

Figure 1.—Location of continuous-gaging stations and mean annual runoff divisions in the East Gulf Coastal Plain of Mississippi.

Table 1.—Continuous-gaging stations used to determine mean annual runoff
[Square mile, mi²; cubic foot per second per square mile, (ft³/s)/mi²]

Reference No.	Station No.	Name	Drainage area (mi ²)	Mean annual runoff [(ft ³ /s)/mi ²] (inches)	Period of record (month-year)	Mean annual runoff for base period 1939-85 [(ft ³ /s)/mi ²] (inches)		
1	02429900	Big Brown Creek near Booneville	27.1	1.89	25.66	6-1973 to 9-1985	1.63	22.18
2	02429949	Little Brown Creek near New Site	42.2	1.64	22.34	6-1973 to 9-1985	1.41	19.11
3	02430085	Red Bud Creek near Moores Mill	15.7	1.65	22.40	6-1975 to 9-1985	1.51	20.52
4	02430015	Mud Creek near Fairview	11.1	1.55	21.04	6-1975 to 9-1985	1.42	19.28
5	02430080	Cummings Creek near Fulton	19.1	1.79	24.24	7-1975 to 9-1985	1.64	22.34
6	02431000	Tombigbee River near Fulton	612	1.58	21.39	8-1928 to 9-1985	1.62	22.00
7	02432500	Bull Mountain Creek at Trenton	136	1.56	21.17	10-1943 to 9-1964	1.46	19.83
8	02433000	Bull Mountain Creek near Smithville	336	1.71	23.21	10-1940 to 9-1984	1.68	22.61
9	02433500	Tombigbee River at Bigbee	1,226	1.73	23.55	10-1944 to 9-1954	1.73	23.55
10	02435020	Town Creek at Easton Boulevard at Tupelo	233	2.02	27.39	10-1970 to 9-1985	1.73	23.55
11	02436500	Tom Creek near Nettleton	620	1.57	21.33	10-1939 to 9-1985	1.57	21.33
12	02437000	Tombigbee River near Amory	1,928	1.62	22.05	10-1937 to 9-1985	1.63	22.28
13	02439400	Buttahaatchee River near Aberdeen	799	1.85	25.17	7-1966 to 9-1985	1.71	23.21
14	02431000	Tibbee Creek near Tibbee	926	1.45	19.70	10-1928 to 9-1930	1.41	19.11
15	02441390	Tombigbee River at Columbus Lock and Dam near Columbus	4,440	1.50	20.32	10-1899 to 12-1912	1.56	21.17
16	02443500	Luxapallila Creek near Columbus	715	1.78	24.22	9-1928 to 9-1930	1.52	20.57
17	02448000	Noxubee River at Macon	768	1.39	18.88	8-1928 to 9-1985	1.43	19.42
18	02472000	Leaf River near Collins	743	1.47	20.00	9-1938 to 9-1985	1.47	20.00
19	02472500	Bowie Creek near Hattiesburg	304	1.48	20.06	9-1938 to 9-1985	1.48	20.06
20	02473000	Leaf River at Hattiesburg	1,748	1.54	20.93	9-1938 to 9-1985	1.54	20.93
21	02473400	Tallahatchee Creek at Waldrop	102	1.70	23.03	10-1979 to 9-1985	1.52	20.57
22	02473500	Tallahatchee Creek at Laurel	238	1.47	19.91	9-1938 to 9-1985	1.47	19.91
23	02474500	Tallahatchee Creek near Runnelstown	612	1.54	20.88	10-1939 to 9-1982	1.52	20.57
24	02474600	Boque Hahn near Richton	344	1.66	22.50	10-1970 to 9-1985	1.38	18.70
25	02475000	Leaf River near McLean	3,495	1.56	21.18	10-1939 to 9-1985	1.54	20.93
26	02475500	Chunky River near Chunky	369	1.35	18.36	8-1938 to 9-1985	1.35	18.36
27	02476500	Snowline Creek at Meridian	52.1	1.28	17.80	10-1950 to 9-1985	1.31	17.80
28	02476600	Okatibbee Creek at Arundel	342	1.59	21.60	10-1968 to 9-1985	1.35	18.36
