3	3.0	.0	.4	32	9
June 11-20.......	385	74	11	3.0	3.0	19	6.9	7.3	.15	1.7	.8	2.6	.8	7.0	3.0	3.0	.0	.4	30	8
June 21-30.......	332	75	6	3.6	2.4	16	6.6	7.6	.08	1.7	.8	2.6		7.0	2.9	2.9	.0	.4	29	8
July 1-10.......	398	75	18	5.0	2.9	10	6.3	7.8	.01	2.1	.7	3.0		7.0	3.7	3.0	.1	.6	29	8
July 11-20.......	352	76	20	..	..	15	6.4	7.2	.01	1.7	.9	3.3		9.0	3.0	3.1	.0	.4	30	8
July 21-31.......	508	75	29	5.2	4.5	14	5.8	8.1	.04	2.6	.9	3.5		7.0	6.9	3.1	.0	.7	36	10

Aug. 1-10	769	75	41	6.7	5.8	24	6.4	8.2	.01	1.8	.8		2.9	6.0	4.2	3.2	.0	.5	36	8
Aug. 11-20	334	76	14	4.2	3.3	13	6.5	8.6	.01	2.0	.7		3.4	8.0	3.8	3.2	.0	.5	32	8
Aug. 21-31	399	72	28	5.6	3.6	10	6.2	8.6	.01	1.6	.7		3.2	7.0	3.3	3.0	.0	.4	30	7
Sept. 1-10	298	70	13	2.8	1.8	12	6.1	6.9	.23	1.3	.8		2.7	6.0	2.7	3.1	.0	.4	26	7
Sept. 11-20	311	71	21	3.6	2.5	18	6.2	7.5	.01	1.6	.9		2.7	7.0	3.2	3.0	.0	.3	29	8
Sept. 21-30	259	71	14	3.8	2.6	14	6.2	8.0	.01	1.4	.9	2.7	.8	7.0	2.9	3.0	.0	.3	28	7
Average	779	61	16	5.7	4.3	21	6.2	7.5	.04	1.9	.9		3.4	8.0	3.9	3.6	.0	.3	33	8

Chemical analyses, in equivalents per million, water year October 1945 to September 1946

Oct. 1-10, 1945	916	67	..	..	..	..	..	..	..	0.090	0.082	0.144	0.018	0.164	0.067	0.099	0.000	0.003	..	..
Oct. 11-20	629	57	..	..	..	..	..	..	..	.080	.074		.126	.115	.060	.099	.000	.006	..	..
Oct. 21-31	663	60	..	..	..	..	..	..	..	.090	.074		.112	.115	.062	.096	.000	.003	..	..
Nov. 1-10	610	56	..	..	..	..	..	..	..	.085	.066		.149	.115	.062	.107	.011	.005	..	..
Nov. 11-20	566	57	..	..	..	..	..	..	..	.080	.066		.164	.115	.077	.102	.011	.005	..	..
Nov. 21-30	540	50	..	..	..	..	..	..	..	.080	.058		.174	.131	.060	.107	.011	.003	..	..
Dec. 1-10	976	47	..	..	..	..	..	..	..	.095	.099		.236	.147	.162	.113	.005	.003	..	..
Dec. 11-20	930	42	..	..	..	..	..	..	..	.090	.082		.146	.098	.092	.118	.005	.005	..	..
Dec. 21-31	1,626	41	..	..	..	..	..	..	..	.095	.082		.149	.098	.102	.118	.005	.003	..	..
Jan. 1-10, 1946	1,994	48	..	..	..	..	..	..	..	.095	.082	.144	.031	.115	.110	.113	.005	.003	..	..
Jan. 11-20	1,228	48	..	..	..	..	..	..	..	.095	.082		.134	.098	.087	.118	.005	.003	..	..
Jan. 21-31	1,279	42	..	..	..	..	..	..	..	.110	.082		.129	.115	.102	.099	.000	.005	..	..
Feb. 1-10	860	46	..	..	..	..	..	..	..	.100	.082		.179	.131	.096	.124	.005	.005	..	..
Feb. 11-19	1,128	48	..	..	..	..	..	..	..	.105	.090		.181	.147	.094	.127	.005	.003	..	..
Feb. 20-28	967	48	..	..	..	..	..	..	..	.100	.090		.151	.131	.079	.124	.005	.002	..	..
Mar. 1-10	707	54	..	..	..	..	..	..	..	.110	.082		.137	.131	.083	.102	.005	.008	..	..
Mar. 11-20	849	56	..	..	..	..	..	..	..	.090	.082		.187	.131	.087	.130	.005	.006	..	..
Mar. 21-31	1,039	59	..	..	..	..	..	..	..	.090	.090		.169	.131	.100	.107	.005	.006	..	..
April 1-10	733	63	..	..	..	..	..	..	..	.095	.099	.135	.010	.147	.071	.111	.000	.003	..	..
April 11-20	926	58	..	..	..	..	..	..	..	.100	.090		.122	.131	.077	.099	.000	.005	..	..
April 21-30	1,113	62	..	..	..	..	..	..	..	.110	.082		.141	.147	.079	.102	.000	.005	..	..
May 1-10	1,530	62	..	..	..	..	..	..	..	.120	.074		.105	.131	.067	.096	.000	.005	..	..
May 11-20	775	68	..	..	..	..	..	..	..	.085	.066		.157	.131	.065	.107	.000	.005	..	..
May 21-31	682	69	..	..	..	..	..	..	..	.095	.074		.148	.147	.060	.107	.000	.003	..	..
June 1-10	424	69	..	..	..	..	..	..	..	.090	.082		.119	.131	.069	.085	.000	.006	..	..
June 11-20	385	74	..	..	..	..	..	..	..	.085	.066	.113	.020	.115	.062	.085	.000	.006	..	..
June 21-30	332	75	..	..	..	..	..	..	..	.085	.066		.112	.115	.060	.082	.000	.006	..	..
July 1-10	398	75	..	..	..	..	..	..	..	.105	.058		.129	.115	.077	.085	.005	.010	..	..
July 11-20	352	76	..	..	..	..	..	..	..	.085	.074		.143	.147	.062	.087	.000	.006	..	..
July 21-31	508	75	..	..	..	..	..	..	..	.130	.074		.153	.115	.144	.087	.000	.011	..	..
Aug. 1-10	769	75	..	..	..	..	..	..	..	.090	.066		.127	.098	.087	.090	.000	.008	..	..
Aug. 11-20	334	76	..	..	..	..	..	..	..	.100	.058		.150	.131	.079	.090	.000	.008	..	..
Aug. 21-31	399	72	..	..	..	..	..	..	..	.080	.058		.137	.115	.069	.085	.000	.006	..	..
Sept. 1-10	298	70	..	..	..	..	..	..	..	.065	.066		.116	.098	.056	.087	.000	.006	..	..
Sept. 11-20	311	71	..	..	..	..	..	..	..	.080	.074		.118	.115	.067	.085	.000	.005	..	..
Sept. 21-30	259	71	..	..	..	..	..	..	..	.070	.074	.117	.020	.115	.060	.085	.000	.005	..	..
Average	779	61	..	..	..	..	..	..	..	.095	.074		.148	.131	.081	.102	.000	.005	..	..

