IMPACT OF DROUGHT CONDITIONS ON MISSISSIPPI STREAMS AND RIVERS IN 2000

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INTRODUCTION

USGS streamgage records indicate droughts have affected Mississippi streams during 1940-44, 1951-57, 1962-71, and 1980-88. During the drought that began in late summer 1999 and continued through fall 2000, many areas of Mississippi experienced near record drought conditions causing concern to many private and public interests.

Droughts are normal, recurring hydrological events caused by deficiency of precipitation over an extended period of time, which can have adverse effects on availability and use of water. Much of Mississippi continued to experience drought conditions through late winter 2000. Data on minimum streamflows are an important factor for determining the regulation of flow-control structures, effluent, surface-water withdrawals, and other water-management decisions during droughts. Data on minimum streamflows become paramount during drought conditions.

The USGS maintains a Statewide network of streamgages providing Federal, State, and local agencies, institutions, and the private sector with accurate, reliable, and timely river stage, river discharge, and other hydraulic and hydrologic parameters for many water-use and design needs. All of the streamgages discussed in this report may be accessed in real-time mode through the internet at the following address:

http://water.usgs.gov/ms/nwis/

This report presents selected streamflow data collected at gages on streams affected by severe drought conditions in Mississippi during the 1999-2000 water years. Discussion of drought conditions presented for the Yazoo River Basin are limited to data collected in the headwaters of the basin at gages upstream of the Mississippi River alluvial floodplain. No discussions are presented for tidally affected flows near the Gulf of Mexico. Comparisons of 1999 and 2000 water-year data to low-flow characteristics at selected streamgages to other period-of-record low-flows at selected gages in the State are also presented. The data are presented in a basin-by-basin analysis.

MISSISSIPPI WATER LAW

Surface-water streamflow duration characteristics are important for water-supply planning, waste-load allocation, storage-facility design, irrigation, wildlife and fish conservation, and recreational uses. In Mississippi, the 7-day, 10-year low-flow (7Q10) is the established minimum flow characteristic used by the Mississippi Department of Environmental Quality's Office of Land and Water Resources (MDEQ-OLWR) and other agencies to permit the rate at which waste effluent is discharged into streams and to set permit limits for water withdrawals from streams. This minimum flow (7Q10) is defined as the average streamflow rate over 7 consecutive days that may be expected to be reached as an annual minimum no more frequently than 1 year in 10.

The established average minimum lake level for a given lake was also amended to be the 7Q10 lake level. Under laws passed by the State in 1985, the MDEQ-OLWR has the authority to permit the use of water from any surface stream and lake only in excess of the established minimum flow based on records or computations by the MDEQ-OLWR. The MDEQ-OLWR may authorize the use of established minimum flows and the water below the established minimum lake levels for industrial purposes upon written assurance, supported by such data and reporting requirements that the MDEQ-OLWR deems appropriate, that the water shall be returned to the stream at a point downstream from the place of withdrawal, and will not result in any substantial detriment to property owners affected thereby or to the public interest. No use of water shall be authorized that will impair the effect of stream standards set under the pollution control laws of this State based upon a minimum streamflow.

MISSISSIPPI PRECIPITATION

According to Wax (1990). Mississippi has an average annual rainfall of about 56 inches. Average annual rainfall ranges from about 68 inches near the Gulf of Mexico coast to about 50 inches in the northern areas of the State. Annual extremes for the period of record ranged from less than 37 inches in 1889 to more than 83 inches in 1983. About 40 inches (70 percent) of the average annual rainfall (56 inches) occurs in the winter and early spring. Low streamflows generally occur in the late summer and early autumn. The principal source of moisture for the State is the Gulf of Mexico, although the eastern Pacific Ocean can also bring significant moisture to the State, mostly during the summer and early autumn months. Streamflow generally reflects rainfall in that high streamflows generally occur from late fall to late spring, and low-flows generally occur from late summer to early fall. The high variability in precipitation makes characterizing and forecasting climatologic events in the State an inexact science.

According to the National Climatic Data Center of the National Oceanic and Atmospheric Administration (2001), annual precipitation for Mississippi during the 2000 calendar year was the 13th lowest in the 106 years of precipitation records for the State. The May-October 2000 period however, was the driest year on record in the Deep South States (Florida, Georgia, Alabama, Mississippi, and Louisiana) and this led to drought conditions as severe as any observed during the twentieth century. The Statewide average total rainfall for the 2000 calendar year was 44.78 inches, which was 9.98 inches below the Statewide average (Wax, written communication, 2001).

STUDY AREA

The USGS currently operates 103 continuous recording streamgages in Mississippi. Sixty-nine of these stream gages were selected for use in this report (fig. 1). Drainage areas range from 2.01 to 6,590 mi^2 (square miles). Slopes and lengths upstream of selected streamgages range from 1.0 to 38.1 feet per mile, and 2.01 to 185 miles, respectively. Twenty-five selected gages (table 1) provide an abbreviated synoptic view of drought conditions in the State during the 1999-2000 water years. The following paragraphs discuss drought flow conditions in the 1999-2000 water years in selected basins gaged by the USGS in Mississippi.

