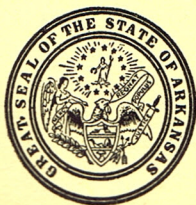


---

# Surface-Water Resources Of Arkansas

---

John L. Saunders  
G. A. Billingsley  
*U. S. Geological Survey*



STATE OF ARKANSAS  
ARKANSAS RESOURCES AND DEVELOPMENT  
COMMISSION  
LITTLE ROCK

---

*and*

---

UNIVERSITY OF ARKANSAS  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
FAYETTEVILLE

STATE OF ARKANSAS  
ARKANSAS RESOURCES AND DEVELOPMENT COMMISSION  
WAYNE C. FLETCHER, EXECUTIVE DIRECTOR  
LITTLE ROCK

UNIVERSITY OF ARKANSAS  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
W. W. GRIGORIEFF, DIRECTOR  
FAYETTEVILLE

---

PUBLICATION EDITED BY  
B. H. MEWES  
J. J. DERBY

# Surface-Water Resources of Arkansas

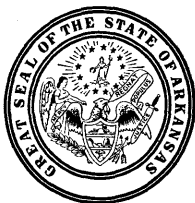
JOHN L. SAUNDERS

*Surface Water Branch, Water Resources Division  
U. S. Geological Survey*

G. A. BILLINGSLEY

*Quality of Water Branch, Water Resources Division  
U. S. Geological Survey*

This Study Was Made by the Surface Water Branch, U. S. Geological Survey, in Cooperation With the Division of Flood Control, Water and Soil Conservation, Arkansas Resources and Development Commission, and by the Quality of Water Branch, U. S. Geological Survey, in Cooperation With the University of Arkansas Institute of Science and Technology



STATE OF ARKANSAS  
ARKANSAS RESOURCES AND DEVELOPMENT  
COMMISSION  
LITTLE ROCK

*and*

UNIVERSITY OF ARKANSAS  
INSTITUTE OF SCIENCE AND TECHNOLOGY  
FAYETTEVILLE





# CONTENTS

|                                                             | <i>Page</i> |
|-------------------------------------------------------------|-------------|
| Purpose and scope-----                                      | 1           |
| History of state cooperative work in Arkansas-----          | 3           |
| Industrial uses of water-----                               | 5           |
| Stream gaging-----                                          | 15          |
| General explanation of field and office work-----           | 15          |
| Explanation of technical terms-----                         | 17          |
| Quality of water-----                                       | 19          |
| Collection and examination of samples-----                  | 19          |
| Expression of results-----                                  | 20          |
| Chemical composition of surface waters-----                 | 20          |
| Properties and characteristics of water-----                | 25          |
| Chemical qualities of Arkansas streams-----                 | 26          |
| <br>St. Francis River basin                                 |             |
| 1. St. Francis River at St. Francis, Ark.-----              | 31          |
| 2. St. Francis River at Lake City, Ark.-----                | 32          |
| 3. St. Francis River at Marked Tree, Ark.-----              | 33          |
| 4. St. Francis River at Parkin, Ark.-----                   | 37          |
| 5. Right Hand Chute of Little River at Rivervale, Ark.----- | 38          |
| 6. St. Francis River Floodway Near Marked Tree, Ark.-----   | 39          |
| 7. St. Francis Bay at Riverfront, Ark.-----                 | 40          |
| <br>White River basin                                       |             |
| 8. White River at Beaver, Ark.-----                         | 41          |
| 9. White River Near Flippin, Ark.-----                      | 45          |
| 10. White River at Calico Rock, Ark.-----                   | 49          |
| 11. White River at Batesville, Ark.-----                    | 50          |
| 12. White River at Newport, Ark.-----                       | 54          |
| 13. White River at De Valls Bluff, Ark.-----                | 64          |
| 14. White River at Clarendon, Ark.-----                     | 65          |
| 15. West Fork White River at Greenland, Ark.-----           | 69          |
| 16. West Fork White River Near Fayetteville, Ark.-----      | 69          |
| 17. Kings River Near Berryville, Ark.-----                  | 70          |
| 18. Buffalo River Near St. Joe, Ark.-----                   | 71          |
| 19. Buffalo River Near Rush, Ark.-----                      | 72          |
| 20. North Fork River at Norfork Dam Near Norfork, Ark.----- | 73          |
| 21. Black River Near Corning, Ark.-----                     | 75          |
| 22. Black River at Pocahontas, Ark.-----                    | 75          |
| 23. Black River at Black Rock, Ark.-----                    | 76          |
| 24. Spring River at Imboden, Ark.-----                      | 80          |
| 25. Eleven Point River Near Elevenpoint, Ark.-----          | 81          |
| 26. Strawberry River Near Evening Shade, Ark.-----          | 82          |
| 27. Strawberry River Near Poughkeepsie, Ark.-----           | 83          |
| 28. Piney Fork Strawberry River at Evening Shade, Ark.----- | 84          |
| 29. South Fork Little Red River Near Clinton, Ark.-----     | 85          |
| 30. Little Red River Near Heber Springs, Ark.-----          | 86          |
| 31. Middle Fork Little Red River at Shirley, Ark.-----      | 87          |
| 32. Cache River at Patterson, Ark.-----                     | 88          |
| 33. Bayou De View Near Morton, Ark.-----                    | 89          |
| 34. Lagrue Bayou Near Stuttgart, Ark.-----                  | 90          |

|                                                                              | <i>Page</i> |
|------------------------------------------------------------------------------|-------------|
| <b>Arkansas River basin</b>                                                  |             |
| 35. Arkansas River at Van Buren, Ark.....                                    | 91          |
| 36. Arkansas River at Dardanelle, Ark.....                                   | 102         |
| 37. Arkansas River at Little Rock, Ark.....                                  | 103         |
| 38. Poteau River at Cauthron, Ark.....                                       | 114         |
| 39. Frog Bayou Near Mountainburg, Ark.....                                   | 115         |
| 40. Mulberry River Near Mulberry, Ark.....                                   | 116         |
| 40A. Illinois Bayou Near Scottsville, Ark.....                               | 117         |
| 41. Petit Jean Creek Near Booneville, Ark.....                               | 118         |
| 42. Petit Jean Creek Near Waveland, Ark.....                                 | 118         |
| 43. Petit Jean Creek at Danville, Ark.....                                   | 119         |
| 44. Dutch Creek at Waltreak, Ark.....                                        | 121         |
| 45. Fourche La Fave River Near Gravelly, Ark.....                            | 122         |
| 46. Fourche La Fave River Near Nimrod, Ark.....                              | 122         |
| 47. South Fourche La Fave River Near Hollis, Ark.....                        | 123         |
| 48. Bayou Meto Near Stuttgart, Ark.....                                      | 124         |
| 49. Crooked Creek Near Humphrey, Ark.....                                    | 125         |
| <b>Red River basin</b>                                                       |             |
| 50. Red River at Index, Ark.....                                             | 126         |
| 51. Red River at Fulton, Ark.....                                            | 127         |
| 52. Red River at Garland, Ark.....                                           | 131         |
| 53. Little River Near Horatio, Ark.....                                      | 132         |
| 54. Cossatot Near De Queen, Ark.....                                         | 134         |
| 55. Saline River Near Dierks, Ark.....                                       | 134         |
| 56. Ouachita River Near Mt. Ida, Ark.....                                    | 135         |
| 57. Ouachita River Near Mountain Pine, Ark.....                              | 136         |
| 58. Ouachita River Near Malvern, Ark.....                                    | 137         |
| 59. Ouachita River at Arkadelphia, Ark.....                                  | 144         |
| 60. Ouachita River at Camden, Ark.....                                       | 146         |
| 61. Caddo River at Runyan Bridge, Ark.....                                   | 153         |
| 62. Little Missouri River at Narrows Dam Site Near<br>Murfreesboro, Ark..... | 154         |
| 63. Little Missouri River Near Murfreesboro, Ark.....                        | 155         |
| 64. Little Missouri River Near Boughton, Ark.....                            | 156         |
| 65. Muddy Fork Creek at Murfreesboro Dam Site Near<br>Murfreesboro, Ark..... | 160         |
| 66. Saline River Near Rye, Ark.....                                          | 161         |
| <b>Spot samples</b>                                                          |             |
| <b>St. Francis River basin</b>                                               |             |
| 1. St. Francis River at St. Francis, Ark.....                                | 165         |
| 2. St. Francis River at Lake City, Ark.....                                  | 165         |
| 4. St. Francis River at Parkin, Ark.....                                     | 165         |
| 7. St. Francis Bay at Riverfront, Ark.....                                   | 165         |
| <b>White River basin</b>                                                     |             |
| 9. White River Near Flippin, Ark.....                                        | 166         |
| 10. White River at Calico Rock, Ark.....                                     | 166         |

|                                                            | <i>Page</i> |
|------------------------------------------------------------|-------------|
| 11. White River at Batesville, Ark.....                    | 166         |
| 13. White River at De Valls Bluff, Ark.....                | 166         |
| 15. West Fork White River at Greenland, Ark.....           | 167         |
| 17. Kings River Near Berryville, Ark.....                  | 167         |
| 18. Buffalo River Near St. Joe, Ark.....                   | 167         |
| 19. Buffalo River Near Rush, Ark.....                      | 168         |
| 21. Black River Near Corning, Ark.....                     | 168         |
| 22. Black River at Pocahontas, Ark.....                    | 168         |
| 23. Black River at Black Rock, Ark.....                    | 168         |
| 24. Spring River at Imboden, Ark.....                      | 169         |
| 25. Eleven Point River Near Elevenpoint, Ark.....          | 169         |
| 26. Strawberry River Near Evening Shade, Ark.....          | 169         |
| 27. Strawberry River Near Poughkeepsie, Ark.....           | 170         |
| 28. Piney Fork Strawberry River at Evening Shade, Ark..... | 170         |
| 29. South Fork Little Red River Near Clinton, Ark.....     | 170         |
| 30. Little Red River Near Heber Springs, Ark.....          | 171         |
| 31. Middle Fork Little Red River at Shirley, Ark.....      | 171         |
| 34. Lagrue Bayou Near Stuttgart, Ark.....                  | 171         |

#### Arkansas River basin

|                                                       |     |
|-------------------------------------------------------|-----|
| 36. Arkansas River at Dardanelle, Ark.....            | 172 |
| 38. Poteau River at Cauthron, Ark.....                | 172 |
| 39. Frog Bayou Near Mountainburg, Ark.....            | 172 |
| 40. Mulberry River Near Mulberry, Ark.....            | 172 |
| 40A. Illinois Bayou Near Scottsville, Ark.....        | 173 |
| 41. Petit Jean Creek Near Booneville, Ark.....        | 173 |
| 42. Petit Jean Creek Near Waveland, Ark.....          | 173 |
| 43. Petit Jean Creek at Danville, Ark.....            | 173 |
| 44. Dutch Creek at Waltreak, Ark.....                 | 174 |
| 45. Fourche La Fave River Near Gravelly, Ark.....     | 174 |
| 46. Fourche La Fave River Near Nimrod, Ark.....       | 174 |
| 47. South Fourche La Fave River Near Hollis, Ark..... | 174 |
| 48. Bayou Meto Near Stuttgart, Ark.....               | 175 |
| 49. Crooked Creek Near Humphrey, Ark.....             | 175 |

#### Red River basin

|                                                       |     |
|-------------------------------------------------------|-----|
| 50. Red River at Index, Ark.....                      | 176 |
| 52. Red River at Garland, Ark.....                    | 176 |
| 53. Little River Near Horatio, Ark.....               | 176 |
| 54. Cossatot River Near De Queen, Ark.....            | 177 |
| 55. Saline River Near Dierks, Ark.....                | 177 |
| 56. Ouachita River Near Mt. Ida, Ark.....             | 177 |
| 57. Ouachita River Near Mountain Pine, Ark.....       | 178 |
| 59. Ouachita River at Arkadelphia, Ark.....           | 178 |
| 63. Little Missouri River Near Murfreesboro, Ark..... | 178 |
| 64. Little Missouri River Near Boughton, Ark.....     | 178 |
| 66. Saline River Near Rye, Ark.....                   | 178 |

|                             |     |
|-----------------------------|-----|
| Miscellaneous analyses..... | 179 |
|-----------------------------|-----|



# SURFACE-WATER RESOURCES OF ARKANSAS

JOHN L. SAUNDERS<sup>1</sup>

G. A. BILLINGSLEY

*U. S. Geological Survey*

Water is one of the most important natural resources of a state. The quantity and quality of available water may be the dominant factor in the establishment and expansion of industries. Adequate and reliable information about its quantity and quality is necessary as the basis for sound economic development. Water is also important in irrigation, domestic use, and for recreational purposes.

Water falls on the earth's surface as precipitation in various forms; a part of this precipitation evaporates into the atmosphere, either directly or by transpiration from plant life; a part percolates into the ground to become ground water; and the remainder becomes the runoff of streams. This report is concerned with the quantity and quality of surface water. The important information about a stream is the quantity and quality of the water integrated with the respective stages of the stream in periods of drought, as well as in periods of floods. This information is important in planning municipal and industrial supplies; in designing, constructing and operating hydraulic works of all kinds; in drainage, sewage disposal, and pollution abatement programs; in designing highways, bridges, and culverts; in outlining recreational developments; in irrigation; and in navigation. To supply reliable information for these needs, records of stream flow must be collected over periods of many years. In general, the longer the period for which a continuous record is available, the more valuable the record becomes.

## PURPOSE AND SCOPE

The purpose of this report is to make available to engineers, public officials, and the general public a summary of stream-flow and quality-of-water records of Arkansas streams throughout the

---

<sup>1</sup> The data herein were compiled and prepared for publication under cooperative agreements between the Arkansas Resources and Development Commission, the University of Arkansas, and the Water Resources Division of the U. S. Geological Survey.

The outline and general plan of this report, and the preparation of stream-flow records, were made under the general direction of John L. Saunders, district engineer, Surface Water Branch, and G. A. Billingsley, chemist in charge, Quality of Water Branch of the U. S. Geological Survey. The computations incident to the presentation of the records and their preparation for publication were made by the technical staff of the U. S. Geological Survey offices in Fort Smith and Fayetteville.

Acknowledgments are due Clarence F. Byrns, chairman, Flood Control, Water and Soil Conservation Committee, and H. K. Thatcher, former director, Division of Agriculture and Industry, of the Arkansas Resources and Development Commission; and to Dr. Harrison Hale of the University of Arkansas for valuable suggestions and criticisms.

years during which local, state, and federal agencies have cooperated with the Water Resources Division of the U. S. Geological Survey. The report contains a summary of stream-flow records collected by the Corps of Engineers at gaging stations operated in connection with special river studies in Arkansas.

In general, daily discharge records have been reviewed and summarized through the water year ending September 30, 1948. Over 800 station-years of stream-flow data at 67 gaging stations on Arkansas streams are covered. Quality-of-water data, collected at most of these stations since 1945, are included.

The data for each gaging station include location, type, and datum of gage; magnitude of drainage area above the gage; period for which records of discharge and chemical quality are available, and, unless otherwise noted, the dates given indicate the period for which daily discharge is available; mean annual runoff in inches and/or acre-feet; average discharge for all complete water years of record; maximum recorded discharge and related stage during period of record; information regarding major floods that occurred outside period of record; minimum mean discharge for a day, 7 days, calendar month, and water year; and remarks regarding changes in type of gage, source of data, and other pertinent facts about the station.

The table of yearly summaries shows the number and page of Water-Supply Paper of the U. S. Geological Survey in which the figures of daily, monthly, and yearly discharges are published; gives maximum and minimum daily discharge, yearly mean discharge, and runoff for both water and calendar years.

Figures of drainage area are given for each station when known. These figures have been revised from time to time as more accurate maps and other information have become available. The discharge per square mile and runoff in inches, in general, have been revised according to the latest figure for the drainage area.

This report is primarily a condensed statistical inventory. For some preliminary studies, particularly those relating to water supply and storage, the tabulation presented will be more useful than the daily records because of its compactness. For detailed studies, daily and monthly discharge records are given in the annual series of Water-Supply Papers unless otherwise noted. Hourly discharges will be needed for more detailed studies; blueprint copies of these data may be obtained from the U. S. Geological Survey office at Fort Smith, or from the appropriate district office of the Corps of Engineers.

In addition to the discharge records, available chemical analyses and temperatures of surface waters at most of the active gaging stations are included.

## HISTORY OF STATE COOPERATIVE WORK IN ARKANSAS

The first stream-flow records in Arkansas were collected from 1903 to 1905 on the Ouachita River near the site of Rammel Dam. During 1909 and 1910 the late W. N. Gladson, dean of the University of Arkansas College of Engineering, carried on river-measurement work at a number of stations. Many of the early records are useful only for preliminary studies, as the stations were maintained for only a short time and were not intensively operated.

From 1911 to 1926 only a few stream-flow records were collected in Arkansas. Some were collected through cooperation of private companies, but no comprehensive studies were made. The first state-wide cooperative water resources investigation in Arkansas was begun in 1927, and in September 1928 a district office of the U. S. Geological Survey was established at Fort Smith to pursue this work within the state. The State Geologist maintained cooperation with the Federal Survey during the fiscal years, 1928 to 1933. Because of insufficient state funds, the number of stream-flow measurement stations was reduced from 21 in 1929 to 12 in September 1931. State cooperation was discontinued in 1933 and was not re-established until 1937. During these years only a few noncooperative stations of primary federal interest were maintained by the federal government.

A state-wide stream-gaging program was established again in 1937 when the Arkansas General Assembly appropriated funds to the State Highway Commission for cooperative work in stream-flow measurement. Each succeeding General Assembly has increased the state's appropriation for stream-gaging work. The funds are matched in essentially an equal amount by the Federal Survey. Cooperation between the Federal Survey and the State is maintained through the Resources and Development Commission.

The Little Rock and Tulsa District offices of the Corps of Engineers are contributing funds toward the operation of several stream-gaging stations in Arkansas. The Memphis, Vicksburg, and New Orleans Districts of the Corps of Engineers are also collecting records on a few streams in the State. On September 30, 1948, there were 65 stream-flow gaging stations in operation on Arkansas streams—80 per cent of these were equipped with water-stage recorders.



## SURFACE-WATER RESOURCES OF ARKANSAS

TABLE 1. INDUSTRIAL REQUIREMENTS FOR WATER <sup>1</sup>

| Product                        | Unit                   | Water required (gallons to produce one unit) |
|--------------------------------|------------------------|----------------------------------------------|
| Alcohol.....                   | gallon                 | 100                                          |
| Aluminum.....                  | pound                  | 160                                          |
| Aviation gas.....              | gallon                 | 7 - 10                                       |
| Buildings:                     |                        |                                              |
| Office.....                    | person                 | 27 - 45 (per day)                            |
| Hospital.....                  | bed                    | 135 - 350 (per day)                          |
| Hotels.....                    | guest room             | 300 - 525 (per day)                          |
| Laundries:                     |                        |                                              |
| Commercial.....                | 1 lb. "work"           | 4.3 - 5.7                                    |
| Institutional.....             | 1 lb. "work"           | 3                                            |
| Restaurants.....               | meal                   | 0.5 - 4.0                                    |
| Canning:                       |                        |                                              |
| Asparagus.....                 | 100 cases No. 2 cans   | 7,000                                        |
| Beans:                         |                        |                                              |
| Green.....                     | 100 cases No. 2 cans   | 3,500                                        |
| Lima.....                      | 100 cases No. 2 cans   | 25,000                                       |
| Pork and.....                  | 100 cases No. 2 cans   | 3,500                                        |
| Beets.....                     | 100 cases No. 2 cans   | 2,500                                        |
| Corn.....                      | 100 cases No. 2 cans   | 2,500                                        |
| Peaches, pears.....            | 100 cases No. 2 cans   | 6,500                                        |
| Peas.....                      | 100 cases No. 2 cans   | 2,500                                        |
| Spinach.....                   | 100 cases No. 2 cans   | 16,000                                       |
| Tomatoes:                      |                        |                                              |
| Products.....                  | 100 cases No. 2 cans   | 7,000                                        |
| Whole.....                     | 100 cases No. 2 cans   | 750                                          |
| Cement.....                    | ton                    | 750                                          |
| Coke.....                      | 100 tons               | 360,000                                      |
| Distilling, grain:             |                        |                                              |
| Combined wastes.....           | 1,000 bu. grain mashed | 600,000                                      |
| Thin slop.....                 | 1,000 bu. grain mashed |                                              |
| Evaporator condensates.....    | 1,000 bu. grain mashed |                                              |
| Tailings.....                  | 1,000 bu. grain mashed |                                              |
| Distilling, molasses.....      | 1,000 gal. 100 proof   | 8,400                                        |
| Distilling, cooling water..... | 1,000 gal. 100 proof   | 120,000                                      |
| Electric power.....            | kw.                    | 80                                           |
| Explosives.....                | lb.                    | 100 plus                                     |
| Gasoline.....                  | gallon                 | 7 - 10                                       |
| Iron ore (brown ore).....      | ton                    | 1,000                                        |
| Meat:                          |                        |                                              |
| Packing house.....             | 100 hogs killed        | 550                                          |
| Slaughterhouse.....            | 100 hogs killed        | 550                                          |
| Stockyards.....                | 1 acre                 | 160                                          |
| Milk:                          |                        |                                              |
| Receiving station.....         | 1,000 raw lb.          | 180                                          |
| Bottling works.....            | 1,000 raw lb.          | 250                                          |
| Cheese factory.....            | 1,000 raw lb.          | 200                                          |
| Creamery.....                  | 1,000 raw lb.          | 110                                          |
| Condensery.....                | 1,000 raw lb.          | 150                                          |
| Dry milk factory.....          | 1,000 raw lb.          | 150                                          |
| General dairy.....             | 1,000 raw lb.          | 340                                          |
| Oil field.....                 | 100 bbl. crude         | 18,000                                       |
| Oil refining.....              | 100 bbl.               | 77,000                                       |
| Paper:                         |                        |                                              |
| Paper mill.....                | 1 ton                  | 39,000                                       |
| Pasteboard.....                | 1 ton                  | 14,000                                       |
| Strawboard.....                | 1 ton                  | 26,000                                       |
| Drinking cups.....             | 1 ton                  | 83,000                                       |
| Paper pulp:                    |                        |                                              |
| Ground wood.....               | 1 ton dry              | 5,000                                        |
| Soda.....                      | 1 ton dry              | 85,000                                       |
| Sulfate.....                   | 1 ton dry              | 64,000                                       |
| Sulfite.....                   | 1 ton dry              | 60,000                                       |
| Poultry.....                   | 1 bird                 | 1 (per day)                                  |
| Rail freight.....              | ton-mile               | 0.1                                          |
| Smokeless powder.....          | ton                    | 50,000                                       |

— Continued.

TABLE 1. INDUSTRIAL REQUIREMENTS FOR WATER<sup>1</sup>—(Continued)

| Product                | Unit                | Water required (gallons to produce one unit) |
|------------------------|---------------------|----------------------------------------------|
| Soap factories.....    | ton                 | 500                                          |
| Steam power.....       | ton of coal         | 60,000 - 120,000                             |
| Tanning.....           | 100 lb. rawhide     | 800                                          |
| Textiles.....          | 1,000 lb. processed | 1,000 - 20,000                               |
| Rayon manufacture..... | 1,000 lb. produced  | 160                                          |
| Rayon hosiery.....     | 1,000 lb. produced  | 9,000                                        |
| Woolens.....           | 1,000 lb. finished  | 70,000                                       |

<sup>1</sup> Data reported in Journal of American Water Works Association, Vol. 38, No. 1, January, 1946.

Most of the stream-gaging work has been on the larger streams as these were considered the most important. However, collection of data on small tributaries is being extended as rapidly as possible because in many instances these are important to nearby communities both as sources of supply, and because floods on small streams are often more destructive in proportion to the area involved than those on large streams.

Although stream-flow records have been collected in Arkansas during the past decade, systematic records of water quality were not begun until July 1, 1945. On this date the University of Arkansas entered into a cooperative agreement with the U. S. Geological Survey to study the quality of Arkansas surface and ground waters with the view to their utilization in industrial development.

Much of the surface water available in Arkansas originates in other states and the quantity and quality of water is influenced by uses in those states. Changes in the uses in these states, therefore, may materially change the quantity and quality of the water flowing into Arkansas. Significant changes in quantity and quality may also occur as the streams flow through Arkansas. Therefore, the records of quantity and quality of water in the principal streams entering and leaving Arkansas must be obtained in order to determine trends in the water as it flows across the state and to safeguard any rights that may be established for the state in interstate streams.

## INDUSTRIAL USES OF WATER

An adequate water supply is a determining factor in the selection of an industrial site. General information about the quantities of water required for the manufacture of certain products in Arkansas is presented in Table 1. Sharing importance with quantity is a knowledge of the chemical composition, degree of pollution, and a seasonal estimate of suspended sediment carried by

TABLE 2. SUGGESTED WATER QUALITY TOLERANCES<sup>1</sup>  
*Allowable limits in parts per million*

| Use                        | Turbidity | Color  | Hard-<br>ness<br>as<br>CaCO <sub>3</sub> | Iron<br>as Fe    | Mangane-<br>se<br>as Mn | Total<br>solids | Alka-<br>linity<br>as<br>CaCO <sub>3</sub> | Odor<br>taste | Hydro-<br>gen<br>sulfide | Other requirements <sup>2</sup>                                       |
|----------------------------|-----------|--------|------------------------------------------|------------------|-------------------------|-----------------|--------------------------------------------|---------------|--------------------------|-----------------------------------------------------------------------|
| Air conditioning           | 10        | 10     | ...                                      | 0.5 <sup>3</sup> | 0.5                     | ...             | ...                                        | Low           | 1                        | No corrosiveness, slime formation.                                    |
| Baking                     | 10        | 10     | ...                                      | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | Low           | .2                       | P.                                                                    |
| Brewing:                   |           |        |                                          |                  |                         |                 |                                            |               |                          |                                                                       |
| Light beer                 | 10        | ...    | ...                                      | .1 <sup>3</sup>  | .1                      | 500             | 75                                         | Low           | .2                       | P. NaCl less than 275.<br>P.p.m. (pH 6.5-7.0).                        |
| Dark beer                  | 10        | ...    | ...                                      | .1 <sup>3</sup>  | .1                      | 1,000           | 150                                        | Low           | .2                       | P. NaCl less than 275.<br>P.p.m. (pH 7.0 or more).                    |
| Canning:                   |           |        |                                          |                  |                         |                 |                                            |               |                          |                                                                       |
| Legumes                    | 10        | ...    | 25-75                                    | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | Low           | 1                        | P.                                                                    |
| General                    | 10        | ...    | ...                                      | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | Low           | 1                        | P.                                                                    |
| Carbonated beverages       | 2         | 10     | 250                                      | .2               | .2                      | 850             | 50-100                                     | Low           | .2                       | P. Organic color plus. O <sub>2</sub> consumed<br>less than 10 p.p.m. |
| Confectionary              | ...       | ...    | ...                                      | .2 <sup>3</sup>  | .2                      | 100             | ...                                        | Low           | .2                       | P.                                                                    |
| Cooling                    | 50        | ...    | 50                                       | .5 <sup>3</sup>  | .5                      | ...             | ...                                        | ...           | 5                        | No corrosiveness, slime formation.                                    |
| Distilling                 | ...       | ...    | ...                                      | ...              | ...                     | ...             | ...                                        | ...           | ...                      |                                                                       |
| Food, general              | 10        | ...    | ...                                      | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | Low           | ...                      | P.                                                                    |
| Ice                        | 5         | 5      | ...                                      | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | Low           | ...                      | P. SiO <sub>2</sub> less than 10 p.p.m.                               |
| Laundry                    | ...       | ...    | 50                                       | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | ...           | ...                      |                                                                       |
| Plastics, clear, uncolored | 2         | 2      | .02 <sup>3</sup>                         | ...              | .02                     | 200             | ...                                        | ...           | ...                      | No grit, corrosiveness.                                               |
| Paper and pulp, groundwood | 50        | 20     | 180                                      | 1.0 <sup>3</sup> | .5                      | ...             | ...                                        | ...           | ...                      |                                                                       |
| Kraft pulp                 | 25        | 15     | 100                                      | .2 <sup>3</sup>  | .1                      | 300             | ...                                        | ...           | ...                      |                                                                       |
| Soda and sulfite           | 15        | 10     | 100                                      | .1 <sup>3</sup>  | .05                     | 200             | ...                                        | ...           | ...                      |                                                                       |
| High-grade light papers    | 5         | 5      | 50                                       | .1 <sup>3</sup>  | .05                     | 200             | ...                                        | ...           | ...                      |                                                                       |
| Rayon (Viscose), pulp      | 5         | 5      | 8                                        | .05 <sup>3</sup> | .03                     | 100             | Total<br>50<br>Hy-<br>drox-<br>ide 8       | ...           | ...                      | Al <sub>2</sub> O <sub>3</sub> less than 8 p.p.m.                     |
| Production                 | ...       | ...    | ...                                      | ...              | ...                     | ...             | ...                                        | ...           | ...                      | SiO <sub>2</sub> less than 25 p.p.m.<br>Cu less than 5 p.p.m.         |
| Manufacture                | 0.3       | ...    | 55                                       | .0               | .0                      | ...             | Total                                      | ...           | ...                      | pH 7.8 to 8.3                                                         |
| Tanning                    | 20        | 10-100 | 50-135                                   | .2 <sup>3</sup>  | .2                      | ...             | 135<br>Hy-<br>drox-<br>ide 8               | ...           | ...                      |                                                                       |
| Textiles, general          | 5         | 20     | ...                                      | .25              | .25                     | ...             | ...                                        | ...           | ...                      |                                                                       |
| Dyeing                     | 5         | 5-20   | ...                                      | .25 <sup>3</sup> | .25                     | 200             | ...                                        | ...           | ...                      | Constant composition residual alum-<br>ina less than 0.5 p.p.m.       |
| Wool scouring              | ...       | 70     | ...                                      | 1.0 <sup>3</sup> | 1.0                     | ...             | ...                                        | ...           | ...                      |                                                                       |
| Cotton bandage             | 5         | 5      | ...                                      | .2 <sup>3</sup>  | .2                      | ...             | ...                                        | ...           | ...                      |                                                                       |

<sup>1</sup> Data from *Progress Report of the Committee on Quality Tolerances of Water for Industrial Uses*. New England Water Works Assoc., Vol. 54, p. 263, 1940.

<sup>2</sup> P indicates that potable water, conforming to U.S.P.H.S. standards, is necessary.

<sup>3</sup> Limit given applies to both iron alone and the sum of iron and manganese.

the stream. Water from streams and lakes will contain in solution, or in suspension, a portion of most everything with which it has come in contact. The concentration of dissolved minerals in solution in surface waters is dependent upon several factors, namely, type of soil or rocks with which the water has come in contact, length of time in contact, the extent of pollution, and ground-water inflow. The source and significance of the constituents of water are discussed in another section.

Some industries require water of much better chemical quality than others. The particular quality required is obtained by selection of suitable natural waters or by costly treatment of the available supply. Limits of tolerance for chemical quality of water for some industries are given in Table 2.<sup>2</sup> The limits serve merely to indicate certain characteristics of water that enter significantly into an evaluation of the suitability of water for specific industrial processes. The limits of impurities in acceptable industrial water supplies are affected by variations in processes and by the desired quality of the manufactured product. In general, limit of impurities specified are those beyond which special corrective treatment becomes necessary.

Chemical analyses of water for industrial purposes are necessary to determine whether the water is suitable for specific purposes, and, if not, to determine the type of treatment needed to make it satisfactory and the probable cost of such treatment. Determination of the industrial utility of water, therefore, is largely a matter of interpreting correctly information made available through chemical analyses of representative samples. The analyses aid in determining the suitability of the water for steam, processing industries, laundering, or other purposes. Complete analyses can also be used to determine the cost of softening water, its tendency to produce scale in steam boilers and domestic hot-water tanks, and its corrosive potential on plumbing.

The chemical composition of some Arkansas streams varies widely from day to day at any given point. This is an important factor with reference to continuous use of water from a stream. At times of high discharge, the concentration is likely to decrease; during periods of low flow, the concentration increases owing to the inflow from ground-water sources during periods of little or no precipitation. Figures 1 to 7 show the relationship of flow to concentration in some Arkansas streams. Because of the fluctuations in dissolved mineral content, daily sampling should be con-

---

<sup>2</sup> Moore, E. W., *Progress report of the committee on quality tolerances of water for industrial uses*. New England Water Works Assoc., Vol. 54, p. 263. 1940.

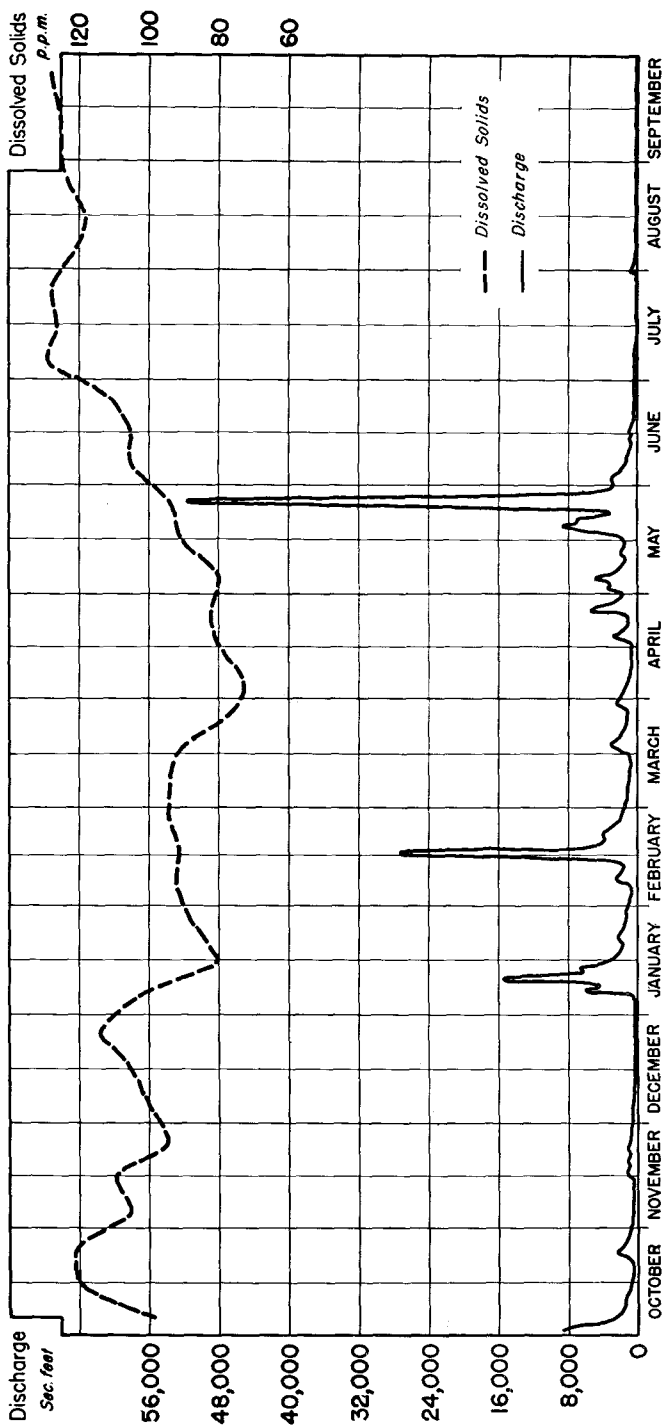


Figure 1. Concentration of dissolved solids related to flow, White River at Beaver, Ark., 1946.

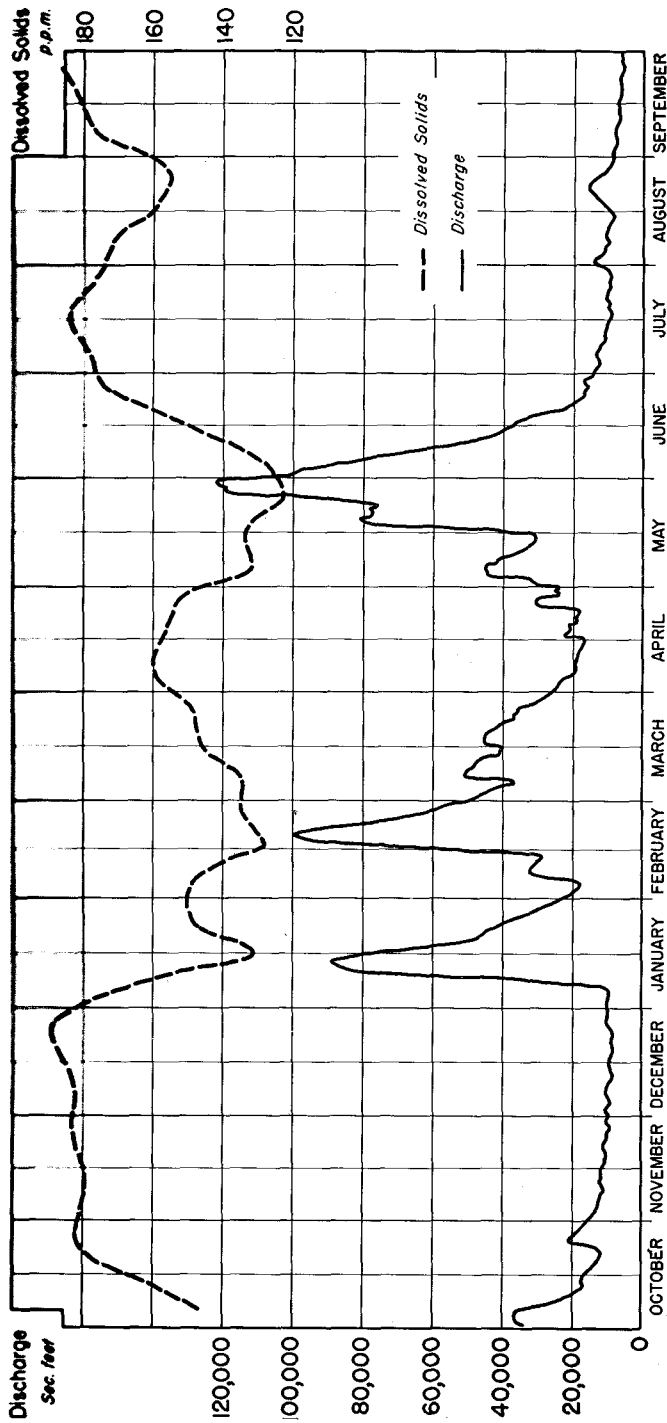


Figure 2. Concentration of dissolved solids related to flow, White River at Newport, Ark., 1946.

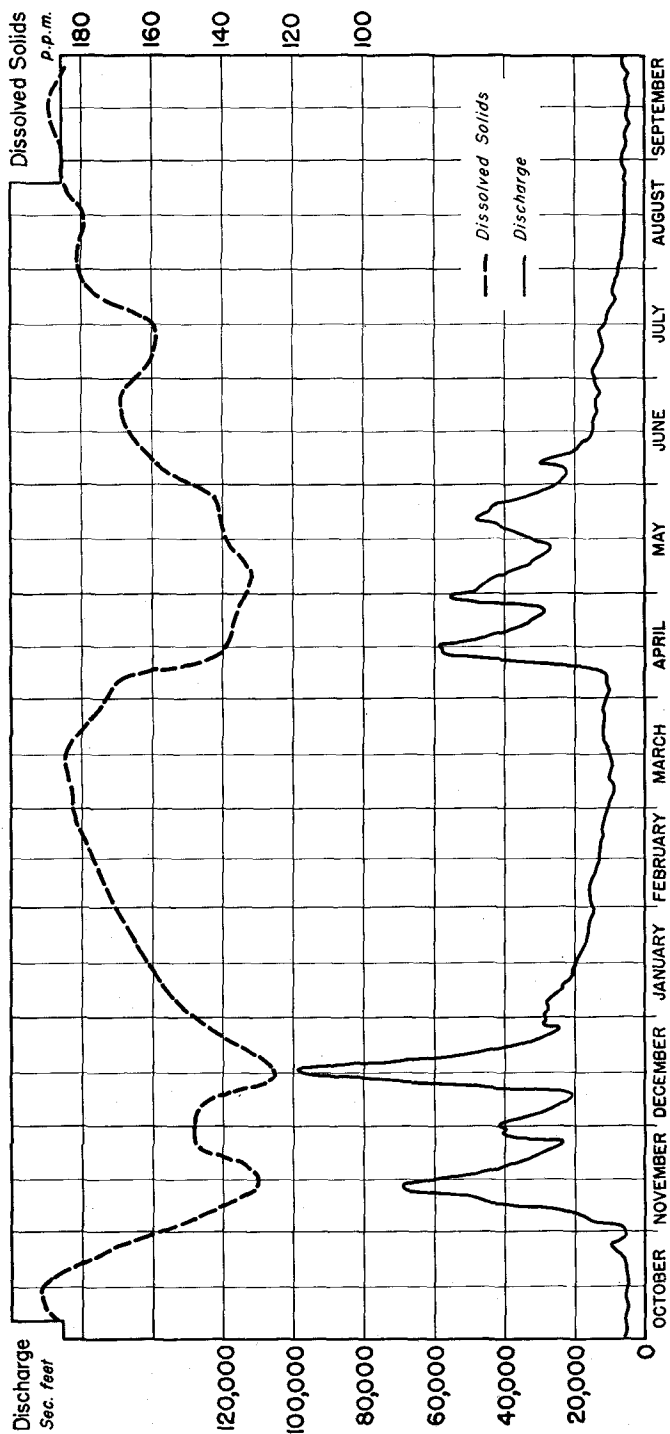


Figure 3. Concentration of dissolved solids related to flow, White River at Newport, Ark., 1947

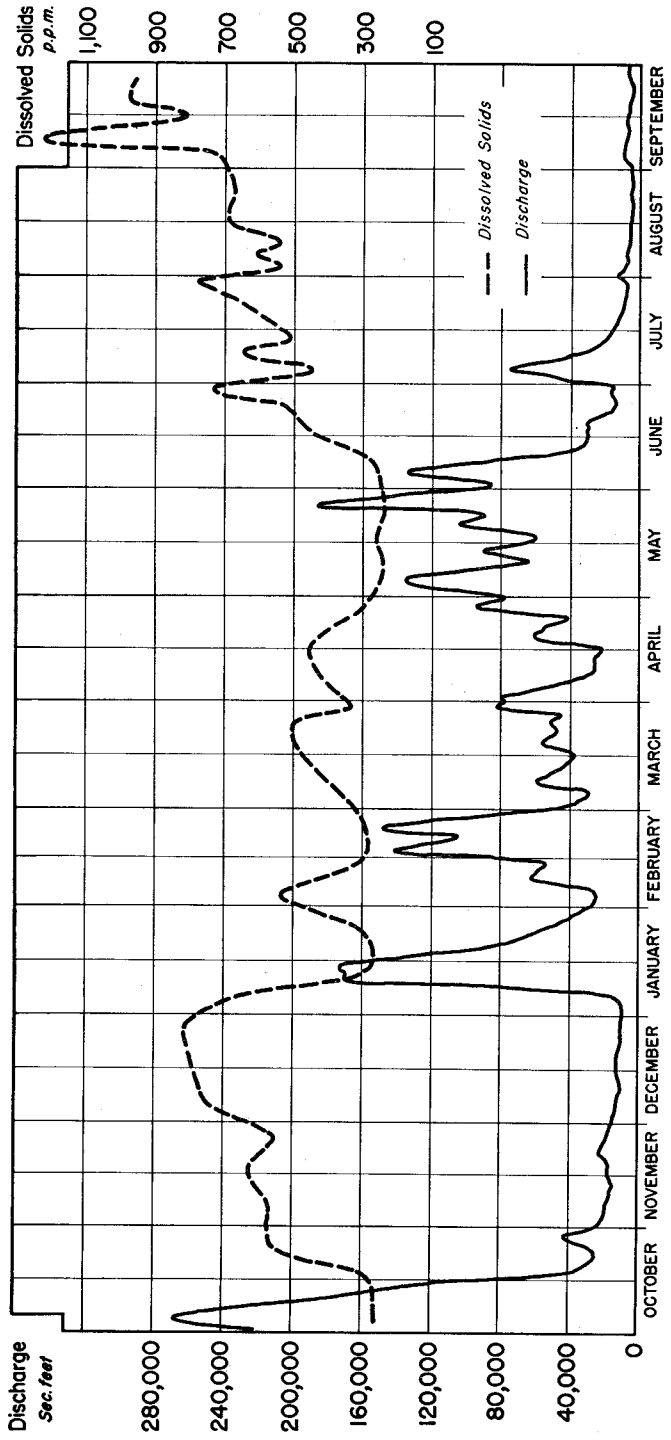


Figure 4. Concentration of dissolved solids related to flow, Arkansas River at Little Rock, Ark., 1946.



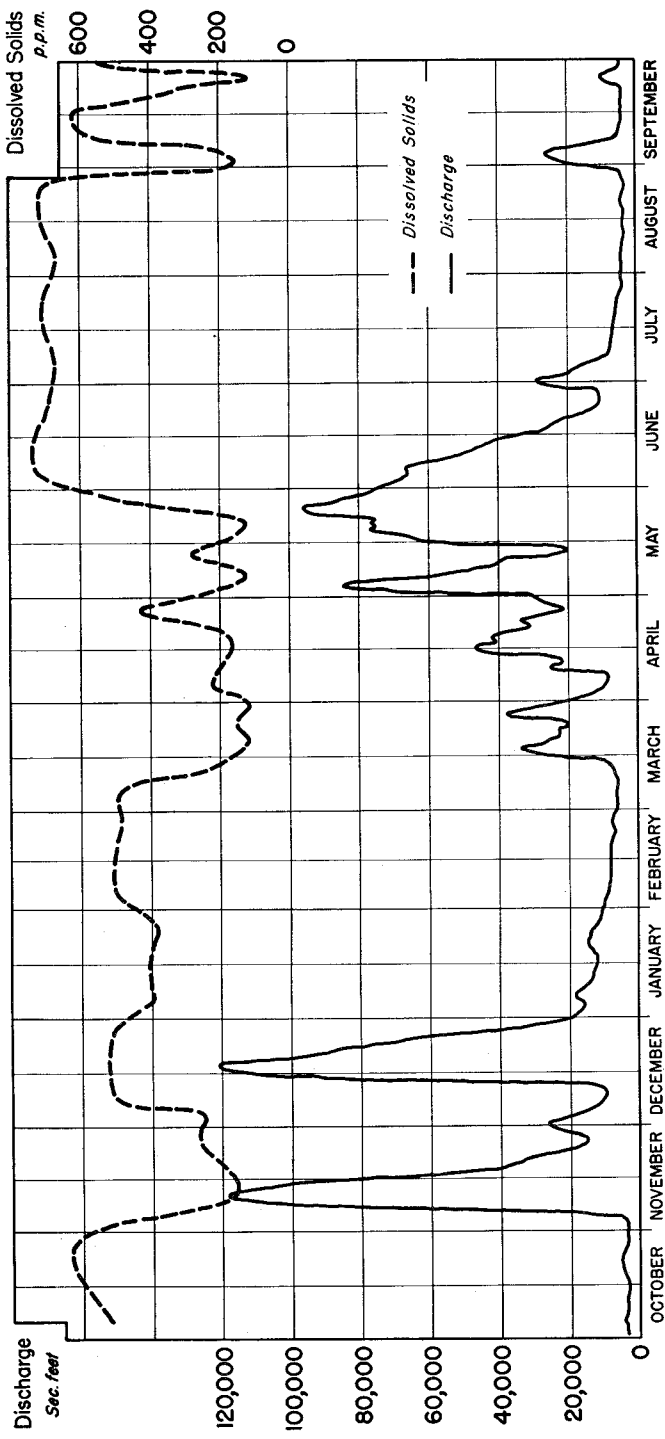


Figure 5. Concentration of dissolved solids related to flow, Red River at Fulton, Ark., 1947.

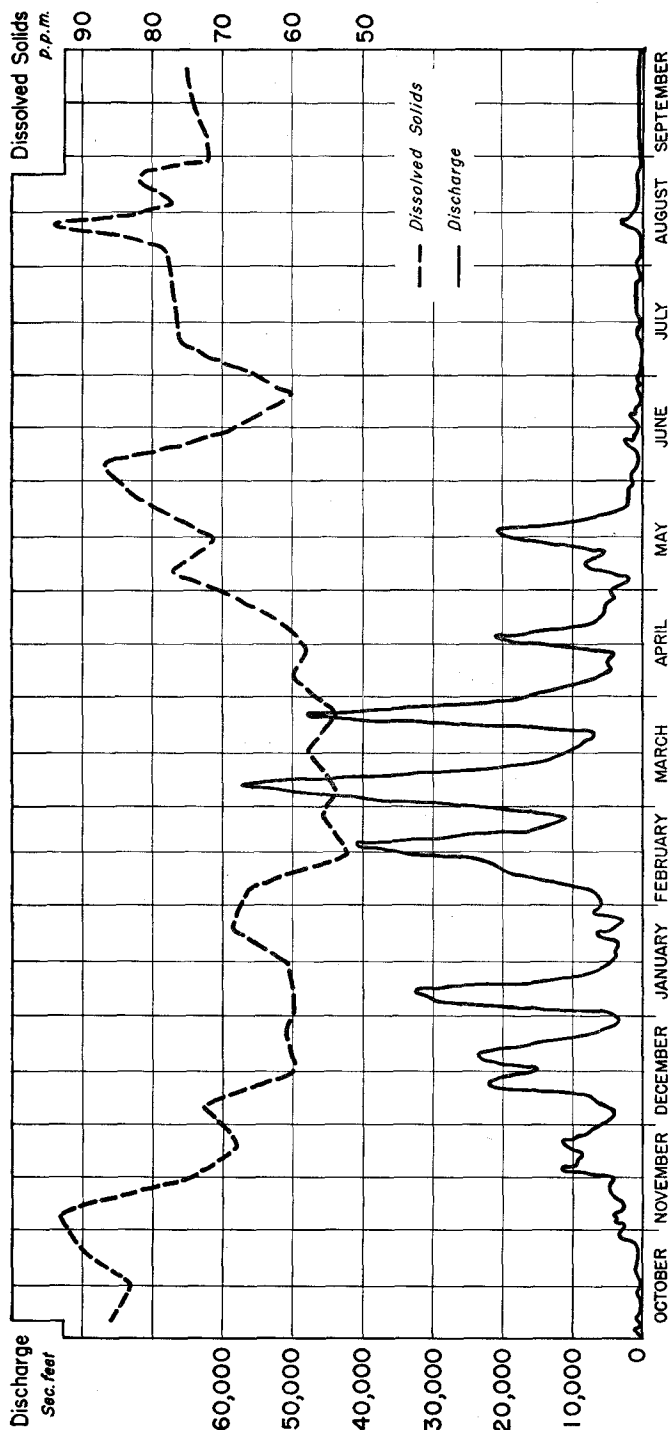


Figure 6. Concentration of dissolved solids related to flow, Ouachita River at Camden, Ark., 1948.

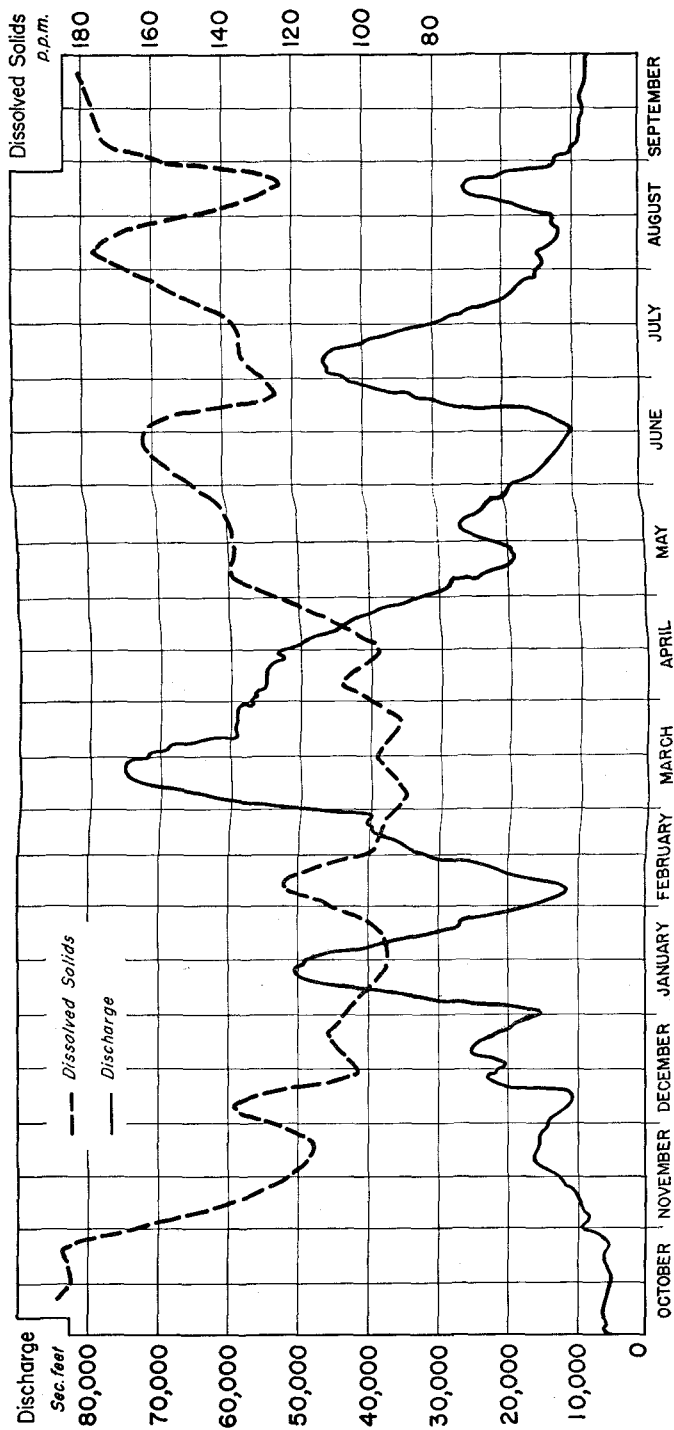


Figure 7. Concentration of dissolved solids related to flow, White River at Clarendon, Ark., 1948.

tinued for at least a year, and at many locations for several years, to determine the maximum range of concentration of dissolved mineral matter. Records should be obtained at many points along a stream to determine chemical changes in the water as it passes downstream. Many years of study are required to determine the quality of water in streams that carry large amounts of soluble salts or mineral matter from such extraneous sources as oil wells, industrial wastes, or return water from irrigation.

## STREAM GAGING

### General Explanation of Field and Office Work

A gaging station, or stream-flow measurement station, is a selected section in a stream channel, equipped with a gage and facilities for measuring the flow of water, where data are gathered by which continuous discharge records may be developed. Basic data systematically collected at such stream-flow measurement stations consist of records of stage, measurements of discharge, and other general information needed to supplement the gage height and discharge measurements in determining the instantaneous and daily mean flow. Records of stage are obtained either by direct readings on a nonrecording gage, such as a staff or wire-weight gage, or from a water-stage recorder. (See Figure 8.)

Discharge measurement is accomplished by measuring the depth and mean velocity of the water at a number of selected points (usually 20 or more) in a section across a stream channel, and computing discharge from these factors. The technical procedure followed and the time consumed in making a discharge measurement depends upon local conditions, the method used in determining the mean velocity, and the manner in which the sounding is made. Discharge measurements are made from bridge, cableway, boat, or by wading. Special equipment developed by the Geological Survey is employed for each type of measurement. Due to the unstable banks and channels of most Arkansas streams, frequent discharge measurements must be made to assure accurate records. The frequency depends upon local conditions and may vary from once each month to once or more each day during extreme high water.

The equipment and methods perfected by the Geological Survey for stream-flow measurements are described in *Stream-Gaging Procedure—A Manual Describing Methods and Practice of the Geological Survey*, published in 1943 as Water-Supply Paper 888.

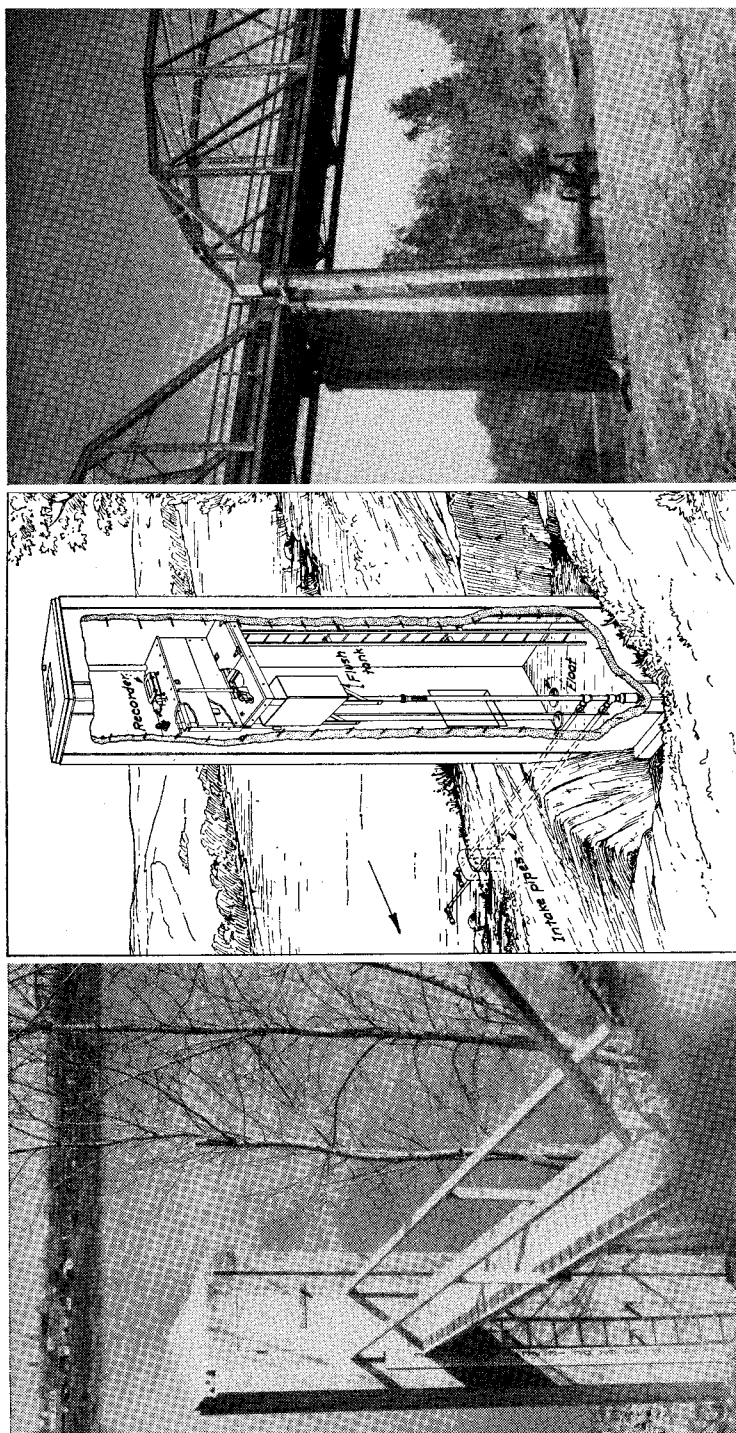


Figure 8. (Left) Concrete house and well for water-stage recorder at Little Rock. (Center) Interior of typical reinforced concrete gage well and shelter. (Right) Pipe well and metal half-shelter for water-stage recorder, Saline River near Eye, Ark.

The State of Arkansas is divided into four major drainage basins: the St. Francis, White, Arkansas, and Red River basins. The records in this report are grouped under those four basins and are arranged in the following order: The stations on the main stream of each basin are given first in downstream order, and then the stations on the tributaries in downstream order. Figure 9 shows the locations of all stream-gaging stations for which records are presented, the type of equipment used, and the type of chemical analysis obtained at each location. The number beside each symbol refers to the station number in the table of contents.

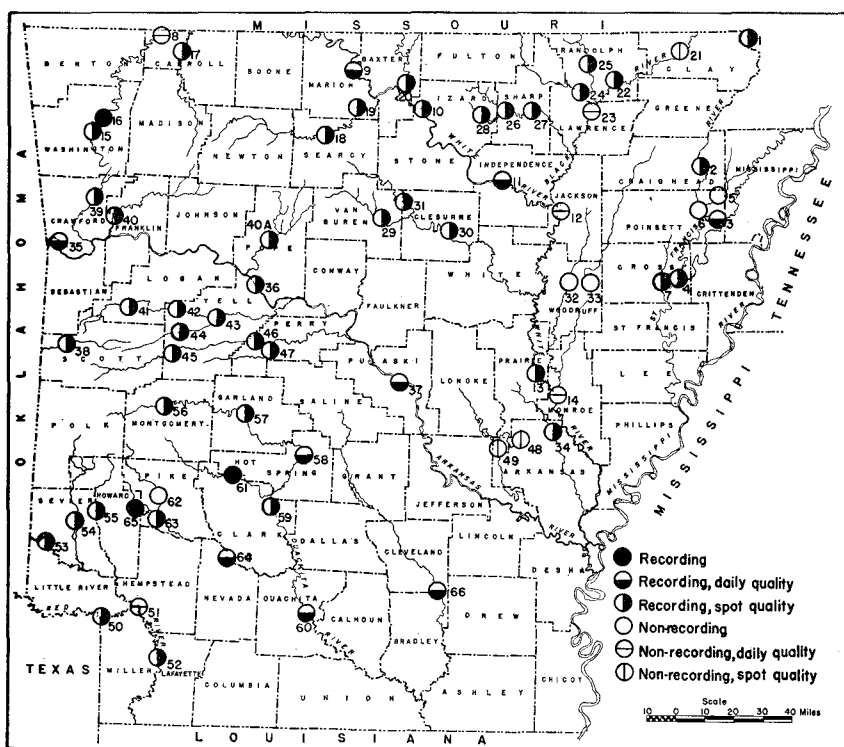


Figure 9. Sixty-eight stream-gaging stations were maintained in Arkansas as of September 30, 1948. Symbols indicate, in addition to location of stations, the chemical analyses run on samples from each location and the type of gage used.

### Explanation of Technical Terms

A few technical terms commonly used in describing water resources and related investigations appear in the text and tables. As some of these terms may be unfamiliar, brief descriptions follow:

*Second-foot* is an abbreviation for cubic feet per second. A second-foot is the rate of discharge equivalent to that of a stream whose channel is one square foot in cross-sectional area and whose average velocity is one foot per second.

*Second-foot per square mile* is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the runoff is distributed uniformly both as regards time and area.

*Runoff* is the portion of precipitation that appears as flow in stream, usually expressed in inches of water depth.

*Runoff in inches* is the depth to which an area would be covered if all the water draining from it in a given period were uniformly distributed on its surface.

*Acre-foot* is a measure of volume—the quantity of water that would cover one acre to a depth of one foot. An acre-foot contains 43,560 cubic feet.

*Datum* is a plane of reference for elevations.

*Discharge* is the rate of flow of water, or other fluid, in a channel past a given point per unit of time, usually expressed in second-feet, gallons per minute, or gallons per day. One second-foot flowing for 24 hours = 86,400 cubic feet = 646,317 gallons = nearly 2 acre-feet (actually 1.983471).

*Drainage area* is the area drained by a stream or stream system upstream from some designated point, usually expressed in square miles.

*Gage*: (1) A staff or wire-weight graduated to indicate the elevation of a water surface above the datum; (2) a device for producing a graphic record of the rise and fall of a water surface with respect to time; usually called a water-level or water-stage recorder.

*Gage-height* is the elevation of a water surface above or below a datum corresponding to the zero of the staff or other type of gage by which the height is indicated.

*Water year* is the year beginning October 1 and ending the following September 30 used by the U. S. Geological Survey in its reports. This period is used rather than the calendar year to facilitate many studies of runoff because it coincides more nearly with the climatological year that affects runoff.

## QUALITY OF WATER

## Collection and Examination of Samples

*Chemical quality.* Samples of water for mineral analysis were collected daily for 11 stations at or near points where stream-measurement stations are maintained. Most of the analyses are 10-day composites of daily samples collected for a period of a year or more at a sampling point.

Three composite samples were usually analyzed each month. The samples were made by mixing equal quantities of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and from the remainder of the month. For streams such as the Arkansas River—subject to sudden large changes in chemical composition—composite samples were sometimes made for shorter periods on the basis of the concentration of dissolved solids indicated by measurements of specific conductance of the daily samples.

In addition to daily samples collected, spot samples were collected semiannually from 46 stations where stream-measurement stations were located. Miscellaneous samples were also collected from time to time from sources other than stream-measurement stations. This additional data made it possible to determine more accurately the change in the composition of the water between sampling stations on the same stream.

The samples were analyzed according to methods regularly used by the Geological Survey. These methods are essentially the same or are modifications of methods described in recognized publications<sup>3</sup> for the mineral analysis of water samples.

In analyses of water containing fairly large quantities of soluble salts, the value reported for dissolved solids is the sum of the quantities of the various constituents determined. In other analyses the value reported as dissolved solids is the residue on evaporation after heating at 180° C. for 1 hour. Specific conductance is given for all analyses, and was determined by means of a conductance bridge using standard potassium chloride solution as reference.

*Temperature.* Daily river temperatures were obtained at the time the water samples were collected for chemical analyses. So far as practicable, the water temperatures were observed at about

---

<sup>3</sup> Collins, W. D., *Notes on practical analyses*. U. S. Geological Survey Water-Supply Paper 596-H, pp. 235-261. 1928.

American Public Health Association, *Standard methods for the examination of water and sewage*. 8th ed., pp. 53-123. 1936.



the same time each day at each station. The water temperature of the larger streams is more uniform throughout the day than the air temperature, but the diurnal fluctuations in water temperature are probably appreciable.

### Expression of Results

In the analysis of water samples, it is necessary to determine the presence of various substances usually found in minute amounts. For this reason the results are usually expressed in parts per millions rather than in percentage. One part per million equals one ten-thousandth of one per cent (0.0001%).

The total hardness is calculated as the calcium carbonate ( $\text{CaCO}_3$ ) equivalent of all the significant cations except sodium and potassium. The noncarbonate hardness is also reported in most of the analyses. Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12.

In the analyses of some waters anticipated for use in irrigation, the quantity of dissolved solids is given in tons per acre-foot, as well as in parts per million. The percentage of sodium has also been computed for these analyses by dividing the equivalents per million of sodium by the sum of the equivalents per million of all the cations (calcium, magnesium, sodium, and potassium) and multiplying by 100.

Average or weighted-average analyses for the water year are given for all daily sampling stations. An average analysis 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. The weighted-average analysis represents approximately 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. The weighted-average analyses show less concentrated water than that represented by the average of the individual analyses for most streams because at times of high discharge the rivers generally have a lower concentration of dissolved solids.

### Chemical Composition of Surface Waters

All natural waters contain dissolved mineral matter. Water in contact with soils or rocks for only a few hours will dissolve some rock materials. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rock or soil through which the water has passed, and the length of time it has

been in contact with the rock or soil. The concentration of mineral matter in a river water is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or in irrigated regions by drainage waters.

The mineral constituents and physical properties of natural waters reported in the tables of analyses included 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 as sodium), bicarbonate, sulfate, chloride, fluoride, nitrate, and dissolved solids. Aluminum and pH are reported for certain streams. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs.

*Silica* ( $\text{SiO}_2$ ). All surface waters in their natural condition contain some silica which is dissolved from practically all rocks. A few natural surface waters contain less than 3 parts per million and some contain more than 50 parts per million, but the more common range is from 10 to 30 parts per million. The use of water for domestic and irrigation purposes is not affected by the presence of silica. Soluble silica has a tendency to form a scale of the analcite series in boilers which, when deposited on metal surfaces receiving high heat input, cause damage in a short time. The analyses of the daily samples collected show that the silica ranged from 1.4 to 29 parts per million.

*Aluminum* (Al). Aluminum is usually found only in negligible quantities in natural waters, except in areas where the waters have been in contact with more soluble rocks of high aluminum content, such as bauxite and certain shales. Acid waters often contain large amounts of aluminum. Aluminum becomes troublesome in boiler feed waters when deposited as a scale on boiler tubes. Natural surface waters in Arkansas are normally very low in aluminum.

*Iron* (Fe). Iron is often found in natural waters since it is present in practically all rocks. On exposure to air, normal basic waters that contain more than one part per million of iron soon become turbid with insoluble reddish ferric oxide produced by oxidation. Surface waters seldom contain as much as one part per million of dissolved iron, although some acid waters carry more than one part per million in solution. Waters low in pH (high in acidity) tend to dissolve iron more readily. Excessive iron causes reddish-brown stains on white porcelain or enameled ware, on

fixtures, and on clothing or other fabrics. Iron is particularly troublesome in water used for many industrial purposes in that the manufactured products may be discolored. It is most readily removed by aeration and filtration. The analyses of the daily samples collected show that iron did not exceed 0.6 part per million except for the Ouachita River at Camden where the concentration reached 1.8 parts per million.

*Calcium* (Ca). Calcium is dissolved from practically all rocks, but is usually found in greater quantities in waters in contact with limestone, dolomite, and gypsum. Calcium and magnesium make water hard, and are largely responsible for the formation of boiler scale. Most waters associated with granite or silicious sands may contain less than 10 parts per million of calcium; many waters in contact with limestone contain from 30 to 100 parts per million; and waters that leach deposits of gypsum may contain several hundred parts per million. For analyses of the daily samples in this report the calcium ranged from 1.6 to 113 parts per million.

*Magnesium* (Mg). Magnesium is dissolved from many rocks, particularly from dolomitic rocks. Its effect is similar to that of calcium. Magnesium in soft waters may amount to only one or 2 parts per million, but water in areas containing large quantities of dolomite or other magnesium-bearing rocks may contain from 20 to 100 or even more parts per million of magnesium. Magnesium concentration in the daily samples in this report ranged from 0.3 to 28 parts per million.

*Sodium and potassium* (Na and K). All natural waters contain compounds of sodium and potassium dissolved from rocks, but they make up only a small part of the dissolved mineral matter in most surface waters in humid regions. 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 greater. As in the water from Arkansas River, sodium may be the predominant basic constituent in more highly mineralized waters.

Moderate quantities of these two constituents have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 to 100 parts per million may require careful operation of steam boilers to prevent foaming. Waters that contain a large proportion of sodium salts may not be satisfactory for irrigation. A few waters contain so much sodium

that they are unfit for nearly all uses. The quantities of sodium plus potassium of the waters as shown by the analyses of daily samples ranged from 0.1 to 514 parts per million, but only for the Arkansas, Red, and Ouachita rivers did they exceed 20 parts per million.

*Carbonate and bicarbonate* ( $\text{CO}_3$  and  $\text{HCO}_3$ ). Carbonate and bicarbonate occur in water owing to the solvent action of carbon dioxide on minerals present in the earth, such as calcite and dolomite, to form calcium and magnesium bicarbonates. Carbonate, as such, is rarely present in appreciable quantities in most natural waters. The bicarbonate in waters that come from relatively insoluble rocks may amount to 50 parts per million or less; many waters from limestone contain from 200 to 400 parts per million. Bicarbonate in moderate concentration has no effect for most uses. Large quantities, however, will cause foaming and priming in boilers. Carbonates present in large quantities may influence the flavor of carbonated beverages. The bicarbonate content of the daily and spot samples did not exceed 239 parts per million.

*Sulfate* ( $\text{SO}_4$ ). Sulfate is dissolved from rocks and soils, and in large quantities from gypsum, beds of shale, and deposits of sodium sulfate. It is also formed by the oxidation of sulfides of iron. Some high-sulfate industrial wastes, such as acid mine drainage and pickling liquors, will increase the sulfate content of natural water. Sulfates in waters that contain much calcium and magnesium cause the formation of hard scale in steam boilers and may increase the cost of softening the water. In the manufacturing of ice, calcium sulfate may cause the formation of white butts in the ice core. The analyses of all daily samples show that sulfate did not exceed 32 parts per million except for the Arkansas River where the maximum was 214 parts per million.

*Chloride* ( $\text{Cl}$ ). Chlorides of calcium, magnesium, sodium, potassium, and other cations normally found in water are extremely soluble; consequently, chloride is present in surface waters in all parts of the country. Chloride, however, has little effect upon the use of water unless it is present in excessive quantities, as in brines. Above normal quantities of chlorides in natural waters may indicate the presence of sewage. Sodium chloride in the higher concentrations imparts to water a salty taste and also causes foaming and priming in boilers. Large quantities of chlorides may affect the industrial use of water by increasing the corrosiveness of waters that contain large quantities of calcium and magnesium. Except for the Ouachita at Camden, Ar-

kansas, and Red rivers, chloride did not exceed 12 parts per million in the daily samples.

*Fluoride (F)*. Fluoride has been reported as present in 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. Fluoride in water is associated with a dental defect of children known as mottled enamel which occurs during the calcification or formation of the teeth. Prevalence of the defect becomes more pronounced as the quantity of fluoride in water increases above one part per million. Current investigations, however, indicate that the incidence of dental caries is less when small amounts of fluoride are present in the water supply. Analyses of the daily samples show that fluoride did not exceed 0.6 part per million.

*Nitrate (NO<sub>3</sub>)*. Nitrate is present in natural waters in relatively small quantities. Nitrate is considered a final oxidation product of nitrogenous material, and indicates contamination by sewage or other organic matter. The quantities of nitrate usually present in surface waters have no effect on the value of water for most uses. It has been reported, however, that as much as 2 parts per million may prevent intercrystalline cracking of boiler steel. The nitrate in the daily samples ranged from 0.2 to 7.0 parts per million.

*Dissolved solids*. The quantity reported as dissolved solids (the residue on evaporation) consists mainly of the dissolved mineral constituents in the water. The dissolved solids may also include some organic matter and water of crystallization. The amount and character of the dissolved solids present in a natural water depend on the solubility and types of rocks with which the water has been in contact. Waters with less than 500 parts per million of dissolved solids are usually satisfactory for domestic and many industrial uses; waters with more than 1,000 parts per million are likely to be unsuitable for most domestic and industrial uses. Waters containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where large volumes of the water are applied on well-drained lands.

The waters of lowest mineral content in Arkansas are found in the Red River Basin near Malvern, Camden, and Rye. Waters in the lower part of Ouachita River are more concentrated than in the headwaters of the stream owing to industrial wastes. The analyses in this report show that dissolved solids in the White

River Basin ranged from 73 to 211 parts per million, in the Arkansas River Basin from 187 to 1,730 parts per million, and in the Red River Basin from 37 to 728 parts per million.

### Properties and Characteristics of Water

*Hydrogen-ion concentration (pH).* The pH of water, indicated by the hydrogen-ion concentration, is related to the corrosive properties of water, and should be known so that the water can be properly treated for coagulation at water-treatment plants. pH is defined as the logarithm of the reciprocal of the hydrogen-ion concentration. 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 towards metal surfaces. As the pH increases, the corrosive activities of the water decrease. The pH of most natural surface water varies between 6.0 and 8.0; although more acid conditions and lower pH will result where water contains high concentrations of acid-mine drainage. pH values above 8.0 are seldom encountered except where pollution by alkaline trade wastes exists.

*Specific conductance ( $K \times 10^6$  at 25° C.)* Specific conductance is a measure of the ability of a water to conduct a current of electricity. It varies with the concentration and degree of ionization of the different minerals in solution and with the temperature. The higher the concentration of ionizable salts present in a water, the greater will be its specific conductance. The conductance, however, does not indicate the relative quantities of the different salts in solution. Specific conductance values are expressed in reciprocal ohms ( $\text{mhos} \times 10^6$ ) at 25° C. For convenience mhos are represented by "K" in the tables of analyses.

*Hardness.* Hardness is usually recognized by the increased quantity of soap required to produce lather. Hard water is objectionable because of the formation of scale in boilers, water heaters, radiators, and pipes, with a resulting loss in heat transfer, possible boiler failure, and loss in 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, but generally they are present in negligible amounts. Hardness is expressed as the calcium carbonate equivalent of all the signifi-

cant cations except sodium and potassium. The hardness caused by calcium, magnesium, and other ions equivalent to the carbonate and bicarbonate in a water is called carbonate hardness; the hardness due to sulfate, chloride, nitrate, and other soluble salts of calcium and magnesium is called noncarbonate hardness.

Since calcium and magnesium are the chief causes of hardness, sections having limestone formations almost invariably have waters of high hardness. Water with less than 60 parts per million of hardness is usually rated as soft and suitable for most purposes without further softening. Waters with hardness ranging between 60 and 120 parts per million may be considered moderately hard, but do not seriously interfere with the use of water except 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, in the upper ranges, laundries and industries may profitably soften the supply. Waters with hardness beyond 200 parts per million usually require some softening before being used for most purposes. The hardness of the daily composite samples in this report range from 8 to 406 parts per million.

*Corrosiveness.* The corrosiveness of water makes it aggressive to metal surfaces and frequently results in the appearance of "red water" caused by the presence of iron. The disadvantages of iron in water have been previously discussed. In addition to the trouble caused by iron in water, corrosiveness causes the deterioration of water pipes, steam boilers, and water-heating equipment. Many waters that do not appreciably corrode cold-water lines will aggressively attack hot-water lines. The principal constituents in water that cause corrosion of metals are due to the presence of any one of the following: (1) free acid, (2) acid generating salts, or (3) dissolved gases, such as oxygen, carbon dioxide, ammonia, and hydrogen sulfide. Normally, very soft waters of low mineral content tend to be more corrosive than hard waters containing appreciable quantities of the carbonates and bicarbonates of calcium and magnesium. Surface waters in the White River Basin are less likely to be corrosive than those in the tributaries to the Red River Basin. Waters from the Arkansas River may be corrosive owing to the salinity of the water.

### Chemical Qualities of Arkansas Streams

The analyses of samples collected daily during the 1946, 1947, and 1948 water years at some sampling stations as to low flow,

high flow, and average flow are summarized in Figures 10, 11, and 12. As pointed out earlier (Figures 1 to 7) the concentration of the dissolved solids is closely related to the discharge or flow of Arkansas rivers.

The analyses of daily composite samples indicate that the dissolved solids ranged from 37 to 1,730 parts per million and the hardness ranged from 8 to 406 parts per million. Streams in the White River Basin and the St. Francis River Basin are calcium-carbonate-type waters, being rather hard but low in dissolved solids. In most cases the dissolved solids are less than 200 parts per million. Waters originating in the Arkansas River Basin are low in mineral concentration and soft. In the Arkansas River, itself, the water is highly mineralized and hard as a result of highly saline waters being carried in from other states.

The mineral content of Arkansas River water is principally sodium chloride. Owing to the many mountain streams of low mineral concentration flowing into the Arkansas River within the state, the concentration usually decreases as the river flows across the state. Streams in the upper Ouachita River Basin are particularly soft and low in dissolved solids, but pollution from industrial and oil-field brine wastes in the southern part of the state have made the waters questionable for industrial, municipal, or domestic uses. Red River tributaries are soft and low in dissolved solids though the Red River, itself, carries water of relatively high mineral content.

The daily composite analyses show that individual mineral constituents did not exceed, in parts per million, the following limits: silica 29, iron 1.8, calcium 113, magnesium 28, sodium plus potassium 514, bicarbonate 239, sulfate 214, chloride 818, fluoride 0.6, and nitrate 7.0.



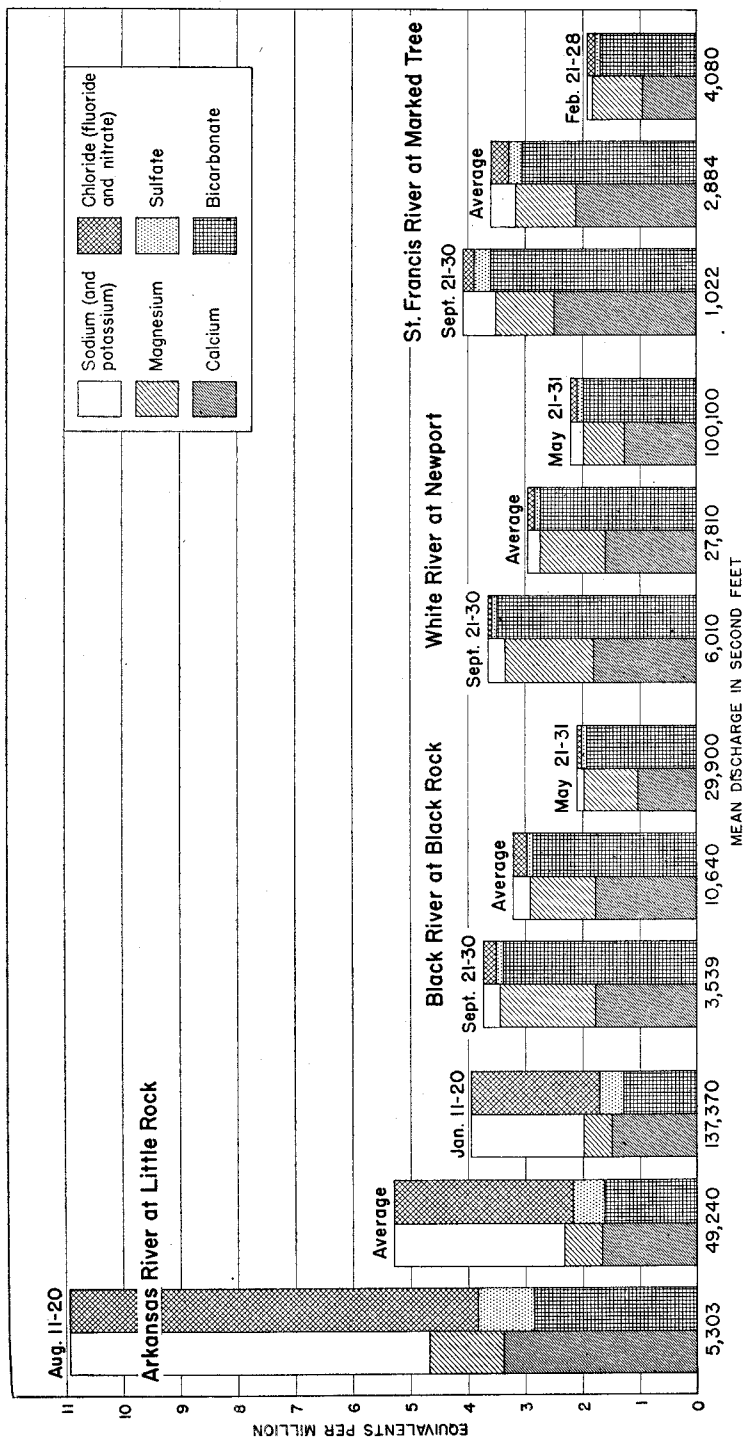


Figure 10. Analyses showing mineral content of some Arkansas streams at low, average, and high flow, October 1945 to September 1946.

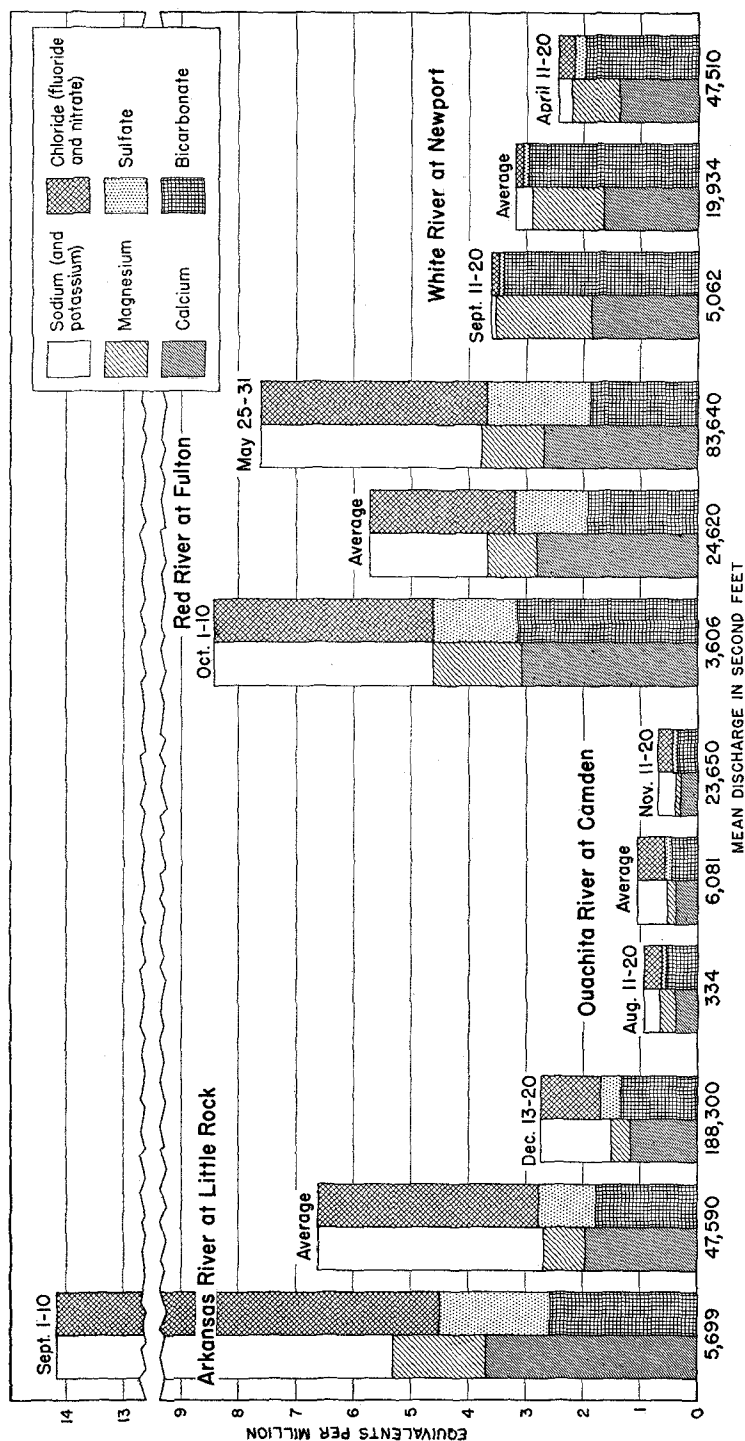


Figure 11. Analyses showing mineral content of some Arkansas streams at low, average, and high flow, October 1946 to September 1947.