SALUDA RIVER AT CHAPPELLS, S. C.

Location.—At gaging station at bridge on State Highway 39 at Chappells, Newberry County, 7 miles downstream from dam at Lake Greenwood, and 8¼ miles upstream from Little River.

Drainage Area—1,350 square miles.

Records Available.—Chemical analyses and water temperatures: October 1946 to September 1947.

Extremes.—Dissolved solids: Maximum, 62 parts per million December 1-10, 21-31; minimum, 39 parts per million February 20-28.

Total Hardness: Maximum, 17 parts per million November 11-20, December 21-31, August 1-10. 21-31, September 1-10; minimum, 12 parts per million February 11-19, March 1-20.

Water Temperatures: Maximum, 82°F. August 25; minimum, 40°F. February 10, March 3.

Chemical analyses, in parts per million, water year October 1946 to September 1947

DATE	Mean discharge (second-feet)	Temperature (°F.)	Suspended matter	Oxygen Consumed		Color	pH	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	Total hardness as $CaCO_3$
				Unfiltered	Filtered															
Oct. 1-10, 1946..	1,613	68	..	3.3	2.0	15	6.9	13	0.06	3.4	1.5	7.2	2.1	28	4.3	3.2	0.1	0.4	51	15
Oct. 11-20.......	1,150	66	20	2.8	2.4	5	7.0	12	.05	3.8	1.5	8.4		28	5.1	3.5	.1	.6	52	16
Oct. 21-31.......	1,423	65	8	2.4	2.0	5	7.0	13	.17	3.5	1.4	9.2		29	4.8	3.5	.1	.6	54	14
Nov. 1-10.......	1,267	64	7	2.7	2.4	5	7.1	14	.13	3.9	1.5	9.7		31	5.3	3.8	.1	.5	58	16
Nov. 11-20.......	1,530	60	12	2.2	2.2	20	7.0	15	.14	4.4	1.5	7.2		30	5.7	4.5	.1	.8	60	17
Nov. 21-30.......	1,767	58	17	2.4	2.2	14	6.9	16	.14	3.7	1.3	11		31	5.8	4.5	.1	.8	61	15
Dec. 1-10.......	1,678	53	12	2.4	1.9	19	7.2	18	.16	3.7	1.5	11		31	6.4	4.1	.1	.9	62	15
Dec. 11-20.......	1,666	53	9	2.4	1.6	16	7.1	16	.15	3.8	1.4	11		30	6.7	4.5	.1	.8	60	15
Dec. 21-31.......	932	49	8	2.8	1.7	6	6.9	16	.07	4.0	1.6	11		33	6.5	4.5	.0	.8	62	17
Jan. 1-10, 1947..	2,057	48	23	4.0	2.8	18	6.9	16	.16	3.8	1.5	9.6		28	6.6	4.4	.0	.7	60	16
Jan. 11-20.......	2,800	48	36	5.5	4.4	20	6.7	13	.01	3.7	1.5	7.4	2.2	26	5.8	3.9	.2	.5	53	16
Jan. 21-31.......	3,932	47	22	3.6	2.5	10	6.7	12	.01	3.0	1.3	7.6	2.1	24	5.1	3.6	.1	.8	49	13
Feb. 1-10.......	2,480	45	30	4.2	3.2	10	6.9	12	.16	3.0	1.3	7.5		22	4.6	3.8	.1	.8	49	13
Feb. 11-19.......	2,026	43	31	4.8	2.9	20	6.9	11	.01	2.8	1.1	6.0		20	4.3	2.2	.1	.4	42	12
Feb. 20-28.......	1,934	42	..	..	..	18	6.9	10	.01	3.2	1.3	5.1		18	4.9	2.8	.1	.4	39	13
Mar. 1-10.......	2,401	42	51	4.3	3.2	14	7.1	10	.02	2.7	1.2	4.8		16	4.2	2.8	.1	.5	40	12
Mar. 11-20.......	2,477	44	66	2.5	2.6	5	6.6	12	.04	2.3	1.5	6.3		18	4.4	4.2	.1	.2	45	12
Mar. 21-31.......	2,227	47	40	3.7	1.9	5	6.6	13	.03	3.0	1.6	7.3		22	4.2	4.5	.1	1.1	49	14
April 1-10.......	1,995	53	23	3.2	2.1	4	6.7	13	.01	3.3	1.4	6.5	1.5	23	4.7	3.8	.2	.6	51	14
April 11-20.......	1,914	58	25	3.6	2.2	3	6.8	13	.02	3.7	1.5	6.7		24	4.3	3.4	.2	.7	52	15
April 21-30.......	1,771	61	12	3.0	1.6	4	6.9	13	.04	3.6	1.4	7.1		24	4.4	3.4	.2	.6	50	15
May 1-10.......	1,761	64	11	2.5	2.0	3	6.9	12	.05	3.4	1.4	7.2		23	4.4	3.9	.2	.5	51	14
May 11-20.......	1,230	65	12	2.6	1.8	3	6.9	12	.02	3.2	1.4	7.9		25	4.4	3.6	.1	.6	50	14
May 21-31.......	1,386	69	24	2.3	2.3	5	6.9	13	.08	3.2	1.6	7.3		25	4.1	3.4	.2	.5	53	15
June 1-10.......	1,209	71	17	2.3	1.9	5	6.9	13	.09	3.0	1.5	7.7		25	3.9	3.5	.1	.7	51	14
June 11-20.......	1,451	73	38	3.5	2.0	10	6.7	14	.05	3.6	1.5	7.7		26	4.6	3.5	.1	.8	54	15
June 21-30.......	1,282	73	25	3.6	2.6	12	7.0	13	.03	3.8	1.6	7.9		27	4.4	3.9	.2	.6	54	16
July 1-10.......	1,187	74	16	3.2	1.9	10	7.2	14	.05	3.8	1.5	7.0	1.8	28	4.2	3.5	.2	.4	54	16
July 11-20.......	1,369	76	13	2.3	2.4	4	6.9	14	.03	3.7	1.5	8.6		29	4.4	3.5	.2	.4	54	15
July 21-31.......	1,520	76	12	3.0	2.4	10	6.9	13	.03	3.4	1.6	8.8		30	4.0	3.4	.2	.2	54	15