29	02477000	Chickasawby River at Enterprise	918	1.37	18.64	8-1938 to 9-1985	1.37	18.64
30	02477500	Chickasawby River near Waynesboro	1,650	1.56	21.06	9-1938 to 9-1950	1.31	17.80
31	02477900	Buckatuna Creek near Denham	492	1.71	23.27	1-1972 to 9-1985	1.41	19.11
32	02478500	Chickasawby River at Leskeville	2,690	1.45	19.71	9-1938 to 9-1985	1.45	19.70
33	02479000	Pascagoula River at Merrill	6,590	1.52	20.57	10-1930 to 9-1985	1.53	20.78
34	02479130	Black Creek near Brooklyn	355	1.95	26.47	10-1970 to 9-1985	1.64	22.34
35	02479155	Cypress Creek near Janice	52.6	1.90	25.82	10-1966 to 9-1985	1.78	24.22
36	02479160	Black Creek near Kwigon	701	1.86	25.17	8-1971 to 9-1985	1.71	23.21
37	02479300	Red Creek at Vestry	441	1.95	26.48	7-1958 to 9-1985	1.88	25.53
38	02479500	Escatawpa River near Agricola	562	2.27	30.76	8-1973 to 9-1985	1.88	25.53
39	02480000	Pearl River at Edinburg	96.1	2.15	27.13	10-1952 to 9-1985	1.79	23.21
40	02481510	Wolf River near London	308	1.31	17.73	8-1928 to 9-1985	1.33	18.01
41	02482000	Pearl River near Carthage	904	1.33	18.01	9-1962 to 9-1985	1.40	19.01
42	02482550	Pearl River near Walnut Grove	411	1.33	18.01	10-1938 to 9-1985	1.33	18.01
43	02483000	Tuscolomea Creek at Walnut Grove	303	1.49	20.17	8-1938 to 9-1985	1.49	20.17
44	02484000	Yockanookany River at Kosciusko	303	1.49	20.17	10-1943 to 9-1985	1.49	20.17
45	02484500	Yockanookany River near Ofatoom	469	1.52	20.39	10-1943 to 9-1985	1.45	19.71
46	02486000	Pearl River at Jackson	3,171	1.31	17.80	10-1901 to 9-1912	1.37	18.64
47	02486500	Pearl River near Monticello	4,993	1.36	18.51	10-1928 to 9-1985	1.36	18.51
48	02486700	Whitesand Creek near Oak Vale	130	1.56	21.21	9-1965 to 9-1985	1.36	18.51
49	02490500	Boque Chitto near Tylertown	492	1.62	22.00	8-1944 to 9-1985	1.56	21.21
50	03592718	Surpreville	24.7	1.85	25.19	5-1973 to 9-1985	1.59	21.59
51	07268000	Little Tallahatchee River at Etta	526	1.62	22.28	9-1938 to 9-1985	1.64	22.34
52	07274000	Yocoma River near Oxford	262	1.52	20.63	5-1944 to 9-1985	1.46	19.83
53	07280270	Tallahatchee Creek below Oakland	37.1	1.63	22.18	10-1974 to 9-1983	1.50	20.35
54	07280340	South Fork Tallahatchee Creek near Charleston	53.9	1.68	22.85	7-1975 to 9-1985	1.40	21.73
55	07282000	Yalobusha River Canal at Calhoun	305	1.38	18.70	10-1950 to 9-1985	1.35	18.36
56	07283000	Skuna River at Bruce	254	1.47	20.00	10-1947 to 9-1985	1.41	19.11
57	07283500	Big Black River at West	985	1.79	24.26	9-1971 to 9-1985	1.38	18.70
58	07290000	Big Black River near Bovina	2,810	1.52	20.35	5-1944 to 9-1985	1.36	18.51
59	07290650	Bayou Pierre near Willows	653	1.41	19.11	6-1961 to 9-1985	1.40	19.01
60	07291000	Homochitto River at Eddiceton	180	1.48	20.07	10-1938 to 9-1985	1.48	20.06
61	07292400	Homochitto River at Roselle	750	1.50	19.11	10-1951 to 9-1985	1.52	20.35
62	07295000	Buffalo River near Woodville	182	1.51	20.32	3-1942 to 9-1985	1.53	20.78