Tennessee-Tombigbee River Basin

Fifleen gages (fig. 1) were selected in the Tennessee-Tombigbee River Basin for discussion of drought impacts. The drainage areas range from 2.01 to 4,460 mi^2, and the period of record ranged from 26 to 85 years.

Flow at four of the streamgages (at Fulton. at Bigbee, at Aberdeen Lock and Dam near Aberdeen, and **at** Stennis Lock and Dam) on the mainstem of the Tombigbee River is regulated by a series of Lock and Dam structures. Since the opening of the waterway in the mid-1980's, low-flows have generally increased during dry periods and, therefore, drought conditions on the mainstem have been reduced. Flow upstream of Town Creek near Nettleton also showed some apparent regulation from upstream during the summer of 2000, and the minimum daily discharge of 8.3 ft^3/s (cubic feet per second) for the 2000 water year was 80 percent above the published 7Q10 discharge of 4.6 ft^3/s. During the 2000 water year, mean monthly flows at the Tombigbee River at Stennis Lock and Dam near Columbus were below normal (<25th quartile of the median value for the reference period of record 1971-2000) for every month of the entire water year except April.

Three of the selected gages in the basin (Pollard Mill Branch near Paden, Mud Creek near Fairview, and Buttahatchee River near Aberdeen) represent three tributaries to the Tombigbee River. For these three gages, the computed minimum daily discharges for the 2000 water year were lower than the previous record low-flows. The period of record for these three gages ranged from 26 to 35 years; these gages were not in operation during the droughts of the 1940's through the 1960s. The minimum daily discharge of 56 ft^3/s computed for the 2000 water year for the Buttahatchee River near Aberdeen was about 52 percent lower than the published 7Q10 value of 117 ft^3/s.

Discharge data indicated the Noxubee River at Macon also exhibited moderate drought-like conditions. The minimum daily discharge computed for Macon for the 2000 water year was 34 ft^3/s, which is only slightly higher than the published 7Q10 value of 32 fl /s for the gage.

In summary, minimum daily discharges computed for 7 of 15 gages in the Tennessee-Tombigbee River Basin selected for discussion were less than the published 7Q10 discharges, and record low-flows occurred at 3 of 15 gages. However, the records were set at gages with periods of record that ranged from 26 to 35 years, and the record did not include data from the droughts of the 1940s through the 1960s.

Pascagoula River Basin

Twenty-one gages (fig. 1) were selected in the Pascagoula River Basin for discussion of drought impacts. The drainage areas range from 52.1 to 6,590 mi^2, and the period of record ranged from 17 to 70 years. Discharge data collected from these streamgages indicate that the 2000 water year drought was the most severe for the period of record.

Minimum daily flows for the 2000 water year at the Leaf River near Collins were 46 percent less than the published 7Q10 discharge for the station and 29 percent less than the previous period of record minimum daily flow at the gage (Table 1). The computed minimum daily discharge for the Pascagoula River at Merrill during the 2000 water year was 649 ft^3/s, which was about 29 percent less than the published 7Q10 discharge and about 8 percent less than the previous period of record minimum daily flow of 704 ft^3/s, which was **set** on October 21, 1936.

Flows at three of the selected gages in the Pascagoula River Basin (Okatibbee Creek at Arundel, Chickasawhay River at Enterprise, and Chickasawhay River at Leakesville) are affected by regulation from the Okatibbee Reservoir north of Meridian during low-flows and, consequently, the effect of the 2000 drought was reduced from what it would have been. Of these three gages, only the Chickasawhay River at Leakesville had minimum daily discharges less than the published 7Q10 discharge.

In summary, minimum daily discharges computed for 19 of 21 gages during the 2000 water year selected were less than the published 7Q10 discharges, and 16 of 21 gages in the Pascagoula River Basin had computed minimum daily discharges that were lowest for the period of record, Notably, 3 of the 5 gages in the basin that did not set new low flow records are affected by flow regulation from the Okatibbee Reservoir.

Coastal Streams Basin

Two gages (Biloxi River at Wortham and Wolf River near Landon) (fig. 1) were selected in the Coastal Streams Basin for discussion of drought impacts. The drainage areas for the two gages are 96.2 and 308 mi , and the period of record was 48 and 30 years, respectively. Discharge data collected from these streamgages indicate the 2000 water year drought was the most severe for the period of record

The computed minimum daily discharge of 11 ft^3/s for the 2000 water year at the Wolf River near Landon was 72 percent lower than the published 7Q10 value of 40 ft^3/s and 63 percent lower than the period of record minimum daily discharge of 30 ft^3/s. The computed minimum daily discharge of 1.2 ft^3/s for the 2000 water year at the Biloxi River at Wortham was 48 percent lower than the published 7Q10 value of 2.3 ft^3/s and equaled the period of record minimum daily discharge set on October 21, 1963. Another indicator of drought severity in this basin can be expressed by the occurrence of the annual peak stages and discharges at gages in the area. The annual peak discharge at the Biloxi River at Wortham and the Wolf River near Landon gages during the 2000 water year occurred during October, which historically is the driest month of the year.