Aug. 1-10.......	1,216	78	16	2.9	1.9	10	6.9	14	.05	4.0	1.6	8.2		30	4.1	3.4	.2	.4	55	17
Aug. 11-20.......	1,276	76	22	3.5	2.2	14	7.1	14	.01	4.1	1.5	8.3		30	4.1	3.4	.2	.3	54	16
Aug. 21-31.......	1,253	79	33	2.7	1.8	16	7.1	14	.03	4.1	1.7	8.0		30	4.5	3.2	.2	.4	51	17
Sept. 1-10.......	1,301	79	17	2.7	2.4	9	6.7	14	.07	4.2	1.5	9.5		33	4.5	3.4	.2	.4	54	17
Sept. 11-20.......	1,200	78	14	2.5	2.3	10	6.9	14	.07	3.7	1.4	9.9		31	4.7	3.8	.2	.3	55	15
Sept. 21-30.......	1,189	70	19	2.7	2.1	8	7.1	14	.08	3.8	1.4	8.4	2.3	31	4.5	4.0	.2	.2	55	15
Average.....	1,692	62	22	3.8	2.3	10	6.9	13	.06	3.5	1.5	8.2		27	4.8	3.7	.1	.6	53	15

Chemical analyses, in equivalents per million, water year October 1946 to September 1947

Oct. 1-10, 1946..	1,613	68	..	..	..	..	..	..	..	0.170	0.123	0.313	0.054	0.459	0.090	0.090	0.005	0.006	..	..
Oct. 11-20.......	1,150	66	..	..	..	..	..	..	..	.190	.123	.366		.459	.106	.099	.005	.010	..	..
Oct. 21-31.......	1,423	65	..	..	..	..	..	..	..	.175	.115	.399		.475	.100	.099	.005	.010	..	..
Nov. 1-10.......	1,267	64	..	..	..	..	..	..	..	.195	.123	.420		.508	.110	.107	.005	.008	..	..
Nov. 11-20.......	1,530	60	..	..	..	..	..	..	..	.220	.123	.313		.492	.119	.127	.005	.013	..	..
Nov. 21-30.......	1,767	58	..	..	..	..	..	..	..	.185	.107	.482		.508	.121	.127	.005	.013	..	..
Dec. 1-10.......	1,678	53	..	..	..	..	..	..	..	.185	.123	.469		.508	.133	.116	.005	.015	..	..
Dec. 11-20.......	1,666	53	..	..	..	..	..	..	..	.190	.115	.472		.492	.140	.127	.005	.013	..	..
Dec. 21-31.......	932	49	..	..	..	..	..	..	..	.200	.132	.484		.541	.135	.127	.000	.013	..	..
Jan. 1-10, 1947..	2,057	48	..	..	..	..	..	..	..	.190	.123	.418		.459	.137	.124	.000	.011	..	..
Jan. 11-20.......	2,800	48	..	..	..	..	..	..	..	.185	.123	.322	.056	.426	.121	.111	.011	.008	..	..
Jan. 21-31.......	3,932	47	..	..	..	..	..	..	..	.150	.107	.330	.054	.393	.106	.102	.005	.013	..	..
Feb. 1-10.......	2,480	45	..	..	..	..	..	..	..	.150	.107	.325		.361	.096	.107	.005	.013	..	..
Feb. 11-19.......	2,026	43	..	..	..	..	..	..	..	.140	.090	.261		.328	.090	.062	.005	.006	..	..
Feb. 20-28.......	1,934	42	..	..	..	..	..	..	..	.160	.107	.220		.295	.102	.079	.005	.006	..	..
Mar. 1-10.......	2,401	42	..	..	..	..	..	..	..	.135	.099	.207		.262	.087	.079	.005	.008	..	..
Mar. 11-20.......	2,477	44	..	..	..	..	..	..	..	.115	.123	.275		.295	.092	.118	.005	.003	..	..
Mar. 21-31.......	2,227	47	..	..	..	..	..	..	..	.150	.132	.316		.361	.087	.127	.005	.018	..	..
April 1-10.......	1,995	53	..	..	..	..	..	..	..	.165	.115	.283	.038	.377	.098	.107	.011	.010	..	..
April 11-20.......	1,914	58	..	..	..	..	..	..	..	.185	.123	.293		.393	.090	.096	.011	.011	..	..
April 21-30.......	1,771	61	..	..	..	..	..	..	..	.180	.115	.307		.393	.092	.096	.011	.010	..	..
May 1-10.......	1,761	64	..	..	..	..	..	..	..	.170	.115	.314		.377	.092	.111	.011	.008	..	..
May 11-20.......	1,230	65	..	..	..	..	..	..	..	.160	.115	.344		.410	.092	.102	.005	.010	..	..
May 21-31.......	1,386	69	..	..	..	..	..	..	..	.160	.132	.318		.410	.085	.096	.011	.008	..	..
June 1-10.......	1,209	71	..	..	..	..	..	..	..	.150	.123	.333		.410	.081	.090	.005	.011	..	..
June 11-20.......	1,451	73	..	..	..	..	..	..	..	.180	.123	.336		.426	.096	.099	.005	.013	..	..
June 21-30.......	1,282	73	..	..	..	..	..	..	..	.190	.132	.344		.442	.092	.111	.011	.010	..	..
July 1-10.......	1,187	74	..	..	..	..	..	..	..	.190	.123	.304	.046	.459	.087	.099	.011	.006	..	..
July 11-20.......	1,369	76	..	..	..	..	..	..	..	.185	.123	.375		.475	.092	.099	.011	.006	..	..
July 21-31.......	1,520	76	..	..	..	..	..	..	..	.170	.132	.383		.492	.083	.096	.011	.003	..	..
Aug. 1-10.......	1,216	78	..	..	..	..	..	..	..	.200	.132	.358		.492	.085	.096	.011	.006	..	..
Aug. 11-20.......	1,276	76	..	..	..	..	..	..	..	.205	.123	.361		.492	.085	.096	.011	.005	..	..
Aug. 21-31.......	1,253	79	..	..	..	..	..	..	..	.205	.140	.348		.492	.094	.090	.011	.006	..	..
Sept. 1-10.......	1,301	79	..	..	..	..	..	..	..	.210	.123	.415		.541	.094	.096	.011	.006	..	..
Sept. 11-20.......	1,200	78	..	..	..	..	..	..	..	.185	.115	.429		.508	.098	.107	.011	.005	..	..
Sept. 21-30.......	1,189	70	..	..	..	..	..	..	..	.190	.115	.365	.059	.508	.094	.113	.011	.003	..	..
Average.....	1,692	62	..	..	..	..	..	..	..	.175	.123	.357		.442	.100	.104	.005	.010	..	..