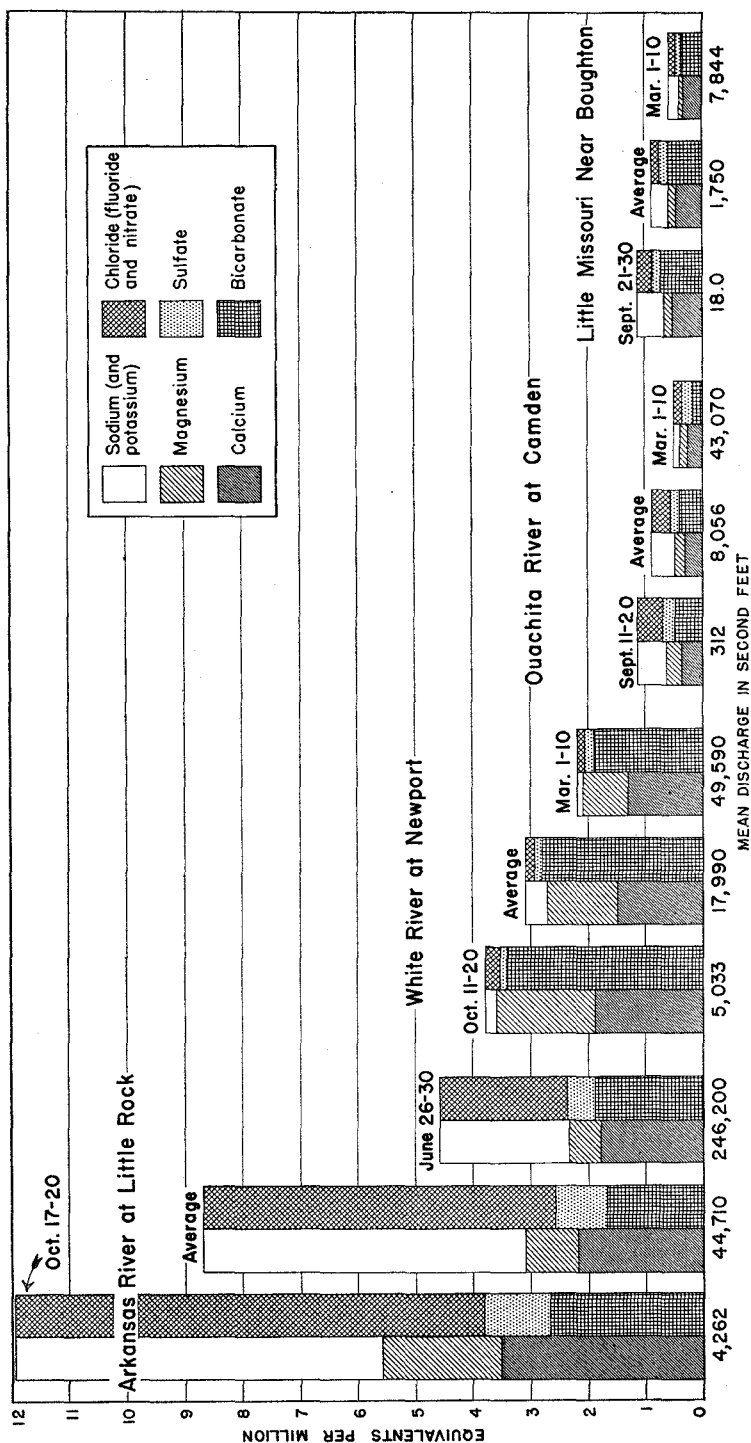


Figure 12. Analyses showing mineral content of some Arkansas streams at low, average, and high flow, October 1947 to September 1948.

## ST. FRANCIS RIVER BASIN

## 1. St. Francis River at St. Francis, Ark.

LOCATION: Water-stage recorder, lat.  $36^{\circ}27'21''$ , long.  $90^{\circ}08'13''$ , in sec. 18, T. 21 N., R. 9 E., at bridge on U. S. Highway 62 at St. Francis, Clay County. Datum of gage is 270.57 feet above mean sea level and 270.79 feet above mean Gulf level.

DRAINAGE AREA: 1,780 square miles.

RECORDS AVAILABLE: Discharge, 1917-29 (measurements only); January 1930 to December 1948 in files of Corps of Engineers, Memphis District; January 1946 to December 1948 in reports of Mississippi River Commission. Chemical quality, see analysis page 165.

MEAN ANNUAL RUNOFF: 1,480,000 acre-feet.

AVERAGE DISCHARGE: 18 years (1931-48), 2,050 second-feet.

MAXIMUM: 1930-48: Discharge observed, 39,200 second-feet Mar. 15, 1935; maximum gage height, 28.20 feet Mar. 15, 1935.

MINIMUM: 1930-48: Day: 70 second-feet (45.2 m.g.d.) Oct. 10-14, 1940.

7-day: 73 second-feet (47.2 m.g.d.) Oct. 8-14, 1940.

Calendar month: 95 second-feet (61.4 m.g.d.) October 1940.

Water year: 478 second-feet (309 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to Aug. 1, 1936, staff gage at same site and datum. Gage-height records since Sept. 26, 1916, are in files of Corps of Engineers, Memphis District; January 1944 to December 1948 in reports of Mississippi River Commission. Flow regulated by Wappapello Reservoir since July 1940. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 19.0 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1930-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1930 |                |                |       |                       |         |           |
| 1931 | 6,540          | 210            | 902   | 0.507                 | 6.88    | 653,000   |
| 1932 | 11,200         | 172            | 1,410 | .792                  | 10.78   | 1,020,000 |
| 1933 | 30,200         | 181            | 3,010 | 1.69                  | 22.94   | 2,180,000 |
| 1934 | 5,350          | 154            | 971   | .546                  | 7.41    | 703,000   |
| 1935 | 37,900         | 230            | 3,520 | 1.98                  | 26.88   | 2,550,000 |
| 1936 | 4,400          | 127            | 772   | .434                  | 5.91    | 560,000   |
| 1937 | 28,600         | 240            | 3,070 | 1.72                  | 23.35   | 2,220,000 |
| 1938 | 18,600         | 220            | 2,330 | 1.31                  | 17.78   | 1,690,000 |
| 1939 | 14,900         | 163            | 2,060 | 1.16                  | 15.75   | 1,490,000 |
| 1940 | 9,290          | 90             | 1,100 | .....                 | .....   | 799,000   |
| 1941 | 3,060          | 70             | 548   | .....                 | .....   | 397,000   |
| 1942 | 8,840          | 110            | 2,260 | .....                 | .....   | 1,640,000 |
| 1943 | 7,460          | 120            | 2,210 | .....                 | .....   | 1,600,000 |
| 1944 | 7,600          | 79             | 1,240 | .....                 | .....   | 900,000   |
| 1945 | 20,500         | 78             | 4,620 | .....                 | .....   | 3,340,000 |
| 1946 | 13,000         | 160            | 3,190 | .....                 | .....   | 2,310,000 |
| 1947 | 8,940          | 115            | 1,760 | .....                 | .....   | 1,270,000 |
| 1948 | 9,560          | 78             | 1,930 | .....                 | .....   | 1,400,000 |

*Calendar Year*

|      |        |     |       |      |       |           |
|------|--------|-----|-------|------|-------|-----------|
| 1930 | 33,100 | 190 | 1,750 | .983 | 13.34 | 1,270,000 |
| 1931 | 6,540  | 172 | 954   | .536 | 7.28  | 691,000   |
| 1932 | 16,000 | 181 | 1,490 | .837 | 11.39 | 1,080,000 |
| 1933 | 30,200 | 250 | 2,970 | 1.67 | 22.67 | 2,150,000 |
| 1934 | 5,350  | 154 | 1,140 | .640 | 8.69  | 825,000   |
| 1935 | 37,900 | 230 | 3,390 | 1.90 | 25.79 | 2,450,000 |

— Continued.

SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1930-48—*Continued*

| Year       | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------------|----------------|----------------|-------|-----------------------|---------|-----------|
|            |                |                |       |                       | Inches  | Acre-feet |
| 1936 ..... | 6,190          | 127            | 969   | 0.544                 | 7.40    | 703,000   |
| 1937 ..... | 28,600         | 240            | 2,890 | 1.62                  | 21.99   | 2,090,000 |
| 1938 ..... | 18,600         | 163            | 2,150 | 1.21                  | 16.42   | 1,560,000 |
| 1939 ..... | 14,900         | 168            | 2,070 | 1.16                  | 15.75   | 1,500,000 |
| 1940 ..... | 9,290          | 70             | 1,130 | .....                 | .....   | 820,000   |
| 1941 ..... | 4,829          | 110            | 905   | .....                 | .....   | 655,000   |
| 1942 ..... | 8,840          | 120            | 2,190 | .....                 | .....   | 1,590,000 |
| 1943 ..... | 7,460          | 119            | 1,890 | .....                 | .....   | 1,370,000 |
| 1944 ..... | 7,600          | 78             | 1,230 | .....                 | .....   | 893,000   |
| 1945 ..... | 20,500         | 214            | 5,200 | .....                 | .....   | 3,760,000 |
| 1946 ..... | 13,000         | 115            | 2,920 | .....                 | .....   | 2,110,000 |
| 1947 ..... | 8,940          | 78             | 1,590 | .....                 | .....   | 1,150,000 |
| 1948 ..... | 9,560          | 101            | 1,950 | .....                 | .....   | 1,420,000 |

## 2. St. Francis River at Lake City, Ark.

LOCATION: Water-stage recorder, lat. 35°49'10", long. 90°25'48", in SE¼ sec. 22, T. 14 N., R. 6 E., at St. Louis-San Francisco Railroad bridge at Lake City, Craighead County. Datum of gage is 217.69 feet above mean sea level and 218.03 feet above mean Gulf level.

DRAINAGE AREA: 2,385 square miles.

RECORDS AVAILABLE: Discharge, January 1931 to December 1948 in files of Corps of Engineers, Memphis District; January 1946 to December 1948 in reports of Mississippi River Commission. Chemical quality, see analysis page 165.

MEAN ANNUAL RUNOFF: 2,010,000 acre-feet.

AVERAGE DISCHARGE: 17 years (1932-48), 2,780 second-feet.

MAXIMUM: 1931-48: Discharge, 36,700 second-feet Jan. 22-24, 1937 (gage height, 13.30 feet).

MINIMUM: 1931-48: Day: 60 second-feet (38.8 m.g.d.) Aug. 29 to Sept. 1, 1936.

7-day: 63.3 second-feet (40.9 m.g.d.) Aug. 26 to Sept. 1, 1936.

Calendar month: 109 second-feet (70.4 m.g.d.) August 1936.

Water year: 782 second-feet (505 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to Aug. 11, 1948, staff gage at same site and datum. Gage-height records October 1916 to December 1948 in files of Corps of Engineers, Memphis District; January 1944 to December 1948 in reports of Mississippi River Commission. Flow regulated by Wappapello Reservoir since July 1940. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 9.5 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1931-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1931 |                |                |       |                       |         |           |
| 1932 | 15,400         | 97             | 2,180 | 0.914                 | 12.44   | 1,580,000 |
| 1933 | 16,800         | 97             | 3,470 | 1.45                  | 19.68   | 2,510,000 |
| 1934 | 11,900         | 73             | 1,420 | .595                  | 8.08    | 1,030,000 |
| 1935 | 20,900         | 217            | 3,970 | 1.66                  | 22.53   | 2,870,000 |
| 1936 | 3,940          | 60             | 921   | .386                  | 5.25    | 669,000   |
| 1937 | 36,700         | 265            | 3,900 | 1.64                  | 22.26   | 2,820,000 |
| 1938 | 16,100         | 169            | 3,040 | 1.27                  | 17.24   | 2,200,000 |
| 1939 | 14,000         | 129            | 2,610 | 1.09                  | 14.80   | 1,890,000 |
| 1940 | 9,470          | 160            | 1,380 |                       |         | 1,000,000 |
| 1941 | 3,100          | 100            | 782   |                       |         | 566,000   |
| 1942 | 10,300         | 100            | 3,090 |                       |         | 2,240,000 |
| 1943 | 7,080          | 240            | 2,610 |                       |         | 1,890,000 |
| 1944 | 10,900         | 220            | 1,710 |                       |         | 1,240,000 |
| 1945 | 21,300         | 220            | 6,200 |                       |         | 4,490,000 |
| 1946 | 18,000         | 368            | 4,560 |                       |         | 3,300,000 |
| 1947 | 9,260          | 198            | 2,580 |                       |         | 1,870,000 |
| 1948 | 10,100         | 152            | 2,840 |                       |         | 2,060,000 |

*Calendar Year*

|      |        |     |       |      |       |           |
|------|--------|-----|-------|------|-------|-----------|
| 1931 | 5,280  | 129 | 1,260 | .528 | 7.17  | 912,000   |
| 1932 | 15,400 | 97  | 2,050 | .860 | 11.71 | 1,490,000 |
| 1933 | 16,800 | 248 | 3,610 | 1.51 | 20.50 | 2,610,000 |
| 1934 | 11,900 | 73  | 1,540 | .646 | 8.77  | 1,110,000 |
| 1935 | 20,900 | 217 | 3,840 | 1.61 | 21.85 | 2,780,000 |
| 1936 | 5,380  | 60  | 1,240 | .520 | 7.08  | 900,000   |
| 1937 | 36,700 | 265 | 3,740 | 1.57 | 21.31 | 2,710,000 |
| 1938 | 16,100 | 129 | 2,680 | 1.12 | 15.20 | 1,940,000 |
| 1939 | 14,000 | 157 | 2,630 | 1.10 | 14.93 | 1,900,000 |
| 1940 | 9,470  | 140 | 1,440 |      |       | 1,050,000 |
| 1941 | 4,440  | 100 | 1,090 |      |       | 789,000   |
| 1942 | 10,300 | 240 | 3,110 |      |       | 2,250,000 |
| 1943 | 7,080  | 250 | 2,250 |      |       | 1,630,000 |
| 1944 | 10,900 | 220 | 1,730 |      |       | 1,260,000 |
| 1945 | 21,300 | 615 | 7,020 |      |       | 5,080,000 |
| 1946 | 18,000 | 243 | 4,150 |      |       | 3,000,000 |
| 1947 | 9,260  | 152 | 2,320 |      |       | 1,680,000 |
| 1948 | 10,100 | 172 | 2,960 |      |       | 2,150,000 |

**3. St. Francis River at Marked Tree, Ark.**

**LOCATION:** Water-stage recorder, lat. 35°31'58", long. 90°25'25", in NE¼ SW¼ sec. 35, T. 11 N., R. 6 E., at Marked Tree, Poinsett County, 4.8 miles downstream from Little River, and 7 miles downstream from dam of Poinsett County Drainage District 7. Auxiliary water-stage recorder, at St. Louis and San Francisco Railway bridge, 3 miles upstream from base gage. Datum of both gages is 196.44 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** Indeterminate.

**RECORDS AVAILABLE:** Discharge, February 1918 and September 1927 to May 1931 (miscellaneous measurements only), July 1934 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1946.

**AVERAGE DISCHARGE:** 14 years, 1,689 second-feet.

**MAXIMUM:** 1934-48: Discharge, 7,120 second-feet Feb. 6, 7, 1937; maximum gage height, 18.88 feet, Feb. 7, 1937.

## SURFACE-WATER RESOURCES OF ARKANSAS

MINIMUM: 1934-48: Day: 64 second-feet (41.4 m.g.d.) October 12, 1941.

7-day: 76.6 second-feet (49.5 m.g.d.) Nov. 8-14, 1938.

Calendar month: 83.4 second-feet (53.9 m.g.d.) November 1938.

Water year: 846 second-feet (547 m.g.d.) Oct. 1, 1937, to Sept. 30, 1938.

REMARKS: Discharge computed by using fall, as determined from auxiliary gage, as a factor. Gage-height records collected at same site since 1904 are contained in reports of U. S. Weather Bureau. Flood flows diverted through St. Francis River floodway at dam of Poinsett County Drainage District 7, 7 miles above station and by-passed to the vicinity of Parkin, Arkansas. Flow regulated by Wappapello Reservoir and by siphons at dam of Poinsett County Drainage District 7. Bank-full stage, about 17 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1935-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|-------|----------------------------|
| 1935 | 787-41                        | 4,150               | 373                 | 2,025 | 1,466,000                  |
| 1936 | 807-41                        | 1,580               | 186                 | 1,033 | 750,200                    |
| 1937 | 827-37                        | 7,120               | 169                 | 1,213 | 878,400                    |
| 1938 | 857-38                        | 4,290               | 96                  | 846   | 612,800                    |
| 1939 | 877-40                        | 2,370               | 76                  | 872   | 613,700                    |
| 1940 | 897-43                        | 3,240               | 96                  | 1,389 | 1,008,000                  |
| 1941 | 927-44                        | 2,900               | 68                  | 1,240 | 897,900                    |
| 1942 | 957-48                        | 3,160               | 64                  | 2,035 | 1,473,000                  |
| 1943 | 977-48                        | 3,680               | 131                 | 2,157 | 1,562,000                  |
| 1944 | 1007-52                       | 3,920               | 118                 | 1,558 | 1,131,000                  |
| 1945 | 1037-49                       | 4,500               | 112                 | 2,340 | 1,694,000                  |
| 1946 | 1057-49                       | 4,320               | 646                 | 2,884 | 2,088,000                  |
| 1947 | 1087-49                       | 3,260               | 114                 | 2,041 | 1,478,000                  |
| 1948 | .....                         | 4,450               | 124                 | 2,014 | 1,463,000                  |

*Calendar Year*

|      |         |       |       |       |           |
|------|---------|-------|-------|-------|-----------|
| 1935 | 787-41  | 4,150 | 373   | 1,986 | 1,398,000 |
| 1936 | 807-41  | 1,580 | 186   | 1,005 | 729,300   |
| 1937 | 827-37  | 7,120 | 169   | 1,104 | 799,000   |
| 1938 | 857-38  | 4,290 | 76    | 749   | 542,600   |
| 1939 | 877-40  | 2,370 | 87    | 985   | 713,200   |
| 1940 | 897-43  | 3,240 | 120   | 1,480 | 1,076,000 |
| 1941 | 927-44  | 2,900 | 64    | 1,353 | 979,400   |
| 1942 | 957-48  | 3,160 | 131   | 2,120 | 1,535,000 |
| 1943 | 977-48  | 3,680 | 120   | 1,886 | 1,366,000 |
| 1944 | 1007-52 | 3,920 | 112   | 1,599 | 1,161,000 |
| 1945 | 1037-49 | 4,500 | 830   | 2,916 | 2,111,000 |
| 1946 | 1057-49 | 4,320 | 158   | 2,427 | 1,757,000 |
| 1947 | 1087-49 | 3,260 | 114   | 1,968 | 1,424,000 |
| 1948 | .....   | ..... | ..... | ..... | .....     |

## 3. ST. FRANCIS RIVER AT MARKED TREE, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1945:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 3,068                        | 21.0                 | 8.3 | 17                         | 0.33      | 2.8           | 31           | 9.3            | 7.0         | 2.8           | 111                             | 12                         | 3.5           | 0.2          | 1.2                        | 142              | 116                           | 25            |
| Oct. 11-20         | 3,240                        | 26.8                 | 8.3 | 22                         | .18       | 1.2           | 40           | 11             | 6.7         | 2.9           | 144                             | 15                         | 5.8           | .2           | .2                         | 176              | 145                           | 27            |
| Oct. 21-31         | 2,857                        | 32.0                 | 8.2 | 21                         | .08       | .5            | 50           | 15             | 8.4         | 2.3           | 185                             | 14                         | 6.5           | .2           | .5                         | 210              | 186                           | 35            |
| Nov. 1-10          | 2,647                        | 31.5                 | 8.3 | 19                         | .08       | .4            | 50           | 16             | 8.7         | 2.6           | 183                             | 13                         | 6.2           | .2           | .5                         | 207              | 190                           | 41            |
| Nov. 11-20         | 2,272                        | 35.6                 | 8.1 | 21                         | .08       | .5            | 46           | 14             | 8.6         | 3.0           | 191                             | 17                         | 12            | .2           | .8                         | 217              | 172                           | 16            |
| Nov. 21-30         | 3,231                        | 33.1                 | 8.1 | 19                         | .08       | .9            | 43           | 12             | 8.0         | 2.9           | 181                             | 15                         | 10            | .2           | .8                         | 203              | 157                           | 8             |
| Dec. 1-10          | 3,140                        | 37.5                 | 8.1 | 26                         | .15       | .8            | 47           | 14             | 13          | 4.1           | 210                             | 17                         | 12            | .1           | .2                         | 238              | 175                           | 23            |
| Dec. 11-20         | 3,028                        | 39.1                 | 8.2 | 24                         | .02       | .7            | 49           | 16             | 11          | 3.5           | 221                             | 17                         | 11            | .0           | 2.0                        | 244              | 188                           | 7             |
| Dec. 21-28, 30-31  | 3,110                        | 39.5                 | 8.3 | 24                         | .06       | .7            | 52           | 10             | 20          | 2.9           | 228                             | 15                         | 10            | .0           | .8                         | 248              | 171                           | 0             |
| 1946:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-9           | 3,282                        | 33.0                 | 8.5 | 22                         | .06       | 1.4           | 45           | 12             | 8.1         | 3.2           | 184                             | 17                         | 8.8           | .2           | 2.0                        | 214              | 162                           | 11            |
| Jan. 10-20         | 4,016                        | 21.2                 | 8.2 | 19                         | .18       | 2.6           | 28           | 7.1            | 4.1         | 3.0           | 101                             | 21                         | 3.5           | .2           | 2.2                        | 145              | 99                            | 16            |
| Jan. 21-31         | 3,534                        | 23.1                 | 8.2 | 17                         | .08       | .9            | 39           | 10             | 5.9         | 3.2           | 158                             | 17                         | 4.5           | .1           | 1.5                        | 185              | 138                           | 9             |
| Feb. 1-10          | 3,882                        | 31.6                 | 8.2 | 12                         | .12       | 2.6           | 27           | 15             | 3.9         | 2.1           | 158                             | 3.7                        | 3.0           | .1           | 3.0                        | 150              | 129                           | 0             |
| Feb. 11-20         | 3,999                        | 28.8                 | 8.2 | 17                         | .30       | 5.8           | 20           | 12             |             | 3.5           | 120                             | 2.7                        | 2.5           | .1           | 2.5                        | 126              | 99                            | 1             |
| Feb. 21-28         | 4,080                        | 26.5                 | 8.1 | 14                         | .30       | 5.1           | 19           | 11             |             | 1.9           | 104                             | 3.5                        | 4.0           | .1           | 2.5                        | 114              | 93                            | 7             |
| Mar. 1-10          | 3,943                        | 32.1                 | 8.0 | 22                         | .12       | .5            | 41           | 11             | 10          | 2.6           | 176                             | 17                         | 7.0           | .2           | .8                         | 201              | 148                           | 3             |
| Mar. 11-20         | 3,269                        | 33.7                 | 8.4 | 22                         | .05       | .4            | 52           | 14             | 12          | 2.6           | 224                             | 19                         | 8.2           | .1           | .8                         | 244              | 187                           | 4             |
| Mar. 21-31         | 3,272                        | 40.5                 | 8.3 | 21                         | .10       | .4            | 52           | 14             | 13          | 2.0           | 227                             | 18                         | 8.2           | .1           | 1.0                        | 246              | 187                           | 1             |
| Apr. 1-10          | 2,947                        | 37.9                 | 8.6 | 27                         | .05       | .1            | 51           | 14             | 9.5         | 2.4           | 218                             | 16                         | 7.5           | .1           | 2.2                        | 244              | 185                           | 6             |
| Apr. 11-20         | 2,805                        | 37.7                 | 8.0 | 28                         | .05       | .1            | 44           | 14             | 13          | 2.7           | 203                             | 17                         | 8.2           | .1           | 3.8                        | 239              | 167                           | 1             |
| Apr. 21-30         | 2,656                        | 37.4                 | 8.1 | 26                         | .05       | .1            | 46           | 15             | 11          | 3.4           | 209                             | 17                         | 8.5           | .2           | 2.2                        | 233              | 176                           | 5             |
| May 1-10           | 2,766                        | 34.8                 | 8.2 | 27                         | .05       | .5            | 40           | 12             | 15          | 3.6           | 190                             | 16                         | 8.5           | .3           | 1.5                        | 222              | 149                           | 0             |
| May 11-20          | 3,123                        | 29.9                 | 8.1 | 25                         | .10       | .6            | 38           | 10             | 10          | 3.0           | 164                             | 15                         | 7.5           | .2           | 1.2                        | 196              | 136                           | 2             |
| May 21-31          | 3,574                        | 30.4                 | 8.1 | 24                         | .08       | .4            | 38           | 10             | 10          | 3.5           | 166                             | 13                         | 8.0           | .3           | 1.2                        | 198              | 136                           | 0             |

—Continued.



## 3. ST. FRANCIS RIVER AT MARKED TREE, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| June 1-10          | 2,782                        | 28.9                              | 8.3 | 25                         | 0.02      | 0.7           | 40           | 10             | 8.1         | 3.5           | 171                             | 13                         | 5.0           | 0.1          | 2.0                        | 196                           | 141           |
| June 11-20         | 2,418                        | 35.2                              | 8.2 | 29                         | .02       | .9            | 48           | 13             | 9.7         | 3.0           | 206                             | 15                         | 9.0           | .1           | 1.0                        | 235                           | 173           |
| June 21-30         | 2,682                        | 38.5                              | 8.1 | 28                         | .02       | .8            | 52           | 14             | 12          | 2.9           | 230                             | 13                         | 10            | .1           | 1.0                        | 258                           | 187           |
| July 1-10          | 2,327                        | 38.0                              | 8.2 | 28                         | .02       | .8            | 50           | 14             | 9.6         | 2.9           | 219                             | 14                         | 8.0           | .1           | 1.2                        | 245                           | 182           |
| July 11-20         | 2,405                        | 36.6                              | 7.8 | 24                         | .02       | .4            | 46           | 13             | 12          | 3.3           | 212                             | 12                         | 7.8           | .1           | 1.0                        | 233                           | 168           |
| July 21-31         | 2,325                        | 34.7                              | 7.9 | 21                         | .02       | .9            | 45           | 12             | 8.2         | 3.3           | 196                             | 12                         | 6.8           | .1           | 1.0                        | 214                           | 162           |
| Aug. 3-10          | 2,322                        | 30.3                              | 8.4 | 21                         | .22       | .0            | 44           | 12             | 5.4         | 2.8           | 182                             | 13                         | 7.0           | .2           | 1.2                        | 201                           | 159           |
| Aug. 11-20         | 2,395                        | 30.6                              | 8.2 | 22                         | .30       | .0            | 40           | 12             | 11          | 2.8           | 182                             | 13                         | 8.0           | .2           | 1.5                        | 204                           | 149           |
| Aug. 21-31         | 2,062                        | 31.9                              | 8.3 | 20                         | .18       | .1            | 43           | 12             | 12          | 2.5           | 196                             | 12                         | 8.0           | .1           | 1.2                        | 208                           | 157           |
| Sept. 1-10         | 1,308                        | 38.2                              | 8.1 | 20                         | .12       | .0            | 52           | 16             | 9.7         | 2.8           | 235                             | 14                         | 8.0           | .1           | 2.0                        | 244                           | 196           |
| Sept. 11-20        | 1,131                        | 37.6                              | 8.1 | 18                         | .30       | .0            | 50           | 15             | 12          | 2.9           | 288                             | 14                         | 8.5           | .1           | 2.0                        | 241                           | 186           |
| Sept. 21-30        | 1,022                        | 37.2                              | 8.1 | 16                         | .08       | .2            | 50           | 15             | 11          | 2.7           | 226                             | 14                         | 8.2           | .1           | 1.5                        | 230                           | 186           |
| Average            | 2,384                        | 33.5                              | 8.2 | 22                         | 0.11      | 1.0           | 43           | 13             | 9.5         | 2.9           | 187                             | 14                         | 7.5           | 0.1          | 1.5                        | 210                           | 159           |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 3. ST. FRANCIS RIVER AT MARKED TREE, ARK.—Continued

*Temperature (° F.) of Water of St. Francis River, Water Year October 1945 to September 1946*

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

## 4. St. Francis River at Parkin, Ark.

**LOCATION:** Water-stage recorder, lat. 35°16'12", long. 90°35'00", in SE¼ sec. 32, T. 8 N., R. 5 E., at Missouri Pacific Railroad bridge 1½ miles west of Parkin, Cross County. Datum of gage is 175.26 feet above mean sea level and 175.68 feet above mean Gulf level.

**RECORDS AVAILABLE:** Discharge, measurements only, along railroad crossing St. Francis Basin, 1890 (before completion of Mississippi River levees); ¼ to 25 miles above mouth of St. Francis River, 1858-1916 (measurements only); at Parkin, January 1928 to December 1948 in reports of Mississippi River Commission. Chemical quality, see analysis page 165.

**MEAN ANNUAL RUNOFF:** 2,490,000 acre-feet.

**AVERAGE DISCHARGE:** 20 years (1929-48), 3,440 second-feet.

**MAXIMUM:** 1927-48: Discharge, 40,000 second-feet (estimated) during Apr. 30 to May 2, 1927 (gage height, 33.7 feet).

No reliable estimate of discharge can be ascertained for the maximum stage 41.6 feet on Apr. 4-6, 1897.

**MINIMUM:** 1928-48: Day: 210 second-feet (136 m.g.d.) Nov. 16, 17, 1940.

7-day: 300 second-feet (194 m.g.d.) Dec. 12-20, 1938.

Calendar month: 310 second-feet (200 m.g.d.) December 1938.

Water year: 1,360 second-feet (879 m.g.d.) Oct. 1, 1935, to Sept. 1936, Oct. 1, 1940 to Sept. 30, 1941.

REMARKS: Prior to Sept. 9, 1948, staff gage at same site and datum. Gage-height records since Dec. 25, 1892, are in files of Corps of Engineers, Memphis District, and in reports of Mississippi River Commission (records Aug. 3 to Oct. 14, 1893 not reliable). Low-flow regulated by siphons at dam of Poinsett County Drainage District 7, 4 miles north-west of Marked Tree. The greater portion of St. Francis River flood flows is diverted through St. Francis River floodway and St. Francis Bay and returns to St. Francis River below Parkin. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 30 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|------|----------------|----------------|-------|----------------------------|
| 1928 |                |                |       |                            |
| 1929 | *23,000        | 1,000          | 7,320 | 5,300,000                  |
| 1930 | 24,400         | 770            | 6,430 | 4,660,000                  |
| 1931 | 8,080          | 730            | 2,340 | 1,690,000                  |
| 1932 | 21,600         | 570            | 5,850 | 4,250,000                  |
| 1933 | 15,100         | 950            | 6,520 | 4,720,000                  |
| 1934 | 13,300         | 500            | 3,530 | 2,560,000                  |
| 1935 | 9,950          | 690            | 3,530 | 2,560,000                  |
| 1936 | 2,990          | 390            | 1,360 | 987,000                    |
| 1937 | 19,500         | 400            | 3,310 | 2,400,000                  |
| 1938 | 8,160          | 300            | 2,280 | 1,650,000                  |
| 1939 | 7,260          | 300            | 2,150 | 1,560,000                  |
| 1940 | 5,350          | 330            | 1,770 | 1,280,000                  |
| 1941 | 3,760          | 210            | 1,360 | 985,000                    |
| 1942 | 7,750          | 220            | 2,560 | 1,850,000                  |
| 1943 | 7,320          | 400            | 2,530 | 1,830,000                  |
| 1944 | 9,850          | 220            | 2,230 | 1,620,000                  |
| 1945 | 12,300         | 250            | 3,760 | 2,720,000                  |
| 1946 | 12,800         | 1,230          | 4,380 | 3,170,000                  |
| 1947 | 10,600         | 463            | 2,690 | 1,950,000                  |
| 1948 | 8,890          | 533            | 2,970 | 2,160,000                  |

### *Calendar Year*

|      |         |       |       |           |
|------|---------|-------|-------|-----------|
| 1928 | *29,000 | 1,000 | 7,000 | 5,080,000 |
| 1929 | *23,000 | 1,000 | 7,000 | 5,070,000 |
| 1930 | 24,400  | 730   | 6,380 | 4,620,000 |
| 1931 | 9,900   | 570   | 2,800 | 2,030,000 |
| 1932 | 21,600  | 900   | 5,610 | 4,070,000 |
| 1933 | 15,100  | 1,570 | 6,770 | 4,900,000 |
| 1934 | 13,300  | 500   | 3,340 | 2,420,000 |
| 1935 | 9,950   | 910   | 3,380 | 2,450,000 |
| 1936 | 3,620   | 390   | 1,400 | 1,020,000 |
| 1937 | 19,500  | 400   | 3,250 | 2,350,000 |
| 1938 | 8,160   | 300   | 2,040 | 1,480,000 |
| 1939 | 7,260   | 360   | 2,270 | 1,640,000 |
| 1940 | 5,350   | 210   | 1,830 | 1,330,000 |
| 1941 | 3,760   | 220   | 1,470 | 1,060,000 |
| 1942 | 7,750   | 400   | 2,660 | 1,930,000 |
| 1943 | 7,320   | 260   | 2,250 | 1,630,000 |
| 1944 | 9,850   | 220   | 2,320 | 1,680,000 |
| 1945 | 12,300  | 1,720 | 4,670 | 3,380,000 |
| 1946 | 12,800  | 463   | 3,580 | 2,590,000 |
| 1947 | 10,600  | 536   | 2,640 | 1,910,000 |
| 1948 | 8,890   | 379   | 2,900 | 2,110,000 |

\* Includes the flow at Riverfront, Ark. (St. Francis Bay).

### 5. Right Hand Chute of Little River at Rivervale, Ark.

LOCATION: Staff gage, lat. 35°40'20", long. 90°20'12", in SW  $\frac{1}{4}$  sec. 10, T. 12 N., R. 7 E., on floodway bridge at Rivervale, Poinsett County. Datum of gage is 213.21 feet above mean sea level and 213.48 feet above mean Gulf level.

**DRAINAGE AREA:** 2,115 square miles.

**RECORDS AVAILABLE:** Discharge, 1936-46 (measurements only); January 1947 to December 1948 in files of Corps of Engineers, Memphis District; January 1947 to December 1948 in report of Mississippi River Commission.

**MAXIMUM:** 1936-48: Discharge, 23,000 second-feet June 22, 23, 1945 (gage height, 12.90 feet), from rating curve extended above 16,400 second-feet.

**MINIMUM:** 1947-48: Day: 101 second-feet (65.3 m.g.d.) Oct. 24, 25, 1947.  
7-day: 144 second-feet (93.1 m.g.d.) Oct. 21-27, 1947.

Calendar month: 260 second-feet (168 m.g.d.) October 1947.

Water year: 2,280 second-feet (1,470 m.g.d.) Oct. 1, 1947, to Sept. 30, 1948.

**REMARKS:** Gage-height records October 1938 to December 1948 in files of Corps of Engineers, Memphis District; January 1945 to December 1948 in reports of Mississippi River Commission. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 5 feet.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1947-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1947 |                |                |       |                       |         |           |
| 1948 | 8,030          | 101            | 2,280 | 1.08                  | 14.70   | 1,660,000 |

*Calendar Year*

|      |       |     |       |      |       |           |
|------|-------|-----|-------|------|-------|-----------|
| 1947 | 5,800 | 101 | 1,700 | .804 | 10.91 | 1,230,000 |
| 1948 | 8,030 | 355 | 2,420 | 1.14 | 15.52 | 1,760,000 |

## 6. St. Francis River Floodway Near Marked Tree, Ark.

**LOCATION:** Staff gage; lat. 35°36', long. 90°27', in SE¼ sec. 10, T. 11 N., R. 6 E., at dam of Poinsett County Drainage District 7, 3 miles north of Marked Tree, Poinsett County. Datum of gage is 198.71 feet above Memphis datum or 192.08 feet above mean sea level (Morgan Engineering Company, bench mark).

**RECORDS AVAILABLE:** Discharge, September 1927 to September 1931, July 1934 to September 1948.

**AVERAGE DISCHARGE:** 14 years (1934-48), 3,621 second-feet.

**MAXIMUM:** 1927-31, 1934-48: Discharge, 48,300 second-feet Jan. 26-28, 1937 (gage height, 31.1 feet).

**MINIMUM:** 1927-31,

1934-48: Day: No flow at times in July to November 1934, August to November 1935, June to October 1936, July to December 1939, January, July to December 1940, April to December 1941, June to November 1942, March, July to December 1943, January, February, July to December 1944, September 1945, July to November 1946, August to November 1947, August, September 1948.

7-day: No flow, see above.

Calendar month: No flow, July to October 1934, September, October 1935, August, September 1936, September 1939, September, October 1940, June to October 1941, August 1942, August to December 1943, August to October 1944, September 1946.

Water year: 258 second-feet (167 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Flow diverted from St. Francis River, by-passes Marked Tree, and returns to St. Francis River immediately below Parkin, Arkansas. Zero flow in St. Francis Lake outlet has been maintained at about gage height 18.5 feet since 1934. Flow regulated by Wappapello Reservoir. Records prior to 1934 not summarized due to levee construction and major channel changes.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1935-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|-------|----------------------------|
| 1935 | 787-42                        | 36,200              | 0                   | 6,887 | 4,987,000                  |
| 1936 | 807-42                        | 3,400               | 0                   | 464   | 366,900                    |
| 1937 | 827-38                        | 48,300              | 0                   | 6,808 | 4,928,000                  |
| 1938 | 857-39                        | 22,200              | 25                  | 5,302 | 3,839,000                  |
| 1939 | 877-41                        | 21,800              | 0                   | 4,822 | 3,491,000                  |
| 1940 | 897-44                        | 12,200              | 0                   | 1,507 | 1,094,000                  |
| 1941 | 927-45                        | 2,190               | 0                   | 258   | 186,700                    |
| 1942 | 957-49                        | 12,100              | 0                   | 2,333 | 1,689,000                  |
| 1943 | 977-49                        | 8,750               | 0                   | 1,777 | 1,287,000                  |
| 1944 | 1007-53                       | 16,800              | 0                   | 1,879 | 1,364,000                  |
| 1945 | 1037-50                       | 36,400              | 0                   | 8,517 | 6,166,000                  |
| 1946 | 1057-50                       | 16,000              | 0                   | 4,619 | 3,344,000                  |
| 1947 | 1087-50                       | 8,410               | 0                   | 2,194 | 1,589,000                  |
| 1948 |                               | 12,700              | 0                   | 3,323 | 2,412,000                  |

*Calendar Year*

|      |         |        |     |       |           |
|------|---------|--------|-----|-------|-----------|
| 1935 | 787-42  | 36,200 | 0   | 6,771 | 4,768,000 |
| 1936 | 807-42  | 4,350  | 0   | 859   | 623,900   |
| 1937 | 827-38  | 48,300 | 740 | 7,002 | 5,069,000 |
| 1938 | 857-39  | 22,200 | 25  | 4,785 | 3,464,000 |
| 1939 | 877-41  | 21,800 | 0   | 4,701 | 3,403,000 |
| 1940 | 897-44  | 12,200 | 0   | 1,492 | 1,083,000 |
| 1941 | 927-45  | 2,190  | 0   | 309   | 224,000   |
| 1942 | 957-49  | 12,100 | 0   | 2,423 | 1,754,000 |
| 1943 | 977-49  | 8,750  | 0   | 1,634 | 1,183,000 |
| 1944 | 1007-53 | 16,800 | 0   | 1,880 | 1,365,000 |
| 1945 | 1037-50 | 36,400 | 0   | 9,110 | 6,595,000 |
| 1946 | 1057-50 | 16,000 | 0   | 4,408 | 3,191,000 |
| 1947 | 1087-50 | 8,410  | 0   | 2,136 | 1,546,000 |
| 1948 |         |        |     |       |           |

#### 7. St. Francis Bay at Riverfront, Ark.

LOCATION: Water-stage recorder, lat. 35°15'34", long. 90°40'46", in W½ sec. 4, T. 7 N., R. 4 E., at bridge on U. S. Highway 64, at Riverfront, Cross County, and 7 miles west of Parkin. Datum of gage is 171.22 feet above mean sea level and 171.27 feet above mean Gulf level.

RECORDS AVAILABLE: Discharge, measurements only, along railroad crossing St. Francis Basin, 1890 (before completion of Mississippi River levee); ¼ to 25 miles above mouth of St. Francis River, 1858-1916 (measurements only); at Riverfront 1928-32 (measurements only), January 1933 to December 1948 (1933, 1934 fragmentary) in reports of Mississippi River Commission. Chemical quality, see analysis page 165.

MEAN ANNUAL RUNOFF: 2,890,000 acre-feet.

AVERAGE DISCHARGE: 13 years (1936-48), 3,990 second-feet.

MAXIMUM: 1928-48: Discharge observed, 54,100 second-feet Feb. 2, 1937; maximum gage height, 38.20 feet Feb. 4-6, 1937.

MINIMUM: 1935-48: Day: No flow, Nov. 17-26, 1941, due to backwater.

7-day: No flow, see above.

Calendar month: 20 second-feet (12.9 m.g.d.) November 1941.

Water year: 343 second-feet (222 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

**REMARKS:** Prior to Aug. 20, 1948, staff and wire-weight gages at same site and datum. Gage-height records, Oct. 26, 1916, to Feb. 18, 1922 (Morgan Engineering Company gage); intermittently 1929 to 1935 and 1935 to date are in files of Corps of Engineers, Memphis District; 1936-45 in reports of Mississippi River Commission. The greater portion of St. Francis River flood flows passes through St. Francis River floodway and St. Francis Bay. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 30 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1935-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|------|----------------|----------------|-------|----------------------------|
| 1935 | .....          | .....          | ..... | .....                      |
| 1936 | 5,240          | 30             | 742   | 539,000                    |
| 1937 | 52,800         | 40             | 8,100 | 5,860,000                  |
| 1938 | 22,300         | 310            | 5,880 | 4,260,000                  |
| 1939 | 22,200         | 40             | 5,460 | 3,950,000                  |
| 1940 | 11,700         | 20             | 1,750 | 1,270,000                  |
| 1941 | 2,100          | 20             | 344   | 249,000                    |
| 1942 | 12,700         | 0              | 2,830 | 2,050,000                  |
| 1943 | 8,700          | 40             | 2,080 | 1,510,000                  |
| 1944 | 18,700         | 50             | 2,390 | 1,740,000                  |
| 1945 | 37,900         | 40             | 9,660 | 6,990,000                  |
| 1946 | 20,400         | 100            | 5,980 | 4,830,000                  |
| 1947 | 8,890          | 80             | 2,540 | 1,840,000                  |
| 1948 | 16,400         | 72             | 4,050 | 2,940,000                  |

*Calendar Year*

|      |        |     |        |           |
|------|--------|-----|--------|-----------|
| 1935 | 31,600 | 70  | 6,890  | 4,990,000 |
| 1936 | 5,240  | 30  | 1,140  | 828,000   |
| 1937 | 52,800 | 920 | 8,300  | 6,010,000 |
| 1938 | 22,300 | 310 | 5,320  | 3,850,000 |
| 1939 | 22,200 | 20  | 5,350  | 3,870,000 |
| 1940 | 11,700 | 30  | 1,750  | 1,270,000 |
| 1941 | 2,100  | 0   | 350    | 253,000   |
| 1942 | 12,700 | 40  | 2,950  | 2,140,000 |
| 1943 | 8,700  | 70  | 1,950  | 1,410,000 |
| 1944 | 18,700 | 40  | 2,420  | 1,760,000 |
| 1945 | 37,900 | 250 | 10,400 | 7,530,000 |
| 1946 | 20,400 | 85  | 5,510  | 3,990,000 |
| 1947 | 8,890  | 72  | 2,500  | 1,810,000 |
| 1948 | 16,400 | 106 | 4,240  | 3,080,000 |

## WHITE RIVER BASIN

### 8. White River at Beaver, Ark.

**LOCATION:** Wire-weight gage, lat. 36°28'20", long. 93°45'55", in sec. 20, T. 21 N., R. 26 W., at Missouri & North Arkansas Railway bridge, a quarter of a mile east of Beaver, Carroll County, 2¾ miles upstream from Leatherwood Creek. Datum of gage is 883.04 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 1,238 square miles.

**RECORDS AVAILABLE:** Discharge, July 1909 to December 1910, May 1923 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1946.

**MEAN ANNUAL RUNOFF:** 17.65 inches or 1,166,000 acre-feet.

**AVERAGE DISCHARGE:** 26 years, 1,610 second-feet.

**MAXIMUM:** 1909-10, 1923-48: Discharge, 105,000 second-feet May 12, 1943 (gage height, 42.33 feet).

Maximum discharge known, that of May 12, 1943.

## SURFACE-WATER RESOURCES OF ARKANSAS

MINIMUM: 1909-10,

1923-48: Day: 3.0 second-feet (1.9 m.g.d.) Aug. 31, Sept. 1, 1936.

7-day: 3.74 second-feet (2.4 m.g.d.) Aug. 26 to Sept. 1, 1936.

Calendar month: 5.13 second-feet (3.3 m.g.d.) August 1936.

Water year: 492 second-feet (318 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Bankfull stage, about 30 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1910, 1924-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1910 | 567-28                        | 21,500              | 42                  | 757   | 0.611                 | 8.29    | 548,000   |
| 1924 | 587-31                        | 21,500              | 90                  | 1,260 | 1.02                  | 13.88   | 911,000   |
| 1925 | 607-28                        | 22,500              | 33                  | 716   | .578                  | 7.85    | 518,000   |
| 1926 | 627-28                        | 13,900              | 44                  | 1,090 | .880                  | 11.95   | 662,000   |
| 1927 | *647-29                       | 69,400              | 182                 | 3,650 | 2.95                  | 40.04   | 2,640,000 |
| 1928 | 667-28                        | 46,100              | 121                 | 3,060 | 2.47                  | 33.62   | 2,220,000 |
| 1929 | 687-26                        | 29,300              | 95                  | 2,500 | 2.02                  | 27.42   | 1,810,000 |
| 1930 | 702-44                        | 23,000              | 42                  | 1,010 | .816                  | 11.08   | 729,000   |
| 1931 | 717-37                        | 21,900              | 52                  | 1,220 | .985                  | 13.37   | 884,000   |
| 1932 | 732-47                        | 16,500              | 37                  | 940   | .759                  | 10.33   | 682,000   |
| 1933 | 747-45                        | 36,400              | 47                  | 1,800 | 1.45                  | 19.68   | 1,300,000 |
| 1934 | 762-44                        | 12,800              | 46                  | 1,141 | .922                  | 12.52   | 826,100   |
| 1935 | 787-49                        | 38,100              | 59                  | 2,677 | 2.16                  | 29.32   | 1,938,000 |
| 1936 | 807-49                        | 11,000              | 3.0                 | 492   | .397                  | 5.40    | 357,000   |
| 1937 | 827-45                        | 19,300              | 82                  | 1,529 | 1.24                  | 16.83   | 1,107,000 |
| 1938 | 857-46                        | 38,800              | 48                  | 1,918 | 1.55                  | 21.04   | 1,388,000 |
| 1939 | 877-59                        | 17,400              | 21                  | 1,080 | .872                  | 11.84   | 782,200   |
| 1940 | 897-51                        | 13,500              | 24                  | 509   | .411                  | 5.59    | 369,900   |
| 1941 | 927-52                        | 34,500              | 35                  | 1,164 | .940                  | 12.78   | 842,400   |
| 1942 | 957-56                        | 23,600              | 88                  | 1,695 | 1.37                  | 18.57   | 1,227,000 |
| 1943 | 977-56                        | 80,400              | 39                  | 2,308 | 1.86                  | 25.32   | 1,671,000 |
| 1944 | 1007-59                       | 28,300              | 55                  | 1,236 | .998                  | 13.59   | 896,800   |
| 1945 | 1037-57                       | 90,600              | 69                  | 3,311 | 2.67                  | 36.31   | 2,397,000 |
| 1946 | 1057-60                       | 51,700              | 38                  | 1,695 | 1.37                  | 18.57   | 1,227,000 |
| 1947 | 1087-60                       | 24,600              | 33                  | 1,747 | 1.41                  | 19.15   | 1,265,000 |
| 1948 |                               | 32,300              | 34                  | 1,359 | 1.10                  | 14.96   | 986,500   |

*Calendar Year*

|      |         |        |     |       |      |       |           |
|------|---------|--------|-----|-------|------|-------|-----------|
| 1910 | 567-28  | 21,500 | 76  | 715   | .578 | 7.85  | 517,000   |
| 1924 | 587-31  | 22,500 | 82  | 1,090 | .880 | 11.98 | 786,000   |
| 1925 | 607-28  | 13,200 | 33  | 869   | .702 | 9.53  | 629,000   |
| 1926 | 627-28  | 18,200 | 44  | 1,540 | 1.24 | 16.83 | 987,000   |
| 1927 | *647-29 | 69,400 | 182 | 3,760 | 3.04 | 41.27 | 2,720,000 |
| 1928 | 667-28  | 36,800 | 114 | 2,290 | 1.85 | 25.18 | 1,660,000 |
| 1929 | 687-26  | 29,300 | 85  | 2,460 | 1.99 | 27.01 | 1,780,000 |
| 1930 | 702-44  | 23,000 | 42  | 1,090 | .880 | 11.95 | 792,000   |
| 1931 | 717-37  | 21,900 | 47  | 1,100 | .889 | 12.07 | 797,000   |
| 1932 | 732-47  | 22,700 | 37  | 1,080 | .872 | 11.87 | 784,000   |
| 1933 | 747-45  | 36,400 | 64  | 1,930 | 1.56 | 21.18 | 1,400,000 |
| 1934 | 762-44  | 12,200 | 46  | 1,092 | .882 | 11.97 | 790,800   |
| 1935 | 787-49  | 38,100 | 59  | 2,583 | 2.09 | 28.37 | 1,870,000 |
| 1936 | 807-49  | 12,300 | 3.0 | 588   | .475 | 6.47  | 426,500   |
| 1937 | 827-45  | 19,300 | 82  | 1,400 | 1.13 | 15.34 | 1,014,000 |
| 1938 | 857-46  | 38,800 | 40  | 1,786 | 1.44 | 19.55 | 1,293,000 |
| 1939 | 877-59  | 17,400 | 21  | 1,075 | .868 | 11.78 | 778,600   |
| 1940 | 897-51  | 13,500 | 74  | 619   | .500 | 6.80  | 449,100   |
| 1941 | 927-52  | 34,500 | 35  | 1,638 | 1.32 | 17.97 | 1,186,000 |
| 1942 | 957-56  | 43,800 | 75  | 1,913 | 1.55 | 20.97 | 1,385,000 |
| 1943 | 977-56  | 80,400 | 39  | 1,506 | 1.22 | 16.54 | 1,091,000 |
| 1944 | 1007-59 | 28,300 | 59  | 1,251 | 1.01 | 13.75 | 907,900   |
| 1945 | 1037-57 | 90,600 | 69  | 3,486 | 2.82 | 38.23 | 2,523,000 |
| 1946 | 1057-60 | 51,700 | 34  | 2,320 | 1.87 | 25.42 | 1,679,000 |
| 1947 | 1087-60 | 13,800 | 33  | 946   | .764 | 10.38 | 685,100   |
| 1948 |         |        |     |       |      |       |           |

\* Revised figures of daily discharge for high-water period and yearly summaries contained in Water-Supply Paper 1007, p. 59.

## 8. WHITE RIVER AT BEAVER, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-foot) | Specific conductance (°F.) | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------------------|---------------|
|                    |                              |                            |     |                            |           |               |              |                |             |               |                                 |                            |               |                            | Total                         | Non-carbonate |
| 1945:              |                              |                            |     |                            |           |               |              |                |             |               |                                 |                            |               |                            |                               |               |
| Oct. 1-10          | 3,629                        | 16.8                       | ... | ...                        | ...       | ...           | 29           | 3.6            | ...         | 0.3           | 87                              | 7.0                        | 5.5           | 1.8                        | 108                           | 16            |
| Oct. 11-20         | 626                          | 18.7                       | ... | ...                        | ...       | ...           | 35           | 3.8            | ...         | 1.2           | 109                             | 7.0                        | 5.5           | 1.5                        | 120                           | 14            |
| Oct. 21-31         | 1,184                        | 19.0                       | ... | ...                        | ...       | ...           | 33           | 4.5            | 2.9         | ...           | 109                             | 7.0                        | 7.0           | 1.0                        | 120                           | 12            |
| Nov. 1-10          | 484                          | 19.7                       | ... | ...                        | ...       | ...           | 34           | 3.8            | ...         | ...           | 116                             | 2.7                        | 2.5           | ...                        | 105                           | 10            |
| Nov. 11-20         | 738                          | 18.5                       | ... | ...                        | ...       | ...           | 32           | 3.1            | ...         | ...           | 106                             | 2.3                        | 3.2           | ...                        | 109                           | 6             |
| Nov. 21-30         | 729                          | 14.9                       | ... | ...                        | ...       | ...           | 26           | 3.1            | ...         | ...           | 81                              | 4.2                        | 4.5           | ...                        | 94                            | 11            |
| Dec. 1-10          | 373                          | 17.1                       | ... | ...                        | ...       | ...           | 26           | 2.8            | ...         | ...           | 94                              | 6.0                        | 6.0           | 1.5                        | 100                           | 76            |
| Dec. 11-20         | 231                          | 18.4                       | ... | ...                        | ...       | ...           | 29           | 3.0            | ...         | ...           | 104                             | 5.7                        | 5.0           | 1.2                        | 105                           | 85            |
| Dec. 21-31         | 185                          | 19.5                       | ... | ...                        | ...       | ...           | 32           | 3.0            | ...         | ...           | 110                             | 5.6                        | 5.0           | 1.8                        | 114                           | 90            |
| 1946:              |                              |                            |     |                            |           |               |              |                |             |               |                                 |                            |               |                            |                               |               |
| Jan. 1-10          | 3,264                        | 16.4                       | ... | ...                        | ...       | ...           | 24           | 3.1            | ...         | ...           | 85                              | 5.5                        | 5.5           | 1.2                        | 103                           | 73            |
| Jan. 11-20         | 4,140                        | 11.5                       | ... | ...                        | ...       | ...           | 21           | 2.5            | ...         | ...           | 80                              | 4.6                        | 4.0           | 1.5                        | 80                            | 63            |
| Jan. 21-31         | 1,668                        | 13.7                       | ... | ...                        | ...       | ...           | 17           | 2.2            | ...         | ...           | 72                              | 6.1                        | 5.5           | 1.5                        | 87                            | 51            |
| Feb. 1-10          | 1,341                        | 14.2                       | ... | ...                        | ...       | ...           | 22           | 2.8            | ...         | ...           | 74                              | 3.1                        | 5.0           | 2.2                        | 92                            | 66            |
| Feb. 11-20         | 7,470                        | 11.9                       | ... | ...                        | ...       | ...           | 17           | 2.4            | ...         | ...           | 62                              | 2.6                        | 5.0           | 1.8                        | 91                            | 52            |
| Feb. 21-28         | 2,304                        | 13.7                       | ... | ...                        | ...       | ...           | 22           | 2.0            | ...         | ...           | 71                              | 2.8                        | 4.5           | ...                        | 94                            | 63            |
| Mar. 1-10          | 1,070                        | 15.5                       | ... | ...                        | ...       | ...           | 25           | 3.4            | ...         | ...           | 87                              | 5.9                        | 3.0           | 1.8                        | 94                            | 76            |
| Mar. 11-20         | 1,612                        | 15.7                       | ... | ...                        | ...       | ...           | 22           | 1.3            | ...         | ...           | 80                              | 6.3                        | 3.2           | 1.5                        | 92                            | 60            |
| Mar. 21-31         | 1,640                        | 11.5                       | ... | ...                        | ...       | ...           | 16           | 1.7            | ...         | ...           | 62                              | 5.4                        | 3.2           | ...                        | 78                            | 52            |
| Apr. 1-10          | 1,076                        | 12.2                       | 8.6 | 7.9                        | 0.20      | 0.7           | 15           | 4.3            | 3.7         | 1.4           | 65                              | 4.8                        | 3.0           | 1.0                        | 73                            | 58            |
| Apr. 11-20         | 1,199                        | 13.1                       | ... | ...                        | ...       | ...           | 18           | 2.9            | ...         | ...           | 69                              | 5.2                        | 2.8           | 1.0                        | 80                            | 57            |
| Apr. 21-30         | 2,318                        | 11.4                       | ... | ...                        | ...       | ...           | 15           | 2.1            | ...         | ...           | 61                              | 5.3                        | 3.0           | 1.5                        | 82                            | 48            |
| May 1-10           | 2,771                        | 10.3                       | ... | ...                        | ...       | ...           | 13           | 1.9            | ...         | ...           | 52                              | 5.2                        | 3.0           | 1.0                        | 80                            | 40            |
| May 11-20          | 3,568                        | 13.7                       | ... | ...                        | ...       | ...           | 18           | 2.6            | ...         | ...           | 73                              | 6.0                        | 2.5           | 1.0                        | 91                            | 56            |
| May 21-31          | 13,220                       | 13.9                       | ... | ...                        | ...       | ...           | 15           | 2.9            | ...         | ...           | 76                              | 4.4                        | 3.0           | 2.0                        | 93                            | 49            |

— Continued.



## 8. WHITE RIVER AT BEAVER, ARK.—Continued

Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Temperature (°F) | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------------------|---------------|
|                    |                              |                                   |                  |     |                            |           |               |              |                |             |               |                                 |                            |               |                            | Total                         | Non-carbonate |
| June 1-10          | 1,736                        | 15.4                              | ...              | ... | ...                        | ...       | ...           | 23           | 2.5            | 6.7         | ...           | 87                              | 5.3                        | 3.0           | 1.5                        | 105                           | 68            |
| June 11-20         | 760                          | 17.1                              | ...              | ... | ...                        | ...       | ...           | 29           | 3.5            | 2.3         | ...           | 108                             | 2.1                        | 3.0           | 1.2                        | 105                           | 87            |
| June 21-30         | 345                          | 19.2                              | ...              | ... | ...                        | ...       | ...           | 31           | 3.3            | 6.4         | ...           | 115                             | 4.6                        | 3.5           | 1.0                        | 112                           | 91            |
| July 1-10          | 239                          | 21.3                              | ...              | ... | ...                        | ...       | ...           | 35           | 4.1            | 8.0         | ...           | 134                             | 5.9                        | 3.2           | 1.0                        | 129                           | 104           |
| July 11-20         | 114                          | 21.4                              | ...              | ... | ...                        | ...       | ...           | 36           | 3.7            | 8.0         | ...           | 135                             | 6.6                        | 3.2           | .5                         | 126                           | 105           |
| July 21-31         | 169                          | 21.4                              | ...              | ... | ...                        | ...       | ...           | 36           | 3.4            | 10          | ...           | 137                             | 6.9                        | 4.0           | .5                         | 128                           | 104           |
| Aug. 1-10          | 201                          | 19.7                              | ...              | ... | ...                        | ...       | ...           | 30           | 3.1            | 7.4         | ...           | 106                             | 8.6                        | 4.8           | 1.5                        | 121                           | 88            |
| Aug. 11-20         | 83                           | 19.1                              | ...              | ... | ...                        | ...       | ...           | 31           | 3.1            | 8.0         | ...           | 114                             | 7.3                        | 3.8           | 1.2                        | 118                           | 90            |
| Aug. 21-31         | 54                           | 21.1                              | ...              | ... | ...                        | ...       | ...           | 33           | 3.6            | 7.6         | ...           | 122                             | 6.8                        | 4.0           | 1.2                        | 123                           | 97            |
| Sept. 1-10         | 46                           | 21.2                              | ...              | ... | ...                        | ...       | ...           | 34           | 3.7            | 9.2         | ...           | 129                             | 7.6                        | 4.0           | 1.0                        | 125                           | 100           |
| Sept. 11-20        | 41                           | 21.6                              | ...              | ... | ...                        | ...       | ...           | 38           | 4.5            | 5.4         | ...           | 136                             | 7.4                        | 4.0           | .2                         | 126                           | 113           |
| Sept. 21-30        | 47                           | 20.9                              | ...              | ... | ...                        | ...       | ...           | 36           | 3.9            | 7.7         | ...           | 132                             | 6.3                        | 5.0           | 1.0                        | 128                           | 106           |
| Average            | 1,695                        | 16.7                              | ...              | ... | ...                        | ...       | ...           | 26           | 3.1            | 5.6         | ...           | 95                              | 5.4                        | 4.1           | 1.2                        | 104                           | 79            |

<sup>1</sup> K × 10<sup>5</sup> at 25° C.

## 8. WHITE RIVER AT BEAVER, ARK.—Continued

*Temperature (° F.) of Water of White River, Water Year October 1945 to September 1946*

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

## 9. White River Near Flippin, Ark.

**LOCATION:** Water-stage recorder, lat. 36°18'50", long. 92°33'20", in NE¼ sec. 10, T. 19 N., R. 15 W., 3 miles northeast of Flippin, Marion County, and 11 miles upstream from Crooked Creek. Datum of gage is 419.66 feet above mean sea level, datum of 1929 (Corps of Engineers, bench mark).

**DRAINAGE AREA:** 6,067 square miles.

**RECORDS AVAILABLE:** Discharge, October 1928 to September 1948. Chemical quality, spot samples collected 1945-47, see analysis page 166. Daily chemical analyses and water temperatures, October 1947 to September 1948.

**MEAN ANNUAL RUNOFF:** 14.38 inches or 4,654,000 acre-feet.

**AVERAGE DISCHARGE:** 20 years, 6,429 second-feet.

**MAXIMUM:** 1928-48: Discharge, 215,000 second-feet Apr. 17, 1945 (gage height, 39.82 feet).

Maximum stage known, 45.4 feet Apr. 16, 1927, original site and datum, or about 41 feet, present site and datum (discharge, 240,000 second-feet, from data of Corps of Engineers).

Water year: 2,206 second-feet (1,430 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Some fluctuation at low water caused by power plant at Forsyth, Missouri. Prior to Dec. 21, 1938, staff gage at site 1½ miles upstream, datum of 1.52 feet higher than present gage. Bankfull stage, about 36 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929-48

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean   | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|--------|-----------------------|---------|-----------|
|      |                               |                |                |        |                       | Inches  | Acre-feet |
| 1929 | 687-27                        | 68,900         | 518            | 9,100  | 1.50                  | 20.36   | 6,590,000 |
| 1930 | 702-46                        | 49,600         | 218            | 4,760  | .785                  | 10.66   | 3,440,000 |
| 1931 | 717-39                        | 31,300         | 384            | 5,230  | .862                  | 11.70   | 3,790,000 |
| 1932 | 732-49                        | 43,700         | 190            | 3,980  | .656                  | 8.93    | 2,900,000 |
| 1933 | 747-47                        | 108,000        | 138            | 6,370  | 1.05                  | 14.25   | 4,610,000 |
| 1934 | 762-46                        | 22,700         | 134            | 3,299  | .544                  | 7.38    | 2,388,000 |
| 1935 | 787-51                        | 155,000        | 246            | 10,350 | 1.71                  | 23.21   | 7,491,000 |
| 1936 | 807-51                        | 27,500         | 108            | 2,206  | .364                  | 4.95    | 1,601,000 |
| 1937 | 827-47                        | 58,900         | 372            | 7,334  | 1.21                  | 16.42   | 5,310,000 |
| 1938 | 857-49                        | 132,000        | 377            | 7,719  | 1.27                  | 17.24   | 5,588,000 |
| 1939 | 877-62                        | 53,100         | 234            | 6,446  | 1.06                  | 14.39   | 4,666,000 |
| 1940 | 897-54                        | 49,700         | 310            | 2,831  | .467                  | 6.36    | 2,055,000 |
| 1941 | 927-55                        | 111,000        | 234            | 4,636  | .764                  | 10.37   | 3,356,000 |
| 1942 | 957-59                        | 62,600         | 413            | 7,160  | 1.18                  | 16.01   | 5,184,000 |
| 1943 | 977-59                        | 197,000        | 400            | 10,320 | 1.70                  | 23.11   | 7,468,000 |
| 1944 | 1007-62                       | 35,000         | 422            | 4,388  | .723                  | 9.82    | 3,186,000 |
| 1945 | 1037-60                       | 211,000        | 388            | 13,790 | 2.27                  | 30.86   | 9,985,000 |
| 1946 | 1057-63                       | 71,400         | 293            | 6,663  | 1.10                  | 14.92   | 4,824,000 |
| 1947 | 1087-63                       | 68,300         | 262            | 6,968  | 1.15                  | 15.58   | 5,044,000 |
| 1948 |                               | 57,700         | 276            | 5,035  | .830                  | 11.32   | 3,655,000 |

## Calendar Year

|      |         |         |     |        |      |       |            |
|------|---------|---------|-----|--------|------|-------|------------|
| 1929 | 687-27  | 68,900  | 316 | 9,140  | 1.51 | 20.50 | 6,620,000  |
| 1930 | 702-46  | 49,600  | 218 | 4,860  | .800 | 10.86 | 3,520,000  |
| 1931 | 717-39  | 31,300  | 384 | 4,710  | .776 | 10.53 | 3,410,000  |
| 1932 | 732-49  | 54,400  | 138 | 4,390  | .724 | 9.85  | 3,190,000  |
| 1933 | 747-47  | 108,000 | 328 | 6,390  | 1.05 | 14.25 | 4,625,000  |
| 1934 | 762-46  | 22,700  | 134 | 3,212  | .529 | 7.18  | 2,325,000  |
| 1935 | 787-51  | 155,000 | 246 | 10,650 | 1.76 | 23.89 | 7,711,000  |
| 1936 | 807-51  | 27,500  | 108 | 2,561  | .422 | 5.74  | 1,859,000  |
| 1937 | 827-47  | 58,900  | 372 | 6,426  | 1.06 | 14.39 | 4,652,000  |
| 1938 | 857-49  | 132,000 | 234 | 7,759  | 1.28 | 17.38 | 5,617,000  |
| 1939 | 877-62  | 53,100  | 259 | 6,127  | 1.01 | 13.71 | 4,436,000  |
| 1940 | 897-54  | 49,700  | 325 | 3,184  | .525 | 7.14  | 2,311,000  |
| 1941 | 927-55  | 111,000 | 234 | 6,979  | 1.15 | 15.61 | 5,052,000  |
| 1942 | 957-59  | 106,000 | 413 | 7,358  | 1.21 | 16.46 | 5,328,000  |
| 1943 | 977-59  | 197,000 | 400 | 7,483  | 1.23 | 16.76 | 5,418,000  |
| 1944 | 1007-62 | 35,000  | 422 | 4,491  | .740 | 10.06 | 3,260,000  |
| 1945 | 1037-60 | 211,000 | 388 | 14,330 | 2.36 | 32.07 | 10,380,000 |
| 1946 | 1057-63 | 71,400  | 272 | 8,870  | 1.46 | 19.85 | 1,118,000  |
| 1947 | 1087-63 | 50,500  | 262 | 4,035  | .665 | 9.03  | 2,921,000  |
| 1948 | .....   |         |     |        |      |       |            |

## 9. WHITE RIVER NEAR FLIPPIN, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-20          | 858                          | 331                               | ... | ...                        | ...       | ...           | 27           | 16             | 16          | ...           | 190                             | 4.0                        | 4.5           | ...          | 1.0                        | 174              | 133                           | 0             |
| Oct. 21-31         | 342                          | 315                               | ... | ...                        | ...       | ...           | 34           | 17             | 7.8         | ...           | 196                             | 4.3                        | 4.5           | ...          | .2                         | 178              | 155                           | 0             |
| Nov. 1-10          | 678                          | 324                               | ... | ...                        | ...       | ...           | 38           | 15             | 6.2         | ...           | 191                             | 6.3                        | 4.5           | ...          | .8                         | 172              | 156                           | 0             |
| Nov. 11-20         | 832                          | 311                               | ... | ...                        | ...       | ...           | 40           | 14             | 5.2         | ...           | 189                             | 5.6                        | 5.0           | ...          | 1.0                        | 172              | 157                           | 3             |
| Nov. 21-30         | 915                          | 324                               | ... | ...                        | ...       | ...           | 43           | 15             | 6.1         | ...           | 203                             | 6.8                        | 5.5           | ...          | 1.2                        | 185              | 169                           | 3             |
| Dec. 1-10          | 997                          | 323                               | ... | ...                        | ...       | ...           | 42           | 15             | 5.2         | ...           | 196                             | 7.2                        | 6.5           | ...          | .8                         | 178              | 166                           | 6             |
| Dec. 11-20         | 1,312                        | 323                               | ... | ...                        | ...       | ...           | 42           | 16             | 10          | ...           | 204                             | 16                         | 5.5           | ...          | 1.5                        | 192              | 171                           | 3             |
| Dec. 21-31         | 1,096                        | 318                               | ... | ...                        | ...       | ...           | 41           | 15             | 6.3         | ...           | 192                             | 9.4                        | 6.0           | ...          | 2.2                        | 179              | 164                           | 6             |
| 1948:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 11,550                       | 230                               | ... | ...                        | ...       | ...           | 28           | 9.8            | 7.8         | ...           | 132                             | 10                         | 3.5           | ...          | 4.1                        | 132              | 110                           | 2             |
| Jan. 11-20         | 2,311                        | 275                               | ... | ...                        | ...       | ...           | 36           | 12             | 8.6         | ...           | 158                             | 17                         | 4.5           | ...          | 5.4                        | 161              | 139                           | 10            |
| Jan. 21-31         | 1,360                        | 302                               | ... | ...                        | ...       | ...           | 39           | 12             | 8.3         | ...           | 176                             | 7.7                        | 5.5           | ...          | 5.8                        | 169              | 147                           | 2             |
| Feb. 1-10          | 1,250                        | 304                               | ... | ...                        | ...       | ...           | 40           | 13             | 5.3         | ...           | 180                             | 6.2                        | 5.5           | ...          | 3.5                        | 168              | 153                           | 6             |
| Feb. 11-20         | 6,470                        | 287                               | ... | ...                        | ...       | ...           | 36           | 13             | 5.8         | ...           | 170                             | 7.6                        | 4.3           | ...          | 2.5                        | 158              | 143                           | 4             |
| Feb. 21-29         | 7,504                        | 277                               | ... | ...                        | ...       | ...           | 34           | 12             | 6.7         | ...           | 162                             | 7.5                        | 4.2           | ...          | 3.0                        | 152              | 134                           | 1             |
| Mar. 1-10          | 21,850                       | 236                               | ... | ...                        | ...       | ...           | 30           | 10             | 7.3         | ...           | 138                             | 11                         | 3.5           | ...          | 3.0                        | 142              | 116                           | 3             |
| Mar. 11-20         | 11,209                       | 253                               | ... | ...                        | ...       | ...           | 31           | 10             | 13          | ...           | 152                             | 13                         | 4.0           | ...          | 3.5                        | 149              | 118                           | 0             |
| Mar. 21-31         | 18,060                       | 243                               | ... | ...                        | ...       | ...           | 30           | 10             | 7.8         | ...           | 142                             | 9.1                        | 3.5           | ...          | 2.7                        | 143              | 116                           | 0             |
| Apr. 1-10          | 7,744                        | 271                               | ... | ...                        | ...       | ...           | 35           | 11             | 5.3         | ...           | 152                             | 9.2                        | 6.2           | ...          | 3.0                        | 154              | 133                           | 8             |
| Apr. 11-20         | 3,603                        | 296                               | ... | ...                        | ...       | ...           | 38           | 13             | 3.5         | ...           | 168                             | 6.4                        | 6.8           | ...          | 2.5                        | 163              | 143                           | 11            |
| Apr. 21-30         | 2,682                        | 293                               | ... | ...                        | ...       | ...           | 37           | 13             | 5.3         | ...           | 172                             | 6.3                        | 6.2           | ...          | 1.3                        | 158              | 146                           | 5             |
| May 1-10           | 3,334                        | 300                               | ... | ...                        | ...       | ...           | 38           | 13             | 7.3         | ...           | 175                             | 5.2                        | 9.6           | ...          | 1.7                        | 186              | 148                           | 4             |
| May 11-20          | 8,818                        | 267                               | ... | ...                        | ...       | ...           | 36           | 9.5            | 7.6         | ...           | 163                             | 5.3                        | 9.6           | ...          | 1.7                        | 160              | 129                           | 4             |
| May 21-31          | 3,336                        | 263                               | ... | ...                        | ...       | ...           | 35           | 9.0            | 6.1         | ...           | 147                             | 4.6                        | 8.6           | ...          | 1.0                        | 138              | 124                           | 4             |

— Continued.

## 9. WHITE RIVER NEAR FLIPPIN, ARK.—Continued

Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948

| Date of collection | Mean discharge (second-foot) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| June 1-10          | 1,540                        | 274                  | ... | ...                        | ...       | ...           | 33           | 12             | ...         | 9.5           | 161                             | 6.4                        | 8.0           | ...          | 3.0                        | 151              | 132                           | 0             |
| June 11-20         | 11,030                       | 252                  | ... | ...                        | ...       | ...           | 26           | 12             | 13          | 13            | 152                             | 6.5                        | 8.0           | ...          | .8                         | 142              | 114                           | 0             |
| June 21-30         | 14,630                       | 248                  | ... | ...                        | ...       | ...           | 29           | 9.9            | ...         | 14            | 146                             | 7.9                        | 8.0           | ...          | 5.2                        | 157              | 113                           | 0             |
| July 1-10          | 7,802                        | 276                  | ... | ...                        | ...       | ...           | 33           | 10             | ...         | 9.9           | 160                             | 6.9                        | 3.2           | ...          | 2.7                        | 163              | 123                           | 0             |
| July 11-20         | 4,676                        | 286                  | ... | ...                        | ...       | ...           | 36           | 11             | ...         | 6.5           | 164                             | 6.7                        | 3.6           | ...          | 3.3                        | 160              | 135                           | 1             |
| July 21-31         | 4,309                        | 233                  | ... | 9.6                        | 0.04      | 0.2           | 38           | 11             | 7.2         | 1.2           | 177                             | 5.0                        | 3.8           | 0.0          | 1.9                        | 168              | 140                           | 0             |
| Aug. 1-10          | 2,179                        | 298                  | ... | ...                        | ...       | ...           | 36           | 13             | ...         | 10            | 188                             | 4.2                        | 3.8           | ...          | 2.2                        | 175              | 143                           | 0             |
| Aug. 11-15         | 5,662                        | 297                  | ... | ...                        | ...       | ...           | 40           | 13             | ...         | 7.5           | 190                             | 4.8                        | 4.5           | ...          | 2.5                        | 175              | 153                           | 0             |
| Aug. 16-20         | 17,900                       | 149                  | ... | ...                        | ...       | ...           | 19           | 4.5            | ...         | 8.7           | 86                              | 9.4                        | 2.5           | ...          | 1.4                        | 117              | 66                            | 0             |
| Aug. 21-31         | 2,406                        | 228                  | ... | ...                        | ...       | ...           | 32           | 8.8            | ...         | 4.5           | 139                             | 5.3                        | 3.5           | ...          | 1.4                        | 135              | 116                           | 2             |
| Sept. 1-10         | 1,667                        | 244                  | 8.5 | 10                         | .01       | .0            | 24           | 10             | 15          | 1.4           | 152                             | 4.2                        | 3.3           | .0           | 1.4                        | 145              | 101                           | 0             |
| Sept. 11-20        | 1,322                        | 257                  | ... | ...                        | ...       | ...           | 36           | 10             | ...         | 7.1           | 160                             | 7.6                        | 4.5           | ...          | 1.2                        | 155              | 131                           | 0             |
| Sept. 21-27        | 726                          | 275                  | ... | ...                        | ...       | ...           | 36           | 13             | ...         | 4.7           | 170                             | 7.7                        | 4.0           | ...          | .6                         | 161              | 143                           | 4             |
| Sept. 28-30        | 387                          | 319                  | ... | ...                        | ...       | ...           | 40           | 13             | ...         | 8.1           | 188                             | 8.4                        | 5.2           | ...          | .8                         | 179              | 153                           | 0             |
| Average            | 5,035                        | 280                  | ... | ...                        | ...       | ...           | 35           | 12             | ...         | 8.0           | 167                             | 7.5                        | 5.2           | ...          | 2.2                        | 160              | 136                           | 2             |

<sup>1</sup> K×10<sup>3</sup> at 25° C.

## WHITE RIVER NEAR FLIPPIN, ARK.—Continued

*Temperature (° F.) of Water of White River, Water Year October 1947 to September 1948*

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

## 10. White River at Calico Rock, Ark.

**LOCATION:** Water-stage recorder, lat. 36°07', long. 92°09', in SW¼ sec. 23, T. 17 N., R. 11 W., at Calico Rock, Izard County, just upstream from Calico Creek. Datum of gage is 317.38 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 9,973 square miles.

**RECORDS AVAILABLE:** Discharge, October 1939 to September 1948. Chemical quality, see analysis page 166.

**MEAN ANNUAL RUNOFF:** 15.03 inches or 7,993,000 acre-feet.

**AVERAGE DISCHARGE:** 9 years, 11,040 second-feet.

**MAXIMUM:** 1939-48: Discharge, 310,000 second-feet Apr. 16, 1945 (gage height, 48.84 feet).

Maximum stage known, 51.9 feet, present datum, Jan. 31, 1916, from records of U. S. Weather Bureau.

**MINIMUM:** 1939-48: Day: 580 second-feet (375 m.g.d.) Sept. 29, 1943.

7-day: 631 second-feet (408 m.g.d.) Aug. 29 to Sept. 4, 1943.

Calendar month: 645 second-feet (417 m.g.d.) October 1943.

Water year: 4,755 second-feet (3,070 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Aug. 14, 1940, staff gage at 1.00 foot higher datum. Gage-height records collected at same site since 1904 are contained in reports of U. S. Weather Bureau. Flow regulated by Norfork Reservoir since June 18, 1943; also slight regulation at low flow by power plant at Forsyth, Missouri. Bankfull stage, about 37 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year | W. S.P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|------------------------------|---------------------|---------------------|--------|----------------------------|
| 1940 | 897-55                       | 87,200              | 1,040               | 4,755  | 3,452,000                  |
| 1941 | 927-56                       | 113,000             | 882                 | 6,811  | 4,931,000                  |
| 1942 | 957-60                       | 116,000             | 1,520               | 12,190 | 8,823,000                  |
| 1943 | 977-60                       | 258,000             | 580                 | 15,250 | 11,040,000                 |
| 1944 | 1007-63                      | 44,200              | 645                 | 6,154  | 4,468,000                  |
| 1945 | 1037-61                      | 292,000             | 825                 | 22,890 | 16,570,000                 |
| 1946 | 1057-64                      | 98,200              | 946                 | 12,480 | 9,035,000                  |
| 1947 | 1087-64                      | 106,000             | 819                 | 10,850 | 7,853,000                  |
| 1948 | .....                        | 63,700              | 963                 | 8,004  | 5,810,000                  |

*Calendar Year*

|      |         |         |       |        |            |
|------|---------|---------|-------|--------|------------|
| 1940 | 897-55  | 87,200  | 983   | 5,152  | 3,740,000  |
| 1941 | 927-56  | 116,000 | 882   | 10,700 | 7,748,000  |
| 1942 | 957-60  | 194,000 | 1,290 | 12,340 | 8,931,000  |
| 1943 | 977-60  | 258,000 | 580   | 10,700 | 7,748,000  |
| 1944 | 1007-63 | 44,200  | 751   | 6,370  | 4,624,000  |
| 1945 | 1037-61 | 292,000 | 907   | 23,910 | 17,310,000 |
| 1946 | 1057-64 | 106,000 | 819   | 15,440 | 11,180,000 |
| 1947 | 1087-64 | 55,900  | 963   | 6,899  | 4,995,000  |
| 1948 | .....   | .....   | ..... | .....  | .....      |

**11. White River at Batesville, Ark.**

LOCATION: Water-stage recorder, lat. 35°46', long. 91°39', in NE¼ sec. 21, T. 13 N., R. 6 W., at Batesville, Independence County, a quarter of a mile upstream from lock and dam 1, and 1 mile downstream from Polk Bayou. Datum of gage is 237.72 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 11,060 square miles.

RECORDS AVAILABLE: Discharge, July 1937 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1946. Spot samples chemical quality, see analysis page 166.

MEAN ANNUAL RUNOFF: 9,245,000 acre-feet.

AVERAGE DISCHARGE: 11 years, 12,770 second-feet.

MAXIMUM: 1937-48: Discharge, 324,000 second-feet Apr. 16, 1945 (gage height, 29.43 feet).

Maximum stage known, occurred during flood of Feb. 1, 1916; a stage of 31.1 feet, original site, was observed during this flood by an employee of Corps of Engineers.

MINIMUM: 1937-48: Day: 780 second-feet (504 m.g.d.) Sept. 30, 1943.

7-day: 837 second-feet (541 m.g.d.) Sept. 25 to Oct. 1, 1943.

Calendar month: 912 second-feet (589 m.g.d.) September 1943.

Water year: 5,237 second-feet (3,380 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

## WHITE RIVER BASIN

51

**REMARKS:** Prior to Jan. 28, 1939, staff gage on upper lock wall of dam 1, same datum. Gage-height records collected at lower lock gage since 1904 are contained in reports of U. S. Weather Bureau. Flow regulated by Norfolk Reservoir since June 18, 1943; also slight regulation at low flow by power plant at Forsyth, Missouri. Bankfull stage, about 16 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-48

*Water Year Ending September 30*

| Year | W. S.P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|------------------------------|---------------------|---------------------|--------|----------------------------|
| 1938 | 857-51                       | 198,000             | 1,340               | 14,410 | 10,430,000                 |
| 1939 | 877-63                       | 158,000             | 1,100               | 13,380 | 9,686,000                  |
| 1940 | 897-56                       | 86,600              | 1,350               | 5,237  | 3,802,000                  |
| 1941 | 927-57                       | 112,000             | 1,220               | 7,097  | 5,138,000                  |
| 1942 | 957-61                       | 110,000             | 1,840               | 13,700 | 9,916,000                  |
| 1943 | 977-61                       | 271,000             | 780                 | 16,800 | 12,160,000                 |
| 1944 | 1007-64                      | 52,600              | 800                 | 7,138  | 5,183,000                  |
| 1945 | 1037-62                      | 303,000             | 956                 | 26,550 | 19,220,000                 |
| 1946 | 1057-65                      | 98,500              | 1,350               | 14,600 | 10,570,000                 |
| 1947 | 1087-65                      | 108,000             | 1,100               | 12,010 | 8,696,000                  |
| 1948 | .....                        | 68,700              | 1,130               | 9,072  | 6,586,000                  |

*Calendar Year*

|      |         |         |       |        |            |
|------|---------|---------|-------|--------|------------|
| 1938 | 857-51  | 258,000 | 1,100 | 14,820 | 10,730,000 |
| 1939 | 877-63  | 158,000 | 1,290 | 12,750 | 9,232,000  |
| 1940 | 897-56  | 86,600  | 1,240 | 5,683  | 4,126,000  |
| 1941 | 927-57  | 112,000 | 1,220 | 11,250 | 8,146,000  |
| 1942 | 957-61  | 200,000 | 1,590 | 13,800 | 9,993,000  |
| 1943 | 977-61  | 271,000 | 780   | 11,980 | 8,672,000  |
| 1944 | 1007-64 | 52,600  | 956   | 7,389  | 5,365,000  |
| 1945 | 1037-62 | 303,000 | 1,420 | 27,660 | 20,020,000 |
| 1946 | 1057-65 | 108,000 | 1,100 | 17,880 | 12,590,000 |
| 1947 | 1087-65 | 62,200  | 1,130 | 7,693  | 5,570,000  |
| 1948 | .....   | .....   | ..... | .....  | .....      |



## 11. WHITE RIVER AT BATESVILLE, ARK.

Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1945:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 17,037                       | 24.3                 | 8.2 | 14                         | 0.08      | 0.4           | 37           | 8.0            | 7.4         | 1.5           | 138                             | 5.0                        | 12            | 0.0          | 1.8                        | 155              | 125                           | 12            |
| Oct. 11-20         | 6,316                        | 28.4                 | 8.2 | 12                         | .02       | .2            | 41           | 12             |             | 1.7           | 177                             | 3.2                        | 4.0           | .0           | 1.6                        | 171              | 152                           | 7             |
| Oct. 21-31         | 10,540                       | 28.4                 | 8.2 | 8.8                        | .08       | .4            | 40           | 12             | 4.3         | 1.5           | 183                             | 3.0                        | 4.0           | .0           | 1.8                        | 166              | 149                           | 0             |
| Nov. 1-10          | 6,409                        | 29.5                 | 8.2 | 6.4                        | .08       | .2            | 41           | 12             |             | 3.0           | 180                             | 3.2                        | 4.0           | .0           | 2.0                        | 161              | 152                           | 4             |
| Nov. 11-20         | 5,015                        | 29.2                 | 8.4 | 7.4                        | .02       | .1            | 42           | 14             | 3.6         | 1.0           | 187                             | 3.9                        | 4.0           | .0           | 1.5                        | 168              | 162                           | 9             |
| Nov. 21-30         | 4,350                        | 29.5                 | 8.3 | 6.9                        | .02       | .1            | 44           | 11             |             | 1.2           | 185                             | 4.3                        | 5.0           | .0           | 1.4                        | 169              | 155                           | 3             |
| Dec. 1-10          | 4,594                        | 28.6                 | 8.1 | 7.4                        | .05       | 1.0           | 40           | 11             |             | 9.8           | 184                             | 4.5                        | 7.0           | .3           | .2                         | 172              | 145                           | 0             |
| Dec. 11-20         | 4,276                        | 28.9                 | 8.1 | 8.3                        | .05       | .7            | 39           | 12             | 6.4         | 1.8           | 181                             | 4.6                        | 7.8           | .0           | .2                         | 170              | 147                           | 0             |
| Dec. 21-31         | 4,211                        | 28.6                 | 8.1 | 8.6                        | .05       | .8            | 37           | 8.3            | 16          | 2.3           | 181                             | 4.6                        | 7.0           | .0           | .5                         | 174              | 126                           | 0             |
| 1946:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 23,780                       | 25.0                 | 8.3 | 9.3                        | .06       | .9            | 33           | 10             | 6.7         | 1.9           | 157                             | 4.8                        | 3.8           | .0           | 1.8                        | 150              | 123                           | 0             |
| Jan. 11-20         | 37,240                       | 22.9                 | 8.0 | 11                         | .06       | 1.9           | 31           | 8.9            |             | 2.9           | 132                             | 5.1                        | 4.0           | .1           | 1.2                        | 133              | 114                           | 6             |
| Jan. 21-31         | 14,472                       | 27.2                 | 8.0 | 9.3                        | .04       | .9            | 38           | 12             |             | 2.5           | 166                             | 5.3                        | 4.8           | .1           | 1.2                        | 156              | 144                           | 8             |
| Feb. 1-10          | 12,381                       | 25.9                 | 8.3 | 10                         | .02       | .8            | 35           | 9.5            | 6.3         | 1.6           | 158                             | 5.5                        | 3.2           | .2           | 2.5                        | 152              | 126                           | 0             |
| Feb. 11-20         | 56,250                       | 21.1                 | 8.3 | 12                         | .04       | 1.2           | 28           | 9.6            |             | 2.1           | 125                             | 4.8                        | 2.8           | .2           | 2.5                        | 132              | 109                           | 7             |
| Feb. 21-28         | 25,950                       | 26.0                 | 8.3 | 10                         | .02       | .9            | 36           | 10             | 6.0         | 1.1           | 162                             | 5.1                        | 3.0           | .2           | 3.2                        | 158              | 131                           | 0             |
| Mar. 1-10          | 21,550                       | 26.0                 | 8.1 | 9.5                        | .02       | .4            | 35           | 11             | 3.2         | 1.1           | 156                             | 5.4                        | 3.5           | .1           | 3.0                        | 155              | 133                           | 5             |
| Mar. 11-20         | 18,070                       | 25.7                 | 8.0 | 7.6                        | .02       | .5            | 35           | 11             | 2.9         | 1.9           | 157                             | 5.2                        | 3.5           | .1           | 2.5                        | 149              | 133                           | 4             |
| Mar. 21-31         | 14,380                       | 26.0                 | 8.1 | 9.1                        | .02       | .4            | 35           | 11             | 3.5         | 1.7           | 159                             | 5.1                        | 3.0           | .1           | 3.0                        | 154              | 133                           | 2             |
| Apr. 1-10          | 10,340                       | 26.8                 | 7.4 | 7.0                        | .02       | .0            | 36           | 11             | 4.3         | 1.0           | 158                             | 6.5                        | 2.5           | .1           | 7.0                        | 153              | 135                           | 6             |
| Apr. 11-20         | 10,190                       | 26.6                 | 7.8 | 8.3                        | .02       | .1            | 36           | 12             | 1.5         | 1.2           | 162                             | 5.4                        | 2.2           | .1           | 2.8                        | 149              | 139                           | 6             |
| Apr. 21-30         | 15,350                       | 25.4                 | 8.1 | 8.8                        | .05       | .1            | 34           | 10             | 3.2         | 1.0           | 151                             | 4.6                        | 2.2           | .1           | 2.8                        | 141              | 126                           | 2             |
| May 1-2, 4-10      | 20,020                       | 23.2                 | 7.9 | 12                         | .06       | .5            | 34           | 8.6            | 2.0         | 1.4           | 141                             | 4.7                        | 3.2           | .2           | 1.2                        | 138              | 120                           | 5             |
| May 11-20          | 37,290                       | 24.5                 | 8.3 | 13                         | .10       | .5            | 34           | 9.8            | 2.2         | 1.7           | 147                             | 5.3                        | 3.2           | .2           | 1.5                        | 145              | 125                           | 5             |
| May 21-31          | 66,110                       | 21.8                 | 8.3 | 13                         | .18       | 1.0           | 33           | 8.1            |             | 1.2           | 131                             | 4.5                        | 2.5           | .3           | 2.0                        | 140              | 116                           | 8             |

— Continued.

