

# Why the Southeast Is Sweltering

The corn and soybeans are withered, the cattle are rawboned, and hundreds of thousands of chickens are dead of heat and thirst. Agricultural losses in the drought-stricken U.S. Southeast are estimated at more than \$1 billion. And the deaths of dozens of people have been attributed to the heat.

Every single month since January, rainfall has been well below normal in the places hardest hit: the western Carolinas, northern Georgia, northeastern Alabama, eastern Tennessee and parts of south central Virginia. Columbia, S.C., which lies at the heart of the drought zone, had less than one-third of its normal rainfall between January and June. In July, many parts of the region withstood temperatures over 100° F for more than two weeks. And except for a respite of rainstorms during the fourth week of July, the parching is expected to continue through August.

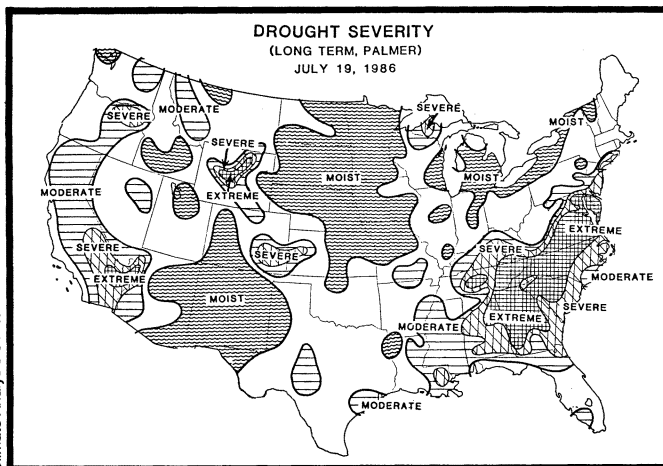
Such are the measures of what is being called the worst drought on record in the Southeast.

The causes are not so apparent. Meteorologists disagree on whether this drought is part of a cyclical process in the Southeast, similar to the drought cycles that affect the Midwest and the Pacific Northwest. They know only that for some reason, three abnormal atmospheric processes have conspired this year to bar rainfall from the region.

- First, because of an unusual pattern in the jet stream during the winter and spring, the cyclonic storms that usually water the Southeast failed to materialize. Most years, six or seven of these rainstorms blow in from the Gulf of Mexico. This year, there were only two, according to Kenneth H. Bergman, meteorologist at the National Weather Service's Climate Analysis Center in Camp Springs, Md.

The jet stream — the narrow band of strong winds in the upper atmosphere — usually dips down from Montana through Texas and then swings back northeastward over the southern states, carrying the cyclonic storms with it. This winter, however, the jet stream blew in two drastically different patterns, never making the upward swing through Texas, according to Bergman.

- The second abnormal spring phenomenon was a trough of low pressure that ran parallel to the Atlantic coast from west of Bermuda to Cuba, according to drought expert Jerome Namias, a research meteorologist at Scripps Institution of Oceanography in La Jolla, Calif. This condition caused a series of small cyclones — including the squall that sunk the *Pride of Baltimore* in May, Namias says. By drawing rainstorms out over the



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*Abnormal atmospheric conditions this year sent much of the Southeast's water to the upper Great Plains and the Midwest.*

ocean, it left the air over the land dry, he says.

- The third major weather quirk began in June, when the Bermuda high-pressure area altered its usual position. Most summers, this clockwise spiral of air is centered over the Atlantic, with its western edge just covering the southeastern states. This year, the Bermuda high has been floating farther inland, reaching west to Texas and Oklahoma. That means its peripheral winds, which usually blow moist air to the Southeast from the Gulf of Mexico, are sending their moisture northward to the Great Plains and the Midwest. Northern farms are flooded, while southeastern fields are parched.

The abnormal position of the Bermuda high also is tied to the jet stream, Bergman says. This summer, the jet stream has arched northward over the Great Lakes, making room for the Bermuda high to move inland, he says.

According to Namias, all three of the major causes of the drought may be inter-related. "It is quite probable in my mind that the conditions which produced drought in the spring later encouraged the Bermuda high to move back," he says.

These atmospheric conditions probably also are related to water temperatures in the Atlantic Ocean, Namias says. Colder water may have drawn the low-pressure trough over the ocean from Bermuda to Cuba, he says. The low pressure, in turn, makes the water colder.

By now, the hot, dry conditions in the Southeast are feeding on themselves, as they do in most droughts. The dryness makes the air hotter because the sun no longer spends part of its daily heat evaporating the dew and other moisture. And the dry soil fails to conduct heat down into the ground. "The dry ground reflects more of the sun's energy, so it has nothing to do but get hotter," says State Climatologist John C. Purvis of Columbia, S.C.

The hot air, in turn, keeps the pressure low close to the ground and the pressure high farther up in the atmosphere, so that the higher air sinks into the lower air and keeps the winds down. Together, air compression and aridity inhibit the production of clouds.

At this point, the drought is likely to persist through August because weather patterns typically remain stable during summer, the meteorologists say. The weakening of high pressure over the Southeast in late July, which caused some rain, was only temporary, they say. Lasting relief probably will not come until fall, unless there is some hurricane activity in late August to break the drought pattern.

Purvis is one meteorologist who believes this drought is part of a cycle. He suggests that droughts in the Southeast recur every 30 to 33 years, and that the cycle may be tied to sunspot activity, as the Midwest and Pacific Northwest drought cycles are thought to be. The Southeast cycle is not always apparent from rainfall statistics, Purvis says, because hurricane activity in autumn often disguises rainfall shortages in summer.

State Climatologist Gayther Plummer of Athens, Ga., says the cycles can be traced to periodic changes in the earth's orbit around the sun.

But other meteorologists say droughts in the Southeast are random. "It's a freak area to find a drought, and this is a freak drought," says Namias.

Bergman notes that there were very similar drought conditions in the Southeast during the winter and spring of 1985, but the pattern broke by last summer, he says. The two summers before that were unusually wet, he says.

"The weather this year is more or less the luck of the draw in a very random process," Bergman says. "Every once in a while, some very unusual event like this is going to happen." — M. Murray