In summary, minimum daily discharges computed for both gages during the 2000 water year were **less** than the published 7Q10 discharges, and both gages in the Coastal Streams Basin had computed minimum daily discharges that equaled or were lower than those for the period of record.

Pearl River Basin

Fifteen gages (fig. 1) were selected in the Pearl River Basin for discussion of drought impacts. The drainage areas range from 49.8 to 4,993 mi^2, and the period of record ranged from 26 to 83 years. Discharge data collected from these streamgages indicate the 2000 water year drought was one of the most severe for the period of record.

During the minimum low-flow period of the 2000 water year, the combined 7-day minimum flows for the two gages that represent inflow into the Ross Barnett Reservoir (Pearl River at Lena and Yockanookany River near Ofahoma) were less

than 50 ft^3/s, whereas the 7-day minimum flow for the Pearl River at Jackson, which represents outflow from the Reservoir, was about 207 ft^3/s. Without flow regulation from the Ross Barnett Reservoir, surface withdrawal by the City of Jackson would have been significantly affected.

In summary, minimum daily discharges computed for 11 of 15 gages during the 2000 water year selected were less than the published 7Q10 discharges, and 8 of 15 gages in the Pearl River Basin had computed minimum daily discharges that were lowest for the period of record. Notably, 3 of the 7 gages in the basin that did not set new low-flow records are affected by flow regulation from the **Ross** Barnett Reservoir, which significantly lessened the effects of the drought.

Yazoo River Basin

Ten gages (fig. 1) were selected in the upper Yazoo River Basin for discussion of drought impacts. The drainage areas range from 35.1 to 1,550 mi^2, and the period of record ranged from 5 to 63 years. Discharge data collected from these streamgages indicate that only moderate drought conditions occurred at selected streamgages in the upper Yazoo River basin during the 2000 water year.

Minimum daily discharges computed for all 10 selected gages during the 2000 water year selected were greater than the published 7Q10 discharges. The Yalobusha River at Grenada is affected by flow regulation from the Grenada Lake. Due to the limited gaging network in the Delta region of the Yazoo River Basin, no data are presented in this report on drought conditions that may have existed in this region during the 2000 water year.

Big Black River Basin

Two gages (Big Black River at West and Big Black River at Bovina) (fig. 1) were selected in the Big Black River Basin for discussion of drought impacts. The drainage areas for the two gages are 1,027 and 2,812 mi^2, and the periods of record were 30 and 65 years, respectively. Discharge data collected from these streamgages indicate the 2000 water year brought highly variable drought conditions to this basin.

Droughts and flood events are highly variable both in time and magnitude. In April 2000, rainfall in the Big Black River Basin brought flood peaks at the Big Black River at West, to a discharge of 54,700 ft^3/s (a flood recurrence interval of 25 years) and a stage of 25.80 ft (feet), only 0.28 ft below the peak stage of record, which occurred at the gage on May 21, 1983.

The computed minimum daily discharge of 13 ft^3/s on August 23 for the 2000 water year at the Big Black River at West was 50 percent lower than the published 7Q10 value of 26 ft^3/s and 7 percent lower than the period of record minimum daily discharge of 14 ft^3/s. During the 2000 water year, the Big Black River at West flooded to a recurrence interval of 25 years, and several months later flowed at record low discharge. Notably, the Big Black River at West had a period of record of 30 years and, therefore, conditions were not representative of droughts that occurred earlier in the twentieth century (i.e., 1940's, 1950's, and 1960's). The computed minimum daily discharge of 100 ft^3/s for the 2000 water year at the Big Black River at Bovina was 18 percent higher than the published 7Q10 value of 85 ft^3/s and 49 percent higher than the period of record minimum daily discharge of 67 ft^3/s set on October 1, 1954.

In summary, while the minimum daily discharge computed for Big Black River at West during the 2000 water year was less than the published 7Q10 and period of record minimum, the minimum daily discharge computed for Big Black at Bovina was greater than the published 7Q10 and the period of record minimum discharge.

Southwest Mississippi River Basins

Four gages (fig. 1) were selected in the Southwest Mississippi River Basins for discussion of drought impacts. The drainage areas range from 180 to 787 mi^2, and the period of record ranged from 40 to 63 years. Discharge data collected from these streamgages indicate the 2000 water year drought was the most severe for the period of record.

Minimum daily discharges computed for all four gages during the 2000 water year selected were less than the published 7Q10 discharges, and 2 of 4 gages in the Southwest Mississippi River Basins had computed minimum daily discharges that were lowest for the period of record.

