LOW-FLOW FREQUENCY DATA FOR CONTINUOUS-RECORD SPRING- AND STREAMFLOW-GAGING STATIONS

In each of the statewide studies that determined the values used in this report, low-flow data for continuous-record stations were defined by two methods. For those station records that did not contain zero flow or outlier values that would inaccurately alter the slope of the mathematically fitted curve, the log-Pearson Type-III distribution (U.S. Water Resources Council, 1967) was fitted to the logarithms of the annual lowest mean discharges to compute the low-flow frequency distribution. For those station records containing zero flow or outlier values, a graphical method was used (Riggs, 1972).

LOW-FLOW FREQUENCY DATA FOR PARTIAL-RECORD SPRING- AND STREAMFLOW-GAGING STATIONS

Low-flow partial-record stations have been operated in the gaging station networks of each of the Ozark subregion States for many years. Their purpose was to provide a relatively inexpensive method of defining low-flow frequency characteristics at numerous sites where continuous streamflow records had never been collected or where the records were too short to define these characteristics adequately. The stations generally were operated until a total of 8 or 10 low-flow measurements had been made on different streamflow recessions in more than 1 year. After a sufficient range of low-flow discharge measurements had been obtained, the measurements were related graphically to concurrent discharges at nearby continuous-record stations. The frequency data for several recurrence intervals then were transferred through the graphical relationship to obtain estimates for the partial-record sites. The 7-day Q_2 and 7-day Q_{10} values (the average minimum flows for 7 consecutive days that have a recurrence interval of 2 or 10 years) were determined with this graphical method at all possible stations. The available data are shown on sheet 3.

REGULATED STREAMS

It is possible to compute flow characteristics for regulated streams and interpret these data as probability information, provided the pattern of regulation has been consistent for a long enough time. Although the computed flow characteristics may be questionable at some individual sites, the information will be valuable to users of this report to identify gains and losses of the streams and to indicate areas of ground-water inflow. The low-flow characteristics are shown for the principal regulated streams in the subregion. The 7-day Q_2 and Q_{10} values shown on sheet 3 are for the period of record.

SEEPAGE INVESTIGATIONS

A seepage investigation is a series of discharge measurements made during a few days to identify where gains or losses in flow occur along a stream reach. Seepage-investigation data have been collected since 1953 in Missouri and during 1982 in Arkansas. These data are excellent indicators of the magnitude and distribution of low flows. The seepage investigations generally were made during periods of minimum streamflow and include discharge measurements at the gaging stations, as well as at ungaged sites. All available seepage-investigation data were analyzed for this study. Ratios of the discharge from the seepage investigations to the 7-day Q_2 and to the 7-day Q_{10} discharges at the gaging stations were calculated. Assuming uniform low-flow conditions throughout the basins, these ratios then were used to estimate the 7-day Q_2 and Q_{10} values at all sites where seepage-investigation data had been collected. These data are shown on sheet 3 with the 7-day Q_2 and Q_{10} values for continuous- and partial-record streamflow-gaging stations.

EXPLANATION

- ▲ Continuous-record streamflow-gaging station
- ▲ Partial-record low-flow streamflow-gaging station
- △ Seepage-investigation measuring site
- Continuous-record spring-gaging station
- Partial-record spring-gaging station
- 356 / 142 Upper number is 7-day, Q_2, in cubic feet per second; Lower number is 7-day, Q_{10}, in cubic feet per second
- (Values are for period of record)
- 28,900 / 21,000 Upper pair of numbers are 7-day, Q_2, and Q_{10}, for period of record prior to reservoir regulation
- 29,700 / 21,000 Lower pair of numbers are 7-day, Q_2, and Q_{10}, for period of record after reservoir regulation
- (A common October 1, 1953, was used to separate unregulated and regulated periods of record for Missouri and Mississippi river stations.)

NOTE: Station numbers are abbreviated versions of complete numbers given in table 1, sheet 2.

CONVERSION FACTORS

Inch-pound units of measurement used in this report may be converted to the International System of Units (SI) using the following factors:

Multiply inch-pound unit	By	To obtain SI units
inch (in)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.59	square kilometer (km^2)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

LOW-FLOW FREQUENCY DATA FOR SELECTED SPRINGS AND STREAMS

Base from U.S. Geological Survey
State maps, 1:500,000, 1975

SCALE 1:750 000
25 0 25 50 MILES
25 0 25 50 KILOMETERS

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1987—WRD/ED

FLOW CHARACTERISTICS FOR SELECTED SPRINGS AND STREAMS IN THE OZARK SUBREGION, ARKANSAS, KANSAS, MISSOURI, AND OKLAHOMA

By
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1987