## 11. WHITE RIVER AT BATESVILLE, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| June 1-10          | 29,610                       | 27.1                              | 7.7 | 9.3                        | 0.02      | 0.8           | 36           | 13             | 2.5         | 1.2           | 168                             | 6.0                        | 3.0           | 0.0          | 2.5                        | 157                           | 143           |
| June 11-20         | 12,500                       | 28.4                              | 8.2 | 7.7                        | .05       | .7            | 36           | 15             | 3.6         | 1.2           | 183                             | 4.9                        | 2.5           | .0           | 2.8                        | 165                           | 152           |
| June 21-28, 30     | 7,239                        | 27.8                              | 7.9 | 7.3                        | .05       | .5            | 37           | 14             | 4.2         | 1.2           | 181                             | 6.6                        | 2.5           | .0           | 2.2                        | 165                           | 150           |
| July 1-10          | 5,082                        | 29.1                              | 8.1 | 6.2                        | .05       | .3            | 38           | 14             | 2.9         | 1.1           | 184                             | 4.4                        | 2.8           | .0           | 1.0                        | 161                           | 152           |
| July 11-20         | 3,860                        | 29.5                              | 8.4 | 6.8                        | .05       | .4            | 38           | 15             | 3.1         | 1.0           | 189                             | 4.0                        | 2.8           | .0           | 1.5                        | 166                           | 156           |
| July 21-31         | 4,556                        | 28.0                              | 8.1 | 6.3                        | .05       | 1.1           | 35           | 15             | 3.3         | 1.2           | 182                             | 3.9                        | 2.5           | .0           | 1.2                        | 159                           | 149           |
| Aug. 1-10          | 4,608                        | 28.3                              | 8.1 | 13                         | .08       | .6            | 36           | 12             | 5.5         | 1.8           | 175                             | 4.6                        | 2.5           | .1           | 1.8                        | 164                           | 139           |
| Aug. 11-20         | 3,150                        | 29.8                              | 8.0 | 9.7                        | .08       | .6            | 34           | 15             | 6.7         | 1.8           | 187                             | 4.5                        | 3.2           | .0           | 1.2                        | 169                           | 147           |
| Aug. 21-31         | 3,103                        | 30.0                              | 8.1 | 9.0                        | .08       | .8            | 35           | 16             | 3.4         | 1.9           | 187                             | 4.5                        | 3.2           | .0           | .8                         | 168                           | 153           |
| Sept. 1-10         | 2,845                        | 28.4                              | 8.3 | 8.0                        | .28       | .1            | 36           | 16             | 3.5         | 2.0           | 187                             | 4.4                        | 4.2           | .2           | 1.8                        | 169                           | 156           |
| Sept. 11-20        | 2,219                        | 28.6                              | 8.3 | 8.4                        | .28       | .0            | 36           | 16             | 4.9         | 1.7           | 192                             | 4.3                        | 3.8           | .1           | 1.0                        | 171                           | 156           |
| Sept. 21-30        | 2,039                        | 29.3                              | 8.3 | 7.7                        | .32       | .0            | 38           | 17             | 3.2         | 1.8           | 198                             | 5.0                        | 4.0           | .1           | .8                         | 175                           | 165           |
| Average            | 14,600                       | 27.1                              | 8.1 | 9.1                        | 0.07      | 0.6           | 36           | 12             | 4.2         | 1.5           | 169                             | 4.7                        | 3.9           | 0.1          | 1.9                        | 158                           | 140           |

<sup>1</sup> K×10<sup>3</sup> at 25° C.

## 11. WHITE RIVER AT BATESVILLE, ARK.—Continued

*Temperature (° F.) of Water of White River, Water Year October 1945 to September 1946*

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

## 12. White River at Newport, Ark.

LOCATION: Staff gage, lat. 35°36'20", long. 91°17'20", in NE¼ sec. 10, T. 11 N., R. 3 W., at highway bridge at Newport, Jackson County, 7¼ miles downstream from Black River. Datum of gage is 194.09 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 19,812 square miles.

RECORDS AVAILABLE: Discharge, September 1927 to September 1931 at site 2¾ miles downstream (published as White River near Newport, Ark.), October 1937 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1948.

MEAN ANNUAL RUNOFF: 17,640,000 acre-feet.

AVERAGE DISCHARGE: 15 years (1927-31, 1937-48), 24,370 second-feet.

MAXIMUM: 1927-31, 1937-48: Discharge, 343,000 second-feet Apr. 17, 1945; maximum gage height observed, 35.9 feet Apr. 18, 1945. Flood of Apr. 16, 1927 reached stage of 35.6 feet, from records of U. S. Weather Bureau. Maximum stage known, that of Apr. 18, 1945.

**MINIMUM:** 1927-31,

1937-48: Day: 3,480 second-feet (2,250 m.g.d.) Aug. 20, Sept. 22-25, 1941.

7-day: 3,536 second-feet (2,290 m.g.d.) Sept. 19-25, 1941.

Calendar month: 4,020 second-feet (2,600 m.g.d.) September 1943.

Water year: 10,580 second-feet (6,840 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** Gage-height records collected at same site since 1885 are contained in reports of U. S. Weather Bureau; January 1927 to December 1937, January 1940 to December 1948, in reports of Mississippi River Commission. Records for period 1937-48 collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 24 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-31, 1938-48

*Water Year Ending September 30*

| Year | W. S.P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|------------------------------|----------------|----------------|--------|----------------------------|
| 1928 | 667-29                       | 163,000        | 7,600          | 41,200 | 29,900,000                 |
| 1929 | 687-28                       | 108,000        | 6,000          | 34,200 | 24,800,000                 |
| 1930 | 702-47                       | 111,000        | 4,110          | 19,200 | 13,900,000                 |
| 1931 | 717-40                       | 64,200         | 4,280          | 16,000 | 11,600,000                 |
| 1938 | 897-59                       | 259,000        | 4,780          | 27,140 | 19,650,000                 |
| 1939 | 897-59                       | 144,000        | 4,260          | 24,570 | 17,790,000                 |
| 1940 | 897-59                       | 75,200         | 4,130          | 10,580 | 7,677,000                  |
| 1941 | 927-58                       | 101,000        | 3,480          | 11,820 | 8,556,000                  |
| 1942 | 957-62                       | 101,000        | 5,700          | 26,370 | 19,090,000                 |
| 1943 | 977-62                       | 302,000        | 3,700          | 28,070 | 20,320,000                 |
| 1944 | 1007-65                      | 59,500         | 3,510          | 14,040 | 10,190,000                 |
| 1945 | 1037-63                      | 340,000        | 3,510          | 46,320 | 33,540,000                 |
| 1946 | 1057-66                      | 122,000        | 5,640          | 27,810 | 20,130,000                 |
| 1947 | 1087-66                      | 99,100         | 4,700          | 20,220 | 14,640,000                 |
| 1948 | .....                        | 64,200         | 4,400          | 17,990 | 13,060,000                 |

### *Calendar Year*

|      |         |         |       |        |            |
|------|---------|---------|-------|--------|------------|
| 1928 | 667-29  | 163,000 | 7,240 | 35,800 | 26,000,000 |
| 1929 | 687-28  | 108,000 | 5,720 | 33,000 | 23,700,000 |
| 1930 | 702-47  | 111,000 | 4,110 | 19,200 | 13,900,000 |
| 1931 | 717-40  | .....   | ..... | .....  | .....      |
| 1938 | 897-59  | 259,000 | 4,390 | 26,580 | 19,240,000 |
| 1939 | 897-59  | 144,000 | 4,130 | 23,940 | 17,330,000 |
| 1940 | 897-59  | 75,200  | 3,610 | 11,090 | 8,052,000  |
| 1941 | 927-58  | 101,000 | 3,480 | 17,710 | 12,830,000 |
| 1942 | 957-62  | 179,000 | 4,270 | 25,220 | 18,260,000 |
| 1943 | 977-62  | 302,000 | 3,580 | 22,610 | 16,370,000 |
| 1944 | 1007-65 | 59,500  | 3,510 | 14,290 | 10,370,000 |
| 1945 | 1037-63 | 340,000 | 4,660 | 48,440 | 35,070,000 |
| 1946 | 1057-66 | 122,000 | 4,850 | 31,620 | 22,890,000 |
| 1947 | 1087-66 | 58,900  | 4,400 | 14,930 | 10,810,000 |
| 1948 | .....   | .....   | ..... | .....  | .....      |

## 12. WHITE RIVER AT NEWPORT, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1945:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 29,970                       | 24.3                              | 8.3 | 16                         | 0.06      | ...           | ...          | ...            | ...         | ...           | 145                             | 7.0                        | 8.0           | 0.2          | 2.2                        | 146              | 146                           | ...           |
| Oct. 11-20         | 15,550                       | 27.0                              | 8.2 | 12                         | .08       | 0.9           | 36           | 15             | 2.8         | 1.8           | 168                             | 4.8                        | 7.0           | .2           | 3.2                        | 167              | 152                           | 14            |
| Oct. 21-31         | 16,390                       | 30.2                              | 8.0 | 10                         | .08       | .7            | 41           | 17             | 2.6         | 2.0           | 187                             | 4.4                        | 9.0           | .2           | 2.8                        | 182              | 172                           | 19            |
| Nov. 1-10          | 12,400                       | 30.0                              | 8.3 | 10                         | .08       | .7            | 40           | 18             | 3.1         | 1.7           | 193                             | 4.9                        | 6.5           | .2           | 1.8                        | 180              | 174                           | 116           |
| Nov. 11-20         | 11,250                       | 30.6                              | 8.3 | 9.1                        | .08       | .7            | 41           | 18             | 2.5         | 1.4           | 188                             | 4.3                        | 7.5           | .2           | 2.2                        | 180              | 176                           | 22            |
| Nov. 21-30         | 10,270                       | 20.9                              | 8.2 | 7.0                        | .08       | .6            | 41           | 18             | 2.9         | 1.3           | 196                             | 4.9                        | 9.5           | .2           | 1.2                        | 183              | 176                           | 16            |
| Dec. 1-10          | 9,978                        | 31.2                              | 7.9 | 9.7                        | .05       | .9            | 36           | 15             | 9.6         | 2.7           | 200                             | 4.2                        | 5.0           | .0           | .1                         | 182              | 152                           | 0             |
| Dec. 11-20         | 9,068                        | 31.5                              | 8.1 | 11                         | .05       | .8            | 34           | 12             | 16          | 3.8           | 198                             | 4.2                        | 4.0           | .1           | 1.8                        | 185              | 134                           | 0             |
| Dec. 21-31         | 9,634                        | 31.8                              | 8.1 | 12                         | .05       | 1.0           | 32           | 15             | 16          | 1.8           | 198                             | 4.4                        | 6.0           | .0           | 3.2                        | 189              | 142                           | 0             |
| 1946:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 24,630                       | 29.8                              | ... | 13                         | .06       | 1.2           | 35           | 14             | 5.2         | 1.8           | 177                             | 5.4                        | 3.8           | .1           | 2.8                        | 170              | 145                           | 0             |
| Jan. 11-20         | 71,050                       | 21.9                              | ... | 15                         | .14       | 3.5           | 26           | 9.2            | 2.0         | 1.8           | 120                             | 4.1                        | 3.0           | .1           | 2.8                        | 131              | 103                           | 4             |
| Jan. 21-31         | 34,320                       | 25.6                              | ... | 13                         | .06       | 1.6           | 31           | 11             | 4.2         | 1.5           | 147                             | 5.1                        | 3.2           | .1           | 3.5                        | 149              | 123                           | 2             |
| Feb. 1-10          | 25,010                       | 25.2                              | 8.2 | 11                         | .06       | 1.6           | 33           | 12             | 4.2         | 1.5           | 151                             | 4.9                        | 3.0           | .1           | 2.5                        | 148              | 132                           | 8             |
| Feb. 11-20         | 69,990                       | 20.1                              | 8.2 | 13                         | .22       | 2.2           | 27           | 8.7            | 3.7         | 1.5           | 124                             | 4.5                        | 2.5           | .1           | 2.0                        | 128              | 103                           | 2             |
| Feb. 21-28         | 63,580                       | 21.2                              | 8.2 | 14                         | .22       | 2.4           | 27           | 10             | 4.5         | 1.6           | 134                             | 4.2                        | 3.0           | .1           | 2.0                        | 135              | 108                           | 0             |
| Mar. 1-10          | 45,870                       | 21.3                              | 8.0 | 12                         | .18       | .6            | 26           | 11             | 3.5         | 1.8           | 132                             | 4.7                        | 2.8           | .2           | 3.0                        | 134              | 110                           | 2             |
| Mar. 11-20         | 43,700                       | 23.4                              | 8.0 | 12                         | .05       | .5            | 29           | 12             | 3.5         | 1.6           | 147                             | 4.2                        | 3.0           | .1           | 2.5                        | 146              | 122                           | 1             |
| Mar. 21-31         | 33,760                       | 25.0                              | 7.9 | 10                         | .02       | .2            | 30           | 13             | 5.0         | 1.5           | 155                             | 4.6                        | 5.0           | .1           | 2.5                        | 148              | 128                           | 1             |
| Apr. 1-10          | 21,090                       | 27.6                              | 8.3 | 9.7                        | .02       | .6            | 32           | 13             | 7.8         | 1.5           | 170                             | 4.4                        | 3.5           | .1           | 3.2                        | 160              | 133                           | 0             |
| Apr. 11-20         | 19,370                       | 27.2                              | 8.0 | 11                         | .04       | .3            | 31           | 14             | 5.3         | 1.6           | 168                             | 4.4                        | 2.5           | .1           | 3.0                        | 157              | 135                           | 0             |
| Apr. 21-30         | 24,110                       | 26.5                              | 8.3 | 11                         | .02       | .4            | 31           | 12             | 7.2         | 1.4           | 162                             | 4.9                        | 2.5           | .2           | 3.0                        | 153              | 127                           | 0             |
| May 1-10           | 39,750                       | 22.4                              | 7.8 | 10                         | .02       | .4            | 27           | 9.7            | 5.2         | 1.6           | 134                             | 5.9                        | 2.2           | .1           | 1.8                        | 132              | 107                           | 0             |
| May 11-20          | 50,080                       | 22.3                              | 8.4 | 11                         | .04       | .4            | 28           | 9.6            | 3.8         | 2.5           | 136                             | 4.0                        | 2.0           | .2           | 2.2                        | 133              | 109                           | 0             |
| May 21-31          | 100,100                      | 20.4                              | 8.3 | 11                         | .10       | .9            | 25           | 8.9            | 4.0         | 2.2           | 122                             | 4.3                        | 3.0           | .2           | 1.5                        | 122              | 99                            | 0             |

— Continued.

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| June 1-10          | 76,890                       | 21.0                              | 8.1 | 5.2                        | 0.04      | 1.2           | 27           | 10             | 2.2         | 1.7           | 131                             | 3.4                        | 2.2           | 0.1          | 1.5                        | 129              | 108                           | 1             |
| June 11-20         | 35,300                       | 24.9                              | 7.8 | 12                         | .02       | .6            | 30           | 13             | 1.9         | 1.7           | 187                             | 1.1                        | 2.2           | .1           | 1.8                        | 150              | 128                           | 0             |
| June 21-30         | 16,850                       | 29.4                              | 8.3 | 11                         | .02       | .6            | 35           | 16             | 4.1         | 1.6           | 186                             | 3.9                        | 3.8           | .1           | 2.0                        | 173              | 153                           | 1             |
| July 1-10          | 12,610                       | 30.2                              | 8.0 | 12                         | .02       | .7            | 36           | 16             | 6.0         | 1.8           | 195                             | 4.0                        | 4.0           | .1           | 1.5                        | 178              | 156                           | 0             |
| July 11-20         | 10,010                       | 31.2                              | 8.2 | 11                         | .05       | .6            | 36           | 18             | 3.4         | 1.8           | 199                             | 3.3                        | 4.2           | .1           | 1.0                        | 184              | 164                           | 1             |
| July 21-31         | 10,380                       | 29.7                              | 7.9 | 11                         | .02       | .7            | 34           | 18             | 2.8         | 2.4           | 192                             | 3.7                        | 4.0           | .1           | 1.0                        | 177              | 159                           | 2             |
| Aug. 3-10          | 11,000                       | 26.7                              | 8.0 | 14                         | .30       | .6            | 34           | 16             | 3.9         | 2.0           | 184                             | 3.5                        | 3.8           | .1           | 2.0                        | 171              | 151                           | 0             |
| Aug. 11-20         | 10,370                       | 22.7                              | 8.4 | 11                         | .18       | .5            | 32           | 16             | 3.2         | 1.7           | 178                             | 3.6                        | 2.2           | .1           | 2.2                        | 160              | 146                           | 0             |
| Aug. 21-31         | 11,690                       | 26.0                              | 8.3 | 12                         | .10       | .3            | 30           | 16             | 2.6         | 1.8           | 168                             | 3.5                        | 4.0           | .1           | 1.8                        | 155              | 141                           | 3             |
| Sept. 1-10         | 7,586                        | 29.2                              | 8.1 | 9.6                        | .08       | .3            | 33           | 19             | 4.0         | 2.1           | 197                             | 4.0                        | 3.2           | .0           | 2.2                        | 174              | 160                           | 0             |
| Sept. 11-20        | 6,484                        | 31.1                              | 8.1 | 10                         | .08       | .5            | 34           | 18             | 7.1         | 1.8           | 203                             | 4.4                        | 3.5           | .0           | .8                         | 180              | 159                           | 0             |
| Sept. 21-30        | 6,010                        | 31.8                              | 8.1 | 10                         | .08       | .5            | 36           | 19             | 5.9         | 1.8           | 210                             | 4.1                        | 3.5           | .0           | 2.2                        | 186              | 168                           | 0             |
| Average            | 27,810                       | 26.7                              | 8.1 | 11                         | 0.08      | 0.9           | 32           | 14             | 4.9         | 1.8           | 168                             | 4.3                        | 4.1           | 0.1          | 2.1                        | 160              | 139                           | 1             |

<sup>1</sup> K × 10<sup>5</sup> at 25° C.

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Temperature (° F.) of Water of White River, Water Year October 1945 to September 1946*

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

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| 1946:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                               |               |
| Oct. 1-10          | 5,349                        | 31.8                 | 8.2 | 9.4                        | 0.05      | ....          | 38           | 20             | 3.8         | 1.1           | 216                             | 3.3                        | 2.0           | 0.1          | 1.8                        | 187                           | 177           |
| Oct. 11-20         | 5,262                        | 32.8                 | 8.4 | 7.0                        | .05       | ....          | 38           | 19             | 6.0         | 1.2           | 219                             | 3.4                        | 1.5           | .1           | 2.2                        | 192                           | 173           |
| Oct. 21-31         | 6,540                        | 29.8                 | 8.2 | 7.8                        | .08       | ....          | 34           | 17             | 5.6         | 1.3           | 195                             | 3.4                        | 2.8           | .1           | 1.2                        | 174                           | 155           |
| Nov. 1-10          | 25,790                       | 24.9                 | 8.0 | 8.8                        | .10       | 0.5           | 31           | 13             | 2.4         | 2.1           | 155                             | 4.4                        | 3.5           | .1           | 2.5                        | 145                           | 131           |
| Nov. 11-20         | 53,110                       | 21.3                 | 8.1 | 11                         | .12       | .9            | 28           | 9.1            | 4.0         | 2.2           | 131                             | 4.4                        | 3.0           | .1           | 3.0                        | 130                           | 107           |
| Nov. 21-30         | 32,130                       | 25.8                 | 7.9 | 8.5                        | .12       | .2            | 34           | 12             | 2.7         | 1.3           | 157                             | 4.5                        | 4.0           | .1           | 3.0                        | 148                           | 134           |
| Dec. 1-10          | 28,300                       | 25.6                 | 8.2 | 9.5                        | .06       | ....          | 29           | 12             | 6.6         | 2.3           | 151                             | 5.2                        | 5.0           | .1           | 3.0                        | 147                           | 122           |
| Dec. 11-20         | 74,550                       | 21.1                 | 8.1 | 12                         | .20       | ....          | 27           | 8.9            | 3.1         | 2.0           | 122                             | 4.8                        | 4.0           | .1           | 3.0                        | 125                           | 104           |
| Dec. 21-31         | 31,770                       | 25.4                 | 8.1 | 9.4                        | .12       | ....          | 31           | 12             | 1.8         | 1.6           | 149                             | 5.0                        | 2.0           | .1           | 2.8                        | 140                           | 127           |
| 1947:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                               |               |
| Jan. 1-10          | 25,820                       | 26.6                 | 8.3 | 8.6                        | .04       | .8            | 34           | 14             | 1.3         | 1.0           | 164                             | 5.1                        | 2.5           | .1           | 3.5                        | 154                           | 142           |
| Jan. 11-20         | 19,360                       | 27.2                 | 8.4 | 6.9                        | .05       | .8            | 35           | 15             | 3.4         | 1.2           | 178                             | 4.8                        | 3.0           | .0           | 3.2                        | 161                           | 149           |
| Jan. 21-31         | 15,820                       | 29.7                 | 8.2 | 5.4                        | .08       | .9            | 36           | 16             | 4.2         | .7            | 186                             | 5.9                        | 3.2           | .0           | 2.8                        | 167                           | 156           |
| Feb. 1-10          | 15,280                       | 30.7                 | 8.1 | 7.6                        | .06       | .5            | 36           | 17             | 4.1         | 1.5           | 192                             | 5.0                        | 3.8           | .0           | 3.0                        | 173                           | 160           |
| Feb. 11-20         | 13,030                       | 30.4                 | 8.3 | 6.9                        | .06       | .7            | 36           | 17             | 5.0         | 1.1           | 191                             | 5.0                        | 3.8           | .1           | 5.6                        | 177                           | 160           |
| Feb. 21-28         | 11,750                       | 30.9                 | 8.1 | 8.1                        | .06       | .3            | 36           | 18             | 4.9         | 1.1           | 196                             | 4.8                        | 4.0           | .1           | 5.0                        | 182                           | 164           |
| Mar. 1-10          | 9,732                        | 32.7                 | 8.0 | 7.7                        | .18       | .4            | 36           | 18             | 5.2         | 2.1           | 202                             | 4.4                        | 3.8           | .0           | 3.0                        | 183                           | 164           |
| Mar. 11-20         | 10,620                       | 32.2                 | 8.4 | 8.0                        | .08       | .6            | 34           | 18             | 8.3         | 1.8           | 204                             | 4.5                        | 3.2           | .0           | 3.0                        | 185                           | 159           |
| Mar. 21-31         | 11,900                       | 31.9                 | 8.0 | 7.0                        | .08       | .4            | 34           | 17             | 7.2         | 1.9           | 197                             | 4.8                        | 3.2           | .0           | 2.2                        | 178                           | 155           |
| Apr. 1-10          | 13,340                       | 30.5                 | 8.2 | 7.3                        | .12       | .5            | 37           | 17             | 2.2         | 1.5           | 190                             | 5.0                        | 3.8           | .1           | 2.5                        | 170                           | 162           |
| Apr. 11-20         | 47,510                       | 23.2                 | 8.1 | 10                         | .16       | 1.2           | 28           | 10             | 3.6         | 1.9           | 128                             | 8.5                        | 4.2           | .1           | 5.0                        | 139                           | 114           |
| Apr. 21-30         | 38,680                       | 23.4                 | 8.1 | 10                         | .14       | .7            | 29           | 11             | 2.9         | 1.1           | 138                             | 5.0                        | 3.5           | .1           | 2.2                        | 136                           | 118           |

— Continued.



## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-foot) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| May 1-10           | 35,500                       | 23.4                 | 7.7 | 7.6                        | 0.06      | 0.7           | 26           | 10             | 7.2         | 1.6           | 138                             | 4.8                        | 2.0           | 0.1          | 3.2                        | 132              | 106                           | 0             |
| May 11-20          | 33,390                       | 24.2                 | 7.9 | 11                         | .06       | .5            | 30           | 11             | 3.2         | 1.7           | 144                             | 5.1                        | 2.5           | .1           | 2.8                        | 139              | 120                           | 2             |
| May 21-31          | 33,000                       | 24.8                 | 7.7 | 7.6                        | .06       | .5            | 31           | 12             | 2.6         | 1.3           | 152                             | 4.3                        | 2.0           | .0           | 2.8                        | 141              | 127                           | 2             |
| June 1-10          | 23,880                       | 27.1                 | 8.2 | 9.1                        | .02       | ....          | 34           | 13             | 3.2         | 2.9           | 169                             | 4.3                        | 1.5           | .2           | 4.0                        | 158              | 138                           | 0             |
| June 11-20         | 15,780                       | 28.2                 | 8.2 | 9.8                        | .02       | ....          | 35           | 15             | 4.0         | 2.3           | 178                             | 3.9                        | 2.8           | .2           | 4.0                        | 167              | 149                           | 3             |
| June 21-30         | 13,880                       | 28.8                 | 8.3 | 9.0                        | .02       | ....          | 35           | 16             | ....        | 2.3           | 178                             | 4.4                        | 2.5           | .1           | 5.0                        | 169              | 153                           | 7             |
| July 1-10          | 13,390                       | 27.1                 | 8.5 | 13                         | .02       | ....          | 34           | 15             | ....        | 2.9           | 173                             | 3.8                        | 2.5           | .3           | 3.5                        | 160              | 147                           | 5             |
| July 11-20         | 11,600                       | 28.0                 | 8.4 | 8.9                        | .02       | ....          | 33           | 15             | ....        | 3.6           | 173                             | 3.5                        | 2.2           | .1           | 3.8                        | 159              | 144                           | 2             |
| July 21-31         | 8,492                        | 30.1                 | 8.3 | 9.9                        | .02       | ....          | 36           | 18             | ....        | 3.2           | 195                             | 3.7                        | 2.8           | .2           | 3.5                        | 178              | 164                           | 4             |
| Aug. 1-10          | 6,726                        | 30.5                 | 8.6 | 12                         | .04       | ....          | 35           | 19             | 3.0         | 2.5           | 198                             | 3.6                        | 4.0           | .2           | 3.8                        | 181              | 165                           | 3             |
| Aug. 11-20         | 5,827                        | 29.9                 | 8.6 | 9.7                        | .02       | ....          | 33           | 20             | 5.0         | ....          | 200                             | 3.5                        | 3.2           | .3           | 3.0                        | 179              | 165                           | 1             |
| Aug. 21-31         | 5,960                        | 31.5                 | 8.6 | 13                         | .02       | ....          | 36           | 20             | 3.5         | 2.8           | 200                             | 3.5                        | 3.2           | .3           | 2.2                        | 185              | 172                           | 2             |
| Sept. 1-10         | 5,597                        | 31.7                 | 8.7 | 10                         | .04       | ....          | 35           | 19             | 6.5         | ....          | 210                             | 3.5                        | 3.5           | .1           | 2.5                        | 186              | 165                           | 0             |
| Sept. 11-20        | 5,062                        | 31.5                 | 8.7 | 12                         | .02       | ....          | 37           | 21             | 2.9         | ....          | 212                             | 3.3                        | 3.5           | .2           | 2.5                        | 189              | 179                           | 5             |
| Sept. 21-30        | 5,470                        | 32.2                 | 8.6 | 7.8                        | .02       | ....          | 35           | 20             | 4.5         | 2.8           | 209                             | 3.7                        | 3.2           | .1           | 3.8                        | 185              | 170                           | 0             |
| Average            | 19,934                       | 28.2                 | 8.4 | 9.1                        | 0.07      | ....          | 34           | 15             | 4.0         | 1.7           | 178                             | 4.4                        | 3.1           | 0.1          | 3.2                        | 163              | 147                           | 3             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Temperature (° F.) of Water of White River, Water Year October 1946 to September 1947*

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

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 5,390                        | 334                               | 8.3 | 12                         | 0.08      | 0.0           | 36           | 20             | 3.9         | 2.6           | 210                             | 3.7                        | 4.0           | 0.0          | 2.0                        | 188              | 172                           | 0             |
| Oct. 11-20         | 5,033                        | 343                               | 8.1 | 10                         | .18       | .6            | 39           | 20             | 4.5         | 4.5           | 216                             | 4.1                        | 4.5           | .0           | 1.5                        | 190              | 180                           | 2             |
| Oct. 21-31         | 5,363                        | 331                               | 8.3 | 9.4                        | .12       | .5            | 36           | 19             | 5.8         | 2.2           | 207                             | 4.4                        | 4.5           | .1           | 2.5                        | 187              | 178                           | 0             |
| Nov. 1-10          | 6,591                        | 320                               | 7.5 | 8.2                        | .02       | .7            | 34           | 19             | 6.9         | 3.1           | 204                             | 6.6                        | 4.5           | .0           | 2.0                        | 186              | 162                           | 0             |
| Nov. 11-20         | 8,111                        | 323                               | 8.3 | 7.4                        | .02       | .6            | 31           | 18             | 7.2         | 3.0           | 190                             | 7.4                        | 4.5           | .0           | 1.5                        | 174              | 151                           | 0             |
| Nov. 21-30         | 7,861                        | 312                               | 8.4 | 6.8                        | .10       | .6            | 36           | 18             | 6.4         | 1.4           | 204                             | 5.0                        | 4.5           | .0           | 1.0                        | 184              | 164                           | 0             |
| Dec. 1-10          | 9,709                        | 310                               | 8.4 | 6.9                        | .10       | 3.4           | 32           | 18             | 7.9         | 1.0           | 194                             | 4.6                        | 4.5           | .1           | 2.0                        | 178              | 154                           | 0             |
| Dec. 11-20         | 13,110                       | 266                               | 8.1 | 5.7                        | .15       | .9            | 32           | 15             | 2.1         | 2.1           | 162                             | 4.9                        | 4.0           | .2           | 2.5                        | 157              | 142                           | 9             |
| Dec. 21-31         | 10,060                       | 297                               | 8.1 | 5.8                        | .15       | 2.5           | 34           | 17             | 3.6         | 1.5           | 186                             | 5.3                        | 3.5           | .1           | 1.8                        | 164              | 155                           | 2             |
| 1948:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 43,790                       | 204                               | 8.1 | 9.0                        | .10       | 1.9           | 24           | 9.7            | 7.2         | 1.6           | 116                             | 14                         | 4.0           | .0           | 2.8                        | 131              | 100                           | 5             |
| Jan. 11-20         | 26,800                       | 198                               | 8.2 | 9.5                        | .20       | 1.8           | 23           | 11             | 5.1         | 1.7           | 114                             | 13                         | 5.0           | .0           | 2.5                        | 129              | 103                           | 9             |
| Jan. 21-31         | 12,290                       | 278                               | 7.2 | 9.2                        | .10       | .8            | 34           | 15             | 7.2         | 1.5           | 168                             | 15                         | 6.0           | .0           | 3.0                        | 175              | 147                           | 9             |
| Feb. 1-10          | 11,580                       | 276                               | 8.2 | 7.5                        | .08       | 1.2           | 32           | 14             | 6.8         | 1.4           | 162                             | 11                         | 5.0           | .0           | 3.0                        | 162              | 137                           | 4             |
| Feb. 11-20         | 20,720                       | 259                               | 8.1 | 6.5                        | .05       | 1.3           | 31           | 14             | 5.0         | 1.0           | 152                             | 13                         | 4.5           | .0           | 3.2                        | 154              | 135                           | 10            |
| Feb. 21-29         | 27,510                       | 248                               | 8.3 | 6.6                        | .10       | 1.3           | 30           | 13             | 4.6         | 1.4           | 148                             | 9.8                        | 4.0           | .1           | 3.0                        | 147              | 128                           | 7             |
| Mar. 1-10          | 49,590                       | 218                               | 8.2 | 11                         | .01       | .7            | 26           | 9.7            | 3.1         | 1.3           | 120                             | 7.2                        | 3.5           | .1           | 2.5                        | 130              | 105                           | 6             |
| Mar. 11-20         | 30,930                       | 247                               | 8.2 | 8.8                        | .01       | .9            | 30           | 12             | 2.6         | 1.2           | 143                             | 6.8                        | 3.5           | .1           | 2.5                        | 140              | 124                           | 7             |
| Mar. 21-31         | 38,100                       | 242                               | 8.1 | 8.4                        | .01       | ....          | 28           | 12             | 3.2         | 1.0           | 140                             | 5.3                        | 3.5           | .1           | 2.5                        | 137              | 119                           | 4             |
| Apr. 1-10          | 28,420                       | 248                               | 8.2 | 11                         | .01       | .0            | 28           | 13             | 3.8         | .8            | 146                             | 5.1                        | 3.0           | .1           | 3.5                        | 149              | 123                           | 0             |
| Apr. 11-20         | 21,250                       | 250                               | 8.1 | 7.6                        | .01       | .1            | 28           | 14             | 4.3         | 1.1           | 156                             | 4.4                        | 3.0           | .1           | 1.5                        | 144              | 127                           | 0             |
| Apr. 20-30         | 14,940                       | 293                               | 8.4 | 7.6                        | .05       | ....          | 32           | 16             | 4.3         | 1.7           | 176                             | 4.5                        | 4.5           | .0           | 2.0                        | 168              | 146                           | 1             |
| May 1-10           | 24,410                       | 276                               | 8.3 | 7.0                        | .05       | ....          | 31           | 14             | 4.4         | 1.3           | 164                             | 4.7                        | 3.5           | .1           | 1.5                        | 159              | 135                           | 0             |
| May 11-20          | 16,870                       | 288                               | 8.2 | 8.0                        | .05       | ....          | 28           | 14             | 8.9         | 1.2           | 166                             | 4.8                        | 4.0           | .0           | 1.5                        | 163              | 127                           | 0             |
| May 21-31          | 10,600                       | 293                               | 8.0 | 8.7                        | .02       | .5            | 34           | 18             | 2.6         | 1.2           | 186                             | 4.2                        | 5.5           | .0           | 2.0                        | 168              | 159                           | 6             |
| June 1-10          | 16,800                       | 312                               | 8.1 | 7.9                        | .04       | .3            | 34           | 19             | 3.5         | 1.7           | 194                             | 4.4                        | 5.0           | .1           | 2.3                        | 180              | 163                           | 4             |
| June 11-20         | 14,800                       | 312                               | 8.1 | 7.9                        | .04       | .3            | 34           | 19             | 3.5         | 1.7           | 194                             | 4.4                        | 5.0           | .1           | 2.3                        | 180              | 163                           | 4             |
| June 21-31         | 43,010                       | 217                               | 8.2 | 12                         | .10       | .8            | 26           | 11             | 2.9         | 2.2           | 130                             | 4.1                        | 4.0           | .1           | 3.1                        | 131              | 110                           | 4             |
| July 1-10          | 27,500                       | 260                               | 8.4 | 13                         | .03       | .4            | 30           | 14             | 4.5         | 1.7           | 162                             | 4.5                        | 3.0           | .0           | 2.7                        | 154              | 132                           | 0             |
| July 11-20         | 15,940                       | 278                               | 8.5 | 12                         | .04       | .4            | 33           | 16             | 4.3         | 2.2           | 180                             | 4.4                        | 4.2           | .1           | 2.0                        | 167              | 148                           | 0             |
| July 21-31         | 12,940                       | 295                               | 8.4 | 9.4                        | .02       | .5            | 36           | 16             | 4.5         | 1.8           | 188                             | 4.2                        | 5.2           | .1           | 1.6                        | 173              | 156                           | 1             |

— Continued.

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948.*

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| Aug. 1-10 .....    | 9,704                        | 314                               | 8.4 | 10                         | 0.06      | 0.4           | 38           | 16             | 7.3         | 0.6           | 198                             | 5.3                        | 5.0           | 0.0          | 2.4                        | 183              | 161                           | 0             |
| Aug. 11-15 .....   | 10,050                       | 305                               | 8.6 | 9.6                        | .06       | .5            | 35           | 18             | 5.7         | .6            | 196                             | 4.4                        | 5.0           | .1           | 1.6                        | 177              | 161                           | 0             |
| Aug. 16-20 .....   | 25,580                       | 236                               | 8.3 | 10                         | .06       | .7            | 28           | 9.1            | 8.5         | .5            | 140                             | 4.0                        | 3.5           | .0           | 3.2                        | 141              | 107                           | 0             |
| Aug. 21-25 .....   | 13,860                       | 231                               | 7.9 | 10                         | .08       | .5            | 27           | 10             | 5.9         | .4            | 136                             | 3.5                        | 3.5           | .1           | 1.8                        | 133              | 108                           | 0             |
| Aug. 26-31 .....   | 8,933                        | 301                               | 8.2 | 9.6                        | .06       | .5            | 34           | 16             | 7.6         | .5            | 188                             | 5.3                        | 5.0           | .0           | 1.1                        | 172              | 151                           | 0             |
| Sept. 1-10 .....   | 8,046                        | 318                               | 8.4 | 5.4                        | .08       | 1.2           | 32           | 17             | 15          | 1.2           | 208                             | 4.5                        | 5.5           | .0           | 1.0                        | 185              | 150                           | 0             |
| Sept. 11-20 .....  | 7,360                        | 331                               | 8.3 | 6.8                        | .04       | .5            | 28           | 18             | 19          | 1.5           | 210                             | 4.7                        | 6.0           | .0           | 1.0                        | 189              | 144                           | 0             |
| Sept. 21-30 .....  | 5,928                        | 345                               | 8.4 | 7.6                        | .04       | .3            | 28           | 20             | 16          | 1.5           | 214                             | 5.2                        | 5.5           | .0           | .5                         | 192              | 152                           | 0             |
| Average .....      | 17,990                       | 281                               | 8.2 | 8.7                        | 0.07      | 0.8           | 31           | 15             | 6.2         | 1.4           | 172                             | 6.1                        | 4.4           | 0.0          | 2.1                        | 163              | 141                           | 2             |

<sup>1</sup> K×10<sup>6</sup> at 25° C.

## 12. WHITE RIVER AT NEWPORT, ARK.—Continued

*Temperature (°F.) of Water of White River, Water Year October 1947 to September 1948*

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

## 13. White River at De Valls Bluff, Ark.

LOCATION: Water-stage recorder, lat. 34°47', long. 91°27', in sec. 16, T. 2 N., R. 4 W., 1 mile northeast of De Valls Bluff, Prairie County, and 23 miles upstream from Cache River. Datum of gage is 152.93 feet above mean sea level, datum of 1929.

DRAINAGE: 23,430 square miles.

RECORDS AVAILABLE: Discharge, December 1927 to September 1945 (discontinued). Chemical quality, see analysis page 166.

MEAN ANNUAL RUNOFF: 17,500,000 acre-feet.

AVERAGE DISCHARGE: 17 years, 24,170 second-feet.

MAXIMUM: 1927-45: Discharge, 151,000 second-feet Jan. 23, 1937; maximum gage height, 30.30 feet Apr. 23, 1945.

Maximum stage known, 34.6 feet Apr. 23, 1927.

MINIMUM: 1927-45: Day: 3,200 second-feet (2,070 m.g.d.) Aug. 30 to Sept. 4, 1936.

7-day: 3,211 second-feet (2,080 m.g.d.) Aug. 30 to Sept. 5, 1936.

Calendar month: 3,455 second-feet (2,230 m.g.d.) August 1936.

Water year: 10,110 second-feet (6,530 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

**REMARKS:** Prior to Dec. 22, 1933, staff gage at same site and datum. Some overflow from White River into Cache River in vicinity of Des Arc and Augusta, by passing station, occurs during extreme floods. Bankfull stage, about 20 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-45

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|--------|----------------------------|
| 1928 | 667-30                        | .....               | .....               | .....  | .....                      |
| 1929 | 687-29                        | 113,000             | 6,570               | 36,800 | 26,600,000                 |
| 1930 | 702-48                        | 113,000             | 4,900               | 23,400 | 16,900,000                 |
| 1931 | 717-41                        | 58,800              | 4,900               | 18,700 | 13,500,000                 |
| 1932 | 747-48                        | 96,600              | 3,760               | 21,000 | 15,300,000                 |
| 1933 | 747-49                        | 114,000             | 3,600               | 27,400 | 19,900,000                 |
| 1934 | 762-47                        | 83,600              | 3,440               | 15,630 | 11,320,000                 |
| 1935 | 787-52                        | 132,000             | 4,630               | 32,190 | 23,300,000                 |
| 1936 | 807-52                        | 37,100              | 3,200               | 10,110 | 7,337,000                  |
| 1937 | 827-48                        | 151,000             | 5,460               | 26,600 | 19,260,000                 |
| 1938 | 857-52                        | 132,000             | 5,080               | 30,140 | 21,820,000                 |
| 1939 | 877-64                        | 102,000             | 4,490               | 28,290 | 20,480,000                 |
| 1940 | 897-60                        | 60,100              | 4,730               | 12,420 | 9,019,000                  |
| 1941 | 927-59                        | 56,900              | 4,060               | 14,120 | 10,230,100                 |
| 1942 | 957-63                        | 86,100              | 6,820               | 30,880 | 22,360,000                 |
| 1943 | 977-63                        | 131,000             | 4,510               | 28,900 | 20,920,000                 |
| 1944 | 1007-66                       | 63,300              | 4,240               | 17,850 | 12,960,000                 |
| 1945 | 1037-64                       | 142,000             | 4,060               | 36,450 | 26,390,000                 |

## Calendar Year

|      |         |         |       |        |            |
|------|---------|---------|-------|--------|------------|
| 1928 | 667-30  | 140,000 | 7,640 | 37,700 | 27,300,000 |
| 1929 | 687-29  | 113,000 | 6,160 | 35,400 | 25,600,000 |
| 1930 | 702-48  | 113,000 | 4,900 | 23,900 | 17,300,000 |
| 1931 | 717-41  | 58,800  | 4,270 | 17,900 | 13,000,000 |
| 1932 | 747-48  | 96,600  | 3,600 | 20,000 | 14,500,000 |
| 1933 | 747-49  | 114,000 | 5,500 | 28,800 | 20,850,000 |
| 1934 | 762-47  | 83,600  | 3,440 | 15,090 | 10,930,000 |
| 1935 | 787-52  | 132,000 | 5,860 | 34,400 | 24,220,000 |
| 1936 | 807-52  | 35,000  | 3,200 | 11,170 | 8,106,000  |
| 1937 | 827-48  | 151,000 | 5,460 | 25,000 | 18,100,000 |
| 1938 | 857-52  | 132,000 | 4,490 | 29,160 | 21,110,000 |
| 1939 | 877-64  | 102,000 | 4,570 | 27,490 | 19,900,000 |
| 1940 | 897-60  | 60,100  | 4,060 | 13,220 | 9,596,000  |
| 1941 | 927-59  | 67,900  | 4,600 | 19,610 | 14,200,000 |
| 1942 | 957-63  | 86,100  | 5,300 | 28,650 | 20,740,000 |
| 1943 | 977-63  | 131,000 | 4,240 | 24,700 | 17,880,000 |
| 1944 | 1007-66 | 63,300  | 4,060 | 18,500 | 13,480,000 |
| 1945 | 1037-64 | .....   | ..... | .....  | .....      |

## 14. White River at Clarendon, Ark.

**LOCATION:** Staff gage, lat. 34°41'08", long. 91°18'55", in W½ sec. 22, T. 1 N., R. 3 W., on Cottonbelt Railroad bridge at Clarendon, Monroe County.  
Datum of gage is 139.91 feet above mean sea level or 140.02 feet mean Gulf level.

**DRAINAGE AREA:** 25,750 square miles.

**RECORDS AVAILABLE:** Discharge, 1879-1927 (measurements only), January 1928 to December 1948 in reports of Mississippi River Commission.  
Chemical analyses, October 1947 to September 1948.

**MEAN ANNUAL RUNOFF:** 21,400,000 acre-feet.

**AVERAGE DISCHARGE:** 20 years, 29,600 second-feet.

**MAXIMUM:** 1879-1948: Discharge, 440,000 second-feet (estimated) Apr. 23, 1927 (gage height, 43.3 feet).

## SURFACE-WATER RESOURCES OF ARKANSAS

MINIMUM: 1928-48: Day: 2,900 second-feet (1,870 m.g.d.) Aug. 31 to Sept. 4, 1936.

7-day: 2,910 second-feet (1,880 m.g.d.) Aug. 30 to Sept. 5, 1936.

Calendar month: 3,230 second-feet (2,090 m.g.d.) August 1936.

Water year: 10,300 second-feet (6,660 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Gage height records July 1884 to December 1948 are contained in reports of Mississippi River Commission. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, 23 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|----------------|----------------|--------|----------------------------|
| 1928 |                |                |        |                            |
| 1929 | 156,000        | 7,000          | 53,100 | 38,400,000                 |
| 1930 | 135,000        | 5,980          | 28,300 | 20,500,000                 |
| 1931 | 56,900         | 6,140          | 20,900 | 15,100,000                 |
| 1932 | 105,000        | 4,000          | 24,800 | 18,000,000                 |
| 1933 | 124,000        | 3,750          | 31,500 | 22,800,000                 |
| 1934 | 106,000        | 3,300          | 18,000 | 13,000,000                 |
| 1935 | 179,000        | 5,000          | 43,200 | 31,300,000                 |
| 1936 | 34,200         | 2,900          | 10,300 | 7,480,000                  |
| 1937 | 215,000        | 5,700          | 33,900 | 24,500,000                 |
| 1938 | 203,000        | 4,700          | 35,900 | 26,000,000                 |
| 1939 | 119,000        | 4,200          | 32,700 | 23,700,000                 |
| 1940 | 67,800         | 4,000          | 13,100 | 9,510,000                  |
| 1941 | 50,400         | 3,700          | 14,300 | 10,400,000                 |
| 1942 | 94,200         | 7,080          | 32,300 | 23,400,000                 |
| 1943 | 147,000        | 4,150          | 31,700 | 22,900,000                 |
| 1944 | 69,800         | 4,000          | 19,700 | 14,300,000                 |
| 1945 | 299,000        | 4,000          | 58,700 | 42,500,000                 |
| 1946 | 132,000        | 6,580          | 38,800 | 28,100,000                 |
| 1947 | 89,200         | 5,470          | 25,200 | 18,200,000                 |
| 1948 | 75,400         | 5,470          | 25,900 | 18,800,000                 |

*Calendar Year*

|      |         |       |        |            |
|------|---------|-------|--------|------------|
| 1928 | 230,000 | 8,000 | 53,000 | 38,500,000 |
| 1929 | 156,000 | 7,000 | 51,000 | 36,900,000 |
| 1930 | 135,000 | 5,980 | 28,800 | 20,900,000 |
| 1931 | 56,900  | 5,650 | 20,400 | 14,800,000 |
| 1932 | 105,000 | 3,750 | 23,200 | 16,800,000 |
| 1933 | 124,000 | 6,170 | 32,800 | 23,700,000 |
| 1934 | 106,000 | 3,300 | 17,100 | 12,400,000 |
| 1935 | 179,000 | 5,800 | 44,400 | 32,100,000 |
| 1936 | 34,500  | 2,900 | 11,600 | 8,420,000  |
| 1937 | 215,000 | 5,700 | 32,400 | 23,500,000 |
| 1938 | 203,000 | 4,200 | 34,700 | 25,100,000 |
| 1939 | 119,000 | 4,000 | 31,900 | 23,100,000 |
| 1940 | 67,800  | 3,700 | 14,000 | 10,200,000 |
| 1941 | 66,500  | 4,100 | 19,600 | 14,200,000 |
| 1942 | 94,200  | 5,400 | 30,300 | 21,900,000 |
| 1943 | 147,000 | 4,000 | 27,300 | 19,800,000 |
| 1944 | 69,800  | 4,000 | 20,400 | 14,800,000 |
| 1945 | 299,000 | 6,800 | 62,000 | 44,900,000 |
| 1946 | 132,000 | 5,780 | 41,700 | 30,200,000 |
| 1947 | 55,600  | 5,470 | 20,200 | 14,600,000 |
| 1948 | 75,400  | 6,000 | 26,300 | 19,100,000 |

## 14. WHITE RIVER AT CLARENDON, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 5,846                        | 342                  | ... | ...                        | ...       | ...           | 31           | 20             | 12          |               | 214                             | 3.5                        | 5.0           | ...          | 2.0                        | 193              | 161                           | 0             |
| Oct. 11-20         | 5,572                        | 333                  | ... | ...                        | ...       | ...           | 37           | 20             | 4.0         |               | 211                             | 3.4                        | 4.0           | ...          | 1.5                        | 185              | 175                           | 2             |
| Oct. 21-31         | 6,405                        | 331                  | ... | ...                        | ...       | ...           | 33           | 20             | 7.2         |               | 203                             | 3.3                        | 6.5           | ...          | 1.2                        | 187              | 165                           | 0             |
| Nov. 1-10          | 8,667                        | 266                  | ... | ...                        | ...       | ...           | 29           | 14             | 6.1         |               | 156                             | 6.1                        | 5.5           | ...          | 1.5                        | 146              | 130                           | 2             |
| Nov. 11-20         | 13,450                       | 208                  | ... | ...                        | ...       | ...           | 20           | 11             | 6.9         |               | 116                             | 6.7                        | 5.0           | ...          | 1.5                        | 122              | 95                            | 0             |
| Nov. 21-30         | 14,930                       | 191                  | ... | ...                        | ...       | ...           | 19           | 10             | 7.4         |               | 110                             | 6.3                        | 4.5           | ...          | 2.0                        | 115              | 88                            | 0             |
| Dec. 1-10          | 12,790                       | 239                  | ... | ...                        | ...       | ...           | 25           | 13             | 8.0         |               | 141                             | 8.6                        | 5.0           | ...          | 2.0                        | 138              | 116                           | 0             |
| Dec. 11-20         | 21,960                       | 170                  | ... | ...                        | ...       | ...           | 16           | 8.6            | 7.1         |               | 92                              | 7.4                        | 4.5           | ...          | 1.5                        | 102              | 75                            | 0             |
| Dec. 21-31         | 20,310                       | 178                  | ... | ...                        | ...       | ...           | 18           | 9.7            | 6.2         |               | 103                             | 6.6                        | 4.0           | ...          | 1.8                        | 111              | 84                            | 0             |
| 1948:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 35,520                       | 153                  | ... | ...                        | ...       | ...           | 12           | 7.3            | 10          |               | 78                              | 10                         | 3.8           | ...          | 2.5                        | 102              | 60                            | 0             |
| Jan. 11-20         | 46,350                       | 155                  | ... | ...                        | ...       | ...           | 15           | 7.1            | 9.4         |               | 86                              | 9.7                        | 3.5           | ...          | 2.0                        | 94               | 67                            | 0             |
| Jan. 21-31         | 26,030                       | 158                  | ... | ...                        | ...       | ...           | 15           | 7.4            | 9.8         |               | 90                              | 8.5                        | 3.5           | ...          | 2.0                        | 97               | 68                            | 0             |
| Feb. 1-10          | 15,190                       | 204                  | ... | ...                        | ...       | ...           | 19           | 9.8            | 11          |               | 116                             | 10                         | 3.5           | ...          | 2.0                        | 124              | 88                            | 0             |
| Feb. 11-20         | 33,130                       | 140                  | ... | ...                        | ...       | ...           | 11           | 6.2            | 13          |               | 76                              | 13                         | 2.5           | ...          | 1.7                        | 99               | 53                            | 0             |
| Feb. 21-29         | 42,580                       | 154                  | ... | ...                        | ...       | ...           | 14           | 7.0            | 9.2         |               | 84                              | 9.7                        | 2.5           | ...          | 1.5                        | 95               | 64                            | 0             |
| Mar. 1-10          | 67,230                       | 112                  | ... | ...                        | ...       | ...           | 9.4          | 1.2            | 16          |               | 46                              | 10                         | 10            | ...          | 2.5                        | 89               | 29                            | 0             |
| Mar. 11-20         | 69,930                       | 130                  | ... | ...                        | ...       | ...           | 13           | 2.0            | 14          |               | 58                              | 11                         | 8.0           | ...          | 2.0                        | 98               | 41                            | 0             |
| Mar. 21-31         | 58,130                       | 151                  | 8.1 | 6.0                        | 0.10      | 0.4           | 15           | 5.4            | 8.7         | 1.6           | 76                              | 4.7                        | 8.0           | 0.0          | 2.0                        | 91               | 59                            | 0             |
| Apr. 1-10          | 55,480                       | 173                  | ... | ...                        | ...       | ...           | 20           | 7.1            | 8.3         |               | 96                              | 4.4                        | 8.8           | ...          | 2.0                        | 108              | 79                            | 0             |
| Apr. 11-20         | 50,380                       | 163                  | ... | ...                        | ...       | ...           | 18           | 6.9            | 5.7         |               | 83                              | 4.1                        | 9.0           | ...          | 1.0                        | 97               | 73                            | 5             |
| Apr. 21-30         | 38,570                       | 184                  | ... | ...                        | ...       | ...           | 17           | 8.7            | 9.5         |               | 100                             | 3.8                        | 8.0           | ...          | 2.0                        | 113              | 78                            | 0             |
| May 1-10           | 24,100                       | 239                  | ... | ...                        | ...       | ...           | 24           | 12             | 9.1         |               | 133                             | 4.5                        | 9.8           | ...          | 2.0                        | 138              | 109                           | 0             |
| May 11-20          | 22,930                       | 251                  | ... | ...                        | ...       | ...           | 25           | 12             | 13          |               | 146                             | 4.9                        | 9.8           | ...          | 1.0                        | 138              | 112                           | 0             |
| May 21-31          | 21,390                       | 250                  | ... | ...                        | ...       | ...           | 23           | 12             | 16          |               | 148                             | 6.0                        | 8.4           | ...          | 1.5                        | 141              | 107                           | 0             |

— Continued.



## 14. WHITE RIVER AT CLARENDON, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| June 1-10          | 14,270                       | 281                               | ... | ...                        | ...       | ...           | 30           | 14             | 12          | 169           | 7.4                             | 8.0                        | ...           | ...          | 1.2                        | 156              | 132                           | 0             |
| June 11-20         | 11,250                       | 304                               | ... | ...                        | ...       | ...           | 32           | 16             | 9.7         | 180           | 8.5                             | 7.0                        | ...           | ...          | .6                         | 162              | 146                           | 0             |
| June 21-30         | 30,680                       | 208                               | ... | ...                        | ...       | ...           | 18           | 9.2            | 13          | 111           | 9.4                             | 7.0                        | ...           | ...          | 1.4                        | 124              | 83                            | 0             |
| July 1-10          | 43,670                       | 223                               | ... | ...                        | ...       | ...           | 25           | 9.7            | 6.0         | 126           | 5.8                             | 2.5                        | ...           | ...          | 3.2                        | 134              | 102                           | 0             |
| July 11-20         | 30,230                       | 232                               | ... | ...                        | ...       | ...           | 26           | 11             | 4.6         | 132           | 6.2                             | 2.8                        | ...           | ...          | 1.9                        | 135              | 110                           | 2             |
| July 21-31         | 17,590                       | 270                               | ... | ...                        | ...       | ...           | 30           | 13             | 5.9         | 158           | 5.2                             | 3.4                        | ...           | ...          | 1.8                        | 154              | 128                           | 0             |
| Aug. 1-10          | 12,960                       | 311                               | ... | ...                        | ...       | ...           | 36           | 16             | 4.9         | 184           | 4.7                             | 5.5                        | ...           | ...          | 3.5                        | 176              | 156                           | 5             |
| Aug. 11-15         | 12,180                       | 299                               | ... | ...                        | ...       | ...           | 27           | 15             | 15          | 174           | 4.4                             | 6.0                        | ...           | ...          | 6.2                        | 167              | 129                           | 0             |
| Aug. 16-20         | 17,780                       | 246                               | ... | ...                        | ...       | ...           | 27           | 13             | 5.7         | 145           | 5.0                             | 5.0                        | ...           | ...          | 2.7                        | 137              | 121                           | 2             |
| Aug. 22-28         | 22,570                       | 200                               | ... | ...                        | ...       | ...           | 22           | 8.7            | 8.6         | 117           | 6.4                             | 4.2                        | ...           | ...          | 1.3                        | 122              | 91                            | 0             |
| Aug. 21, 29-31     | 15,530                       | 247                               | ... | ...                        | ...       | ...           | 31           | 12             | 8.6         | 155           | 4.9                             | 5.8                        | ...           | ...          | 6.2                        | 149              | 127                           | 0             |
| Sept. 1-10         | 9,667                        | 314                               | ... | ...                        | ...       | ...           | 31           | 15             | 15          | 190           | 4.9                             | 6.5                        | ...           | ...          | .8                         | 173              | 139                           | 0             |
| Sept. 11-20        | 8,387                        | 318                               | ... | ...                        | ...       | ...           | 37           | 17             | 6.7         | 189           | 4.6                             | 6.5                        | ...           | ...          | .8                         | 176              | 162                           | 0             |
| Sept. 21-30        | 7,310                        | 328                               | ... | ...                        | ...       | ...           | 30           | 19             | 13          | 203           | 4.3                             | 7.2                        | ...           | ...          | .5                         | 180              | 153                           | 0             |
| Average            | 25,930                       | 228                               | ... | ...                        | ...       | ...           | 23           | 11             | 9.4         | 132           | 6.5                             | 5.8                        | ...           | ...          | 2.0                        | 133              | 104                           | 0             |

<sup>1</sup> K×10<sup>3</sup> at 25° C.

### 15. West Fork White River at Greenland, Ark.

**LOCATION:** Water-stage recorder, lat.  $35^{\circ}59'$ , long.  $94^{\circ}10'$ , in NW $\frac{1}{4}$  sec. 16, T. 15 N., R. 30 W., at bridge on U. S. Highway 71, 1 mile south of Greenland, Washington County, and 10.5 miles upstream from mouth. Datum of gage is 1,233.00 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 83.2 square miles.

**RECORDS AVAILABLE:** Discharge, October 1945 to September 1948. Chemical quality, see analysis page 167.

**MAXIMUM:** 1945-48: Discharge, 23,400 second-feet May 24, 1946 (gage height, 13.71 feet), from rating curve extended above 5,300 second-feet.

**MINIMUM:** 1945-48: Day: No flow Oct. 4-10, 1946 and September 1 to Oct. 21, 1947.

7-day: No flow, see above.

Calendar month: No flow September 1947.

Water year: 130 second-feet (84.0 m.g.d.) Oct. 1, 1945, to Sept. 30, 1946.

**REMARKS:** Prior to Oct. 20, 1945, wire-weight gage at same site and datum. Bankfull stage, about 9 feet.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1946-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1946 | 1087-67                       | 4,800               | 0.1                 | 130  | 1.56                  | 21.28   | 94,450    |
| 1947 | 1087-67                       | 2,900               | 0                   | 139  | 1.67                  | 22.62   | 100,400   |
| 1948 | .....                         | 6,600               | 0                   | 133  | 1.60                  | 21.71   | 96,440    |

#### *Calendar Year*

|      |         |       |       |       |       |       |         |
|------|---------|-------|-------|-------|-------|-------|---------|
| 1946 | 1087-67 | 4,800 | 0     | 184   | 2.21  | 30.06 | 133,400 |
| 1947 | 1087-67 | 1,840 | 0     | 77.1  | .927  | 12.56 | 55,800  |
| 1948 | .....   | ..... | ..... | ..... | ..... | ..... | .....   |

### 16. West Fork White River Near Fayetteville, Ark.

**LOCATION:** Water stage recorder, lat.  $36^{\circ}03'$ , long.  $94^{\circ}07'$ , in NE $\frac{1}{4}$  sec. 24, T. 16 N., R. 30 W., 3 miles southeast of Fayetteville, Washington County, and  $3\frac{1}{2}$  miles upstream from mouth. Datum of gage is 1,158.06 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 118 square miles.

**RECORDS AVAILABLE:** Discharge, July 1937 to September 1945 (discontinued).

**MEAN ANNUAL RUNOFF:** 19.44 inches or 122,400 acre-feet.

**AVERAGE DISCHARGE:** 8 years, 169 second-feet.

**MAXIMUM:** 1937-45: Discharge, 53,000 second-feet Apr. 14, 1945 (gage height, 21.50 feet), by contracted-opening method.

Maximum discharge known, that of Apr. 14, 1945.

**MINIMUM:** 1937-45: Day: No flow, July 23-25, July 27 to Aug. 3, Aug. 6-14, 1937.

7-day: No flow, see above.

Calendar month: 0.83 second-foot (0.51 m.g.d.) September 1939.

Water year: 45.3 second-feet (27.9 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** City of Fayetteville diverts water for municipal use and returns effluent from sewage disposal plant above station. Bankfull stage, about 13 feet.

## SURFACE-WATER RESOURCES OF ARKANSAS

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-45

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|------|----------------------------|
| 1938 | *857-54                       | 4,400               | 0.5                 | 175  | 126,600                    |
| 1939 | 877-65                        | 2,500               | .4                  | 84.7 | 61,340                     |
| 1940 | 897-61                        | 1,870               | .4                  | 45.3 | 32,850                     |
| 1941 | 927-60                        | 8,100               | .4                  | 122  | 88,330                     |
| 1942 | 957-64                        | 3,410               | 1.1                 | 182  | 132,100                    |
| 1943 | 977-64                        | 18,000              | .4                  | 241  | 174,400                    |
| 1944 | 1007-67                       | 5,050               | .5                  | 147  | 106,900                    |
| 1945 | 1037-65                       | 17,900              | .7                  | 354  | 256,600                    |

*Calendar Year*

|      |         |        |    |      |         |
|------|---------|--------|----|------|---------|
| 1938 | *857-54 | 4,400  | .5 | 162  | 117,300 |
| 1939 | 877-65  | 2,500  | .4 | 85.2 | 61,710  |
| 1940 | 897-61  | 1,870  | .5 | 55.7 | 40,450  |
| 1941 | 927-60  | 8,100  | .4 | 176  | 127,100 |
| 1942 | 957-64  | 9,520  | .9 | 207  | 149,500 |
| 1943 | 977-64  | 18,000 | .4 | 153  | 110,600 |
| 1944 | 1007-67 | 5,050  | .9 | 149  | 108,100 |
| 1945 | 1037-65 |        |    |      |         |

\* Revised figures of daily discharge for high-water period and yearly summaries contained in Water-Supply Paper 927, p. 60.

**17. Kings River Near Berryville, Ark.**

LOCATION: Water-stage recorder, lat. 36°24', long. 93°38', in sec. 15, T. 20 N., R. 25 W., a quarter of a mile downstream from Osage Creek and 4 miles northwest of Berryville, Carroll County. Datum of gage is 990.81 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 517 square miles.

RECORDS AVAILABLE: Discharge, April 1939 to September 1948. Chemical quality, see analysis page 167.

MEAN ANNUAL RUNOFF: 15.18 inches or 418,500 acre-feet.

AVERAGE DISCHARGE: 9 years, 578 second-feet.

MAXIMUM: 1939-48: Discharge, 59,000 second-feet May 10, 1943 (gage height, 30.20 feet).

Maximum discharge known, that of May 10, 1943.

MINIMUM: 1939-48: Day: 3.1 second-feet (2.0 m.g.d.) Sept. 28, 1939, Sept. 8, 9, 1947.

7-day: 3.54 second-feet (2.3 m.g.d.) Sept. 5-11, 1947.

Calendar month: 6.57 second-feet (4.2 m.g.d.) September 1939.

Water year: 241 second-feet (156 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to July 12, 1939, wire-weight gage at same site and datum. Bankfull stage, about 16 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1940 | 897-62                        | 6,760               | 5.6                 | 241   | 0.466                 | 6.34    | 175,100   |
| 1941 | 927-61                        | 16,400              | 9.2                 | 393   | .760                  | 10.31   | 284,200   |
| 1942 | 957-65                        | 12,400              | 22                  | 575   | 1.11                  | 15.10   | 415,900   |
| 1943 | 977-65                        | 32,700              | 5.0                 | 805   | 1.56                  | 21.13   | 582,900   |
| 1944 | 1007-68                       | 6,350               | 8.4                 | 348   | .673                  | 9.17    | 252,900   |
| 1945 | 1037-66                       | 37,300              | 14                  | 1,251 | 2.42                  | 32.86   | 905,900   |
| 1946 | 1057-67                       | 13,900              | 6.8                 | 602   | 1.16                  | 15.80   | 435,800   |

— Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48—(Continued)

| Year          | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|---------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|               |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1947          | 1087-69                       | 12,200              | 3.1                 | 642   | 1.24                  | 16.85   | 464,600   |
| 1948          | .....                         | 4,080               | 4.5                 | 346   | .669                  | 9.11    | 251,100   |
| Calendar Year |                               |                     |                     |       |                       |         |           |
| 1940          | 897-62                        | 6,760               | 17                  | 278   | .538                  | 7.33    | 202,100   |
| 1941          | 927-61                        | 16,400              | 9.2                 | 575   | 1.11                  | 15.12   | 416,500   |
| 1942          | 957-65                        | 26,000              | 18                  | 628   | 1.21                  | 16.49   | 454,700   |
| 1943          | 977-65                        | 32,700              | 5.0                 | 528   | 1.02                  | 13.87   | 382,400   |
| 1944          | 1007-68                       | 6,350               | 8.4                 | 352   | .681                  | 9.25    | 255,200   |
| 1945          | 1037-66                       | 37,300              | 15                  | 1,307 | 2.53                  | 34.32   | 946,400   |
| 1946          | 1057-67                       | 13,900              | 5.1                 | 819   | 1.58                  | 21.50   | 592,900   |
| 1947          | 1087-69                       | 6,940               | 3.1                 | 369   | .714                  | 9.70    | 267,400   |
| 1948          | .....                         | .....               | .....               | ..... | .....                 | .....   | .....     |

## 18. Buffalo River Near St. Joe, Ark.

**LOCATION:** Water-stage recorder, lat. 35°59', long. 92°45', in SW¼ sec. 36, T. 16 N., R. 17 W., at bridge on U. S. Highway 65, 1¼ miles downstream from Mill Creek, 4½ miles southeast of St. Joe, Searcy County. Datum of gage is 560.35 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 825 square miles.

**RECORDS AVAILABLE:** Discharge, October 1939 to September 1948. Chemical quality, see analysis page 167.

**MEAN ANNUAL RUNOFF:** 18.16 inches or 799,300 acre-feet.

**AVERAGE DISCHARGE:** 9 years, 1,104 second-feet.

**MAXIMUM:** 1939-48: Discharge, 109,000 second-feet Apr. 15, 1945 (gage height, 41.00 feet); from rating curve extended above 74,000 second-feet by logarithmic plotting.

Maximum stage known, 50.5 feet in August 1915, from information by Corps of Engineers.

**MINIMUM:** 1939-48: Day: 20 second-feet (12.9 m.g.d.) Sept. 23-28, 1943.

7-day: 20.1 second-feet (13.0 m.g.d.) Sept. 22-28, 1943.

Calendar month: 22.6 second-feet (14.6 m.g.d.) September 1943.

Water year: 418 second-feet (270 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** Prior to Mar. 1, 1940, wire-weight gage at same site and datum. Bankfull stage, about 25 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

Water Year Ending September 30

| Year          | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|---------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|               |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1940          | 897-64                        | 7,190               | 23                  | 418   | 0.507                 | 6.89    | 303,400   |
| 1941          | 927-63                        | 9,230               | 38                  | 608   | .737                  | 9.99    | 439,800   |
| 1942          | 957-67                        | 26,600              | 58                  | 1,256 | 1.52                  | 20.65   | 909,300   |
| 1943          | 977-67                        | 51,700              | 20                  | 1,196 | 1.45                  | 19.69   | 865,800   |
| 1944          | 1007-70                       | 11,200              | 28                  | 777   | .942                  | 12.81   | 564,200   |
| 1945          | 1037-68                       | 80,500              | 27                  | 2,619 | 3.17                  | 43.09   | 1,896,000 |
| 1946          | 1057-69                       | 30,000              | 39                  | 1,361 | 1.65                  | 22.39   | 985,400   |
| 1947          | 1087-71                       | 27,200              | 25                  | 1,009 | 1.22                  | 16.62   | 730,700   |
| 1948          | .....                         | 19,800              | 27                  | 694   | .841                  | 11.45   | 503,800   |
| Calendar Year |                               |                     |                     |       |                       |         |           |
| 1940          | 897-64                        | 7,190               | 40                  | 504   | .611                  | 8.30    | 365,600   |
| 1941          | 927-63                        | 26,600              | 38                  | 1,026 | 1.24                  | 16.88   | 742,600   |
| 1942          | 957-67                        | 42,100              | 50                  | 1,144 | 1.39                  | 18.80   | 827,800   |

—Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48—(Continued)

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |            |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|------------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet. |
| 1943 | 977-67                        | 51,700              | 20                  | 814   | 0.987                 | 13.40   | 589,600    |
| 1944 | 1007-70                       | 11,200              | 27                  | 804   | .975                  | 13.24   | 583,200    |
| 1945 | 1037-68                       | 80,500              | 71                  | 2,651 | 3.21                  | 43.62   | 1,919,000  |
| 1946 | 1057-69                       | 30,000              | 27                  | 1,748 | 2.12                  | 28.75   | 1,265,000  |
| 1947 | 1087-71                       | 12,800              | 25                  | 584   | .708                  | 9.62    | 422,600    |
| 1948 |                               |                     |                     |       |                       |         |            |

## 19. Buffalo River Near Rush, Ark.

LOCATION: Water-stage recorder, lat. 36°07', long. 92°33', in sec. 15, T. 17 N., R. 15 W., three-quarters of a mile upstream from Rush Creek, 1½ miles southeast of Rush, Marion County, and 24 miles upstream from mouth. Datum of gage is 451.98 feet above mean sea level, datum of 1929 (Corps of Engineers, bench mark).

DRAINAGE AREA: 1,091 square miles.

RECORDS AVAILABLE: Discharge, October 1928 to September 1948. Chemical quality, see analysis page 168.

MEAN ANNUAL RUNOFF: 16.83 inches or 97,950 acre-feet.

AVERAGE DISCHARGE: 20 years, 1,353 second-feet.

MAXIMUM: 1928-48: Discharge, 121,000 second-feet Apr. 15, 1945 (gage height, 38.86 feet).

Maximum stage known, 45.5 feet Aug. 19, 1915, original site, and about 46 feet, present site (discharge, 164,000 second-feet, by slope-area method, from data furnished by Corps of Engineers).

MINIMUM: 1928-48: Day: 15 second-feet (9.7 m.g.d.) Aug. 30 to Sept. 1, 1936.

7-day: 16.0 second-feet (10.3 m.g.d.) Aug. 27 to Sept. 2, 1936.

Calendar month: 19.6 second-feet (12.7 m.g.d.) August 1936.

Water year: 437 second-feet (282 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Prior to Jan. 27, 1939, staff gage at site half a mile downstream at same datum. Bankfull stage, about 24 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929-48

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1929 | 687-33                        | 42,000              | 65                  | 1,950 | 1.79                  | 24.29   | 1,420,000 |
| 1930 | 702-50                        | 47,400              | 60                  | 1,120 | 1.03                  | 13.98   | 810,000   |
| 1931 | 717-45                        | 29,200              | 60                  | 1,080 | .990                  | 13.43   | 779,000   |
| 1932 | 732-53                        | 13,200              | 54                  | 769   | .705                  | 9.60    | 558,000   |
| 1933 | 747-52                        | 38,800              | 62                  | 1,350 | 1.24                  | 16.83   | 979,000   |
| 1934 | 762-50                        | 21,000              | 40                  | 880   | .807                  | 10.95   | 637,000   |
| 1935 | 787-55                        | 49,500              | 82                  | 2,206 | 2.02                  | 27.45   | 1,597,000 |
| 1936 | 807-55                        | 13,000              | 15                  | 437   | .401                  | 5.46    | 317,400   |
| 1937 | 827-51                        | 27,300              | 64                  | 1,346 | 1.23                  | 16.75   | 974,800   |
| 1938 | 857-57                        | 63,900              | 46                  | 1,756 | 1.61                  | 21.85   | 1,271,000 |
| 1939 | 877-69                        | 50,600              | 30                  | 1,787 | 1.64                  | 22.24   | 1,294,000 |
| 1940 | 897-65                        | 10,800              | 43                  | 518   | .475                  | 6.45    | 375,800   |
| 1941 | 927-64                        | 10,800              | 56                  | 728   | .667                  | 9.05    | 526,900   |
| 1942 | 957-68                        | 23,300              | 71                  | 1,607 | 1.47                  | 20.01   | 1,163,000 |
| 1943 | 977-68                        | 91,100              | 38                  | 1,527 | 1.40                  | 19.00   | 1,105,000 |
| 1944 | 1007-71                       | 15,900              | 44                  | 962   | .882                  | 12.01   | 698,200   |
| 1945 | 1037-69                       | 101,000             | 40                  | 3,308 | 3.03                  | 41.14   | 2,394,000 |

—Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929-48—(Continued)

| Year                 | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|----------------------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|                      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1946                 | 1057-70                       | 29,400         | 63             | 1,670 | 1.53                  | 20.76   | 1,209,000 |
| 1947                 | 1087-72                       | 27,700         | 39             | 1,210 | 1.11                  | 15.07   | 876,100   |
| 1948                 | .....                         | 18,800         | 44             | 843   | .773                  | 10.52   | 611,900   |
| <i>Calendar Year</i> |                               |                |                |       |                       |         |           |
| 1929                 | 687-33                        | 42,000         | 65             | 1,910 | 1.75                  | 23.75   | 1,390,000 |
| 1930                 | 702-50                        | 47,400         | 60             | 1,160 | 1.06                  | 14.38   | 838,000   |
| 1931                 | 717-45                        | 29,200         | 54             | 916   | .840                  | 11.40   | 662,000   |
| 1932                 | 732-53                        | 13,200         | 58             | 892   | .818                  | 11.13   | 647,000   |
| 1933                 | 747-52                        | 38,800         | 65             | 1,360 | 1.25                  | 16.96   | 986,000   |
| 1934                 | 762-50                        | 21,000         | 40             | 817   | .749                  | 10.16   | 591,300   |
| 1935                 | 787-55                        | 49,500         | 85             | 2,249 | 2.06                  | 27.99   | 1,628,000 |
| 1936                 | 807-55                        | 12,300         | 15             | 562   | .515                  | 7.01    | 408,100   |
| 1937                 | 827-51                        | 27,300         | 64             | 1,221 | 1.12                  | 15.19   | 883,900   |
| 1938                 | 857-57                        | 63,900         | 30             | 1,727 | 1.58                  | 21.48   | 1,250,000 |
| 1939                 | 877-69                        | 50,600         | 41             | 1,693 | 1.56                  | 21.13   | 1,229,000 |
| 1940                 | 897-65                        | 10,800         | 59             | 613   | .562                  | 7.64    | 445,300   |
| 1941                 | 927-64                        | 23,300         | 56             | 1,231 | 1.13                  | 15.34   | 891,400   |
| 1942                 | 957-68                        | 34,100         | 71             | 1,498 | 1.37                  | 18.63   | 1,084,000 |
| 1943                 | 977-68                        | 91,000         | 38             | 1,045 | .958                  | 13.01   | 756,900   |
| 1944                 | 1007-71                       | 15,900         | 40             | 998   | .915                  | 12.46   | 724,100   |
| 1945                 | 1037-69                       | 101,000        | 112            | 3,352 | 3.07                  | 41.69   | 2,427,000 |
| 1946                 | 1057-70                       | 29,400         | 50             | 2,115 | 1.94                  | 26.30   | 1,531,000 |
| 1947                 | 1087-72                       | 15,000         | 39             | 706   | .647                  | 8.79    | 511,000   |
| 1948                 | .....                         | .....          | .....          | ..... | .....                 | .....   | .....     |

## 20. North Fork River at Norfork Dam Near Norfork, Ark.

LOCATION: Water-stage recorder, lat. 36°15', long. 92°14', in SE¼ sec. 2, T. 18 N., R. 12 W., at Norfork Dam, 4.3 miles northeast of Norfork, Baxter County.

DRAINAGE AREA: 1,806 square miles.

RECORDS AVAILABLE: Discharge, May 1944 to September 1948. Chemical analyses, September 1946 to September 1948.

MAXIMUM: 1944-48: Daily discharge, 21,000 second-feet Apr. 16, 1945.

MINIMUM: 1944-48: Day: No flow May 20-28, June 4-15, Oct. 8, 15, 22, 29, Dec. 6, 7, 9, 10, 19, 21-31, 1944, Jan. 1-3, 5-9, Feb. 15, Sept. 18-27, Oct. 4-9, Nov. 23, 1945, Apr. 28, May 5, 12, July 4, 7, 1946, Apr. 20, 1947, Jan. 3-7, 1948.

7-day: No flow, see above.

Calendar month: 8.4 second-feet (5.4 m.g.d.) January 1948.

Water year: 1,360 second-feet (879 m.g.d.) Oct. 1, 1947, to Sept. 30, 1948.

REMARKS: Flow regulated by Norfork Reservoir. Records collected and computed by Corps of Engineers, Little Rock District, reviewed by U. S. Geological Survey.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1945-48

*Water Year Ending September 30*

| Year                 | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|----------------------|-------------------------------|----------------|----------------|-------|----------------------------|
| 1945                 | 1037-74                       | 21,000         | 0              | 3,168 | 2,293,000                  |
| 1946                 | 1057-73                       | 8,400          | 0              | 2,057 | 1,815,000                  |
| 1947                 | 1087-75                       | 4,260          | 0              | 1,766 | 1,279,000                  |
| 1948                 | .....                         | 4,730          | 0              | 1,360 | 987,500                    |
| <i>Calendar Year</i> |                               |                |                |       |                            |
| 1945                 | 1037-74                       | 21,000         | 0              | 3,447 | 2,495,000                  |
| 1946                 | 1057-73                       | 8,400          | 0              | 2,617 | 1,895,000                  |
| 1947                 | 1087-75                       | 4,260          | 0              | 1,591 | 1,152,000                  |
| 1948                 | .....                         | .....          | .....          | ..... | .....                      |

## 20. NORTH FORK RIVER AT NORFORK DAM, ARK.

Chemical Analyses, in Parts Per Million, September 22, 1946 to September 16, 1948

| Date of collection | Mean discharge<br>(second-foot) | Specific conductance <sup>1</sup> | Iron<br>(Fe) | Calcium<br>(Ca) | Magnesium<br>(Mg) | Sodium<br>(Na) | Potassium<br>(K) | Bicarbonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |       |
|--------------------|---------------------------------|-----------------------------------|--------------|-----------------|-------------------|----------------|------------------|------------------------------------|-------------------------------|------------------|-------------------------------|-------------------------------|-------|
|                    |                                 |                                   |              |                 |                   |                |                  |                                    |                               |                  |                               | Dissolved<br>solids           | Total |
|                    |                                 |                                   |              |                 |                   |                |                  |                                    |                               |                  |                               |                               |       |
| 1946:              |                                 |                                   |              |                 |                   |                |                  |                                    |                               |                  |                               |                               |       |
| Sept. 22           | .....                           | .....                             | .....        | .....           | .....             | .....          | .....            | 188                                | 4.0                           | 5.0              | 8.2                           | 168                           | ...   |
| Oct. 1-10          | 9,082                           | 28.1                              | 0.02         | 31              | 17                | 5.0            | 1.3              | 181                                | 4.9                           | 2.5              | 3.2                           | 147                           | 0     |
| Oct. 11-20         | 6,385                           | 28.1                              | .04          | 32              | 16                | 6.5            | 1.4              | 186                                | 3.2                           | 2.5              | 1.5                           | 169                           | 0     |
| Oct. 21-31         | 8,780                           | 27.9                              | .04          | 32              | 17                | 4.7            | 1.1              | 185                                | 3.2                           | 2.2              | 1.8                           | 167                           | 0     |
| Nov. 1-10          | 9,000                           | 28.6                              | .08          | 29              | 18                | 9.2            | 1.8              | 192                                | 3.7                           | 4.5              | 1.0                           | 173                           | 0     |
| Nov. 11-20         | 23,340                          | 28.8                              | .08          | 28              | 18                | 8.3            | 2.1              | 167                                | 3.3                           | 2.0              | 1.5                           | 167                           | 0     |
| Nov. 21-30         | 26,300                          | 28.4                              | .08          | 27              | 19                | 7.1            | 1.8              | 168                                | 3.6                           | 5.0              | 1.5                           | 165                           | 0     |
| Dec. 30            | 2,640                           | 28.3                              | .04          | 31              | 18                | 2.2            | 1.4              | 182                                | 4.1                           | 2.2              | 1.5                           | 151                           | 2     |
| 1947:              |                                 |                                   |              |                 |                   |                |                  |                                    |                               |                  |                               |                               |       |
| Jan. 31            | 2,640                           | 29.2                              | .06          | 30              | 19                | 1.8            | 1.0              | 183                                | 3.8                           | 2.0              | 1.2                           | 160                           | 3     |
| Feb. 20            | 2,730                           | 28.8                              | .06          | 29              | 19                | 2.7            | .9               | 169                                | 4.0                           | 1.5              | 1.0                           | 158                           | 1     |
| Mar. 27            | 1,360                           | 29.2                              | .06          | 30              | 18                | 3.9            | .9               | 184                                | 3.7                           | 1.8              | 1.2                           | 160                           | 0     |
| Apr. 21            | 1,660                           | 29.4                              | .12          | 30              | 19                | 5.1            | 1.2              | 190                                | 3.5                           | 3.2              | 1.8                           | 163                           | 0     |
| May 28             | 2,640                           | 28.9                              | .06          | 32              | 20                | 3.1            | .9               | 190                                | 5.0                           | 3.0              | 2.0                           | 167                           | 3     |
| June 24            | 2,690                           | 31.1                              | .10          | 32              | 19                | 5.4            | 2.3              | 198                                | 4.0                           | 3.2              | 2.2                           | 174                           | 0     |
| July 23            | 1,510                           | 31.4                              | .06          | 28              | 19                | 11             | 1.5              | 199                                | 4.0                           | 3.5              | 2.0                           | 174                           | 0     |
| Aug. 11            | 1,080                           | 31.6                              | .06          | 34              | 19                | 2.4            | 1.6              | 198                                | 3.9                           | 1.5              | 2.2                           | 174                           | 1     |
| Sept. 11           | 1,580                           | 30.8                              | .02          | 34              | 20                | 3.4            | .....            | 203                                | 3.4                           | 1.5              | 2.5                           | 179                           | 1     |
| Oct. 30            | 1,430                           | 32.1                              | .00          | 34              | 21                | 3.4            | .....            | 207                                | 4.1                           | 2.0              | 2.0                           | 171                           | 2     |
| 1948:              |                                 |                                   |              |                 |                   |                |                  |                                    |                               |                  |                               |                               |       |
| Jan. 22            | 10                              | 30.9                              | .01          | 29              | 22                | 2.1            | .8               | 194                                | 4.7                           | 2.5              | 1.0                           | 170                           | 5     |
| Feb. 25            | 1,330                           | 31.8                              | .03          | 32              | 21                | 1.4            | 1.2              | 198                                | 3.7                           | 3.0              | .5                            | 170                           | 6     |
| Mar. 23            | 4,730                           | 31.5                              | .02          | 33              | 22                | 3.3            | .6               | 206                                | 3.8                           | 4.5              | 1.5                           | 176                           | 4     |
| Apr. 20            | 2,470                           | 31.8                              | .02          | 33              | 22                | 1.4            | 1.2              | 204                                | 3.9                           | 3.8              | 1.0                           | 175                           | 6     |
| May 25             | 1,970                           | 31.5                              | .03          | 29              | 22                | 2.8            | 2.9              | 196                                | 4.6                           | 4.0              | .9                            | 177                           | 6     |
| June 26            | 1,680                           | 31.8                              | .03          | 29              | 22                | 3.5            | 1.2              | 198                                | 4.4                           | 3.0              | 1.0                           | 176                           | 2     |
| July 14            | 1,500                           | 32.0                              | .04          | 28              | 22                | 3.1            | 2.6              | 194                                | 4.6                           | 4.0              | 1.2                           | 178                           | 1     |
| Aug. 11            | 1,540                           | 31.5                              | .02          | 33              | 20                | 6.0            | .1               | 204                                | 4.2                           | 3.5              | 1.6                           | 179                           | 0     |
| Sept. 16           | 1,550                           | 32.9                              | .04          | 31              | 22                | 5.9            | .8               | 200                                | 5.0                           | 8.0              | 1.7                           | 178                           | 4     |

<sup>1</sup> K $\times 10^5$  at 25° C.