1999-2000 DROUGHT RESULTS FOR THREE INDEX STATIONS IN MISSISSIPPI

In a United States Department of Agriculture (USDA) emergency declaration on January 7, 2000, USDA Secretary Dan Glickman declared 81 Mississippi counties in a drought due to insufficient rainfall and extreme heat that occurred from March 1, 1998 until November 18, 1999 (National Drought Mitigation Center 2000).

After a moderately dry 1999 calendar year, many rivers in the State were experiencing record low-flows for January and February 2000. According to Plunkett et al. (2000), annual mean streamflow was normal (within the 25th and 75th quartile of the long term median discharge for the reference water year period 1961-90) in most streams in Mississippi during the 1999 water year. Comparisons of monthly mean and annual mean runoff in the 1999 water year with median runoff for the reference water year period 1961-90 were made for three representative USGS streamgages:

Station name and number	1999 runoff (inches)	1961-90 median runoff	1999 runoff as a percentage of 1961-90 median runoff
Tombigbee River at Stennis Lock and Dam near Columbus	23.03	21.10	109
Pascagoula River At Merrill	13.79	20.64	67
Big Black River Near Bovina	19.46	17.67	110

If data within the 25th and 75th quartile of the median flow are considered normal, then streamflow at two of three representative gages in the State was normal for the 1999 water year; however, during August and September 1999, all three gages were below normal. The Pascagoula River at Merrill flowed below normal for 7 months in the 1999 water year (December 1998, January, April, May, July, August, and September 1999). Flows at many of the gages in the Pascagoula River Basin flowed below their computed 7Q10 value.

During the 2000 water year, many rivers in the State experienced record low-flows. According to Plunkett et al (2001), annual mean streamflow was below normal (less than the 25th quartile of the long term median discharge for the reference water year period 1971-2000) in most streams in Mississippi during the 2000 water year. Comparisons of monthly mean and annual mean runoff in the 2000 water year with median runoff for the reference water year period 1971-2000 were made for three representative USGS streamgages:

Station name and number	2000 runoff (inches)	1971-90 median runoff	2000 runoff as a percentage of 1961-90 median runoff
Tombigbee River at Stennis Lock and Dam near Columbus	10.48	21.75	48
Pascagoula River At Merrill	6.04	21.21	28
Big Black River Near Bovina	9.76	19.88	49

If data within the 25th and 75th quartile of the median flow are considered normal, then monthly streamflow at all three representative gages in the State was below normal for 11 of 12 months of the 2000 water year.

Daily mean discharge compared to the minimum, maximum, and mean discharges for the entire period of record at the three index stations indicate also indicate that the 2000 water year was one of the driest on record at these gages (fig. 2). The regulated daily mean discharge at the Tombigbee River at Stennis Lock and Dam near Columbus was below the long term daily mean for every month but April. The daily mean discharge at the Pascagoula River at Merrill set new minimum daily discharges for the period of record for almost 6 months of the 2000 water year. Although there was a significant flooding event in April, daily mean discharge for the Big Black River at Bovina was extremely low for the 2000 water year.

RESULTS AND SUMMARY

Of 69 USGS continuous recording streamgages selected for this report, 44 had at least one daily mean discharge below the published 7Q10 value, and 34 had daily mean discharges at or below the published period of record minimum daily discharge (fig. 1, table 1). Seven of 15 (47%) selected gages in the Tennessee-Tombigbee River Basin, 19 of 21 (90%) selected gages located in the Pascagoula River Basin, 2 of 2 (100%) selected gages located in the Coastal River Basins, 11 of 15 (73%) selected gages located in the Pearl River Basin, 1 of 2

gages (50%) located in the Big Black River Basin, and 4 of 4 (100%) selected gages located in the Southwest Mississippi River Basins flowed below the published 7Q10 discharge. Three of 15 (20%) selected gages in the Tennessee-Tombigbee River Basin, 16 of 21 (76%) selected gages located in the Pascagoula River Basin, 2 of 2 (100%) selected gages located in the Coastal River Basins, 8 of 15 (53%) selected gages located in the Pearl River Basin, 1 of 2 (50%) gages located in the Big Black River Basin, and 4 of 4 (100%) selected gages located in the Southwest Mississippi River Basins, equaled or were lower than period of record minimum daily discharges. None of the 10 selected gages in the Yazoo River Basin flowed below the published 7Q10 discharge. No data are presented for the Delta region of the Yazoo River due to the limited gaging network.

Flow regulation on the Tennessee-Tombigbee Waterway. the Okatibbee Lake, and the Ross Barnett Reservoir lessened the effects of drought on the rivers downstream of these flow control structures. The Tombigbee River did not flow below the respective published 7Q10 values for four streamgages during the 2000 water year. Three gages downstream of Okatibbee Lake (Okatibbee Creek at Arundel, Chickasawhay River at Enterprise and Leakesville). did not reach record low-flows during the 2000 water year due to outflow from Okatibbee Lake although the most downstream site (Chickasawhay River at Leakesville) did flow below its published 7Q10 value. Three streamgages downstream of the Ross Barnett Reservoir near Jackson did not flow below 7Q10 during the 2000 water year due to outflows from this reservoir. The combined minimum 7-consecutive-day discharge at the Pearl River at Lena and the Yockanookany River near Ofahoma was 49.2 ft^3/s whereas the minimum 7-consecutive-day discharge at the Pearl River at Jackson was 207 ft^3/s. Without outflows from these flow control structures. the effects of the 2000 year drought would have been significantly greater.