WATEREE RIVER NEAR CAMDEN, S. C.

Location.—At gaging station at new bridge on U. S. Highway 1, 1,500 feet downstream from Twenty-five Mile Creek, 4,000 feet upstream from Seaboard Airline Railroad bridge, 2.2 miles west of Camden, Kershaw County, and 7.4 miles downstream from Wateree Dam.

Drainage Area.—5,070 Square miles.

Records Available.—Chemical analyses and water temperatures: October 1946 to September 1947.

Extremes.—Dissolved solids: Maximum, 56 parts per million June 11-20; minimum, 44 parts per million February 1-10, September 1-10.
Total Hardness: Maximum, 21 parts per million June 21-30; minimum, 15 parts per million February 1-19, September 21-30.
Water Temperatures: Maximum, 80°F. August 27; minimum, 37°F. Feburary 26, March 3, 4.

Chemical analyses, in parts per million, water year October, 1946 to September, 1947

DATE	Mean discharge (second-feet)	Temperature (°F.)	Suspended matter	Oxygen Consumed		Color	pH	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	Total hardness as $CaCO_3$
				Unfiltered	Filtered															
Oct. 1-10, 1946	5,722	69	38	2.2	1.3	16	7.0	9.7	0.08	4.1	1.9	5.1	1.6	26	4.3	3.2	0.0	0.3	46	18
Oct. 11-20	6,081	67	9	3.2	3.3	7	7.0	9.1	.04	4.0	1.6	6.8		25	4.5	4.0	.1	.3	47	17
Oct. 21-31	4,796	65	12	3.7	3.4	10	7.0	9.0	.02	3.7	1.7	7.1		24	4.5	4.8	.1	.4	46	16
Nov. 1-10	4,576	65	8	3.8	4.0	9	7.2	12	.02	4.1	1.8	6.0		25	4.7	3.5	.1	.2	50	18
Nov. 11-20	4,277	58	9	4.2	3.6	10	7.1	9.1	.03	3.8	1.7	6.5		23	4.6	4.8	.1	.3	45	16
Nov. 21-30	4,810	57	11	3.1	2.0	8	6.9	12	.07	4.2	1.6	7.0		25	5.7	3.8	.0	.6	49	17
Dec. 1-10	3,193	49	..	2.7	..	9	7.1	12	.06	4.2	1.6	7.4		25	5.6	4.5	.0	.6	49	17
Dec. 11-20	3,706	51	5	3.2	2.0	5	7.1	12	.07	4.2	1.6	7.2		25	5.7	4.1	.0	.5	48	17
Dec. 21-31	1,953	48	8	3.1	2.0	5	7.1	11	.01	3.9	1.6	8.3		25	5.5	5.5	.0	.5	47	16
Jan. 1-10, 1947	5,756	48	12	3.3	2.7	7	7.0	11	.01	4.1	1.7	6.1	1.6	25	5.5	4.2	.2	.3	49	17
Jan. 11-20	10,280	47	9	3.2	2.4	8	7.1	11	.03	4.2	1.9	6.6	1.5	26	5.8	4.2	.2	.3	49	18
Jan. 21-31	19,290	44	38	4.6	3.2	16	6.9	10	.04	3.8	1.6	5.2		20	5.2	3.5	.1	.4	46	16