## 21. Black River Near Corning, Ark.

LOCATION: Wire-weight gage, lat. 36°24'05", long. 90°32'30", near center of sec. 4, T. 20 N., R. 5 E., at highway bridge 2¼ miles east of Corning, Clay County. Datum of gage is 272.90 feet above mean Gulf level.

DRAINAGE AREA: 1,749 square miles.

RECORDS AVAILABLE: Discharge, October 1938 to September 1948. Chemical quality, see analysis page 168.

MEAN ANNUAL RUNOFF: 13.33 inches or 1,243,000 acre-feet.

AVERAGE DISCHARGE: 10 years, 1,717 second-feet.

MAXIMUM: 1938-48: Discharge, 48,600 second-feet June 13, 1945 (gage height, 16.92 feet).

Maximum discharge known, that of June 13, 1945.

MINIMUM: 1938-48: Day: 224 second-feet (145 m.g.d.) Sept. 22-27, 1941.

7-day: 226 second-feet (146 m.g.d.) Sept. 21-27, 1941.

Calendar month: 272 second-feet (176 m.g.d.) August 1941.

Water year: 748 second-feet (483 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Gage-height records collected at site 7 miles downstream January 1925 to December 1929 are contained in reports of U. S. Weather Bureau. Bankfull stage, about 10 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|            |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1939 ..... | 897-74                        | 17,200              | 282                 | 1,755 | 1.00                  | 13.64   | 1,271,000 |
| 1940 ..... | 897-74                        | 6,900               | 302                 | 985   | .563                  | 7.67    | 715,200   |
| 1941 ..... | 927-70                        | 2,800               | 224                 | 784   | .428                  | 5.80    | 541,700   |
| 1942 ..... | 957-74                        | 9,900               | 371                 | 1,851 | 1.06                  | 14.37   | 1,340,000 |
| 1943 ..... | 977-75                        | 30,000              | 334                 | 1,962 | 1.12                  | 15.24   | 1,420,000 |
| 1944 ..... | 1007-77                       | 8,620               | 261                 | 1,068 | .611                  | 8.32    | 775,100   |
| 1945 ..... | 1037-79                       | 47,800              | 283                 | 3,562 | 2.04                  | 27.65   | 2,579,000 |
| 1946 ..... | 1057-78                       | 16,600              | 422                 | 2,310 | 1.32                  | 17.92   | 1,672,000 |
| 1947 ..... | 1087-80                       | 10,100              | 362                 | 1,430 | .818                  | 11.12   | 1,035,000 |
| 1948 ..... | .....                         | 11,200              | 362                 | 1,503 | .859                  | 11.71   | 1,091,000 |

### *Calendar Year*

|            |         |        |       |       |       |       |           |
|------------|---------|--------|-------|-------|-------|-------|-----------|
| 1939 ..... | 897-74  | 17,200 | 282   | 1,754 | 1.00  | 13.63 | 1,270,000 |
| 1940 ..... | 897-74  | 6,900  | 292   | 1,031 | .589  | 8.02  | 748,600   |
| 1941 ..... | 927-70  | 4,700  | 224   | 1,020 | .583  | 7.91  | 738,300   |
| 1942 ..... | 957-74  | 9,900  | 346   | 1,817 | 1.04  | 14.13 | 1,315,000 |
| 1943 ..... | 977-75  | 30,000 | 307   | 1,672 | .956  | 12.97 | 1,211,000 |
| 1944 ..... | 1007-77 | 8,620  | 261   | 1,052 | .601  | 8.21  | 763,700   |
| 1945 ..... | 1037-79 | 47,800 | 389   | 3,784 | 2.16  | 29.36 | 2,739,000 |
| 1946 ..... | 1057-78 | 16,600 | 391   | 2,344 | 1.34  | 18.20 | 1,697,000 |
| 1947 ..... | 1087-80 | 10,100 | 362   | 1,268 | .725  | 9.85  | 918,200   |
| 1948 ..... | .....   | .....  | ..... | ..... | ..... | ..... | .....     |

## 22. Black River at Pocahontas, Ark.

LOCATION: Water-stage recorder, lat. 36°15', long. 90°58', in SW¼ sec. 27, T. 19 N., R. 1 E., at Pocahontas, Randolph County, 1½ miles downstream from Fourche Creek. Datum of gage is 242.43 feet above mean Gulf level.

DRAINAGE AREA: 4,483 square miles.

RECORDS AVAILABLE: Discharge, January 1936 to September 1948. Chemical quality, see analysis page 168.

MEAN ANNUAL RUNOFF: 15.82 inches or 4,087,000 acre-feet.

AVERAGE DISCHARGE: 12 years, 5,645 second-feet.



## SURFACE-WATER RESOURCES OF ARKANSAS

**MAXIMUM:** 1936-48: Discharge, 59,600 second-feet June 17, 1945 (gage height, 24.32 feet).

Maximum stage known, 25.9 feet April 17, 1927, present site.

**MINIMUM:** 1936-48: Day: 1,190 second-feet (769 m.g.d.) Aug. 28 to Sept. 2, 1936.

7-day: 1,197 second-feet (774 m.g.d.) Aug. 27 to Sept. 3, 1936.

Calendar month: 1,328 second-feet (858 m.g.d.) August 1936.

Water year: 2,704 second-feet (1,750 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

**REMARKS:** Staff gage at site a quarter of a mile upstream, present datum, Jan. 1, 1936, to July 15, 1937; wire-weight gage at present site and datum July 16, 1937, to July 23, 1940. Records for period Jan. 1, 1936, to July 15, 1937, collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 18 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1936-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean   | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|--------|-----------------------|---------|-----------|
|      |                               |                |                |        |                       | Inches  | Acre-feet |
| 1936 | 877-77                        |                |                |        |                       |         |           |
| 1937 | 877-77                        | 31,600         | 1,720          | 6,512  | 1.34                  | 18.19   | 4,714,000 |
| 1938 | 857-62                        | 30,100         | 1,760          | 6,204  | 1.28                  | 17.38   | 4,492,000 |
| 1939 | 877-77                        | 28,000         | 1,540          | 5,648  | 1.17                  | 15.88   | 4,089,000 |
| 1940 | 897-75                        | 15,000         | 1,570          | 3,278  | .677                  | 9.22    | 2,380,000 |
| 1941 | 927-71                        | 7,160          | 1,330          | 2,704  | .558                  | 7.58    | 1,958,000 |
| 1942 | 957-75                        | 18,600         | 1,710          | 6,122  | 1.26                  | 17.17   | 4,432,000 |
| 1943 | 977-76                        | 38,000         | 1,610          | 6,015  | 1.24                  | 16.87   | 4,354,000 |
| 1944 | 1007-78                       | 17,100         | 1,440          | 3,696  | .763                  | 10.38   | 2,683,000 |
| 1945 | 1037-80                       | 59,600         | 1,440          | 10,470 | 2.16                  | 29.37   | 7,584,000 |
| 1946 | 1057-79                       | 29,600         | 2,240          | 6,997  | 1.44                  | 19.61   | 5,066,000 |
| 1947 | 1087-81                       | 14,600         | 1,880          | 4,993  | 1.03                  | 14.01   | 3,615,000 |
| 1948 |                               | 15,400         | 1,720          | 5,096  | 1.05                  | 14.31   | 3,700,000 |

*Calendar Year*

|      |         |        |       |        |      |       |           |
|------|---------|--------|-------|--------|------|-------|-----------|
| 1936 | 877-77  | 9,850  | 1,190 | 2,999  | .619 | 8.43  | 2,177,000 |
| 1937 | 877-77  | 31,600 | 1,720 | 6,159  | 1.27 | 17.24 | 4,459,000 |
| 1938 | 857-62  | 30,100 | 1,580 | 6,035  | 1.25 | 16.97 | 4,369,000 |
| 1939 | 877-77  | 28,000 | 1,540 | 5,618  | 1.16 | 15.75 | 4,067,000 |
| 1940 | 897-75  | 15,000 | 1,450 | 3,374  | .697 | 9.48  | 2,449,000 |
| 1941 | 927-71  | 12,800 | 1,330 | 3,549  | .733 | 9.94  | 2,570,000 |
| 1942 | 957-75  | 19,100 | 1,610 | 5,911  | 1.22 | 16.59 | 4,279,000 |
| 1943 | 977-76  | 38,000 | 1,640 | 5,276  | 1.09 | 14.79 | 3,819,000 |
| 1944 | 1007-78 | 17,100 | 1,440 | 3,669  | .758 | 10.31 | 2,664,000 |
| 1945 | 1037-80 | 59,600 | 1,640 | 11,000 | 2.27 | 30.83 | 7,962,000 |
| 1946 | 1057-79 | 29,600 | 2,090 | 7,461  | 1.54 | 20.91 | 5,401,000 |
| 1947 | 1087-81 | 14,600 | 1,820 | 4,296  | .887 | 12.05 | 3,110,000 |
| 1948 |         |        |       |        |      |       |           |

## 23. Black River at Black Rock, Ark.

**LOCATION:** Staff gage, lat. 36°06', long. 91°06', in NW¼ sec. 21, T. 17 N., R. 1 W., 900 feet downstream from St. Louis-San Francisco Railway Bridge at Black Rock, Lawrence County, 3¾ miles below Spring River. Datum of gage is 229.56 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 7,323 square miles.

**RECORDS AVAILABLE:** Discharge, June 1929 to September 1931, October 1939 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1946. Spot samples chemical quality, see analysis page 168.

## 77

MAXIMUM: 1929-31, 1939-48: Discharge, 87,400 second-feet Mar. 31, 1945  
(gage height, 27.2 feet).

Maximum stage known, 31.9 feet Aug. 21, 1915, from records of U. S. Weather Bureau.

1939-48: Day: 1,800 second-feet (1,160 m.g.d.) Sept. 19-24,  
1931.

7-day: 1,810 second-feet (1,170 m.g.d.) Sept. 18-24, 1931.

Calendar month: 2,136 second-feet (1,380 m.g.d.) August 1941.

Water year: 3,847 second-feet (2,490 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Gage-height records collected in same vicinity since 1904 are contained in reports of U. S. Weather Bureau. Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 20 feet.

## Water Year Ending September 30

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Per<br>square<br>mile | Run-off |            |
|------------|-------------------------------|---------------------|---------------------|--------|-----------------------|---------|------------|
|            |                               |                     |                     |        |                       | Inches  | Acre-feet  |
| 1930 ..... | 702-54                        | 41,100              | 2,290               | 7,730  | 1.06                  | 14.39   | 5,600,000  |
| 1931 ..... | 717-49                        | 23,000              | 1,800               | 5,170  | .706                  | 9.58    | 3,740,000  |
| 1940 ..... | 897-76                        | 22,400              | 2,180               | 4,762  | .650                  | 8.85    | 3,457,000  |
| 1941 ..... | 927-72                        | 11,800              | 1,870               | 3,847  | .525                  | 7.13    | 2,785,000  |
| 1942 ..... | 957-76                        | 35,400              | 2,850               | 9,451  | 1.29                  | 17.52   | 6,842,000  |
| 1943 ..... | 977-77                        | 64,200              | 2,550               | 9,067  | 1.24                  | 16.80   | 6,564,000  |
| 1944 ..... | 1007-79                       | 30,000              | 2,140               | 5,421  | .740                  | 10.07   | 3,936,000  |
| 1945 ..... | 1037-81                       | 84,300              | 2,050               | 15,790 | 2.16                  | 29.28   | 11,430,000 |
| 1946 ..... | 1057-80                       | 40,400              | 3,400               | 10,640 | 1.45                  | 19.73   | 7,701,000  |
| 1947 ..... | 1087-82                       | 19,100              | 2,650               | 6,974  | .952                  | 12.91   | 5,049,000  |
| 1948 ..... |                               | 26,800              | 2,500               | 7,220  | .986                  | 13.42   | 5,242,000  |

## Calendar Year

|      |         |        |       |        |      |       |            |
|------|---------|--------|-------|--------|------|-------|------------|
| 1930 | 702-54  | 41,100 | 2,290 | 7,450  | 1.02 | 13.85 | 5,400,000  |
| 1931 | 717-49  |        |       |        |      |       |            |
| 1940 | 897-76  | 22,400 | 2,050 | 4,861  | .664 | 9.04  | 3,529,000  |
| 1941 | 927-72  | 23,200 | 1,870 | 5,236  | .715 | 9.71  | 3,791,000  |
| 1942 | 957-76  | 41,400 | 2,550 | 9,327  | 1.27 | 17.29 | 6,752,000  |
| 1943 | 977-77  | 64,200 | 2,450 | 7,894  | 1.05 | 14.25 | 5,571,000  |
| 1944 | 1007-79 | 30,000 | 2,050 | 5,353  | .731 | 9.95  | 3,886,000  |
| 1945 | 1037-81 | 84,300 | 2,300 | 16,560 | 2.26 | 30.70 | 11,990,000 |
| 1946 | 1057-80 | 40,400 | 3,120 | 11,270 | 1.54 | 20.89 | 8,156,000  |
| 1947 | 1087-82 | 19,100 | 2,650 | 5,970  | .815 | 11.06 | 4,322,000  |
| 1948 |         |        |       |        |      |       |            |

## 23. BLACK RIVER AT BLACK ROCK, ARK.

Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1945:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 9,703                        | 24.1                              | 8.3 | 12                         | 0.14      | 1.5           | 30           | 16             | 4.6         | 2.4           | 158                             | 4.4                        | 2.5           | 0.1          | 1.5                        | 153              | 141                           | 11            |
| Oct. 11-20         | 6,759                        | 27.0                              | 8.3 | 11                         | .12       | 1.0           | 30           | 20             | 3.8         | 1.9           | 173                             | 4.4                        | 1.5           | .1           | 1.8                        | 161              | 157                           | 15            |
| Oct. 21-31         | 5,179                        | 31.2                              | 8.2 | 10                         | .10       | .7            | 36           | 23             | 3.8         | 1.8           | 206                             | 4.3                        | 1.5           | .0           | 1.5                        | 184              | 184                           | 16            |
| Nov. 1-10          | 4,898                        | 31.0                              | 8.4 | 9.1                        | .10       | .2            | 35           | 23             | 3.5         | 1.7           | 207                             | 3.6                        | 1.8           | .0           | 1.8                        | 182              | 182                           | 12            |
| Nov. 11-20         | 5,007                        | 31.6                              | 8.4 | 9.2                        | .14       | .4            | 34           | 21             | 3.8         | 1.9           | 211                             | 4.1                        | 2.2           | .0           | 1.5                        | 183              | 171                           | 0             |
| Nov. 21-30         | 4,756                        | 32.0                              | 8.3 | 6.6                        | .14       | .5            | 35           | 22             | 4.2         | 1.8           | 212                             | 4.4                        | 2.0           | .0           | 1.6                        | 184              | 178                           | 4             |
| Dec. 1-10          | 4,432                        | 33.4                              | 8.4 | 14                         | .02       | .5            | 35           | 22             | 11          | 1.7           | 239                             | 2.9                        | 4.0           | .0           | 1.0                        | 210              | 178                           | 0             |
| Dec. 11-20         | 4,080                        | 33.5                              | 8.6 | 14                         | .02       | .2            | 36           | 22             | 4.4         | 1.6           | 220                             | 3.1                        | 4.5           | .0           | 2.0                        | 196              | 180                           | 0             |
| Dec. 21-31         | 4,329                        | 33.5                              | 8.2 | 14                         | .01       | .5            | 39           | 14             | 15          | 1.4           | 221                             | 2.6                        | 4.5           | .0           | 1.5                        | 201              | 155                           | 0             |
| 1946:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 8,259                        | 34.0                              | 8.6 | 12                         | .10       | 1.1           | 34           | 20             | 4.0         | 1.8           | 200                             | 6.7                        | 3.0           | .1           | 2.8                        | 184              | 167                           | 3             |
| Jan. 11-20         | 18,360                       | 20.9                              | 8.6 | 14                         | .18       | 2.6           | 20           | 13             | 2.3         | 1.6           | 124                             | 3.8                        | 2.0           | .1           | 2.2                        | 129              | 103                           | 2             |
| Jan. 21-31         | 12,450                       | 22.7                              | 8.8 | 12                         | .12       | .8            | 23           | 14             | 3.2         | 1.8           | 138                             | 4.2                        | 2.5           | .2           | 3.2                        | 133              | 115                           | 2             |
| Feb. 1-10          | 10,080                       | 32.2                              | 8.0 | 23                         | .14       | 2.0           | 44           | 12             | 9.0         | 4.2           | 182                             | 18                         | 10            | .2           | 1.5                        | 213              | 159                           | 2             |
| Feb. 11-20         | 22,610                       | 29.3                              | 8.2 | 21                         | .16       | 2.6           | 38           | 11             | 8.9         | 3.1           | 160                             | 17                         | 8.0           | .1           | 3.0                        | 192              | 140                           | 10            |
| Feb. 21-28         | 24,600                       | 26.9                              | 8.2 | 21                         | .62       | 5.0           | 35           | 8.9            | 6.1         | 4.0           | 146                             | 14                         | 3.5           | .2           | 3.0                        | 173              | 124                           | 9             |
| Mar. 1-10          | 19,330                       | 22.7                              | 7.9 | 14                         | .18       | 1.1           | 22           | 12             | 5.0         | 1.6           | 130                             | 4.6                        | 2.5           | .1           | 2.5                        | 131              | 104                           | 4             |
| Mar. 11-20         | 17,610                       | 23.9                              | 8.1 | 12                         | .05       | .6            | 28           | 14             | 1.9         | 1.3           | 150                             | 3.6                        | 3.0           | .1           | 2.5                        | 141              | 127                           | 0             |
| Mar. 21-31         | 13,550                       | 25.0                              | 8.0 | 10                         | .05       | .3            | 28           | 15             | 2.3         | 1.6           | 156                             | 4.0                        | 3.0           | .1           | 2.5                        | 147              | 132                           | 4             |
| Apr. 1-10          | 8,976                        | 28.2                              | 8.2 | 11                         | .05       | .0            | 31           | 16             | 5.1         | 1.5           | 180                             | 3.1                        | 2.0           | .1           | 2.8                        | 161              | 143                           | 4             |
| Apr. 11-20         | 7,321                        | 27.6                              | 8.4 | 9.4                        | .02       | .5            | 26           | 18             | 6.3         | .9            | 174                             | 5.1                        | 2.0           | .1           | 2.8                        | 157              | 139                           | 0             |
| Apr. 21-30         | 7,539                        | 29.2                              | 8.4 | 8.5                        | .02       | .1            | 30           | 18             | 5.7         | .8            | 187                             | 3.3                        | 1.8           | .3           | 2.2                        | 163              | 149                           | 0             |
| May 1-10           | 16,320                       | 23.9                              | 8.3 | 12                         | .02       | .6            | 25           | 14             | 4.7         | 1.7           | 150                             | 4.0                        | 2.5           | .2           | 1.5                        | 142              | 120                           | 0             |
| May 11-20          | 19,620                       | 20.8                              | 8.1 | 13                         | .06       | .7            | 22           | 12             | 3.7         | 1.8           | 128                             | 3.8                        | 2.5           | .4           | 1.5                        | 125              | 104                           | 0             |
| May 21-31          | 29,900                       | 19.1                              | 8.1 | 10                         | .06       | 1.8           | 21           | 11             | 2.9         | 1.8           | 118                             | 3.3                        | 3.0           | .2           | 1.5                        | 115              | 98                            | 0             |

— Continued.

## 23. BLACK RIVER AT BLACK ROCK, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| June 1-10 .....    | 28,680                       | 18.8                              | 7.5 | 10                         | 0.10      | 1.5           | 19           | 11             | 3.6         | 1.2           | 115                             | 3.1                        | 1.5           | 0.5          | 1.5                        | 110              | 93                            | 1             |
| June 11-20 .....   | 13,330                       | 23.9                              | 8.3 | 12                         | .06       | .5            | 25           | 14             | 5.8         | 1.2           | 152                             | 4.6                        | 2.0           | .3           | 1.5                        | 142              | 120                           | 0             |
| June 21-30 .....   | 7,309                        | 29.5                              | 8.3 | 13                         | .08       | .5            | 32           | 18             | 4.1         | 1.0           | 189                             | 3.3                        | 2.5           | .2           | 2.0                        | 170              | 154                           | 0             |
| July 1-10 .....    | 6,124                        | 30.5                              | 7.7 | 13                         | .08       | .6            | 32           | 19             | 7.5         | 1.2           | 204                             | 3.5                        | 2.5           | .1           | 1.5                        | 181              | 158                           | 0             |
| July 11-20 .....   | 5,194                        | 31.1                              | 7.9 | 12                         | .08       | .5            | 32           | 20             | 3.7         | 1.2           | 199                             | 3.0                        | 2.8           | .1           | 1.8                        | 175              | 162                           | 0             |
| July 21-31 .....   | 5,378                        | 30.8                              | 8.3 | 14                         | .08       | .6            | 32           | 19             | 5.5         | 1.3           | 199                             | 3.0                        | 2.5           | .1           | 1.5                        | 178              | 158                           | 0             |
| Aug. 1-10 .....    | 5,258                        | 28.3                              | 8.2 | 12                         | .08       | 1.2           | 30           | 19             | 2.1         | 1.5           | 184                             | 3.3                        | 2.5           | .1           | 1.8                        | 164              | 153                           | 0             |
| Aug. 11-20 .....   | 8,197                        | 24.1                              | 8.1 | 12                         | .14       | 2.0           | 29           | 16             | 5.1         |               | 171                             | 3.6                        | 2.2           | .1           | 2.5                        | 157              | 138                           | 2             |
| Aug. 21-31 .....   | 7,203                        | 28.0                              | 8.1 | 10                         | .18       | 1.2           | 31           | 17             | 2.6         | 2.1           | 179                             | 3.9                        | 1.8           | .0           | 2.8                        | 161              | 147                           | 0             |
| Sept. 1-10 .....   | 4,613                        | 29.4                              | 8.1 | 7.9                        | .08       | .7            | 32           | 19             | 5.2         | 1.4           | 198                             | 3.7                        | 2.5           | .0           | 1.8                        | 172              | 158                           | 1             |
| Sept. 11-20 .....  | 3,823                        | 31.2                              | 8.1 | 8.7                        | .12       | .8            | 34           | 22             | 2.6         | 1.8           | 212                             | 3.7                        | 2.8           | .0           | 2.2                        | 183              | 175                           | 0             |
| Sept. 21-30 .....  | 3,539                        | 32.5                              | 8.3 | 8.2                        | .12       | .7            | 36           | 21             | 3.9         | 1.8           | 215                             | 3.6                        | 3.5           | .0           | 2.5                        | 187              | 176                           | 2             |
| Average .....      | 10,640                       | 27.8                              | 8.4 | 12                         | 0.11      | 1.0           | 31           | 17             | 4.9         | 1.7           | 177                             | 4.8                        | 2.8           | 0.1          | 2.0                        | 105              | 146                           | 1             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 23. BLACK RIVER AT BLACK ROCK, ARK.—Continued

*Temperature (° F.) of Water of Black River, Water Year October 1945 to September 1946*

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

## 24. Spring River at Imboden, Ark.

**LOCATION:** Water-stage recorder, lat. 36°12', long. 91°10', in E½ sec. 15, T. 18 N., R. 2. W., at Imboden, Randolph County, 8 miles upstream from Eleven Point River. Datum of gage is 254.07 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 1,162 square miles.

**RECORDS AVAILABLE:** Discharge, February 1936 to September 1948. Chemical quality, see analysis page 169.

**MEAN ANNUAL RUNOFF:** 15.85 inches or 982,400 acre-feet.

**AVERAGE DISCHARGE:** 12 years, 1,357 second-feet.

**MAXIMUM:** 1936-48: Discharge, 64,300 second-feet May 11, 1943 (gage height, 26.10 feet), from rating curve extended above 47,000 second-feet. Maximum stage known, about 30.9 feet in August 1915.

**MINIMUM:** 1936-48: Day: 215 second-feet (139 m.g.d.) Aug. 1, 1936.

7-day: 253 second-feet (164 m.g.d.) Sept. 16-22, 1941.

Calendar month: 291 second-feet (188 m.g.d.) August 1941.

Water year: 528 second-feet (341 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

**REMARKS:** Low flow slightly regulated by power plant at Mammoth Spring, Missouri. Staff gage at site 200 feet downstream, present datum, Feb. 21, 1936, to July 17, 1937; wire-weight gage at present site and datum

Oct. 1, 1938, to Feb. 8, 1939. Records for period February 1936 to July 1937 were collected and computed by the Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 16 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1937 | 877-88                        | 31,500              | 355                 | 1,573 | 1.35                  | 18.33   | 1,139,000 |
| 1938 | 877-88                        | 35,200              | 355                 | 1,622 | 1.40                  | 19.00   | 1,174,000 |
| 1939 | 877-88                        | 33,900              | 329                 | 1,461 | 1.26                  | 17.10   | 1,057,000 |
| 1940 | 897-85                        | 11,600              | 242                 | 668   | .575                  | 7.83    | 485,000   |
| 1941 | 927-80                        | 3,630               | 238                 | 528   | .454                  | 6.16    | 382,000   |
| 1942 | 957-84                        | 21,000              | 375                 | 1,640 | 1.41                  | 19.15   | 1,187,000 |
| 1943 | 977-83                        | 51,700              | 319                 | 1,418 | 1.22                  | 16.56   | 1,027,000 |
| 1944 | 1007-85                       | 13,400              | 275                 | 846   | .728                  | 9.90    | 614,100   |
| 1945 | 1037-87                       | 44,800              | 275                 | 2,760 | 2.38                  | 32.24   | 1,998,000 |
| 1946 | 1057-86                       | 25,600              | 415                 | 1,784 | 1.54                  | 20.84   | 1,292,000 |
| 1947 | 1087-88                       | 6,330               | 293                 | 907   | .781                  | 10.60   | 656,400   |
| 1948 |                               | 13,400              | 305                 | 1,079 | .929                  | 12.63   | 783,000   |

*Calendar Year*

|      |         |        |     |       |      |       |           |
|------|---------|--------|-----|-------|------|-------|-----------|
| 1937 | 877-88  | 31,500 | 355 | 1,507 | 1.30 | 17.65 | 1,091,000 |
| 1938 | 877-88  | 35,200 | 329 | 1,536 | 1.32 | 17.92 | 1,112,000 |
| 1939 | 877-88  | 33,900 | 322 | 1,445 | 1.24 | 16.83 | 1,046,000 |
| 1940 | 897-85  | 11,600 | 242 | 683   | .588 | 7.99  | 495,700   |
| 1941 | 927-80  | 12,100 | 238 | 820   | .706 | 9.57  | 593,400   |
| 1942 | 957-84  | 27,100 | 424 | 1,745 | 1.50 | 20.38 | 1,263,000 |
| 1943 | 977-83  | 51,700 | 308 | 995   | .856 | 11.63 | 720,600   |
| 1944 | 1007-85 | 13,400 | 275 | 848   | .730 | 9.91  | 615,800   |
| 1945 | 1037-87 | 44,800 | 334 | 2,857 | 2.46 | 33.38 | 2,068,000 |
| 1946 | 1057-86 | 25,600 | 391 | 1,891 | 1.63 | 22.09 | 1,369,000 |
| 1947 | 1087-88 | 6,250  | 293 | 741   | .638 | 8.67  | 536,500   |
| 1948 |         |        |     |       |      |       |           |

## 25. Eleven Point River Near Elevenpoint, Ark.

LOCATION: Water-stage recorder, lat. 36°21', long. 91°07', in SE¼SE¼ sec. 30, T. 20 N., R. 1 W., 1½ miles southwest of Elevenpoint, Randolph County. Datum of gage is 291.98 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 1,115 square miles.

RECORDS AVAILABLE: Discharge, November 1929 to June 1933, February 1936 to September 1948. Chemical quality, see analysis page 169.

MEAN ANNUAL RUNOFF: 13.14 inches or 781,200 acre-feet.

AVERAGE DISCHARGE: 14 years (1930-32, 1936-48), 1,079 second-feet.

MAXIMUM: 1929-33, 1936-48: Discharge, 26,900 second-feet May 11, 1943 (gage height, 18.97 feet).

Maximum discharge known, that of May 11, 1943.

MINIMUM: 1929-33,

1936-48: Day: 226 second-feet (146 m.g.d.) Sept. 9, 1936.

7-day: 241 second-feet (156 m.g.d.) Aug. 25-31, 1936.

Calendar month: 269 second-feet (174 m.g.d.) August 1936.

Water year: 527 second-feet (341 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to Nov. 21, 1938, chain gage at same site, datum 0.04 foot higher; Nov. 21 to Dec. 11, 1938, wire-weight gage at same site and datum. Records for period 1929 to 1933 and 1935 to 1938 collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 14 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1930-32, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1930 | 877-90                        | .....               | .....               | ..... | .....                 | .....   | .....     |
| 1931 | 877-91                        | 4,630               | 390                 | 802   | 0.719                 | 9.75    | 580,500   |
| 1932 | *877-91                       | 5,670               | 290                 | 684   | .613                  | 8.34    | 496,400   |
| 1937 | *877-93                       | 14,300              | 290                 | 1,138 | 1.02                  | 13.85   | 823,900   |
| 1938 | *877-93                       | 12,800              | 388                 | 1,182 | 1.06                  | 14.38   | 855,900   |
| 1939 | *877-94                       | 14,600              | 399                 | 1,201 | 1.08                  | 14.62   | 869,500   |
| 1940 | 897-87                        | 5,760               | 345                 | 679   | .609                  | 8.28    | 492,600   |
| 1941 | 927-82                        | 2,230               | 277                 | 527   | .473                  | 6.42    | 381,400   |
| 1942 | *957-86                       | 19,800              | 396                 | 1,390 | 1.25                  | 16.92   | 1,006,000 |
| 1943 | 977-87                        | 19,100              | 444                 | 1,262 | 1.13                  | 15.33   | 913,400   |
| 1944 | 1007-87                       | 9,690               | 317                 | 705   | .652                  | 8.58    | 511,600   |
| 1945 | 1037-89                       | 21,100              | 308                 | 2,092 | 1.88                  | 25.47   | 1,515,000 |
| 1946 | 1057-88                       | 12,200              | 636                 | 1,573 | 1.41                  | 19.14   | 1,139,000 |
| 1947 | 1087-90                       | 3,600               | 450                 | 933   | .837                  | 11.35   | 675,300   |
| 1948 | .....                         | 7,280               | 420                 | 943   | .846                  | 11.51   | 684,400   |

*Calendar Year*

|      |         |        |       |       |       |       |           |
|------|---------|--------|-------|-------|-------|-------|-----------|
| 1930 | 877-90  | 8,850  | 450   | 1,062 | .952  | 12.92 | 768,700   |
| 1931 | 877-91  | 4,630  | 340   | 759   | .681  | 9.22  | 549,600   |
| 1932 | *877-91 | 6,230  | 290   | 728   | .653  | 8.89  | 528,700   |
| 1937 | *877-93 | 14,300 | 388   | 1,115 | 1.00  | 13.57 | 807,300   |
| 1938 | *877-93 | 12,800 | 404   | 1,169 | 1.05  | 14.22 | 846,400   |
| 1939 | *877-94 | 17,600 | 399   | 1,229 | 1.10  | 14.96 | 890,000   |
| 1940 | 897-87  | 5,760  | 320   | 660   | .592  | 8.06  | 479,200   |
| 1941 | 927-82  | 8,410  | 277   | 740   | .664  | 9.02  | 536,100   |
| 1942 | *957-86 | 19,800 | 478   | 1,461 | 1.31  | 17.77 | 1,057,000 |
| 1943 | 977-87  | 19,100 | 348   | 975   | .874  | 11.84 | 705,600   |
| 1944 | 1007-87 | 9,690  | 313   | 689   | .618  | 8.39  | 500,400   |
| 1945 | 1037-89 | 21,100 | 308   | 2,220 | 1.99  | 27.03 | 1,607,000 |
| 1946 | 1057-88 | 12,200 | 611   | 1,632 | 1.46  | 19.86 | 1,182,000 |
| 1947 | 1087-90 | 3,200  | 420   | 783   | .702  | 9.53  | 566,900   |
| 1948 | .....   | .....  | ..... | ..... | ..... | ..... | .....     |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 977, pp. 85-87.

**26. Strawberry River Near Evening Shade, Ark.**

LOCATION: Water-stage recorder, lat. 36°06', long. 91°36', in NE¼ sec. 27, T. 17 N., R. 6 W., at highway bridge 2 miles north of Evening Shade, Sharp County. Datum of gage is 406.56 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 225 square miles.

RECORDS AVAILABLE: Discharge, February 1939 to September 1948. Chemical quality, see analysis page 169.

MEAN ANNUAL RUNOFF: 12.19 inches or 146,200 acre-feet.

AVERAGE DISCHARGE: 9 years, 202 second-feet.

MAXIMUM: 1939-48: Discharge, 22,700 second-feet May 11, 1943 (gage height 24.55 feet).

Maximum discharge known, that of May 11, 1943.

MINIMUM: 1939-48: Day: 5 second-feet (3.2 m.g.d.) Sept. 18-23, 1941.

7-day: 5.1 second-feet (3.3 m.g.d.) Sept. 17-23, 1941.

Calendar month: 7.44 second-feet (4.8 m.g.d.) October 1944.

Water year: 61.6 second-feet (39.8 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to July 23, 1939, wire-weight gage at same site and datum. Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 9 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1940 | 897-90                        | 2,810               | 7.0                 | 89.6 | 0.398                 | 5.43    | 65,040    |
| 1941 | 927-84                        | 2,100               | 5                   | 61.6 | .274                  | 3.70    | 44,620    |
| 1942 | 957-88                        | 5,000               | 10                  | 257  | 1.14                  | 15.49   | 185,900   |
| 1943 | 977-88                        | 13,600              | 6.1                 | 189  | .840                  | 11.45   | 137,200   |
| 1944 | 1007-89                       | 4,510               | 6.7                 | 126  | .560                  | 7.62    | 91,360    |
| 1945 | 1037-91                       | 8,600               | 6.6                 | 479  | 2.13                  | 28.91   | 347,000   |
| 1946 | 1057-90                       | 7,970               | 9.0                 | 288  | 1.28                  | 17.35   | 208,400   |
| 1947 | 1087-92                       | 4,350               | 6.6                 | 136  | .604                  | 8.19    | 98,370    |
| 1948 | .....                         | 5,070               | 5.8                 | 191  | .849                  | 11.57   | 138,800   |

*Calendar Year*

|      |         |        |       |       |       |       |         |
|------|---------|--------|-------|-------|-------|-------|---------|
| 1940 | 897-90  | 2,810  | 7     | 104   | .462  | 6.28  | 75,290  |
| 1941 | 927-84  | 5,000  | 5     | 129   | .573  | 7.77  | 93,400  |
| 1942 | 957-88  | 7,910  | 10    | 248   | 1.10  | 14.99 | 179,800 |
| 1943 | 977-88  | 13,600 | 6.1   | 115   | .511  | 6.96  | 83,270  |
| 1944 | 1007-89 | 4,510  | 6.6   | 128   | .569  | 7.72  | 92,700  |
| 1945 | 1037-91 | 8,600  | 12    | 488   | 2.17  | 29.41 | 353,000 |
| 1946 | 1057-90 | 7,970  | 9.0   | 333   | 1.48  | 20.07 | 241,000 |
| 1947 | 1087-92 | 2,440  | 5.8   | 94.2  | .419  | 5.68  | 68,180  |
| 1948 | .....   | .....  | ..... | ..... | ..... | ..... | .....   |

**27. Strawberry River Near Poughkeepsie, Ark.**

LOCATION: Water-stage recorder, lat. 36°07', long. 91°27', in NW¼ sec. 19, T. 17 N., R. 4 W., half a mile downstream from Hurricane Creek and 2½ miles northeast of Poughkeepsie, Sharp County. Datum of gage is 298.07 feet above mean sea level (Corps of Engineers bench mark).

DRAINAGE AREA: 476 square miles.

RECORDS AVAILABLE: February 1936 to September 1948. Chemical quality, see analysis page 170.

MEAN ANNUAL RUNOFF: 15.06 inches or 382,300 acre-feet.

AVERAGE DISCHARGE: 12 years, 528 second-feet.

MAXIMUM: 1936-48: Discharge, 32,900 second-feet May 11, 1943 (gage height, 24.60 feet).

Maximum discharge known, that of May 11, 1943.

MINIMUM: 1936-48: Day: 12 second-feet (7.8 m.g.d.) Oct. 3, 1938.

7-day: 27.3 second-feet (17.6 m.g.d.) Oct. 2-8, 1938.

Calendar month: 43.2 second-feet (27.9 m.g.d.) October 1938.

Water year: 168 second-feet (109 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to May 12, 1938, staff gage at same site and datum; May 13 to Dec. 10, 1938, wire-weight gage at same site and datum. Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 20 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1937 | 877-99                        | 10,400              | 44                  | 624  | 1.31                  | 17.78   | 451,600   |
| 1938 | 877-100                       | 26,100              | 18                  | 860  | 1.81                  | 24.57   | 622,600   |
| 1939 | 877-100                       | 14,900              | 12                  | 529  | 1.11                  | 15.07   | 383,100   |
| 1940 | 897-91                        | 3,880               | 49                  | 213  | .447                  | 6.10    | 154,900   |
| 1941 | 927-85                        | 2,920               | 45                  | 168  | .353                  | 4.80    | 121,800   |

— Continued.



## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48—(Continued)

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|            |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1942 ..... | 957-89                        | 11,000              | 58                  | 616   | 1.29                  | 17.57   | 446,000   |
| 1943 ..... | 977-89                        | 28,400              | 44                  | 449   | .943                  | 12.80   | 324,900   |
| 1944 ..... | 1007-90                       | 8,170               | 38                  | 310   | .651                  | 8.86    | 224,800   |
| 1945 ..... | 1037-92                       | 19,800              | 41                  | 1,084 | 2.28                  | 30.90   | 784,600   |
| 1946 ..... | 1057-91                       | 14,600              | 51                  | 667   | 1.40                  | 19.02   | 482,600   |
| 1947 ..... | 1087-93                       | 6,780               | 46                  | 351   | .737                  | 10.00   | 254,200   |
| 1948 ..... | .....                         | 8,700               | 47                  | 471   | .989                  | 13.47   | 341,900   |

*Calendar Year*

|            |         |        |       |       |       |       |         |
|------------|---------|--------|-------|-------|-------|-------|---------|
| 1937 ..... | 877-99  | 10,100 | 60    | 669   | 1.41  | 19.14 | 484,300 |
| 1938 ..... | 877-100 | 26,100 | 12    | 702   | 1.47  | 19.95 | 508,500 |
| 1939 ..... | 877-100 | 14,900 | 40    | 528   | 1.11  | 15.05 | 382,200 |
| 1940 ..... | 897-91  | 3,880  | 47    | 240   | .504  | 6.84  | 173,900 |
| 1941 ..... | 927-85  | 6,330  | 45    | 291   | .611  | 8.29  | 210,400 |
| 1942 ..... | 957-89  | 16,300 | 54    | 601   | 1.26  | 17.12 | 434,800 |
| 1943 ..... | 977-89  | 28,400 | 44    | 309   | .649  | 8.82  | 223,900 |
| 1944 ..... | 1007-90 | 8,170  | 38    | 320   | .672  | 9.15  | 232,300 |
| 1945 ..... | 1037-92 | 19,800 | 62    | 1,105 | 2.32  | 31.50 | 799,600 |
| 1946 ..... | 1057-91 | 14,600 | 50    | 752   | 1.58  | 21.46 | 544,700 |
| 1947 ..... | 1087-93 | 6,780  | 46    | 270   | .567  | 7.70  | 195,500 |
| 1948 ..... | .....   | .....  | ..... | ..... | ..... | ..... | .....   |

## 28. Piney Fork Strawberry River at Evening Shade, Ark.

LOCATION: Water-stage recorder, lat. 36°05', long. 91°37', in NE¼ sec. 34, T. 17 N., R. 6 W., at bridge on State highway 11, three-quarters of a mile north of Evening Shade, Sharp County. Datum of gage is 420.62 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 99 square miles.

RECORDS AVAILABLE: Discharge, February 1939 to September 1948. Chemical quality, see analysis page 170.

MEAN ANNUAL RUNOFF: 12.22 inches or 64,510 acre-feet.

AVERAGE DISCHARGE: 9 years, 89.1 second-feet.

MAXIMUM: 1939-48: Discharge, 11,300 second-feet May 11, 1943 (gage height, 19.96 feet). Maximum discharge known, that of May 11, 1943.

MINIMUM: 1939-48: Day: No flow, Sept. 22, 23, 1941 and Sept. 22-27, 1944.

7-day: 0.01 second-foot (0.006 m.g.d.) Sept. 21-27, 1944.

Calendar month: 0.98 second-foot (0.63 m.g.d.) September 1944.

Water year: 21.3 second-feet (13.8 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: Prior to Oct. 5, 1945, wire-weight gage at same site and datum.

Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 12 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|            |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1940 ..... | 1037-97                       | 976                 | 1.2                 | 32.2 | 0.325                 | 4.43    | 23,410    |
| 1941 ..... | 1037-97                       | 366                 | 0                   | 21.3 | .215                  | 2.91    | 15,390    |
| 1942 ..... | 1037-97                       | 2,910               | 1.3                 | 116  | 1.17                  | 15.86   | 83,730    |
| 1943 ..... | 1037-98                       | 5,410               | .6                  | 75.3 | .761                  | 10.33   | 54,540    |
| 1944 ..... | 1037-98                       | 1,750               | 0                   | 55.7 | .563                  | 7.64    | 40,400    |
| 1945 ..... | 1037-98                       | 5,740               | .4                  | 208  | 2.10                  | 28.55   | 150,700   |

—Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48—(Continued)

| Year          | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|---------------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|               |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1946          | 1057-92                       | 4,740               | 1.3                 | 137  | 1.38                  | 18.84   | 99,470    |
| 1947          | 1087-94                       | 1,940               | .1                  | 72.4 | .731                  | 9.92    | 52,380    |
| 1948          |                               | 1,620               | .5                  | 83.9 | .848                  | 11.54   | 60,950    |
| Calendar Year |                               |                     |                     |      |                       |         |           |
| 1940          | 1037-97                       | 976                 | .9                  | 34.9 | .353                  | 4.81    | 25,350    |
| 1941          | 1037-97                       | 1,030               | 0                   | 36.7 | .371                  | 5.02    | 26,540    |
| 1942          | 1037-97                       | 4,570               | 2.6                 | 118  | 1.19                  | 16.25   | 85,770    |
| 1943          | 1037-98                       | 5,410               | .6                  | 51.0 | .515                  | 6.98    | 36,940    |
| 1944          | 1037-98                       | 1,750               | 0                   | 58.5 | .591                  | 8.03    | 42,420    |
| 1945          | 1037-98                       | 5,740               | 4.0                 | 213  | 2.15                  | 29.26   | 154,500   |
| 1946          | 1057-92                       | 4,740               | 1.3                 | 157  | 1.59                  | 21.47   | 113,300   |
| 1947          | 1087-94                       | 1,920               | .1                  | 51.1 | .516                  | 7.01    | 37,020    |
| 1948          |                               |                     |                     |      |                       |         |           |

## 29. South Fork Little Red River Near Clinton, Ark.

LOCATION: Water-stage recorder, lat. 35°34', long. 92°23', in NE¼ sec. 29, T. 11 N., R. 13 W., 1¼ miles downstream from Pedee Creek, 4¼ miles southeast of Clinton, Van Buren County. Datum of gage is 430.02 feet above mean sea level, datum of 1929 (levels by Corps of Engineers).

DRAINAGE AREA: 316 square miles.

RECORDS AVAILABLE: Discharge, February 1939 to September 1948. Chemical quality, see analysis page 170.

MEAN ANNUAL RUNOFF: 23.33 inches or 393,100 acre-feet.

AVERAGE DISCHARGE: 9 years, 543 second-feet.

MAXIMUM: 1939-48: Discharge, 48,500 second-feet May 11, 1943 (gage height 24.27 feet), from rating curve extended above 26,000 second-feet.

Maximum stage known, 25.2 feet, date unknown, from information by local resident.

MINIMUM: 1939-48: Day: No flow, Sept. 21-29, Oct. 19-25, 1939; Sept. 15 to Oct. 12, 1943, Oct. 4-23, 1946, Aug. 18 to Sept. 19, Sept. 24 to Oct. 25, 1947.

7-day: No flow, see above.

Calendar month: 0.02 second-foot (0.013 m.g.d.) September 1947.

Water year: 172 second-feet (111 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to July 14, 1939, staff gage at same site and datum. Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage, about 12 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1940 | 927-88                        | 3,930               | 0                   | 172   | 0.544                 | 7.42    | 124,900   |
| 1941 | 927-88                        | 3,240               | 1.0                 | 326   | 1.03                  | 14.03   | 236,300   |
| 1942 | 957-90                        | 15,800              | 2.2                 | 789   | 2.50                  | 33.89   | 570,900   |
| 1943 | 977-90                        | 22,700              | 0                   | 508   | 1.61                  | 21.78   | 367,600   |
| 1944 | 1007-91                       | 17,300              | 0                   | 508   | 1.61                  | 21.89   | 369,000   |
| 1945 | 1037-99                       | 25,700              | .2                  | 1,099 | 3.48                  | 47.19   | 795,600   |
| 1946 | 1057-93                       | 14,100              | .2                  | 637   | 2.02                  | 27.37   | 461,300   |
| 1947 | 1087-95                       | 14,400              | 0                   | 372   | 1.18                  | 15.99   | 269,300   |
| 1948 |                               | 11,200              | 0                   | 476   | 1.51                  | 20.49   | 345,400   |

—Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48—(Continued)

| Year          | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |            |
|---------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|------------|
|               |                               |                     |                     |       |                       | Inches  | Acre-feet. |
| Calendar Year |                               |                     |                     |       |                       |         |            |
| 1940 .....    | 927-88                        | 3,930               | 1.0                 | 240   | 0.759                 | 10.37   | 174,500    |
| 1941 .....    | 927-88                        | 15,800              | 1.0                 | 550   | 1.74                  | 23.62   | 398,000    |
| 1942 .....    | 957-90                        | 16,700              | 2.2                 | 664   | 2.10                  | 28.54   | 480,800    |
| 1943 .....    | 977-90                        | 22,700              | 0                   | 340   | 1.08                  | 14.58   | 246,200    |
| 1944 .....    | 1007-91                       | 17,300              | .1                  | 560   | 1.77                  | 24.12   | 406,700    |
| 1945 .....    | 1037-99                       | 25,700              | 2.8                 | 1,103 | 3.49                  | 47.35   | 798,300    |
| 1946 .....    | 1057-93                       | 14,400              | 0                   | 768   | 2.43                  | 33.02   | 556,400    |
| 1947 .....    | 1087-95                       | 4,740               | 0                   | 231   | .731                  | 9.92    | 167,200    |
| 1948 .....    |                               |                     |                     |       |                       |         |            |

## 30. Little Red River Near Heber Springs, Ark.

LOCATION: Water-stage recorder, lat. 35°32', long. 92°00', in NE¼ sec. 6, T. 10 N., R. 9 W., 2¾ miles downstream from Peter Creek and 3 miles northeast of town of Heber Springs, Cleburne County. Datum of gage is 271.81 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 1,141 square miles.

RECORDS AVAILABLE: Discharge, September 1927 to June 1935 and March 1936 to September 1948. Chemical quality, see analysis page 171.

MEAN ANNUAL RUNOFF: 21.91 inches or 1,334,000 acre-feet.

AVERAGE DISCHARGE: 19 years (1927-35, 1936-48), 1,842 second-feet.

MAXIMUM: 1927-35, 1936-48: Discharge, 99,100 second-feet May 11, 1943 (gage height, 43.95 feet).

Maximum discharge known, that of May 11, 1943. Maximum stage known prior to 1943, 44.0 feet, original site and datum, in April 1927 (discharge, 78,900 second-feet).

MINIMUM: 1927-35,

1936-48: Day: No flow at times in October 1929, August 1930, August-September 1936, October 1943, October 1946, August-October 1947.

7-day: No flow at times in October 1929, August 1930, September 1936, October 1943, October 1946, August-October 1947.

Calendar month: No flow September 1947.

Water year: 577 second-feet (373 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Dec. 15, 1938, staff gage at site half a mile upstream, datum 1.06 feet lower. Records for period March 1936 to September 1948 collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-34, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1928 | *667-40                       | 71,200              | 24                  | 2,213 | 1.94                  | 26.41   | 1,608,000 |
| 1929 | 687-43                        | 40,800              | 2                   | 2,290 | 2.01                  | 27.28   | 1,660,000 |
| 1930 | *702-63                       | 61,400              | 0                   | 1,660 | 1.45                  | 19.68   | 1,202,000 |
| 1931 | 717-59                        | 22,500              | 8                   | 1,220 | 1.07                  | 14.52   | 884,000   |
| 1932 | 732-74                        | 47,400              | 1                   | 1,690 | 1.48                  | 20.15   | 1,230,000 |
| 1933 | *747-66                       | 62,900              | 12                  | 1,865 | 1.63                  | 22.13   | 1,349,000 |

— Continued.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48—(Continued)

| Year | W. S. P.<br>(no and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |            |
|------|------------------------------|----------------|----------------|-------|-----------------------|---------|------------|
|      |                              |                |                |       |                       | Inches  | Acres-feet |
| 1934 | 762-33                       | 48,500         | 1              | 1,253 | 1.10                  | 14.93   | 906,000    |
| 1937 | 857-75                       | 32,400         | 6              | 2,144 | 1.88                  | 25.52   | 1,552,000  |
| 1938 | 857-75                       | 64,800         | 9              | 2,505 | 2.20                  | 29.86   | 1,813,000  |
| 1939 | 877-101                      | 65,800         | .8             | 2,261 | 1.98                  | 26.88   | 1,637,000  |
| 1940 | 897-92                       | 13,900         | .5             | 877   | .506                  | 6.89    | 419,000    |
| 1941 | 927-89                       | 10,500         | 1.9            | 866   | .759                  | 10.32   | 627,000    |
| 1942 | 957-91                       | 46,400         | 14             | 2,448 | 2.15                  | 29.13   | 1,772,000  |
| 1943 | 977-91                       | 78,100         | .1             | 1,533 | 1.34                  | 18.22   | 1,110,000  |
| 1944 | 1007-92                      | 32,400         | 0              | 1,701 | 1.49                  | 20.28   | 1,235,000  |
| 1945 | 1037-100                     | 76,900         | 1.3            | 3,718 | 3.26                  | 44.23   | 2,692,000  |
| 1946 | 1057-94                      | 48,800         | .5             | 2,326 | 2.04                  | 27.67   | 1,684,000  |
| 1947 | 1087-96                      | 30,600         | 0              | 1,254 | 1.10                  | 14.91   | 90,800     |
| 1948 |                              | 26,300         | 0              | 1,478 | 1.30                  | 17.62   | 1,073,000  |

## Calendar Year

|      |          |        |      |       |      |       |           |
|------|----------|--------|------|-------|------|-------|-----------|
| 1928 | *667-40  | 71,200 | 9    | 2,020 | 1.77 | 24.09 | 1,470,000 |
| 1929 | 687-43   | 40,800 | 0    | 2,080 | 1.82 | 24.71 | 1,510,000 |
| 1930 | *702-63  | 61,400 | 0    | 1,860 | 1.63 | 22.13 | 1,350,000 |
| 1931 | 717-59   | 17,400 | 1    | 1,060 | .929 | 12.61 | 768,000   |
| 1932 | 732-74   | 47,400 | 14   | 1,740 | 1.52 | 20.69 | 1,260,000 |
| 1933 | *747-66  | 62,900 | 12   | 1,730 | 1.52 | 20.63 | 1,250,000 |
| 1934 | 762-33   | 48,500 | 1    | 1,245 | 1.09 | 14.80 | 901,000   |
| 1937 | 857-75   | 32,400 | 6    | 2,046 | 1.79 | 24.30 | 1,481,000 |
| 1938 | 857-75   | 64,800 | 4    | 2,322 | 2.04 | 27.69 | 1,681,000 |
| 1939 | 877-101  | 65,800 | .5   | 2,098 | 1.84 | 24.98 | 1,519,000 |
| 1940 | 897-92   | 13,900 | 1.9  | 723   | .634 | 8.62  | 524,900   |
| 1941 | 927-89   | 36,100 | 10.7 | 1,588 | 1.39 | 18.90 | 1,149,000 |
| 1942 | 957-91   | 46,400 | 14   | 2,081 | 1.82 | 24.76 | 1,507,000 |
| 1943 | 977-91   | 78,100 | 0    | 1,032 | .904 | 12.27 | 747,300   |
| 1944 | 1007-92  | 32,400 | 1.3  | 1,878 | 1.65 | 22.39 | 1,368,000 |
| 1945 | 1037-100 | 76,900 | 14   | 3,727 | 3.27 | 44.35 | 2,699,000 |
| 1946 | 1057-94  | 48,800 | 0    | 2,768 | 2.43 | 32.92 | 2,004,000 |
| 1947 | 1,087-96 | 12,800 | 0    | 797   | .699 | 9.49  | 577,300   |
| 1948 |          |        |      |       |      |       |           |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 857, pp. 75-77.

## 31. Middle Fork Little Red River at Shirley, Ark.

**LOCATION:** Water-stage recorder, lat. 35°39', long. 92°18', in SW¼ sec. 20, T. 12 N., R. 12 W., at Missouri and Arkansas Railway bridge, 1 mile east of Shirley, Van Buren County. Datum of gage is 483.12 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 294 square miles.

**RECORDS AVAILABLE:** Discharge, February 1939 to September 1948. Chemical quality, see analysis page 171.

**MEAN ANNUAL RUNOFF:** 21.47 inches or 336,600 acre-feet.

**AVERAGE DISCHARGE:** 9 years, 465 second-feet.

**MAXIMUM:** 1939-48: Discharge, 60,700 second-feet May 11, 1943 (gage height, 27.15 feet).

Maximum stage known, 27.3 feet Mar. 10, 1935, from information by local resident.

**MINIMUM:** 1939-48: Day: No flow Sept. 13 to Oct. 23, 1943, Sept. 27, Oct. 5-21, 1946, Aug. 10 to Oct. 31, 1947.

7-day: No flow, see above.

Calendar Month: No flow September, October 1947.

Water year: 130 second-feet (84.0 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to June 6, 1939, wire-weight gage at same site and datum. Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Bankfull stage of about 19 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1940 | 897-94                        | 2,240               | 0.1                 | 130  | 0.442                 | 6.02    | 94,300    |
| 1941 | 927-90                        | 4,330               | .1                  | 255  | .867                  | 11.77   | 184,800   |
| 1942 | 957-92                        | 13,200              | 2.2                 | 653  | 2.22                  | 30.16   | 473,000   |
| 1943 | 977-92                        | 23,100              | 0                   | 458  | 1.56                  | 21.14   | 331,800   |
| 1944 | 1007-92                       | 13,200              | 0                   | 419  | 1.43                  | 19.40   | 304,200   |
| 1945 | 1037-101                      | 24,600              | .2                  | 959  | 3.26                  | 44.28   | 694,000   |
| 1946 | 1057-95                       | 12,600              | 0                   | 567  | 1.93                  | 26.18   | 410,500   |
| 1947 | 1087-97                       | 12,100              | 0                   | 395  | 1.34                  | 18.24   | 285,800   |
| 1948 |                               | 11,000              | 0                   | 352  | 1.20                  | 16.28   | 255,600   |

*Calendar Year*

|      |          |        |     |     |      |       |         |
|------|----------|--------|-----|-----|------|-------|---------|
| 1940 | 897-94   | 2,240  | .1  | 172 | .585 | 7.95  | 124,600 |
| 1941 | 927-90   | 13,200 | 2.6 | 471 | 1.60 | 21.75 | 341,300 |
| 1942 | 957-92   | 16,300 | 2.2 | 572 | 1.95 | 26.42 | 414,400 |
| 1943 | 977-92   | 23,100 | 0   | 281 | .956 | 12.97 | 203,600 |
| 1944 | 1007-92  | 13,200 | .2  | 459 | 1.56 | 21.27 | 333,400 |
| 1945 | 1037-101 | 24,600 | 4.0 | 957 | 3.26 | 44.18 | 692,600 |
| 1946 | 1057-95  | 12,600 | 0   | 717 | 2.44 | 33.10 | 518,900 |
| 1947 | 1087-97  | 7,160  | 0   | 240 | .816 | 11.09 | 173,900 |
| 1948 |          |        |     |     |      |       |         |

## 32. Cache River at Patterson, Ark.

LOCATION: Staff gage, lat. 35°15'28", long. 91°14'25", in S½ sec. 6, T. 7 N., R. 2 W., 250 feet north of bridge on U. S. Highway 64, just west of Patterson, Woodruff County. Datum of gage is 0.24 foot below mean sea level, 0.00 mean Gulf level.

DRAINAGE AREA: 1,050 square miles.

RECORDS AVAILABLE: Discharge, February 1928 to September 1931 in reports of Geological Survey; July 1937 to December 1948 in files of Corps of Engineers, Memphis District.

MEAN ANNUAL RUNOFF: 13.19 inches or 767,000 acre-feet.

AVERAGE DISCHARGE: 14 years (1929-48), 1,060 second-feet.

MAXIMUM: 1928-31, 1937-48: Discharge, 13,200 second-feet Feb. 24, 1938 (gage height, 196.4 feet).

MINIMUM: 1928-31,

1938-48 Day: 35 second-feet (22.6 m.g.d.) Oct. 9-19, 1938.

7-day: 35 second-feet (22.6 m.g.d.), see above.

Calendar month: 37 second-feet (23.9 m.g.d.) October 1938.

Water year: 308 second-feet (199 m.g.d.) Oct. 1, 1930, to Sept. 30, 1931.

REMARKS: Gage-height records July 11, 1916, to Dec. 31, 1931, are contained in reports of U. S. Weather Bureau; January 1945 to December 1948 in reports of Mississippi River Commission. Records for period July 1937 to December 1948 furnished by Corps of Engineers, Memphis District. Bankfull stage, about 192 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929-31, 1938-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1929 | 687-44                        | 6,340               | 100                 | 1,420 | 1.35                  | 18.32   | 1,030,000 |
| 1930 | 702-64                        | 10,800              | 51                  | 1,040 | .990                  | 13.44   | 752,000   |
| 1931 | 717-60                        | 2,400               | 57                  | 308   | .293                  | 3.98    | 223,000   |
| 1938 |                               | 10,100              | 39                  | 1,490 | 1.42                  | 19.28   | 1,080,000 |
| 1939 |                               | 7,320               | 35                  | 1,180 | 1.12                  | 15.20   | 854,000   |
| 1940 |                               | 5,380               | 40                  | 468   | .446                  | 6.07    | 340,000   |
| 1941 |                               | 2,820               | 40                  | 356   | .339                  | 4.60    | 258,000   |
| 1942 |                               | 5,700               | 40                  | 1,230 | 1.17                  | 15.88   | 890,000   |
| 1943 |                               | 6,020               | 40                  | 708   | .674                  | 9.15    | 513,000   |
| 1944 |                               | 4,760               | 40                  | 840   | .800                  | 10.89   | 610,000   |
| 1945 |                               | 10,200              | 40                  | 2,290 | 2.18                  | 29.59   | 1,660,000 |
| 1946 |                               | 6,020               | 70                  | 1,380 | 1.31                  | 17.78   | 999,000   |
| 1947 |                               | 4,360               | 52                  | 708   | .674                  | 9.15    | 513,000   |
| 1948 |                               | 5,560               | 44                  | 1,360 | 1.30                  | 17.70   | 987,000   |

*Calendar Year*

|      |        |        |     |       |      |       |           |
|------|--------|--------|-----|-------|------|-------|-----------|
| 1929 | 687-44 | 6,340  | 84  | 1,190 | 1.13 | 15.34 | 857,000   |
| 1930 | 702-64 | 10,800 | 51  | 1,020 | .971 | 13.15 | 737,000   |
| 1931 | 717-60 |        |     |       |      |       |           |
| 1938 |        | 10,100 | 35  | 1,230 | 1.17 | 15.88 | 890,000   |
| 1939 |        | 7,320  | 40  | 1,180 | 1.12 | 15.20 | 854,000   |
| 1940 |        | 5,380  | 40  | 530   | .505 | 6.87  | 385,000   |
| 1941 |        | 2,820  | 40  | 376   | .358 | 4.86  | 272,000   |
| 1942 |        | 5,700  | 50  | 1,230 | 1.17 | 15.88 | 890,000   |
| 1943 |        | 6,020  | 40  | 617   | .588 | 7.98  | 447,000   |
| 1944 |        | 4,760  | 40  | 930   | .886 | 12.06 | 675,000   |
| 1945 |        | 10,200 | 100 | 2,350 | 2.24 | 30.41 | 1,700,000 |
| 1946 |        | 6,020  | 60  | 1,410 | 1.34 | 18.19 | 1,020,000 |
| 1947 |        | 4,360  | 44  | 791   | .757 | 10.28 | 573,000   |
| 1948 |        | 5,560  | 60  | 1,340 | 1.28 | 17.42 | 973,000   |

**33. Bayou De View Near Morton, Ark.**

LOCATION: Staff gage, lat. 35°15'07", long. 91°06'37", on line between secs. 4 and 5, T. 7 N., R. 1 W., at bridge on U. S. Highway 64, one mile west of Morton, Woodruff County. Datum of gage is 0.26 foot below mean sea level, datum of 1929, and 0.00 mean Gulf level.

DRAINAGE AREA: 425 square miles.

RECORDS AVAILABLE: Discharge, June 1937 to January 1939 (measurements only); February 1939 to December 1948 in files of Corps of Engineers, Memphis District.

MEAN ANNUAL RUNOFF: 15.14 inches or 343,000 acre-feet.

AVERAGE DISCHARGE: 9 years (1940-48), 474 second-feet.

MAXIMUM: 1939-48: Discharge, 4,150 second-feet Feb. 10, 1939 (gage height, 204.80 feet M.G.L.).

Discharge not determined for maximum stage of 206.54 M.G.L. Jan. 26, 1937.

MINIMUM: 1940-48: Day: No flow, Aug. 7-16, Aug. 19 to Oct. 13, Nov. 28 to Dec. 8, 1943; July 8-27, Aug. 10-30, Oct. 27 to Nov. 7, 1944; Sept. 14, 1946; June 17-19, Aug. 2 to Sept. 15, Oct. 3-25, 1947; May 25 to June 15, Oct. 19-31, 1948.

7-day: No flow, see above.

Calendar month: No flow, September 1943.

Water year: 135 second feet (87.3 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

REMARKS: High-water readings since 1932 and daily gage-height records since Feb. 5, 1939, are in files of Corps of Engineers, Memphis District. Gage-height records, 1945 to 1948, are contained in reports of Mississippi River Commission. Records furnished by Corps of Engineers, Memphis District. Bankfull stage, about 201 feet.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|------|-----------------------|---------|-----------|
|      |                |                |      |                       | Inches  | Acre-feet |
| 1939 |                |                |      |                       |         |           |
| 1940 | 2,790          | 2              | 212  | 0.499                 | 6.79    | 154,000   |
| 1941 | 1,420          | 2              | 141  | .332                  | 4.51    | 102,000   |
| 1942 | 3,120          | 4              | 478  | 1.12                  | 15.20   | 345,000   |
| 1943 | 2,790          | 0              | 236  | .355                  | 7.53    | 171,000   |
| 1944 | 3,710          | 0              | 473  | 1.11                  | 15.11   | 343,000   |
| 1945 | 3,800          | 0              | 925  | 2.18                  | 29.59   | 670,000   |
| 1946 | 3,780          | 0              | 807  | 1.90                  | 25.79   | 584,000   |
| 1947 | 2,800          | 0              | 307  | .722                  | 9.80    | 224,000   |
| 1948 | 3,510          | 0              | 684  | 1.61                  | 21.91   | 497,000   |

#### *Calendar Year*

|      |       |   |       |      |       |         |
|------|-------|---|-------|------|-------|---------|
| 1939 | 4,150 | 1 |       |      |       |         |
| 1940 | 2,790 | 2 | 249   | .586 | 7.98  | 181,000 |
| 1941 | 2,040 | 2 | 159   | .374 | 5.08  | 115,000 |
| 1942 | 3,120 | 4 | 468   | 1.10 | 14.93 | 339,000 |
| 1943 | 2,790 | 0 | 189   | .445 | 6.04  | 137,000 |
| 1944 | 3,710 | 0 | 562   | 1.32 | 17.97 | 408,000 |
| 1945 | 3,800 | 7 | 1,006 | 2.36 | 32.04 | 727,000 |
| 1946 | 3,780 | 0 | 750   | 1.76 | 23.89 | 543,000 |
| 1947 | 2,800 | 0 | 340   | .800 | 10.86 | 246,000 |
| 1948 | 3,510 | 0 | 747   | 1.76 | 23.96 | 542,000 |

### 34. Lagrue Bayou Near Stuttgart, Ark.

LOCATION: Water-stage recorder, lat. 94°31'55", long. 91°21'20", in NW¼ sec. 17, T. 2 S., R. 3 W., 11 miles east of Stuttgart, Arkansas County. Datum of gage is 175.14 feet above mean Gulf level (Corps of Engineers, bench mark).

DRAINAGE: 175 square miles.

RECORDS AVAILABLE: Discharge, August 1935 to September 1948. Chemical quality, see analysis page 171.

MEAN ANNUAL RUNOFF: 16.44 inches or 153,500 acre-feet.

AVERAGE DISCHARGE: 13 years, 212 second-feet.

MAXIMUM: 1935-48: Discharge, 6,580 second-feet Jan. 24, 1937 (gage height, 16.9 feet, from flood mark), from rating curve extended above 3,000 second-feet.

Maximum discharge known, that of Jan. 24, 1937.

MINIMUM: 1935-48: Day: No flow at times in 1936, 1937, 1938, 1941, 1943, 1944, 1947.

7-day: No flow at times in 1936, 1937, 1938, 1944 and 1947.

Calendar month: 0.4 second-foot (0.26 m.g.d.) June 1936.

Water year: 53.5 second-feet (34.6 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Prior to Sept. 13, 1940, staff gage at same site and datum. Flow affected by seasonal diversions for irrigation. Bankfull stage, about 10 feet.

# ARKANSAS RIVER BASIN

91

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1936-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|------|----------------------------|
| 1936 | 807-68                        | 1,210               | 0                   | 53.5 | 38,860                     |
| 1937 | *827-66                       | 6,440               | 0                   | 259  | 187,100                    |
| 1938 | *857-78                       | 3,860               | 1                   | 285  | 206,200                    |
| 1939 | *877-102                      | 3,970               | 0                   | 286  | 206,800                    |
| 1940 | 897-95                        | 850                 | .1                  | 86.6 | 62,870                     |
| 1941 | 927-91                        | 592                 | 0                   | 90.5 | 65,500                     |
| 1942 | *957-93                       | 2,230               | .1                  | 173  | 125,200                    |
| 1943 | *977-93                       | 1,930               | .3                  | 124  | 89,460                     |
| 1944 | 1007-94                       | 1,700               | 0                   | 142  | 103,100                    |
| 1945 | 1037-103                      | 3,310               | 0                   | 342  | 247,700                    |
| 1946 | 1057-96                       | 3,750               | 2.7                 | 455  | 329,100                    |
| 1947 | 1087-98                       | 925                 | .5                  | 94.9 | 68,730                     |
| 1948 | .....                         | 3,970               | 0                   | 363  | 263,200                    |

### *Calendar Year*

|      |          |       |       |       |         |
|------|----------|-------|-------|-------|---------|
| 1936 | 807-68   | 1,210 | 0     | 62.7  | 45,540  |
| 1937 | *827-66  | 6,440 | 0     | 268   | 194,100 |
| 1938 | *857-78  | 3,860 | 0     | 251   | 181,500 |
| 1939 | *877-102 | 3,970 | .1    | 293   | 212,100 |
| 1940 | 897-95   | 850   | .9    | 99.8  | 72,470  |
| 1941 | 927-91   | 592   | 0     | 73.8  | 53,440  |
| 1942 | *957-93  | 2,230 | .1    | 197   | 142,300 |
| 1943 | *977-93  | 1,930 | 0     | 94.2  | 68,220  |
| 1944 | 1007-94  | 3,090 | 0     | 198   | 143,600 |
| 1945 | 1037-103 | 3,310 | 1.7   | 456   | 330,300 |
| 1946 | 1057-96  | 3,750 | .8    | 311   | 225,000 |
| 1947 | 1087-98  | 1,110 | 0     | 123   | 89,180  |
| 1948 | .....    | ..... | ..... | ..... | .....   |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 1037, p. 102.

# ARKANSAS RIVER BASIN

## 35. Arkansas River at Van Buren, Ark.

**LOCATION:** Water-stage recorder, lat. 35°26', long. 94°22', in sec. 24, T. 9 N., R. 32 W., at Van Buren, Crawford County, 1½ miles downstream from Lee Creek. Datum of gage is 372.36 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 150,300 square miles.

**RECORDS AVAILABLE:** Discharge, October 1927 to September 1948. Chemical analyses and water temperatures, October 1945 to September 1948.

**MEAN ANNUAL RUNOFF:** 23,490,000 acre-feet.

**AVERAGE DISCHARGE:** 21 years, 32,450 second-feet.

**MAXIMUM:** 1927-48: Discharge, 850,000 second-feet May 12, 1943 (gage height, 38.0 feet).

Maximum discharge known, that of May 12, 1943; maximum gage height known, 38.1 feet April 16, 1945.

**MINIMUM:** 1927-48: Day: 245 second-feet (158 m.g.d.) Aug. 21, 1934.

7-day: 276 second-feet (178 m.g.d.) Aug. 19-25, 1934.

Calendar month: 658 second-feet (425 m.g.d.) August 1934.

Water year: 7,523 second-feet (4,860 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.



REMARKS: Prior to Oct. 1, 1934, chain gage at same site and datum. Gage-height records collected at Fort Smith, 8 miles upstream, since 1879 are contained in reports of U. S. Weather Bureau. Flow partly regulated by Lake O' The Cherokees on Neosho (Grand) River since March 1940. Bankfull stage, about 22 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|--------|----------------------------|
| 1928 | 667-47                        | 241,000             | 3,780               | 43,900 | 31,900,000                 |
| 1929 | 687-50                        | 315,000             | 3,380               | 50,100 | 36,200,000                 |
| 1930 | 702-70                        | 157,000             | 2,380               | 19,600 | 14,200,000                 |
| 1931 | 717-66                        | 81,200              | 1,260               | 14,900 | 11,200,000                 |
| 1932 | 732-80                        | 184,000             | 2,000               | 28,800 | 20,900,000                 |
| 1933 | 747-72                        | 278,000             | 850                 | 23,900 | 17,300,000                 |
| 1934 | 762-78                        | 114,000             | 245                 | 12,280 | 8,888,000                  |
| 1935 | 787-87                        | 403,000             | 2,960               | 49,620 | 35,920,000                 |
| 1936 | 807-84                        | 140,000             | 710                 | 11,890 | 8,634,000                  |
| 1937 | 827-81                        | 150,000             | 2,680               | 24,350 | 17,630,000                 |
| 1938 | 857-96                        | 369,000             | 2,420               | 32,580 | 23,580,000                 |
| 1939 | 877-122                       | 73,400              | 1,010               | 10,600 | 7,674,000                  |
| 1940 | 897-115                       | 98,900              | 559                 | 7,523  | 5,462,000                  |
| 1941 | 927-113                       | 304,000             | 1,360               | 31,800 | 23,020,000                 |
| 1942 | 957-114                       | 480,000             | 7,640               | 65,250 | 47,240,000                 |
| 1943 | 977-114                       | 784,000             | 2,660               | 50,480 | 36,540,000                 |
| 1944 | 1007-115                      | 232,000             | 3,220               | 33,520 | 24,340,000                 |
| 1945 | 1037-127                      | 637,000             | 3,850               | 62,940 | 45,560,000                 |
| 1946 | 1057-121                      | 282,000             | 3,120               | 33,790 | 24,460,000                 |
| 1947 | 1087-123                      | 252,000             | 3,130               | 38,660 | 27,990,000                 |
| 1948 | .....                         | 328,000             | 2,730               | 34,910 | 25,340,000                 |

*Calendar Year*

|      |          |         |       |        |            |
|------|----------|---------|-------|--------|------------|
| 1928 | 667-47   | 235,000 | 3,380 | 40,100 | 29,200,000 |
| 1929 | 687-50   | 315,000 | 3,070 | 46,200 | 33,300,000 |
| 1930 | 702-70   | 157,000 | 2,380 | 20,300 | 14,700,000 |
| 1931 | 717-66   | 136,000 | 1,260 | 18,900 | 13,700,000 |
| 1932 | 732-80   | 184,000 | 850   | 25,000 | 18,200,000 |
| 1933 | 747-72   | 278,000 | 2,440 | 24,000 | 17,300,000 |
| 1934 | 762-78   | 114,000 | 245   | 14,370 | 10,400,000 |
| 1935 | 787-87   | 403,000 | 3,320 | 50,880 | 36,830,000 |
| 1936 | 807-84   | 140,000 | 710   | 10,950 | 7,951,000  |
| 1937 | 827-81   | 150,000 | 2,420 | 20,850 | 15,090,000 |
| 1938 | 857-96   | 369,000 | 2,180 | 31,800 | 23,020,000 |
| 1939 | 877-122  | 73,400  | 790   | 10,060 | 7,286,000  |
| 1940 | 897-115  | 98,900  | 559   | 9,640  | 6,999,000  |
| 1941 | 927-113  | 480,000 | 4,300 | 56,320 | 40,770,000 |
| 1942 | 957-114  | 324,000 | 7,640 | 47,900 | 34,680,000 |
| 1943 | 977-114  | 784,000 | 2,660 | 42,960 | 31,100,000 |
| 1944 | 1007-115 | 232,000 | 5,250 | 38,220 | 27,750,000 |
| 1945 | 1037-127 | 637,000 | 3,850 | 65,690 | 47,560,000 |
| 1946 | 1057-121 | 252,000 | 3,120 | 32,900 | 23,820,000 |
| 1947 | 1087-123 | 238,000 | 2,730 | 31,480 | 22,790,000 |
| 1948 | .....    | .....   | ..... | .....  | .....      |

## 35. ARKANSAS RIVER AT VAN BUREN, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection          | Mean discharge (second-foot) | Spec-ific con-ductance <sup>1</sup> | Cal-cium (Ca) | Magne-sium (Mg) | So-dium (Na) + Potas-sium (K) | Bicar-bonate (HCO <sub>3</sub> ) | Sul-fate (SO <sub>4</sub> ) | Chlo-ride (Cl) | Ni-trate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Per-cent so-dium |                |
|-----------------------------|------------------------------|-------------------------------------|---------------|-----------------|-------------------------------|----------------------------------|-----------------------------|----------------|-----------------------------|-------------------|--------------------|-------------------------------|-------|------------------|----------------|
|                             |                              |                                     |               |                 |                               |                                  |                             |                |                             | Parts per million | Tons per acre-foot | Tons per day                  | Total |                  | Non-carbon-ate |
|                             |                              |                                     |               |                 |                               |                                  |                             |                |                             |                   |                    |                               |       |                  |                |
| 1945:                       |                              |                                     |               |                 |                               |                                  |                             |                |                             |                   |                    |                               |       |                  |                |
| Oct. 1-10 .....             | 216,100                      | 36.9                                | 32            | 6.6             | 30                            | 90                               | 20                          | 54             | 1.5                         | 228               | 0.31               | 133,000                       | 107   | 33               | 38             |
| Oct. 11-15, 17 .....        | 77,510                       | 60.4                                | 45            | 8.3             | 73                            | 151                              | 32                          | 104            | 1.5                         | 364               | .50                | 76,200                        | 146   | 22               | 52             |
| Oct. 16, 18-20 .....        | 20,820                       | 122                                 | 78            | 16              | 15                            | 66                               | 59                          | 275            | 3.2                         | 736               | 1.00               | 41,400                        | 260   | 124              | 56             |
| Oct. 21-23, 25, 30-31 ..... | 22,080                       | 135                                 | 80            | 17              | 157                           | 164                              | 61                          | 292            | 1.8                         | 784               | 1.07               | 46,700                        | 270   | 135              | 56             |
| Oct. 24, 26-29 .....        | 25,180                       | 94.9                                | 55            | 12              | 107                           | 120                              | 45                          | 194            | 1.2                         | 541               | .74                | 36,800                        | 186   | 88               | 56             |
| Nov. 1-10 .....             | 12,880                       | 150                                 | 79            | 19              | 192                           | 160                              | 57                          | 355            | 1.8                         | 838               | 1.10               | 29,100                        | 275   | 144              | 60             |
| Nov. 11-20 .....            | 9,688                        | 182                                 | 90            | 23              | 241                           | 179                              | 61                          | 448            | 1.0                         | 1,020             | 1.39               | 26,700                        | 319   | 172              | 62             |
| Nov. 21-30 .....            | 8,448                        | 200                                 | 96            | 24              | 257                           | 185                              | 64                          | 480            | .8                          | 1,010             | 1.38               | 23,000                        | 338   | 186              | 62             |
| Dec. 1-10 .....             | 7,572                        | 199                                 | 95            | 26              | 277                           | 190                              | 68                          | 510            | 1.2                         | 1,070             | 1.46               | 21,900                        | 344   | 188              | 64             |
| Dec. 11-20 .....            | 6,888                        | 212                                 | 100           | 25              | 301                           | 200                              | 71                          | 545            | 1.2                         | 1,140             | 1.55               | 21,200                        | 352   | 188              | 65             |
| Dec. 21-31 .....            | 6,411                        | 222                                 | 101           | 26              | 311                           | 195                              | 69                          | 568            | 1.7                         | 1,170             | 1.59               | 20,300                        | 359   | 199              | 65             |
| 1946:                       |                              |                                     |               |                 |                               |                                  |                             |                |                             |                   |                    |                               |       |                  |                |
| Jan. 1-8 .....              | 27,390                       | 212                                 | 98            | 24              | 302                           | 171                              | 66                          | 560            | 1.2                         | 1,140             | 1.55               | 84,300                        | 343   | 203              | 66             |
| Jan. 9-16 .....             | 106,840                      | 43.2                                | 32            | 6.7             | 49                            | 82                               | 24                          | 85             | 2.2                         | 283               | .38                | 81,600                        | 107   | 40               | 50             |
| Jan. 17-20 .....            | 38,820                       | 70.0                                | 44            | 9.2             | 80                            | 102                              | 34                          | 142            | 2.8                         | 414               | .56                | 43,400                        | 148   | 64               | 54             |
| Jan. 21-26 .....            | 25,430                       | 94.5                                | 51            | 12              | 117                           | 115                              | 44                          | 205            | 2.8                         | 558               | .76                | 38,300                        | 176   | 82               | 59             |
| Jan. 27-31 .....            | 18,720                       | 130                                 | 69            | 17              | 164                           | 146                              | 58                          | 295            | 2.8                         | 779               | 1.06               | 39,400                        | 242   | 122              | 60             |
| Feb. 1-10 .....             | 21,350                       | 114                                 | 58            | 14              | 142                           | 132                              | 55                          | 244            | 2.8                         | 658               | .90                | 37,900                        | 202   | 94               | 61             |
| Feb. 11-13, 18 .....        | 37,800                       | 77.5                                | 38            | 9.1             | 95                            | 88                               | 35                          | 163            | 2.0                         | 428               | .58                | 43,700                        | 132   | 60               | 61             |
| Feb. 14-17, 19-26 .....     | 85,000                       | 38.0                                | 23            | 5.4             | 45                            | 57                               | 20                          | 77             | 1.8                         | 237               | .32                | 54,400                        | 80    | 33               | 55             |
| Feb. 27-Mar. 10 .....       | 23,140                       | 130                                 | 60            | 15              | 168                           | 139                              | 49                          | 290            | 2.8                         | 726               | .99                | 45,400                        | 211   | 97               | 63             |
| Mar. 11-20 .....            | 29,440                       | 130                                 | 64            | 16              | 170                           | 142                              | 63                          | 293            | 1.5                         | 729               | .99                | 57,900                        | 226   | 109              | 62             |
| Mar. 21-31 .....            | 35,680                       | 102                                 | 54            | 14              | 133                           | 132                              | 57                          | 214            | 2.0                         | 585               | .79                | 56,200                        | 192   | 84               | 60             |
| Apr. 1-6 .....              | 25,680                       | 107                                 | 57            | 15              | 127                           | 149                              | 46                          | 218            | 2.5                         | 596               | .81                | 41,300                        | 204   | 82               | 58             |
| Apr. 7-10 .....             | 19,080                       | 150                                 | 68            | 19              | 195                           | 167                              | 65                          | 333            | 2.5                         | 844               | 1.15               | 43,500                        | 248   | 114              | 63             |
| Apr. 11, 16, 18, 20 .....   | 22,540                       | 124                                 | 60            | 16              | 152                           | 130                              | 53                          | 272            | 2.2                         | 706               | .96                | 43,000                        | 218   | 109              | 60             |
| Apr. 12-15, 19 .....        | 18,540                       | 162                                 | 73            | 21              | 212                           | 155                              | 65                          | 378            | 2.0                         | 925               | 1.26               | 46,300                        | 268   | 142              | 63             |

— Continued.

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection   | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) + Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved Solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|----------------------|------------------------------|-----------------------------------|--------------|----------------|-----------------------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                      |                              |                                   |              |                |                             |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| Apr. 21-24, 27       | 27,820                       | 145                               | 66           | 17             | 188                         | 138                             | 53                         | 336           | 1.8                        | 829               | 1.12               | 62,300                        | 234   | 122            |
| Apr. 25-26, 28-30    | 54,000                       | 60.4                              | 28           | 9.4            | 69                          | 76                              | 24                         | 121           | 1.5                        | 335               | .46                | 48,800                        | 108   | 46             |
| May 1-2, 7-8, 10     | 66,800                       | 58.0                              | 34           | 7.1            | 70                          | 84                              | 26                         | 119           | 2.0                        | 348               | .47                | 62,800                        | 114   | 45             |
| May 3-6, 9           | 76,180                       | 42.4                              | 25           | 5.8            | 51                          | 77                              | 22                         | 77            | 2.2                        | 252               | .34                | 51,800                        | 86    | 23             |
| May 11, 14-15, 19    | 55,180                       | 64.6                              | 38           | 8.2            | 81                          | 90                              | 28                         | 142           | 2.0                        | 394               | .54                | 58,700                        | 128   | 54             |
| May 12-13, 16-18     | 58,270                       | 37.4                              | 22           | 5.8            | 43                          | 67                              | 21                         | 66            | 2.0                        | 228               | .31                | 35,900                        | 79    | 24             |
| May 21, 24-26, 28-30 | 91,800                       | 34.4                              | 23           | 6.2            | 36                          | 73                              | 18                         | 57            | 1.8                        | 217               | .30                | 53,800                        | 83    | 23             |
| May 22-23, 27, 31    | 68,320                       | 50.2                              | 36           | 7.0            | 52                          | 90                              | 25                         | 92            | 2.0                        | 292               | .40                | 53,900                        | 119   | 45             |
| June 1-6             | 95,980                       | 40.7                              | 29           | 5.8            | 46                          | 85                              | 22                         | 73            | 2.0                        | 243               | .33                | 63,000                        | 96    | 27             |
| June 7-10            | 30,250                       | 96.3                              | 54           | 12             | 125                         | 131                             | 70                         | 194           | 1.8                        | 570               | .78                | 46,600                        | 134   | 77             |
| June 11-20           | 15,874                       | 114                               | 56           | 14             | 150                         | 127                             | 56                         | 255           | 1.8                        | 650               | .88                | 27,900                        | 197   | 93             |
| June 21-24, 28       | 15,820                       | 160                               | 72           | 18             | 232                         | 138                             | 63                         | 410           | 1.2                        | 963               | 1.31               | 40,000                        | 254   | 140            |
| June 25-27, 29-30    | 25,570                       | 110                               | 57           | 14             | 141                         | 122                             | 51                         | 250           | 1.8                        | 640               | .87                | 44,200                        | 200   | 100            |
| July 1-4, 9          | 54,840                       | 68.0                              | 40           | 8.2            | 86                          | 100                             | 35                         | 142           | 2.0                        | 396               | .54                | 58,600                        | 134   | 52             |
| July 5-8, 10         | 27,660                       | 95.8                              | 49           | 10             | 137                         | 121                             | 53                         | 216           | 1.8                        | 579               | .79                | 43,200                        | 163   | 64             |
| July 11-20           | 10,040                       | 114                               | 69           | 13             | 171                         | 138                             | 66                         | 278           | 1.5                        | 720               | .98                | 19,500                        | 203   | 90             |
| July 21-31           | 5,602                        | 149                               | 64           | 17             | 216                         | 137                             | 62                         | 369           | 2.0                        | 887               | 1.21               | 13,400                        | 230   | 118            |
| Aug. 1-10            | 4,979                        | 130                               | 66           | 16             | 175                         | 144                             | 53                         | 310           | 2.2                        | 772               | 1.05               | 10,400                        | 230   | 112            |
| Aug. 11-20           | 4,416                        | 124                               | 68           | 16             | 167                         | 148                             | 55                         | 297           | 1.5                        | 762               | 1.04               | 9,080                         | 236   | 114            |
| Aug. 21-24, 27-29    | 5,368                        | 105                               | 65           | 14             | 148                         | 146                             | 53                         | 260           | 1.2                        | 700               | .95                | 10,100                        | 220   | 100            |
| Aug. 25-26, 30-31    | 6,737                        | 192                               | 83           | 22             | 231                         | 130                             | 51                         | 530           | 2.0                        | 1,030             | 1.40               | 18,700                        | 298   | 191            |
| Sept. 1-10           | 7,254                        | 188                               | 74           | 18             | 259                         | 129                             | 45                         | 473           | 2.0                        | 934               | 1.44               | 18,300                        | 258   | 168            |
| Sept. 11-20          | 4,801                        | 182                               | 76           | 16             | 257                         | 143                             | 74                         | 438           | 1.8                        | 933               | 1.27               | 12,100                        | 256   | 138            |
| Sept. 21-30          | 6,440                        | 188                               | 87           | 21             | 254                         | 153                             | 116                        | 430           | 2.2                        | 986               | 1.34               | 17,100                        | 304   | 194            |
| Weighted average     | 33,790                       | 75.9                              | 43           | 10             | 93                          | 105                             | 35                         | 161           | 1.9                        | 441               | 0.60               | 66,200                        | 150   | 64             |

<sup>1</sup> K × 10<sup>5</sup> at 25° C.

