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Droughts in Georgia

Droughts do not have the immediate effects of floods, but sustained droughts can cause economic stress throughout the State. The word "drought" has various meanings, depending on a person's perspective. To a farmer, a drought is a period of moisture deficiency that affects the crops under cultivation—even two weeks without rainfall can stress many crops during certain periods of the growing cycle. To a meteorologist, a drought is a prolonged period when precipitation is less than normal. To a water manager, a drought is a deficiency in water supply that affects water availability and water quality. To a hydrologist, a drought is an extended period of decreased precipitation and streamflow. Droughts in Georgia have severely affected municipal and industrial water supplies, agriculture, stream water quality, recreation at major reservoirs, hydropower generation, navigation, and forest resources.

USGS streamflow gaging station, Ogeechee River near Eden, July 2000.

In Georgia, droughts have been documented at U.S. Geological Survey (USGS) streamflow gaging stations since the 1890's. From 1910 to 1940, about 20 streamflow gaging stations were in operation. Since the early 1950's through the late 1980's, about 100 streamflow gaging stations were in operation. Currently (2000), the USGS streamflow gaging network consists of more than 135 continuous-recording gages. Ground-water levels are currently monitored at 165 wells equipped with continuous recorders.

Summary of previous droughts

The 1903–05 drought was the earliest recorded severe drought in Georgia. In 1904, the U.S. Weather Bureau (1904, p. 4) reported that levels in streams and wells were the lowest in several years. Many localities had to conserve water for stock and machinery and many factories were forced to close or operate at half capacity.

The drought of 1924–27 was most severe in the Altamaha, Chattahoochee, and Coosa River basins, and in north-central Georgia. The U.S. Weather Bureau (1925, p. 49–50) reported:

> The drought was especially severe during the latter part of July, August, and September and the rivers in many places reached the lowest stages ever known. The scarcity of water had a profound influence on industrial and agricultural conditions in Georgia.

The severity of the 1930–35 drought exceeded a 25-year recurrence interval in central and southwestern Georgia and affected much of the United States. In extreme northern and southeastern Georgia, the recurrence interval was 10–25 years; in coastal Georgia and the Savannah and Ogeechee River basins, however, the recurrence interval was less than 10 years. The **recurrence interval** is the average time between droughts of a given severity. In a drought with a 25-year recurrence interval, the low streamflows occur, on average, once every 25 years.

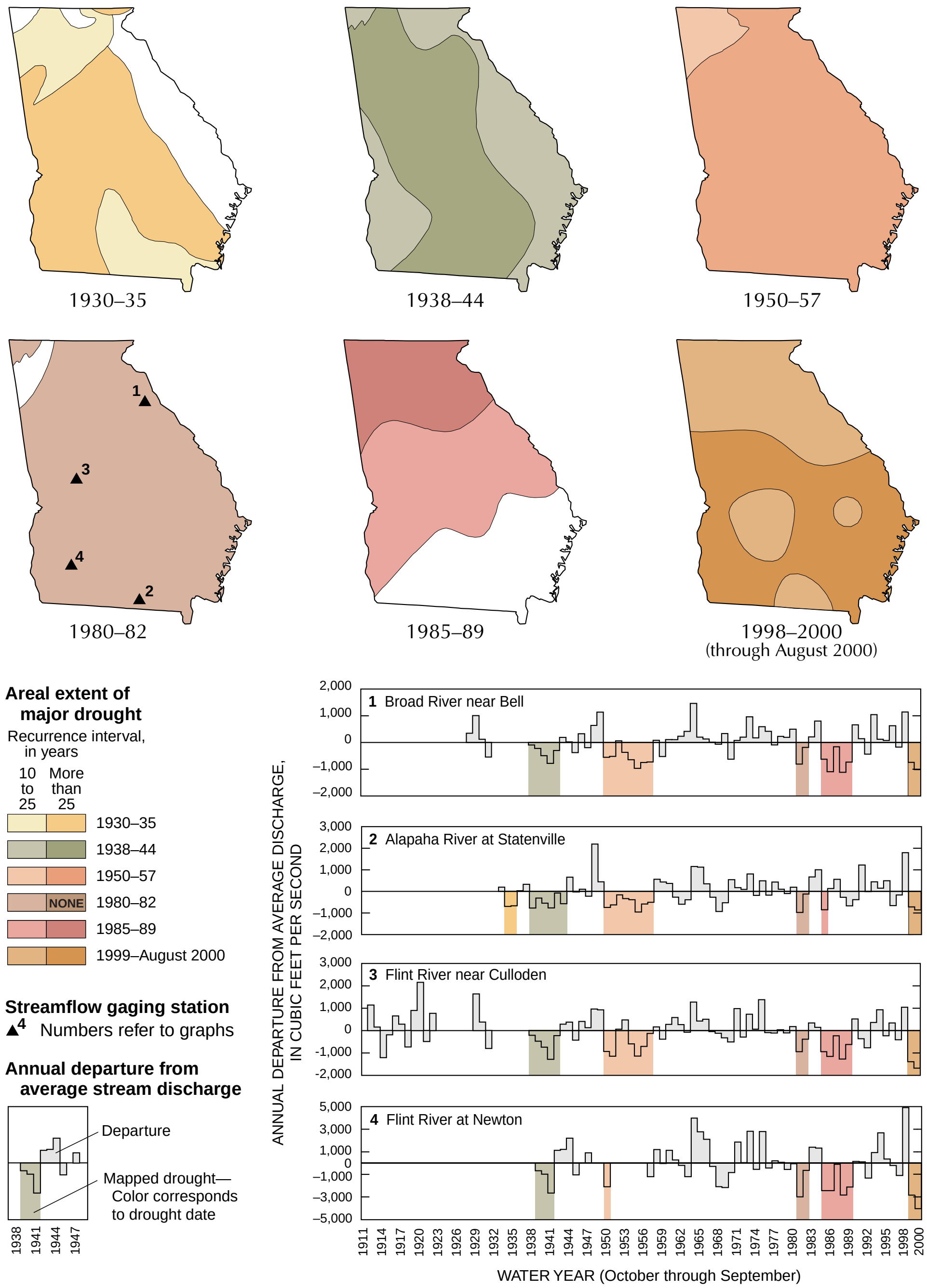
The 1938–44 drought affected much of the same area as the 1930–35 drought. In the upper Coosa and Chattahoochee River basins, the recurrence interval exceeded 50 years, and in much of central and southern Georgia, it exceeded 25 years. In the Savannah and Ogeechee River basins and in extreme northern and southwestern Georgia, the drought had recurrence intervals of 10–25 years.