Feb. 1-10	4,216	42	20	4.1	3.2	22	7.0	10	.04	3.6	1.5	4.9		19	5.0	3.2	.1	.4	44	15
Feb. 11-19	4,615	40	..	3.7	3.0	26	7.1	11	.02	3.6	1.5	5.8		20	5.2	3.8	.1	.4	45	15
Feb. 20-28	5,077	39	..	..	..	17	7.1	13	.09	4.4	2.0	4.9		22	6.4	3.5	.0	.4	49	19
Mar. 1-10	6,214	39	36	..	..	8	7.2	11	.03	4.0	1.7	4.3		20	5.1	3.0	.1	.2	47	17
Mar. 11-20	9,684	41	32	4.7	2.1	10	6.9	12	.02	3.8	1.9	6.3		21	5.0	5.5	.1	.6	48	17
Mar. 21-31	5,431	47	..	..	2.6	10	6.8	11	.09	3.7	1.9	5.5		20	5.6	4.0	.2	.6	48	17
April 1-10	6,656	55	37	4.8	3.4	15	6.7	11	.02	3.6	1.6	4.3	.9	18	5.5	3.6	.1	.4	47	16
April 11-20	7,684	59	39	4.1	3.2	12	6.8	12	.05	3.9	1.8	4.9		20	5.3	3.8	.1	.4	49	17
April 21-30	5,688	62	14	4.2	3.0	8	7.0	12	.12	4.3	1.9	5.9		24	5.5	3.9	.1	.3	53	19
May 1-10	4,383	63	13	4.0	3.0	9	7.1	12	.06	4.4	2.1	5.4		25	5.1	3.6	.1	.3	54	20
May 11-20	2,275	67	12	4.0	3.2	9	7.1	12	.02	4.7	2.0	5.4		25	5.0	3.9	.1	.2	54	20
May 21-31	2,910	73	22	3.8	3.5	10	7.1	14	.08	4.4	2.2	5.3		24	5.2	3.6	.5	.1	54	20
June 1-10	3,212	72	16	5.1	2.8	11	7.1	12	.09	4.3	2.2	6.0		26	5.3	3.9	.1	.4	53	20
June 11-20	6,180	74	8	2.8	2.5	15	7.1	12	.08	4.8	2.0	6.4		27	5.6	4.0	.1	.4	56	20
June 21-30	3,759	74	10	2.8	2.7	10	7.2	11	.04	5.3	2.0	6.9		30	5.1	4.0	.2	.5	53	21
July 1-10	3,212	74	14	2.8	2.4	10	7.3	11	.04	5.0	1.9	5.5	1.8	27	5.0	4.0	.2	.5	52	20
July 11-20	3,386	74	14	3.5	2.6	10	7.0	10	.04	4.8	1.9	6.1		28	4.7	3.4	.1	.2	49	20
July 21-31	3,484	75	18	2.9	2.3	10	7.0	11	.02	5.0	1.9	5.8		27	4.7	3.8	.1	.4	51	20

Aug. 1-10	3,065	77	59	4.1	3.3	24	6.9	9.7	.01	4.0	1.6	5.7		24	4.4	3.0	.1	.4	45	17
Aug. 11-20	4,569	77	13	2.0	1.1	14	..	6.9	.05	4.6	1.9	7.2		29	4.9	3.8	.1	.5	48	19
Aug. 21-31	3,553	77	8	2.1	1.4	18	7.1	6.6	.04	4.4	1.7	6.0		24	4.6	4.2	.1	.5	46	18
Sept. 1-10	3,327	77	6	2.8	2.0	10	7.1	9.9	.02	4.1	1.4	6.1		24	4.6	3.0	.1	.3	44	16
Sept. 11-20	3,482	76	7	3.7	1.9	6	7.1	10	.02	4.2	1.6	5.3	1.6	25	4.7	3.0	.1	.2	45	17
Sept. 21-30	3,568	69	16	4.8	4.6	14	6.8	8.3	.16	3.8	1.4	6.0		21	6.3	2.8	.1	.3	45	15
Average	5,130	61	18	3.5	2.7	12	7.0	11	.05	4.2	1.8	6.1		24	5.2	3.8	.1	.4	49	18

Chemical analyses, in equivalents per million, water year October 1946 *to September* 1947