In order to understand the variabilitv in measurement and difficulty in identifying a relation of drought over time, minimum daily mean discharges for 10 selected gages from six river basins throughout the State were plotted with the published 7Q10 values (figs. 3-5). There is considerable variability of the data for the six river basins, and drought periods are evident in the decades of the 1940's, 1950's. 1960's, and 1980's, and the 1999-2000 wateryears.

Monthly mean discharges for three representative gages at the Tombigbee River at Stennis Lock and Dam near Columbus, the Big Black River near Bovina, and the Pascagoula River at Merrill, were plotted with the 25th and 75th quartiles of the period of record mean monthly median discharges. The Tombigbee River at Stennis Lock and Dam near Columbus, and the Big Black River near Bovina, flowed below normal for all months in the 2000 water year except for the month of April. The Pascagoula River at Merrill flowed below the normal range for all months of the water year except for October.

In summary, the drought which began in late summer 1998 and continued through the fall of 2000 was one of the most severe droughts on rivers in Mississippi, The Pascagoula Basin suffered the worst drought of record.

REFERENCES

Hayes, Michael J., 2000. Drought indices. National Drought Mitigation Center.

National Drought Mitigation Center. 2000. National Drought Monitor Summary-Drought impacts in the United States, Januarv 5 through February 8, 2000. National Drought Mitigation Center. *(http://enso.unl.edu/ndmc/impacts/us/usimpact.htm#mississippi)*

National Oceanic and Atmospheric Administration, National Climatic Data Center. Climate of 2000 – Annual Review: U.S. Summary. January 12, 2001. *(http://W.ncdc.noaa.gov/ol/climate/research/2000/ann/us_summary.htm#Apcp)*

Paulson, Richard W., Edith B. Chase, Roberts S. Roberts, and David W. Moody (Compilers). 1991. National Water Summary 1988-89 – Hydrologic Events and Floods and Droughts. U.S. Geological Survey Water-Supply Paper 2375. 353-360.

Plunkett, Michael L., Fred Morris III, W.T. Oakley and D. Phil Turnipseed, 2000. Water Resources Data in Mississippi in Water Year 1999 U.S. Geological Survey Water-Data Report MS-99-1.

Plunkett, Michael L.. Fred Morris III, and D. Phil Turnipseed, 2001. Water Resources Data in Mississippi in Water Year 2000. U.S. Geological Survey Water-Data Report MS-00-1.

State of Mississippi. 1956. Water Laws-Mississippi Code of 1956. Mississippi Department of Natural Resources, 2-7.

State of Mississippi. 1972. Water Laws-Mississippi Code of 1972. Mississippi Department of Natural Resources, 2-7.

Telis, Pamela A., 1990. Low-flow and flow-duration characteristics of Mississippi streams. U.S. Geological Survey Water-Resources Investigations Report 904087, 214 p.

Wax, C.L., 1990, General Climatology of Mississippi--Floods and Droughts, in National Water Summary 1988—Hydrologic Events and Floods and Droughts, USGS Water-Supply Paper 2375, Reston, VA.

———1990, Written communication, 2001, State Climatologist, Mississippi State University Department of Geosciences, Mississippi State, MS.

Table 1. Basin and low-flow characteristics for 25 selected streamgages in Mississippi.
[mi², square miles; ft/mi, feet per mile; ft³/s, cubic feet per second; 7Q10, 7-day, 10-year low flow; dwhrrgc, 7-day low flow discharge; 7Q]