* Includes data collected at Tombigbee River at Columbus, prior to April 1981.

ABSTRACT

Mean annual runoff values or ranges in cubic feet per second per square mile of drainage area for streams draining the East Gulf Coastal Plain of Mississippi are shown in this map report. The map is based on runoff values at 62 continuous-record gaging stations computed for a common 47-year base period of October 1938 through September 1985. Mean annual runoff values at these stations ranged from 1.31 cubic feet per second per square mile in the central and north-central parts of the State to 2.02 cubic feet per second per square mile along the Gulf Coast. Mean annual runoff, which is useful in designing storage and flood-control impoundments and in determining the quantity of water available for use from a stream or reservoir can be estimated at ungaged sites on streams by multiplying the runoff value from the map by the drainage area above the site. The part of Mississippi not included in this runoff map is the Mississippi River Alluvial Plain, where streamflow is affected by diversions, withdrawals, irrigation return flows and regulation.

INTRODUCTION

Runoff is that part of the precipitation, free from the effects of the works of man, that appears in surface streams. Runoff may be described in terms of total volume for a given period of time or as flow per unit area averaged over a given period of time. When making comparisons of precipitation and runoff, runoff volume is commonly expressed in terms of inches of water uniformly distributed over an area. However, runoff also is frequently expressed in terms of average flow per unit area when it is desirable to express the volume of runoff in units common to design applications. In this report, runoff is expressed as mean annual discharge per square mile of drainage area and is reported in units of cubic feet per second per square mile [(ft³/s)/mi²]. This report shows the runoff at gaged sites, the areal variation in runoff, and for selected sites, the year-to-year and seasonal variations.

MEAN ANNUAL RUNOFF

Mean annual runoff information is useful in the design of water storage facilities and flood-control projects, and in determining the amount of water available for withdrawal from a stream or reservoir. Areal mean annual runoff values (fig. 1) may be used to estimate the mean annual runoff at any point on a stream by multiplying the areal mean annual runoff value by the drainage area upstream from the site.

The mean annual runoff map is based on mean annual runoff values computed for 62 continuous-record gaging stations in the East Gulf Coastal Plain. These stations have periods of record ranging from 6 to 70 years and drainage areas ranging from 11.1 to 6,590 mi². Twelve of these stations with long-term streamflow record were selected as index stations for the analysis of runoff. Mean annual runoff values at all 62 stations were computed for a 47-year base period of October 1938 through September 1985. For those stations with fewer than 47 years of record, computed means for the period of record were adjusted to the 47-year base period through comparison with the nearest long-term index stations. For stations that have more than 47 years of record, only the computed means in the base period were used to determine the mean annual runoff (table 1). The stations used in this analysis are not significantly affected by regulation.

The Mississippi Alluvial Plain was not included in this analysis because runoff characteristics are uncertain in the Mississippi Alluvial Plain because of flow diversions, irrigation return flows, and irregular flow patterns. Streamflow data in that region of the State are sparse. Consequently, mean annual runoff results were not extrapolated into the Mississippi Alluvial Plain.

VARIATION IN RUNOFF

Figure 1 shows the areal variation in mean annual runoff within the East Gulf Coastal Plain of Mississippi. Areal variations in mean annual runoff are due to regional differences in rainfall, topography, geology, land use, soil permeability, and other factors. Among the most important factors affecting the runoff from a drainage basin are the quantity and areal distribution of precipitation. The average annual precipitation in the State generally ranges from 54 inches in the northern part of the State to 60 inches in the Gulf Coast region (fig. 2), the statewide average annual precipitation during the period 1951-80 was 55.82 inches (Wax, 1982).

The runoff varies with location and period of time. For the 47-year base period, runoff ranged from 1.31 (ft³/s)/mi² (table 1) at two sites in the Chickasawby River basin in the central and north-central parts of the State to 2.02 (ft³/s)/mi² at one site on the Biloxi River along the Gulf Coast in southern Mississippi (fig. 1).

Variations in annual mean runoff during the period of record are shown in figure 3 for the 12 long-term index gaging stations. At most of these index stations, mean annual runoff in 1983, an unusually wet year, was from 4 to more than 10 times greater than that in 1963, an unusually dry year. Runoff also varies seasonally within any given year. Mean monthly runoff generally is highest in February, March, and April, and lowest in August, September, and October. At the index stations the mean monthly runoff is typically 10 times greater than the mean runoff for October (fig. 4). Maximum monthly runoff values at the index stations range from 3 to 5 times greater than the respective mean monthly runoff values.

REFERENCE

Wax, C.L., 1982, Atlas of the climatic water balance in Mississippi: normals and variability, 1951-80: Water Resources Research Institute Bulletin, Mississippi State University, Mississippi State, Miss., 82 p.

Copies of Water-Resources Investigations Report 88-4079 can be purchased from:

Books and Open-File Reports Section
U.S. Geological Survey
Federal Center, Box 25425
Denver, Colorado 80225

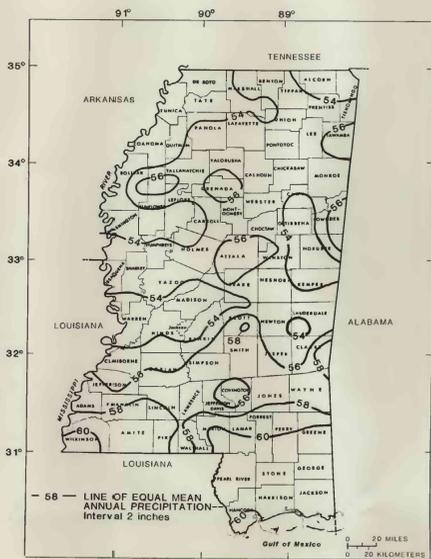


Figure 2.—Mean annual precipitation in Mississippi for the base period 1951-80. (C.L. Wax, 1982)