Oct. 1-10, 1946	5,722	69	..	..	..	..	..	..	..	0.205	0.156	0.222	0.041	0.426	0.090	0.090	0.000	0.005	..	..
Oct. 11-20	6,081	67	..	..	..	..	..	..	..	.200	.132	.295		.410	.094	.113	.005	.005	..	..
Oct. 21-31	4,796	65	..	..	..	..	..	..	..	.185	.140	.308		.393	.094	.135	.005	.006	..	..
Nov. 1-10	4,576	65	..	..	..	..	..	..	..	.205	.148	.262		.410	.098	.099	.005	.003	..	..
Nov. 11-20	4,277	58	..	..	..	..	..	..	..	.190	.140	.281		.370	.096	.135	.005	.005	..	..
Nov. 21-30	4,810	57	..	..	..	..	..	..	..	.210	.132	.304		.410	.119	.107	.000	.010	..	..
Dec. 1-10	3,193	49	..	..	..	..	..	..	..	.210	.132	.322		.410	.117	.127	.000	.010	..	..
Dec. 11-20	3,706	51	..	..	..	..	..	..	..	.210	.132	.311		.410	.119	.116	.000	.008	..	..
Dec. 21-31	1,953	48	..	..	..	..	..	..	..	.195	.132	.361		.410	.115	.155	.000	.008	..	..
Jan. 1-10, 1947	5,756	48	..	..	..	..	..	..	..	.205	.140	.265	.041	.410	.115	.118	.011	.005	..	..
Jan. 11-20	10,280	47	..	..	..	..	..	..	..	.210	.156	.287	.038	.426	.121	.118	.011	.005	..	..
Jan. 21-31	19,290	44	..	..	..	..	..	..	..	.190	.132	.224		.328	.108	.099	.005	.006	..	..
Feb. 1-10	4,216	42	..	..	..	..	..	..	..	.180	.123	.213		.311	.104	.090	.005	.006	..	..
Feb. 11-19	4,615	40	..	..	..	..	..	..	..	.180	.123	.251		.328	.108	.107	.005	.006	..	..
Feb. 20-28	5,077	39	..	..	..	..	..	..	..	.220	.164	.215		.361	.133	.099	.000	.006	..	..
Mar. 1-10	6,214	39	..	..	..	..	..	..	..	.200	.140	.187		.328	.106	.085	.005	.003	..	..
Mar. 11-20	9,684	41	..	..	..	..	..	..	..	.190	.156	.272		.344	.104	.155	.005	.010	..	..
Mar. 21-31	5,431	47	..	..	..	..	..	..	..	.185	.156	.238		.328	.117	.113	.011	.010	..	..
April 1-10	6,656	55	..	..	..	..	..	..	..	.180	.132	.187	.023	.295	.115	.102	.005	.006	..	..
April 11-20	7,684	59	..	..	..	..	..	..	..	.195	.148	.213		.328	.110	.107	.005	.006	..	..
April 21-30	5,688	62	..	..	..	..	..	..	..	.215	.156	.258		.393	.115	.111	.005	.005	..	..
May 1-10	4,383	63	..	..	..	..	..	..	..	.220	.173	.235		.410	.106	.102	.005	.005	..	..
May 11-20	2,275	67	..	..	..	..	..	..	..	.234	.164	.235		.410	.104	.111	.005	.003	..	..
May 21-31	2,910	73	..	..	..	..	..	..	..	.220	.181	.230		.393	.108	.102	.026	.002	..	..
June 1-10	3,212	72	..	..	..	..	..	..	..	.215	.181	.262		.426	.110	.111	.005	.006	..	..
June 11-20	6,180	74	..	..	..	..	..	..	..	.240	.164	.279		.442	.117	.113	.005	.006	..	..
June 21-30	3,759	74	..	..	..	..	..	..	..	.264	.164	.302		.492	.106	.113	.011	.008	..	..
July 1-10	3,212	74	..	..	..	..	..	..	..	.250	.156	.239	.046	.442	.104	.113	.011	.008	..	..
July 11-20	3,386	74	..	..	..	..	..	..	..	.240	.156	.265		.459	.098	.096	.005	.003	..	..
July 21-31	3,484	75	..	..	..	..	..	..	..	.250	.156	.252		.442	.098	.107	.005	.006	..	..
Aug. 1-10	3,065	77	..	..	..	..	..	..	..	.200	.132	.249		.393	.092	.085	.005	.006	..	..
Aug. 11-20	4,569	77	..	..	..	..	..	..	..	.230	.156	.311		.475	.102	.107	.005	.008	..	..
Aug. 21-31	3,553	77	..	..	..	..	..	..	..	.220	.140	.260		.393	.096	.118	.005	.008	..	..
Sept. 1-10	3,327	77	..	..	..	..	..	..	..	.205	.115	.264		.393	.096	.085	.005	.005	..	..
Sept. 11-20	3,482	76	..	..	..	..	..	..	..	.210	.132	.230	.041	.410	.098	.085	.005	.003	..	..
Sept. 21-30	3,568	69	..	..	..	..	..	..	..	.190	.115	.259		.344	.131	.079	.005	.005	..	..
Average	5,130	61	..	..	..	..	..	..	..	.210	.148	.265		.393	.108	.107	.005	.006	..	..