Drainage basin	Station number	Station name	Drainage area (mi²)	Length (miles)	Slope (ft/mi)	Period of record (years)	Mean annual discharge (ft³/s)	1999 Annual mean discharge (ft³/s)	2000 Annual mean discharge (ft³/s)	7Q10 (ft³/s)	1999 Minimum daily discharge (ft³/s)	2000 Minimum daily discharge (ft³/s)	Period of record minimum daily discharge (ft³/s)	Period of record minimum daily Date	Previous period of record minimum daily discharge (ft³/s)	Previous Period of record minimum daily Date
Tennessee-Tombigbee Waterway	2431000	Tombigbee River near Fulton, MS	612	42.2	1.5	1985-2000	852	885	365	27	114	106	33	10/05/1984		
						1929-2000	944	885	365				12	09/01/1943		
	2436500	Town Creek near Nettleton, MS	620	38.2	6.9	1939-2000	980	1060	359	4.6	22	8.3	1	09/14/1942		
	2439400	Buttahatchee River near Aberdeen, MS	799	11.6	4.1	1966-2000	1428	1301	634	117	110	56	56	09/05/2000	90	08/31/1988
	2441390	Tombigbee River at Stennis L&D near Columbus, MS	4460	143	1.4	1982-2000	7605	7530	3419	228	285	286	120	09/25/1984		
						1900-12, 1929-2000	6764									
	2448000	Noxubee River at Macon, MS	768	90.6	2.5	1928-2000	1049	832	359	32	49	34	23	08/26/1943		
Pascagoula River	2472000	Leaf River near Collins, MS	743	59.7	1.6	1938-2000	1096	561	285	72	68	39	39	09/06/2000	55	08/29/1957
	2472500	Bouie Creek near Hattiesburg, MS	304	51	6.5	1938-2000	450	300	172	100	107	84	83	08/29/1957		
	2473500	Tallahala Creek at Laurel, MS	238	56.6	1.1	1938-2000	344	151	104	4.4	4.7	3	1.8	10/31/1963		
	2474560	Leaf River near New Augusta, MS	2540	139	2.3	1984-2000	3747	2177	1195	497	472	360	360	08/23/2000	472	09/25/1999
	2475000	Leaf River near McLain, MS	3500	165	1.9	1940-2000	5404	3247	1514	598	549	411	411	08/25/2000	482	10/24/1963
	2475500	Chunky River near Chunky, MS	369	39.8	5.[illegible]	1938-2000	496	265	118	5.2	7.5	0.99	0.99	09/11/2000		
	2478500	Chickasawhay River at Leakesville, MS	2690	184	1.6	1938-2000	3872	2630	1252	246	264	179	162	10/30/1963		
	2479000	Pascagoula River at Merrill, MS	6590	184	1.9	1931-2000	9954	6692	2921	917	868	649	649	08/26/2000	704	10/21/1936
	2479300	Red Creek at Vestry, MS	441	76.1	2.9	1958-2000	862	546	200	108	108	77	77	08/31/2000	89	10/21/1963
Wolf River	2481510	Wolf River near Landon, MS	308	60.4	4.9	1971-2000	625	274	73	40	30	11	11	07/15/2000	30	09/23/1999
Pearl River	2482000	Pearl River at Edinburg, MS	904	76.3	1.[illegible]	1928-2000	1157	763	401	5.4	5.6	1.3	1.3	09/05/2000	2.2	10/05/1954
	2484000	Yockanookany River near Kosciusko, MS	303	37.7	1.9	1938-2000	443	357	171	5.5	7.5	2.9	2.3	08/20/1943		
	2484500	Yockanookany River near Ofahoma, MS	469	73.9	2.2	1944-2000	673	437	269	9.8	14	8.9	5.3	08/20/1954		
	2486000	Pearl River at Jackson, MS	3170	177	1	1962-2000	4431	2748	1300	103	187	121	45	09/18/1963		
						1902-12,1929-2000	4087									
	2488500	Pearl River near Monticello, MS	4990	273	1	1962-2000	7097	4441	2224	359	447	445	269	10/24/1963		
						1939-2000	6751									
	2268000	Little Tallahatchie River at Etta, MS	526	32	5.3	1939-2000	833	847	214	9.8	19	12	4.1	10/03/1938		