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Temperature (° F.) of Water of Arkansas River, Water Year October 1945 to  
 September 1946*

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

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved Solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| 1946:              |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               |       |                |
| Oct. 1-10          | 4,487                        | 154                               | 76           | 19             | 222         |               | 164                             | 91                         | 368           | 3.2                        | 925               | 1.26               | 11,200                        | 268   | 133            |
| Oct. 11-16         | 13,920                       | 147                               | 84           | 23             | 175         |               | 188                             | 168                        | 250           | 2.8                        | 853               | 1.16               | 32,100                        | 304   | 150            |
| Oct. 17-20         | 12,050                       | 292                               | 113          | 28             | 444         |               | 168                             | 214                        | 708           | 3.0                        | 1,590             | 2.16               | 51,700                        | 397   | 71             |
| Oct. 21-24         | 10,050                       | 306                               | 84           | 17             | 506         |               | 157                             | 140                        | 782           | 2.5                        | 1,610             | 2.19               | 43,700                        | 280   | 150            |
| Oct. 25-31         | 11,890                       | 190                               | 70           | 16             | 297         |               | 147                             | 97                         | 470           | 2.0                        | 1,020             | 1.39               | 32,700                        | 240   | 119            |
| Nov. 1, 2, 6       | 27,170                       | 182                               | 76           | 16             | 258         |               | 127                             | 73                         | 450           | 2.0                        | 938               | 1.28               | 68,800                        | 256   | 151            |
| Nov. 3-5, 7-10     | 68,200                       | 55.0                              | 35           | 7.4            | 63          |               | 83                              | 27                         | 112           | 2.0                        | 336               | .46                | 61,900                        | 118   | 54             |
| Nov. 11-14         | 62,180                       | 44.3                              | 26           | 6.1            | 49          |               | 70                              | 21                         | 82            | 1.5                        | 261               | .36                | 43,800                        | 90    | 33             |
| Nov. 15-20         | 24,930                       | 100                               | 46           | 9.8            | 134         |               | 96                              | 52                         | 222           | 2.0                        | 568               | .77                | 38,200                        | 156   | 77             |
| Nov. 21-26         | 14,580                       | 119                               | 60           | 13             | 156         |               | 113                             | 62                         | 272           | 2.0                        | 675               | .92                | 26,600                        | 203   | 110            |
| Nov. 27-30         | 25,400                       | 58.8                              | 30           | -7.2           | 78          |               | 67                              | 37                         | 128           | 1.2                        | 354               | .48                | 24,300                        | 104   | 49             |
| Dec. 1-2, 11, 20   | 63,950                       | 97.0                              | 51           | 11             | 139         |               | 106                             | 52                         | 235           | 3.0                        | 605               | .82                | 104,000                       | 172   | 85             |
| Dec. 3-10          | 22,440                       | 172                               | 75           | 18             | 243         |               | 134                             | 89                         | 415           | 2.2                        | 908               | 1.24               | 55,000                        | 261   | 151            |
| Dec. 12-19         | 141,800                      | 39.0                              | 28           | 6.2            | 40          |               | 82                              | 17                         | 67            | 2.8                        | 239               | .33                | 91,500                        | 95    | 28             |
| Dec. 21-25         | 18,900                       | 109                               | 53           | 13             | 135         |               | 110                             | 56                         | 232           | 3.5                        | 620               | .84                | 31,600                        | 186   | 95             |
| Dec. 26-31         | 12,900                       | 143                               | 72           | 17             | 219         |               | 130                             | 80                         | 378           | 3.5                        | 908               | 1.23               | 31,600                        | 250   | 143            |
| 1947:              |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               |       |                |
| Jan. 1-10          | 10,600                       | 117                               | 56           | 13             | 145         |               | 120                             | 49                         | 254           | 2.0                        | 648               | .88                | 18,500                        | 193   | 94             |
| Jan. 11-16         | 10,150                       | 164                               | 77           | 17             | 230         |               | 144                             | 71                         | 402           | 2.5                        | 942               | 1.28               | 25,800                        | 262   | 144            |
| Jan. 17-20         | 10,330                       | 248                               | 102          | 23             | 348         |               | 154                             | 83                         | 632           | 3.0                        | 1,270             | 1.73               | 35,400                        | 349   | 222            |
| Jan. 21-22, 26-28  | 9,016                        | 204                               | 89           | 21             | 275         |               | 159                             | 90                         | 482           | 3.2                        | 1,040             | 1.41               | 25,300                        | 308   | 178            |
| Jan. 23-25, 29-31  | 8,668                        | 260                               | 101          | 25             | 384         |               | 181                             | 104                        | 660           | 3.5                        | 1,370             | 1.86               | 32,100                        | 355   | 206            |
| Feb. 1, 7-9        | 6,903                        | 267                               | 102          | 26             | 402         |               | 174                             | 134                        | 675           | 2.2                        | 1,430             | 1.94               | 26,700                        | 362   | 218            |
| Feb. 2-6, 10       | 7,075                        | 229                               | 92           | 22             | 328         |               | 167                             | 115                        | 550           | 2.0                        | 1,190             | 1.62               | 22,700                        | 320   | 183            |
| Feb. 11-20         | 5,821                        | 233                               | 99           | 25             | 333         |               | 175                             | 122                        | 568           | 3.0                        | 1,240             | 1.69               | 19,500                        | 350   | 206            |
| Feb. 21-28         | 5,995                        | 237                               | 100          | 25             | 338         |               | 166                             | 114                        | 598           | 2.0                        | 1,250             | 1.70               | 20,280                        | 352   | 216            |
| Mar. 1-10          | 5,643                        | 203                               | 98           | 24             | 309         |               | 165                             | 114                        | 538           | 2.5                        | 1,170             | 1.59               | 17,800                        | 343   | 207            |
| Mar. 11-20         | 19,010                       | 220                               | 83           | 21             | 278         |               | 149                             | 94                         | 480           | 1.8                        | 1,030             | 1.40               | 52,900                        | 294   | 171            |
| Mar. 21-31         | 17,830                       | 198                               | 76           | 18             | 317         |               | 130                             | 117                        | 478           | .2                         | 1,070             | 1.46               | 50,600                        | 264   | 156            |
| Apr. 1-4, 9        | 18,850                       | 209                               | 79           | 19             | 307         |               | 140                             | 118                        | 500           | .2                         | 1,090             | 1.48               | 55,500                        | 275   | 161            |
| Apr. 5-8, 10       | 39,500                       | 125                               | 58           | 13             | 169         |               | 111                             | 76                         | 280           | 1.0                        | 744               | 1.01               | 79,300                        | 198   | 107            |

Continued

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection       | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |               | Percent sodium |
|--------------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|---------------|----------------|
|                          |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Total                         | Non-carbonate |                |
| Apr. 11-12, 17-19        | 192,600                      | 86.6                              | 41           | 8.7            | 111         |               | 110                             | 41                         | 175           | 1.2                        | 507               | .69                | 264,000                       | 138           | 48             |
| Apr. 13-16, 20           | 176,000                      | 55.8                              | 38           | 7.0            | 62          |               | 118                             | 38                         | 87            | 1.5                        | 335               | .46                | 159,000                       | 124           | 27             |
| <sup>2</sup> Apr. 21-30  | 146,900                      | 59.1                              | 43           | 7.2            | 6.1         | 1.7           | 106                             | 44                         | 96            | 2.8                        | 348               | .47                | 138,000                       | 137           | 50             |
| May 1-5                  | 113,000                      | 52.4                              | 38           | 6.0            | 58          |               | 97                              | 39                         | 87            | 3.2                        | 323               | .44                | 98,500                        | 119           | 40             |
| May 6-9                  | 42,050                       | 83.2                              | 53           | 8.8            | 103         |               | 120                             | 62                         | 161           | 3.0                        | 509               | .69                | 57,800                        | 168           | 69             |
| May 10-13                | 41,530                       | 115                               | 62           | 13             | 152         |               | 126                             | 78                         | 249           | 2.8                        | 686               | .83                | 76,300                        | 208           | 104            |
| May 14-20                | 161,100                      | 66.0                              | 44           | 6.7            | 76          |               | 108                             | 38                         | 123           | 2.5                        | 381               | .52                | 166,000                       | 138           | 49             |
| May 21-23, 25, 27-28     | 158,700                      | 52.4                              | 40           | 6.1            | 61          |               | 104                             | 39                         | 92            | 2.2                        | 311               | .42                | 133,000                       | 125           | 40             |
| May 24, 26, 28-31        | 123,800                      | 68.2                              | 48           | 7.9            | 80          |               | 120                             | 53                         | 121           | 2.2                        | 408               | .55                | 136,000                       | 152           | 54             |
| June 1, 2, 8-10          | 64,940                       | 81.7                              | 52           | 9.0            | 94          |               | 118                             | 64                         | 145           | 4.0                        | 474               | .64                | 83,100                        | 167           | 70             |
| June 3-7                 | 104,300                      | 59.7                              | 42           | 6.1            | 64          |               | 140                             | 41                         | 99            | 3.8                        | 347               | .47                | 97,700                        | 130           | 45             |
| June 11-20               | 37,340                       | 98.0                              | 62           | 12             | 106         |               | 126                             | 100                        | 161           | 2.5                        | 588               | .80                | 59,800                        | 204           | 101            |
| June 21-26               | 43,970                       | 116                               | 61           | 14             | 141         |               | 116                             | 70                         | 245           | 2.5                        | 664               | .90                | 78,800                        | 210           | 114            |
| June 27-30               | 63,630                       | 66.2                              | 40           | 8.1            | 79          |               | 98                              | 45                         | 125           | 2.2                        | 393               | .53                | 67,500                        | 134           | 53             |
| July 1-2, 4, 6           | 46,220                       | 60.0                              | 42           | 7.0            | 60          |               | 103                             | 45                         | 93            | 3.8                        | 349               | .47                | 43,600                        | 134           | 50             |
| July 3, 5, 7-8, 10       | 35,180                       | 85.5                              | 52           | 12             | 115         |               | 116                             | 67                         | 185           | 3.0                        | 562               | .76                | 53,400                        | 180           | 84             |
| July 12-16, 19           | 12,950                       | 93.2                              | 68           | 17             | 130         |               | 187                             | 132                        | 165           | .2                         | 622               | .85                | 21,700                        | 240           | 87             |
| July 17, 17-18, 20       | 14,980                       | 124                               | 76           | 18             | 166         |               | 200                             | 143                        | 220           | 3.0                        | 756               | 1.03               | 30,600                        | 264           | 99             |
| July 21-26               | 9,770                        | 159                               | 87           | 22             | 201         |               | 175                             | 150                        | 315           | 2.2                        | 976               | 1.33               | 25,700                        | 312           | 164            |
| July 27-31               | 13,660                       | 229                               | 109          | 29             | 324         |               | 164                             | 176                        | 550           | 3.0                        | 1,270             | 1.73               | 46,800                        | 391           | 257            |
| Aug. 1-4                 | 12,650                       | 166                               | 82           | 19             | 230         |               | 151                             | 135                        | 365           | 3.5                        | 962               | 1.31               | 32,900                        | 282           | 159            |
| Aug. 5-10                | 8,603                        | 116                               | 66           | 16             | 141         |               | 139                             | 103                        | 222           | 3.5                        | 678               | .92                | 15,700                        | 230           | 117            |
| Aug. 11-20               | 6,465                        | 140                               | 68           | 19             | 185         |               | 122                             | 115                        | 302           | 4.0                        | 830               | 1.13               | 14,500                        | 248           | 147            |
| Aug. 21-22, 25-27, 30-31 | 5,689                        | 142                               | 70           | 17             | 189         |               | 130                             | 94                         | 318           | 3.2                        | 804               | 1.09               | 12,400                        | 244           | 138            |
| Aug. 23-24, 28-29        | 5,520                        | 184                               | 74           | 21             | 256         |               | 138                             | 115                        | 420           | 3.0                        | 957               | 1.30               | 14,300                        | 271           | 158            |
| Sept. 1-10               | 4,301                        | 147                               | 70           | 19             | 188         |               | 130                             | 67                         | 342           | 2.8                        | 850               | 1.16               | 9,870                         | 252           | 146            |
| Sept. 11-13, 19-20       | 7,025                        | 195                               | 80           | 23             | 277         |               | 128                             | 68                         | 510           | 2.0                        | 1,020             | 1.39               | 19,350                        | 294           | 189            |
| Sept. 14-18              | 9,546                        | 79.2                              | 37           | 11             | 98          |               | 90                              | 37                         | 168           | 2.0                        | 483               | .59                | 11,200                        | 138           | 64             |
| Sept. 21-22, 27-30       | 6,523                        | 187                               | 74           | 20             | 275         |               | 124                             | 67                         | 490           | 2.2                        | 989               | 1.35               | 17,400                        | 266           | 165            |
| Sept. 23-26              | 6,705                        | 115                               | 52           | 13             | 155         |               | 103                             | 42                         | 278           | 1.8                        | 674               | .92                | 12,200                        | 184           | 99             |
| Weighted average         | 35,660                       | 84.5                              | 48           | 9.7            | 108         |               | 111                             | 54                         | 174           | 2.4                        | 494               | 0.67               | 107,000                       | 161           | 69             |

<sup>1</sup> K $\times 10^6$  at 25° C.      <sup>2</sup> pH—7.8, Silica (SiO<sub>2</sub>)—9.2, Iron (Fe)—0.10, Aluminum (Al)—0.9.

## 35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued

*Temperature (° F.) of Water of Arkansas River, Water Year October 1946 to September 1947*

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

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-foot) | Spe- cific con- duct- ance <sup>1</sup> | Cal- cium (Ca) | Magne- sium (Mg) | So- dium (Na) | Potas- sium (K) | Bicar- bonate (HCO <sub>3</sub> ) | Sul- fate (SO <sub>4</sub> ) | Chlo- ride (Cl) | Ni- trate (NO <sub>3</sub> ) | Dissolved solids  |                     |              | Hardness as CaCO <sub>3</sub> |                 |                    |
|--------------------|------------------------------|-----------------------------------------|----------------|------------------|---------------|-----------------|-----------------------------------|------------------------------|-----------------|------------------------------|-------------------|---------------------|--------------|-------------------------------|-----------------|--------------------|
|                    |                              |                                         |                |                  |               |                 |                                   |                              |                 |                              | Parts per million | Tons per acre- foot | Tons per day | Total                         | Non-carbon- ate | Per- cent so- dium |
| 1947:              |                              |                                         |                |                  |               |                 |                                   |                              |                 |                              |                   |                     |              |                               |                 |                    |
| Oct. 1-5           | 4,538                        | 2,100                                   | 65             | 24               | 337           |                 | 130                               | 57                           | 568             | 2.8                          | 1,110             | 1.51                | 13,600       | 260                           | 154             | 73                 |
| Oct. 6-10          | 4,000                        | 1,360                                   | 48             | 16               | 191           |                 | 134                               | 57                           | 305             | 2.0                          | 754               | 1.03                | 8,140        | 186                           | 76              | 69                 |
| Oct. 11-12, 17-19  | 4,882                        | 1,630                                   | 74             | 22               | 217           |                 | 150                               | 65                           | 392             | 2.8                          | 942               | 1.28                | 12,400       | 275                           | 152             | 59                 |
| Oct. 13-16, 20     | 5,342                        | 1,260                                   | 54             | 21               | 158           |                 | 131                               | 55                           | 282             | 3.5                          | 723               | .98                 | 10,400       | 222                           | 114             | 61                 |
| Oct. 21-25, 31     | 5,403                        | 888                                     | 38             | 10               | 119           |                 | 111                               | 37                           | 187             | 2.0                          | 516               | .70                 | 7,530        | 136                           | 45              | 66                 |
| Oct. 26-30         | 6,016                        | 1,300                                   | 46             | 16               | 184           |                 | 130 <sup>2</sup>                  | 47                           | 300             | 3.8                          | 778               | 1.06                | 12,600       | 181                           | 75              | 69                 |
| Nov. 1-10          | 4,474                        | 2,050                                   | 61             | 22               | 310           |                 | 151 <sup>2</sup>                  | 63                           | 515             | 2.5                          | 1,050             | 1.43                | 12,700       | 242                           | 119             | 73                 |
| Nov. 11-20         | 5,263                        | 1,580                                   | 68             | 19               | 215           |                 | 178 <sup>3</sup>                  | 56                           | 360             | 3.0                          | 882               | 1.20                | 12,500       | 248                           | 102             | 65                 |
| Nov. 21, 24-28     | 6,450                        | 1,680                                   | 56             | 19               | 243           |                 | 113                               | 46                           | 428             | 2.0                          | 936               | 1.27                | 16,300       | 218                           | 125             | 70                 |
| Nov. 29-23, 29-30  | 5,608                        | 2,620                                   | 100            | 27               | 376           |                 | 123                               | 55                           | 722             | 2.2                          | 1,340             | 1.82                | 20,300       | 360                           | 260             | 69                 |
| Dec. 1, 3, 5, 7    | 3,940                        | 1,340                                   | 84             | 20               | 188           |                 | 212                               | 47                           | 335             | 5.5                          | 894               | 1.22                | 9,510        | 292                           | 118             | 62                 |
| Dec. 2, 4, 6       | 3,247                        | 2,130                                   | 100            | 24               | 342           |                 | 144                               | 53                           | 650             | 2.5                          | 1,240             | 1.69                | 10,900       | 348                           | 230             | 68                 |
| Dec. 8-10          | 17,370                       | 704                                     | 30             | 8.3              | 94            |                 | 64                                | 29                           | 162             | 2.5                          | 401               | .55                 | 18,800       | 109                           | 57              | 65                 |
| Dec. 11-13, 18-20  | 10,150                       | 1,170                                   | 50             | 13               | 172           |                 | 92                                | 42                           | 306             | 2.5                          | 703               | .96                 | 19,300       | 178                           | 103             | 68                 |
| Dec. 14-17         | 9,390                        | 1,770                                   | 72             | 17               | 283           |                 | 108                               | 61                           | 505             | 2.0                          | 993               | 1.35                | 25,200       | 250                           | 161             | 71                 |
| Dec. 21-27, 31     | 5,266                        | 1,170                                   | 68             | 17               | 157           |                 | 160 <sup>4</sup>                  | 55                           | 276             | 3.2                          | 722               | .98                 | 10,300       | 240                           | 108             | 59                 |
| Dec. 28-30         | 3,947                        | 1,700                                   | 82             | 20               | 270           |                 | 144                               | 80                           | 475             | 2.5                          | 1,000             | 1.36                | 10,700       | 286                           | 169             | 67                 |
| 1948:              |                              |                                         |                |                  |               |                 |                                   |                              |                 |                              |                   |                     |              |                               |                 |                    |
| Jan. 1-3, 10       | 30,160                       | 870                                     | 37             | 8.0              | 112           |                 | 72 <sup>4</sup>                   | 25                           | 200             | 2.0                          | 509               | .69                 | 41,500       | 126                           | 66              | 66                 |
| Jan. 4-9           | 23,020                       | 581                                     | 25             | 6.0              | 73            |                 | 48                                | 17                           | 132             | 2.0                          | 358               | .49                 | 22,300       | 87                            | 48              | 65                 |
| Jan. 11-13, 16-18  | 6,615                        | 1,095                                   | 58             | 12               | 169           |                 | 122 <sup>5</sup>                  | 36                           | 300             | 1.5                          | 710               | .97                 | 12,700       | 194                           | 94              | 65                 |
| Jan. 14-15, 19-20  | 6,113                        | 1,875                                   | 81             | 18               | 277           |                 | 122 <sup>5</sup>                  | 62                           | 505             | 2.0                          | 1,000             | 1.37                | 16,600       | 276                           | 176             | 69                 |
| Jan. 21-23, 28     | 4,635                        | 1,443                                   | 69             | 18               | 205           |                 | 142 <sup>5</sup>                  | 57                           | 365             | 2.0                          | 885               | 1.20                | 10,800       | 246                           | 130             | 65                 |
| Jan. 24-27, 29-31  | 4,334                        | 1,990                                   | 88             | 20               | 295           | 15              | 152 <sup>5</sup>                  | 72                           | 540             | 1.5                          | 1,110             | 1.52                | 13,000       | 302                           | 177             | 67                 |
| Feb. 1-6           | 6,468                        | 1,640                                   | 73             | 14               | 225           |                 | 134                               | 50                           | 400             | 2.5                          | 961               | 1.31                | 16,800       | 240                           | 130             | 67                 |
| Feb. 7-10          | 13,750                       | 1,100                                   | 42             | 12               | 144           |                 | 68                                | 34                           | 275             | 3.0                          | 624               | .85                 | 31,600       | 154                           | 99              | 67                 |
| Feb. 11, 15-20     | 13,830                       | 1,020                                   | 41             | 9.6              | 153           |                 | 70                                | 32                           | 270             | 2.0                          | 601               | .82                 | 22,400       | 142                           | 85              | 70                 |
| Feb. 12-14         | 14,130                       | 1,380                                   | 49             | 12               | 208           |                 | 78                                | 35                           | 370             | 2.0                          | 806               | 1.10                | 30,700       | 172                           | 108             | 73                 |
| Feb. 21-26         | 10,480                       | 1,560                                   | 62             | 13               | 233           |                 | 92                                | 43                           | 420             | 1.2                          | 921               | 1.25                | 26,100       | 208                           | 133             | 71                 |

—Continued.



35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| Feb. 27-29         | 66,170                       | 814                               | 36           | 6.1            | 111         | 78            | 78                              | 25                         | 188           | 1.5                        | 488               | 0.66               | 85,900                        | 115   | 51             |
| Mar. 1-5           | 73,000                       | 770                               | 37           | 7.6            | 99          | 80            | 80                              | 26                         | 174           | 2.5                        | 441               | .50                | 86,900                        | 124   | 59             |
| Mar. 6-10          | 52,460                       | 1,293                             | 54           | 11             | 193         | 108           | 108                             | 62                         | 315           | 2.5                        | 747               | 1.02               | 106,000                       | 181   | 92             |
| Mar. 11-20         | 33,180                       | 1,120                             | 48           | 9.6            | 183         | 86            | 86                              | 52                         | 275           | 2.0                        | 667               | .91                | 59,800                        | 160   | 89             |
| Mar. 21-24, 26     | 62,240                       | 1,122                             | 48           | 10             | 171         | 86            | 86                              | 55                         | 285           | 2.5                        | 660               | .90                | 111,000                       | 161   | 91             |
| Mar. 25, 27-31     | 66,920                       | 810                               | 44           | 7.9            | 108         | 114           | 114                             | 40                         | 170           | 2.5                        | 470               | .64                | 84,800                        | 143   | 49             |
| Apr. 1-5           | 26,920                       | 891                               | 50           | 9.8            | 104         | 109           | 109                             | 64                         | 167           | 1.5                        | 512               | .70                | 37,200                        | 166   | 76             |
| Apr. 6-10          | 17,420                       | 1,129                             | 61           | 13             | 149         | 123           | 123                             | 85                         | 240           | 1.5                        | 661               | .90                | 31,100                        | 206   | 105            |
| Apr. 11-16         | 27,820                       | 747                               | 37           | 8.3            | 90          | 76            | 76                              | 44                         | 151           | 1.0                        | 423               | .58                | 31,800                        | 127   | 64             |
| Apr. 17-20         | 14,920                       | 1,125                             | 54           | 13             | 146         | 102           | 102                             | 69                         | 248           | 1.5                        | 641               | .87                | 25,800                        | 189   | 105            |
| Apr. 21, 27, 30    | 19,370                       | 1,199                             | 56           | 15             | 160         | 112           | 112                             | 68                         | 273           | .8                         | 682               | .93                | 35,700                        | 201   | 109            |
| Apr. 22-26, 28-29  | 13,530                       | 1,479                             | 70           | 18             | 205         | 126           | 126                             | 90                         | 362           | 1.0                        | 855               | 1.16               | 31,200                        | 249   | 145            |
| May 1-2, 7-11      | 17,590                       | 1,390                             | 64           | 14             | 201         | 125           | 125                             | 70                         | 338           | 2.0                        | 814               | 1.11               | 38,700                        | 217   | 115            |
| May 3-6            | 11,920                       | 1,600                             | 62           | 16             | 238         | 114           | 114                             | 69                         | 405           | 2.0                        | 927               | 1.26               | 29,800                        | 221   | 127            |
| May 12-17          | 50,180                       | 1,060                             | 47           | 12             | 150         | 96            | 96                              | 45                         | 260           | 2.0                        | 601               | .82                | 81,400                        | 167   | 89             |
| May 18-20          | 35,770                       | 605                               | 31           | 6.7            | 82          | 79            | 79                              | 30                         | 131           | 2.0                        | 362               | .49                | 35,000                        | 105   | 40             |
| May 21-27          | 19,270                       | 758                               | 41           | 9.2            | 97          | 93            | 93                              | 42                         | 163           | 1.5                        | 456               | .62                | 23,700                        | 141   | 65             |
| May 28-31          | 19,950                       | 1,220                             | 55           | 14             | 175         | 98            | 98                              | 41                         | 313           | 3.5                        | 728               | .99                | 39,200                        | 195   | 115            |
| June 1-2, 6-10     | 10,110                       | 1,170                             | 44           | 13             | 176         | 118           | 118                             | 53                         | 279           | 1.3                        | 676               | .92                | 15,500                        | 104   | 67             |
| June 3-5           | 15,830                       | 1,820                             | 61           | 19             | 293         | 109           | 109                             | 50                         | 513           | 3.5                        | 993               | 1.35               | 41,100                        | 230   | 141            |
| June 11, 19-20     | 7,767                        | 1,460                             | 53           | 17             | 232         | 120           | 120                             | 73                         | 375           | 3.5                        | 859               | 1.17               | 18,000                        | 203   | 104            |
| June 12-18         | 6,500                        | 1,220                             | 57           | 14             | 168         | 112           | 112                             | 65                         | 286           | 1.5                        | 725               | .99                | 12,700                        | 200   | 108            |
| June 21, 24        | 71,500                       | 1,170                             | 56           | 14             | 158         | 122           | 122                             | 57                         | 270           | 1.5                        | 686               | .91                | 129,000                       | 197   | 97             |
| June 25-30         | 273,200                      | 414                               | 37           | 8.6            | 34          | 108           | 108                             | 28                         | 59            | 1.5                        | 256               | .35                | 189,000                       | 128   | 39             |
| July 1-6           | 106,000                      | 679                               | 36           | 6.0            | 72          | 108           | 108                             | 36                         | 103           | 2.0                        | 330               | .45                | 166,000                       | 114   | 26             |
| July 7-10          | 71,300                       | 975                               | 49           | 8.8            | 132         | 121           | 121                             | 49                         | 208           | 2.5                        | 564               | .77                | 109,000                       | 158   | 59             |
| July 11-13         | 66,300                       | 1,085                             | 46           | 10             | 162         | 113           | 113                             | 48                         | 258           | 2.1                        | 641               | .87                | 115,000                       | 156   | 64             |
| July 14-20         | 103,400                      | 547                               | 36           | 6.0            | 63          | 96            | 96                              | 32                         | 97            | 2.1                        | 314               | .43                | 87,600                        | 114   | 36             |
| July 21-23, 29-31  | 136,860                      | 402                               | 31           | 5.2            | 45          | 100           | 100                             | 28                         | 59            | 1.9                        | 243               | .33                | 89,400                        | 99    | 17             |
| July 24-28         | 141,800                      | 555                               | 41           | 6.3            | 59          | 104           | 104                             | 34                         | 95            | 2.0                        | 324               | .44                | 124,000                       | 129   | 44             |

—Continued.

35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection       | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K)    | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved Solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|------------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                          |                              |                                   |              |                |             |                  |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| Aug. 1-8 .....           | 77,690                       | 427                               | 36           | 6.6            | 42          | 106              | 30                              | 63                         | 2.3           | 253                        | .34               | 53,100             | 117                           | 30    | 44             |
| Aug. 9, 16-18 .....      | 113,600                      | 538                               | 25           | 7.2            | 75          | 91               | 36                              | 101                        | 1.8           | 308                        | .42               | 94,500             | 92                            | 18    | 64             |
| Aug. 10-12, 14-15 .....  |                              |                                   |              |                |             |                  |                                 |                            |               |                            |                   |                    |                               |       |                |
| Aug. 13, 21-22 .....     | 76,040                       | 708                               | 42           | 7.8            | 88          | 104              | 40                              | 142                        | 2.3           | 409                        | .56               | 84,000             | 137                           | 52    | 58             |
| Aug. 26-29 .....         | 59,033                       | 873                               | 48           | 10             | 114         | 117              | 60                              | 177                        | .9            | 496                        | .67               | 79,100             | 161                           | 65    | 61             |
| Aug. 29-30, 30-31 .....  | 22,450                       | 1,410                             | 66           | 15             | 212         | 140 <sup>4</sup> | 125                             | 312                        | 1.2           | 842                        | 1.15              | 51,000             | 226                           | 111   | 67             |
| Sept. 1-3, 8 .....       | 29,480                       | 1,190                             | 60           | 13             | 175         | 133              | 113                             | 252                        | 1.8           | 690                        | .94               | 54,900             | 203                           | 94    | 65             |
| Sept. 4-7, 9-10 .....    | 14,120                       | 1,374                             | 74           | 16             | 189         | 164 <sup>3</sup> | 98                              | 300                        | 2.5           | 792                        | 1.08              | 30,200             | 250                           | 116   | 62             |
| Sept. 11-14, 20 .....    | 11,880                       | 1,614                             | 88           | 17             | 225         | 170              | 111                             | 370                        | 2.0           | 934                        | 1.27              | 30,000             | 290                           | 150   | 63             |
| Sept. 15-19 .....        | 9,992                        | 1,538                             | 77           | 18             | 218         | 163              | 105                             | 350                        | 3.0           | 884                        | 1.20              | 28,800             | 266                           | 132   | 64             |
| Sept. 21-24, 26-27 ..... | 10,160                       | 1,224                             | 63           | 14             | 175         | 142              | 80                              | 280                        | 1.0           | 697                        | .95               | 19,100             | 214                           | 98    | 64             |
| Sept. 25, 28-30 .....    | 7,333                        | 1,593                             | 76           | 18             | 230         | 141              | 93                              | 388                        | 3.5           | 891                        | 1.21              | 17,600             | 264                           | 143   | 65             |
| Weighted average         | 6,678                        | 1,895                             | 79           | 19             | 286         | 146              | 98                              | 478                        | 1.5           | 1,030                      | 1.40              | 18,600             | 275                           | 156   | 69             |
|                          | 34,910                       | 795                               | 43           | 9.1            | 104         | 105              | 42                              | 170                        | 2.0           | 463                        | 0.63              | 95,471             | 145                           | 59    | 57             |

<sup>1</sup> K $\times 10^6$  at 25° C.

<sup>2</sup> Includes equivalent of 6 parts per million carbonate (CO<sub>3</sub>).

<sup>3</sup> Includes equivalent of 9 parts per million carbonate (CO<sub>3</sub>).

<sup>4</sup> Includes equivalent of 8 parts per million carbonate (CO<sub>3</sub>).

<sup>5</sup> Includes equivalent of 12 parts per million carbonate (CO<sub>3</sub>).

<sup>6</sup> Includes equivalent of 22 parts per million carbonate (CO<sub>3</sub>).

## 35. ARKANSAS RIVER AT VAN BUREN, ARK.—Continued

*Temperature (° F.) of Water of Arkansas River, Water Year October 1947 to September 1948*

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

## 36. Arkansas River at Dardanelle, Ark.

LOCATION: Water-stage recorder, lat. 35°13', long. 93°09', in sec. 29, T. 7 N., R. 20 W., at Dardanelle, Yell County, 5 miles downstream from Illinois Bayou. Datum of gage is 290.16 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 153,600 square miles.

RECORDS AVAILABLE: Discharge, July 1937 to September 1948. Chemical quality, see analysis page 172.

MEAN ANNUAL RUNOFF: 29,810,000 acre-feet.

AVERAGE DISCHARGE: 11 years, 41,170 second-feet.

MAXIMUM: 1937-48: Discharge, 683,000 second-feet May 13, 14, 1943; maximum gage height, 33.60 feet, recording gage, and 34.1 feet, wire-weight gage, May 25, 1943.

Maximum discharge known, that of May 13, 14, 1943. Flood of April 19, 1927, reached stage of 33.0 feet.

MINIMUM: 1937-48: Day: 1,180 second-feet (763 m.g.d.) Oct. 6-9, 1939.

7-day: 1,219 second-feet (788 m.g.d.) Oct. 4-10, 1939.

Calendar month: 1,325 second-feet (856 m.g.d.) October 1939.

Water year: 8,823 second-feet (5,700 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Gage-height records collected at same site since 1886 are contained in reports of U. S. Weather Bureau. Flow partly regulated by Lake O' The Cherokees on Neosho (Grand) River since March 1940. Prior to Jan. 11, 1939, wire-weight gage at same site and datum. Bank-full stage, about 22 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|----------------|----------------|--------|----------------------------|
| 1938 | 857-98                        | 396,000        | 3,050          | 38,960 | 28,200,000                 |
| 1939 | 877-123                       | 133,000        | 1,320          | 14,460 | 10,470,000                 |
| 1940 | 897-116                       | 90,300         | 1,180          | 8,823  | 6,405,000                  |
| 1941 | 927-114                       | 294,000        | 1,570          | 34,390 | 24,900,000                 |
| 1942 | 957-115                       | 432,000        | 8,560          | 69,030 | 49,980,000                 |
| 1943 | 977-115                       | 676,000        | 3,080          | 54,260 | 39,290,000                 |
| 1944 | 1007-116                      | 243,000        | 3,630          | 37,670 | 27,340,000                 |
| 1945 | 1037-128                      | 578,000        | 5,320          | 72,110 | 52,210,000                 |
| 1946 | 1057-122                      | 283,000        | 3,800          | 40,640 | 29,420,000                 |
| 1947 | 1087-124                      | 360,000        | 3,600          | 44,110 | 31,940,000                 |
| 1948 | .....                         | 298,000        | 3,500          | 38,390 | 27,870,000                 |

*Calendar Year*

|      |          |         |       |        |            |
|------|----------|---------|-------|--------|------------|
| 1938 | 857-98   | 396,000 | 2,660 | 37,790 | 27,360,000 |
| 1939 | 877-123  | 133,000 | 1,180 | 13,860 | 10,260,000 |
| 1940 | 897-116  | 90,300  | 1,200 | 11,150 | 8,097,000  |
| 1941 | 927-114  | 432,000 | 5,960 | 59,620 | 43,160,000 |
| 1942 | 957-115  | 315,000 | 8,560 | 51,190 | 37,060,000 |
| 1943 | 977-115  | 676,000 | 3,080 | 46,290 | 33,510,000 |
| 1944 | 1007-116 | 243,000 | 7,290 | 42,720 | 31,020,000 |
| 1945 | 1037-128 | 578,000 | 5,320 | 75,770 | 54,860,000 |
| 1946 | 1057-122 | 300,000 | 3,600 | 40,670 | 29,450,000 |
| 1947 | 1087-124 | 238,000 | 3,500 | 34,970 | 25,320,000 |
| 1948 | .....    | .....   | ..... | .....  | .....      |

## 37. Arkansas River at Little Rock, Ark.

LOCATION: Water-stage recorder, lat. 34°45', long. 92°16', in sec. 3, T. 1 N., R. 12 W., at Little Rock, Pulaski County. Datum of gage is 223.61 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 157,900 square miles.

RECORDS AVAILABLE: Discharge, 1885-1927 (measurements only), January 1928 to December 1948 in reports of Mississippi River Commission; September 1927 to September 1931 and October 1933 to September 1948 in reports of Geological Survey. Chemical analyses and water temperatures, October 1945 to September 1948.

MEAN ANNUAL RUNOFF: 31,120,000 acre-feet.

AVERAGE DISCHARGE: 21 years, 42,980 second-feet.

MAXIMUM: 1927-48: Discharge, 536,000 second-feet May 27, 1943 (gage height, 30.05 feet).

Maximum stage known, 34.6 feet in June 1833; flood of Apr. 20, 1927, reached a stage of 33.0.

MINIMUM: 1927-48: Day: 850 second-feet (549 m.g.d.) Aug. 23, 1934.

7-day: 921 second-feet (595 m.g.d.) Aug. 20-26, 1934.

Calendar month: 1,141 second-feet (737 m.g.d.) August 1934.

Water year: 10,820 second-feet (6,990 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

## SURFACE-WATER RESOURCES OF ARKANSAS

REMARKS: Prior to Oct. 1, 1934, staff gage 130 feet upstream at Main Street Bridge, at same datum. Gage-height records collected at or near same site since 1873 are contained in reports of U. S. Weather Bureau, January 1872 to December 1948 at site three-quarters of a mile upstream in reports of Mississippi River Commission. Bankfull stage, about 23 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|--------|----------------------------|
| 1928 | 667-48                        | 220,000             | 5,340               | 53,100 | 38,500,000                 |
| 1929 | 687-51                        | 275,000             | 4,160               | 60,400 | 43,700,000                 |
| 1930 | 702-71                        | 221,000             | 2,740               | 28,300 | 20,500,000                 |
| 1931 | 717-67                        | 97,000              | 1,450               | 19,300 | 14,000,000                 |
| 1932 | (*)                           | 233,000             | 1,640               | 48,430 | 27,900,000                 |
| 1933 | (*)                           | 277,000             | 1,940               | 33,580 | 24,310,000                 |
| 1934 | 762-79                        | 126,000             | 850                 | 18,740 | 12,710,000                 |
| 1935 | 787-88                        | 418,000             | 4,300               | 65,400 | 47,350,000                 |
| 1936 | 807-85                        | 144,000             | 1,290               | 14,010 | 10,170,000                 |
| 1937 | 827-82                        | 170,000             | 5,320               | 35,700 | 25,850,000                 |
| 1938 | 857-99                        | 452,000             | 3,510               | 46,590 | 33,730,000                 |
| 1939 | 877-124                       | 178,000             | 1,820               | 21,770 | 15,760,000                 |
| 1940 | 897-117                       | 90,100              | 1,440               | 10,820 | 7,852,000                  |
| 1941 | 927-115                       | 292,000             | 2,110               | 38,330 | 27,750,000                 |
| 1942 | 957-116                       | 399,000             | 10,100              | 77,830 | 56,340,000                 |
| 1943 | 977-116                       | 536,000             | 3,900               | 58,730 | 42,530,000                 |
| 1944 | 1007-117                      | 274,000             | 3,900               | 45,240 | 32,840,000                 |
| 1945 | 1037-129                      | 467,000             | 6,630               | 84,780 | 61,370,000                 |
| 1946 | 1057-123                      | 268,000             | 4,100               | 49,240 | 35,650,000                 |
| 1947 | 1087-125                      | 283,000             | 4,100               | 47,590 | 34,460,000                 |
| 1948 |                               | 263,000             | 3,940               | 44,710 | 32,460,000                 |

*Calendar Year*

|      |          |          |        |         |             |
|------|----------|----------|--------|---------|-------------|
| 1928 | 667-48   | 213,000  | 4,160  | 47,400  | 34,400,000  |
| 1929 | 687-51   | 275,000  | 4,500  | 56,300  | 40,800,000  |
| 1930 | 702-71   | 221,000  | 2,740  | 29,100  | 21,100,000  |
| 1931 | 717-67   | *128,000 | *1,640 | *25,270 | *18,290,000 |
| 1932 | (*)      | 233,000  | 1,940  | 34,400  | 24,970,000  |
| 1933 | (*)      | 277,000  | 5,500  | 35,300  | 25,570,000  |
| 1934 | 762-79   | 126,000  | 850    | 20,090  | 14,540,000  |
| 1935 | 787-88   | 418,000  | 5,750  | 67,080  | 48,560,000  |
| 1936 | 807-85   | 117,000  | 1,290  | 14,510  | 10,540,000  |
| 1937 | 827-82   | 170,000  | 3,510  | 31,260  | 22,630,000  |
| 1938 | 857-99   | 452,000  | 2,920  | 44,680  | 32,350,000  |
| 1939 | 877-124  | 178,000  | 1,440  | 20,800  | 15,060,000  |
| 1940 | 897-117  | 90,100   | 2,000  | 13,900  | 10,090,000  |
| 1941 | 927-115  | 399,000  | 7,690  | 64,660  | 46,810,000  |
| 1942 | 957-116  | 308,000  | 10,100 | 58,540  | 42,380,000  |
| 1943 | 977-116  | 536,000  | 3,900  | 50,400  | 36,490,000  |
| 1944 | 1007-117 | 274,000  | 6,630  | 50,930  | 43,750,000  |
| 1945 | 1037-129 | 467,000  | 7,190  | 88,900  | 64,360,000  |
| 1946 | 1057-123 | 283,000  | 4,100  | 49,330  | 35,720,000  |
| 1947 | 1087-125 | 230,000  | 3,940  | 37,810  | 27,370,000  |
| 1948 |          |          |        |         |             |

\*From reports of Mississippi River Commission.

## Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946

| Date of collection      | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|-------------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|----------------|-------------------------------|-------|----------------|
|                         |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons acre-foot | Tons per day                  | Total | Non-carbonate  |
| 1945:                   |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                |                               |       |                |
| Oct. 1-10               | 232,800                      | 44.9                              | 38           | 7.0            |             | 36            | 105                             | 21                         | 66            | 2.0                        | 257               | 0.35           | 162,000                       | 124   | 38             |
| Oct. 11-20              | 93,390                       | 46.0                              | 38           | 7.0            |             | 37            | 101                             | 26                         | 67            | .8                         | 266               | .36            | 67,100                        | 124   | 41             |
| Oct. 21-31              | 29,880                       | 99.6                              | 61           | 12             | 109         | 139           | 45                              | 196                        | 8             | .8                         | 556               | .76            | 44,800                        | 202   | 88             |
| Nov. 1-10               | 18,220                       | 96.6                              | 58           | 13             | 121         | 149           | 43                              | 207                        | 1.7           | .5                         | 556               | .76            | 27,400                        | 198   | 76             |
| Nov. 11-20              | 16,610                       | 110                               | 57           | 14             | 158         | 139           | 73                              | 250                        | .5            | .5                         | 623               | .85            | 27,900                        | 200   | 84             |
| Nov. 21-30              | 18,670                       | 97.7                              | 48           | 13             | 127         | 116           | 35                              | 225                        | 1.0           | .8                         | 545               | .74            | 27,500                        | 174   | 78             |
| Dec. 1-10               | 12,450                       | 132                               | 67           | 16             | 170         | 154           | 45                              | 305                        | .8            | .8                         | 749               | 1.02           | 25,200                        | 233   | 107            |
| Dec. 11-20              | 11,810                       | 138                               | 70           | 17             | 184         | 160           | 46                              | 330                        | .8            | .8                         | 784               | 1.07           | 25,000                        | 244   | 114            |
| Dec. 21-31 <sup>2</sup> | 10,350                       | 144                               | 71           | 18             | 167         | 162           | 48                              | 342                        | 1.0           | 1.0                        | 811               | 1.10           | 22,700                        | 251   | 220            |
| 1946:                   |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                |                               |       |                |
| Jan. 1-10               | 50,705                       | 116                               | 59           | 8.8            | 160         | 126           | 36                              | 275                        | 2.2           | 2.2                        | 652               | .88            | 89,300                        | 184   | 80             |
| Jan. 11-20              | 137,370                      | 42.9                              | 30           | 6.0            | 45          | 80            | 19                              | 78                         | 2.0           | .8                         | 263               | .36            | 97,500                        | 100   | 40             |
| Jan. 21-26              | 59,000                       | 47.2                              | 29           | 7.1            | 55          | 70            | 23                              | 98                         | 1.5           | 1.5                        | 287               | .39            | 45,700                        | 102   | 34             |
| Jan. 27-31              | 35,580                       | 72.6                              | 36           | 9.8            | 84          | 76            | 34                              | 152                        | 1.5           | 1.5                        | 434               | .59            | 41,700                        | 130   | 68             |
| Feb. 1-5                | 26,780                       | 93.8                              | 54           | 13             | 118         | 120           | 44                              | 212                        | 1.8           | 1.8                        | 538               | .73            | 37,400                        | 188   | 90             |
| Feb. 6-10               | 54,540                       | 62.3                              | 36           | 8.3            | 77          | 94            | 29                              | 130                        | 2.0           | 2.0                        | 361               | .49            | 53,200                        | 124   | 47             |
| Feb. 11-20              | 100,370                      | 46.4                              | 28           | 6.0            | 55          | 70            | 21                              | 95                         | 1.8           | 1.8                        | 285               | .39            | 77,200                        | 94    | 37             |
| Feb. 21-28              | 109,460                      | 47.6                              | 36           | 9.2            | 48          | 101           | 26                              | 86                         | 2.2           | 2.2                        | 298               | .41            | 88,100                        | 128   | 45             |
| Mar. 1-10               | 43,510                       | 66.6                              | 38           | 9.1            | 77          | 98            | 34                              | 129                        | 2.0           | 2.0                        | 368               | .50            | 43,200                        | 132   | 52             |
| Mar. 11-20              | 46,170                       | 87.1                              | 41           | 10             | 116         | 102           | 45                              | 187                        | 2.0           | 2.0                        | 473               | .64            | 59,000                        | 144   | 60             |
| Mar. 21-26              | 49,030                       | 91.9                              | 46           | 12             | 112         | 106           | 45                              | 194                        | 1.5           | 1.5                        | 506               | .69            | 67,000                        | 164   | 78             |
| Mar. 27-31              | 68,600                       | 58.6                              | 34           | 9.3            | 63          | 84            | 29                              | 113                        | 1.5           | 1.5                        | 330               | .45            | 61,100                        | 123   | 54             |
| Apr. 1-10               | 46,210                       | 74.8                              | 54           | 11             | 70          | 114           | 30                              | 146                        | 1.8           | 1.8                        | 416               | .56            | 51,900                        | 180   | 86             |
| Apr. 11-20              | 38,390                       | 83.8                              | 41           | 11             | 105         | 108           | 36                              | 176                        | 1.5           | 1.5                        | 456               | .62            | 47,300                        | 148   | 59             |
| Apr. 21-30              | 66,100                       | 58.2                              | 28           | 7.8            | 69          | 72            | 20                              | 121                        | 2.0           | 2.0                        | 319               | .43            | 56,900                        | 102   | 43             |
| May 1-10                | 105,110                      | 42.1                              | 27           | 5.7            | 55          | 75            | 20                              | 90                         | 1.5           | 1.5                        | 243               | .33            | 69,000                        | 91    | 29             |
| May 11-20               | 75,290                       | 46.0                              | 30           | 5.9            | 57          | 80            | 21                              | 95                         | 2.2           | 2.2                        | 259               | .35            | 52,700                        | 102   | 34             |
| May 21-31               | 124,300                      | 38.2                              | 29           | 5.0            | 44          | 79            | 16                              | 75                         | 1.8           | 1.8                        | 232               | .32            | 77,900                        | 93    | 28             |

— Continued.

37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1945 to September 1946*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| June 1-10          | 96,780                       | 40.6                              | 31           | 5.2            |             | 47            | 90                              | 22                         | 73            | 1.8                        | 252               | 0.34               | 65,800                        | 99    | 25             |
| June 11-20         | 31,550                       | 75.0                              | 46           | 10             |             | 89            | 116                             | 45                         | 147           | 1.5                        | 435               | .59                | 37,100                        | 166   | 61             |
| June 21-26         | 15,850                       | 90.4                              | 49           | 12             |             | 113           | 121                             | 43                         | 192           | 1.5                        | 518               | .70                | 22,200                        | 172   | 72             |
| June 27-30         | 18,800                       | 131                               | 64           | 16             |             | 169           | 138                             | 56                         | 298           | 2.0                        | 733               | 1.00               | 37,200                        | 226   | 59             |
| July 1, 8-10       | 34,620                       | 115                               | 55           | 11             |             | 162           | 133                             | 44                         | 268           | 2.0                        | 658               | .90                | 61,500                        | 182   | 62             |
| July 2-7           | 58,280                       | 77.1                              | 44           | 8.5            |             | 96            | 110                             | 27                         | 166           | 2.0                        | 443               | .60                | 69,700                        | 145   | 73             |
| July 11-16         | 18,580                       | 87.8                              | 50           | 10             |             | 112           | 130                             | 51                         | 177           | 2.0                        | 508               | .69                | 25,500                        | 166   | 55             |
| July 17-20         | 12,950                       | 102                               | 60           | 12             |             | 113           | 153                             | 61                         | 181           | 2.0                        | 573               | .78                | 20,000                        | 109   | 60             |
| July 21-27         | 8,710                        | 113                               | 58           | 13             |             | 151           | 142                             | 59                         | 246           | 2.0                        | 649               | .88                | 15,300                        | 198   | 55             |
| July 28-31         | 9,622                        | 139                               | 69           | 16             |             | 189           | 155                             | 53                         | 380           | 2.0                        | 782               | 1.06               | 20,300                        | 238   | 82             |
| Aug. 1-3, 8, 10    | 7,048                        | 92.8                              | 47           | 12             |             | 129           | 129                             | 39                         | 212           | 3.8                        | 535               | .73                | 10,200                        | 166   | 61             |
| Aug. 4-7, 9        | 7,284                        | 105                               | 54           | 14             |             | 146           | 147                             | 44                         | 242           | 2.8                        | 606               | .82                | 11,900                        | 192   | 63             |
| Aug. 11-20         | 5,308                        | 116                               | 68           | 16             |             | 150           | 175                             | 45                         | 262           | 2.8                        | 685               | .93                | 9,810                         | 236   | 62             |
| Aug. 21-31         | 4,611                        | 112                               | 69           | 15             |             | 146           | 183                             | 46                         | 249           | 2.2                        | 671               | .91                | 8,350                         | 234   | 58             |
| Sept. 1-5          | 8,112                        | 122                               | 70           | 15             |             | 166           | 168                             | 51                         | 272           | 2.2                        | 706               | .96                | 15,500                        | 236   | 58             |
| Sept. 6-10         | 7,590                        | 222                               | 85           | 22             |             | 353           | 120                             | 50                         | 650           | 3.2                        | 1,220             | 1.66               | 25,000                        | 302   | 59             |
| Sept. 11-13, 18-20 | 6,568                        | 180                               | 78           | 18             |             | 268           | 146                             | 54                         | 478           | 1.8                        | 970               | 1.32               | 17,200                        | 263   | 72             |
| Sept. 14-17        | 6,355                        | 133                               | 68           | 16             |             | 190           | 152                             | 47                         | 355           | 1.8                        | 803               | 1.09               | 13,800                        | 236   | 68             |
| Sept. 21-30        | 5,485                        | 162                               | 80           | 16             |             | 242           | 170                             | 77                         | 405           | 1.8                        | 959               | 1.30               | 14,200                        | 266   | 64             |
| Weighted average   | 49,240                       | 61.5                              | 33           | 8.1            |             | 71            | 98                              | 28                         | 124           | 1.8                        | 355               | 0.48               | 76,900                        | 180   | 51             |
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               |       | 52             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.<sup>2</sup> pH—8.3, Silica (SiO<sub>2</sub>)—9.6, Iron (Fe)—0.02.

## 37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued

*Temperature (°F.) of Water of Arkansas River, Water Year October 1945 to September 1946*

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



37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| 1946:              |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               |       |                |
| Oct. 1-10          | 7,022                        | 185                               | 86           | 25             | 253         | 10            | 172                             | 122                        | 405           | 2.0                        | 998               | 1.36               | 18,900                        | 318   | 189            |
| Oct. 11-20         | 10,490                       | 165                               | 87           | 23             | 198         |               | 190                             | 138                        | 312           | 3.0                        | 924               | 1.26               | 26,200                        | 312   | 155            |
| Oct. 21-23, 30-31  | 12,020                       | 200                               | 88           | 23             | 267         |               | 172                             | 150                        | 422           | 3.2                        | 1,040             | 1.41               | 33,800                        | 314   | 172            |
| Oct. 24-29         | 10,920                       | 334                               | 104          | 26             | 514         |               | 164                             | 186                        | 815           | 1.8                        | 1,780             | 2.35               | 51,000                        | 366   | 232            |
| Nov. 1-6           | 14,440                       | 154                               | 66           | 15             | 204         |               | 137                             | 72                         | 340           | 3.0                        | 807               | 1.10               | 31,500                        | 226   | 114            |
| Nov. 7-10          | 94,880                       | 119                               | 58           | 10             | 155         |               | 133                             | 55                         | 252           | 2.0                        | 639               | .87                | 164,000                       | 186   | 76             |
| Nov. 11-16         | 100,100                      | 37.0                              | 25           | 5.0            | 37          |               | 76                              | 17                         | 58            | 1.8                        | 214               | .29                | 57,800                        | 83    | 21             |
| Nov. 17-20         | 49,830                       | 66.2                              | 32           | 6.6            | 81          |               | 79                              | 31                         | 131           | 2.2                        | 359               | .49                | 48,300                        | 107   | 42             |
| Nov. 21-30         | 32,360                       | 72.8                              | 34           | 7.4            | 92          |               | 85                              | 43                         | 141           | 2.0                        | 383               | .52                | 33,500                        | 116   | 46             |
| Dec. 1-6           | 31,950                       | 58.0                              | 28           | 6.6            | 67          |               | 65                              | 33                         | 109           | 2.0                        | 315               | .43                | 27,200                        | 97    | 44             |
| Dec. 7-10          | 16,950                       | 109                               | 51           | 12             | 135         |               | 102                             | 57                         | 231           | 1.8                        | 574               | .78                | 26,300                        | 176   | 93             |
| Dec. 11-20         | 188,300                      | 29.4                              | 23           | 4.3            | 28          |               | 81                              | 15                         | 38            | .2                         | 187               | .25                | 95,100                        | 75    | 9              |
| Dec. 21-25         | 55,080                       | 62.2                              | 24           | 5.7            | 38          |               | 62                              | 19                         | 67            | 1.5                        | 227               | .31                | 33,800                        | 83    | 32             |
| Dec. 26-31         | 34,480                       | 69.2                              | 34           | 7.5            | 69          |               | 74                              | 36                         | 117           | 3.5                        | 340               | .46                | 31,700                        | 116   | 55             |
| 1947:              |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               |       |                |
| Jan. 1-10          | 25,660                       | 93.4                              | 44           | 11             | 122         |               | 96                              | 50                         | 204           | 2.2                        | 546               | .74                | 37,800                        | 155   | 76             |
| Jan. 11-12, 14-16  | 18,660                       | 79.0                              | 41           | 9.4            | 98          |               | 105                             | 41                         | 159           | 2.5                        | 444               | .60                | 22,400                        | 141   | 55             |
| Jan. 13, 17-20     | 17,580                       | 102                               | 51           | 11             | 131         |               | 117                             | 44                         | 222           | 2.0                        | 576               | .78                | 27,300                        | 172   | 76             |
| Jan. 21-31         | 15,470                       | 154                               | 68           | 19             | 216         |               | 132                             | 61                         | 385           | 2.5                        | 873               | 1.19               | 36,500                        | 248   | 139            |
| Feb. 1-5           | 12,850                       | 149                               | 68           | 17             | 200         |               | 144                             | 72                         | 340           | 2.8                        | 796               | 1.08               | 27,700                        | 240   | 121            |
| Feb. 6-10          | 10,800                       | 193                               | 78           | 19             | 288         |               | 153                             | 83                         | 485           | 2.0                        | 1,030             | 1.40               | 30,030                        | 272   | 147            |
| Feb. 11-20         | 9,015                        | 186                               | 81           | 19             | 264         |               | 165                             | 92                         | 440           | 2.0                        | 979               | 1.33               | 23,800                        | 280   | 144            |
| Feb. 21-23         | 8,718                        | 185                               | 82           | 21             | 253         |               | 168                             | 91                         | 430           | 1.8                        | 963               | 1.31               | 22,700                        | 291   | 153            |
| Mar. 1-10          | 8,252                        | 192                               | 82           | 22             | 266         |               | 158                             | 91                         | 460           | 1.0                        | 1,000             | 1.36               | 23,300                        | 295   | 165            |
| Mar. 11-14, 18-19  | 12,560                       | 152                               | 57           | 22             | 201         |               | 134                             | 75                         | 340           | 1.5                        | 867               | 1.18               | 29,400                        | 232   | 122            |
| Mar. 15-17, 20-23  | 28,120                       | 172                               | 69           | 17             | 253         |               | 132                             | 84                         | 422           | 1.5                        | 912               | 1.24               | 69,200                        | 242   | 134            |
| Mar. 24-31         | 31,790                       | 114                               | 39           | 10             | 169         |               | 93                              | 59                         | 260           | 2.8                        | 664               | .90                | 57,000                        | 138   | 62             |

—Continued.

## 37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection       | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|--------------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                          |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| Apr. 1-10 .....          | 21,660                       | 154                               | 60           | 14             | 218         | 108           | 108                             | 90                         | 352           | 3.0                        | 865               | 1.18               | 50,600                        | 207   | 118            |
| Apr. 11-12, 18-20 .....  | 174,400                      | 91.0                              | 46           | 8.6            | 116         | 121           | 121                             | 49                         | 177           | 3.0                        | 512               | .70                | 241,000                       | 150   | 51             |
| Apr. 13-17 .....         | 183,800                      | 56.5                              | 18           | 6.2            | 84          | 102           | 102                             | 36                         | 92            | 2.5                        | 326               | .44                | 162,000                       | 70    | 0              |
| Apr. 21-30 .....         | 162,100                      | 56.6                              | 18           | 7.5            | 84          | 110           | 110                             | 41                         | 88            | 3.0                        | 337               | .46                | 147,000                       | 76    | 0              |
| May 1-10 .....           | 127,100                      | 50.2                              | 36           | 7.2            | 53          | 102           | 102                             | 37                         | 78            | 3.5                        | 301               | .41                | 103,000                       | 119   | 36             |
| May 11-15 .....          | 56,680                       | 82.2                              | 47           | 10             | 100         | 110           | 110                             | 56                         | 160           | 2.2                        | 476               | .65                | 72,800                        | 158   | 68             |
| May 16-20 .....          | 156,200                      | 61.4                              | 38           | 7.8            | 71          | 101           | 101                             | 34                         | 114           | 1.8                        | 356               | .48                | 149,000                       | 127   | 44             |
| May 21-31 .....          | 184,000                      | 51.0                              | 39           | 7.8            | 50          | 114           | 114                             | 36                         | 74            | 2.5                        | 305               | .41                | 151,000                       | 129   | 36             |
| June 1-10 .....          | 109,120                      | 61.3                              | 43           | 7.9            | 65          | 111           | 111                             | 44                         | 101           | 2.2                        | 357               | .49                | 10,500                        | 140   | 49             |
| June 11-20 .....         | 47,110                       | 77.8                              | 51           | 11             | 89          | 114           | 114                             | 82                         | 130           | 2.2                        | 467               | .64                | 5,940                         | 172   | 78             |
| June 21-30 .....         | 47,970                       | 88.5                              | 56           | 13             | 109         | 119           | 119                             | 74                         | 180           | 2.5                        | 533               | .72                | 6,900                         | 193   | 95             |
| July 1-10 .....          | 50,100                       | 61.8                              | 40           | 8.3            | 70          | 102           | 102                             | 46                         | 108           | 3.5                        | 350               | .48                | 4,730                         | 134   | 50             |
| July 11-12, 17-20 .....  | 20,780                       | 89.9                              | 58           | 13             | 109         | 134           | 134                             | 91                         | 162           | 3.2                        | 540               | .73                | 3,030                         | 198   | 88             |
| July 13-16 .....         | 22,850                       | 126                               | 69           | 15             | 175         | 137           | 137                             | 99                         | 282           | 2.5                        | 778               | 1.06               | 4,800                         | 234   | 121            |
| July 21-31 .....         | 12,490                       | 111                               | 74           | 18             | 133         | 163           | 163                             | 125                        | 200           | 2.8                        | 689               | .94                | 2,320                         | 258   | 125            |
| Aug. 1, 2, 6, 8-10 ..... | 12,190                       | 158                               | 86           | 23             | 220         | 165           | 165                             | 150                        | 350           | 3.0                        | 988               | 1.34               | 32,500                        | 309   | 174            |
| Aug. 3-5, 7 .....        | 13,680                       | 244                               | 110          | 32             | 333         | 166           | 166                             | 167                        | 580           | 2.5                        | 1,310             | 1.78               | 48,400                        | 406   | 270            |
| Aug. 11-20 .....         | 8,068                        | 100                               | 70           | 18             | 144         | 164           | 164                             | 107                        | 225           | 2.2                        | 729               | .99                | 1,590                         | 248   | 114            |
| Aug. 21-31 .....         | 5,978                        | 132                               | 70           | 21             | 170         | 155           | 155                             | 109                        | 275           | 1.2                        | 812               | 1.10               | 1,310                         | 261   | 134            |
| Sept. 1-10 .....         | 5,699                        | 146                               | 74           | 21             | 204         | 155           | 155                             | 94                         | 345           | 3.0                        | 883               | 1.20               | 1,360                         | 271   | 144            |
| Sept. 11-20 .....        | 8,002                        | 131                               | 65           | 17             | 175         | 144           | 144                             | 72                         | 295           | 3.8                        | 755               | 1.03               | 1,630                         | 232   | 114            |
| Sept. 21-26 .....        | 6,977                        | 86.3                              | 44           | 10             | 112         | 110           | 110                             | 36                         | 186           | 2.2                        | 481               | .65                | 3,360                         | 151   | 61             |
| Sept. 27-30 .....        | 7,178                        | 167                               | 73           | 20             | 235         | 134           | 134                             | 53                         | 432           | 2.0                        | 974               | 1.32               | 1,890                         | 264   | 154            |
| Weighted average         | 47,590                       | 72.6                              | 39           | 9.0            | 91          | 108           | 108                             | 47                         | 137           | 2.3                        | 419               | 0.57               | 92,050                        | 135   | 49             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued

*Temperature (° F.) of Water of Arkansas River, Water Year October 1946 to September 1947*

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

## 37. ARKANSAS RIVER AT LITTLE ROCK, ARK.-Continued

Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K)    | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    |              | Hardness as CaCO <sub>3</sub> |               | Percent sodium |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|------------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|--------------|-------------------------------|---------------|----------------|
|                    |                              |                                   |              |                |             |                  |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day | Total                         | Non-carbonate |                |
| 1947:              |                              |                                   |              |                |             |                  |                                 |                            |               |                            |                   |                    |              |                               |               |                |
| Oct. 1-5           | 6,346                        | 1,110                             | 56           | 19             | 139         | 116              | 116                             | 56                         | 258           | 2.2                        | 646               | 0.88               | 11,100       | 218                           | 123           | 58             |
| Oct. 6-10          | 5,366                        | 1,740                             | 80           | 20             | 238         | 147              | 147                             | 60                         | 435           | 3.0                        | 956               | 1.30               | 13,900       | 232                           | 161           | 65             |
| Oct. 11-16         | 4,538                        | 1,350                             | 88           | 23             | 247         | 158              | 158                             | 58                         | 465           | 3.0                        | 962               | 1.31               | 11,800       | 314                           | 185           | 63             |
| Oct. 17-20         | 4,226                        | 1,300                             | 70           | 26             | 146         | 162              | 162                             | 53                         | 290           | 2.8                        | 738               | 1.00               | 8,490        | 282                           | 149           | 53             |
| Oct. 21-28         | 6,626                        | 1,340                             | 69           | 18             | 176         | 151 <sup>2</sup> | 151                             | 56                         | 315           | 3.8                        | 773               | 1.05               | 13,800       | 246                           | 122           | 61             |
| Oct. 29-31         | 6,793                        | 842                               | 42           | 12             | 108         | 103              | 103                             | 34                         | 190           | 1.8                        | 477               | .65                | 8,750        | 154                           | 70            | 60             |
| Nov. 1-3, 6-7      | 6,658                        | 1,120                             | 58           | 16             | 137         | 129 <sup>3</sup> | 129                             | 44                         | 252           | .8                         | 618               | .84                | 11,100       | 210                           | 105           | 58             |
| Nov. 4-5, 8-10     | 6,250                        | 1,470                             | 64           | 18             | 201         | 124              | 124                             | 42                         | 372           | 2.2                        | 821               | 1.12               | 13,900       | 234                           | 132           | 65             |
| Nov. 11-15         | 6,130                        | 1,660                             | 71           | 18             | 239         | 124              | 124                             | 46                         | 440           | 1.2                        | 947               | 1.29               | 15,700       | 251                           | 150           | 67             |
| Nov. 16-20         | 7,756                        | 1,190                             | 50           | 14             | 160         | 114              | 114                             | 37                         | 232           | 1.0                        | 658               | .89                | 13,800       | 182                           | 89            | 43             |
| Nov. 21-22, 25-27  | 9,274                        | 1,130                             | 49           | 13             | 155         | 111              | 111                             | 37                         | 270           | 1.5                        | 624               | .85                | 15,600       | 176                           | 85            | 55             |
| Nov. 23-24, 28     | 8,693                        | 1,540                             | 66           | 18             | 198         | 119              | 119                             | 23                         | 388           | 1.5                        | 831               | 1.13               | 19,500       | 238                           | 141           | 64             |
| Nov. 29-30         | 8,450                        | 2,280                             | 84           | 22             | 367         | 107              | 107                             | 91                         | 648           | 1.5                        | 1,270             | 1.73               | 29,000       | 300                           | 213           | 74             |
| Dec. 1-6           | 6,097                        | 1,420                             | 55           | 16             | 193         | 102              | 102                             | 35                         | 355           | 1.0                        | 780               | 1.06               | 12,800       | 203                           | 120           | 67             |
| Dec. 7-10          | 17,060                       | 912                               | 38           | 10             | 118         | 77               | 77                              | 22                         | 217           | 1.2                        | 498               | .68                | 22,900       | 136                           | 73            | 64             |
| Dec. 11-12, 19-21  | 30,940                       | 827                               | 27           | 8.3            | 122         | 59               | 59                              | 25                         | 206           | 1.5                        | 454               | .62                | 37,900       | 102                           | 53            | 72             |
| Dec. 13-18         | 26,200                       | 510                               | 20           | 5.8            | 69          | 49               | 49                              | 16                         | 118           | 1.0                        | 297               | .40                | 21,000       | 74                            | 34            | 67             |
| Dec. 22-31         | 12,720                       | 654                               | 28           | 8.0            | 86          | 66               | 66                              | 27                         | 146           | 1.0                        | 374               | .51                | 12,800       | 103                           | 49            | 64             |
| 1948:              |                              |                                   |              |                |             |                  |                                 |                            |               |                            |                   |                    |              |                               |               |                |
| Jan. 1-2, 5-6      | 59,750                       | 540                               | 28           | 6.6            | 70          | 72               | 72                              | 23                         | 116           | 2.5                        | 331               | .45                | 53,400       | 97                            | 38            | 61             |
| Jan. 3-4, 7-10     | 63,950                       | 328                               | 14           | 5.7            | 52          | 62               | 62                              | 20                         | 70            | 2.5                        | 209               | .28                | 36,100       | 59                            | 8             | 66             |
| Jan. 11-14         | 29,880                       | 309                               | 12           | 4.3            | 53          | 62               | 62                              | 17                         | 66            | 2.2                        | 206               | .28                | 16,600       | 48                            | 0             | 71             |
| Jan. 15-17         | 21,770                       | 623                               | 25           | 6.6            | 93          | 66               | 66                              | 21                         | 152           | 1.5                        | 388               | .53                | 22,800       | 90                            | 36            | 69             |
| Jan. 18-20         | 13,400                       | 1,089                             | 42           | 9.8            | 165         | 90               | 90                              | 32                         | 280           | 2.0                        | 641               | .87                | 23,200       | 145                           | 72            | 72             |
| Jan. 21-31         | 9,375                        | 1,311                             | 58           | 9.6            | 193         | 114              | 114                             | 44                         | 325           | 2.0                        | 769               | 1.05               | 19,500       | 180                           | 86            | 70             |
| Feb. 1-7           | 10,380                       | 1,150                             | 54           | 14             | 154         | 112              | 112                             | 44                         | 275           | 1.5                        | 695               | .95                | 19,500       | 193                           | 101           | 63             |
| Feb. 8-10          | 35,100                       | 594                               | 26           | 7.2            | 75          | 52               | 52                              | 23                         | 134           | 2.0                        | 344               | .47                | 32,600       | 94                            | 52            | 63             |

—Continued.

37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|---------------|
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Total                         | Non-carbonate |
| Feb. 11-13, 17-20  | 35,590                       | 648                               | 22           | 7.2            | 86          |               | 40                              | 23                         | 152           | 1.5                        | 369               | 0.50               | 35,500                        | 84            |
| Feb. 14-16         | 36,470                       | 452                               | 17           | 5.6            | 58          |               | 32                              | 20                         | 102           | 1.5                        | 258               | .35                | 25,400                        | 65            |
| Feb. 21-25         | 24,740                       | 606                               | 22           | 6.3            | 79          |               | 42                              | 21                         | 140           | 2.0                        | 358               | .49                | 23,900                        | 83            |
| Feb. 26-29         | 85,750                       | 400                               | 14           | 5.3            | 54          |               | 40                              | 18                         | 86            | 1.5                        | 247               | .34                | 57,200                        | 57            |
| Mar. 1-7           | 125,000                      | 471                               | 18           | 6.1            | 62          |               | 62                              | 20                         | 94            | 1.5                        | 281               | .38                | 94,800                        | 70            |
| Mar. 8-10          | 97,870                       | 693                               | 30           | 7.7            | 93          |               | 74                              | 30                         | 152           | 2.5                        | 405               | .55                | 107,000                       | 106           |
| Mar. 11-20         | 61,430                       | 796                               | 34           | 9.1            | 104         | 5.0           | 74                              | 41                         | 178           | 1.5                        | 445               | .61                | 73,800                        | 129           |
| Mar. *21, 24-26    | 71,920                       | 900                               | 35           | 9.3            | 130         |               | 82                              | 42                         | 210           | 1.5                        | 527               | .72                | 102,000                       | 125           |
| Mar. 22-23, 27-31  | 81,460                       | 719                               | 34           | 8.0            | 89          |               | 82                              | 32                         | 154           | 2.0                        | 417               | .57                | 91,700                        | 118           |
| Apr. 1-10          | 37,820                       | 748                               | 40           | 8.9            | 93          |               | 96                              | 52                         | 145           | 2.6                        | 430               | .58                | 43,900                        | 137           |
| Apr. 11-14         | 57,200                       | 612                               | 30           | 7.4            | 81          |               | 78                              | 49                         | 116           | 3.4                        | 352               | .48                | 54,400                        | 106           |
| Apr. 15-20         | 56,520                       | 493                               | 20           | 5.8            | 53          |               | 51                              | 33                         | 79            | 1.8                        | 235               | .32                | 35,900                        | 74            |
| Apr. 21-25         | 28,020                       | 616                               | 32           | 8.1            | 79          |               | 71                              | 43                         | 129           | 1.3                        | 352               | .48                | 26,600                        | 114           |
| Apr. 26-30         | 19,220                       | 923                               | 46           | 11             | 116         |               | 92                              | 60                         | 194           | .8                         | 526               | .72                | 27,300                        | 161           |
| May 1-8, 10        | 27,520                       | 1,110                             | 58           | 12             | 156         |               | 105                             | 57                         | 273           | 2.5                        | 685               | .93                | 50,900                        | 194           |
| May 9, 11-18       | 48,010                       | 866                               | 41           | 9.0            | 115         |               | 83                              | 39                         | 197           | 3.3                        | 486               | .66                | 63,000                        | 140           |
| May 19-27          | 35,470                       | 525                               | 27           | 7.3            | 69          |               | 30                              | 30                         | 105           | 2.3                        | 310               | .42                | 29,700                        | 97            |
| May 28-31          | 27,720                       | 725                               | 40           | 8.8            | 90          |               | 90                              | 41                         | 151           | 3.4                        | 435               | .59                | 32,600                        | 136           |
| June 1-8           | 18,380                       | 1,190                             | 60           | 13             | 167         |               | 106                             | 41                         | 308           | 2.6                        | 702               | .95                | 34,800                        | 203           |
| June 9-11          | 12,500                       | 1,650                             | 74           | 17             | 253         |               | 121                             | 48                         | 463           | 2.0                        | 983               | 1.34               | 33,200                        | 255           |
| June 12-19         | 9,742                        | 1,150                             | 60           | 14             | 163         |               | 137                             | 54                         | 278           | 1.3                        | 674               | .92                | 17,700                        | 207           |
| June 20-25         | 20,460                       | 923                               | 41           | 12             | 128         |               | 103                             | 51                         | 207           | 1.4                        | 536               | .73                | 29,600                        | 152           |
| June 26-30         | 246,200                      | 466                               | 36           | 7.9            | 49          |               | 118                             | 27                         | 72            | 2.0                        | 269               | .37                | 179,000                       | 122           |
| July 1-3           | 245,300                      | 411                               | 30           | 5.6            | 47          |               | 116                             | 25                         | 54            | 3.5                        | 238               | .32                | 158,000                       | 98            |
| July 4-10          | 162,800                      | 627                               | 39           | 5.9            | 79          |               | 118                             | 32                         | 115           | 3.0                        | 358               | .49                | 157,000                       | 122           |
| July 11-16         | 70,130                       | 1,000                             | 50           | 9.4            | 140         |               | 126                             | 46                         | 223           | 2.8                        | 573               | .78                | 108,000                       | 164           |
| July 17-20         | 94,880                       | 567                               | 32           | 5.7            | 75          |               | 108                             | 30                         | 102           | 3.0                        | 326               | .44                | 83,500                        | 104           |
| July 21-25, 31     | 137,200                      | 435                               | 30           | 5.2            | 51          |               | 110                             | 24                         | 64            | 3.0                        | 260               | .35                | 96,300                        | 96            |
| July 26-30         | 140,000                      | 552                               | 26           | 5.8            | 80          |               | 113                             | 30                         | 96            | 3.5                        | 318               | .43                | 120,000                       | 89            |
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               | 0             |
|                    |                              |                                   |              |                |             |               |                                 |                            |               |                            |                   |                    |                               | 60            |

—Continued.

37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection              | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    |              | Hardness as CaCO <sub>3</sub> |               | Percent sodium |
|---------------------------------|------------------------------|-----------------------------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|--------------|-------------------------------|---------------|----------------|
|                                 |                              |                                   |              |                |             |               |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day | Total                         | Non-carbonate |                |
| Aug. 1-10 .....                 | 87,680                       | 425                               | 32           | 5.5            | 47          |               | 114                             | 25                         | 59            | 2.8                        | 253               | 0.34               | 59,900       | 102                           | 9             | 50             |
| Aug. 11-12, 18, 20              | 86,180                       | 506                               | 32           | 5.1            | 68          |               | 114                             | 26                         | 90            | 2.2                        | 289               | .39                | 67,200       | 101                           | 8             | 60             |
| Aug. 13-17, 19 .....            | 79,670                       | 642                               | 31           | 6.3            | 90          |               | 106                             | 33                         | 125           | 2.0                        | 370               | .50                | 79,600       | 104                           | 16            | 65             |
| Aug. 21-24 .....                | 86,450                       | 665                               | 34           | 6.3            | 92          |               | 111                             | 39                         | 126           | 2.5                        | 379               | .52                | 88,500       | 111                           | 20            | 64             |
| Aug. 25-28 .....                | 40,380                       | 984                               | 54           | 9.2            | 131         |               | 121                             | 71                         | 200           | 2.5                        | 576               | .78                | 62,800       | 173                           | 74            | 62             |
| Aug. 29-31 .....                | 30,270                       | 1,240                             | 61           | 11             | 173         |               | 132                             | 85                         | 265           | 3.0                        | 701               | .95                | 57,300       | 197                           | 89            | 66             |
| Sept. 1-2, 8-10 .....           | 20,360                       | 1,324                             | 72           | 14             | 184         |               | 156                             | 94                         | 290           | 1.5                        | 766               | 1.04               | 42,100       | 237                           | 109           | 63             |
| Sept. 3-7 .....                 | 21,120                       | 1,188                             | 72           | 13             | 165         |               | 156                             | 91                         | 260           | 2.5                        | 692               | .94                | 39,500       | 233                           | 105           | 61             |
| Sept. 11-12, 15-16, 19-20 ..... | 12,030                       | 1,434                             | 72           | 16             | 209         |               | 178                             | 97                         | 320           | 2.5                        | 816               | 1.11               | 26,500       | 246                           | 100           | 65             |
| Sept. 13-14, 17-18              | 11,980                       | 1,593                             | 94           | 18             | 217         |               | 188                             | 105                        | 365           | 2.0                        | 912               | 1.24               | 29,500       | 308                           | 154           | 60             |
| Sept. 21, 28-30 .....           | 9,538                        | 1,429                             | 67           | 17             | 209         |               | 157                             | 86                         | 335           | 1.2                        | 800               | 1.09               | 20,600       | 237                           | 108           | 66             |
| Sept. 22-27 .....               | 9,085                        | 1,173                             | 62           | 14             | 167         |               | 156                             | 77                         | 260           | .5                         | 662               | .90                | 16,200       | 212                           | 84            | 63             |
| Weighted average...             | 44,710                       | 658                               | 34           | 7.6            | 87          |               | 97                              | 34                         | 134           | 2.4                        | 382               | 0.52               | 83,900       | 117                           | 38            | 60             |

<sup>1</sup> K×10<sup>6</sup> at 25° C.

<sup>2</sup> Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).

<sup>3</sup> Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

## 37. ARKANSAS RIVER AT LITTLE ROCK, ARK.—Continued

*Temperature (° F.) of Water of Arkansas River, Water Year October 1947 to September 1948*

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

## 38. Poteau River at Cauthron, Ark.

LOCATION: Water-stage recorder, lat. 34°55', long. 94°18', in sec. 16, T. 3 N., R. 31 W., at highway bridge at Cauthron, Scott County, about 8 miles downstream from Jones Creek. Datum of gage is altitude 535 feet (from topographic map).

DRAINAGE AREA: 198 square miles.

RECORDS AVAILABLE: Discharge, February 1939 to September 1948. Chemical quality, see analysis page 172.

MEAN ANNUAL RUNOFF: 15.70 inches or 165,800 acre-feet.

AVERAGE DISCHARGE: 9 years, 229 second-feet.

MAXIMUM: 1939-48: Discharge, 24,400 second-feet Apr. 16, 1939 (gage height, 22.5 feet, from graph based on gage readings).

Maximum stage known, 27.4 feet, in June 1935, from information by local residents.

MINIMUM: 1939-48: Day: No flow, Sept. 23-28, Oct. 1-9, 1939; Oct. 25-27, 1940; Aug. 3 to Oct. 1, Oct. 7-12, 1943; Oct. 26 to Nov. 7, 1944; Sept. 2, Sept. 5-30, Oct. 2-16, 1946; July 22 to Aug. 16, Aug. 21-27, 1947.

7-day: No flow, see above.

Calendar month: No flow, September 1943.

Water year: 49.9 second-feet (32.2 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to May 2, 1939, wire-weight gage at same site and datum. Bankfull stage, about 20 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|------|-----------------------|---------|-----------|
|      |                               |                |                |      |                       | Inches  | Acre-feet |
| 1940 | 897-231                       | 1,730          | 0              | 49.9 | 0.252                 | 3.44    | 36,220    |
| 1941 | 927-225                       | 1,540          | 0              | 135  | .682                  | 9.25    | 97,770    |
| 1942 | 957-263                       | 7,230          | .6             | 253  | 1.28                  | 17.35   | 183,200   |
| 1943 | 977-254                       | 9,110          | 0              | 162  | .818                  | 11.13   | 117,500   |
| 1944 | 1007-242                      | 5,890          | 0              | 219  | 1.11                  | 15.05   | 159,000   |
| 1945 | 1037-268                      | 16,000         | 0              | 538  | 2.72                  | 36.88   | 389,500   |
| 1946 | 1057-273                      | 5,830          | 0              | 266  | 1.34                  | 18.21   | 192,300   |
| 1947 | 1087-265                      | 10,900         | 0              | 219  | 1.11                  | 15.01   | 158,600   |
| 1948 | .....                         | 11,400         | .2             | 215  | 1.09                  | 14.80   | 156,300   |

*Calendar Year*

|      |          |        |       |       |       |       |         |
|------|----------|--------|-------|-------|-------|-------|---------|
| 1940 | 897-231  | 1,730  | 0     | 75.3  | .380  | 5.18  | 54,670  |
| 1941 | 927-225  | 7,230  | .6    | 205   | 1.04  | 14.01 | 148,000 |
| 1942 | 957-263  | 4,520  | .1    | 178   | .899  | 12.20 | 128,800 |
| 1943 | 977-254  | 9,110  | 0     | 148   | .747  | 10.13 | 106,900 |
| 1944 | 1007-242 | 5,890  | 0     | 238   | 1.20  | 16.33 | 172,500 |
| 1945 | 1037-268 | 16,000 | .3    | 532   | 2.69  | 36.48 | 385,300 |
| 1946 | 1057-273 | 10,900 | 0     | 388   | 1.96  | 26.57 | 280,700 |
| 1947 | 1087-265 | 4,040  | 0     | 115   | .581  | 7.85  | 82,920  |
| 1948 | .....    | .....  | ..... | ..... | ..... | ..... | .....   |

## 39. Frog Bayou Near Mountainburg, Ark.

LOCATION: Water-stage recorder, lat. 35°39'40", long. 94°09'10", in NW¼ NE¼ sec. 2, T. 11 N., R. 30 W., 2½ miles northeast of Mountainburg, Crawford County. Datum of gage is 800.00 feet above mean sea level, datum of 1929 (levels by city of Fort Smith).

DRAINAGE AREA: 74.4 square miles.

RECORDS AVAILABLE: Discharge, July 1936 to September 1948. Chemical quality, see analysis page 172.

MEAN ANNUAL RUNOFF: 77,460 acre-feet.

AVERAGE DISCHARGE: 12 years, 107 second-feet (does not include diversions by city of Fort Smith).

MAXIMUM: 1936-48: Discharge, 17,300 second-feet Apr. 15, 1945 (gage height, 31.06 feet).

Maximum discharge known, that of Apr. 15, 1945.

MINIMUM: 1936-48: Day: No flow at times each year.

7-day: Same as above.

Calendar month: Same as above.

Water year: 28.1 second-feet (18.2 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Aug. 28, 1939, staff gage at same site and datum. Published daily discharge records represent spillway overflow from Lake Fort Smith and do not include water diverted for municipal supply of Fort Smith.



## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Run-off   | Diversion             |
|------|-------------------------------|---------------------|---------------------|------|-----------|-----------------------|
|      |                               |                     |                     |      | Acre-feet | (Mean,<br>sec.-feet)* |
| 1937 | 827-140                       | 1,480               | 0                   | 103  | 74,370    | ....                  |
| 1938 | 857-159                       | 4,270               | 0                   | 117  | 84,440    | ....                  |
| 1939 | 877-228                       | 1,000               | 0                   | 54.5 | 39,490    | ....                  |
| 1940 | 897-234                       | 2,350               | 0                   | 28.1 | 20,400    | ....                  |
| 1941 | 927-231                       | 1,290               | 0                   | 52.7 | 38,190    | 7.8                   |
| 1942 | 957-267                       | 2,900               | 0                   | 107  | 77,780    | 9.8                   |
| 1943 | 977-258                       | 7,210               | 0                   | 140  | 101,600   | 11.8                  |
| 1944 | 1007-246                      | 2,770               | 0                   | 95.4 | 69,270    | 11.8                  |
| 1945 | 1037-272                      | 7,490               | 0                   | 231  | 167,400   | 10.7                  |
| 1946 | 1057-276                      | 3,150               | 0                   | 138  | 99,600    | 10.3                  |
| 1947 | 1087-268                      | 2,620               | 0                   | 134  | 97,020    | 10.2                  |
| 1948 | .....                         | 1,250               | 0                   | 84.9 | 61,640    | 11.0                  |

*Calendar Year*

|      |          |       |       |       |         |       |
|------|----------|-------|-------|-------|---------|-------|
| 1937 | 827-140  | 1,480 | 0     | 76.7  | 55,520  | ....  |
| 1938 | 857-159  | 4,270 | 0     | 112   | 80,880  | ....  |
| 1939 | 877-228  | 1,000 | 0     | 54.5  | 39,490  | ....  |
| 1940 | 897-234  | 2,350 | 0     | 30.5  | 22,130  | ....  |
| 1941 | 927-231  | 1,820 | 0     | 81.3  | 58,850  | 7.9   |
| 1942 | 957-267  | 5,520 | 0     | 125   | 90,330  | 10.6  |
| 1943 | 977-258  | 7,210 | 0     | 92.0  | 66,620  | 11.9  |
| 1944 | 1007-246 | 2,770 | 0     | 96.4  | 69,980  | 11.7  |
| 1945 | 1037-272 | 7,490 | 0     | 240   | 173,800 | 10.7  |
| 1946 | 1057-276 | 3,150 | 0     | 190   | 137,200 | 9.9   |
| 1947 | 1087-268 | 1,680 | 0     | 77.1  | 55,850  | 10.3  |
| 1948 | .....    | ..... | ..... | ..... | .....   | ..... |

\* Diversion for municipal supply of Fort Smith.