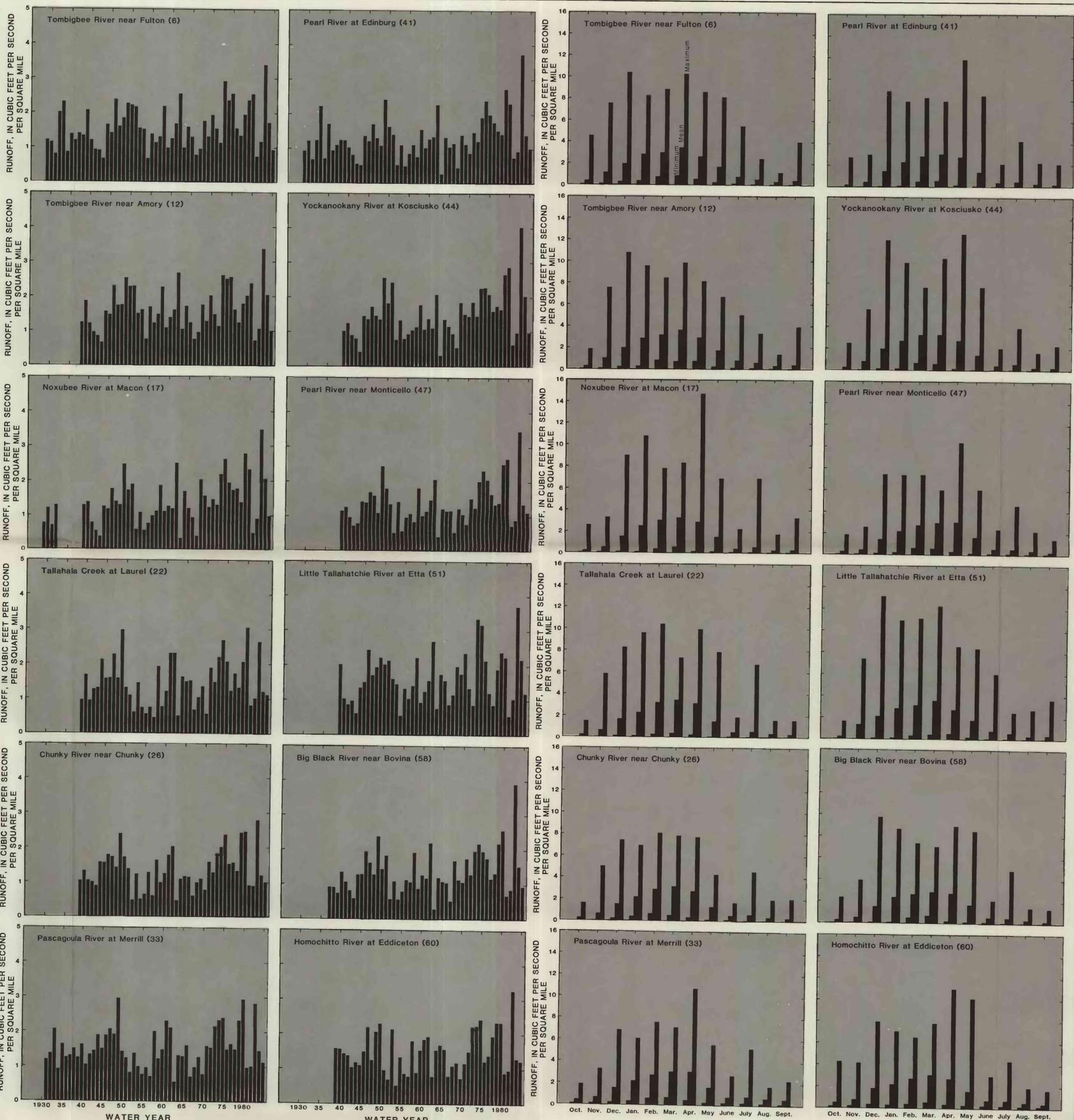


Figure 3.—Annual mean runoff for the 12 index stations.

Figure 4.—Minimum, mean, and maximum monthly runoff for the 12 index stations.

MEAN ANNUAL RUNOFF IN THE EAST GULF COASTAL PLAIN OF MISSISSIPPI, 1939-85

By
Rodney E. Southard
1989