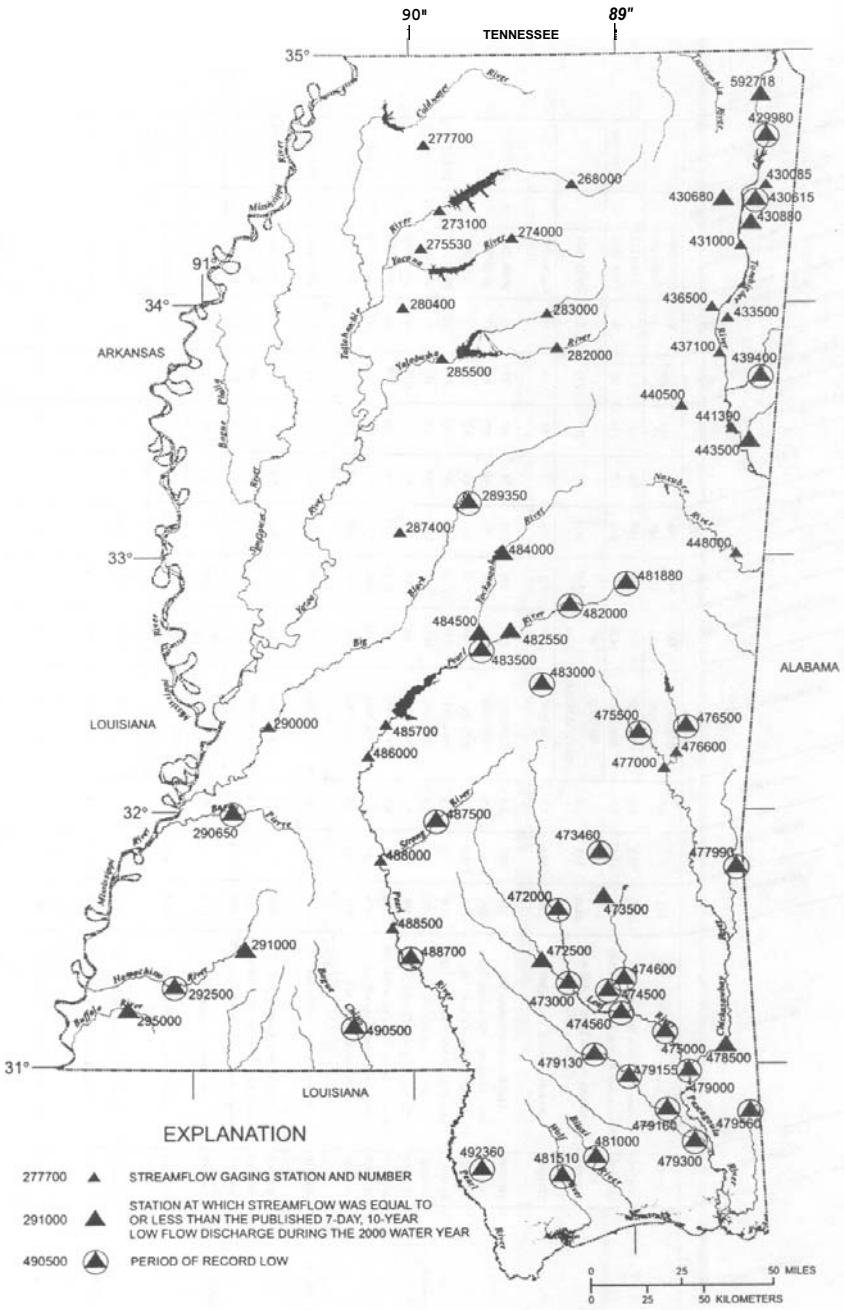

Figure 1.–Location of sixty-nine selected continuous record streamgages in Mississippi for which low-flow statistics were compared during the 2000 water year.