**40. Mulberry River Near Mulberry, Ark.**

LOCATION: Water-stage recorder, lat. 35°34', long. 94°01', in NW¼ sec. 6, T. 10 N., R. 28 W., a quarter of a mile upstream from Mill Creek, and 5 miles northeast of Mulberry, Crawford County. Datum of gage is 432.75 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 372 square miles.

RECORDS AVAILABLE: Discharge, May 1938 to September 1948. Chemical quality, see analysis page 172.

MEAN ANNUAL RUNOFF: 20.87 inches or 414,100 acre-feet.

AVERAGE DISCHARGE: 10 years, 572 second-feet.

MAXIMUM: 1938-48: Discharge, 47,800 second-feet Apr. 15, 1945 (gage height, 19.70 feet).

Maximum stage known, 22.0 feet in April 1927.

MINIMUM: 1938-48: Day: No flow Sept. 24-28, 1939, Aug. 25 to Sept. 29, 1943.

7-day: No flow, see above.

Calendar month: 0.03 second-foot (0.019 m.g.d.) September 1943.

Water year: 247 second-feet (160 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Apr. 19, 1940, staff gage 500 feet downstream, same datum. Bankfull stage, about 18 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1939 | 897-237                       | 8,300               | 0                   | 452   | 1.22                  | 16.49   | 327,000   |
| 1940 | 897-237                       | 5,740               | .1                  | 247   | .664                  | 9.03    | 179,400   |
| 1941 | 927-232                       | 4,490               | 2.8                 | 349   | .938                  | 12.74   | 252,600   |
| 1942 | 957-268                       | 9,810               | 1.8                 | 605   | 1.63                  | 22.07   | 437,800   |
| 1943 | *977-259                      | 20,500              | 0                   | 565   | 1.52                  | 20.62   | 409,300   |
| 1944 | 1007-247                      | 8,220               | .2                  | 545   | 1.47                  | 19.93   | 395,400   |
| 1945 | 1037-273                      | 26,500              | 2.3                 | 1,226 | 3.30                  | 44.72   | 887,500   |
| 1946 | 1057-277                      | 11,900              | .6                  | 639   | 1.72                  | 23.29   | 462,300   |
| 1947 | 1087-269                      | 15,300              | .1                  | 670   | 1.80                  | 24.47   | 485,300   |
| 1948 |                               | 9,210               | 3.9                 | 419   | 1.13                  | 15.32   | 303,800   |

*Calendar Year*

|      |          |        |     |       |      |       |         |
|------|----------|--------|-----|-------|------|-------|---------|
| 1939 | 897-237  | 8,300  | 0   | 461   | 1.24 | 16.83 | 333,800 |
| 1940 | 897-237  | 5,740  | 2.8 | 287   | .772 | 10.49 | 208,200 |
| 1941 | 927-232  | 9,810  | 2.8 | 493   | 1.33 | 18.02 | 357,200 |
| 1942 | 957-268  | 12,200 | 1.8 | 545   | 1.47 | 19.88 | 394,700 |
| 1943 | *977-259 | 20,500 | 0   | 435   | 1.17 | 15.87 | 315,200 |
| 1944 | 1007-247 | 8,220  | 9.1 | 590   | 1.59 | 21.57 | 428,000 |
| 1945 | 1037-273 | 26,500 | 2.3 | 1,209 | 3.25 | 44.12 | 875,400 |
| 1946 | 1057-277 | 15,300 | .6  | 921   | 2.48 | 33.59 | 666,700 |
| 1947 | 1087-269 | 9,490  | .1  | 382   | 1.03 | 13.93 | 276,300 |
| 1948 |          |        |     |       |      |       |         |

\* Revised figures of daily discharge for high-water period and yearly summaries contained in Water-Supply Paper 1007, p. 247.

## 40A. Illinois Bayou Near Scottsville, Ark.

LOCATION: Water-stage recorder, lat. 35°28', long. 93°02', in SW¼ sec. 32, T. 10 N., R. 19 W., at county bridge 1¼ miles north of Scottsville, Pope County, and 3 miles downstream from North Fork Illinois Bayou. Datum of gage is 447.54 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 242 square miles.

RECORDS AVAILABLE: Discharge, October 1947 to September 1948. Chemical quality, see analysis page 173.

MAXIMUM: 1947-48: Discharge, 18,600 second-feet Jan. 1, 1948 (gage height, 15.0 feet), from high-water mark.

Flood of May 10, 1943, reached a stage of 24.6 feet, from flood mark set by local residents.

MINIMUM: 1947-48: Day: 0.5 second-foot (0.32 m.g.d.) Sept. 27, 28, 1948.  
7-day: 0.6 second-foot (0.39 m.g.d.) Sept. 24-30, 1948.

Calendar month: 2.88 second-feet (1.86 m.g.d.) October, 1947.

Water year: 337 second-feet (218 m.g.d.) Oct. 1, 1947, to Sept. 30, 1948.

REMARKS: Prior to Mar. 25, 1948, wire-weight gage at same site and datum. Bankfull stage, about 16 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1948

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1948 |                               | 7,290               | 0.5                 | 337  | 1.39                  | 18.96   | 244,700   |

### 41. Petit Jean Creek Near Booneville, Ark.

**LOCATION:** Water stage recorder, lat.  $35^{\circ}06'$ , long.  $93^{\circ}55'$ , in NW  $\frac{1}{4}$  sec. 18, T. 5 N., R. 27 W., at bridge on State highway 116,  $2\frac{1}{4}$  miles south of Booneville, Logan County. Datum of gage is 423.39 feet above mean sea level, datum of 1929 (levels by Corps of Engineers).

**DRAINAGE AREA:** 247 square miles.

**RECORDS AVAILABLE:** Discharge, November 1938 to September 1948. Chemical quality, see analysis page 173.

**MEAN ANNUAL RUNOFF:** 14.45 inches or 190,400 acre-feet.

**AVERAGE DISCHARGE:** 9 years, 263 second-feet.

**MAXIMUM:** 1938-48: Discharge, 43,200 second-feet Apr. 16, 1939 (gage height, 23.42 feet), by slope-area and contracted-opening methods.

Maximum discharge known, that of Apr. 16, 1939.

**MINIMUM:** 1938-48: Day: No flow Aug. 19, 20, Aug. 31 to Oct. 9, 1939; Oct. 26-29, 1942; Aug. 8 to Oct. 11, 1943; Sept. 4-20, Sept. 27 to Nov. 2, 1946; July 22 to Aug. 19, Sept. 1-11, Oct. 12-26, 1947; Sept. 19-30, 1948.

7-day: No flow, see above.

Calendar month: No flow September 1939, September 1943 and October 1946.

Water year: 51.8 second-feet (33.5 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** Prior to May 24, 1939, wire-weight gage at same site and datum. Bankfull stage, about 19 feet.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1939 | 927-235                       | .....          | ....           | ..... | .....                 | .....   | .....     |
| 1940 | 927-235                       | 1,620          | 0              | 51.8  | 0.210                 | 2.85    | 37,600    |
| 1941 | 927-235                       | 4,950          | .2             | 176   | .713                  | 9.68    | 127,500   |
| 1942 | 957-269                       | 5,500          | .5             | 258   | 1.04                  | 14.20   | 186,900   |
| 1943 | 977-260                       | 15,400         | 0              | 209   | .846                  | 11.50   | 151,500   |
| 1944 | 1007-248                      | 4,700          | 0              | 234   | .947                  | 12.85   | 169,700   |
| 1945 | 1037-274                      | 15,200         | .1             | 657   | 2.66                  | 36.10   | 475,500   |
| 1946 | 1057-278                      | 5,640          | 0              | 302   | 1.22                  | 16.59   | 218,500   |
| 1947 | 1087-270                      | 13,600         | 0              | 248   | 1.00                  | 13.64   | 179,600   |
| 1948 | .....                         | 11,500         | 0              | 234   | .947                  | 12.88   | 169,800   |

*Calendar Year*

|      |          |        |       |       |       |       |         |
|------|----------|--------|-------|-------|-------|-------|---------|
| 1939 | 927-235  | 28,600 | 0     | 250   | 1.01  | 13.77 | 181,300 |
| 1940 | 927-235  | 1,620  | .2    | 77.2  | .313  | 4.26  | 56,080  |
| 1941 | 927-235  | 4,950  | .3    | 213   | .862  | 11.74 | 154,400 |
| 1942 | 957-269  | 5,500  | 0     | 227   | .919  | 12.46 | 164,200 |
| 1943 | 977-260  | 15,400 | 0     | 180   | .729  | 9.89  | 130,400 |
| 1944 | 1007-248 | 4,700  | .1    | 252   | 1.02  | 13.85 | 182,700 |
| 1945 | 1037-274 | 15,200 | .4    | 663   | 2.68  | 36.43 | 479,800 |
| 1946 | 1057-278 | 13,600 | 0     | 425   | 1.72  | 23.34 | 307,400 |
| 1947 | 1087-270 | 4,310  | 0     | 133   | .538  | 7.29  | 95,950  |
| 1948 | .....    | .....  | ..... | ..... | ..... | ..... | .....   |

### 42. Petit Jean Creek Near Waveland, Ark.

**LOCATION:** Water-stage recorder, lat.  $35^{\circ}06'17''$ , long.  $93^{\circ}37'51''$ , in SE  $\frac{1}{4}$  SW  $\frac{1}{4}$  sec. 11, T. 5 N., R. 25 W., 0.8 mile downstream from Rock Creek, and 1.3 miles south of Waveland, Yell County. Datum of gage is 339.70 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 517 square miles.

RECORDS AVAILABLE: Discharge, January 1939 to September 1948. January 1939 to September 1943, at site  $1\frac{1}{4}$  miles upstream, published as Petit Jean Creek near Blue Mountain, Ark. Chemical quality, see analysis page 173.

MEAN ANNUAL RUNOFF: 14.91 inches or 411,200 acre-feet.

AVERAGE DISCHARGE: 9 years, 568 second-feet.

MAXIMUM: 1939-48: Discharge, 62,600 second-feet Apr. 16, 1939 (gage height, 29.95 feet, former site and datum, and 34.0 feet, from flood marks, present site).

Maximum discharge known, that of Apr. 16, 1939.

MINIMUM: 1939-48: Day: No flow, Aug. 23 to Sept. 5, Sept. 17-29, 1943; Aug. 31 to Sept. 2, Sept. 6-9, 1946.

7-day: No flow, see above.

Calendar month: 0.09 second-foot (0.06 m.g.d.) September 1943.

Water year: 121 second-feet (78.2 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Flow regulated by operations at Blue Mountain Dam, 1.4 miles upstream, since May 1946. Bankfull stage, about 23 feet.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48

*Water Year Ending September 30*

| Year        | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|-------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|             |                               |                     |                     |       |                       | Inches  | Acre-feet |
| *1940 ..... | 897-239                       | 2,550               | 0.1                 | 121   | 0.244                 | 3.32    | 87,780    |
| *1941 ..... | 927-236                       | 7,040               | .1                  | 361   | .729                  | 9.90    | 261,600   |
| *1942 ..... | 957-270                       | 9,380               | 1.6                 | 504   | 1.02                  | 13.82   | 364,700   |
| *1943 ..... | 977-261                       | 33,500              | 0                   | 411   | .830                  | 11.27   | 297,900   |
| 1944 .....  | 1007-249                      | 8,580               | .2                  | 567   | 1.10                  | 14.92   | 411,500   |
| 1945 .....  | 1037-275                      | 30,200              | .3                  | 1,418 | 2.74                  | 37.21   | 1,026,000 |
| 1946 .....  | 1057-279                      | 12,800              | 0                   | 733   | 1.42                  | 19.22   | 530,400   |
| 1947 .....  | 1087-271                      | 9,050               | .2                  | 458   | .....                 | .....   | 331,300   |
| 1948 .....  | .....                         | 8,170               | .4                  | 538   | .....                 | .....   | 390,800   |

#### *Calendar Year*

|             |          |        |       |       |       |       |           |
|-------------|----------|--------|-------|-------|-------|-------|-----------|
| *1940 ..... | 897-239  | 2,550  | .1    | 167   | .337  | 4.58  | 121,300   |
| *1941 ..... | 927-236  | 7,040  | 3.6   | 442   | .893  | 12.11 | 319,600   |
| *1942 ..... | 957-270  | 9,380  | .5    | 437   | .883  | 11.98 | 316,300   |
| *1943 ..... | 977-261  | 33,500 | 0     | 357   | .691  | 9.76  | 258,100   |
| 1944 .....  | 1007-249 | 8,500  | .3    | 599   | 1.16  | 15.74 | 434,500   |
| 1945 .....  | 1037-275 | 30,200 | 4.7   | 1435  | 2.78  | 37.66 | 1,039,000 |
| 1946 .....  | 1057-279 | 12,800 | 0     | 961   | ..... | ..... | 695,600   |
| 1947 .....  | 1087-271 | 2,660  | .4    | 217   | ..... | ..... | 157,400   |
| 1948 .....  | .....    | .....  | ..... | ..... | ..... | ..... | .....     |

\* Published as Petit Jean Creek Near Blue Mountain, Ark. (Drainage area, 495 square miles.)

### 43. Petit Jean Creek at Danville, Ark.

LOCATION: Water-stage recorder, lat.  $35^{\circ}04'$ , long.  $93^{\circ}24'$ , in SE  $\frac{1}{4}$  sec. 25, T. 5 N., R. 23 W., at highway bridge at Danville, Yell County, 1,800 feet upstream from Chicago, Rock Island & Pacific Railway bridge. Datum of gage is 303.24 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 760 square miles.

RECORDS AVAILABLE: Discharge, June 1916 to September 1948. Chemical quality, see analysis page 173.

MEAN ANNUAL RUNOFF: 14.95 inches or 606,000 acre-feet.

AVERAGE DISCHARGE: 32 years, 837 second-feet.

MAXIMUM: 1916-48: Discharge, 70,800 second-feet Apr. 17, 1939 (gage height, 31.82 feet).

Maximum discharge known, that of Apr. 17, 1939.

MINIMUM: 1916-48: Day: No flow, Oct. 20 to Nov. 15, 1924; Nov. 17-19, 1934; Sept. 23-28, Oct. 5-9, 1935; July 23-26, July 30 to Sept. 30, 1936; Aug. 20 to Sept. 6, 1943.

7-day: No flow, see above.

Calendar month: No flow, August, September 1936.

Water year: 190 second-feet (123 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: June 1, 1946, to Aug. 24, 1934, chain gage on Chicago, Rock Island & Pacific Railway bridge, 1,800 feet downstream, datum 0.25 foot higher. Aug. 25, 1934, to July 12, 1939, wire-weight gage at present site and datum. Records prior to July 1937 computed by Corps of Engineers, Little Rock District, using gage height furnished by U. S. Weather Bureau; reviewed by U. S. Geological Survey. Flow regulated by operations at Blue Mountain Dam since May 1946. Bankfull stage, about 20 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1917-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1917 | 877-229                       | 5,660               | 10                  | 478   | 0.629                 | 8.54    | 345,800   |
| 1918 | 877-229                       | 4,750               | 5                   | 267   | .351                  | 4.77    | 193,100   |
| 1919 | 877-229                       | 12,100              | 7                   | 605   | .796                  | 10.81   | 438,300   |
| 1920 | 877-229                       | 16,100              | 7                   | 1,113 | 1.46                  | 19.94   | 807,700   |
| 1921 | 877-229                       | 15,700              | 28                  | 667   | .878                  | 11.92   | 482,900   |
| 1922 | 877-229                       | 11,200              | 5                   | 722   | .950                  | 12.88   | 522,600   |
| 1923 | 877-229                       | 17,900              | 1                   | 1,073 | 1.41                  | 19.18   | 776,600   |
| 1924 | 877-229                       | 17,600              | 10                  | 652   | .858                  | 11.69   | 473,600   |
| 1925 | 877-229                       | 2,720               | 0                   | 192   | .253                  | 3.43    | 139,100   |
| 1926 | 877-229                       | 10,200              | .5                  | 632   | .823                  | 11.29   | 457,400   |
| 1927 | 877-229                       | 46,300              | 3                   | 1,954 | 2.57                  | 34.89   | 1,414,000 |
| 1928 | 877-229                       | 20,100              | 5                   | 974   | 1.28                  | 17.46   | 707,400   |
| 1929 | 877-229                       | 11,900              | 7                   | 944   | 1.24                  | 16.85   | 683,300   |
| 1930 | 877-229                       | 28,400              | 5                   | 777   | 1.02                  | 13.88   | 562,600   |
| 1931 | 877-229                       | 5,560               | 16                  | 526   | .692                  | 9.19    | 381,000   |
| 1932 | 877-229                       | 14,600              | 5                   | 870   | 1.14                  | 15.57   | 631,400   |
| 1933 | 877-229                       | 10,800              | 5                   | 718   | .945                  | 12.81   | 519,700   |
| 1934 | 877-229                       | 7,780               | 3                   | 447   | .588                  | 7.98    | 323,700   |
| 1935 | 877-229                       | 53,100              | 0                   | 1,975 | 2.60                  | 35.29   | 1,430,000 |
| 1936 | 877-229                       | 9,300               | 0                   | 202   | .266                  | 3.62    | 146,700   |
| 1937 | 877-229                       | 12,200              | 2.9                 | 984   | 1.29                  | 17.56   | 712,300   |
| 1938 | 877-229                       | 35,300              | 2.8                 | 1,276 | 1.68                  | 22.76   | 923,700   |
| 1939 | 877-229                       | 59,400              | .2                  | 987   | 1.30                  | 17.63   | 714,800   |
| 1940 | 897-240                       | 3,330               | .4                  | 190   | .250                  | 3.41    | 137,800   |
| 1941 | 927-237                       | 5,800               | .2                  | 545   | .717                  | 9.68    | 392,700   |
| 1942 | 957-271                       | 11,800              | 7.6                 | 896   | 1.18                  | 16.01   | 648,600   |
| 1943 | 977-262                       | 30,300              | 0                   | 587   | .772                  | 10.47   | 425,100   |
| 1944 | 1007-250                      | 11,800              | .5                  | 865   | 1.14                  | 15.50   | 628,100   |
| 1945 | 1037-276                      | 38,700              | .5                  | 2,045 | 2.69                  | 36.52   | 1,481,000 |
| 1946 | 1057-280                      | 12,600              | .7                  | 1,136 | 1.49                  | 20.28   | 822,200   |
| 1947 | 1087-272                      | 12,200              | .2                  | 619   | .814                  | 11.05   | 448,100   |
| 1948 | .....                         | 10,800              | 1.5                 | 854   | .....                 | .....   | 620,200   |

### *Calendar Year*

|      |         |        |    |       |      |       |         |
|------|---------|--------|----|-------|------|-------|---------|
| 1917 | 877-229 | 5,660  | 16 | 428   | .563 | 7.64  | 309,700 |
| 1918 | 877-229 | 12,100 | 5  | 460   | .605 | 8.23  | 333,100 |
| 1919 | 877-229 | 7,160  | 7  | 714   | .939 | 12.76 | 517,100 |
| 1920 | 877-229 | 16,100 | 7  | 865   | 1.14 | 15.49 | 627,700 |
| 1921 | 877-229 | 15,700 | 13 | 767   | 1.01 | 13.70 | 555,000 |
| 1922 | 877-229 | 8,220  | 1  | 580   | .763 | 10.34 | 419,600 |
| 1923 | 877-229 | 17,900 | 10 | 1,303 | 1.71 | 23.30 | 943,600 |
| 1924 | 877-229 | 17,600 | 0  | 413   | .543 | 7.41  | 299,800 |
| 1925 | 877-229 | 10,200 | .5 | 471   | .620 | 8.43  | 341,300 |

— Continued.

## 121

SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1917-48—(Continued)

[illegible]

#### 44. Dutch Creek at Waltreak, Ark.

LOCATION: Water-stage recorder, lat. 34°59', long. 93°37', in SE¼NW¼ sec. 24, T. 4 N., R. 25 W., a quarter of a mile north of Waltreak, Yell County. Datum of gage is 371.48 feet above mean sea level, datum of 1929 (levels by Corps of Engineers).

DRAINAGE AREA: 74.0 square miles.

RECORDS AVAILABLE: Discharge, November 1945 to September 1948. Chemical quality, see analysis, page 174.

MAXIMUM: 1945-48: Discharge, 13,000 second-feet Jan. 1, 1948 (gage height, 18.12 feet).

Maximum stage known, 19.5 feet in 1927, from information by local resident.

MINIMUM: 1945-48: Day: No flow Aug. 24 to Dec. 1, 1946, July 16 to Aug. 15, Aug. 21 to Oct. 31, Nov. 2-6, 1947.

7-day: No flow, see above.

Calendar month: No flow September, October 1946, September, October, 1947.

Water year: 64.9 second-feet (41.9 m.g.d.) Oct. 1, 1946, to Sept. 30, 1947.

REMARKS: Bankfull stage, about 17 feet.

SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1916-48.

Water Year Ending September 30

| Year                 | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|----------------------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|                      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1946 .....           | 1057-281                      |                | ...            | ..... | .....                 |         |           |
| 1947 .....           | 1087-273                      | 4,080          | 0              | 64.9  | 0.877                 | 11.90   | 46,960    |
| 1948 .....           |                               | 4,020          | 0              | 102   | 1.38                  | 18.78   | 74,160    |
| <i>Calendar Year</i> |                               |                |                |       |                       |         |           |
| 1946 .....           | 1057-281                      | 4,660          | 0              | 165   | 2.23                  | 30.35   | 119,800   |
| 1947 .....           | 1087-273                      | 2,290          | 0              | 43.3  | .585                  | 7.93    | 31,340    |
| 1948 .....           |                               |                |                |       |                       |         |           |

**45. Fourche La Fave River Near Gravelly, Ark.**

**LOCATION:** Water-stage recorder, lat.  $34^{\circ}52'$ , long.  $93^{\circ}39'$ , in NW  $\frac{1}{4}$  sec. 34 T. 3 N., R. 25 W., at bridge on State highway 28, 1 mile downstream from Garner Creek, and  $1\frac{1}{4}$  miles east of Gravelly, Yell County. Datum of gage is 410.50 feet above mean sea level, datum of 1929 (levels by Corps of Engineers).

**DRAINAGE AREA:** 413 square miles.

**RECORDS AVAILABLE:** Discharge, February 1939 to September 1948. Chemical quality, see analysis page 174.

**MEAN ANNUAL RUNOFF:** 18.83 inches, or 414,800 acre-feet.

**AVERAGE DISCHARGE:** 9 years, 573 second-feet.

**MAXIMUM:** 1939-48: Discharge, 39,800 second-feet Jan. 1, 1948 (gage height, 27.37 feet).

**MINIMUM:** 1939-48: Day: No flow Sept. 22 to Oct. 9, Oct. 20-25, Nov. 4-9, 1939; Aug. 11 to Oct. 29, 1943; Oct. 18 to Nov. 7, 1944; Oct. 4-17, 22, 1946; Aug. 3 to Sept. 11, 1947.

7-day: No flow, see above.

Calendar month: No flow September 1943.

Water year: 115 second-feet (74.3 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** Prior to May 11, 1939, wire-weight gage at same site and datum. Bankfull stage, about 24 feet.

**SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-48**

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1940 | 897-242                       | 2,740          | 0              | 115   | 0.278                 | 3.78    | 83,420    |
| 1941 | 927-238                       | 2,900          | .4             | 344   | .833                  | 11.29   | 248,700   |
| 1942 | 957-272                       | 18,400         | 10             | 706   | 1.71                  | 23.21   | 511,100   |
| 1943 | 977-263                       | 6,290          | 0              | 297   | .719                  | 9.79    | 215,400   |
| 1944 | 1007-251                      | 12,700         | 0              | 670   | 1.62                  | 22.06   | 486,500   |
| 1945 | 1037-277                      | 29,300         | 0              | 1,269 | 3.07                  | 41.71   | 918,600   |
| 1946 | 1057-282                      | 16,200         | .3             | 833   | 2.02                  | 27.37   | 602,900   |
| 1947 | 1087-274                      | 21,400         | 0              | 385   | .932                  | 12.65   | 278,500   |
| 1948 |                               | 28,700         | 2.8            | 541   | 1.31                  | 17.85   | 393,000   |

*Calendar Year*

|      |          |        |     |       |      |       |         |
|------|----------|--------|-----|-------|------|-------|---------|
| 1940 | 897-242  | 2,740  | .4  | 173   | .419 | 5.68  | 125,300 |
| 1941 | 927-238  | 18,400 | 2.4 | 506   | 1.23 | 16.62 | 366,000 |
| 1942 | 957-272  | 11,000 | 8.2 | 553   | 1.34 | 18.20 | 400,700 |
| 1943 | 977-263  | 6,290  | 0   | 265   | .642 | 8.72  | 191,900 |
| 1944 | 1007-251 | 12,700 | 0   | 745   | 1.80 | 24.56 | 541,200 |
| 1945 | 1037-277 | 29,300 | 20  | 1,243 | 3.01 | 40.85 | 899,800 |
| 1946 | 1057-282 | 21,400 | 0   | 985   | 2.38 | 32.38 | 713,100 |
| 1947 | 1087-274 | 4,310  | 0   | 220   | .533 | 7.24  | 159,200 |
| 1948 |          |        |     |       |      |       |         |

**46. Fourche La Fave River Near Nimrod, Ark.**

**LOCATION:** Water-stage recorder, lat.  $34^{\circ}57'01''$ , long.  $93^{\circ}09'18''$ , in SW  $\frac{1}{4}$  sec. 32, T. 4 N., R. 20 W., 2,000 feet downstream from Nimrod Dam,  $4\frac{1}{2}$  miles southwest of Nimrod, Perry County, and 9.8 miles upstream from South Fourche La Fave River. Datum of gage is 305.25 feet above mean sea level, datum of 1929 (Corps of Engineers, bench mark).

**DRAINAGE AREA:** 680 square miles.

RECORDS AVAILABLE: Discharge, March 1936 to September 1948. Chemical quality, see analysis page 174.

MEAN ANNUAL RUNOFF: 18.41 inches or 667,500 acre-feet.

AVERAGE DISCHARGE: 12 years, 922 second-feet.

MAXIMUM: 1936-48: Discharge, 36,100 second-feet Feb. 19, 1938 (gage height, 29.7 feet, site and datum then in use, and 27.6 feet present site and datum, from flood mark). Maximum stage known, 28.8 feet June 1935, present site and datum, information by Corps of Engineers.

MINIMUM: 1936-48: Day: No flow Aug. 6 to Oct. 18, 1936; Nov. 1, 2, 1938; Nov. 2-9, 1939.

7-day: No flow, see above.

Calendar month: No flow, September 1936.

Water year: 179 second-feet (116 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Dec. 21, 1938, staff gage at site 0.7 mile downstream, datum 301.33 feet above mean sea level; Dec. 22, 1938, to Aug. 21, 1946, water-stage recorder at site 2 miles downstream at datum 295.53 feet above mean sea level. Records for period March 1936 to September 1938 collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey. Flow regulated by Nimrod Reservoir (capacity, 307,000 acre-feet), since 1941.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1937 | 877-249                       | 19,700         | 0              | 869   | 1.27                  | 17.28   | 628,800   |
| 1938 | 877-249                       | 32,600         | 3.4            | 1,226 | 1.80                  | 24.42   | 887,700   |
| 1939 | 877-249                       | 32,600         | 0              | 876   | 1.28                  | 17.38   | 634,200   |
| 1940 | 897-243                       | 4,290          | 0              | 179   | .262                  | 3.56    | 130,000   |
| 1941 | 927-239                       | 3,330          | .3             | 503   | .735                  | 9.98    | 364,000   |
| 1942 | 957-273                       | 10,300         | 11             | 1,015 | .....                 | .....   | 734,500   |
| 1943 | 977-264                       | 8,650          | 2.8            | 406   | .....                 | .....   | 293,700   |
| 1944 | 1007-252                      | 7,080          | .9             | 1,030 | .....                 | .....   | 747,400   |
| 1945 | 1037-279                      | 19,800         | .5             | 2,028 | .....                 | .....   | 1,468,000 |
| 1946 | 1057-284                      | 8,460          | 1.0            | 1,435 | .....                 | .....   | 1,039,000 |
| 1947 | 1087-276                      | 7,030          | .8             | 600   | .....                 | .....   | 434,400   |
| 1948 | .....                         | 6,170          | .8             | 899   | .....                 | .....   | 652,900   |

*Calendar Year*

|      |          |        |       |       |       |       |           |
|------|----------|--------|-------|-------|-------|-------|-----------|
| 1937 | 877-249  | 19,700 | 5.2   | 1,008 | 1.48  | 20.05 | 729,400   |
| 1938 | 877-249  | 32,600 | 0     | 987   | 1.45  | 19.66 | 714,600   |
| 1939 | 877-249  | 32,600 | 0     | 842   | 1.23  | 16.69 | 609,200   |
| 1940 | 897-243  | 4,290  | .3    | 263   | .385  | 5.23  | 191,000   |
| 1941 | 927-239  | 8,390  | 6.7   | 752   | ..... | ..... | 544,100   |
| 1942 | 957-273  | 10,300 | 2.8   | 777   | ..... | ..... | 562,900   |
| 1943 | 977-264  | 4,750  | 4.8   | 351   | ..... | ..... | 254,200   |
| 1944 | 1007-252 | 7,080  | .5    | 1,145 | ..... | ..... | 831,300   |
| 1945 | 1037-279 | 19,800 | 7.7   | 2,029 | ..... | ..... | 1,469,000 |
| 1946 | 1057-284 | 8,460  | .8    | 1,625 | ..... | ..... | 1,176,000 |
| 1947 | 1087-276 | 4,490  | .8    | 351   | ..... | ..... | 253,900   |
| 1948 | .....    | .....  | ..... | ..... | ..... | ..... | .....     |

#### 47. South Fourche La Fave River Near Hollis, Ark.

LOCATION: Water-stage recorder, lat. 34°55', long. 93°03', in NE¼ sec. 18, T. 3 N., R. 19 W., three-quarters of a mile upstream from Big Cove Creek, and 4 miles northeast of Hollis, Perry County. Datum of gage is 366.10 feet above mean sea level, datum of 1929 (Corps of Engineers, bench mark).



DRAINAGE AREA: 211 square miles.

RECORDS AVAILABLE: Discharge, May 1941 to September 1948. Chemical quality, see analysis page 174.

MEAN ANNUAL RUNOFF: 21.49 inches or 241,800 acre-feet.

AVERAGE DISCHARGE: 7 years, 334 second-feet.

MAXIMUM: 1941-48: Discharge, 54,400 second-feet Mar. 30, 1945 (gage height, 19.47 feet), by slope-area method.

Maximum discharge known, that of Mar. 30, 1945.

MINIMUM: 1941-48: Day: No flow July 24 to Oct. 13, 1943; July 15-25, Oct. 20 to Nov. 7, 1944; Oct. 10, Oct. 13-17, 1946; July 20 to Oct. 31, 1947.

7-day: No flow, see above.

Calendar month: No flow, August, September 1943, August to October 1947.

Water year: 164 second-feet (106 m.g.d.) Oct. 1, 1942, to Sept. 30, 1943.

REMARKS: Records collected and computed by Corps of Engineers, Little Rock District; reviewed by U. S. Geological Survey.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1942-48

*Water Year Ending September 30*

| Year       | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|----------------|----------------|------|-----------------------|---------|-----------|
|            |                               |                |                |      |                       | Inches  | Acre-feet |
| 1942 ..... | 977-267                       | 9,010          | 0.9            | 333  | 1.58                  | 21.45   | 241,200   |
| 1943 ..... | 977-267                       | 8,430          | 0              | 164  | .777                  | 10.55   | 118,800   |
| 1944 ..... | 1007-253                      | 17,300         | 0              | 345  | 1.64                  | 22.32   | 250,600   |
| 1945 ..... | 1037-280                      | 26,300         | 0              | 597  | 2.83                  | 38.42   | 432,500   |
| 1946 ..... | 1057-285                      | 11,600         | .5             | 455  | 2.16                  | 29.32   | 329,700   |
| 1947 ..... | 1087-277                      | 9,870          | 0              | 169  | .801                  | 10.85   | 122,400   |
| 1948 ..... | .....                         | 7,360          | 0              | 275  | 1.30                  | 17.75   | 199,900   |

#### *Calendar Year*

|            |          |        |       |       |       |       |         |
|------------|----------|--------|-------|-------|-------|-------|---------|
| 1942 ..... | 977-267  | 9,010  | .2    | 287   | 1.36  | 18.46 | 208,000 |
| 1943 ..... | 977-267  | 3,690  | 0     | 130   | .616  | 8.36  | 94,240  |
| 1944 ..... | 1007-253 | 17,300 | 0     | 396   | 1.88  | 25.59 | 287,200 |
| 1945 ..... | 1037-280 | 26,300 | 2.7   | 571   | 2.71  | 36.79 | 413,700 |
| 1946 ..... | 1057-285 | 11,600 | 0     | 519   | 2.46  | 33.40 | 376,000 |
| 1947 ..... | 1087-277 | 2,340  | 0     | 108   | .512  | 6.93  | 78,320  |
| 1948 ..... | .....    | .....  | ..... | ..... | ..... | ..... | .....   |

### 48. Bayou Meto Near Stuttgart, Ark.

LOCATION: Wire-weight gage, lat. 34°27'15", long. 91°37'00", in SE¼ sec. 11, T. 3 S., R. 6 W., at highway bridge, on U. S. Highway 79, 5½ miles southwest of Stuttgart, Arkansas County. Datum of gage is 169.94 feet above mean sea level, datum of 1929.

DRAINAGE AREA: Indeterminate.

RECORDS AVAILABLE: Discharge, October 1935 to September 1948. Chemical quality, see analysis page 175.

MEAN ANNUAL RUNOFF: 379,400 acre-feet.

AVERAGE DISCHARGE: 13 years, 524 second-feet.

MAXIMUM: 1935-48: Discharge, 6,550 second-feet Jan. 26, 27, 1937 (gage height, 25.50 feet). Maximum discharge known, that of Jan. 26, 27, 1937.

MINIMUM: 1935-48: Day: No flow at times each year except 1945 and 1948.

7-day: No flow at times except 1941, 1945, 1946, and 1948.

## ARKANSAS RIVER BASIN

125

Calendar month: No flow June, August to October 1936, July 1942, August, September 1943.

Water year: 72.9 second-feet (47.1 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Flow affected by diversions for irrigation. During flows above about 600 second-feet, Bayou Meto and Crooked Creek are interconnected above station. Bankfull stage, about 18 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1936-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean | Run-off<br>in<br>acre-feet |
|------|-------------------------------|----------------|----------------|------|----------------------------|
| 1936 | 807-131                       | 844            | 0              | 72.9 | 52,930                     |
| 1937 | 857-164                       | 6,550          | 0              | 593  | 429,300                    |
| 1938 | 857-164                       | 3,050          | 0              | 689  | 498,800                    |
| 1939 | 877-250                       | 3,420          | 0              | 767  | 554,900                    |
| 1940 | 897-244                       | 1,060          | 0              | 199  | 144,500                    |
| 1941 | 927-240                       | 1,080          | 0              | 299  | 216,600                    |
| 1942 | 957-274                       | 2,100          | 0              | 526  | 378,600                    |
| 1943 | 977-268                       | 1,760          | 0              | 290  | 210,000                    |
| 1944 | 1007-254                      | 2,130          | 0              | 423  | 306,700                    |
| 1945 | 1037-281                      | 2,800          | 0.1            | 893  | 646,500                    |
| 1946 | 1057-286                      | 2,680          | 0              | 975  | 705,500                    |
| 1947 | 1087-278                      | 1,010          | 0              | 335  | 242,500                    |
| 1948 |                               | 2,740          | 2.0            | 726  | 527,000                    |

*Calendar Year*

|      |          |       |    |       |         |
|------|----------|-------|----|-------|---------|
| 1936 | 807-131  | 902   | 0  | 101   | 73,190  |
| 1937 | 857-164  | 6,550 | 0  | 613   | 443,900 |
| 1938 | 857-164  | 3,050 | 0  | 629   | 455,400 |
| 1939 | 877-250  | 3,420 | 0  | 770   | 558,300 |
| 1940 | 897-244  | 1,060 | 0  | 242   | 175,400 |
| 1941 | 927-240  | 1,080 | 0  | 284   | 205,900 |
| 1942 | 957-274  | 2,100 | 0  | 517   | 374,000 |
| 1943 | 977-268  | 1,760 | 0  | 260   | 188,400 |
| 1944 | 1007-254 | 2,130 | 0  | 479   | 347,600 |
| 1945 | 1037-281 | 2,800 | 24 | 1,064 | 770,500 |
| 1946 | 1057-286 | 2,680 | 0  | 822   | 595,200 |
| 1947 | 1087-278 | 1,010 | 0  | 393   | 284,300 |
| 1948 |          |       |    |       |         |

## 49. Crooked Creek Near Humphrey, Ark.

LOCATION: Wire-weight gage, lat. 34°25'35", long. 91°40'00", in SE¼ sec. 20, T. 3 S., R. 6 W., at bridge on U. S. Highway 79, 2 miles east of Humphrey, Arkansas County. Datum of gage is 169.94 feet above mean sea level, datum of 1929.

DRAINAGE AREA: Indeterminate.

RECORDS AVAILABLE: Discharge, October 1938 to September 1948 (prior to February 1940 high-water periods only). Chemical quality, see analysis page 175.

MEAN ANNUAL RUNOFF: 165,100 acre-feet.

AVERAGE DISCHARGE: 8 years, 228 second-feet.

MAXIMUM: 1938-48: Discharge, 1,780 second-feet Feb. 15, 1939 (gage height, 22.70 feet).

MINIMUM: 1938-48: Day: No flow at times each year.

7-day: No flow at times each year.

Calendar month: No flow September, October 1940, July to December 1943, July 1944, August 1947, June 1948.

Water year: 50.7 second-feet (32.8 m.g.d.) Oct 1, 1940, to Sept. 30, 1941.

REMARKS: Crooked Creek and Bayou Meto are interconnected above station at high stages. Bankfull stage, about 18 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1941-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|------|----------------------------|
| 1941 | 927-241                       | 511                 | 0                   | 50.7 | 36,670                     |
| 1942 | 957-275                       | 1,080               | 0                   | 202  | 146,000                    |
| 1943 | 977-269                       | 767                 | 0                   | 84.4 | 61,140                     |
| 1944 | 1007-255                      | 1,180               | 0                   | 189  | 137,400                    |
| 1945 | 1037-282                      | 1,610               | 0                   | 408  | 295,300                    |
| 1946 | 1057-287                      | 1,740               | 0                   | 461  | 333,700                    |
| 1947 | 1087-279                      | 422                 | 0                   | 69.0 | 49,980                     |
| 1948 | .....                         | 1,760               | 0                   | 356  | 258,200                    |

### *Calendar Year*

|      |          |       |       |       |         |
|------|----------|-------|-------|-------|---------|
| 1941 | 927-241  | 511   | 0     | 49.8  | 36,010  |
| 1942 | 957-275  | 1,080 | 0     | 202   | 146,600 |
| 1943 | 977-269  | 767   | 0     | 79.9  | 57,800  |
| 1944 | 1007-255 | 1,180 | 0     | 205   | 143,700 |
| 1945 | 1037-282 | 1,610 | 0     | 491   | 355,200 |
| 1946 | 1057-287 | 1,740 | 0     | 374   | 270,500 |
| 1947 | 1087-279 | 422   | 0     | 88.5  | 64,080  |
| 1948 | .....    | ..... | ..... | ..... | .....   |

## RED RIVER BASIN

### 50. Red River at Index, Ark.

LOCATION: Water-stage recorder, lat. 33°33', long. 94°02', in SW¼ sec. 7, T. 14 S., R. 28 W., at bridge on U. S. Highway 71, at Index, Little River County. Datum of gage is 246.87 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 46,580 square miles.

RECORDS AVAILABLE: Discharge, July 1936 to September 1948. Chemical quality, see analysis page 176.

MEAN ANNUAL RUNOFF: 10,280,000 acre-feet.

AVERAGE DISCHARGE: 12 years, 14,200 second-feet.

MAXIMUM: 1936-48: Discharge, 297,000 second-feet Feb. 23, 1938 (gage height, 34.25 feet, observed at crest).

Maximum discharge known, that of Feb. 23, 1938.

MINIMUM: 1936-48: Day: 400 second-feet (259 m.g.d.) Sept. 12-14, 1936.

7-day: 434 second-feet (280 m.g.d.) Sept. 9-15, 1936.

Calendar month: 586 second-feet (379 m.g.d.) October 1939, January 1940.

Water year: 4,839 second-feet (3,130 m.g.d.) Oct. 1, 1938, to Sept. 30, 1939.

REMARKS: Prior to Dec. 12, 1939, wire-weight gage at same site and datum. Gage-height records collected at same site since 1917 are contained in reports of U. S. Weather Bureau. Some regulation by Lake Texoma (Denison Dam), 261 miles upstream, since July 1942. Records collected and computed by Corps of Engineers, Tulsa District; reviewed by U. S. Geological Survey. Bankfull stage, about 25 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|--------|----------------------------|
| 1937 | 877-288                       | 86,600              | 1,600               | 10,020 | 7,254,000                  |
| 1938 | 877-288                       | 286,000             | 1,400               | 17,630 | 12,760,000                 |
| 1939 | 877-288                       | 67,600              | 500                 | 4,839  | 3,503,000                  |
| 1940 | 897-282                       | 68,500              | 415                 | 6,797  | 4,935,000                  |
| 1941 | 927-281                       | 142,000             | 680                 | 18,910 | 13,690,000                 |
| 1942 | 957-322                       | 177,000             | 1,600               | 23,560 | 17,060,000                 |
| 1943 | 977-300                       | 111,000             | 821                 | 11,970 | 8,665,000                  |
| 1944 | 1007-287                      | 87,700              | 470                 | 7,060  | 5,126,000                  |
| 1945 | 1037-314                      | 151,000             | 452                 | 25,310 | 18,330,000                 |
| 1946 | 1057-318                      | 74,400              | 1,550               | 16,270 | 11,780,000                 |
| 1947 | 1087-310                      | 110,000             | 2,220               | 18,120 | 13,120,000                 |
| 1948 | .....                         | 79,600              | 1,770               | 9,870  | 7,164,000                  |

*Calendar Year*

|      |          |         |       |        |            |
|------|----------|---------|-------|--------|------------|
| 1937 | 877-288  | 51,900  | 1,600 | 8,873  | 6,424,000  |
| 1938 | 877-288  | 286,000 | 775   | 16,500 | 11,950,000 |
| 1939 | 877-288  | 67,600  | 455   | 4,748  | 3,437,000  |
| 1940 | 897-282  | 68,500  | 415   | 8,609  | 6,250,000  |
| 1941 | 927-281  | 142,000 | 2,700 | 24,490 | 17,730,000 |
| 1942 | 957-322  | 177,000 | 1,600 | 18,550 | 13,430,000 |
| 1943 | 977-300  | 111,000 | 730   | 9,786  | 7,085,000  |
| 1944 | 1007-287 | 87,700  | 452   | 7,470  | 5,423,000  |
| 1945 | 1037-314 | 151,000 | 1,480 | 28,810 | 20,860,000 |
| 1946 | 1057-318 | 110,000 | 2,350 | 18,250 | 13,210,000 |
| 1947 | 1087-310 | 73,700  | 1,770 | 13,110 | 9,493,000  |
| 1948 | .....    | .....   | ..... | .....  | .....      |

**51. Red River at Fulton, Ark.**

LOCATION: Wire-weight gage, lat 33° 36'37", long. 93° 48'57", in NE¼ sec. 20, T. 13 S., R. 26 W., at bridge on U. S. Highway 67 at Fulton, Hempstead County, 0.3 mile downstream from Missouri Pacific Railroad bridge. Datum of gage is 224.94 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 50,860 square miles.

RECORDS AVAILABLE: Discharge, October 1937 to September 1938 in report of Corps of Engineers, Vicksburg District; October 1938 to September 1942 in files of Corps of Engineers, Vicksburg District; January 1946 to December 1948 in files of Corps of Engineers, New Orleans District. Chemical analyses and water temperatures, October 1946 to September 1947.

MEAN ANNUAL RUNOFF: 15,150,000 acre-feet.

AVERAGE DISCHARGE: 7 years (1938-42, 1946-48), 20,920 second-feet.

MAXIMUM: 1938-42, 1946-48: Discharge, 338,000 second-feet Feb. 24, 1938 (gage height, 36.45 feet).

Maximum stage known, 37.4 feet Apr. 2, 1945; discharge not determined.

MINIMUM: 1938-42,

1946-48: Day: 562 second-feet (363 m.g.d.) Nov. 4-6, 1939.

7-day: 600 second-feet (388 m.g.d.) Oct. 31 to Nov. 6, 1939.

Calendar month: 767 second-feet (496 m.g.d.) October 1939.

Water year: 9,750 second-feet (6,300 m.g.d.) Oct. 1, 1938, to Sept. 30, 1939.

REMARKS: Prior to Oct. 16, 1942, staff, chain, and wire-weight gages at Missouri Pacific Railroad bridge approximately 1,500 feet upstream. Gage-height records November 1885 to December 1948 are in reports of U. S. Weather Bureau and Mississippi River Commission; January 1932

to December 1945 in reports of Corps of Engineers, Vicksburg District, and January 1946 to December 1948 in reports of Corps of Engineers, New Orleans District. Some regulation by Lake Texoma, 287 miles upstream, since July 1942. Records furnished by Corps of Engineers, New Orleans District. Bankfull stage, about 30 feet.

SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-42, 1946-48

*Water Year Ending September 30*

| Year       | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------------|---------------------|---------------------|--------|----------------------------|
| 1938 ..... | 325,000             | 1,590               | 28,550 | 20,670,000                 |
| 1939 ..... | 79,000              | 590                 | 9,750  | 7,059,000                  |
| 1940 ..... | 82,800              | 562                 | 11,220 | 8,123,000                  |
| 1941 ..... | 143,000             | 1,020               | 24,000 | 17,380,000                 |
| 1942 ..... | 203,000             | 2,460               | 30,070 | 21,770,000                 |
| 1946 ..... | .....               | .....               | .....  | .....                      |
| 1947 ..... | 136,000             | 2,150               | 26,140 | 18,920,000                 |
| 1948 ..... | 100,000             | 2,000               | 16,740 | 12,150,000                 |

*Calendar Year*

|            |         |       |        |            |
|------------|---------|-------|--------|------------|
| 1938 ..... | 325,000 | 1,100 | 26,850 | 19,440,000 |
| 1939 ..... | 79,000  | 562   | 9,639  | 6,978,000  |
| 1940 ..... | 82,800  | 1,020 | 14,280 | 10,340,000 |
| 1941 ..... | 143,000 | 3,220 | 29,510 | 21,360,000 |
| 1942 ..... | .....   | ..... | .....  | .....      |
| 1946 ..... | 136,000 | 1,700 | 29,800 | 21,570,000 |
| 1947 ..... | 94,200  | 2,740 | 19,700 | 14,260,000 |
| 1948 ..... | 100,000 | 1,750 | 14,700 | 10,670,000 |

## 51. RED RIVER AT FULTON, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection              | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) + Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|---------------------------------|------------------------------|-----------------------------------|--------------|----------------|-----------------------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                                 |                              |                                   |              |                |                             |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| 1946:                           |                              |                                   |              |                |                             |                                 |                            |               |                            |                   |                    |                               |       |                |
| Oct. 1-10 .....                 | 3,606                        | 84.0                              | 62           | 19             | 87                          | 189                             | 73                         | 134           | 1.0                        | 519               | 0.71               | 5,050                         | 232   | 77             |
| Oct. 11-20 .....                | 3,760                        | 92.4                              | 71           | 22             | 98                          | 187                             | 100                        | 158           | .5                         | 593               | .81                | 6,020                         | 268   | 114            |
| Oct. 21-31, Nov. 1-4 .....      | 4,249                        | 106                               | 74           | 22             | 107                         | 178                             | 108                        | 175           | 1.0                        | 627               | .85                | 7,190                         | 275   | 128            |
| Nov. 5-19 .....                 | 78,250                       | 19.9                              | 22           | 4.4            | 18                          | 78                              | 18                         | 20            | 1.2                        | 150               | .20                | 31,690                        | 83    | 9              |
| Nov. 20-30 .....                | 22,100                       | 42.7                              | 32           | 7.6            | 42                          | 88                              | 41                         | 62            | .5                         | 263               | .36                | 15,690                        | 111   | 39             |
| Dec. 1-5, 7, 9, 11, 13-21 ..... | 39,803                       | 39.4                              | 34           | 8.1            | 32                          | 89                              | 37                         | 54            | 1.5                        | 245               | .33                | 26,330                        | 118   | 45             |
| Dec. 6, 8, 10, 12, 22-31 .....  | 62,952                       | 79.1                              | 58           | 14             | 87                          | 139                             | 87                         | 132           | 1.0                        | 507               | .69                | 86,170                        | 202   | 88             |
| 1947:                           |                              |                                   |              |                |                             |                                 |                            |               |                            |                   |                    |                               |       |                |
| Jan. 1-10 .....                 | 16,300                       | 61.2                              | 48           | 12             | 67                          | 124                             | 68                         | 100           | 1.5                        | 391               | .53                | 17,200                        | 170   | 68             |
| Jan. 11-20 .....                | 13,020                       | 61.6                              | 52           | 13             | 67                          | 129                             | 71                         | 106           | 1.2                        | 404               | .55                | 14,200                        | 184   | 78             |
| Jan. 21-31 .....                | 12,550                       | 61.0                              | 48           | 12             | 64                          | 121                             | 67                         | 99            | 1.2                        | 382               | .52                | 12,900                        | 170   | 70             |
| Feb. 1-10 .....                 | 9,041                        | 87.0                              | 56           | 16             | 92                          | 152                             | 92                         | 131           | .8                         | 504               | .69                | 12,300                        | 206   | 81             |
| Feb. 11-20 .....                | 8,146                        | 86.8                              | 54           | 16             | 95                          | 150                             | 92                         | 133           | .8                         | 503               | .68                | 11,100                        | 201   | 78             |
| Feb. 21-28 .....                | 7,276                        | 82.8                              | 52           | 16             | 90                          | 151                             | 87                         | 125           | .5                         | 482               | .66                | 9,470                         | 196   | 72             |
| Mar. 1-7, 9 .....               | 6,220                        | 79.5                              | 61           | 16             | 81                          | 164                             | 84                         | 122           | .5                         | 496               | .67                | 8,330                         | 218   | 83             |
| Mar. 8, 10-13, 26, 31 .....     | 12,250                       | 41.1                              | 33           | 7.2            | 37                          | 84                              | 43                         | 54            | 3.5                        | 247               | .34                | 8,160                         | 112   | 43             |
| Mar. 14-17, 23, 25, 27 .....    | 24,680                       | 24.9                              | 22           | 4.4            | 18                          | 64                              | 21                         | 26            | .5                         | 158               | .24                | 10,500                        | 73    | 21             |
| Mar. 18-22, 28-30 .....         | 27,380                       | 13.6                              | 12           | 3.1            | 13                          | 50                              | 13                         | 12            | .5                         | 113               | .16                | 8,290                         | 43    | 2              |
| Apr. 1, 8-10, 13 .....          | 22,720                       | 29.9                              | 24           | 5.4            | 30                          | 90                              | 28                         | 30            | 1.5                        | 201               | .27                | 12,300                        | 82    | 8              |
| Apr. 2-6, 7, 11-12 .....        | 12,832                       | 36.7                              | 25           | 6.8            | 39                          | 95                              | 36                         | 42            | 1.0                        | 225               | .31                | 7,780                         | 90    | 12             |
| Apr. 14-20, 21-22 .....         | 39,410                       | 20.3                              | 19           | 6.4            | 18                          | 80                              | 22                         | 17            | 1.0                        | 164               | .22                | 17,700                        | 74    | 8              |
| Apr. 23-24, 29-30 .....         | 34,600                       | 53.2                              | 36           | 8.2            | 57                          | 113                             | 52                         | 71            | .8                         | 313               | .43                | 29,200                        | 134   | 31             |
| Apr. 25-28 .....                | 24,780                       | 70.2                              | 48           | 12             | 81                          | 114                             | 82                         | 118           | .8                         | 436               | .59                | 29,200                        | 170   | 76             |

—Continued.

## 51. RED RIVER AT FULTON, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection   | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) + Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids  |                    | Hardness as CaCO <sub>3</sub> |       | Percent sodium |
|----------------------|------------------------------|-----------------------------------|--------------|----------------|-----------------------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|--------------------|-------------------------------|-------|----------------|
|                      |                              |                                   |              |                |                             |                                 |                            |               |                            | Parts per million | Tons per acre-foot | Tons per day                  | Total | Non-carbonate  |
| May 1, 11-13, 24     | 46,860                       | 48.6                              | 34           | 7.5            | 53                          | 90                              | 50                         | 74            | .2                         | 287               | .39                | 36,300                        | 116   | 42             |
| May 4-8              | 58,910                       | 15.4                              | 11           | 5.2            | 12                          | 60                              | 10                         | 11            | .3                         | 121               | .16                | 19,700                        | 49    | 0              |
| May 2-3, 9-10, 14-18 | 59,770                       | 27.5                              | 22           | 6.7            | 25                          | 75                              | 23                         | 32            | 1.2                        | 182               | .25                | 29,400                        | 82    | 21             |
| May 19-20, 21-23     | 77,800                       | 17.5                              | 12           | 5.7            | 14                          | 54                              | 12                         | 18            | 1.0                        | 124               | .17                | 26,000                        | 53    | 9              |
| May 25-31            | 83,640                       | 80.2                              | 54           | 13             | 87                          | 115                             | 86                         | 137           | 1.2                        | 498               | .68                | 112,000                       | 183   | 94             |
| June 1-10            | 61,790                       | 119                               | 74           | 17             | 144                         | 131                             | 142                        | 221           | 1.0                        | 728               | .99                | 121,000                       | 254   | 147            |
| June 11-20           | 33,290                       | 110                               | 78           | 17             | 133                         | 143                             | 147                        | 200           | 1.2                        | 726               | .99                | 63,290                        | 264   | 148            |
| June 21-30           | 15,550                       | 117                               | 78           | 17             | 125                         | 161                             | 135                        | 187           | .8                         | 688               | .94                | 28,900                        | 264   | 148            |
| July 1-10            | 13,900                       | 103                               | 75           | 17             | 120                         | 159                             | 133                        | 175           | 2.0                        | 682               | 9.0                | 25,000                        | 257   | 126            |
| July 11-20           | 6,751                        | 108                               | 82           | 20             | 123                         | 184                             | 142                        | 180           | 1.2                        | 698               | .95                | 12,700                        | 286   | 136            |
| July 21-31           | 4,921                        | 113                               | 84           | 20             | 121                         | 201                             | 143                        | 170           | 1.2                        | 700               | .95                | 9,300                         | 292   | 127            |
| Aug. 1-10            | 4,018                        | 110                               | 78           | 20             | 114                         | 187                             | 126                        | 170           | 1.2                        | 665               | .90                | 7,210                         | 276   | 124            |
| Aug. 11-20           | 3,614                        | 114                               | 82           | 22             | 118                         | 196                             | 136                        | 175           | 2.0                        | 708               | .96                | 6,910                         | 295   | 134            |
| Aug. 21-31           | 5,365                        | 109                               | 79           | 20             | 117                         | 179                             | 136                        | 172           | 2.5                        | 704               | .96                | 10,200                        | 279   | 132            |
| Sept. 1-2, 4-5       | 21,920                       | 22.8                              | 15           | 4.8            | 23                          | 52                              | 22                         | 29            | 1.2                        | 146               | .20                | 8,640                         | 57    | 15             |
| Sept. 3, 6-7         | 14,520                       | 45.2                              | 37           | 9.7            | 44                          | 98                              | 50                         | 66            | 1.8                        | 272               | .37                | 10,700                        | 132   | 52             |
| Sept. 8-10           | 4,757                        | 91.9                              | 68           | 17             | 106                         | 161                             | 117                        | 152           | 1.2                        | 580               | .79                | 7,450                         | 240   | 108            |
| Sept. 11-20          | 4,228                        | 98.9                              | 70           | 18             | 99                          | 151                             | 100                        | 167           | .5                         | 613               | .83                | 7,000                         | 248   | 124            |
| Sept. 21-22, 29-30   | 3,970                        | 84.2                              | 62           | 16             | 103                         | 151                             | 128                        | 132           | .8                         | 539               | .73                | 5,770                         | 220   | 96             |
| Sept. 24-26          | 9,257                        | 19.3                              | 9.0          | 3.2            | 21                          | 83                              | 16                         | 25            | 1.8                        | 107               | .15                | 2,680                         | 36    | 9              |
| Sept. 23, 27-28      | 5,170                        | 42.4                              | 30           | 9.3            | 49                          | 78                              | 63                         | 63            | .8                         | 253               | .34                | 3,530                         | 113   | 49             |
| Weighted average     | 24,620                       | .....                             | 42           | 10             | 61                          | 106                             | 62                         | 89            | 1.1                        | 361               | 0.49               | 43,570                        | 147   | 59             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 51. RED RIVER AT FULTON, ARK.—Continued

*Temperature (° F.) of Water of Red River, Water Year October 1946 to September 1947*

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

## 52. Red River at Garland, Ark.

LOCATION: Water-stage recorder, lat. 33°21', long. 93°42', in SE¼ sec. 17, T. 16 S., R. 25 W., at Garland, Miller County. Datum of gage is 203.08 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 51,500 square miles.

RECORDS AVAILABLE: Discharge, October 1927 to December 1931 and June 1934 to September 1948 in reports of Geological Survey; January 1932 to May 1934 in reports of Corps of Engineers, Vicksburg District. Chemical quality, see analysis page 176.

MEAN ANNUAL RUNOFF: 13,630,000 acre feet.

AVERAGE DISCHARGE: 21 years, 18,820 second-feet.

MAXIMUM: 1927-48: Discharge, 327,000 second-feet Feb. 25, 1938; maximum gage height, 36.87 feet Apr. 3, 1945.

Maximum discharge known, that of Feb. 25, 1938. Maximum stage known prior to 1945, 35.97 feet Feb. 24, 1938, just before break in levee above gage.

MINIMUM: 1927-48: Day: 400 second-feet (259 m.g.d.) Oct. 8-19, 1931.

7-day: 400 second-feet (259 m.g.d.), see above.

Calendar month: 667 second-feet (431 m.g.d.) August 1934.

Water year: 7,298 second-feet (4,720 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.



REMARKS: Prior to Oct. 1, 1934, chain gage a quarter of a mile upstream at same datum. Gage-height records collected at same site from February 1890 to December 1899, and results of discharge measurements in September 1893 and November 1902 are contained in reports of Mississippi River Commission. Some regulation by Lake Texoma, 326 miles upstream, since July 1942. Bankfull stage, about 30 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1928-48

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Run-off<br>in<br>acre-feet |
|------|-------------------------------|---------------------|---------------------|--------|----------------------------|
| 1928 | 667-67                        | 78,900              | 1,720               | 18,200 | 13,200,000                 |
| 1929 | 687-69                        | 107,000             | 660                 | 19,300 | 14,000,000                 |
| 1930 | 702-96                        | 119,000             | 730                 | 15,900 | 11,500,000                 |
| 1931 | 717-90                        | 57,100              | 440                 | 9,360  | 6,780,000                  |
| 1932 | (*)                           | 131,000             | 400                 | 24,500 | 17,800,000                 |
| 1933 | (*)                           | 80,000              | 1,060               | 13,800 | 9,970,000                  |
| 1934 | (*)                           | 54,800              | 530                 | 7,934  | 5,744,000                  |
| 1935 | 787-138                       | 143,000             | 920                 | 28,350 | 20,530,000                 |
| 1936 | 807-133                       | 73,100              | 980                 | 7,298  | 5,298,000                  |
| 1937 | 827-143                       | 73,700              | 1,760               | 16,730 | 12,110,000                 |
| 1938 | 857-168                       | 321,000             | 1,500               | 27,380 | 19,830,000                 |
| 1939 | 877-289                       | 82,200              | 702                 | 10,570 | 7,654,000                  |
| 1940 | 897-283                       | 86,400              | 538                 | 11,210 | 8,140,000                  |
| 1941 | 927-282                       | 130,000             | 922                 | 24,100 | 17,460,000                 |
| 1942 | 957-323                       | 184,000             | 1,980               | 29,290 | 21,210,000                 |
| 1943 | 977-301                       | 111,000             | 992                 | 14,870 | 10,760,000                 |
| 1944 | 1007-288                      | 122,000             | 724                 | 14,400 | 10,450,000                 |
| 1945 | 1037-315                      | 278,000             | 484                 | 36,520 | 26,440,000                 |
| 1946 | 1057-319                      | 93,300              | 2,710               | 24,440 | 17,690,000                 |
| 1947 | 1087-311                      | 121,000             | 2,830               | 24,620 | 17,820,000                 |
| 1948 |                               | 87,200              | 2,750               | 16,600 | 12,050,000                 |

## Calendar Year

|      |          |         |       |        |            |
|------|----------|---------|-------|--------|------------|
| 1928 | 667-67   | 78,900  | 1,200 | 18,200 | 13,200,000 |
| 1929 | 687-69   | 107,000 | 660   | 19,100 | 13,800,000 |
| 1930 | 702-96   | 119,000 | 730   | 16,500 | 12,000,000 |
| 1931 | 717-90   | 41,700  | 400   | 9,280  | 6,710,000  |
| 1932 | (*)      | 131,000 | 1,060 | 22,700 | 16,500,000 |
| 1933 | (*)      | 80,000  | 1,240 | 13,620 | 9,858,000  |
| 1934 | (*)      | 54,800  | 530   | 8,485  | 6,143,000  |
| 1935 | 787-138  | 143,000 | 2,200 | 29,780 | 21,560,000 |
| 1936 | 807-133  | 73,700  | 980   | 7,852  | 5,700,000  |
| 1937 | 827-143  | 63,800  | 1,760 | 16,010 | 11,590,000 |
| 1938 | 857-168  | 321,000 | 1,030 | 24,850 | 17,990,000 |
| 1939 | 877-289  | 82,200  | 538   | 10,460 | 7,576,000  |
| 1940 | 897-283  | 86,400  | 922   | 14,280 | 10,360,000 |
| 1941 | 927-282  | 130,000 | 2,820 | 29,150 | 21,100,000 |
| 1942 | 957-323  | 184,000 | 1,980 | 23,850 | 17,260,000 |
| 1943 | 977-301  | 111,000 | 992   | 12,630 | 9,142,000  |
| 1944 | 1007-288 | 122,000 | 484   | 15,290 | 11,100,000 |
| 1945 | 1037-315 | 278,000 | 3,110 | 40,150 | 29,070,000 |
| 1946 | 1057-319 | 121,000 | 2,710 | 27,950 | 20,240,000 |
| 1947 | 1087-311 | 96,000  | 2,830 | 18,760 | 13,580,000 |
| 1948 |          |         |       |        |            |

\* From reports of Corps of Engineers, Vicksburg District.

## 53. Little River Near Horatio, Ark.

LOCATION: Water-stage recorder, lat. 33°55', long. 94°23', in NW¼ sec. 11, T. 10 S., R. 32 W., 2 miles southwest of Horatio, Sevier County, and 28 miles upstream from Cossatot River. Datum of gage is 272.89 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 2,690 square miles.

RECORDS AVAILABLE: Discharge, December 1930 to September 1948. Chemical quality, see analysis page 176.

MEAN ANNUAL RUNOFF: 19.91 inches or 2,856,000 acre-feet.

AVERAGE DISCHARGE: 17 years, 3,945 second-feet.

MAXIMUM: 1930-48: Discharge, 120,000 second-feet Mar. 30, 1945 (gage height, 37.70 feet), from rating curve extended above 60,000 second-feet.

Maximum stage known, 38 feet August 1915.

MINIMUM: 1930-48: Day: 1 second-foot (0.65 m.g.d.) Aug. 18 to Sept. 1, 1934.

7-day: 1 second-foot (0.65 m.g.d.), see above.

Calendar month: 1.8 second-feet (1.2 m.g.d.) August 1934.

Water year: 1,851 second-feet (1,200 m.g.d.) Oct. 1, 1933, to Sept. 30, 1934.

REMARKS: Prior to Feb. 5, 1935, chain gage at same site and datum. Bank-full stage, about 26 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1931-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1931 | 717-99                        | .....               | .....               | ..... | .....                 | .....   | .....     |
| 1932 | *732-125                      | 50,800              | 24                  | 4,900 | 1.82                  | 24.82   | 3,560,000 |
| 1933 | 747-112                       | 23,700              | 26                  | 3,080 | 1.14                  | 15.54   | 2,230,000 |
| 1934 | 762-121                       | 24,900              | 1                   | 1,851 | .688                  | 9.34    | 1,340,000 |
| 1935 | *787-141                      | 79,700              | 26                  | 6,462 | 2.40                  | 32.61   | 4,678,000 |
| 1936 | *807-135                      | 30,600              | 2                   | 1,533 | .570                  | 7.76    | 1,112,000 |
| 1937 | 827-159                       | 26,100              | 17                  | 3,908 | 1.45                  | 19.60   | 2,829,000 |
| 1938 | 857-180                       | 105,000             | 16                  | 5,618 | 2.09                  | 28.35   | 4,067,000 |
| 1939 | 877-311                       | 51,800              | 5.0                 | 2,983 | 1.11                  | 15.05   | 2,160,000 |
| 1940 | 897-312                       | 33,600              | 4.5                 | 2,696 | 1.00                  | 13.65   | 1,957,000 |
| 1941 | 927-312                       | 22,800              | 42                  | 3,449 | 1.28                  | 17.42   | 2,497,000 |
| 1942 | 957-355                       | 46,800              | 54                  | 3,535 | 1.31                  | 17.82   | 2,559,000 |
| 1943 | 977-329                       | 22,800              | 2.7                 | 1,868 | .694                  | 9.41    | 1,352,000 |
| 1944 | 1007-317                      | 57,000              | 10                  | 4,175 | 1.55                  | 21.13   | 3,031,000 |
| 1945 | 1037-344                      | 112,000             | 12                  | 7,501 | 2.79                  | 37.85   | 5,431,000 |
| 1946 | 1057-354                      | 45,700              | 19                  | 5,194 | 1.93                  | 26.20   | 3,760,000 |
| 1947 | 1087-346                      | 55,900              | 10                  | 4,459 | 1.66                  | 22.51   | 3,228,000 |
| 1948 | .....                         | 52,000              | 16                  | 3,855 | 1.43                  | 19.51   | 2,799,000 |

### *Calendar Year*

|      |          |         |       |       |       |       |           |
|------|----------|---------|-------|-------|-------|-------|-----------|
| 1931 | 717-99   | 20,600  | 74    | 2,240 | .832  | 11.29 | 1,620,000 |
| 1932 | *732-125 | 50,800  | 24    | 4,520 | 1.68  | 22.86 | 3,280,000 |
| 1933 | 747-112  | 23,700  | 44    | 3,050 | 1.13  | 15.39 | 2,208,000 |
| 1934 | 762-121  | 24,900  | 1     | 1,979 | .736  | 9.99  | 1,433,000 |
| 1935 | *787-141 | 42,200  | 26    | 6,232 | 2.32  | 31.45 | 4,511,000 |
| 1936 | *807-135 | 19,100  | 2     | 1,406 | .523  | 7.12  | 1,021,000 |
| 1937 | 827-159  | 26,100  | 17    | 3,884 | 1.44  | 19.60 | 2,812,000 |
| 1938 | 857-180  | 105,000 | 8     | 4,898 | 1.82  | 24.72 | 3,546,000 |
| 1939 | 877-311  | 51,800  | 4.5   | 2,995 | 1.11  | 15.12 | 2,168,000 |
| 1940 | 897-312  | 33,600  | 42    | 3,565 | 1.33  | 18.05 | 2,588,000 |
| 1941 | 927-312  | 23,500  | 51    | 3,348 | 1.24  | 16.89 | 2,424,000 |
| 1942 | 957-355  | 46,800  | 44    | 3,274 | 1.22  | 16.51 | 2,370,000 |
| 1943 | 977-329  | 21,300  | 2.7   | 1,547 | .575  | 7.80  | 1,120,000 |
| 1944 | 1007-317 | 57,000  | 12    | 4,487 | 1.67  | 22.70 | 3,257,000 |
| 1945 | 1037-344 | 112,000 | 122   | 7,618 | 2.83  | 38.44 | 5,516,000 |
| 1946 | 1057-354 | 50,200  | 19    | 6,164 | 2.29  | 31.09 | 4,462,000 |
| 1947 | 1087-346 | 55,900  | 10    | 3,704 | 1.38  | 18.70 | 2,681,000 |
| 1948 | .....    | .....   | ..... | ..... | ..... | ..... | .....     |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 857, p. 179.

## 54. Cossatot Near De Queen, Ark.

LOCATION: Water-stage recorder, lat. 34°03', long. 94°13', on south edge of SE¼ sec. 20, T. 8 S., R. 30 W., at highway bridge just downstream from Hale Creek and 7 miles east of De Queen, Sevier County. Datum of gage is 335.60 feet above mean sea level (unadjusted).

DRAINAGE AREA: 361 square miles.

RECORDS AVAILABLE: Discharge, January 1938 to September 1948. Chemical quality, see analysis page 177.

MEAN ANNUAL RUNOFF: 22.86 inches or 440,200 acre-feet.

AVERAGE DISCHARGE: 10 years, 608 second-feet.

MAXIMUM: 1938-48: Discharge, 46,900 second-feet Aug. 28, 1947 (gage height, 20.47 feet).

MINIMUM: 1938-48: Day: 1.2 second-feet (0.78 m.g.d.) Aug. 30 to Sept. 1, 1943.

7-day: 1.3 second-feet (0.84 m.g.d.) Aug. 28 to Sept. 3, 1943.

Calendar month: 3.37 second-feet (2.2 m.g.d.) August 1943.

Water year: 279 second-feet (180 m.g.d.) Oct. 1, 1942 to Sept. 30, 1943.

REMARKS: Prior to Nov. 9, 1938, wire-weight gage at same site and datum. Bankfull stage, about 15 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|      |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1939 | 877-315                       | 16,200              | 1.7                 | 525  | 1.48                  | 19.74   | 380,000   |
| 1940 | 897-314                       | 11,300              | 1.6                 | 480  | 1.33                  | 18.10   | 348,200   |
| 1941 | 927-314                       | 7,600               | 9                   | 436  | 1.21                  | 16.40   | 315,500   |
| 1942 | 957-357                       | 13,600              | 16                  | 594  | 1.65                  | 22.34   | 430,200   |
| 1943 | 977-331                       | 5,800               | 1.2                 | 279  | .773                  | 10.52   | 202,200   |
| 1944 | 1007-319                      | 19,400              | 6.5                 | 685  | 1.90                  | 25.83   | 497,000   |
| 1945 | 1037-346                      | 29,800              | 6.8                 | 990  | 2.74                  | 37.23   | 716,600   |
| 1946 | 1057-356                      | 21,000              | 6.4                 | 826  | 2.29                  | 31.06   | 598,200   |
| 1947 | 1087-348                      | 16,400              | 2.0                 | 550  | 1.52                  | 20.71   | 398,500   |
| 1948 |                               | 15,600              | 9.5                 | 715  | 1.98                  | 26.96   | 518,900   |

*Calendar Year*

|      |          |        |     |     |      |       |         |
|------|----------|--------|-----|-----|------|-------|---------|
| 1939 | 877-315  | 16,200 | 1.6 | 528 | 1.46 | 19.86 | 382,400 |
| 1940 | 897-314  | 11,300 | 9   | 598 | 1.66 | 22.57 | 434,300 |
| 1941 | 927-314  | 5,650  | 10  | 423 | 1.17 | 15.92 | 306,300 |
| 1942 | 957-357  | 13,600 | 16  | 568 | 1.57 | 21.87 | 411,200 |
| 1943 | 977-331  | 5,800  | 1.2 | 224 | .620 | 8.42  | 161,900 |
| 1944 | 1007-319 | 19,400 | 6.5 | 755 | 2.09 | 28.48 | 548,100 |
| 1945 | 1037-346 | 29,800 | 16  | 959 | 2.66 | 36.07 | 694,500 |
| 1946 | 1057-356 | 21,000 | 6.4 | 929 | 2.57 | 34.92 | 672,300 |
| 1947 | 1087-348 | 16,400 | 2.0 | 642 | 1.78 | 24.17 | 465,100 |
| 1948 |          |        |     |     |      |       |         |

## 55. Saline River Near Dierks, Ark.

LOCATION: Water-stage recorder, lat. 34°06', long. 94°05', in W½ sec. 3, T. 8 S., R. 29 W., at bridge on U. S. Highway 70, 3½ miles upstream from Holly Creek, and 4 miles southwest of Dierks, Howard County. Datum of gage above mean sea level not determined.

DRAINAGE AREA: 122 square miles.

RECORDS AVAILABLE: Discharge, May 1938 to September 1948. Chemical quality, see analysis page 177.

MEAN ANNUAL RUNOFF: 21.03 inches or 136,800 acre-feet.

AVERAGE DISCHARGE: 10 years, 189 second-feet.

MAXIMUM: 1938-48: Discharge, 31,200 second-feet Mar. 30, 1945 (gage height, 19.93 feet). Maximum stage known, 21.9 feet sometime in 1920, from information by local resident.

MINIMUM: 1938-48: Day: No flow, Aug. 25 to Sept. 1, Sept. 9-28, Oct. 1-4, 11, 12, 1943; Sept. 17 to Oct. 16, 1946.

7-day: No flow, see above.

Calendar month: 0.06 second-foot (0.039 m.g.d.) September 1943.

Water year: 85.4 second-feet (55.2 m.g.d.) Oct. 1, 1942, to Sept. 30, 1943.

REMARKS: Prior to Aug. 10, 1940, wire-weight gage at same site and datum.

Records collected and computed by Corps of Engineers, Tulsa District; reviewed by U. S. Geological Survey. Bankfull stage, about 15 feet.

### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1939-48

*Water Year Ending September 30*

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|            |                               |                     |                     |      |                       | Inches  | Acre-feet |
| 1939 ..... | *877-317                      | 7,070               | 0.2                 | 181  | 1.48                  | 20.15   | 181,000   |
| 1940 ..... | *897-315                      | 4,750               | .1                  | 116  | .951                  | 12.90   | 83,990    |
| 1941 ..... | *927-315                      | 6,360               | .1                  | 178  | 1.46                  | 19.77   | 128,600   |
| 1942 ..... | *957-358                      | 7,050               | .3                  | 169  | 1.39                  | 18.86   | 122,600   |
| 1943 ..... | 977-332                       | 2,130               | 0                   | 85.4 | .700                  | 9.50    | 61,860    |
| 1944 ..... | 1007-320                      | 6,760               | 0                   | 230  | 1.89                  | 25.64   | 166,800   |
| 1945 ..... | 1037-347                      | 16,300              | .1                  | 302  | 2.48                  | 33.55   | 218,300   |
| 1946 ..... | 1057-357                      | 5,590               | 0                   | 251  | 2.06                  | 27.90   | 181,500   |
| 1947 ..... | 1087-349                      | 2,900               | 0                   | 158  | 1.30                  | 17.58   | 114,400   |
| 1948 ..... | .....                         | 2,550               | .2                  | 219  | 1.80                  | 24.42   | 158,800   |

### *Calendar Year*

|            |          |        |       |       |       |       |         |
|------------|----------|--------|-------|-------|-------|-------|---------|
| 1939 ..... | *877-317 | 7,070  | .1    | 180   | 1.48  | 19.98 | 129,900 |
| 1940 ..... | *897-315 | 6,360  | .1    | 167   | 1.37  | 18.66 | 121,500 |
| 1941 ..... | *927-315 | 6,000  | 1.0   | 165   | 1.35  | 18.41 | 119,700 |
| 1942 ..... | *957-358 | 7,050  | .3    | 150   | 1.23  | 16.72 | 108,700 |
| 1943 ..... | 977-332  | 1,510  | 0     | 75.9  | .622  | 8.44  | 54,940  |
| 1944 ..... | 1007-320 | 6,760  | .1    | 259   | 2.12  | 28.84 | 187,700 |
| 1945 ..... | 1037-347 | 16,300 | .3    | 276   | 2.26  | 30.77 | 200,100 |
| 1946 ..... | 1057-357 | 5,590  | 0     | 289   | 2.37  | 32.13 | 209,100 |
| 1947 ..... | 1087-349 | 2,550  | .1    | 188   | 1.54  | 20.96 | 136,400 |
| 1948 ..... | .....    | .....  | ..... | ..... | ..... | ..... | .....   |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 1007, p. 320.

## 56. Ouachita River Near Mt. Ida, Ark.

LOCATION: Water-stage recorder, lat. 34°36'41", long. 93°41'46", in sec. 32, T. 1 S., R. 25 W., at bridge on U. S. Highway 270, 5½ miles northwest of Mt. Ida, Montgomery County. Datum of gage is 655.14 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 410 square miles.

RECORDS AVAILABLE: Discharge, November 1941 to December 1946 in files of Corps of Engineers, Vicksburg District; January 1947 to December 1948 in report of Corps of Engineers, Vicksburg District. Chemical quality, see analysis page 177.

MEAN ANNUAL RUNOFF: 27.78 inches or 607,400 acre-feet.

AVERAGE DISCHARGE: 6 years, 839 second-feet.

MAXIMUM: 1941-48: Discharge, 48,500 second-feet Mar. 30, 1945 (gage height, 27.80 feet).

MINIMUM: 1941-48: Day: 8.4 second-feet (5.43 m.g.d.) Aug. 11-13, 1947.  
7-day: 9.03 second-feet (5.84 m.g.d.) Aug. 10-16, 1947.

Calendar month: 12.7 second-feet (8.2 m.g.d.) September 1943.

Water year: 371 second-feet (240 m.g.d.) Oct. 1, 1942, to Sept. 30, 1943.

REMARKS: Prior to Dec. 3, 1941, tape gage at same site and datum. Gage-height records November 1941 to December 1948 are contained in reports of Corps of Engineers, Vicksburg District; January 1945 to December 1948 in reports of Mississippi River Commission. Records furnished by Corps of Engineers, Vicksburg District.

#### SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1942-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1942 | 4,570          | 10             | 371   | 0.905                 | 12.29   | 268,600   |
| 1943 | 11,700         | 16             | 811   | 1.98                  | 26.93   | 589,000   |
| 1944 | 46,700         | 18             | 1,499 | 3.66                  | 49.63   | 1,085,000 |
| 1945 | 16,600         | 25             | 1,055 | 2.57                  | 34.94   | 763,500   |
| 1946 | 13,600         | 8.4            | 544   | 1.33                  | 18.01   | 393,600   |
| 1947 | 28,100         | 18             | 754   | 1.84                  | 25.03   | 547,100   |

#### *Calendar Year*

|      |        |     |       |      |       |           |
|------|--------|-----|-------|------|-------|-----------|
| 1942 | 15,700 | 28  | 806   | 1.97 | 26.69 | 583,500   |
| 1943 | 4,540  | 10  | 337   | .882 | 11.15 | 243,700   |
| 1944 | 11,700 | 16  | 899   | 2.19 | 29.83 | 652,600   |
| 1945 | 46,700 | 52  | 1,488 | 3.63 | 49.27 | 1,077,000 |
| 1946 | 16,600 | 25  | 1,147 | 2.80 | 37.99 | 830,200   |
| 1947 | 9,550  | 8.4 | 508   | 1.24 | 16.82 | 367,500   |
| 1948 | 28,100 | 18  | 653   | 1.59 | 21.68 | 474,000   |

### 57. Ouachita River Near Mountain Pine, Ark.

LOCATION: Water-stage recorder, lat. 34°36', long. 93°12', in NW¼NW¼ sec. 1, T. 2 S., R. 21 W., 2 miles downstream from Blakely Creek, and 4 miles northwest of Mountain Pine, Garland County. Datum of gage is 404.16 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 1,100 square miles.

RECORDS AVAILABLE: Discharge, June 1936 to September 1948. Chemical quality, see analysis page 178.

MEAN ANNUAL RUNOFF: 22.03 inches or 1,292,000 acre-feet.

AVERAGE DISCHARGE: 12 years, 1,785 second-feet.

MAXIMUM: 1936-48: Discharge, 123,000 second-feet Mar. 30, 1945 (gage height, 38.55 feet).

Maximum discharge known, that of Mar. 30, 1945.

MINIMUM: 1936-48: Day: 12 second-feet (7.8 m.g.d.) Sept. 8, 13-15, 1936.  
7-day: 12.6 second-feet (8.1 m.g.d.) Sept. 11-17, 1936.

Calendar month: 19.7 second-feet (12.7 m.g.d.) August 1936.

Water year: 646 second-feet (418 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1937-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1937 | *827-164                      | 34,900              | 43                  | 1,579 | 1.44                  | 19.48   | 1,143,000 |
| 1938 | *857-183                      | 74,000              | 31                  | 2,240 | 2.04                  | 27.64   | 1,621,000 |
| 1939 | 877-328                       | 86,300              | 26                  | 1,698 | 1.54                  | 20.95   | 1,229,000 |
| 1940 | 897-323                       | 11,400              | 46                  | 646   | .587                  | 8.00    | 469,200   |
| 1941 | 927-324                       | 25,100              | 37                  | 1,210 | 1.10                  | 14.94   | 875,900   |
| 1942 | 957-369                       | 38,000              | 74                  | 2,063 | 1.88                  | 25.42   | 1,494,000 |
| 1943 | 977-346                       | 20,100              | 21                  | 1,041 | .946                  | 12.84   | 753,300   |
| 1944 | 1007-339                      | 49,900              | 38                  | 1,966 | 1.79                  | 24.34   | 1,427,000 |
| 1945 | 1037-364                      | 90,300              | 42                  | 3,452 | 3.14                  | 42.59   | 2,499,000 |
| 1946 | 1057-373                      | 37,000              | 70                  | 2,634 | 2.39                  | 32.51   | 1,907,000 |
| 1947 | 1087-365                      | 22,700              | 22                  | 1,238 | 1.12                  | 15.27   | 896,200   |
| 1948 |                               | 31,000              | 48                  | 1,648 | 1.50                  | 20.38   | 1,197,000 |

*Calendar Year*

|      |          |        |     |       |      |       |           |
|------|----------|--------|-----|-------|------|-------|-----------|
| 1937 | *827-164 | 34,900 | 43  | 1,711 | 1.56 | 21.12 | 1,239,000 |
| 1938 | *857-183 | 74,000 | 26  | 1,945 | 1.77 | 24.00 | 1,408,000 |
| 1939 | 877-328  | 86,300 | 27  | 1,634 | 1.49 | 20.17 | 1,183,000 |
| 1940 | 897-323  | 25,100 | 37  | 932   | .847 | 11.53 | 676,800   |
| 1941 | 927-324  | 14,200 | 83  | 1,428 | 1.30 | 17.62 | 1,034,000 |
| 1942 | 957-369  | 38,000 | 74  | 1,784 | 1.62 | 21.98 | 1,291,000 |
| 1943 | 977-346  | 12,100 | 21  | 887   | .806 | 10.95 | 642,500   |
| 1944 | 1007-339 | 49,900 | 40  | 2,233 | 2.03 | 27.66 | 1,622,000 |
| 1945 | 1037-364 | 90,300 | 129 | 3,357 | 3.05 | 41.41 | 2,430,000 |
| 1946 | 1057-373 | 37,000 | 70  | 2,933 | 2.67 | 36.20 | 2,123,000 |
| 1947 | 1087-365 | 16,900 | 22  | 1,019 | .926 | 12.57 | 787,900   |
| 1948 |          |        |     |       |      |       |           |

\* Revised figures of daily discharge for high-water period and yearly summaries contained in Water-Supply Paper 877, p. 327.

**58. Ouachita River Near Malvern, Ark.**

**LOCATION:** Water-stage recorder, lat. 34°23', long. 52°51', in NW¼ sec. 16, T. 4 S., R. 17 W., at Rockport Bridge, 2 miles northwest of Malvern, Hot Spring County. Datum of gage is 228.05 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 1,570 square miles.

**RECORDS AVAILABLE:** Discharge, March 1903 to April 1905, June 1922 to September 1924 (fragmentary); and March 1937 to September 1948. January 1925 to March 1937 at site at Remmel Dam, 6 miles upstream published as Ouachita River at Remmel Dam, near Malvern, Arkansas. Chemical analyses and water temperatures, October 1946 to September 1948.

**MEAN ANNUAL RUNOFF:** 20.44 inches or 1,711,000 acre-feet.

**AVERAGE DISCHARGE:** 21 years, 2,364 second-feet.

**MAXIMUM:** 1903-05, 1922-24, 1937-48: Discharge, 140,000 second-feet May 15, 1923 (gage height, 30.3 feet).

Maximum discharge known, that of May 15, 1923.

**MINIMUM:** 1903-05, 1922-24,

1937-48: Day: 40 second-feet (25.8 m.g.d.) Dec. 18-20, 1904.

7-day: 54.3 second-feet (35.1 m.g.d.) Dec. 16-22, 1904.