MISCELLANEOUS ANALYSES OF STREAMS IN SOUTH CAROLINA

Chemical analyses, in parts per million, October 1945 to September 1947

SOURCE	DATE	Mean Dis-charge (second-feet)	Color	pH	Silica (SiO_2)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	Sodium and po-tassium (Na+K)	Bicar-bonate (HCO_3)	Sul-fate (SO_4)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO_3)	Dis-solved solids	Total hard-ness as $CaCO_3$
Black Mingo Creek at Nesmith	Sept. 27, 1946	[1]8.56	85	6.4	11	0.12	14	1.5	6.3	46	3.9	7.4	0.0	0.2	91	41
Black River at Kingstree	Mar. 11	1,090	146	6.0	1.7	.02	2.5	1.1	4.2	9.0	2.1	7.2	.0	.3	[2]55	11
Broad River near Gaffney	Feb. 25	3,200	25	6.8	12	.14	2.3	1.1	3.4	15	2.3	1.6	.1	.6	33	10
Broad River near Carlisle	Feb. 26	5,140	4	6.9	11	.02	2.7	1.3	3.8	17	2.8	2.1	.0	.6	36	12
Broad River at Richtex	Feb. 28	5,940	6	7.0	13	.02	2.4	1.7	6.0	22	3.2	2.8	.1	.5	42	13
Catawba River near Rock Hill	Sept. 24	2,510	16	6.8	9.0	.11	3.5	1.4	6.0	22	4.4	2.8	.2	.5	41	14
Congaree River at Columbia	Aug. 15	9,280	9	7.1	12	.05	3.3	1.4	7.8	25	4.4	3.2	.2	1.1	49	14
Coosawhatchie River near Hampton	Feb. 27	[1]361	80	6.6	5.4	.05	6.0	1.4	...	18	1.7	3.2	.0	.1	55	21
Edisto River near Givhans	Mar. 11	2,600	92	7.2	1.5	.23	5.1	1.0	3.8	18	2.7	5.2	.0	.2	47	17
Enoree River near Enoree	Feb. 25	532	13	6.5	13	.09	2.6	1.1	6.9	21	4.1	2.5	.1	.9	43	11
Fair Forest Creek near Union	Sept. 24	421	18	6.5	12	.04	3.8	1.9	4.4	22	3.9	2.6	.2	.7	47	17
Keowee River near Newry	Aug. 14	630	13	..	12	.09	1.9	.8	2.5	13	1.2	1.0	.0	.2	28	8
Lakes Marion-Moultrie Diversion Canal near Pineville	Sept. 27	11,100	23	6.6	10	.16	3.8	1.4	6.7	25	3.8	2.9	.2	.8	46	15
Little Pee Dee River near Dillon	Mar. 12	598	124	5.9	1.0	.01	1.0	1.0	1.7	7.0	2.3	1.4	.0	.2	[3]38	7
Little Pee Dee River at Galivants Ferry	Mar. 12	3,470	145	5.7	.7	.01	1.3	1.2	1.1	7.0	2.5	1.5	.0	.2	[3]45	8
Little River near Mount Carmel	Aug. 15	58	5	..	20	.03	5.2	2.4	5.8	34	2.6	3.0	.1	.4	59	23
Lynches River near Bishopville [4]	1945–46	779	21	6.2	7.5	.04	1.9	.9	3.4	8.0	3.9	3.6	.0	.3	33	8
Lynches River at Effingham	Mar. 12, 1946	842	37	6.9	5.1	.36	2.3	.9	5.6	12	4.3	5.0	.0	.8	38	9
Middle Tyger River at Lyman	Sept. 23	116	14	6.4	9.3	.02	1.9	.7	4.3	12	2.9	2.0	.2	1.0	32	8
North Fork Edisto River at Orangeburg	Mar. 11	675	51	6.2	1.5	.09	1.6	.5	3.0	8.0	1.6	3.0	.0	.1	24	6
North Pacolet River at Fingerville	Sept. 23	225	7	6.1	10	.02	2.9	1.2	5.3	21	3.1	1.8	.1	.6	35	12
North Tyger River near Moore	Feb. 25	288	17	6.7	12	.16	3.1	1.5	8.9	28	5.3	2.8	.1	.6	49	14
Pacolet River near Clifton	Feb. 26	715	8	6.9	11	.02	2.4	1.1	3.0	14	2.4	1.8	.0	.6	30	10
Pee Dee River near Mars Bluff	Mar. 12	8,100	15	7.3	7.8	.16	3.3	1.4	5.9	20	4.2	3.6	.1	.9	42	14
Reedy River near Ware Shoals	Aug. 12	238	18	..	12	.07	3.2	1.3	21	48	7.0	6.8	.2	2.0	81	13
Salkehatchie River near Barnwell	Feb. 27	[1]58.4	48	6.8	6.9	.17	5.6	.5	2.4	19	1.3	2.9	.0	.2	37	16
Salkehatchie River near Hampton	Sept. 25	[1]195	55	6.9	11	.10	9.0	.8	4.9	28	1.5	7.0	.1	.2	58	26
Saluda River near West Greenville	Aug. 13	310	8	..	13	.05	2.3	.9	3.0	15	1.5	1.4	.0	.3	32	9
Saluda River near Ware Shoals	Sept. 23	478	7	6.9	13	.01	2.2	.8	6.2	18	3.3	2.0	.2	.8	40	9
Saluda River at Chappells [5]	1946–47	1,692	10	6.9	13	.06	3.5	1.5	8.2	..	4.8	3.7	.1	.6	..	15
Saluda River near Columbia	Sept. 25, 1946	3,640	13	6.2	10	.02	3.6	1.4	7.3	26	4.3	3.0	.1	.5	45	15
Savannah River near Calhoun Falls	Aug. 15	3,140	5	..	12	.03	2.8	1.2	4.2	19	2.2	2.0	.1	.4	35	12
Seneca River near Anderson	Aug. 14	1,030	4	..	12	.03	2.4	1.0	3.5	16	1.4	2.0	.0	.5	32	10
Shaw Creek near Eureka	Sept. 24	[1]41.0	38	6.0	6.4	.01	1.2	.5	3.9	8.0	1.5	3.6	.0	.4	30	5
South Fork Edisto River near Montmorenci	Mar. 11	196	33	6.5	3.4	.13	.8	.7	4.0	8.0	2.1	3.4	.0	.2	23	5
South Fork Edisto River near Denmark	Mar. 11	648	55	6.2	1.7	.06	1.6	.7	3.3	9.0	1.8	3.4	.0	.2	26	7
South Tyger River near Woodruff	Feb. 25, 1946	201	27	6.9	14	.12	3.0	1.3	3.4	17	2.3	2.1	.1	.9	41	13
Stevens Creek near Modoc	Aug. 15	7.6	16	..	14	.05	8.2	3.6	8.3	49	4.1	5.8	.1	.5	74	35
Wateree River near Camden	Aug. 13	5,830	7	..	7.9	.04	4.4	1.8	6.5	25	5.8	3.4	.1	1.1	46	18
Wateree River near Camden [6]	1946–47	5,130	12	7.0	11	.05	4.2	1.8	6.1	24	5.2	3.8	.1	.4	49	18