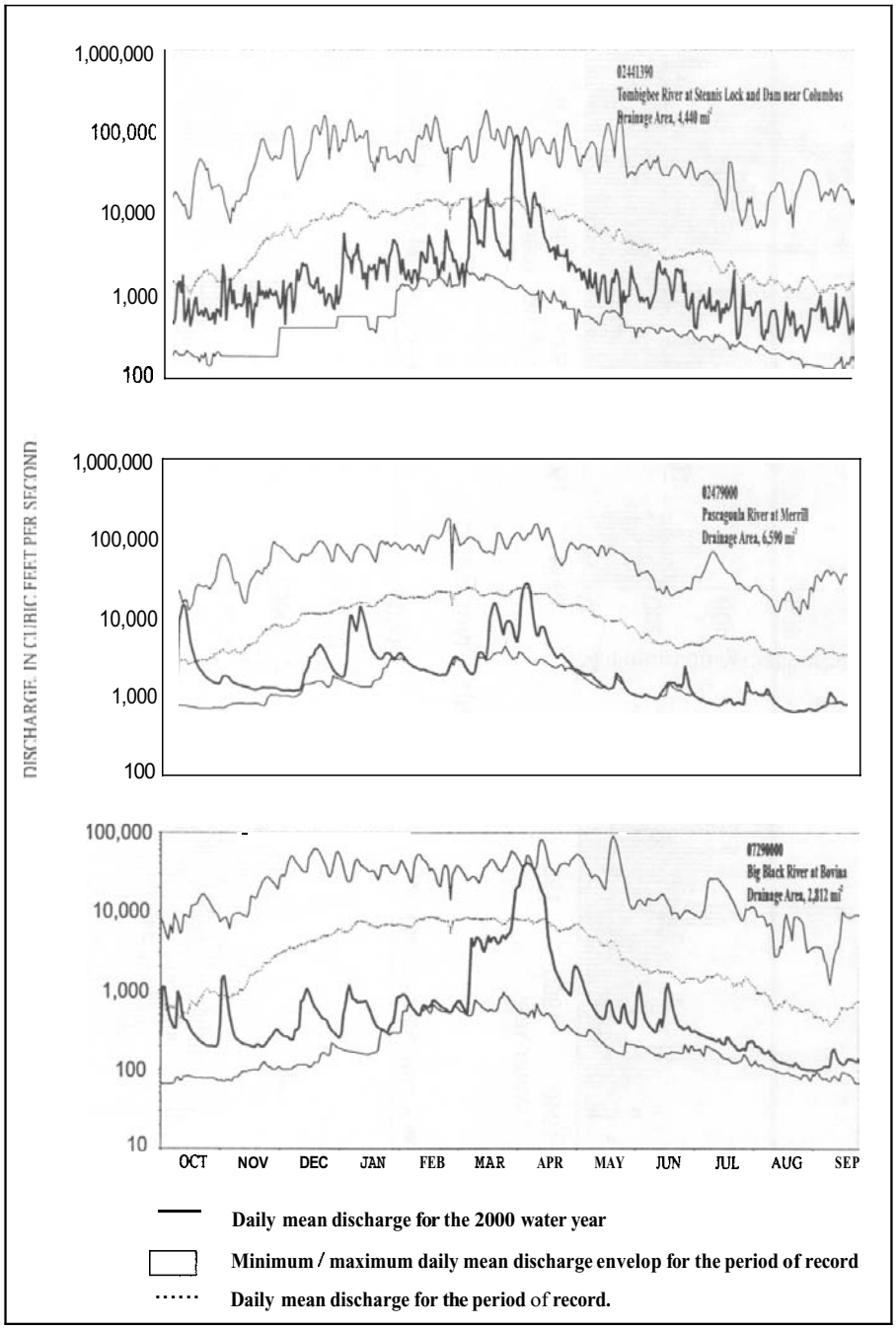

Figure 2.--Relation of daily mean discharge during 2000 water year to maximum, mean. and minimum daily mean discharges for the period of record for three representative gaging stations.

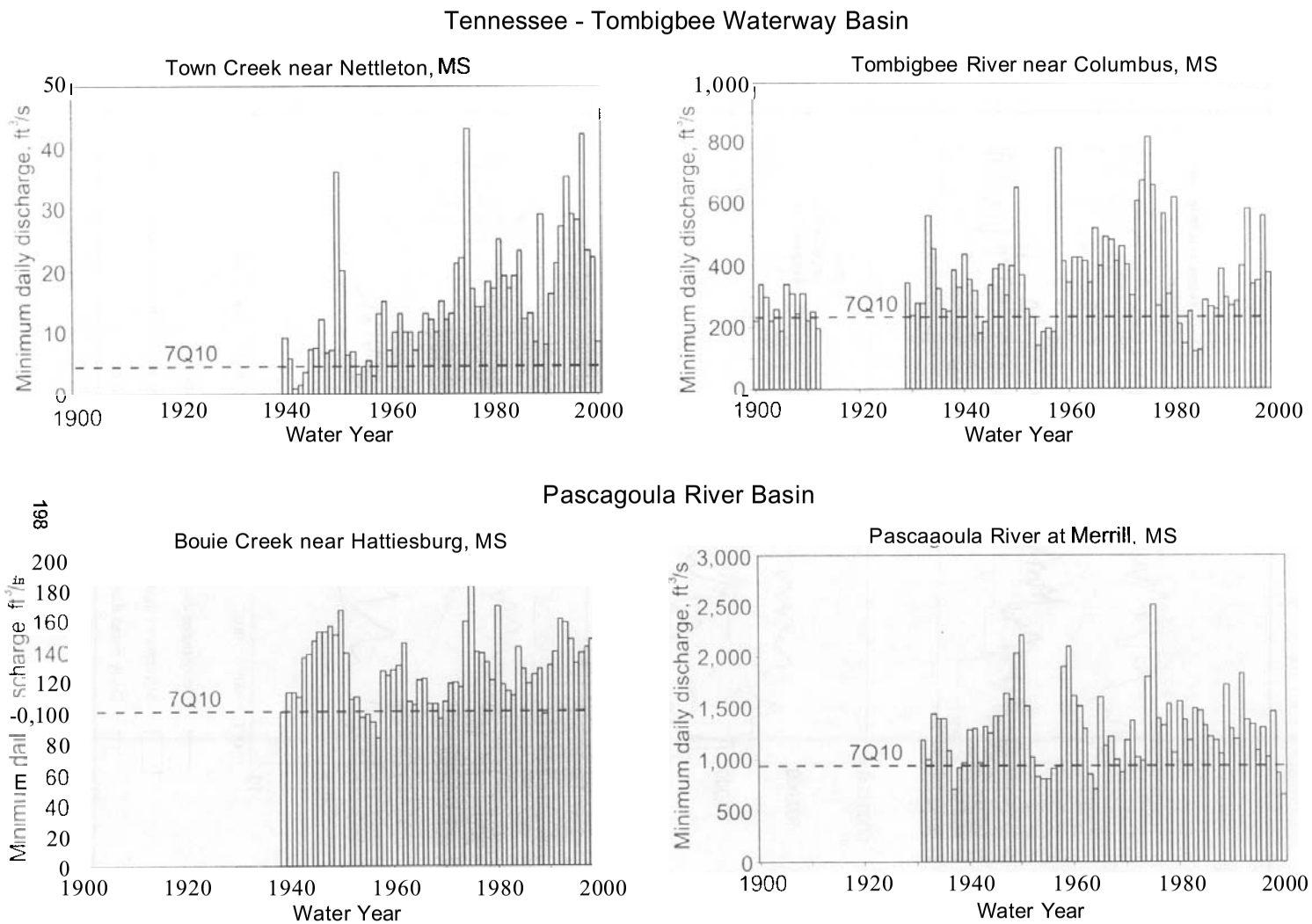

Figure 3.-- Minimum daily discharges for four selected streamgages in the Tennessee - Tombigbee Waterway and Pascagoula River Basins in Mississippi.