Calendar month: 95.7 second-feet (61.8 m.g.d.) September 1943.

Water year: 941 second-feet (608 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

**REMARKS:** Flow regulated by power plants above station since 1923. Summary of yearly discharge for 1926, 1929-36, are for station at Remmel Dam.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1926, 1929-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Run-off<br>in<br>acre-feet |
|------|-------------------------------|----------------|----------------|-------|----------------------------|
| 1926 | 627-95                        | 42,000         | 63             | 2,090 | 1,510,000                  |
| 1929 | 687-79                        | 41,600         | 39             | 2,480 | 1,800,000                  |
| 1930 | 702-109                       | 45,600         | 68             | 2,420 | 1,750,000                  |
| 1931 | 717-104                       | 23,100         | 58             | 1,090 | 786,000                    |
| 1932 | 732-128                       | 60,900         | 76             | 2,870 | 2,090,000                  |
| 1933 | 747-115                       | 49,600         | 68             | 2,100 | 1,520,000                  |
| 1934 | 762-124                       | 45,400         | 48             | 1,335 | 966,200                    |
| 1935 | 787-144                       | 64,900         | 64             | 3,387 | 2,452,000                  |
| 1936 | 807-138                       | 11,400         | 62             | 960   | 697,100                    |
| 1937 | 827-165                       | 44,700         | 88             | 2,323 | 1,682,000                  |
| 1938 | 857-185                       | 90,700         | 110            | 3,195 | 2,314,000                  |
| 1939 | 877-329                       | 92,100         | 90             | 2,690 | 1,948,000                  |
| 1940 | 897-324                       | 18,400         | 134            | 941   | 683,100                    |
| 1941 | 927-325                       | 11,400         | 83             | 1,690 | 1,223,000                  |
| 1942 | 977-348                       | 47,600         | 113            | 3,000 | 2,172,000                  |
| 1943 | 977-348                       | 16,700         | 49             | 1,613 | 1,168,000                  |
| 1944 | 1007-340                      | 62,800         | 49             | 2,770 | 2,011,000                  |
| 1945 | 1037-365                      | 104,000        | 94             | 4,769 | 3,452,000                  |
| 1946 | 1057-374                      | 52,900         | 102            | 3,993 | 2,891,000                  |
| 1947 | 1087-366                      | 28,400         | 82             | 1,643 | 1,190,000                  |
| 1948 |                               | 30,900         | 62             | 2,285 | 1,659,000                  |

*Calendar Year*

|      |          |         |     |       |           |
|------|----------|---------|-----|-------|-----------|
| 1926 | 627-95   | 70,700  | 63  | 2,150 | 1,560,000 |
| 1929 | 687-79   | 24,800  | 39  | 2,280 | 1,650,000 |
| 1930 | 702-109  | 45,600  | 68  | 2,510 | 1,810,000 |
| 1931 | 717-104  | 23,300  | 58  | 1,300 | 938,000   |
| 1932 | 732-128  | 60,900  | 70  | 2,590 | 1,880,000 |
| 1933 | 747-115  | 20,000  | 68  | 1,970 | 1,430,000 |
| 1934 | 762-124  | 45,400  | 48  | 1,438 | 1,041,000 |
| 1935 | 787-144  | 64,900  | 64  | 3,629 | 2,627,000 |
| 1936 | 807-138  | 8,860   | 62  | 666   | 483,500   |
| 1937 | 827-165  | 44,700  | 88  | 2,544 | 1,842,000 |
| 1938 | 857-185  | 90,700  | 110 | 2,977 | 2,155,000 |
| 1939 | 877-329  | 92,100  | 90  | 2,536 | 1,836,000 |
| 1940 | 897-324  | 18,400  | 134 | 1,297 | 941,700   |
| 1941 | 927-325  | 10,700  | 83  | 1,941 | 1,405,000 |
| 1942 | 977-348  | 47,600  | 113 | 2,588 | 1,874,000 |
| 1943 | 977-348  | 16,700  | 49  | 1,352 | 978,600   |
| 1944 | 1007-340 | 62,800  | 69  | 3,263 | 2,369,000 |
| 1945 | 1037-365 | 104,000 | 108 | 4,640 | 3,359,000 |
| 1946 | 1057-374 | 52,900  | 102 | 4,300 | 3,113,000 |
| 1947 | 1087-366 | 15,300  | 82  | 1,406 | 1,018,000 |
| 1948 |          |         |     |       |           |

## 58. OUACHITA RIVER NEAR MALVERN, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1946:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 311                          | 6.01                              | 7.3 | 7.7                        | 0.04      | 0.2           | 4.7          | 1.7            | 3.3         | 1.1           | 20                              | 2.5                        | 3.0           | 0.5          | 3.5                        | 44               | 19                            | 3             |
| Oct. 11-20         | 232                          | 6.42                              | 7.3 | 8.4                        | .01       | .1            | 4.0          | 1.7            | 6.2         | 1.0           | 26                              | 2.8                        | 2.5           | .6           | 3.0                        | 45               | 17                            | 0             |
| Oct. 21-31         | 401                          | 6.46                              | 7.4 | 8.9                        | .01       | .0            | 4.9          | 1.4            | 6.3         | 1.0           | 28                              | 2.8                        | 2.5           | .5           | 2.8                        | 46               | 18                            | 0             |
| Nov. 1-10          | 6,866                        | 7.20                              | 7.4 | 6.4                        | .02       | .1            | 5.4          | 1.7            | 7.0         | .9            | 31                              | 4.5                        | 2.5           | .6           | 2.0                        | 46               | 20                            | 0             |
| Nov. 11-20         | 3,364                        | 5.64                              | 7.3 | 7.4                        | .06       | .2            | 3.0          | 1.4            | 6.7         | 1.0           | 22                              | 4.9                        | 2.5           | .6           | 1.2                        | 47               | 18                            | 0             |
| Nov. 21-30         | 1,975                        | 5.54                              | 7.2 | 7.4                        | .02       | .1            | 3.5          | 1.6            | 6.6         | 1.0           | 25                              | 4.3                        | 2.5           | .5           | 1.5                        | 42               | 15                            | 0             |
| Dec. 1-10          | 1,656                        | 5.55                              | 7.4 | 7.7                        | .11       | .9            | 6.4          | 1.6            | 3.7         | 1.2           | 28                              | 4.2                        | 2.5           | .1           | 1.5                        | 47               | 23                            | 0             |
| Dec. 11-20         | 10,500                       | 5.18                              | 7.7 | 6.3                        | .16       | 1.3           | 5.8          | 1.6            | 2.8         | 1.0           | 23                              | 4.0                        | 2.5           | .3           | 1.5                        | 47               | 21                            | 2             |
| Dec. 20-31         | 1,889                        | 5.12                              | 7.4 | 6.3                        | .14       | 1.3           | 5.2          | 1.4            | 4.0         | .8            | 23                              | 3.6                        | 3.0           | .3           | 1.0                        | 45               | 19                            | 0             |
| 1947:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 2,824                        | 4.85                              | 7.2 | 7.1                        | .04       | .8            | 2.9          | 1.4            | 5.2         | .8            | 18                              | 3.7                        | 3.0           | .4           | 1.8                        | 42               | 13                            | 0             |
| Jan. 11-20         | 1,559                        | 4.73                              | 7.1 | 7.1                        | .02       | .8            | 2.8          | 1.5            | 5.8         | .7            | 20                              | 4.0                        | 2.5           | .5           | 1.5                        | 43               | 13                            | 0             |
| Jan. 21-31         | 1,238                        | 5.11                              | 7.2 | 8.0                        | .06       | .6            | 3.8          | 1.4            | 5.9         | 1.2           | 23                              | 4.3                        | 3.0           | .4           | 1.2                        | 48               | 15                            | 0             |
| Feb. 1-10          | 619                          | 5.64                              | 7.6 | 7.6                        | .06       | .9            | 5.4          | 1.4            | 3.8         | .8            | 23                              | 4.2                        | 2.8           | .3           | .8                         | 42               | 19                            | 0             |
| Feb. 11-20         | 732                          | 5.45                              | 7.7 | 8.9                        | .04       | .2            | 5.2          | 1.4            | 4.1         | .7            | 23                              | 3.8                        | 3.0           | .3           | .8                         | 41               | 19                            | 0             |
| Feb. 21-28         | 509                          | 6.06                              | 7.1 | 6.8                        | .06       | 1.2           | 5.5          | 1.3            | 5.0         |               | 24                              | 4.0                        | 3.0           | .4           | 1.0                        | 47               | 19                            | 0             |
| Mar. 1-10          | 421                          | 5.68                              | 7.4 | 6.6                        | .06       | .5            | 5.3          | 1.3            | 2.9         | 1.4           | 22                              | 4.2                        | 1.8           | .1           | 1.8                        | 42               | 19                            | 0             |
| Mar. 11-20         | 1,706                        | 5.91                              | 7.2 | 7.7                        | .04       | .3            | 5.6          | 1.4            | 2.5         | 1.6           | 22                              | 4.0                        | 2.5           | .1           | 1.5                        | 44               | 20                            | 2             |
| Mar. 21-31         | 2,034                        | 6.66                              | 7.1 | 5.9                        | .04       | .3            | 6.8          | 1.5            | 2.3         | 1.8           | 25                              | 4.1                        | 2.5           | .1           | 2.5                        | 45               | 23                            | 3             |

— Continued.



58. OUACHITA RIVER NEAR MALVERN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| Apr. 1-10          | 1,522                        | 7.74                              | 7.4 | 6.4                        | 0.02      | 0.6           | 8.4          | 1.7            | 2.9         | 1.2           | 29                              | 4.8                        | 2.2           | 0.2          | 4.2                        | 51               | 28                            | 4             |
| Apr. 11-20         | 2,769                        | 7.45                              | 7.0 | 6.8                        | .04       | .6            | 8.4          | 1.7            | 3.7         | 1.0           | 31                              | 4.9                        | 3.0           | .1           | 2.8                        | 48               | 28                            | 3             |
| Apr. 21-30         | 2,774                        | 6.91                              | 6.8 | 5.6                        | .04       | .3            | 8.4          | 1.7            | 2.3         | 1.1           | 31                              | 4.8                        | 2.0           | .1           | 1.2                        | 48               | 28                            | 3             |
| May 1-10           | 3,915                        | 7.44                              | 7.2 | 7.0                        | .02       | .1            | 8.4          | 1.7            | 2.4         | .7            | 30                              | 4.6                        | 1.8           | .1           | 2.2                        | 48               | 28                            | 3             |
| May 11-20          | 4,351                        | 7.04                              | 7.1 | .....                      | .03       | .....         | 8.0          | 1.7            | 2.9         | .7            | 30                              | 4.3                        | 1.8           | .1           | 2.8                        | 47               | 27                            | 2             |
| May 21-31          | 1,615                        | 6.76                              | 7.0 | 5.5                        | .04       | .3            | 7.6          | 1.7            | 3.6         | .7            | 31                              | 5.4                        | 1.8           | .1           | 1.0                        | 45               | 26                            | 1             |
| June 1-10          | 734                          | 6.54                              | 7.4 | 8.1                        | .02       | .3            | 4.6          | 1.7            | 7.3         | .9            | 31                              | 4.5                        | 2.0           | .2           | 2.5                        | 51               | 18                            | 0             |
| June 11-20         | 396                          | 7.40                              | 7.5 | 6.2                        | .02       | .4            | 6.0          | 1.8            | 4.9         | 1.4           | 31                              | 4.4                        | 2.0           | .2           | 1.8                        | 49               | 22                            | 0             |
| June 21-30         | 201                          | 6.76                              | 7.9 | 8.2                        | .02       | .3            | 5.8          | 1.6            | 5.1         | .8            | 30                              | 4.9                        | 2.0           | .1           | .5                         | 50               | 21                            | 0             |
| July 1-10          | 186                          | 6.92                              | 8.0 | 6.9                        | .04       | .3            | 8.2          | 1.8            | 3.2         | .9            | 31                              | 4.8                        | 3.0           | .1           | 1.2                        | 48               | 28                            | 2             |
| July 11-20         | 505                          | 6.52                              | 7.9 | 8.4                        | .02       | .2            | 7.8          | 1.8            | 3.7         | 1.0           | 35                              | 3.9                        | 3.0           | .2           | 1.0                        | 52               | 27                            | 0             |
| July 21-31         | 267                          | 6.90                              | 7.9 | 7.3                        | .04       | .2            | 8.2          | 1.9            | 4.7         | 1.0           | 36                              | 3.5                        | 2.5           | .1           | 1.0                        | 50               | 28                            | 0             |
| Aug. 1-10          | 351                          | 6.71                              | 7.5 | 10                         | .02       | .5            | 7.6          | 1.0            | 5.8         | 1.0           | 34                              | 2.8                        | 3.5           | .2           | 1.0                        | 54               | 23                            | 0             |
| Aug. 11-20         | 167                          | 7.62                              | 7.6 | 9.7                        | .03       | .3            | 8.8          | .9             | 5.4         | .9            | 36                              | 2.8                        | 2.8           | .2           | 2.0                        | 56               | 26                            | 0             |
| Aug. 21-31         | 185                          | 7.72                              | 7.6 | 8.1                        | .02       | .5            | 8.8          | 1.0            | 5.1         | 1.2           | 35                              | 2.6                        | 2.8           | .2           | 3.5                        | 54               | 26                            | 0             |
| Sept. 1-10         | 492                          | 8.60                              | 7.4 | 8.1                        | .04       | .6            | 8.6          | 1.0            | 6.0         | 1.2           | 36                              | 3.5                        | 3.5           | .2           | 2.0                        | 65               | 25                            | 0             |
| Sept. 11-20        | 322                          | 7.84                              | 7.2 | 7.4                        | .03       | .5            | 9.8          | 1.1            | 6.0         | 1.0           | 31                              | 10                         | 3.5           | .2           | 2.5                        | 60               | 29                            | 4             |
| Sept. 21-30        | 239                          | 7.44                              | 7.2 | 8.9                        | .02       | .5            | 8.8          | 1.1            | 7.1         | 1.2           | 31                              | 9.0                        | 4.0           | .3           | 2.8                        | 62               | 26                            | 1             |
| Average            | 1,647                        | 6.49                              | 7.4 | 7.5                        | 0.04      | 0.5           | 6.3          | 1.5            | 4.6         | 1.0           | 28                              | 4.3                        | 2.6           | 0.3          | 1.9                        | 48               | 22                            | 1             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 58. OUACHITA RIVER NEAR MALVERN, ARK.—Continued

*Temperature (° F.) of Water of Ouachita River, Water Year October 1946 to September 1947*

| Day        | October | November | December | January | February | March | April | May | June | July | August | September |
|------------|---------|----------|----------|---------|----------|-------|-------|-----|------|------|--------|-----------|
| 1          | ....    | ....     | 55       | 50      | 50       | 50    | 60    | 60  | 70   | 80   | 80     | 80        |
| 2          | ....    | ....     | 55       | 50      | 45       | 45    | ....  | 65  | 70   | 80   | 80     | 80        |
| 3          | ....    | ....     | 50       | 40      | 45       | 45    | 60    | 65  | 70   | 80   | 80     | 80        |
| 4          | ....    | ....     | 55       | 45      | 45       | 50    | 65    | 65  | 70   | 80   | 80     | 80        |
| 5          | ....    | ....     | 55       | 45      | ....     | 50    | 60    | 65  | 70   | 80   | 78     | 80        |
| 6          | ....    | ....     | 55       | 50      | 45       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 7          | ....    | ....     | 55       | 50      | 47       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 8          | ....    | ....     | 55       | 50      | 45       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 9          | ....    | ....     | 60       | 50      | 45       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 10         | ....    | ....     | 55       | 50      | 45       | 50    | 60    | 65  | 65   | 80   | 80     | 80        |
| 11         | 70      | 60       | 60       | 50      | 45       | 50    | 60    | 65  | 70   | 75   | 80     | 80        |
| 12         | 60      | 60       | 60       | 50      | 45       | 50    | 60    | 65  | 70   | 75   | 80     | 80        |
| 13         | 60      | 60       | 55       | 50      | 50       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 14         | 60      | 60       | 55       | 50      | 50       | 50    | 60    | 60  | 70   | 85   | 80     | 80        |
| 15         | 70      | 65       | 55       | 50      | 50       | 45    | 60    | 60  | 70   | 80   | 80     | 80        |
| 16         | 70      | 60       | 55       | 50      | 50       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 17         | 70      | 65       | 55       | 50      | 50       | 50    | 60    | 65  | 70   | 80   | 80     | 80        |
| 18         | 65      | 60       | 50       | 50      | 50       | 50    | 60    | 65  | 70   | 80   | 80     | 75        |
| 19         | 60      | 60       | 50       | 50      | 50       | 50    | 60    | 65  | 80   | 80   | 80     | 75        |
| 20         | 60      | 60       | 50       | 50      | 45       | 50    | 60    | 60  | 80   | 75   | 80     | 75        |
| 21         | 70      | 60       | 50       | 45      | 50       | 50    | 60    | 70  | 80   | 80   | 80     | 75        |
| 22         | ....    | 60       | ....     | 50      | ....     | 50    | 60    | 65  | 80   | 80   | 80     | 75        |
| 23         | ....    | 60       | 50       | 50      | 45       | 50    | 60    | 65  | 80   | 80   | 80     | 75        |
| 24         | ....    | 60       | 55       | 50      | 45       | 50    | 60    | 65  | 80   | 80   | 80     | 75        |
| 25         | ....    | 60       | 50       | 50      | 45       | 50    | 60    | 65  | 75   | 80   | 80     | 75        |
| 26         | ....    | 55       | 55       | 50      | 50       | 60    | 60    | 65  | 80   | 80   | 80     | 75        |
| 27         | ....    | 60       | 55       | 50      | 50       | 55    | 60    | 70  | 80   | 80   | 80     | 73        |
| 28         | ....    | 60       | 45       | 50      | 50       | 55    | 60    | 71  | 80   | 80   | 80     | 75        |
| 29         | 70      | 60       | 50       | 50      | ....     | 55    | 60    | 70  | 80   | 80   | 80     | 75        |
| 30         | ....    | 60       | 50       | 50      | ....     | 55    | 60    | 70  | 80   | 80   | 80     | 75        |
| 31         | 70      | ....     | 45       | 50      | ....     | 55    | ....  | 70  | .... | 80   | 80     | ....      |
| Average .. | ....    | ....     | 53       | 49      | 47       | 51    | 60    | 65  | 74   | 80   | 80     | 78        |

58. OUACHITA RIVER NEAR MALVERN, ARK.—Continued  
*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection     | Mean discharge (second-foot) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|------------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                        |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:                  |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10              | 352                          | 83.8                 | 7.7 | 8.3                        | 0.01      | 0.3           | 9.1          | 1.9            | 5.6         | 7.8           | 36                              | 9.0                        | 3.0           | ...          | 2.5                        | 58               | 28                            | 0             |
| Oct. 11-20             | 414                          | 84.9                 | ... | ...                        | ...       | ...           | 9.1          | 2.1            | ...         | ...           | 39                              | 4.0                        | 4.5           | 0.1          | 3.0                        | 58               | 31                            | 0             |
| Oct. 21-31             | 486                          | 82.8                 | 7.6 | 5.7                        | .07       | .6            | 6.6          | 2.0            | 3.7         | 9.4           | 36                              | 9.9                        | 2.5           | ...          | 2.0                        | 53               | 25                            | 0             |
| Nov. 1-10              | 637                          | 81.0                 | ... | ...                        | ...       | ...           | 8.5          | 2.0            | ...         | ...           | 28                              | 8.3                        | 3.5           | .1           | 3.2                        | 53               | 29                            | 6             |
| Nov. 11-20             | 1,637                        | 78.0                 | ... | ...                        | ...       | ...           | 8.6          | 1.7            | ...         | 2.7           | 28                              | 5.3                        | 2.5           | ...          | 3.0                        | 50               | 28                            | 6             |
| Nov. 21-30             | 1,629                        | 82.5                 | ... | ...                        | ...       | ...           | 3.8          | 1.7            | 11          | ...           | 32                              | 8.9                        | 3.0           | ...          | 2.0                        | 56               | 17                            | 0             |
| Dec. 1-10              | 4,731                        | 82.0                 | ... | ...                        | ...       | ...           | 7.6          | 1.6            | ...         | 6.6           | 30                              | 6.7                        | 4.5           | ...          | 2.5                        | 57               | 26                            | 1             |
| Dec. 11-20             | 5,971                        | 86.9                 | ... | ...                        | ...       | ...           | 7.2          | 1.7            | ...         | 5.4           | 24                              | 4.8                        | 6.5           | ...          | 3.5                        | 68               | 25                            | 5             |
| Dec. 21-31             | 2,132                        | 60.2                 | 7.9 | 6.4                        | .07       | .6            | 6.0          | 1.8            | 6.5         | 1.6           | 24                              | 11                         | 4.0           | .1           | 2.0                        | 45               | 22                            | 3             |
| 1948:                  |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10              | 9,724                        | 53.3                 | ... | ...                        | ...       | ...           | 4.7          | 1.5            | ...         | 4.6           | 14                              | 5.3                        | 6.0           | ...          | 3.0                        | 43               | 18                            | 6             |
| Jan. 11-20             | 2,117                        | 42.0                 | ... | ...                        | ...       | ...           | 1.6          | 1.0            | ...         | 5.1           | 12                              | 4.4                        | 2.5           | ...          | 1.5                        | 37               | 8                             | 0             |
| Jan. 21-31             | 1,656                        | 48.6                 | 7.6 | 6.5                        | .06       | .9            | 4.8          | 1.2            | 3.2         | 1.1           | 18                              | 4.0                        | 3.5           | .1           | 1.5                        | 42               | 17                            | 2             |
| Feb. 1-10              | 2,072                        | 47.8                 | ... | ...                        | ...       | ...           | 3.6          | 2.2            | ...         | 2.5           | 14                              | 6.3                        | 3.0           | ...          | 1.5                        | 43               | 18                            | 7             |
| Feb. 11-20             | 5,085                        | 58.8                 | ... | ...                        | ...       | ...           | 5.0          | 1.4            | ...         | 3.9           | 18                              | 5.8                        | 3.0           | ...          | 2.0                        | 50               | 18                            | 4             |
| Feb. 21-29             | 9,856                        | 65.0                 | 8.0 | 7.8                        | .08       | 1.0           | 5.6          | 1.7            | 12          | ...           | 18                              | 8.0                        | 5.0           | .1           | .8                         | 71               | 21                            | 14            |
| Mar. 1-31              | 5,509                        | 50.0                 | 7.6 | 7.7                        | .06       | .7            | 4.5          | 1.0            | 3.3         | 1.0           | 16                              | 4.1                        | 3.5           | ...          | 1.5                        | 40               | 15                            | 2             |
| Apr. 1-30              | 3,009                        | 57.5                 | 7.5 | 7.9                        | .06       | .2            | 5.6          | 1.5            | 2.2         | 1.4           | 20                              | 4.7                        | 3.0           | .1           | 1.0                        | 45               | 20                            | 0             |
| May 1-10               | 1,069                        | 65.0                 | ... | ...                        | ...       | ...           | 5.9          | 1.6            | ...         | 5.9           | 21                              | 10                         | 4.1           | ...          | 1.0                        | 45               | 21                            | 4             |
| May 11-20              | 3,505                        | 64.0                 | ... | ...                        | ...       | ...           | 5.8          | 1.6            | ...         | 5.9           | 25                              | 5.8                        | 4.6           | ...          | 1.0                        | 46               | 21                            | 1             |
| May 21-31              | 602                          | 66.0                 | ... | ...                        | ...       | ...           | 6.7          | 1.8            | ...         | 4.5           | 25                              | 6.0                        | 4.6           | ...          | .8                         | 48               | 24                            | 4             |
| June 1-10              | 513                          | 70.4                 | ... | ...                        | ...       | ...           | 7.3          | 1.7            | ...         | 5.5           | 27                              | 8.5                        | 3.8           | ...          | 1.2                        | 52               | 25                            | 3             |
| June 11-20             | 771                          | 68.1                 | ... | ...                        | ...       | ...           | 6.9          | 1.6            | ...         | 5.2           | 26                              | 6.3                        | 4.3           | ...          | 1.5                        | 49               | 24                            | 2             |
| June 21, 23, 25-28, 30 | 487                          | 71.4                 | ... | ...                        | ...       | ...           | 7.7          | 1.8            | ...         | 5.3           | 28                              | 8.5                        | 4.0           | ...          | .9                         | 53               | 27                            | 4             |
| June 22, 24, 29        | 371                          | 85.5                 | ... | ...                        | ...       | ...           | 8.8          | 1.6            | ...         | 7.4           | 37                              | 6.9                        | 4.5           | ...          | .9                         | 58               | 29                            | 0             |
| July 1-10              | 393                          | 71.9                 | ... | ...                        | ...       | ...           | 7.5          | 2.0            | ...         | 5.8           | 36                              | 4.7                        | 3.0           | ...          | 1.2                        | 50               | 27                            | 0             |
| July 11-20             | 383                          | 78.9                 | ... | ...                        | ...       | ...           | 8.3          | 2.1            | ...         | 5.2           | 32                              | 8.8                        | 3.2           | ...          | 1.0                        | 57               | 29                            | 3             |
| July 21-31             | 287                          | 82.8                 | ... | ...                        | ...       | ...           | 7.0          | 2.0            | ...         | 6.3           | 30                              | 8.1                        | 3.0           | ...          | 2.5                        | 58               | 26                            | 1             |

— Continued.

## 58. OUACHITA RIVER NEAR MALVERN, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| Aug. 1-10          | 154                          | 97.3                              | ... | ...                        | ...       | ...           | 7.6          | 2.2            | ...         | 6.6           | 34                              | 7.5                        | 4.0           | ...          | 1.4                        | 50               | 28                            | 0             |
| Aug. 11-20         | 401                          | 87.7                              | ... | ...                        | ...       | ...           | 9.0          | 2.4            | ...         | 6.1           | 37                              | 8.9                        | 3.5           | ...          | 1.4                        | 53               | 32                            | 2             |
| Aug. 21-31         | 306                          | 81.8                              | ... | ...                        | ...       | ...           | 7.6          | 2.1            | ...         | 5.1           | 32                              | 5.1                        | 4.0           | ...          | 2.0                        | 48               | 28                            | 1             |
| Sept. 1-10         | 264                          | 75.7                              | ... | ...                        | ...       | ...           | 7.3          | 1.7            | ...         | 5.5           | 32                              | 3.1                        | 4.5           | ...          | 1.8                        | 57               | 25                            | 0             |
| Sept. 11-20        | 189                          | 78.3                              | ... | ...                        | ...       | ...           | 8.1          | 4.0            | ...         | 1.3           | 35                              | 3.3                        | 4.2           | ...          | 1.7                        | 57               | 37                            | 8             |
| Sept. 21-30        | 189                          | 78.0                              | 8.7 | 8.1                        | 0.02      | 0.0           | 8.4          | 2.3            | 3.2         | 1.0           | 36                              | 3.0                        | 3.2           | 0.0          | 1.8                        | 52               | 30                            | 1             |
| Average            | 2,285                        | 71.8                              | ... | ...                        | ...       | ...           | 6.7          | 1.8            | ...         | 5.8           | 27                              | 7.2                        | 3.8           | ...          | 1.8                        | 52               | 24                            | 3             |

<sup>1</sup> K $\times 10^6$  at 25° C.

58. OUACHITA RIVER NEAR MALVERN, ARK.—Continued  
*Temperature (° F.) of Water of Ouachita River, Water Year October 1947 to  
 September 1948*

| Day     | October | November | December | January | February | March | April | May  | June | July | August | September |
|---------|---------|----------|----------|---------|----------|-------|-------|------|------|------|--------|-----------|
| 1       | 75      | 70       | 50       | 50      | 40       | 40    | ....  | .... | 70   | 75   | 75     | 80        |
| 2       | 75      | 70       | 50       | 45      | 48       | 45    | ....  | .... | 70   | 75   | 75     | 75        |
| 3       | 75      | 70       | 55       | 50      | ....     | ....  | ....  | .... | 70   | 75   | 75     | 75        |
| 4       | 75      | 70       | 55       | 50      | 40       | 45    | ....  | .... | 75   | 75   | 75     | 75        |
| 5       | 75      | 70       | 50       | ....    | 40       | 45    | ....  | .... | 75   | 75   | 75     | 75        |
| 6       | 75      | 70       | 50       | ....    | 40       | 45    | ....  | .... | 75   | 75   | 75     | 75        |
| 7       | 70      | 65       | 50       | 50      | 40       | 47    | ....  | .... | 76   | 75   | 75     | 75        |
| 8       | 75      | 65       | 50       | 50      | 40       | 45    | ....  | .... | 75   | 75   | 75     | 75        |
| 9       | 75      | 65       | 50       | ....    | 40       | 40    | ....  | .... | 75   | .... | 70     | 75        |
| 10      | 75      | 65       | 50       | ....    | 40       | 50    | ....  | .... | 80   | 75   | 75     | 75        |
| 11      | 75      | 65       | 50       | 45      | 40       | 50    | ....  | .... | 80   | 75   | 80     | 75        |
| 12      | 75      | 65       | 50       | ....    | 40       | 50    | ....  | .... | 80   | 75   | 80     | 75        |
| 13      | 75      | 65       | 50       | 45      | 40       | 50    | ....  | 70   | 80   | 75   | 80     | 75        |
| 14      | 75      | 65       | 50       | 50      | 40       | 50    | ....  | 70   | 80   | 75   | 80     | 75        |
| 15      | 75      | 60       | 50       | 50      | 40       | 50    | ....  | 70   | 80   | 75   | 80     | 75        |
| 16      | 75      | 60       | 50       | ....    | 40       | 50    | ....  | 70   | .... | 75   | 80     | 75        |
| 17      | 75      | 65       | ....     | 40      | 40       | 50    | ....  | 70   | 80   | 75   | 80     | 75        |
| 18      | 75      | 65       | 50       | 40      | 40       | 60    | ....  | 70   | 70   | 75   | 80     | ....      |
| 19      | 75      | 65       | 50       | 40      | 40       | 40    | ....  | 70   | 75   | 75   | 75     | 75        |
| 20      | 75      | 65       | 50       | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 75     | 75        |
| 21      | 76      | 65       | 45       | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 75     | 75        |
| 22      | 75      | 60       | 45       | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 80     | 75        |
| 23      | 75      | 60       | 45       | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 80     | 75        |
| 24      | 75      | 60       | 45       | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 75     | 75        |
| 25      | 76      | 60       | 50       | 40      | 40       | 50    | ....  | .... | 75   | 75   | 75     | 70        |
| 26      | 76      | 60       | ....     | 40      | 40       | 50    | ....  | 70   | 75   | 75   | 75     | 70        |
| 27      | 70      | 55       | 50       | 40      | 40       | 50    | ....  | 70   | 75   | 80   | 75     | 70        |
| 28      | 70      | 55       | 50       | 40      | 40       | 50    | ....  | .... | 75   | 80   | 75     | 70        |
| 29      | 70      | 55       | 50       | 40      | 40       | 50    | ....  | .... | 75   | 80   | 80     | 70        |
| 30      | 76      | 55       | 50       | 40      | ....     | ....  | ....  | 70   | 75   | 75   | 80     | 70        |
| 31      | 70      | ....     | 50       | 40      | ....     | ....  | ....  | 70   | .... | 75   | 80     | ....      |
| Average | 74      | 64       | 50       | ....    | 40       | 48    | ....  | .... | 75   | 76   | 77     | 74        |

59. Ouachita River at Arkadelphia, Ark.

LOCATION: Water-stage recorder, lat. 34°07'16", long. 93°02'46", on line between secs. 16 and 21, T. 7 S., R. 19 W., at bridge on State Highway 51, at Arkadelphia, Clark County. Datum of gage is 160.301 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 2,311 square miles.

RECORDS AVAILABLE: Discharge, August 1905 to December 1906, April to September 1929 in reports of Geological Survey; October 1929 to September 1938, January 1947 to December 1948, in reports of Corps of Engineers, Vicksburg District; October 1938 to December 1946, in files of Corps of Engineers, Vicksburg District. Chemical quality, see analysis page 178.

MEAN ANNUAL RUNOFF: 20.52 inches or 2,529,000 acre-feet.

AVERAGE DISCHARGE: 20 years (1905-06, 1929-48) 3,493 second-feet.

MAXIMUM: 1905-06, 1929-48: Discharge, 222,000 second-feet Mar. 30, 1945 (gage height, 30.3 feet).

MINIMUM: 1905-06,

1929-48: Day: 62 second-feet (40.0 m.g.d.) Aug. 8, 1937.

7-day: 93.7 second-feet (60.6 m.g.d.) Aug. 13-19, 1937.

Calendar month: 113 second-feet (73.0 m.g.d.) August 1930.

Water year: 1,442 second-feet (932 m.g.d.) Oct. 1, 1935, to Sept. 30, 1936.

REMARKS: Gage-height records collected at same site since September 1913 are contained in reports of U. S. Weather Bureau. Gage-height records January 1914 to December 1931 are in files of Corps of Engineers, Vicksburg District; January 1932 to December 1948 in reports of Corps of Engineers, Vicksburg District; January 1945 to December 1948 in reports of Mississippi River Commission. Gage-height records August 1905 to December 1906 from chain gage on St. Louis & Iron Mountain and Southern Railroad bridge 800 feet downstream; Sept. 6, 1913 to Aug. 9, 1934 from staff and chain gages, Aug. 10, 1934 to May 31, 1946, from wire-weight gage, present site. Datum of gage was lowered 5.00 feet Oct. 18, 1934 by Corps of Engineers, Vicksburg District. Records furnished by Corps of Engineers, Vicksburg District. Bankfull stage, about 17.5 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1906, 1930-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| 1906 | 209-74                        | 33,800              | 340                 | 3,660 | 1.58                  | 21.45   | 2,650,000 |
| 1930 |                               | 60,700              | 108                 | 3,697 | 1.60                  | 21.68   | 2,676,000 |
| 1931 |                               | 30,600              | 100                 | 1,540 | .666                  | 9.04    | 1,115,000 |
| 1932 |                               | 72,100              | 103                 | 4,282 | 1.85                  | 25.23   | 3,108,000 |
| 1933 |                               | 51,400              | 159                 | 2,881 | 1.25                  | 16.93   | 2,085,000 |
| 1934 |                               | 48,500              | 90                  | 1,968 | .852                  | 11.55   | 1,425,000 |
| 1935 |                               | 84,200              | 186                 | 4,746 | 2.05                  | 27.87   | 3,436,000 |
| 1936 |                               | 18,200              | 111                 | 1,442 | .624                  | 8.50    | 1,047,000 |
| 1937 |                               | 76,200              | 62                  | 3,703 | 1.60                  | 21.73   | 2,680,000 |
| 1938 |                               | 112,000             | 104                 | 4,810 | 2.08                  | 28.26   | 3,483,000 |
| 1939 |                               | 104,000             | 140                 | 3,787 | 1.64                  | 22.24   | 2,742,000 |
| 1940 |                               | 19,800              | 215                 | 1,393 | .603                  | 8.21    | 1,012,000 |
| 1941 |                               | 18,800              | 140                 | 2,583 | 1.12                  | 15.17   | 1,870,000 |
| 1942 |                               | 80,300              | 174                 | 4,093 | 1.77                  | 24.03   | 2,963,000 |
| 1943 |                               | 19,900              | 78                  | 2,313 | 1.00                  | 13.59   | 1,675,000 |
| 1944 |                               | 87,000              | 94                  | 3,979 | 1.72                  | 23.43   | 2,889,000 |
| 1945 |                               | 171,000             | 136                 | 6,697 | 2.90                  | 39.34   | 4,848,000 |
| 1946 |                               | 115,000             | 236                 | 6,361 | 2.75                  | 37.36   | 4,605,000 |
| 1947 |                               | 36,000              | 163                 | 2,483 | 1.07                  | 14.56   | 1,797,000 |
| 1948 |                               | 40,600              | 157                 | 3,435 | 1.49                  | 20.23   | 2,493,000 |

*Calendar Year*

|      |        |         |     |       |      |       |           |
|------|--------|---------|-----|-------|------|-------|-----------|
| 1906 | 209-74 | 33,800  | 305 | 3,190 | 1.38 | 18.73 | 2,320,000 |
| 1930 |        | 60,700  | 108 | 3,817 | 1.65 | 22.41 | 2,756,000 |
| 1931 |        | 33,500  | 100 | 1,899 | .822 | 11.16 | 1,375,000 |
| 1932 |        | 72,100  | 162 | 3,627 | 1.57 | 21.37 | 2,633,000 |
| 1933 |        | 50,600  | 159 | 2,891 | 1.25 | 16.98 | 2,093,000 |
| 1934 |        | 48,500  | 90  | 2,099 | .908 | 12.33 | 1,520,000 |
| 1935 |        | 84,200  | 186 | 5,108 | 2.21 | 30.00 | 3,698,000 |
| 1936 |        | 11,600  | 111 | 1,059 | .453 | 6.24  | 768,500   |
| 1937 |        | 76,200  | 62  | 4,031 | 1.74 | 23.66 | 2,918,000 |
| 1938 |        | 112,000 | 104 | 4,429 | 1.92 | 26.02 | 3,207,000 |
| 1939 |        | 104,000 | 140 | 3,537 | 1.53 | 20.75 | 2,561,000 |
| 1940 |        | 19,800  | 215 | 1,936 | .838 | 11.40 | 1,405,000 |
| 1941 |        | 18,600  | 140 | 2,854 | 1.23 | 16.77 | 2,066,000 |
| 1942 |        | 80,300  | 174 | 3,611 | 1.56 | 21.20 | 2,614,000 |
| 1943 |        | 19,900  | 78  | 1,956 | .846 | 11.49 | 1,416,000 |
| 1944 |        | 87,000  | 136 | 4,674 | 2.02 | 27.53 | 3,393,000 |
| 1945 |        | 171,000 | 190 | 6,548 | 2.83 | 38.46 | 4,740,000 |
| 1946 |        | 115,000 | 228 | 6,771 | 2.93 | 39.76 | 4,902,000 |
| 1947 |        | 22,400  | 163 | 2,117 | .916 | 12.42 | 1,532,000 |
| 1948 |        | 40,600  | 157 | 3,136 | 1.36 | 18.48 | 2,277,000 |

### 60. Ouachita River at Camden, Ark.

**LOCATION:** Water-stage recorder, lat. 33°35'49", long. 92°49'12", in SE¼ sec. 14, T. 13 S., R. 17 W., at bridge on U. S. Highway 79, half a mile northeast of Camden, Ouachita County, 0.4 mile downstream from St. Louis & Southwestern Railroad bridge. Datum of gage is 71.692 feet above mean sea level, datum of 1929, supplementary adjustment of 1941. Auxiliary staff gage at Cold Springs Bar, 6 miles upstream. Datum of auxiliary gage is 76.64 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 5,390 square miles.

**RECORDS AVAILABLE:** Discharge, August 1928 to September 1929 in reports of Geological Survey; October 1929 to September 1938 (August 1930, February, April, and May 1934 incomplete), January 1947 to December 1948, in reports of Corps of Engineers, Vicksburg District; October 1938 to December 1946 in files of Corps of Engineers, Vicksburg District. Chemical analyses and water temperatures, October 1946 to September 1948.

**MEAN ANNUAL RUNOFF:** 19.32 inches or 5,554,000 acre-feet.

**AVERAGE DISCHARGE:** 18 years (1928-29, 1930-33, 1934-48) 7,672 second-feet.

**MAXIMUM:** 1928-29, 1930-33, 1934-48: Discharge, 243,000 second-feet Apr. 3, 1945 (gage height, 44.82 feet).

Maximum stage known, 46.0 feet, May 12, 1882.

**MINIMUM:** 1928-29, 1930-33,

1934-48: Day: 97 second-feet (62.7 m.g.d.) Aug. 4, 1930.

7-day: 171 second-feet (111 m.g.d.) Aug. 30 to Sept. 5, 1929.

Calendar month: 217 second-feet (140 m.g.d.) August 1929.

Water year: 2,884 second-feet (1,860 m.g.d.) Oct. 1, 1930, to Sept. 30, 1931.

**REMARKS:** Gage-height records collected in same vicinity since December 1885 are contained in reports of U. S. Weather Bureau. Gage-height records August 1890 to December 1931 are in files of Corps of Engineers, Vicksburg District; January 1932 to December 1948 in reports of Corps of Engineers, Vicksburg District; January 1927 to December 1948 in reports of Mississippi River Commission. Low-water control for base gage is Lock & Dam No. 8, 50 miles downstream. Discharge for periods of low flow computed on basis of records at auxiliary gage. Records furnished by Corps of Engineers, Vicksburg District. Bankfull stage, about 30 feet.

#### SUMMARY OF YEARLY DISCHARGE IN SECOND-FEET, 1929, 1931-33, 1935-48

*Water Year Ending September 30*

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Per<br>square<br>mile | Run-off |           |
|------------|-------------------------------|---------------------|---------------------|--------|-----------------------|---------|-----------|
|            |                               |                     |                     |        |                       | Inches  | Acre-feet |
| 1929 ..... | 687-81                        | 61,600              | 160                 | 6,240  | 1.16                  | 15.75   | 4,520,000 |
| 1931 ..... |                               | 13,800              | 220                 | 2,884  | .535                  | 7.26    | 2,088,000 |
| 1932 ..... |                               | 95,500              | 188                 | 10,340 | 1.92                  | 26.13   | 7,429,000 |
| 1933 ..... |                               | 36,200              | 200                 | 4,862  | .902                  | 12.24   | 3,520,000 |
| 1935 ..... |                               | 122,000             | 305                 | 9,941  | 1.84                  | 24.98   | 7,197,000 |
| 1936 ..... |                               | 22,500              | 240                 | 2,292  | .425                  | 5.78    | 1,664,000 |
| 1937 ..... |                               | 151,000             | 285                 | 7,620  | 1.41                  | 19.20   | 5,517,000 |
| 1938 ..... |                               | 148,000             | 330                 | 11,200 | 2.08                  | 28.13   | 8,085,000 |
| 1939 ..... |                               | 101,000             | 330                 | 8,812  | 1.63                  | 22.19   | 6,380,000 |
| 1940 ..... |                               | 24,300              | 345                 | 3,169  | .588                  | 8.01    | 2,301,000 |
| 1941 ..... |                               | 37,400              | 315                 | 6,685  | 1.24                  | 16.82   | 4,839,000 |
| 1942 ..... |                               | 123,000             | 440                 | 8,259  | 1.53                  | 20.80   | 5,980,000 |
| 1943 ..... |                               | 38,300              | 125                 | 4,236  | .786                  | 10.66   | 3,067,000 |

— Continued.

SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929, 1931-33, 1935-48  
—(Continued)

| Year       | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean   | Per<br>square<br>mile | Run-off |            |
|------------|-------------------------------|---------------------|---------------------|--------|-----------------------|---------|------------|
|            |                               |                     |                     |        |                       | Inches  | Acre-feet  |
| 1944 ..... | .....                         | 139,000             | 158                 | 7,689  | 1.43                  | 19.44   | 5,582,000  |
| 1945 ..... | .....                         | 238,000             | 292                 | 15,440 | 2.86                  | 38.91   | 11,186,000 |
| 1946 ..... | .....                         | 89,900              | 460                 | 14,280 | 2.65                  | 35.97   | 10,340,000 |
| 1947 ..... | .....                         | 33,500              | 188                 | 6,082  | 1.13                  | 15.32   | 4,403,000  |
| 1948 ..... | .....                         | 57,000              | 155                 | 8,056  | 1.49                  | 20.35   | 5,848,000  |

| <i>Calendar Year</i> |        |         |     |        |      |       |            |
|----------------------|--------|---------|-----|--------|------|-------|------------|
| 1929 .....           | 687-81 | 38,400  | 160 | 5,460  | 1.01 | 13.71 | 3,950,000  |
| 1931 .....           | .....  | 50,500  | 188 | 3,958  | .734 | 9.96  | 2,865,000  |
| 1932 .....           | .....  | 95,500  | 200 | 8,460  | 1.57 | 21.37 | 6,141,000  |
| 1933 .....           | .....  | 36,200  | 297 | 5,074  | .941 | 12.77 | 3,674,000  |
| 1935 .....           | .....  | 122,000 | 330 | 10,850 | 1.96 | 26.61 | 7,658,000  |
| 1936 .....           | .....  | 16,600  | 240 | 1,579  | .293 | 3.98  | 1,145,000  |
| 1937 .....           | .....  | 151,000 | 285 | 8,496  | 1.58 | 21.40 | 6,149,000  |
| 1938 .....           | .....  | 148,000 | 330 | 10,200 | 1.89 | 25.68 | 7,381,000  |
| 1939 .....           | .....  | 101,000 | 330 | 8,505  | 1.58 | 21.43 | 6,158,000  |
| 1940 .....           | .....  | 24,300  | 360 | 4,361  | .809 | 11.01 | 3,166,000  |
| 1941 .....           | .....  | 37,400  | 315 | 6,586  | 1.22 | 16.57 | 4,768,000  |
| 1942 .....           | .....  | 123,000 | 440 | 7,520  | 1.40 | 18.94 | 5,444,000  |
| 1943 .....           | .....  | 38,300  | 125 | 3,863  | .717 | 9.72  | 2,797,000  |
| 1944 .....           | .....  | 139,000 | 292 | 8,774  | 1.63 | 22.13 | 6,352,000  |
| 1945 .....           | .....  | 238,000 | 600 | 15,510 | 2.88 | 39.07 | 11,240,000 |
| 1946 .....           | .....  | 89,900  | 320 | 15,010 | 2.78 | 37.80 | 10,860,000 |
| 1947 .....           | .....  | 30,300  | 188 | 5,709  | 1.06 | 14.38 | 4,133,000  |
| 1948 .....           | .....  | 57,000  | 155 | 7,003  | 1.30 | 17.69 | 5,084,000  |



## 60. OUACHITA RIVER AT CAMDEN, ARK.

Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1946:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 390                          | 14.5                 | 7.2 | 7.7                        | 0.10      | 0.7           | 8.0          | 1.7            | 17          | 1.6           | 28                              | 5.8                        | 25            | 0.3          | 0.8                        | 86               | 27                            | 4             |
| Oct. 11-20         | 524                          | 12.9                 | 7.1 | 7.3                        | .08       | .6            | 7.2          | 1.6            | 16          | 1.5           | 30                              | 6.2                        | 20            | .2           | 1.0                        | 79               | 25                            | 0             |
| Oct. 25-27, 30-31  | 1,013                        | 28.7                 | 7.1 | 6.6                        | .12       | .5            | 10           | 2.6            | 44          | 2.5           | 30                              | 6.7                        | 72            | .2           | 1.5                        | 183              | 36                            | 11            |
| Oct. 21-24, 28-29  | 922                          | 17.1                 | 7.0 | 6.4                        | .08       | .8            | 8.0          | 1.7            | 22          | 1.8           | 28                              | 6.3                        | 82            | .2           | 1.8                        | 103              | 27                            | 4             |
| Nov. 1-5, 8        | 3,540                        | 15.5                 | 5.8 | 6.8                        | .18       | .4            | 7.4          | 1.9            | 6.7         | 3.7           | 3                               | 7.3                        | 24            | .3           | 1.2                        | 91               | 26                            | 24            |
| Nov. 6-7, 9-10     | 13,150                       | 7.53                 | 7.2 | 9.8                        | .22       | .5            | 6.4          | 1.3            | 7.2         | 3.2           | 26                              | 6.1                        | 8.5           | .2           | 1.0                        | 74               | 21                            | 0             |
| Nov. 11-20         | 23,650                       | 7.22                 | 7.2 | 7.8                        | .12       | .9            | 6.4          | 1.2            | 5.3         | 2.0           | 22                              | 4.7                        | 7.5           | .2           | 1.0                        | 58               | 21                            | 3             |
| Nov. 21-30         | 7,563                        | 8.10                 | 6.9 | 9.5                        | .20       | 1.5           | 6.8          | 1.4            | 5.8         | 2.3           | 22                              | 5.6                        | 9.5           | .1           | 1.0                        | 67               | 23                            | 5             |
| Dec. 1-12          | 5,246                        | 9.10                 | 7.8 | 10                         | .33       | 1.7           | 6.9          | 1.4            | 8.9         | 1.0           | 25                              | 5.8                        | 11            | .2           | 1.2                        | 72               | 23                            | 2             |
| Dec. 13-31         | 14,100                       | 6.90                 | 7.8 | 8.3                        | .38       | 1.6           | 5.1          | 1.3            | 7.8         | 1.0           | 25                              | 5.0                        | 6.5           | .3           | .8                         | 58               | 18                            | 0             |
| 1947:              |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 8,785                        | 7.64                 | 7.6 | 8.5                        | .36       | 1.7           | 5.5          | 1.3            | 7.4         | 1.4           | 20                              | 5.8                        | 9.5           | .1           | 1.0                        | 63               | 19                            | 3             |
| Jan. 11-20         | 6,067                        | 8.40                 | 7.5 | 9.7                        | .31       | 1.6           | 5.8          | 1.4            | 8.2         | .8            | 20                              | 6.0                        | 11            | .2           | .5                         | 63               | 20                            | 4             |
| Jan. 21-31         | 7,932                        | 7.44                 | 7.4 | 11                         | .43       | 2.0           | 5.2          | 1.3            | 9.5         | 1.0           | 20                              | 6.8                        | 11            | .2           | 1.0                        | 67               | 18                            | 2             |
| Feb. 1-10          | 3,430                        | 10.1                 | 7.1 | 11                         | .34       | 1.1           | 6.3          | 1.4            | 12          | 1.2           | 24                              | 6.8                        | 15            | .4           | .8                         | 72               | 21                            | 2             |
| Feb. 11-20         | 2,888                        | 11.6                 | 7.1 | 11                         | .39       | .8            | 7.8          | 1.5            | 13          | 1.5           | 25                              | 6.7                        | 19            | .3           | .5                         | 76               | 26                            | 5             |
| Feb. 21-28         | 3,851                        | 12.7                 | 7.3 | 11                         | .36       | 1.3           | 6.7          | 1.4            | 15          | 1.2           | 23                              | 7.4                        | 21            | .3           | .5                         | 83               | 22                            | 4             |
| Mar. 1-10          | 10,520                       | 12.9                 | 7.1 | 9.0                        | .20       | 1.1           | 7.0          | 1.4            | 13          | 2.4           | 20                              | 7.4                        | 20            | .1           | 2.5                        | 85               | 23                            | 7             |
| Mar. 11-20         | 10,520                       | 8.28                 | 7.2 | 12                         | .36       | 2.4           | 6.0          | 1.2            | 6.6         | 3.2           | 18                              | 7.0                        | 10            | .1           | 2.5                        | 76               | 20                            | 5             |
| Mar. 21-31         | 11,520                       | 6.82                 | 7.1 | 9.6                        | .09       | 2.0           | 5.3          | 1.3            | 5.4         | 2.1           | 20                              | 5.8                        | 6.8           | .1           | .8                         | 62               | 19                            | 2             |
| Apr. 1-10          | 5,030                        | 10.0                 | 7.0 | 9.5                        | .60       | .4            | 5.0          | 1.5            | 11          | 1.1           | 22                              | 5.8                        | 13            | .1           | 2.8                        | 69               | 19                            | 1             |
| Apr. 11-20         | 13,210                       | 7.16                 | 6.7 | 7.6                        | 1.00      | .7            | 6.4          | 1.2            | 5.3         | 1.2           | 18                              | 4.9                        | 8.2           | .1           | 2.8                        | 63               | 21                            | 6             |
| Apr. 21-30         | 5,241                        | 7.78                 | 7.2 | 9.3                        | 1.80      | .3            | 7.0          | 1.3            | 7.1         | 1.2           | 23                              | 5.0                        | 9.8           | .0           | 2.5                        | 68               | 23                            | 4             |
| May 1-10           | 19,900                       | 6.60                 | 7.1 | 10                         | 1.40      | 2.0           | 6.4          | 1.5            | 3.4         | 2.5           | 22                              | 4.9                        | 5.0           | .0           | 3.2                        | 66               | 22                            | 4             |
| May 11-20          | 18,720                       | 7.00                 | 7.0 | 12                         | 1.80      | 2.3           | 7.1          | 1.2            | 2.4         | 2.0           | 26                              | 3.9                        | 6.0           | .1           | 1.8                        | 72               | 23                            | 1             |
| May 21-31          | 13,210                       | 8.14                 | 6.9 | 10                         | 1.80      | .8            | 7.8          | 1.3            | 7.0         | 1.9           | 29                              | 5.1                        | 7.8           | .1           | 1.8                        | 69               | 25                            | 1             |
| June 1-10          | 2,849                        | 11.0                 | 7.8 | 11                         | .38       | .8            | 8.0          | 1.6            | 10          | 1.4           | 26                              | 5.6                        | 15            | .3           | 3.0                        | 77               | 27                            | 5             |
| June 11-20         | 951                          | 10.6                 | 8.2 | 9.6                        | .25       | .7            | 5.6          | 1.9            | 13          | 1.6           | 28                              | 6.7                        | 14            | .2           | 1.5                        | 72               | 22                            | 0             |
| June 21-30         | 2,472                        | 10.3                 | 7.9 | 12                         | .88       | 2.2           | 7.8          | 1.3            | 11          | 2.1           | 28                              | 6.4                        | 14            | .1           | 2.2                        | 81               | 25                            | 2             |

— Continued.

## 60. OUACHITA RIVER AT CAMDEN, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection       | Mean discharge (second-foot) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                          |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| July 1-10 .....          | 598                          | 16.6                              | 7.9 | 12                         | 0.75      | 0.5           | 10           | 2.4            | 19          | 2.5           | 32                              | 8.6                        | 30            | 0.3          | 2.0                        | 112                           | 35            |
| July 11-20 .....         | 594                          | 12.4                              | 7.9 | 9.2                        | .06       | .3            | 8.0          | 2.9            | 12          | 1.3           | 35                              | 7.2                        | 16            | .2           | 1.5                        | 82                            | 32            |
| July 21-31 .....         | 339                          | 9.76                              | 7.9 | 9.6                        | .04       | .2            | 8.4          | 1.9            | 9.0         | 1.6           | 35                              | 6.4                        | 9.0           | .3           | 1.8                        | 65                            | 28            |
| Aug. 1-10 .....          | 527                          | 11.9                              | 7.7 | 11                         | .01       | .6            | 8.6          | 3.2            | 6.5         | 3.2           | 35                              | 5.3                        | 12            | .1           | 1.8                        | 76                            | 35            |
| Aug. 11-20 .....         | 334                          | 10.1                              | 7.6 | 11                         | .02       | .6            | 7.7          | 3.5            | 4.5         | 3.0           | 33                              | 5.3                        | 8.8           | .1           | 2.5                        | 68                            | 34            |
| Aug. 21-31 .....         | 717                          | 10.1                              | 7.6 | 10                         | .02       | .2            | 7.8          | 3.1            | 5.0         | 3.5           | 31                              | 4.9                        | 10            | .0           | 3.8                        | 69                            | 32            |
| Sept. 1-10 .....         | 2,389                        | 12.1                              | 7.4 | 11                         | .16       | .5            | 11           | 2.5            | 12          | 6.2           | 34                              | 6.4                        | 11            | .0           | 1.5                        | 86                            | 10            |
| Sept. 11-18 .....        | 723                          | 12.0                              | 7.6 | 12                         | .08       | .4            | 7.5          | 2.5            | 12          | 3.2           | 35                              | 5.5                        | 16            | .0           | 2.0                        | 81                            | 29            |
| Sept. 19-21, 26 .....    | 834                          | 28.3                              | 7.5 | ....                       | ....      | ....          | 13           | 3.1            | 87          | ....          | 31                              | 7.7                        | 64            | .0           | 1.5                        | 172                           | 45            |
| Sept. 22-25, 27-30 ..... | 816                          | 17.0                              | 7.5 | 11                         | .14       | .7            | 9.2          | 3.1            | 16          | 3.2           | 29                              | 6.1                        | 31            | .0           | 1.8                        | 102                           | 36            |
| Average .....            | 6,081                        | 11.4                              | 7.3 | 9.8                        | 0.43      | 1.0           | 7.3          | 1.8            | 11          | 2.0           | 26                              | 6.1                        | 17            | 0.1          | 1.7                        | 81                            | 26            |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## 60. OUACHITA RIVER AT CAMDEN, ARK.—Continued

*Temperature (° F.) of Water of Ouachita River, Water Year October 1946 to September 1947*

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

## 60. OUACHITA RIVER AT CAMDEN, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|-----------------------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 451                          | 139                               | 7.5 | 10                         | 0.11      | 1.4           | 7.5          | 3.0            | 12          | 3.0           | 29                              | 7.0                        | 21            | 0.0          | 1.2                        | 86               | 31                            | 7             |
| Oct. 11-20         | 603                          | 136                               | 7.2 | 7.8                        | .04       | .6            | 8.6          | 3.3            | 11          | 2.3           | 33                              | 6.0                        | 20            | .0           | 1.5                        | 83               | 35                            | 8             |
| Oct. 21-31         | 1,486                        | 139                               | 7.4 | 8.7                        | .11       | .8            | 9.4          | 2.9            | 12          | 2.3           | 34                              | 5.6                        | 20            | .0           | 1.8                        | 90               | 35                            | 8             |
| Nov. 1-10          | 3,537                        | 113                               | 7.3 | 14                         | .08       | 2.8           | 6.4          | .8             | 17          | 2.0           | 35                              | 6.0                        | 16            | .1           | 1.0                        | 93               | 19                            | 0             |
| Nov. 11-20         | 7,229                        | 104                               | 7.7 | 10                         | .20       | 1.5           | 7.8          | .8             | 12          | 2.2           | 26                              | 7.6                        | 14            | .1           | 2.2                        | 75               | 22                            | 1             |
| Nov. 21-30         | 9,147                        | 92.6                              | 7.1 | 7.5                        | .18       | 2.3           | 6.4          | 1.0            | 5.1         | 3.7           | 24                              | 8.4                        | 4.5           | .0           | 1.5                        | 68               | 20                            | 0             |
| Dec. 1-10          | 6,917                        | 104                               | 8.2 | 9.9                        | .10       | 1.2           | 8.6          | 1.5            | 7.7         | 2.7           | 29                              | 6.5                        | 12            | .0           | .5                         | 73               | 28                            | 4             |
| Dec. 11-20         | 20,090                       | 78.8                              | 7.4 | 7.6                        | .11       | 1.8           | 6.6          | 1.4            | 5.1         | 2.3           | 22                              | 5.3                        | 8.0           | .2           | 1.0                        | 60               | 22                            | 4             |
| Dec. 21-31         | 9,482                        | 85.6                              | 8.3 | 9.3                        | .10       | 1.0           | 6.7          | 1.4            | 6.3         | 2.2           | 21                              | 5.6                        | 10            | .2           | 1.5                        | 61               | 22                            | 5             |
| 1948:              |                              |                                   |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 22,840                       | 64.5                              | 8.5 | 1.4                        | .04       | 1.8           | 5.7          | 1.5            | 4.7         | 2.2           | 21                              | 4.9                        | 6.8           | .1           | 1.5                        | 60               | 20                            | 3             |
| Jan. 11-20         | 5,509                        | 79.6                              | 8.0 | 11                         | .12       | 1.3           | 5.9          | 1.3            | 8.4         | 2.1           | 21                              | 6.3                        | 11            | .2           | 1.5                        | 61               | 20                            | 3             |
| Jan. 21-31         | 5,338                        | 91.2                              | 7.6 | 12                         | .12       | 1.2           | 6.3          | 1.5            | 9.0         | 2.8           | 22                              | 5.9                        | 14            | .1           | 1.0                        | 69               | 22                            | 4             |
| Feb. 1-10          | 11,930                       | 81.2                              | 8.0 | 11                         | .16       | 1.6           | 6.6          | 1.1            | 5.9         | 2.5           | 18                              | 6.7                        | 9.8           | .2           | 1.0                        | 66               | 21                            | 6             |
| Feb. 11-20         | 29,630                       | 60.3                              | 7.9 | 8.7                        | .12       | 1.9           | 4.5          | 1.1            | 4.0         | 2.1           | 16                              | 5.8                        | 5.2           | .1           | .5                         | 52               | 16                            | 3             |
| Feb. 21-29         | 17,140                       | 62.0                              | 7.7 | 9.4                        | .14       | 1.5           | 5.6          | 1.2            | 5.1         | 2.3           | 20                              | 5.6                        | 6.8           | .1           | 1.0                        | 56               | 19                            | 2             |
| Mar. 1-10          | 43,070                       | 53.8                              | 7.3 | 10                         | .12       | 1.3           | 5.0          | 1.3            | 4.1         | .5            | 12                              | 10                         | 4.0           | .1           | 1.5                        | 54               | 18                            | 8             |
| Mar. 11-20         | 12,220                       | 66.4                              | 7.3 | 11                         | .12       | 1.3           | 5.4          | 1.8            | 3.7         | 1.5           | 16                              | 5.5                        | 7.5           | .1           | 1.5                        | 58               | 21                            | 8             |
| Mar. 21-31         | 27,270                       | 45.2                              | 7.6 | 11                         | .20       | .6            | 4.8          | 1.5            | 4.1         | .9            | 18                              | 5.1                        | 5.5           | .1           | 1.5                        | 54               | 19                            | 3             |
| Apr. 1-10          | 8,279                        | 74.5                              | 7.1 | 11                         | .12       | .6            | 5.7          | 1.4            | 5.2         | 1.2           | 18                              | 4.8                        | 8.0           | .1           | 2.0                        | 60               | 20                            | 5             |
| Apr. 11-20         | 11,830                       | 75.6                              | 6.8 | 10                         | .18       | .8            | 5.8          | 1.4            | 5.0         | 2.4           | 14                              | 8.3                        | 9.0           | .2           | 1.0                        | 58               | 20                            | 9             |
| Apr. 21-30         | 5,650                        | 83.6                              | 7.2 | 11                         | .18       | .7            | 6.5          | 1.6            | 7.1         | 1.2           | 22                              | 4.8                        | 11            | .1           | 1.2                        | 65               | 23                            | 5             |
| May 1-10           | 5,461                        | 91.8                              | 7.1 | 13                         | .20       | 1.5           | 7.7          | 1.4            | 6.9         | 1.6           | 24                              | 5.8                        | 11            | .0           | 1.1                        | 77               | 25                            | 5             |
| May 11-20          | 14,920                       | 75.6                              | 7.2 | 11                         | .09       | 1.5           | 7.0          | 1.2            | 4.7         | 2.7           | 20                              | 6.3                        | 8.0           | .1           | 2.0                        | 71               | 22                            | 6             |
| May 21-31          | 3,269                        | 108                               | 7.2 | 10                         | .38       | .2            | 6.4          | 1.7            | 11          | 1.7           | 22                              | 7.1                        | 16            | .0           | 2.2                        | 81               | 23                            | 5             |
| June 1-10          | 1,377                        | 136                               | 7.3 | 7.8                        | .20       | .0            | 8.0          | 1.9            | 16          | 1.6           | 26                              | 6.4                        | 26            | .0           | 1.0                        | 87               | 28                            | 6             |
| June 11-20         | 1,312                        | 103                               | 7.3 | 9.0                        | .09       | .0            | 8.0          | 1.8            | 10          | 1.5           | 26                              | 6.1                        | 16            | .0           | 1.0                        | 68               | 27                            | 6             |
| June 21-30         | 589                          | 101                               | 7.3 | 8.0                        | .04       | .8            | 7.9          | 1.8            | 6.3         | 2.4           | 24                              | 6.1                        | 12            | .1           | 1.0                        | 60               | 27                            | 7             |

—Continued.

## 60. OUACHITA RIVER AT CAMDEN, ARK.—Continued

Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH  | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-----|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |     |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| July 1-13          | 502                          | 115                  | 7.3 | 9.5                        | 0.05      | 0.5           | 8.6          | 1.5            | 14          | 0.8           | 30                              | 7.2                        | 18            | 0.1          | 0.9                        | 76               | 28                            | 3             |
| July 14-31         | 678                          | 118                  | 7.4 | 8.5                        | .06       | .4            | 7.6          | 1.7            | 13          | 1.5           | 28                              | 6.6                        | 18            | .0           | 1.2                        | 77               | 26                            | 3             |
| Aug. 1-10          | 320                          | 127                  | 8.1 | 5.8                        | .02       | .6            | 7.2          | 2.3            | 16          | 1.4           | 36                              | 9.7                        | 16            | .1           | 1.5                        | 78               | 27                            | 0             |
| Aug. 11-15         | 2,186                        | 152                  | 7.8 | 8.6                        | .21       | .9            | 6.4          | 2.4            | 20          | 2.5           | 32                              | 9.3                        | 25            | .1           | .5                         | 94               | 26                            | 0             |
| Aug. 16-20         | 844                          | 106                  | 7.8 | 8.0                        | .37       | .9            | 7.2          | 2.3            | 14          | 1.8           | 34                              | 12                         | 13            | .1           | 1.0                        | 77               | 27                            | 0             |
| Aug. 21, 23, 29-31 | 475                          | 114                  | 7.8 | 6.4                        | .32       | .7            | 8.0          | 2.6            | 11          | 1.8           | 30                              | 10                         | 15            | .1           | .5                         | 72               | 31                            | 6             |
| Aug. 22, 24-28     | 610                          | 142                  | 7.7 | 5.6                        | .27       | .6            | 8.4          | 2.4            | 14          | 1.7           | 28                              | 8.0                        | 22            | .1           | 1.0                        | 82               | 31                            | 8             |
| Sept. 1-10         | 364                          | 110                  | 7.9 | 10                         | .06       | .5            | 6.8          | 2.0            | 7.9         | .6            | 34                              | 6.7                        | 15            | .1           | .8                         | 72               | 25                            | 0             |
| Sept. 11-20        | 312                          | 119                  | 7.9 | 8.8                        | .04       | .4            | 7.0          | 2.0            | 8.1         | .6            | 30                              | 7.5                        | 17            | .1           | 1.2                        | 74               | 26                            | 1             |
| Sept. 21-30        | 316                          | 119                  | 8.0 | 9.0                        | .05       | .4            | 7.4          | 1.7            | 10          | 1.4           | 34                              | 9.4                        | 17            | .1           | .7                         | 75               | 25                            | 0             |
| Average            | 8,056                        | 99.1                 | 7.6 | 9.2                        | 0.14      | 1.0           | 6.9          | 1.7            | 9.1         | 1.9           | 25                              | 6.9                        | 13            | 0.1          | 1.2                        | 71               | 24                            | 4             |

<sup>1</sup> K × 10<sup>6</sup> at 25° C.

## 60. OUACHITA RIVER AT CAMDEN, ARK.—Continued

*Temperature (° F.) of Water of Ouachita River, Water Year October 1947 to September 1948*

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

## 61. Caddo River at Runyan Bridge, Ark.

LOCATION: Water-stage recorder, lat. 34°16', long. 93°22', in SE¼ sec. 28, T. 5 S., R. 22 W., at Runyan Bridge on road between Alpine and Bismarck, 2½ miles northeast of Alpine, Clark County, and 33.8 miles above mouth. Datum of gage is 394.85 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 312 square miles.

RECORDS AVAILABLE: Discharge, October 1938 to September 1941, June 1946 to December 1946 in files of Corps of Engineers, Vicksburg District, January 1947 to December 1948 in reports of Corps of Engineers, Vicksburg District.

MEAN ANNUAL RUNOFF: 18.75 inches or 312,000 acre-feet.

AVERAGE DISCHARGE: 5 years (1938-41, 1946-48) 431 second-feet.

MAXIMUM: 1938-41, 1946-48: Discharge, 64,200 second-feet Mar. 30, 1945 (gage height 30.16 feet).

Maximum stage known, that of Mar. 30, 1945.

MINIMUM: 1938-41,

1946-48: Day: 12 second-feet (7.6 m.g.d.) Sept. 28, 29, 1939.

7-day: 17.7 second-feet (11.4 m.g.d.) Sept. 22-28, 1939.

Calendar month: 22.1 second-feet (14.3 m.g.d.) September 1939.

Water year: 254 second-feet (164 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Jan. 29, 1947, staff gage at same site and datum. Gage-height records September 1938 to December 1942, June 1946 to December 1948, are contained in reports of Corps of Engineers, Vicksburg District. Records furnished by Corps of Engineers, Vicksburg District.

### SUMMARY OF YEARLY DISCHARGE IN SECOND-FEET, 1939-41, 1947-48

*Water Year Ending September 30*

| Year       | Maximum<br>day | Minimum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------------|----------------|----------------|------|-----------------------|---------|-----------|
|            |                |                |      |                       | Inches  | Acre-feet |
| 1939 ..... | 21,400         | 12             | 493  | 1.58                  | 21.45   | 357,000   |
| 1940 ..... | 4,940          | 13             | 254  | .814                  | 11.08   | 184,400   |
| 1941 ..... | 19,700         | 18             | 445  | 1.43                  | 19.36   | 322,000   |
| 1947 ..... | 8,680          | 16             | 435  | 1.39                  | 18.90   | 314,600   |
| 1948 ..... | 9,400          | 24             | 529  | 1.70                  | 23.10   | 384,400   |

### *Calendar Year*

|            |        |       |       |       |       |         |
|------------|--------|-------|-------|-------|-------|---------|
| 1939 ..... | 21,400 | 12    | 466   | 1.49  | 20.25 | 337,100 |
| 1940 ..... | 19,700 | 13    | 384   | 1.23  | 16.77 | 278,900 |
| 1941 ..... | .....  | ..... | ..... | ..... | ..... | .....   |
| 1947 ..... | 6,510  | 16    | 356   | 1.14  | 15.48 | 257,600 |
| 1948 ..... | 9,400  | 24    | 452   | 1.45  | 19.73 | 328,000 |

## 62. Little Missouri River at Narrows Dam Site Near Murfreesboro, Ark.

LOCATION: Staff gage, lat. 34°08'51", long. 93°43'04", in SW¼ sec. 7, T. 7 S., R. 25 W., 6.5 miles northwest of Murfreesboro, Pike County, 105.5 miles above mouth. Datum of gage is 400.81 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 237 square miles.

RECORDS AVAILABLE: Discharge, March 1943 to December 1946 (except Mar. 30 to Apr. 2, 1945 when gage washed out) in files of Corps of Engineers, Vicksburg District, January 1947 to December 1948 in reports of Corps of Engineers, Vicksburg District.

MAXIMUM: 1943-48: Discharge, 53,700 second-feet Mar. 30, 1945 (gage height, 29.99 feet, from high-water mark).

MINIMUM: 1943-48: Day: 4.8 second-feet (3.10 m.g.d.) Aug. 5, 1948.

7-day: 6.40 second-feet 4.14 m.g.d.) Aug 1-7, 1948.

Calendar month: 9.94 second-feet (6.42 m.g.d.) August 1943.

Water year: 310 second-feet (200 m.g.d.) Oct. 1, 1946, to Sept. 30, 1947.

REMARKS: Gage-height records Jan. 13 to Apr. 6, May 9 to July 6, Aug. 12, 1940 to Nov. 3, 1942 from staff gage; Mar. 19, 1943 to June 17, 1947 from water-stage recorder; June 18 to Dec. 31, 1948 from staff gage, in reports of Corps of Engineers, Vicksburg District. Auxiliary water-stage recorder installed 2,700 feet downstream June 18, 1947. All gages set to the same datum. Records furnished by Corps of Engineers, Vicksburg District.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1944-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|------|-----------------------|---------|-----------|
|      |                |                |      |                       | Inches  | Acre-feet |
| 1944 | 14,200         | 55             | 485  | 2.05                  | 27.80   | 352,000   |
| 1946 | 12,000         | 7.3            | 545  | 2.30                  | 31.22   | 394,700   |
| 1947 | 5,290          | 10             | 310  | 1.31                  | 17.77   | 224,400   |
| 1948 | 5,710          | 4.8            | 459  | 1.94                  | 26.39   | 333,500   |

| <i>Calendar Year</i> |        |     |     |      |       |         |
|----------------------|--------|-----|-----|------|-------|---------|
| 1944                 | 14,200 | 5.5 | 567 | 2.39 | 32.50 | 411,500 |
| 1946                 | 12,000 | 7.3 | 617 | 2.60 | 35.35 | 446,900 |
| 1947                 | 5,290  | 10  | 341 | 1.44 | 19.57 | 247,200 |
| 1948                 | 5,710  | 4.8 | 356 | 1.50 | 20.43 | 258,200 |

## 63. Little Missouri River Near Murfreesboro, Ark.

LOCATION: Water-stage recorder, lat. 34°03', long. 93°43', in SE¼ sec. 13, T. 8 S., R. 26 W., 2 miles southwest of Murfreesboro, Pike County, and 4 miles upstream from Prairie Creek. Datum of gage is 324.28 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 380 square miles.

RECORDS AVAILABLE: Discharge, October 1927 to September 1931, July 1937 to September 1948. Chemical quality, see analysis page 178.

MEAN ANNUAL RUNOFF: 22.50 inches or 456,100 acre-feet.

AVERAGE DISCHARGE: 14 years, (1927-31, 1937-48), 630 second-feet.

MAXIMUM 1927-31, 1937-48: Discharge, 120,000 second-feet Mar. 30, 1945 (gage height, 19.84 feet), by contracted-opening method.

Maximum stage known, about 21 feet in April 1927, from information by Arkansas State Highway Department.

MINIMUM: 1927-31,

1937-48: Day: 3 second-feet (1.9 m.g.d.) Sept. 27-30, 1931.

7-day: 3.4 second-feet (2.2 m.g.d.) Sept. 24-30, 1931;  
Aug. 26 to Sept. 1, 1943.

Calendar month: 6.20 second-feet (4.0 m.g.d.) September 1939.

Water year: 303 second-feet (196 m.g.d.) Oct. 1, 1930, to Sept. 30, 1931.

REMARKS: Prior to Nov. 11, 1938, wire-weight gage at same site and datum. Bankfull stage, about 17 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1929-31, 1938-48

*Water Year Ending September 30*

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1929 | 687-82                        | 21,600         | 5              | 723   | 1.90                  | 25.79   | 523,000   |
| 1930 | 702-110                       | 26,000         | 4              | 676   | 1.78                  | 24.16   | 489,000   |
| 1931 | 717-105                       | 6,290          | 3              | 303   | .797                  | 10.82   | 220,000   |
| 1938 | *857-187                      | 27,900         | 8              | 851   | 2.24                  | 30.41   | 616,300   |
| 1939 | 877-331                       | 12,300         | 3.6            | 558   | 1.47                  | 19.95   | 404,200   |
| 1940 | 897-326                       | 7,610          | 6.0            | 306   | .805                  | 10.95   | 222,000   |
| 1941 | *927-327                      | 20,400         | 8.0            | 539   | 1.42                  | 19.26   | 390,500   |
| 1942 | 957-372                       | 21,100         | 16             | 712   | 1.87                  | 25.42   | 515,200   |
| 1943 | 977-350                       | 11,800         | 3.2            | 393   | 1.03                  | 14.02   | 284,600   |
| 1944 | 1007-342                      | 27,700         | 7.7            | 769   | 2.02                  | 27.56   | 558,600   |
| 1945 | 1037-367                      | 65,400         | 10             | 1,047 | 2.76                  | 37.40   | 758,000   |
| 1946 | 1057-376                      | 19,300         | 9.0            | 816   | 2.15                  | 29.14   | 590,900   |
| 1947 | 1087-368                      | 8,240          | 4.0            | 455   | 1.20                  | 16.23   | 329,100   |
| 1948 |                               | 11,600         | 7.7            | 670   | 1.76                  | 23.99   | 486,300   |

— Continued.



## SUMMARY OF YEARLY DISCHARGE IN SECOND-FEET, 1929-31, 1938-48—(Continued)

| Year          | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean | Per<br>square<br>mile | Run-off |           |
|---------------|-------------------------------|---------------------|---------------------|------|-----------------------|---------|-----------|
|               |                               |                     |                     |      |                       | Inches  | Acre-feet |
| Calendar Year |                               |                     |                     |      |                       |         |           |
| 1929          | 687-82                        | 10,000              | 5                   | 613  | 1.61                  | 21.85   | 444,000   |
| 1930          | 702-110                       | 26,000              | 4                   | 697  | 1.83                  | 24.84   | 504,000   |
| 1931          | 717-105                       |                     |                     |      |                       |         |           |
| 1938          | *857-187                      | 27,900              | 6.0                 | 764  | 2.01                  | 27.31   | 553,400   |
| 1939          | 877-331                       | 12,300              | 3.6                 | 545  | 1.43                  | 19.46   | 394,300   |
| 1940          | 897-326                       | 20,400              | 7.1                 | 446  | 1.17                  | 15.96   | 323,700   |
| 1941          | *927-327                      | 11,900              | 14                  | 545  | 1.43                  | 19.47   | 394,300   |
| 1942          | 957-372                       | 21,100              | 16                  | 651  | 1.71                  | 23.22   | 471,100   |
| 1943          | 977-350                       | 7,440               | 3.2                 | 338  | .889                  | 12.06   | 244,700   |
| 1944          | 1007-342                      | 27,700              | 7.7                 | 893  | 2.35                  | 31.99   | 648,400   |
| 1945          | 1037-367                      | 65,400              | 19                  | 942  | 2.48                  | 33.66   | 681,900   |
| 1946          | 1057-376                      | 19,300              | 9.0                 | 939  | 2.47                  | 33.52   | 679,800   |
| 1947          | 1087-368                      | 8,240               | 4.0                 | 497  | 1.31                  | 17.74   | 359,600   |
| 1948          |                               |                     |                     |      |                       |         |           |

\* Revised figures of daily discharge for high-water periods and yearly summaries contained in Water-Supply Paper 1007, p. 342.

## 64. Little Missouri River Near Boughton, Ark.

LOCATION: Water-stage recorder, lat. 35°52'32", long. 93°18'16", on Clark-Nevada County line, at bridge on U. S. Highway 67, 2 miles northeast of Boughton, Nevada County. Datum of gage is 182.13 feet above mean sea level, datum of 1929.

DRAINAGE AREA: 1,070 square miles.

RECORDS AVAILABLE: Discharge, October 1937 to September 1938 in reports of Corps of Engineers, Vicksburg District; October 1938 to September 1942 in files of Corps of Engineers, Vicksburg District; January 1947 to December 1948 in reports of Corps of Engineers, Vicksburg District. Chemical quality, spot samples collected 1946, see analysis page 178. Daily chemical analyses and water temperatures, October 1, 1947 to September 1948.

MEAN ANNUAL RUNOFF: 19.60 inches or 1,119,000 acre-feet.

AVERAGE DISCHARGE: 8 years (1937-42, 1945-48), 1,545 second-feet.

MAXIMUM: 1937-42, 1945-48: Discharge, 111,000 second-feet Mar. 31, 1945 (gage height, 27.2 feet, from high-water mark).

MINIMUM: 1937-42,

1945-48: Day: 10 second-feet (6.5 m.g.d.) Sept. 20-30, 1939.

7-day: 10 second-feet (6.5 m.g.d.), see above.

Calendar month: 12.4 second-feet (8.0 m.g.d.) September 1939.

Water year: 707 second-feet (456 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to Mar. 19, 1947, wire-weight gage at same site and datum. Gage-height records since Sept. 23, 1937 are contained in reports of U. S. Weather Bureau and Corps of Engineers, Vicksburg District. Records furnished by Corps of Engineers, Vicksburg District.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-42, 1946-48

*Water Year Ending September 30*

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1938 | 54,000         | 16             | 2,036 | 1.91                  | 25.87   | 1,474,000 |
| 1939 | 16,700         | 10             | 1,443 | 1.35                  | 18.30   | 1,045,000 |
| 1940 | 6,790          | 11             | 707   | .661                  | 9.01    | 513,500   |
| 1941 | 14,200         | 15             | 1,297 | 1.21                  | 16.45   | 938,800   |
| 1942 | 24,800         | 16             | 1,668 | 1.56                  | 21.16   | 1,208,000 |
| 1946 | 30,000         | 11             | 2,139 | 2.00                  | 27.13   | 1,548,000 |
| 1947 | 29,500         | 11             | 1,320 | 1.23                  | 16.73   | 954,300   |
| 1948 | 16,600         | 17             | 1,750 | 1.64                  | 22.26   | 1,270,000 |

*Calendar Year*

|      |        |    |       |      |       |           |
|------|--------|----|-------|------|-------|-----------|
| 1938 | 54,000 | 12 | 1,851 | 1.73 | 23.52 | 1,340,000 |
| 1939 | 16,700 | 10 | 1,392 | 1.30 | 17.66 | 1,009,000 |
| 1940 | 9,700  | 15 | 951   | .889 | 12.11 | 690,800   |
| 1941 | 14,200 | 20 | 1,318 | 1.23 | 16.74 | 954,500   |
| 1942 |        |    |       |      |       |           |
| 1946 | 30,000 | 11 | 2,492 | 2.33 | 31.62 | 1,804,000 |
| 1947 | 29,500 | 11 | 1,323 | 1.24 | 16.79 | 957,700   |
| 1948 | 16,600 | 16 | 1,341 | 1.25 | 17.06 | 973,600   |

## 64. LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | Specific conductance | pH    | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|----------------------|-------|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|------------------|-------------------------------|---------------|
|                    |                              |                      |       |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  | Total                         | Non-carbonate |
| 1947:              |                              |                      |       |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Oct. 1-10          | 70.3                         | 78.3                 | 7.6   | .....                      | .....     | .....         | 7.9          | 2.6            | .....       | 2.9           | 30                              | 5.6                        | 3.8           | .....        | 1.2                        | 60               | 30                            | 6             |
| Oct. 11-20         | 60.3                         | 88.4                 | 7.5   | .....                      | .....     | .....         | 9.1          | 3.1            | .....       | 3.4           | 37                              | 5.3                        | 4.2           | .....        | 1.5                        | 60               | 35                            | 5             |
| Oct. 21-26, 28-29  | 613                          | 60.5                 | 7.4   | .....                      | .....     | .....         | 5.3          | 2.2            | .....       | 3.4           | 24                              | 4.7                        | 2.8           | .....        | 1.5                        | 48               | 22                            | 8             |
| Oct. 27, 30-31     | 1,200                        | 126                  | 7.8   | .....                      | .....     | .....         | 16           | 5.9            | .....       | 2.4           | 64                              | 12                         | 2.0           | .....        | 2.0                        | 88               | 64                            | 12            |
| Nov. 1-10          | 1,704                        | 62.8                 | ..... | .....                      | .....     | .....         | 6.4          | 2.4            | .....       | 2.0           | 21                              | 7.9                        | 2.8           | .....        | 1.0                        | 56               | 26                            | 9             |
| Nov. 11-20         | 3,275                        | 56.6                 | ..... | .....                      | .....     | .....         | 5.8          | 2.1            | .....       | 3.2           | 21                              | 7.7                        | 2.8           | .....        | 1.0                        | 55               | 23                            | 6             |
| Nov. 21-30         | 2,751                        | 60.9                 | ..... | .....                      | .....     | .....         | 5.7          | 1.7            | .....       | 3.7           | 21                              | 7.0                        | 2.5           | .....        | 1.5                        | 51               | 21                            | 4             |
| Dec. 1-8, 9-10     | 2,892                        | 61.8                 | ..... | .....                      | .....     | .....         | 4.2          | 1.4            | .....       | 8.7           | 24                              | 8.6                        | 3.5           | .....        | 2.0                        | 50               | 16                            | 0             |
| Dec. 4-8           | 2,542                        | 99.6                 | ..... | .....                      | .....     | .....         | 12           | 1.4            | .....       | 8.6           | 45                              | 11                         | 4.0           | .....        | .5                         | 74               | 36                            | 0             |
| Dec. 11-20         | 4,938                        | 61.2                 | ..... | .....                      | .....     | .....         | 6.4          | 1.2            | .....       | 6.9           | 25                              | 9.7                        | 3.5           | .....        | .5                         | 54               | 21                            | 0             |
| Dec. 21-31         | 1,255                        | 65.0                 | ..... | .....                      | .....     | .....         | 6.0          | 1.1            | .....       | 7.3           | 25                              | 8.3                        | 4.0           | .....        | .8                         | 52               | 19                            | 0             |
| 1948:              |                              |                      |       |                            |           |               |              |                |             |               |                                 |                            |               |              |                            |                  |                               |               |
| Jan. 1-10          | 3,811                        | 89.1                 | ..... | .....                      | .....     | .....         | 9.6          | 1.1            | .....       | 6.9           | 30                              | 8.4                        | 6.0           | .....        | 2.0                        | 70               | 28                            | 4             |
| Jan. 11-20         | 1,052                        | 115                  | ..... | .....                      | .....     | .....         | 8.4          | 1.4            | .....       | 12            | 28                              | 10                         | 12            | .....        | 3.5                        | 81               | 27                            | 4             |
| Jan. 21-31         | 998                          | 96.0                 | ..... | .....                      | .....     | .....         | 10           | 2.4            | .....       | 5.2           | 34                              | 10                         | 5.0           | .....        | 1.0                        | 69               | 35                            | 7             |
| Feb. 1-20          | 5,147                        | 88.4                 | ..... | .....                      | .....     | .....         | 8.8          | 1.3            | .....       | 5.2           | 30                              | 7.7                        | 4.0           | .....        | .5                         | 58               | 27                            | 3             |
| Feb. 21-29         | 5,059                        | 69.0                 | ..... | .....                      | .....     | .....         | 8.0          | 1.7            | .....       | 2.9           | 24                              | 8.9                        | 2.5           | .....        | 1.0                        | 85               | 27                            | 7             |
| Mar. 1-10          | 7,844                        | 63.2                 | ..... | .....                      | .....     | .....         | 6.2          | .9             | .....       | 4.1           | 21                              | 5.7                        | 3.3           | .....        | .3                         | 53               | 19                            | 2             |
| Mar. 11-20         | 1,288                        | 64.1                 | ..... | .....                      | .....     | .....         | 6.4          | 1.3            | .....       | 3.3           | 20                              | 5.4                        | 4.3           | .....        | .5                         | 47               | 21                            | 5             |
| Mar. 21-31         | 4,617                        | 74.4                 | ..... | .....                      | .....     | .....         | 8.4          | .9             | .....       | 4.5           | 28                              | 5.4                        | 3.9           | .....        | .5                         | 57               | 25                            | 2             |
| Apr. 1-10          | 1,012                        | 67.3                 | ..... | .....                      | .....     | .....         | 7.0          | 1.1            | .....       | 6.8           | 27                              | 8.0                        | 4.5           | .....        | .0                         | 53               | 22                            | 0             |
| Apr. 11-20         | 1,671                        | 61.1                 | ..... | .....                      | .....     | .....         | 5.8          | 1.1            | .....       | 5.4           | 20                              | 8.1                        | 3.9           | .....        | .3                         | 54               | 19                            | 3             |
| Apr. 21-30         | 662                          | 68.7                 | ..... | .....                      | .....     | .....         | 8.4          | 1.2            | .....       | 3.2           | 26                              | 5.5                        | 4.1           | .....        | .0                         | 53               | 26                            | 5             |
| May 1-10           | 1,127                        | 112                  | ..... | .....                      | .....     | .....         | 17           | .8             | .....       | 4.6           | 52                              | 5.5                        | 4.7           | .....        | 1.0                        | 92               | 46                            | 3             |
| May 11-20          | 4,818                        | 72.6                 | ..... | .....                      | .....     | .....         | 10           | .7             | .....       | 5.2           | 30                              | 7.2                        | 4.7           | .....        | .5                         | 80               | 28                            | 3             |
| May 21-31          | 445                          | 88.0                 | ..... | .....                      | .....     | .....         | 11           | 1.1            | .....       | 6.0           | 35                              | 6.3                        | 6.6           | .....        | .5                         | 71               | 32                            | 3             |

— Continued.