Black Mingo Creek at Nesmith	Sept. 27, 1946	[1]8.56	..	..	..	..	0.699	0.123	0.275	0.754	0.081	0.209	0.000	0.003	..	..
Black River at Kingstree	Mar. 11	1,090	..	..	..	..	.125	.090	.184	.147	.044	.203	.000	.005	..	..
Broad River near Gaffney	Feb. 25	3,200	..	..	..	..	.115	.090	.149	.246	.048	.046	.005	.010	..	..
Broad River near Carlisle	Feb. 26	5,140	..	..	..	..	.135	.107	.164	.279	.058	.059	.000	.010	..	..
Broad River at Richtex	Feb. 28	5,940	..	..	..	..	.120	.140	.260	.361	.067	.079	.005	.008	..	..
Catawba River near Rock Hill	Sept. 24	2,510	..	..	..	..	.175	.115	.261	.361	.092	.079	.011	.008	..	..
Congaree River at Columbia	Aug. 15	9,280	..	..	..	..	.165	.115	.341	.410	.092	.090	.011	.018	..	..
Coosawhatchie River near Hampton	Feb. 27	[1]367	..	..	..	..	.299	.115	....	.295	.035	.090	.000	.002	..	..
Edisto River near Givhans	Mar. 11	2,600	..	..	..	..	.254	.082	.165	.295	.056	.147	.000	.003	..	..
Enoree River near Enoree	Feb. 25	532	..	..	..	..	.130	.090	.300	.344	.085	.071	.005	.015	..	..
Fair Forest Creek near Union	Sept. 24	421	..	..	..	..	.190	.156	.191	.361	.081	.073	.011	.011	..	..
Keowee River near Newry	Aug. 14	630	..	..	..	..	.095	.066	.108	.213	.025	.028	.000	.003	..	..
Lakes Marion-Moultrie Diversion Canal near Pineville	Sept. 27	11,100	..	..	..	..	.190	.115	.290	.410	.079	.082	.011	.013	..	..
Little Pee Dee River near Dillon	Mar. 12	598	..	..	..	..	.050	.082	.073	.115	.048	.039	.000	.003	..	..
Little Pee Dee River at Galivants Ferry	Mar. 12	3,470	..	..	..	..	.065	.099	.048	.115	.052	.042	.000	.003	..	..
Little River near Mount Carmel	Aug. 15	58	..	..	..	..	.260	.197	.250	.557	.054	.085	.005	.006	..	..
Lynches River near Bishopville [4]	1945–46	779	..	..	..	..	.095	.074	.148	.131	.081	.102	.000	.005	..	..
Lynches River at Effingham	Mar. 12, 1946	842	..	..	..	..	.115	.074	.244	.197	.090	.141	.000	.005	..	..
Middle Tyger River at Lyman	Sept. 23	116	..	..	..	..	.095	.058	.187	.197	.060	.056	.011	.016	..	..
North Fork Edisto River at Orangeburg	Mar. 11	675	..	..	..	..	.080	.041	.130	.131	.033	.085	.000	.002	..	..
North Pacolet River at Fingerville	Sept. 23	225	..	..	..	..	.145	.099	.231	.344	.065	.051	.005	.010	..	..
North Tyger River near Moore	Feb. 25	288	..	..	..	..	.155	.123	.385	.459	.110	.079	.005	.010	..	..
Pacolet River near Clifton	Feb. 26	715	..	..	..	..	.120	.090	.130	.229	.050	.051	.000	.010	..	..
Pee Dee River near Mars Bluff	Mar. 12	8,100	..	..	..	..	.165	.115	.257	.328	.087	.102	.005	.015	..	..
Reedy River near Ware Shoals	Aug. 12	238	..	..	..	..	.160	.107	.901	.787	.146	.192	.011	.032	..	..
Salkehatchie River near Barnwell	Feb. 27	[1]58.4	..	..	..	..	.279	.041	.103	.311	.027	.082	.000	.003	..	..
Salkehatchie River near Hampton	Sept. 25	[1]195	..	..	..	..	.449	.066	.214	.459	.031	.197	.005	.003	..	..
Saluda River near West Greenville	Aug. 13	310	..	..	..	..	.115	.074	.132	.246	.031	.039	.000	.005	..	..
Saluda River near Ware Shoals	Sept. 23	478	..	..	..	..	.110	.066	.268	.295	.069	.056	.011	.013	..	..
Saluda River at Chappells [5]	1946–47	1,692	..	..	..	..	.175	.123	.357	.442	.100	.104	.005	.010	..	..
Saluda River near Columbia	Sept. 25, 1946	3,640	..	..	..	..	.180	.115	.319	.426	.090	.085	.005	.008	..	..
Savannah River near Calhoun Falls	Aug. 15	3,140	..	..	..	..	.140	.099	.184	.311	.046	.056	.005	.006	..	..
Seneca River near Anderson	Aug. 14	1,030	..	..	..	..	.120	.082	.153	.262	.029	.056	.000	.008	..	..
Shaw Creek near Eureka	Sept. 24	[1]41.0	..	..	..	..	.060	.041	.169	.131	.031	.102	.000	.006	..	..
South Fork Edisto River near Montmorenci	Mar. 11	196	..	..	..	..	.040	.058	.176	.131	.044	.096	.000	.003	..	..
South Fork Edisto River near Denmark	Mar. 11	648	..	..	..	..	.080	.058	.145	.147	.037	.096	.000	.003	..	..
South Tyger River near Woodruff	Feb. 25, 1946	201	..	..	..	..	.150	.107	.149	.279	.048	.059	.005	.015	..	..
Stevens Creek near Modoc	Aug. 15	7.6	..	..	..	..	.409	.296	.360	.803	.085	.164	.005	.008	..	..
Wateree River near Camden	Aug. 13	5,830	..	..	..	..	.220	.148	.282	.410	.121	.096	.005	.018	..	..
Wateree River near Camden [6]	1946–47	5,130	..	..	..	..	.210	.148	.265	.393	.108	.107	.005	.006	..	..

[1] Measured discharge.
[2] Large proportion of organic matter; sum of mineral constituents 24 parts.
[3] Large proportion organic matter; sum of mineral constituents 12 parts.
[4] Average of analyses of composites of daily samples (see pp. 14–15).
[5] Average of analyses of composites of daily samples (see pp. 16–17).
[6] Average of analyses of composites of daily samples (see pp. 18–19).

LYNCHES RIVER NEAR BISHOPVILLE, S. C.

Temperature (°F.) of water of Lynches River, water year October 1945 *to September* 1946

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

SALUDA RIVER AT CHAPPELLS, S. C.

Temperature (°F.) of water of Saluda River, water year October 1946 to September 1947

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

WATEREE RIVER NEAR CAMDEN, S. C.

Temperature (°F.) of water of Wateree River, Water year October 1946 to September 1947

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