The 1950–57 drought was most severe in southern Georgia, with most streamflows having recurrence intervals exceeding 25 years. In northeastern Georgia, the drought severity also exceeded the 25-year recurrence interval. In northwestern Georgia, the recurrence interval of the drought was between 10 and 25 years.

Selected rivers in Georgia.

The 1980–82 drought resulted in the lowest streamflows since 1954 in most areas, and the lowest streamflows since 1925 in some areas (Carter, 1983, p. 2). Recurrence intervals of 10–25 years were common in most of Georgia. Pool levels at four major reservoirs receded to the lowest levels since first filling. Ground-water levels in many observation wells were lower than previously observed. Nearly continuous declines were recorded in some wells for as long as 20 consecutive months, and water levels remained below previous record lows for as long as nine consecutive months.

Streamflows during the 1985–89 drought in northern Georgia were near the lowest of the 1900's. By 1988, the drought had reached recurrence intervals of 50–100 years in extreme northern Georgia, 10–25 years in central Georgia, and less than 10 years in southern Georgia. Water-supply shortages occurred in Georgia in 1986. Shortages first occurred in a few Atlanta



Areal extent of major droughts in Georgia, and annual departure from average stream discharge for selected sites, water years 1911–2000. (Source: Data from U.S. Geological Survey files. Water year 2000—average of monthly departures October 1999–August 2000.)

metropolitan systems, primarily because of large demand and small reservoir storage. As the drought continued, other systems in the southern part of the metropolitan area also had water-supply problems, as did several municipalities in northern and central Georgia. During 1986, the U.S. Army Corps of Engineers significantly decreased the release of water from Lake Sidney Lanier, but reservoir levels continued to recede to about 2 feet above the record minimum lake level, which occurred during the 1980–82 drought. Ground-water levels in northern Georgia were significantly less than normal during the 1985–89 drought, and shortages in ground-water supplies from domestic wells occurred in the northern one-third of the State.

Current drought 1998–2000

Despite above-normal streamflow for the entire 1998 water year, streamflow in the last quarter of the water year (July–September) was below normal. In central Georgia, July flow averaged about 50 percent of normal and August flow averaged less than 80 percent of normal. Across southern Georgia, July and August streamflows averaged about 50 and 65 percent of normal, respectively.

The rainfall deficit for Georgia for calendar year 1999 was about 11.5 inches and the rainfall deficit has continued to increase into 2000. During water year 1999, most streams throughout the State had minimum flows with recurrence intervals ranging from about 20 years to greater than 50 years. New record daily low flows occurred at three streamflow gaging stations along the Flint River. These stations are located in the vicinity of large agricultural areas, with extensive surface- and ground-water withdrawals for irrigation. Three other streamflow stations, located in the Ogeechee, Ocmulgee, and Altamaha River basins, had greater than a 50-year recurrence interval low flows. During the 2000 water year to date (August 2000), four stations have recorded new minimum daily flows.

Ground-water levels in much of the State have been affected by reduced rainfall and increased ground-water usage during the drought. From January–August 2000, new record low water levels were recorded in more than 40 wells in the statewide ground-water monitoring network, mostly wells located in southwest Georgia.

Shortages of surface-water supplies similar to those during 1986 occurred in the 1998–2000 drought. Water shortages during the Summer of 2000 prompted the Georgia Department of Natural Resources to institute statewide restrictions on outdoor water use.

Current streamflow and ground-water information for Georgia can be accessed through the USGS Web site at: **http://ga.water.usgs.gov/**

References

Carter, R.F., 1983, Effects of the drought of 1980–81 on streamflow and on ground-water levels in Georgia: U.S. Geological Survey Water-Resources Investigations Report 83–4158, 46 p.

U.S. Geological Survey, 1991, National water summary 1988–89—Hydrologic events and floods and droughts: U.S. Geological Survey Water-Supply Paper 2375, 591 p.

U.S. Weather Bureau, 1904, Climatological data, Georgia section: Climate and Crop Service, Department of Agriculture, v. 8, 15 p.

____1925, Climatological data, Georgia section: Climate and Crop Service, Department of Agriculture, v. 29, no. 1, 9, p. 1, 49–50.

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