## 64. LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.—Continued

*Chemical Analyses, in Parts Per Million, Water Year October 1947 to September 1948*

| Date of collection | Mean discharge (second-feet) | pH   | Silica (SiO <sub>2</sub> ) | Iron (Fe) | Aluminum (Al) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|--------------------|------------------------------|------|----------------------------|-----------|---------------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                    |                              |      |                            |           |               |              |                |             |               |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| June 1-10          | 206                          | 90.0 | ...                        | ...       | ...           | 13           | 1.6            | ...         | 5.1           | 39                              | 9.2                        | 5.5           | ...          | 1.0                        | 39                            | 2             |
| June 11-20         | 88.2                         | 116  | ...                        | ...       | ...           | 10           | 1.5            | 13          | ...           | 52                              | 8.0                        | 6.0           | ...          | .8                         | 31                            | 0             |
| June 21-30         | 45.6                         | 119  | ...                        | ...       | ...           | 12           | 1.8            | 7.5         | ...           | 50                              | 6.7                        | 3.8           | ...          | .5                         | 37                            | 0             |
| July 1-10          | 47.2                         | 114  | ...                        | ...       | ...           | 11           | 1.5            | 9.9         | ...           | 48                              | 6.4                        | 5.8           | ...          | 1.2                        | 34                            | 0             |
| July 11-20         | 98.9                         | 105  | ...                        | ...       | ...           | 11           | 1.3            | 7.8         | ...           | 43                              | 6.3                        | 4.8           | ...          | 1.4                        | 33                            | 0             |
| July 21-31         | 77.7                         | 163  | 7.2                        | 0.05      | 0.3           | 23           | 1.4            | 7.6         | 1.2           | 77                              | 8.3                        | 5.8           | 0.1          | 1.2                        | 99                            | 63            |
| Aug. 1-5           | 19.8                         | 141  | ...                        | ...       | ...           | 18           | 1.7            | 11          | ...           | 74                              | 7.2                        | 5.8           | ...          | .3                         | 91                            | 52            |
| Aug. 6-10          | 884                          | 56.2 | ...                        | ...       | ...           | 5.5          | 1.6            | 4.7         | ...           | 22                              | 7.2                        | 3.0           | ...          | .9                         | 60                            | 2             |
| Aug. 11-20         | 360                          | 73.1 | ...                        | ...       | ...           | 8.7          | 2.0            | 5.8         | ...           | 35                              | 8.4                        | 3.2           | ...          | .6                         | 68                            | 30            |
| Aug. 21-31         | 54.7                         | 92.1 | ...                        | ...       | ...           | 10           | 1.9            | 17          | ...           | 45                              | 25                         | 4.2           | ...          | .3                         | 81                            | 33            |
| Sept. 1-10         | 18.4                         | 110  | ...                        | ...       | ...           | 11           | 1.7            | 9.9         | ...           | 45                              | 6.5                        | 8.0           | ...          | 1.3                        | 87                            | 34            |
| Sept. 11-20        | 20.5                         | 110  | ...                        | ...       | ...           | 10           | 2.2            | 10          | ...           | 44                              | 6.4                        | 8.5           | ...          | 1.9                        | 82                            | 34            |
| Sept. 21-30        | 18.0                         | 111  | 7.4                        | .06       | .3            | 11           | 2.0            | 8.0         | 2.2           | 46                              | 5.5                        | 7.5           | .0           | 2.2                        | 72                            | 36            |
| Average            | 1,750                        | 88.1 | ...                        | ...       | ...           | 9.6          | 1.7            | 6.5         | ...           | 36                              | 7.9                        | 4.7           | ...          | 1.0                        | 68                            | 3             |

<sup>1</sup> K×10<sup>6</sup> at 25° C.

**LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.—Continued**  
*Temperature (° F.) Water of Little Missouri River, Water Year October 1947  
to September 1948*

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

**65. Muddy Fork Creek at Murfreesboro Dam Site**  
Near Murfreesboro, Ark.

**LOCATION:** Water-stage recorder, lat. 34°04'59", long. 93°45'07", in NE¼ sec. 3, T. 8 S., R. 26 W., 4 miles northwest of Murfreesboro, Pike County.  
Datum of gage is 337.29 feet above mean sea level, datum of 1929.

**DRAINAGE AREA:** 121 square miles.

**RECORDS AVAILABLE:** Discharge, January 1940 to September 1942, October 1946 to December 1946 in files of Corps of Engineers, Vicksburg District, January 1947 to December 1948 in report of Corps of Engineers, Vicksburg District.

**MAXIMUM:** 1940-42, 1946-48: Discharge, 47,100 second-feet Mar. 30, 1945 (gage height, 29.7 feet).

**MINIMUM:** 1940-42,

1946-48: Day: No flow Aug. 19-27, 1947, Sept. 7 to Oct. 30, 1948.

7-day: No flow, see above.

Calendar month: 0.003 second-foot (0.002 m.g.d.) October 1948.

Water year: 140 second-feet (90.5 m.g.d.) Oct. 1, 1940, to Sept. 30, 1941.

**REMARKS:** Prior to Mar. 4, 1940, staff gage at same site and datum.  
Gage-height records January 1940 to December 1948 are in reports of

Corps of Engineers, Vicksburg District. Records furnished by Corps of Engineers, Vicksburg District.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1940-42, 1947-48

Water Year Ending September 30

| Year | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                |                |       |                       | Inches  | Acre-feet |
| 1940 | .....          | .....          | ..... | .....                 | .....   | .....     |
| 1941 | 6,380          | 0.2            | 140   | 1.16                  | 15.73   | 101,600   |
| 1942 | 8,220          | .7             | 161   | 1.33                  | 18.12   | 116,900   |
| 1947 | 4,050          | 0              | 128   | 1.06                  | 14.40   | 92,940    |
| 1948 | 3,060          | 0              | 170   | 1.40                  | 19.09   | 123,200   |

## Calendar Year

|      |       |       |       |       |       |         |
|------|-------|-------|-------|-------|-------|---------|
| 1940 | 6,380 | .2    | 114   | .942  | 12.36 | 79,810  |
| 1941 | 3,020 | 1.0   | 134   | 1.11  | 15.06 | 97,300  |
| 1942 | ..... | ..... | ..... | ..... | ..... | .....   |
| 1947 | 4,050 | 0     | 143   | 1.18  | 16.03 | 103,400 |
| 1948 | 3,060 | 0     | 119   | .983  | 13.37 | 86,240  |

## 66. Saline River Near Rye, Ark.

LOCATION: Water-stage recorder, lat. 33°42', long. 92°02', on line between secs. 3 and 4, T. 12 S., R. 9 W., at bridge on State Highway 15, 4 miles southwest of Rye, Cleveland County. Datum of gage is not available.

DRAINAGE AREA: 2,040 square miles.

RECORDS AVAILABLE: Discharge, August 1937 to September 1948. Chemical analyses and water temperatures, October 1946 to September 1947. Spot samples 1945-46, see analysis page 178.

MEAN ANNUAL RUNOFF: 17.69 inches or 1,925,000 acre-feet.

AVERAGE DISCHARGE: 11 years, 2,659 second-feet.

MAXIMUM: 1937-48: Discharge, 47,600 second-feet Apr. 5, 1945 (gage height, 28.43 feet). Maximum stage known, 30.5 feet, in April 1927.

MINIMUM: 1937-48: Day: 8.1 second-feet (5.2 m.g.d.) Sept. 28, 29, 1943.

7-day: 8.67 second-feet (5.6 m.g.d.) Sept. 24-30, 1943.

Calendar month: 10.1 second-feet (6.5 m.g.d.) September 1943.

Water year: 756 second-feet (489 m.g.d.) Oct. 1, 1939, to Sept. 30, 1940.

REMARKS: Prior to May 30, 1939, wire-weight gage at same site and datum. Bankfull stage, about 20 feet.

## SUMMARY OF YEARLY DISCHARGE, IN SECOND-FEET, 1938-48

Water Year Ending September 30

| Year | W. S. P.<br>(no. and<br>page) | Maximum<br>day | Minimum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|------|-------------------------------|----------------|----------------|-------|-----------------------|---------|-----------|
|      |                               |                |                |       |                       | Inches  | Acre-feet |
| 1938 | 857-189                       | 39,900         | 20             | 3,555 | 1.74                  | 29.62   | 2,574,000 |
| 1939 | 877-332                       | 30,600         | 11             | 3,501 | 1.72                  | 23.29   | 2,535,000 |
| 1940 | 897-327                       | 8,770          | 17             | 756   | .371                  | 5.04    | 548,700   |
| 1941 | 927-328                       | 9,050          | 25             | 1,762 | .863                  | 11.70   | 1,275,000 |
| 1942 | 957-373                       | 39,600         | 42             | 2,486 | 1.22                  | 16.54   | 1,800,000 |
| 1943 | 977-351                       | 9,900          | 8.1            | 1,099 | .539                  | 7.30    | 795,700   |
| 1944 | 1007-343                      | 32,000         | 9.1            | 2,177 | 1.07                  | 14.52   | 1,581,000 |
| 1945 | 1037-368                      | 47,600         | 14             | 4,529 | 2.22                  | 30.11   | 3,279,000 |
| 1946 | 1057-377                      | 36,100         | 41             | 4,911 | 2.41                  | 32.68   | 3,556,000 |
| 1947 | 1087-369                      | 10,500         | 18             | 1,822 | .893                  | 12.13   | 1,319,000 |
| 1948 | .....                         | 19,800         | 24             | 2,655 | 1.30                  | 17.71   | 1,923,000 |

— Continued.

| Year                 | W. S. P.<br>(no. and<br>page) | Maxi-<br>mum<br>day | Mini-<br>mum<br>day | Mean  | Per<br>square<br>mile | Run-off |           |
|----------------------|-------------------------------|---------------------|---------------------|-------|-----------------------|---------|-----------|
|                      |                               |                     |                     |       |                       | Inches  | Acre-feet |
| <i>Calendar Year</i> |                               |                     |                     |       |                       |         |           |
| 1938                 | 857-189                       | 39,900              | 11                  | 3,237 | 1.59                  | 21.54   | 2,344,000 |
| 1939                 | 877-332                       | 30,600              | 17                  | 3,432 | 1.68                  | 22.82   | 2,484,000 |
| 1940                 | 897-327                       | 8,770               | 25                  | 1,032 | .506                  | 6.88    | 749,400   |
| 1941                 | 927-328                       | 9,050               | 33                  | 1,676 | .822                  | 11.14   | 1,213,000 |
| 1942                 | 957-373                       | 39,600              | 32                  | 2,333 | 1.14                  | 15.52   | 1,689,000 |
| 1943                 | 977-351                       | 9,900               | 8.1                 | 1,064 | .522                  | 7.07    | 770,000   |
| 1944                 | 1007-343                      | 32,000              | 14                  | 2,368 | 1.16                  | 15.78   | 1,719,000 |
| 1945                 | 1037-368                      | 47,600              | 151                 | 5,122 | 2.51                  | 34.06   | 3,708,000 |
| 1946                 | 1057-377                      | 36,100              | 41                  | 4,347 | 2.13                  | 28.94   | 3,147,000 |
| 1947                 | 1087-369                      | 10,500              | 18                  | 1,770 | .868                  | 11.76   | 1,281,000 |
| 1948                 |                               |                     |                     |       |                       |         |           |

66. SALINE RIVER NEAR RYE, ARK.  
*Chemical Analyses, in Parts Per Million, Water Year October 1946 to September 1947*

| Date of collection          | Mean discharge (second-feet) | Specific conductance <sup>1</sup> | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) + Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Fluoride (F) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|-----------------------------|------------------------------|-----------------------------------|--------------|----------------|-----------------------------|---------------------------------|----------------------------|---------------|--------------|----------------------------|-------------------------------|---------------|
|                             |                              |                                   |              |                |                             |                                 |                            |               |              |                            | Total                         | Non-carbonate |
| 1946:                       |                              |                                   |              |                |                             |                                 |                            |               |              |                            |                               |               |
| Oct. 1-10                   | 59.9                         | 12.1                              | 11           | 3.1            | 8.5                         | 48                              | 11                         | 5.5           | ...          | 0.2                        | 75                            | 1             |
| Oct. 11-20                  | 45.1                         | 12.5                              | 10           | 3.1            | 11                          | 48                              | 14                         | 5.0           | ...          | .5                         | 76                            | 0             |
| Oct. 21-31                  | 79.8                         | 13.1                              | 9.7          | 3.1            | 13                          | 48                              | 18                         | 5.5           | ...          | .5                         | 87                            | 0             |
| Nov. 1-8                    | 290                          | 13.6                              | 9.8          | 2.2            | 15                          | 47                              | 19                         | 4.5           | ...          | 1.0                        | 92                            | 0             |
| Nov. 9-20                   | 2,440                        | 7.10                              | 6.4          | 1.8            | 5.4                         | 19                              | 14                         | 3.0           | ...          | .8                         | 58                            | 8             |
| Nov. 21-26, 29-30           | 1,040                        | 9.06                              | 7.8          | 2.1            | 9.8                         | 28                              | 19                         | 4.5           | ...          | .5                         | 74                            | 5             |
| Dec. 1-5                    | 1,288                        | 9.88                              | 8.0          | 2.4            | 8.9                         | 28                              | 19                         | 4.0           | ...          | .8                         | 78                            | 7             |
| Dec. 7, 9-10, 12, 14, 16-19 | 1,231                        | 9.61                              | 8.7          | 2.4            | 4.7                         | 24                              | 15                         | 4.0           | ...          | 1.0                        | 74                            | 12            |
| 1947:                       |                              |                                   |              |                |                             |                                 |                            |               |              |                            |                               |               |
| Jan. 7-9, 11-17, 19-20      | 2,299                        | 8.22                              | 5.7          | 2.3            | 6.7                         | 21                              | 14                         | 4.2           | ...          | .8                         | 65                            | 6             |
| Jan. 21-22, 24-31           | 2,979                        | 8.48                              | 5.4          | 2.0            | 8.7                         | 22                              | 15                         | 4.5           | ...          | .8                         | 69                            | 4             |
| Feb. 1-2, 4-5, 7, 10        | 956                          | 10.0                              | 7.2          | 2.5            | 8.3                         | 32                              | 14                         | 3.8           | ...          | .2                         | 71                            | 2             |
| Feb. 11-18, 20              | 560                          | 9.81                              | 8.3          | 2.6            | 9.5                         | 36                              | 14                         | 5.0           | ...          | 1.2                        | 73                            | 2             |
| Feb. 21-28                  | 840                          | 9.17                              | 7.0          | 2.8            | 9.2                         | 28                              | 18                         | 5.0           | ...          | .2                         | 75                            | 6             |
| Mar. 1, 3-6, 8-10           | 1,281                        | 11.0                              | 6.5          | 3.0            | 10                          | 30                              | 18                         | 5.5           | ...          | .2                         | 85                            | 4             |
| Mar. 11, 13-20              | 3,605                        | 6.92                              | 4.2          | 2.2            | 5.4                         | 16                              | 12                         | 3.8           | ...          | .5                         | 70                            | 6             |
| Mar. 21-22, 24-28, 30-31    | 3,203                        | 7.12                              | 5.1          | 2.2            | 5.2                         | 18                              | 12                         | 3.8           | ...          | .5                         | 66                            | 7             |
| Apr. 1-5, 7-10              | 2,166                        | 7.66                              | 5.8          | 2.6            | 3.7                         | 17                              | 13                         | 3.5           | ...          | 1.0                        | 65                            | 11            |
| Apr. 11-12, 14-17, 20       | 7,070                        | 5.72                              | 3.4          | 1.9            | 3.2                         | 15                              | 7.0                        | 1.5           | ...          | 2.0                        | 59                            | 4             |
| Apr. 21-25, 27-30           | 4,524                        | 7.62                              | 6.5          | 2.5            | 3.9                         | 26                              | 9.0                        | 3.0           | ...          | .2                         | 68                            | 5             |
| May 1-4, 6-10               | 5,059                        | 6.23                              | 4.4          | 1.2            | 6.0                         | 20                              | 7.3                        | 3.0           | ...          | 1.0                        | 57                            | 0             |
| May 12-20                   | 3,750                        | 5.88                              | 4.4          | 2.0            | 3.7                         | 20                              | 6.8                        | 3.0           | ...          | .5                         | 56                            | 4             |
| May 22-23, 25-27, 29-30     | 6,247                        | 5.20                              | 3.2          | 1.6            | 4.0                         | 15                              | 6.5                        | 2.8           | ...          | .5                         | 55                            | 2             |
| June 1-7, 9-10              | 1,157                        | 7.96                              | 2.9          | .3             | 15                          | 28                              | 8.3                        | 5.5           | ...          | 1.2                        | 70                            | 0             |
| June 11-13, 15-20           | 254                          | 9.88                              | 8.7          | 2.1            | 9.6                         | 40                              | 10                         | 4.8           | ...          | 1.5                        | 77                            | 0             |
| June 21, 23-28, 30          | 6,559                        | 3.07                              | 2.5          | 1.4            | 1.1                         | 8.0                             | 4.0                        | 2.0           | ...          | 1.2                        | 45                            | 5             |
| July 1-3, 5, 7-10           | 1,650                        | 9.88                              | 6.2          | 2.4            | 4.8                         | 18                              | 16                         | 2.0           | ...          | 2.0                        | 70                            | 10            |
| July 11, 13-20              | 147                          | 9.64                              | 7.5          | 2.5            | 6.9                         | 27                              | 16                         | 2.0           | ...          | 3.0                        | 76                            | 7             |
| July 21-27, 29-31           | 72.5                         | 10.3                              | 7.9          | 2.4            | 8.8                         | 32                              | 15                         | 4.0           | ...          | 1.5                        | 74                            | 3             |
| Aug. 1, 3-9                 | 41.0                         | 11.0                              | 8.1          | 2.8            | 9.3                         | 36                              | 14                         | 4.0           | ...          | 2.8                        | 79                            | 2             |
| Aug. 11-16, 18-20           | 34.4                         | 10.8                              | 7.3          | 3.1            | 10                          | 38                              | 13                         | 4.0           | ...          | 2.8                        | 77                            | 0             |
| Aug. 21-23, 25-27, 29-31    | 24.2                         | 10.1                              | 7.1          | 4.5            | 8.2                         | 44                              | 11                         | 4.0           | ...          | 1.2                        | 77                            | 0             |
| Sept. 1-2, 4-5              | 23.2                         | 10.9                              | 6.8          | 3.6            | 8.9                         | 40                              | 12                         | 4.0           | ...          | .2                         | 73                            | 0             |
| Average                     | 1,822                        | 9.05                              | 6.7          | 2.4            | 7.7                         | 29                              | 13                         | 3.9           | ...          | 1.0                        | 71                            | 4             |

<sup>1</sup> K X 10<sup>3</sup> at 25° C.



## 66. SALINE RIVER NEAR RYE, ARK.—Continued

*Temperature (° F.) of Water of Saline River, Water Year October 1946 to September 1947*

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

## SPOT SAMPLES

## ST. FRANCIS RIVER BASIN

*Chemical Analyses, in Parts Per Million*

| Date of collection                        | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 1. St. Francis River at St. Francis, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 5, 1946.....                         | 1,520                          | 15.6                                      | 15              | 8.9                    | 4.6                                         | 86                                      | 8.3                           | 3.0              | 1.0                           | 87                  | 74                               |
| 2. St. Francis River at Lake City, Ark.   |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 6, 1946.....                         | 2,680                          | 19.2                                      | 21              | 8.9                    | 6.5                                         | 111                                     | 6.8                           | 3.0              | 1.0                           | 118                 | 89                               |
| 4. St. Francis River at Parkin, Ark.      |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 6, 1946.....                         | 4,700                          | 36.5                                      | 49              | 13                     | 10                                          | 211                                     | 15                            | 6.0              | .8                            | 222                 | 176                              |
| 7. St. Francis Bay at Riverfront, Ark.    |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 6, 1946.....                         | 6,390                          | 23.9                                      | 30              | 9.8                    | 6.6                                         | 140                                     | 8.7                           | 4.0              | .2                            | 144                 | 115                              |

<sup>1</sup> K×10<sup>5</sup> at 25° C.

## WHITE RIVER BASIN

*Chemical Analyses, in Parts Per Million*

| Date of collection                      | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-----------------------------------------|--------------------------------|------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 9. White River Near Flippin, Ark.       |                                |                              |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 24, 1945.....                      | 1,560                          | 29.5                         | 44              | 13                     | 1.6                                         | 193                                     | 3.6                           | 2.5              | 1.5                           | 172                 | 163                              |
| Apr. 9, 1946.....                       | 2,710                          | 26.0                         | 34              | 12                     | 3.5                                         | 157                                     | 5.3                           | 4.0              | 2.5                           | 140                 | 134                              |
| Aug. 13, 1947.....                      | 344                            | 25.3                         | .....           | .....                  | .....                                       | 168                                     | 2.0                           | 2.6              | .2                            | .....               | 129                              |
| May 5, 1948.....                        | 2,770                          | 20.6                         | .....           | .....                  | .....                                       | 166                                     | 3.0                           | 6.0              | .0                            | .....               | 57                               |
| Aug. 25, 1948.....                      | 2,180                          | 25.9                         | .....           | .....                  | .....                                       | 159                                     | 3.0                           | 2.8              | 1.8                           | .....               | 95                               |
| 10. White River at Calico Rock, Ark.    |                                |                              |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 26, 1945.....                      | 2,470                          | 31.3                         | 46              | 13                     | 1.4                                         | 192                                     | 6.2                           | 4.2              | 2.0                           | 168                 | 168                              |
| June 6, 1946.....                       | 21,600                         | 27.4                         | .....           | .....                  | .....                                       | 186                                     | 5.0                           | 2.5              | 2.5                           | .....               | 183                              |
| Jan. 13, 1947.....                      | 9,210                          | 28.7                         | .....           | .....                  | .....                                       | 180                                     | 7.0                           | 5.0              | 4.0                           | .....               | 198                              |
| Aug. 22, 1947.....                      | 2,050                          | 30.6                         | .....           | .....                  | .....                                       | 198                                     | 4.0                           | 1.5              | .8                            | .....               | 152                              |
| Apr. 21, 1948.....                      | 6,560                          | 30.2                         | .....           | .....                  | .....                                       | 184                                     | 10                            | 4.0              | .0                            | .....               | 49                               |
| Sept. 8, 1948.....                      | 2,230                          | 31.6                         | .....           | .....                  | .....                                       | 197                                     | 2.0                           | 9.5              | 1.4                           | .....               | 99                               |
| 11. White River at Batesville, Ark.     |                                |                              |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 2, 1947.....                       | 2,740                          | 30.3                         | .....           | .....                  | .....                                       | 196                                     | 4.0                           | 1.2              | .5                            | .....               | 152                              |
| Apr. 23, 1948.....                      | 8,050                          | 29.2                         | .....           | .....                  | .....                                       | 174                                     | 5.0                           | 6.0              | .3                            | .....               | 45                               |
| Sept. 22, 1948.....                     | 3,140                          | 31.0                         | .....           | .....                  | .....                                       | 192                                     | 3.0                           | 8.0              | .8                            | .....               | 102                              |
| 13. White River at De Valls Bluff, Ark. |                                |                              |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 16, 1945.....                      | 5,100                          | 20.6                         | 24              | 10                     | 2.9                                         | 120                                     | 3.6                           | 3.0              | 1.1                           | 115                 | 101                              |
| May 29, 1946.....                       | 53,000                         | 16.3                         | .....           | .....                  | .....                                       | 101                                     | 3.0                           | 2.2              | 1.8                           | .....               | 99                               |
| Feb. 14, 1947.....                      | .....                          | 28.7                         | .....           | .....                  | .....                                       | 182                                     | 5.0                           | 10               | 1.2                           | .....               | 213                              |
| Sept. 23, 1947.....                     | .....                          | 38.6                         | 34              | 13                     | 17                                          | 199                                     | 4.0                           | 4.0              | .5                            | 184                 | 188                              |

— Continued.

WHITE RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                           | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|----------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 15. West Fork White River at Greenland, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 7, 1946.....                            | 63                             | 7.50                                      | 4.8             | 0.9                    | 11                                          | 36                                      | 5.0                           | 2.8              | 0.2                           | 50                  | 16                               |
| Apr. 21, 1947.....                           | 119                            | .....                                     | .....           | .....                  | .....                                       | 30                                      | 8.0                           | 4.0              | .2                            | .....               | 32                               |
| Apr. 5, 1948.....                            | 59                             | 5.62                                      | .....           | .....                  | .....                                       | 30                                      | 8.0                           | 4.0              | .5                            | .....               | 22                               |
| Apr. 11, 1948.....                           | 94                             | 7.88                                      | 9.6             | 1.4                    | 4.7                                         | 33                                      | 5.7                           | 3.8              | 1.0                           | 58                  | 30                               |
| Aug. 25, 1948.....                           | 29                             | 10.5                                      | .....           | .....                  | .....                                       | 44                                      | 4.0                           | 5.5              | 2.0                           | .....               | 38                               |
| 17. Kings River Near Berryville, Ark.        |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 23, 1945.....                           | 127                            | 24.6                                      | 41              | 8.3                    | .1                                          | 158                                     | 3.6                           | 2.0              | .8                            | 143                 | 136                              |
| Apr. 10, 1946.....                           | 262                            | 19.1                                      | 28              | 5.8                    | 3.2                                         | 112                                     | 4.7                           | 2.5              | .5                            | 102                 | 94                               |
| Jan. 23, 1947.....                           | 241                            | 21.0                                      | .....           | .....                  | .....                                       | 126                                     | 8.0                           | 6.0              | 1.0                           | .....               | 129                              |
| July 29, 1947.....                           | 31                             | 23.4                                      | .....           | .....                  | .....                                       | 148                                     | 3.0                           | .8               | .2                            | .....               | 111                              |
| Apr. 15, 1948.....                           | 228                            | 19.4                                      | .....           | .....                  | .....                                       | 266                                     | 5.0                           | 6.0              | .4                            | .....               | 57                               |
| Aug. 23, 1948.....                           | 178                            | 24.1                                      | .....           | .....                  | .....                                       | 146                                     | 3.0                           | 7.0              | 1.1                           | .....               | 99                               |
| 18. Buffalo River Near St. Joe, Ark.         |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 23, 1945.....                           | 190                            | 23.9                                      | 45              | 4.0                    | 1.1                                         | 152                                     | 4.3                           | 1.5              | .0                            | 140                 | 129                              |
| Apr. 18, 1946.....                           | 2,100                          | 18.0                                      | 31              | 2.5                    | 2.9                                         | 103                                     | 5.0                           | 3.0              | .2                            | 102                 | 88                               |
| May 28, 1946.....                            | 2,950                          | 22.0                                      | .....           | .....                  | .....                                       | 148                                     | 4.0                           | .....            | .....                         | .....               | 123                              |
| Jan. 7, 1947.....                            | 780                            | 19.8                                      | .....           | .....                  | .....                                       | 118                                     | 7.0                           | 5.0              | .5                            | .....               | 92                               |
| Aug. 12, 1947.....                           | 41                             | 22.5                                      | .....           | .....                  | .....                                       | 136                                     | 3.0                           | 1.5              | .2                            | .....               | 100                              |
| Apr. 16, 1948.....                           | 951                            | 16.0                                      | .....           | .....                  | .....                                       | 96                                      | 10                            | 6.0              | .3                            | .....               | 36                               |
| Aug. 24, 1948.....                           | 220                            | 21.7                                      | .....           | .....                  | .....                                       | 131                                     | 8.0                           | 2.5              | .2                            | .....               | 99                               |

— Continued.

WHITE RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                  | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 19. Buffalo River Near Rush, Ark.   |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 15, 1945.....                  | 900                            | 24.9                                      | 46              | 4.3                    | 1.9                                         | 154                                     | 5.3                           | 3.0              | 0.8                           | 136                 | 132                              |
| July 31, 1946.....                  | 840                            | 20.4                                      | .....           | .....                  | .....                                       | 124                                     | 4.0                           | 3.0              | 1.5                           | .....               | 99                               |
| Jan. 9, 1947.....                   | 970                            | 21.0                                      | .....           | .....                  | .....                                       | 128                                     | 5.0                           | .....            | .5                            | .....               | 92                               |
| July 30, 1947.....                  | 96                             | 21.8                                      | .....           | .....                  | .....                                       | 128                                     | 4.0                           | 1.2              | .2                            | .....               | 91                               |
| Apr. 22, 1948.....                  | 838                            | 19.3                                      | .....           | .....                  | .....                                       | 102                                     | 10                            | 6.0              | .0                            | .....               | 47                               |
| Aug. 24, 1948.....                  | 322                            | 21.7                                      | .....           | .....                  | .....                                       | 133                                     | 3.0                           | 2.5              | .5                            | .....               | 97                               |
| 21. Black River Near Corning, Ark.  |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 27, 1945.....                  | 697                            | 23.3                                      | 29              | 14                     | .0                                          | 148                                     | 4.4                           | 2.2              | 1.2                           | 132                 | 130                              |
| Apr. 5, 1946.....                   | 1,410                          | 20.6                                      | 22              | 12                     | 3.6                                         | 126                                     | 4.0                           | 2.8              | .8                            | 112                 | 104                              |
| Aug. 18, 1947.....                  | 538                            | 23.4                                      | .....           | .....                  | .....                                       | 162                                     | 3.0                           | 1.0              | .5                            | .....               | 122                              |
| Apr. 20, 1948.....                  | 2,590                          | 16.5                                      | .....           | .....                  | .....                                       | 92                                      | 10                            | 6.0              | .3                            | .....               | 61                               |
| Sept. 9, 1948.....                  | 438                            | 26.3                                      | .....           | .....                  | .....                                       | 163                                     | 1.0                           | 9.0              | 1.2                           | .....               | 82                               |
| 22. Black River at Pocahontas, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 23, 1945.....                  | 3,460                          | 27.5                                      | 32              | 17                     | .5                                          | 176                                     | 2.4                           | 2.0              | 1.5                           | 156                 | 150                              |
| Apr. 5, 1946.....                   | 5,690                          | 23.7                                      | 25              | 14                     | 5.2                                         | 151                                     | 3.4                           | 2.5              | .5                            | 129                 | 120                              |
| Aug. 17, 1947.....                  | 2,370                          | 30.1                                      | .....           | .....                  | .....                                       | 190                                     | 1.0                           | 1.0              | .2                            | .....               | 144                              |
| Apr. 22, 1948.....                  | 11,100                         | 16.2                                      | .....           | .....                  | .....                                       | 90                                      | 3.0                           | 4.0              | .0                            | .....               | 71                               |
| Sept. 9, 1948.....                  | 2,090                          | 31.7                                      | .....           | .....                  | .....                                       | 209                                     | 1.0                           | 9.0              | .9                            | .....               | 41                               |
| 23. Black River at Black Rock, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Feb. 6, 1947.....                   | 7,200                          | 23.5                                      | .....           | .....                  | .....                                       | 193                                     | 3.0                           | 5.0              | 1.2                           | .....               | 166                              |
| May 19, 1948.....                   | 8,100                          | 31.1                                      | .....           | .....                  | .....                                       | 195                                     | 2.0                           | 4.0              | 2.9                           | .....               | 162                              |
| June 23, 1948.....                  | 9,900                          | 27.4                                      | .....           | .....                  | .....                                       | 174                                     | 2.0                           | 4.0              | .5                            | .....               | 91                               |
| Sept. 23, 1948.....                 | 2,650                          | 34.3                                      | .....           | .....                  | .....                                       | 227                                     | 4.0                           | 9.0              | 1.2                           | .....               | 121                              |

— Continued.

WHITE RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                            | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-----------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 24. Spring River at Imboden, Ark.             |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 28, 1945.....                            | 1,020                          | 38.2                                      | 46              | 26                     | 0.3                                         | 262                                     | 3.1                           | 1.2              | 3.2                           | 222                 | 222                              |
| Sept. 16, 1945.....                           | 859                            | 37.7                                      | 44              | 25                     | .1                                          | 216                                     | 2.7                           | 2.0              | 2.2                           | 209                 | 213                              |
| Apr. 18, 1946.....                            | 1,250                          | 40.6                                      | 45              | 28                     | 1.4                                         | 269                                     | 2.6                           | 3.5              | 3.0                           | 227                 | 227                              |
| Jan. 17, 1947.....                            | 900                            | 39.3                                      | .....           | .....                  | .....                                       | 262                                     | 4.0                           | 6.0              | 3.0                           | .....               | 273                              |
| Aug. 16, 1947.....                            | 358                            | 40.3                                      | .....           | .....                  | .....                                       | 270                                     | 2.0                           | 1.5              | 1.0                           | .....               | 213                              |
| Apr. 21, 1948.....                            | 1,360                          | 40.9                                      | .....           | .....                  | .....                                       | 102                                     | 3.0                           | 6.0              | 1.5                           | .....               | 76                               |
| Sept. 8, 1948.....                            | 399                            | 42.5                                      | .....           | .....                  | .....                                       | 284                                     | 2.0                           | 7.5              | 1.6                           | .....               | 137                              |
| 25. Eleven Point River Near Elevenpoint, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 27, 1945.....                            | 1,310                          | 31.5                                      | 37              | 21                     | 1.0                                         | 210                                     | 2.5                           | 2.8              | 2.8                           | 180                 | 179                              |
| Sept. 16, 1945.....                           | 966                            | 34.6                                      | 42              | 22                     | .4                                          | 229                                     | 1.8                           | 1.8              | 2.8                           | 195                 | 195                              |
| Apr. 18, 1946.....                            | 1,200                          | 32.8                                      | 36              | 22                     | 2.6                                         | 215                                     | 3.0                           | 3.0              | 2.8                           | 178                 | 180                              |
| June 13, 1946.....                            | 1,760                          | 23.9                                      | .....           | .....                  | .....                                       | 178                                     | 2.0                           | 2.5              | 2.0                           | .....               | 183                              |
| Jan. 14, 1947.....                            | 1,060                          | 32.9                                      | .....           | .....                  | .....                                       | 212                                     | 3.0                           | 6.0              | 2.8                           | .....               | 243                              |
| Aug. 18, 1947.....                            | 553                            | 36.8                                      | .....           | .....                  | .....                                       | 242                                     | 2.0                           | 1.0              | 1.5                           | .....               | 186                              |
| Apr. 22, 1948.....                            | 1,270                          | 31.8                                      | .....           | .....                  | .....                                       | 200                                     | 3.0                           | 4.0              | 2.0                           | .....               | 49                               |
| Sept. 9, 1948.....                            | 553                            | 37.1                                      | .....           | .....                  | .....                                       | 247                                     | 1.0                           | 6.5              | 1.9                           | .....               | 114                              |
| 26. Strawberry River Near Evening Shade, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 13, 1945.....                            | 32                             | 42.7                                      | 49              | 24                     | 11                                          | 271                                     | 6.6                           | 3.0              | 1.0                           | 233                 | 221                              |
| Aug. 6, 1946.....                             | 39                             | 33.5                                      | .....           | .....                  | .....                                       | 232                                     | 5.0                           | 2.0              | 3.0                           | .....               | 213                              |
| Feb. 5, 1947.....                             | 77                             | 30.9                                      | .....           | .....                  | .....                                       | 198                                     | 6.0                           | 6.0              | .8                            | .....               | 152                              |
| Aug. 5, 1947.....                             | 12                             | 42.0                                      | .....           | .....                  | .....                                       | 278                                     | 4.0                           | .8               | .....                         | .....               | 236                              |
| June 14, 1948.....                            | 23                             | 42.0                                      | .....           | .....                  | .....                                       | 277                                     | 3.0                           | 3.8              | .5                            | .....               | 138                              |
| Sept. 23, 1948.....                           | 13                             | 54.9                                      | .....           | .....                  | .....                                       | 298                                     | 21                            | 27               | .6                            | .....               | 139                              |

— Continued.

WHITE RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                                     | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance† | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|--------------------------------------------------------|--------------------------------|-------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 27. Strawberry River Near Poughkeepsie, Ark.           |                                |                               |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 13, 1945.....                                     | 140                            | 42.6                          | 48              | 28                     | 1.8                                         | 254                                     | 4.4                           | 3.5              | 1.5                           | 233                 | 235                              |
| Aug. 8, 1946.....                                      | 100                            | 30.6                          | .....           | .....                  | .....                                       | 192                                     | 7.0                           | 3.0              | 1.0                           | .....               | 159                              |
| Feb. 5, 1947.....                                      | 212                            | 30.0                          | .....           | .....                  | .....                                       | 198                                     | 4.0                           | 6.0              | .8                            | .....               | 174                              |
| Aug. 6, 1947.....                                      | 55                             | 33.3                          | .....           | .....                  | .....                                       | 251                                     | 4.0                           | 1.0              | .2                            | .....               | 202                              |
| June 16, 1948.....                                     | 84                             | 37.4                          | .....           | .....                  | .....                                       | 253                                     | 4.0                           | 3.2              | .5                            | .....               | 69                               |
| 28. Piney Fork Strawberry River at Evening Shade, Ark. |                                |                               |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 13, 1945.....                                     | 22                             | 35.4                          | 40              | 23                     | 2.4                                         | 233                                     | 3.0                           | 3.5              | .8                            | 191                 | 194                              |
| Aug. 6, 1946.....                                      | 26                             | 30.6                          | .....           | .....                  | .....                                       | 214                                     | 2.0                           | 3.0              | .5                            | .....               | 198                              |
| Feb. 5, 1947.....                                      | 26                             | 28.7                          | .....           | .....                  | .....                                       | 179                                     | 3.0                           | 5.0              | 3.2                           | .....               | 159                              |
| Aug. 5, 1947.....                                      | 3.6                            | 30.6                          | .....           | .....                  | .....                                       | 201                                     | 1.0                           | 1.0              | .2                            | .....               | 162                              |
| June 15, 1948.....                                     | 9.8                            | 33.7                          | .....           | .....                  | .....                                       | 220                                     | 2.0                           | 3.5              | .8                            | .....               | 103                              |
| Sept. 23, 1948.....                                    | 4.2                            | 35.1                          | .....           | .....                  | .....                                       | 236                                     | 1.0                           | 8.5              | .3                            | .....               | 32                               |
| 29. South Fork Little Red River Near Clinton, Ark.     |                                |                               |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 11, 1945.....                                     | 120                            | 2.90                          | 3.2             | 1.5                    | 1.0                                         | 14                                      | 1.8                           | 2.0              | .2                            | 24                  | 14                               |
| Aug. 5, 1946.....                                      | 25                             | 5.50                          | .....           | .....                  | .....                                       | 22                                      | 3.0                           | 2.0              | .5                            | .....               | 32                               |
| Feb. 3, 1947.....                                      | 192                            | 3.30                          | .....           | .....                  | .....                                       | 12                                      | 3.0                           | 5.0              | 2.2                           | .....               | 16                               |
| Aug. 4, 1947.....                                      | 1.2                            | 4.52                          | .....           | .....                  | .....                                       | 21                                      | 1.0                           | .8               | .2                            | .....               | 13                               |
| June 1, 1948.....                                      | 117                            | 3.92                          | .....           | .....                  | .....                                       | 17                                      | 1.0                           | 2.6              | .6                            | .....               | 10                               |
| Sept. 21, 1948.....                                    | 2.8                            | 5.68                          | .....           | .....                  | .....                                       | 30                                      | 1.0                           | 3.2              | .2                            | .....               | 18                               |

— Continued.

WHITE RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                                | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|---------------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 30. Little Red River Near Heber Springs, Ark.     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 12, 1945                                     | 423                            | 4.60                                      | 5.7             | 1.5                    | 2.5                                         | 22                                      | 3.6                           | 2.5              | 0.5                           | 32                  | 20                               |
| Aug. 6, 1946                                      | 113                            | 6.20                                      | .....           | .....                  | .....                                       | 23                                      | 7.0                           | 3.0              | 1.5                           | .....               | 32                               |
| Feb. 4, 1947                                      | 830                            | 5.40                                      | .....           | .....                  | .....                                       | 22                                      | 7.0                           | 6.0              | .2                            | .....               | 39                               |
| Aug. 5, 1947                                      | 7.4                            | 5.50                                      | .....           | .....                  | .....                                       | 27                                      | 1.0                           | 1.2              | .2                            | .....               | 18                               |
| June 2, 1948                                      | 334                            | 5.44                                      | .....           | .....                  | .....                                       | 25                                      | 3.0                           | 3.4              | .6                            | .....               | 15                               |
| Sept. 22, 1948                                    | 9.4                            | 7.84                                      | .....           | .....                  | .....                                       | 40                                      | 1.0                           | 2.8              | .5                            | .....               | 25                               |
| 31. Middle Fork Little Red River at Shirley, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Dec. 11, 1945                                     | 90                             | 7.20                                      | 10              | 1.5                    | 2.9                                         | 32                                      | 5.8                           | 3.5              | .2                            | 44                  | 31                               |
| Aug. 5, 1946                                      | 37                             | 11.8                                      | .....           | .....                  | .....                                       | 64                                      | 3.0                           | 2.0              | .2                            | .....               | 54                               |
| Feb. 3, 1947                                      | 273                            | 10.3                                      | .....           | .....                  | .....                                       | 47                                      | 13                            | 4.0              | .0                            | .....               | 54                               |
| Aug. 4, 1947                                      | .4                             | 9.86                                      | .....           | .....                  | .....                                       | 54                                      | 3.0                           | 1.5              | .2                            | .....               | 39                               |
| June 2, 1948                                      | 62                             | 7.31                                      | .....           | .....                  | .....                                       | 32                                      | 5.0                           | 3.0              | 1.2                           | .....               | 24                               |
| Sept. 21, 1948                                    | 1.2                            | 16.2                                      | .....           | .....                  | .....                                       | 78                                      | 14                            | 6.0              | .6                            | .....               | 71                               |
| 34. Lagrue Bayou Near Stuttgart, Ark.             |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 15, 1945                                     | 2,280                          | 7.10                                      | 6.1             | 2.1                    | 4.5                                         | 28                                      | 4.0                           | 4.2              | .7                            | 80                  | 24                               |
| May 28, 1946                                      | 2,380                          | 5.20                                      | .....           | .....                  | .....                                       | 21                                      | 11                            | 2.8              | 2.8                           | .....               | 39                               |
| Feb. 13, 1947                                     | 41                             | 12.3                                      | .....           | .....                  | .....                                       | 59                                      | 5.0                           | 7.0              | 1.8                           | .....               | 62                               |
| Aug. 7, 1947                                      | 1.4                            | 29.7                                      | .....           | .....                  | .....                                       | 164                                     | 4.0                           | 9.8              | 1.0                           | .....               | 91                               |
| Apr. 20, 1948                                     | 328                            | 6.91                                      | .....           | .....                  | .....                                       | 30                                      | 5.0                           | 4.0              | 1.0                           | .....               | 21                               |
| Sept. 7, 1948                                     | 11                             | 18.1                                      | .....           | .....                  | .....                                       | 103                                     | 1.0                           | 11               | .6                            | .....               | 48                               |

<sup>1</sup> K×10<sup>5</sup> at 25° C.



## ARKANSAS RIVER BASIN

Chemical Analyses, in Parts Per Million

| Date of collection                     | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|----------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 36. Arkansas River at Dardanelle, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Jan. 3, 1946.....                      | 8,200                          | 209                                       | 102             | 25                     | 275                                         | 191                                     | 58                            | 522              | 2.0                           | 1,180               | 357                              |
| Feb. 11, 1947.....                     | 7,680                          | 210                                       | .....           | .....                  | .....                                       | 175                                     | 115                           | 488              | 1.5                           | .....               | 308                              |
| Oct. 31, 1947.....                     | 5,950                          | 144                                       | .....           | .....                  | .....                                       | 130                                     | 25                            | 358              | 1.2                           | .....               | 178                              |
| Apr. 19, 1948.....                     | 20,200                         | 92.8                                      | .....           | .....                  | .....                                       | 112                                     | 28                            | 178              | 1.8                           | .....               | 66                               |
| Aug. 31, 1948.....                     | 22,500                         | 137                                       | 68              | 13                     | 203                                         | 146                                     | 105                           | 307              | 2.0                           | 820                 | 223                              |
| Sept. 3, 1948.....                     | 16,600                         | 116                                       | .....           | .....                  | .....                                       | 134                                     | 93                            | 250              | 1.0                           | .....               | 196                              |
| Sept. 24, 1948.....                    | 7,420                          | 151                                       | 71              | 17                     | 214                                         | 146                                     | 79                            | 360              | .2                            | 855                 | 247                              |
| 38. Poteau River at Cauthron, Ark.     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 23, 1945.....                     | 9.2                            | 530                                       | 3.4             | 3.0                    | 3.7                                         | 24                                      | 4.8                           | 3.0              | .0                            | 52                  | 21                               |
| May 27, 1946.....                      | 345                            | 5.00                                      | .....           | .....                  | .....                                       | 15                                      | 7.0                           | 2.2              | 1.2                           | .....               | 24                               |
| Feb. 3, 1947.....                      | 25                             | 9.80                                      | .....           | .....                  | .....                                       | 19                                      | 17                            | 10               | .5                            | .....               | 39                               |
| June 2, 1948.....                      | 12                             | 6.36                                      | .....           | .....                  | .....                                       | 22                                      | 7.0                           | 4.6              | .6                            | .....               | 16                               |
| 39. Frog Bayou Near Mountainburg, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Jan. 14, 1947.....                     | 52                             | 330                                       | .....           | .....                  | .....                                       | 12                                      | 6.0                           | 8.0              | .8                            | .....               | 16                               |
| May 6, 1948.....                       | 53                             | 3.99                                      | .....           | .....                  | .....                                       | 12                                      | 10                            | 4.0              | .3                            | .....               | 11                               |
| Sept. 24, 1948.....                    | .0                             | 4.58                                      | 3.0             | 1.3                    | 8.3                                         | 22                                      | 8.4                           | 2.5              | .2                            | 43                  | 13                               |
| 40. Mulberry River Near Mulberry, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 24, 1945.....                     | 7.8                            | 4.90                                      | 5.2             | 1.7                    | 1.3                                         | 22                                      | 1.3                           | 1.8              | 1.2                           | 32                  | 20                               |
| Jan. 21, 1947.....                     | 251                            | 2.80                                      | .....           | .....                  | .....                                       | 11                                      | 3.0                           | 5.0              | .2                            | .....               | 9                                |
| Aug. 15, 1947.....                     | 1.1                            | 5.38                                      | .....           | .....                  | .....                                       | 24                                      | 1.0                           | 1.0              | .2                            | .....               | 18                               |
| Apr. 16, 1948.....                     | 475                            | 2.59                                      | .....           | .....                  | .....                                       | 10                                      | 5.0                           | 2.0              | .3                            | .....               | 10                               |
| Sept. 24, 1948.....                    | 6.4                            | 5.19                                      | 3.1             | 1.5                    | 8.5                                         | 24                                      | 6.8                           | 3.5              | .2                            | 42                  | 14                               |

— Continued.

ARKANSAS RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                         | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|--------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 40A. Illinois Bayou Near Scottsville, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Apr. 30, 1948.....                         | 209                            | 3.54                                      | .....           | .....                  | .....                                       | 12                                      | 3.0                           | 4.0              | 0.0                           | .....               | 16                               |
| Aug. 31, 1948.....                         | 7.5                            | 7.78                                      | 3.9             | 2.4                    | 8.3                                         | 18                                      | 11                            | 6.0              | 2.1                           | 51                  | 20                               |
| Sept. 17, 1948.....                        | 2.5                            | 4.94                                      | .....           | .....                  | .....                                       | 25                                      | 1.0                           | 3.5              | .6                            | .....               | 16                               |
| 41. Petit Jean Creek Near Booneville, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 23, 1945.....                         | 17                             | 7.50                                      | 4.3             | 3.3                    | 5.2                                         | 26                                      | 8.5                           | 3.0              | 1.5                           | 67                  | 34                               |
| Apr. 24, 1946.....                         | 5,640                          | 4.80                                      | 1.1             | 1.5                    | 5.2                                         | 12                                      | 5.7                           | 3.0              | .2                            | 60                  | 8.9                              |
| Jan. 8, 1947.....                          | 195                            | 7.10                                      | .....           | .....                  | .....                                       | 17                                      | 18                            | 10               | .5                            | .....               | 16                               |
| May 18, 1948.....                          | 132                            | 6.87                                      | .....           | .....                  | .....                                       | 14                                      | 23                            | 6.0              | .3                            | .....               | 18                               |
| Sept. 14, 1948.....                        | .2                             | 9.32                                      | .....           | .....                  | .....                                       | 39                                      | 5.0                           | 6.2              | 1.0                           | .....               | 20                               |
| Sept. 24, 1948.....                        | .0                             | 10.3                                      | 3.7             | 4.5                    | 10                                          | 42                                      | 6.7                           | 5.0              | .6                            | 69                  | 38                               |
| 42. Petit Jean Creek Near Waveland, Ark.   |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 23, 1945.....                         | 60                             | 5.20                                      | 3.3             | 2.9                    | 3.9                                         | 23                                      | 4.8                           | 2.5              | 1.5                           | 51                  | 20                               |
| Jan. 8, 1947.....                          | 410                            | 9.30                                      | .....           | .....                  | .....                                       | 20                                      | 11                            | 8.0              | .8                            | .....               | 24                               |
| Aug. 4, 1947.....                          | 3.8                            | 12.3                                      | .....           | .....                  | .....                                       | 41                                      | 8.0                           | 2.8              | 1.0                           | .....               | 30                               |
| May 18, 1948.....                          | 1,720                          | 6.05                                      | .....           | .....                  | .....                                       | 14                                      | 28                            | 6.0              | .0                            | .....               | 17                               |
| Sept. 14, 1948.....                        | 19                             | 8.45                                      | .....           | .....                  | .....                                       | 34                                      | 5.0                           | 5.2              | .9                            | .....               | 26                               |
| 43. Petit Jean Creek at Danville, Ark.     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 20, 1945.....                         | 176                            | 8.20                                      | 4.6             | 3.4                    | 6.0                                         | 30                                      | 7.8                           | 3.5              | 1.0                           | 63                  | 26                               |
| Apr. 25, 1946.....                         | 5,070                          | 3.50                                      | 1.6             | 1.4                    | 3.2                                         | 9.0                                     | 3.5                           | 3.5              | 1.0                           | 47                  | 9.8                              |
| Jan. 9, 1947.....                          | 524                            | 7.30                                      | .....           | .....                  | .....                                       | 13                                      | 17                            | 8.0              | 1.2                           | .....               | 16                               |
| Aug. 6, 1947.....                          | 1.9                            | 10.6                                      | .....           | .....                  | .....                                       | 51                                      | 5.0                           | 5.0              | .2                            | .....               | 37                               |
| May 4, 1948.....                           | 384                            | 5.88                                      | .....           | .....                  | .....                                       | 18                                      | 28                            | 6.0              | .0                            | .....               | 16                               |
| Sept. 24, 1948.....                        | 19                             | 9.32                                      | 4.1             | 3.3                    | 9.7                                         | 36                                      | 5.8                           | 5.5              | .5                            | 52                  | 24                               |

— Continued.

ARKANSAS RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                                | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|---------------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 44. Dutch Creek at Waltham, Ark.                  |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Sept. 15, 1948.....                               | 1.0                            | 7.91                                      | .....           | .....                  | .....                                       | 38                                      | 2.0                           | 6.5              | 1.1                           | .....               | 17                               |
| Sept. 24, 1948.....                               | .4                             | 7.76                                      | 3.2             | 3.2                    | 7.9                                         | 34                                      | 2.1                           | 5.0              | .4                            | 50                  | 21                               |
| 45. Fourche La Fave River Near Gravelly, Ark.     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 23, 1945.....                                | 359                            | 4.30                                      | 2.3             | 2.5                    | 1.4                                         | 17                                      | 1.8                           | 2.0              | .5                            | 48                  | 16                               |
| Apr. 26, 1946.....                                | 2,190                          | 3.20                                      | 1.2             | 1.4                    | 4.1                                         | 13                                      | 3.2                           | 2.5              | .2                            | 42                  | 8.8                              |
| Jan. 10, 1947.....                                | 300                            | 3.30                                      | .....           | .....                  | .....                                       | 10                                      | 7.0                           | 5.0              | .2                            | .....               | 32                               |
| Aug. 7, 1947.....                                 | .0                             | 5.70                                      | .....           | .....                  | .....                                       | 24                                      | 2.0                           | 2.5              | .5                            | .....               | 18                               |
| May 19, 1948.....                                 | 281                            | 3.87                                      | .....           | .....                  | .....                                       | 18                                      | 5.0                           | 6.0              | .3                            | .....               | 9                                |
| 46. Fourche La Fave River Near Nimrod, Ark.       |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Aug. 22, 1945.....                                | 246                            | 5.10                                      | 3.3             | 2.0                    | 2.6                                         | 20                                      | 1.0                           | 2.0              | 2.4                           | 31                  | 16                               |
| Apr. 25, 1946.....                                | 929                            | 3.20                                      | 1.8             | 1.8                    | 2.8                                         | 10                                      | 3.9                           | 3.5              | 1.0                           | 43                  | 12                               |
| Jan. 9, 1947.....                                 | 390                            | 3.50                                      | .....           | .....                  | .....                                       | 13                                      | 3.0                           | 4.0              | .2                            | .....               | 16                               |
| Aug. 9, 1947.....                                 | 3.3                            | 5.38                                      | .....           | .....                  | .....                                       | 19                                      | 1.0                           | 1.5              | 1.2                           | .....               | 15                               |
| May 20, 1948.....                                 | 7.1                            | 3.97                                      | .....           | .....                  | .....                                       | 14                                      | 5.0                           | 4.0              | .3                            | .....               | 10                               |
| 47. South Fourche La Fave River Near Hollis, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Jan. 24, 1946.....                                | 190                            | 7.10                                      | 1.2             | 1.0                    | 3.5                                         | 10                                      | 2.7                           | 2.5              | .2                            | 34                  | 7                                |
| Jan. 9, 1947.....                                 | 172                            | 2.70                                      | .....           | .....                  | .....                                       | 11                                      | 3.0                           | 4.0              | .2                            | .....               | 16                               |
| May 20, 1948.....                                 | 271                            | 2.76                                      | .....           | .....                  | .....                                       | 6                                       | 5.0                           | 6.0              | .0                            | .....               | 9                                |
| June 8, 1948.....                                 | 16                             | 4.23                                      | .....           | .....                  | .....                                       | 18                                      | 2.0                           | 3.4              | .6                            | .....               | 11                               |

— Continued.

ARKANSAS RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                    | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|---------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 48. Bayou Meto Near Stuttgart, Ark.   |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 14, 1945.....                    | 1,310                          | 4.70                                      | 3.8             | 1.6                    | 2.2                                         | 14                                      | 3.7                           | 3.5              | 0.8                           | 76                  | 16                               |
| Apr. 30, 1946.....                    | 991                            | 4.70                                      | 3.0             | 1.7                    | 4.7                                         | 22                                      | 3.0                           | 2.5              | .2                            | 57                  | 14                               |
| Feb. 12, 1947.....                    | 567                            | 6.30                                      | .....           | .....                  | .....                                       | 18                                      | 9.0                           | 8.0              | .5                            | .....               | 39                               |
| Oct. 29, 1947.....                    | 425                            | 11.8                                      | .....           | .....                  | .....                                       | 42                                      | 10                            | 9.2              | .2                            | .....               | 27                               |
| Apr. 19, 1948.....                    | 1,670                          | 5.12                                      | .....           | .....                  | .....                                       | 22                                      | 8.0                           | 4.0              | 1.0                           | .....               | 13                               |
| Sept. 7, 1948.....                    | 38                             | 15.9                                      | .....           | .....                  | .....                                       | 88                                      | 2.0                           | 10               | .8                            | .....               | 38                               |
| 49. Crooked Creek Near Humphrey, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 14, 1945.....                    | 767                            | 4.50                                      | 3.5             | 1.3                    | 2.3                                         | 13                                      | 3.6                           | 3.0              | .5                            | 77                  | 14                               |
| May 28, 1946.....                     | 905                            | 4.30                                      | .....           | .....                  | .....                                       | 17                                      | 4.0                           | 3.2              | 1.2                           | .....               | 32                               |
| Feb. 12, 1947.....                    | 6.2                            | 9.30                                      | .....           | .....                  | .....                                       | 26                                      | 17                            | 4.0              | 1.2                           | .....               | 39                               |
| Apr. 19, 1948.....                    | 1,200                          | 5.46                                      | .....           | .....                  | .....                                       | 30                                      | 10                            | 6.0              | 1.0                           | .....               | 16                               |
| July 8, 1948.....                     | .1                             | 23.2                                      | .....           | .....                  | .....                                       | 126                                     | 3.0                           | 28               | 2.4                           | .....               | 53                               |

<sup>1</sup> K×10<sup>3</sup> at 25° C.

## RED RIVER BASIN

## Chemical Analyses, in Parts Per Million

| Date of collection                  | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>a</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 50. Red River at Index, Ark.        |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 15, 1945.....                  | 7,010                          | 72.4                                      | 64              | 17                     | 53                                          | 163                                     | 69                            | 94               | 0.8                           | 424                 | 230                              |
| Jan. 21, 1947.....                  | 11,100                         | 89.6                                      | .....           | .....                  | .....                                       | 166                                     | 90                            | 137              | .2                            | .....               | 243                              |
| Aug. 21, 1947.....                  | 3,140                          | 89.6                                      | .....           | .....                  | .....                                       | 158                                     | 175                           | 142              | .8                            | .....               | 222                              |
| Sept. 22, 1948.....                 | 2,880                          | 148                                       | 68              | 25                     | 211                                         | 190                                     | 169                           | 280              | .3                            | 874                 | 272                              |
| 52. Red River at Garland, Ark.      |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 26, 1945.....                  | 21,200                         | 80.4                                      | 62              | 15                     | 83                                          | 138                                     | 90                            | 184              | .8                            | 502                 | 216                              |
| Aug. 22, 1945.....                  | 23,000                         | 37.9                                      | 31              | 7.4                    | 29                                          | 84                                      | 32                            | 48               | .8                            | 217                 | 108                              |
| Dec. 15, 1945.....                  | 3,190                          | 53.6                                      | 60              | 15                     | 33                                          | 228                                     | 30                            | 46               | .8                            | 297                 | 211                              |
| May 29, 1946.....                   | 46,500                         | 15.2                                      | .....           | .....                  | .....                                       | 70                                      | 12                            | 7.5              | 1.2                           | .....               | 69                               |
| Apr. 15, 1948.....                  | 15,400                         | 42.9                                      | .....           | .....                  | .....                                       | 108                                     | 261                           | 86               | .0                            | .....               | 55                               |
| Sept. 30, 1948.....                 | 3,730                          | 140                                       | .....           | .....                  | .....                                       | 214                                     | 154                           | 260              | .4                            | .....               | 246                              |
| 53. Little River Near Horatio, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 24, 1945.....                  | 419                            | 11.4                                      | 7.7             | 2.1                    | 13                                          | 32                                      | 3.7                           | 18               | .5                            | 76                  | 28                               |
| Aug. 21, 1945.....                  | 2,060                          | 5.70                                      | 4.6             | 2.2                    | 1.8                                         | 18                                      | 2.1                           | 5.0              | .7                            | 50                  | 21                               |
| May 28, 1946.....                   | 25,400                         | 3.10                                      | .....           | .....                  | .....                                       | 12                                      | 2.0                           | 2.2              | .8                            | .....               | 32                               |
| Oct. 1-10, 1946.....                | 552                            | 45.1                                      | 15              | 4.1                    | 66                                          | 44                                      | 8.0                           | 108              | 1.8                           | 259                 | 54                               |
| Oct. 11-20, 1946.....               | 50 <sup>a</sup>                | 44.7                                      | 16              | 6.1                    | 65                                          | 52                                      | 8.8                           | 108              | 2.0                           | 263                 | 65                               |
| Oct. 21-31, 1946.....               | 102 <sup>a</sup>               | 58.4                                      | 18              | 4.1                    | 92                                          | 56                                      | 13                            | 142              | 1.8                           | 333                 | 62                               |
| Nov. 7-15, 1946.....                | 18,200 <sup>a</sup>            | 4.60                                      | 2.8             | 1.0                    | 5.6                                         | 14                                      | 4.7                           | 4.5              | .8                            | 51                  | 11                               |
| Aug. 19, 1947.....                  | 26                             | 32.7                                      | .....           | .....                  | .....                                       | 33                                      | 10                            | 75               | .2                            | .....               | 40                               |
| Apr. 13, 1948.....                  | 3,500                          | 7.86                                      | .....           | .....                  | .....                                       | 22                                      | 10                            | 12               | .3                            | .....               | 17                               |
| Sept. 22, 1948.....                 | 27                             | 27.6                                      | 8.4             | 3.1                    | 44                                          | 30                                      | 5.6                           | 68               | .2                            | 151                 | 34                               |
| Sept. 29, 1948.....                 | 16                             | 38.1                                      | .....           | .....                  | .....                                       | 40                                      | 13                            | 90               | .5                            | .....               | 47                               |

— Continued.

RED RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                            | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|-----------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| <b>54. Cossatot River Near De Queen, Ark.</b> |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 25, 1945.....                            | 28                             | 5.00                                      | 4.2             | 1.6                    | 3.6                                         | 23                                      | 2.7                           | 2.2              | 0.2                           | 38                  | 17                               |
| Aug. 22, 1945.....                            | 380                            | 3.80                                      | 2.9             | 1.7                    | 2.7                                         | 15                                      | 4.6                           | 2.0              | .8                            | 48                  | 14                               |
| May 28, 1946.....                             | 1,180                          | 4.10                                      | .....           | .....                  | .....                                       | 10                                      | 1.0                           | 3.8              | 1.8                           | .....               | 33                               |
| Oct. 1-10, 1946.....                          | 14 <sup>2</sup>                | 6.10                                      | 5.6             | 2.6                    | 4.5                                         | 29                                      | 3.5                           | 4.5              | .8                            | 41                  | 30                               |
| Oct. 11-20, 1946.....                         | 16 <sup>2</sup>                | 6.00                                      | 5.6             | 2.4                    | 3.6                                         | 28                                      | 3.5                           | 3.5              | .2                            | 41                  | 34                               |
| Oct. 21-31, 1946.....                         | 23 <sup>2</sup>                | 6.50                                      | 6.2             | 2.1                    | 4.4                                         | 29                                      | 3.4                           | 4.0              | 1.0                           | 48                  | 34                               |
| Nov. 3-17, 1946.....                          | 1,310 <sup>2</sup>             | 3.80                                      | 2.1             | 1.2                    | 4.0                                         | 13                                      | 3.3                           | 2.5              | 1.5                           | 37                  | 10                               |
| Aug. 19, 1947.....                            | 37                             | 5.95                                      | .....           | .....                  | .....                                       | 24                                      | 3.0                           | 2.0              | .2                            | .....               | 16                               |
| June 2, 1948.....                             | 59                             | 4.31                                      | .....           | .....                  | .....                                       | 15                                      | 3.0                           | 5.0              | 1.0                           | .....               | 11                               |
| Aug. 31, 1948.....                            | 24                             | 4.78                                      | .....           | .....                  | .....                                       | 22                                      | 1.0                           | 3.5              | .2                            | .....               | 14                               |
| Sept. 22, 1948.....                           | 10                             | 5.92                                      | 3.3             | 1.7                    | 4.8                                         | 20                                      | 3.3                           | 4.0              | .1                            | 33                  | 10                               |
| <b>55. Saline River Near Dierks, Ark.</b>     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 14, 1945.....                            | 100                            | 4.30                                      | 5.1             | 1.4                    | 1.4                                         | 18                                      | 2.0                           | 3.2              | .3                            | 66                  | 18                               |
| May 29, 1946.....                             | 309                            | 5.10                                      | .....           | .....                  | .....                                       | 6.0                                     | 3.0                           | 6.0              | 7.5                           | .....               | 33                               |
| Jan. 18, 1947.....                            | 233                            | 3.40                                      | .....           | .....                  | .....                                       | 16                                      | 5.0                           | 6.0              | .2                            | .....               | 16                               |
| Sept. 30, 1947.....                           | 20                             | 3.38                                      | .....           | .....                  | .....                                       | 16                                      | 1.0                           | 2.5              | .2                            | .....               | 18                               |
| Apr. 20, 1948.....                            | 81                             | 4.92                                      | .....           | .....                  | .....                                       | 14                                      | 5.0                           | 6.0              | .3                            | .....               | 8                                |
| Sept. 22, 1948.....                           | .8                             | 5.33                                      | 3.1             | 1.7                    | 5.6                                         | 22                                      | 2.8                           | 4.0              | .0                            | 35                  | 15                               |
| <b>56. Ouachita River Near Mt. Ida, Ark.</b>  |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Oct. 1-8, 10, 1946.....                       | 32 <sup>2</sup>                | 10.8                                      | 16              | 1.7                    | 5.7                                         | 59                                      | 4.9                           | 4.0              | .2                            | 67                  | 47                               |
| Oct. 11-20, 1946.....                         | 35 <sup>2</sup>                | 10.5                                      | 15              | 1.9                    | 4.6                                         | 54                                      | 4.5                           | 4.2              | .5                            | 64                  | 45                               |
| Oct. 21-31, 1946.....                         | 49 <sup>2</sup>                | 10.6                                      | 15              | 1.7                    | 5.5                                         | 55                                      | 5.0                           | 4.2              | .2                            | 66                  | 44                               |
| Nov. 1-5, 1946.....                           | 1,020 <sup>2</sup>             | 9.40                                      | 10              | 1.5                    | 9.2                                         | 43                                      | 5.0                           | 6.5              | 2.0                           | 65                  | 31                               |
| Nov. 6-15, 1946.....                          | 1,860 <sup>2</sup>             | 4.60                                      | 4.0             | 1.0                    | 6.1                                         | 19                                      | 4.8                           | 4.0              | 1.5                           | 40                  | 14                               |
| Sept. 12, 1947.....                           | 76                             | 8.10                                      | .....           | .....                  | .....                                       | 39                                      | 3.0                           | 2.0              | 2.5                           | .....               | 35                               |

—Continued.

RED RIVER BASIN—Continued  
Chemical Analyses, in Parts Per Million

| Date of collection                                | Discharge<br>(second-<br>feet) | Specific<br>conduct-<br>ance <sup>1</sup> | Calcium<br>(Ca) | Magne-<br>sium<br>(Mg) | Sodium<br>and<br>potas-<br>sium<br>(Na + K) | Bicar-<br>bonate<br>(HCO <sub>3</sub> ) | Sulfate<br>(SO <sub>4</sub> ) | Chloride<br>(Cl) | Nitrate<br>(NO <sub>3</sub> ) | Dissolved<br>solids | Hardness<br>as CaCO <sub>3</sub> |
|---------------------------------------------------|--------------------------------|-------------------------------------------|-----------------|------------------------|---------------------------------------------|-----------------------------------------|-------------------------------|------------------|-------------------------------|---------------------|----------------------------------|
| 57. Ouachita River Near Mountain Pine, Ark.       |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 27, 1945.....                                | 182                            | 12.6                                      | 19              | 3.3                    | 2.9                                         | 73                                      | 4.1                           | 2.2              | 0.0                           | 74                  | 61                               |
| Aug. 23, 1945.....                                | 576                            | 14.0                                      | 20              | 3.5                    | 1.8                                         | 75                                      | 3.5                           | 2.0              | .3                            | 78                  | 64                               |
| May 30, 1946.....                                 | 2,310                          | 7.20                                      | .....           | .....                  | .....                                       | 39                                      | 2.0                           | 2.2              | 1.0                           | .....               | 39                               |
| Jan. 8, 1947.....                                 | 1,260                          | 7.80                                      | .....           | .....                  | .....                                       | 35                                      | 5.0                           | 6.0              | 4.0                           | .....               | 32                               |
| Sept. 11, 1947.....                               | 98                             | 8.59                                      | .....           | .....                  | .....                                       | 42                                      | 2.5                           | 2.5              | 1.0                           | .....               | 29                               |
| Apr. 16, 1948.....                                | 2,860                          | 6.72                                      | .....           | .....                  | .....                                       | 30                                      | 5.0                           | 4.0              | .0                            | .....               | 24                               |
| Sept. 2, 1948.....                                | 81                             | 12.6                                      | .....           | .....                  | .....                                       | 68                                      | 3.0                           | 8.5              | 1.2                           | .....               | 46                               |
| Sept. 23, 1948.....                               | 50                             | 12.1                                      | 12              | 2.8                    | 8.3                                         | 60                                      | 3.7                           | 4.0              | .4                            | 66                  | 41                               |
| 59. Ouachita River at Arkadelphia, Ark.           |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Sept. 25, 1947.....                               | 332                            | 17.1                                      | 10              | 2.3                    | 5.7                                         | 36                                      | 7.2                           | 5.2              | 1.0                           | 60                  | 34                               |
| 63. Little Missouri River Near Murfreesboro, Ark. |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| July 25, 1945.....                                | 28                             | 4.60                                      | 4.6             | 1.4                    | 3.7                                         | 23                                      | 2.8                           | 2.5              | .0                            | 34                  | 17                               |
| Aug. 25, 1945.....                                | 172                            | 4.40                                      | 5.0             | 1.4                    | 1.2                                         | 20                                      | 2.0                           | 1.5              | .2                            | 31                  | 18                               |
| May 28, 1946.....                                 | 1,180                          | 3.80                                      | .....           | .....                  | .....                                       | 9.0                                     | 2.0                           | 2.5              | 3.2                           | .....               | 24                               |
| Jan. 9, 1947.....                                 | 314                            | 3.90                                      | .....           | .....                  | .....                                       | 14                                      | 6.0                           | 3.0              | .5                            | .....               | 24                               |
| Aug. 20, 1947.....                                | 31                             | 6.10                                      | .....           | .....                  | .....                                       | 28                                      | 4.0                           | 2.5              | 1.0                           | .....               | 20                               |
| Apr. 14, 1948.....                                | 1,560                          | 3.43                                      | .....           | .....                  | .....                                       | 10                                      | 5.0                           | 6.0              | .0                            | .....               | 10                               |
| Sept. 1, 1948.....                                | 15                             | 7.25                                      | .....           | .....                  | .....                                       | 37                                      | 10                            | 4.0              | 1.3                           | .....               | 22                               |
| 64. Little Missouri River Near Boughton, Ark.     |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Oct. 1-10, 1946.....                              | 22 <sup>2</sup>                | 7.4                                       | 5.8             | 1.0                    | 8.1                                         | 27                                      | 6.2                           | 5.0              | .8                            | 58                  | 19                               |
| Oct. 11-20, 1946.....                             | 32 <sup>2</sup>                | 8.7                                       | 5.4             | .8                     | 11                                          | 31                                      | 6.2                           | 6.5              | .8                            | 59                  | 17                               |
| Oct. 21-31, 1946.....                             | 125 <sup>2</sup>               | 9.2                                       | 9.2             | 1.1                    | 10                                          | 40                                      | 8.2                           | 5.5              | 1.0                           | 68                  | 27                               |
| Nov. 1-15, 1946.....                              | 6,000 <sup>2</sup>             | 8.8                                       | 8.5             | 1.5                    | 6.9                                         | 38                                      | 6.6                           | 2.5              | 1.2                           | 62                  | 27                               |
| 66. Saline River Near Rye, Ark.                   |                                |                                           |                 |                        |                                             |                                         |                               |                  |                               |                     |                                  |
| Nov. 14, 1945.....                                | 7,400                          | 4.30                                      | 3.0             | 1.3                    | 1.1                                         | 8.0                                     | 5.5                           | 2.0              | 0.3                           | 49                  | 13                               |
| May 28, 1946.....                                 | 9,790                          | 4.50                                      | .....           | .....                  | .....                                       | 17                                      | 7.0                           | 2.8              | 1.0                           | .....               | 32                               |

<sup>1</sup> K X 10<sup>5</sup> at 25° C.

<sup>2</sup> Mean discharge.

## MISCELLANEOUS ANALYSES

*Chemical Analyses, in Parts Per Million*

| Source                          | Location                                          | Date of collection | Specific conductance <sup>1</sup> | Iron (Fe) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dis-solved solids | Hardness as CaCO <sub>3</sub> | Non-carbonate |
|---------------------------------|---------------------------------------------------|--------------------|-----------------------------------|-----------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------|-------------------------------|---------------|
| Tyroneza River                  | Near Tyroneza, Ark.                               | Sept. 16, 1945     | 59.9                              | .....     | 88           | 26             | .....       | 7.8           | 334                             | 43                         | 5.9           | 1.8                        | 359               | 326                           | 38            |
| Tyroneza River                  | Near Tyroneza, Ark.                               | Mar. 17, 1946      | 29.8                              | .....     | 39           | 11             | .....       | 8.8           | 166                             | 17                         | 4.2           | 2.5                        | 184               | 143                           | 6             |
| St. Francis River floodway      | Near Marked Tree, Ark.                            | Apr. 6, 1946       | 35.1                              | .....     | 47           | 13             | .....       | 11            | 204                             | 13                         | 9.5           | .2                         | 213               | 171                           | 4             |
| Lake Leatherwood                | Eureka Springs, Ark.                              | Sept. 27, 1947     | 18.9                              | 0.01      | 23           | 10             | 2.0         | 1.3           | 120                             | 3.9                        | 1.2           | .2                         | 113               | 98                            | 0             |
| Arkansas River                  | On 23 Highway Bridge Ozark, Ark.                  | Sept. 24, 1948     | 162                               | .05       | 62           | 19             | 242         | 4.2           | 142                             | 92                         | 390           | .2                         | 911               | 232                           | 116           |
| Cache River                     | On U. S. Highway Bridge at Biscoe, Ark.           | Sept. 28, 1947     | 33.3                              | .05       | 22           | 2.8            | 47          | 3.8           | 155                             | 12                         | 23            | .8                         | 196               | 66                            | 0             |
| Hurricane Creek                 | On Highway 35 near Sheridan, Ark.                 | Aug. 29, 1948      | 56.7                              | .02       | 40           | 5.7            | 66          | 3.0           | 44                              | 181                        | 30            | .2                         | 359               | 124                           | 88            |
| North Fork Saline River         | On Highway 70 near Benton, Ark.                   | Sept. 28, 1948     | 17.2                              | .02       | 21           | 6.2            | 4.0         | .9            | 96                              | 3.8                        | 3.5           | .1                         | 95                | 65                            | 0             |
| Lake Hamilton                   | On Highway 7 near Hot Springs, Ark.               | Sept. 23, 1948     | 8.67                              | .01       | 7.2          | 2.1            | 7.3         | .5            | 42                              | 3.6                        | 4.0           | .4                         | 53                | 27                            | 0             |
| Arkansas River                  | On U. S. 79 Highway Bridge near Pine Bluff, Ark.  | Sept. 24, 1947     | 86.0                              | .02       | 46           | 12             | 96          | 4.5           | 111                             | 40                         | 174           | 1.8                        | 460               | 164                           | 73            |
| Caddo River                     | On U. S. 67 Highway Bridge near Arkadelphia, Ark. | Sept. 25, 1947     | 8.48                              | .04       | 10           | 1.6            | 4.3         | 1.4           | 42                              | 4.9                        | 1.8           | .8                         | 54                | 32                            | 0             |
| Caddo River                     | On U. S. 67 Highway Bridge near Arkadelphia, Ark. | Sept. 28, 1948     | 9.99                              | .01       | 11           | 2.1            | 6.0         | .6            | 48                              | 4.0                        | 4.5           | .2                         | 68                | 36                            | 0             |
| Terre Noir Creek                | On U. S. 67 Highway near Gordon, Ark.             | Sept. 25, 1947     | 19.1                              | .57       | 12           | 2.3            | 22          | 3.6           | 60                              | 11                         | 21            | .8                         | 123               | 39                            | 0             |
| South Ditch of Terre Noir Creek | On U. S. 67 Highway near Gordon, Ark.             | Sept. 25, 1947     | 32.0                              | .02       | 22           | 2.1            | 26          | 2.5           | 99                              | 35                         | 23            | .2                         | 192               | 91                            | 10            |
| Saline River                    | Near Poole, Ark.                                  | Aug. 29, 1948      | 13.0                              | .03       | 11           | 3.0            | 10          | 2.4           | 44                              | 13                         | 10            | .9                         | 78                | 40                            | 4             |
| Two Bayou                       | On Highway 7 near Camden, Ark.                    | Aug. 30, 1948      | 20.0                              | .12       | 8.4          | 1.9            | 20          | 3.6           | 52                              | 8.1                        | 18            | .5                         | 110               | 29                            | 0             |

— Continued.



MISCELLANEOUS ANALYSES—Continued  
*Chemical Analyses, in Parts Per Million*

| Source          | Location                              | Date of collection | Specific conductance <sup>1</sup> | Iron (Fe) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Hardness as CaCO <sub>3</sub> |               |
|-----------------|---------------------------------------|--------------------|-----------------------------------|-----------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|-------------------------------|---------------|
|                 |                                       |                    |                                   |           |              |                |             |               |                                 |                            |               |                            | Dissolved solids              | Non-carbonate |
| Ouachita River  | 2 miles below Morobay, Ark.           | Sept. 24, 1947     | 111                               | 0.08      | 40           | 8.5            | 154         | 3.7           | 36                              | 8.4                        | 308           | 1.2                        | 630                           | 135           |
| Ouachita River  | Near Calion, Ark.                     | Sept. 24, 1947     | 48.8                              | .22       | 19           | 4.7            | 62          | 2.5           | 36                              | 7.3                        | 118           | 2.2                        | 277                           | 87            |
| Smackover Creek | On Highway 7, Smackover, Ark.         | Sept. 24, 1947     | 512                               | .10       | 129          | 42             | 907         | 14            | 2.0                             | 69                         | 1,710         | .2                         | 2,880                         | 488           |
| Smackover Creek | On Highway 7, Smackover, Ark.         | Aug. 30, 1948      | 262                               | .04       | 77           | 19             | 431         | 18            | 6.0                             | 11                         | 860           | .4                         | 1,440                         | 265           |
| Smackover Creek | 1 mile north of Smackover, Ark.       | Sept. 24, 1947     | 430                               | .10       | 44           | 34             | 804         | 14            | 2.0                             | 11                         | 1,420         | .2                         | 2,350                         | 248           |
| Dorcheat Creek  | On U. S. 82 Highway                   | Sept. 25, 1947     | 47.6                              | .12       | 30           | 4.4            | 46          | 2.6           | 3.0                             | 4.7                        | 133           | .2                         | 300                           | 90            |
| Ouachita River  | Bridge between Waldo and Stamps, Ark. | Dec. 27, 1946      | 37.6                              | .27       | 13           | 3.4            | 52          | 2.0           | 20                              | 6.3                        | 98            | .5                         | 228                           | 30            |
| Ouachita River  | Between Strong and Crossett, Ark.     | Feb. 7, 1947       | 42.7                              | 0.39      | 14           | 4.2            | 56          | 2.1           | 20                              | 9.3                        | 106           | 0.5                        | 236                           | 36            |
| Ouachita River  | Between Strong and Crossett, Ark.     | Mar. 11, 1947      | 36.2                              | .67       | 11           | 3.7            | 49          | 2.1           | 11                              | 9.8                        | 95            | .2                         | 216                           | 34            |
| Ouachita River  | Between Strong and Crossett, Ark.     | Apr. 5, 1947       | 29.9                              | .30       | 9.3          | 3.3            | 40          |               | 15                              | 5.8                        | 73            | .2                         | 188                           | 24            |
| Ouachita River  | Between Strong and Crossett, Ark.     | May 19, 1947       | 10.6                              | 1.10      | 7.7          | 1.5            | 13          | 1.4           | 26                              | 6.0                        | 18            | .8                         | 87                            | 3             |
| Ouachita River  | Between Strong and Crossett, Ark.     | June 19, 1947      | 63.2                              | .19       | 22           | 5.4            | 85          | 2.0           | 28                              | 6.5                        | 166           | .5                         | 358                           | 54            |
| Ouachita River  | Between Strong and Crossett, Ark.     | July 15, 1947      | 41.6                              | .65       | 11           | 3.9            | 60          | 2.6           | 25                              | 8.8                        | 104           | .8                         | 250                           | 23            |
| Ouachita River  | Between Strong and Crossett, Ark.     | Aug. 9, 1947       | 103                               | .00       | 33           | 8.6            | 154         | 3.0           | 28                              | 13                         | 298           | .5                         | 592                           | 95            |

— Continued.

MISCELLANEOUS ANALYSES—Continued  
*Chemical Analyses, in Parts Per Million*

| Source            | Location                                                        | Date of collection | Specific conductance <sup>1</sup> | Iron (Fe) | Calcium (Ca) | Magnesium (Mg) | Sodium (Na) | Potassium (K) | Bicarbonate (HCO <sub>3</sub> ) | Sulfate (SO <sub>4</sub> ) | Chloride (Cl) | Nitrate (NO <sub>3</sub> ) | Dissolved solids | Hardness as CaCO <sub>3</sub> |               |
|-------------------|-----------------------------------------------------------------|--------------------|-----------------------------------|-----------|--------------|----------------|-------------|---------------|---------------------------------|----------------------------|---------------|----------------------------|------------------|-------------------------------|---------------|
|                   |                                                                 |                    |                                   |           |              |                |             |               |                                 |                            |               |                            |                  | Total                         | Non-carbonate |
| Quachita River    | Between Strong and Crossett, Ark.                               | Sept. 24, 1947     | 59.9                              | .05       | 19           | 7.8            | 80          | 6.8           | 29                              | 7.0                        | 162           | 1.2                        | 350              | 80                            | 55            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Oct. 8-10, 1947    | 470                               | .20       | 138          | 36             | 743         | 25            | 16                              | 8.7                        | 1,500         | 2.8                        | 2,460            | 492                           | 480           |
| Quachita River    | Between Strong and Crossett, Ark.                               | Oct. 21-31, 1947   | 484                               | .20       | 137          | 35             | 763         | 19            | 16                              | 9.2                        | 1,520         | 2.8                        | 2,500            | 486                           | 473           |
| Quachita River    | Between Strong and Crossett, Ark.                               | Nov. 1-3, 1947     | 509                               | .06       | 151          | 47             | 811         | 8.3           | 18                              | 9.9                        | 1,640         | 6.0                        | 2,700            | 570                           | 555           |
| Quachita River    | Between Strong and Crossett, Ark.                               | Nov. 4-10, 1947    | 81.6                              | .15       | 13           | 5.9            | 134         | 8.3           | 33                              | 7.4                        | 228           | 2.8                        | 446              | 57                            | 30            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Nov. 12-18, 1947   | 90.6                              | .05       | 31           | 7.0            | 131         | 9.9           | 22                              | 12                         | 263           | 1.5                        | 575              | 106                           | 88            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Nov. 19-21, 1947   | 28.5                              | .15       | 12           | 2.7            | 32          | 14            | 22                              | 7.6                        | 72            | 1.5                        | 186              | 41                            | 23            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Dec. 1-9, 1947     | 82.2                              | .08       | 28           | 7.0            | 115         | 11            | 26                              | 8.9                        | 234           | 1.5                        | 520              | 99                            | 78            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Dec. 10-24, 1947   | 15.5                              | .14       | 7.7          | 1.9            | 16          | 2.3           | 20                              | 6.8                        | 28            | 1.2                        | 102              | 27                            | 11            |
| Quachita River    | Between Strong and Crossett, Ark.                               | Aug. 30, 1948      | 82.1                              | .16       | 24           | 6.3            | 124         | 7.7           | 26                              | 15                         | 232           | .4                         | 485              | 86                            | 64            |
| La Pail Creek     | On U. S. 82 Highway between Strong and Crossett, Ark.           | Sept. 24, 1947     | 794                               | .20       | 141          | 48             | 1,550       | 13            | .0                              | 21                         | 2,770         | .5                         | 4,560            | 550                           | 550           |
| La Pail Creek     | On U. S. 82 Highway between Strong and Crossett, Ark.           | Aug. 30, 1948      | 1,260                             | .76       | 392          | 97             | 2,400       | 50            | .0                              | 25                         | 4,710         | .9                         | 7,840            | 1,380                         | 1,380         |
| Fish Trap Lake    | Below U. S. 82 Highway Bridge between Strong and Crossett, Ark. | Aug. 30, 1948      | 2,130                             | 1.8       | 940          | 187            | 4,350       | 128           | .0                              | 82                         | 8,960         | 18                         | 14,700           | 3,110                         | 3,110         |
| Bayou Bartholomew | Near Wilmot, Ark.                                               | July 25, 1947      | 10.5                              | 3.0       | 4.4          | 3.7            | 20          | 1.9           | 62                              | 7.8                        | 8.5           | .8                         | 106              | 26                            | 0             |

<sup>1</sup> K×10<sup>5</sup> at 25° C.