

Southeast Region: (Information provided by the Southeast Regional Climate Center)

- Temperatures were much warmer than normal across most of the Southeast in September. Temperature departures ranged from slightly cooler than normal in a small portion of the Florida Everglades to more than 8 degrees F (4.4 degrees C) warmer than normal in western Virginia and North Carolina. Puerto Rico reported temperatures near normal across the island this month. Many mainland stations reported one of their warmest Septembers on record, including Shelby, NC (1936-2018; 1st warmest), Asheville, NC (1892-2018; 1st warmest), Tarpon Springs, FL (1894-2018; 1st warmest), Gainesville, FL (1890-2018; 1st warmest), and Atlanta, GA (1878-2018' 2nd warmest). Tampa, FL (1890-2018) reported a monthly average temperature of 85.9 degrees F (29.9 degrees C), which broke the old monthly temperature record for any month previously held by June 1998 with a temperature of 85.6 degrees F (29.8 degrees C). Norfolk, VA (1873-2018; 1st warmest) reported 79.1 degrees F (26.2 degrees C), which was 6.8 degrees F (3.8 degrees C) warmer than normal. Key West, FL (1874-2018; 1st warmest), which is in an area with little year-to-year variability because of the surrounding ocean, observed 85.8 degrees F (29.9 degrees C), 2.6 degrees F (1.4 degrees C) warmer than normal. Greenville, SC (1954-2018; 1st warmest) reported 79.9 degrees F (26.6 degrees C), which was 8.4 degrees F (4.7 degrees C) warmer than normal and the highest temperature departure observed in the region in September. Seven stations reported a temperature of 100 degrees F (37.8 degrees C) during the month, including Monroe, NC and Columbia, SC (on the 6th), Macon, GA and Andalusia, AL (on the 18th) and Eufaula, Muscle Shoals and Childersburg, AL (on the 20th). The 100 degree F (37.8 degree C) reading in Macon, GA was the first September 100 degree F reading since September 8, 1990; in Muscle Shoals, AL it was the first September 100 degree reading since September 2, 2011. The coolest maximum temperatures in Florida and Alabama were on September 2 and 3 due to the clouds and rain associated with Tropical Storm Gordon. In North Carolina and Virginia, the lowest maximum temperatures occurred on September 23 in the cloudy and rainy conditions north of a stationary front draped across North Carolina and Tennessee. Appomattox, VA (1956-2018; 3rd coldest) reported a high of 63 degrees F (17.2 degrees C) on that date. While maximum temperatures were above normal at most locations, the biggest contribution to the warmth was from high minimum temperatures, which set records across the region. Over 120 long-term stations (at least 50 years of record), including 44 stations with over 100 years of record, had their highest September average minimum temperature ever. Almost every station in Alabama, Florida, Georgia, South Carolina and eastern North Carolina did not experience a single morning with a temperature at or below 60 degrees F (15.6 degrees C) during September. Several stations, including Brunswick, GA (73 degrees F or 22.8 degrees C; 3rd warmest minimum for the month), reported that temperatures never got below 70 degrees F (21.1 degrees C). A number of inland airport stations reported new records for the number of hours with a dew point temperature of 65 degrees F (18.3 degrees C) or higher, including Charlotte, NC, Greenville-Spartanburg, SC and Asheville, NC, which reported more than 500 additional hours of very humid conditions above their previous records. The high humidity associated with these elevated dew points was one of the contributing factors to the record-setting high minimum temperatures across the region.

- Precipitation across the Southeast in September was highly variable. This was due to the presence of a dominating high pressure system that suppressed convective showers in the central part of the region and two tropical systems that brought record-breaking rainfall along the paths of the storms. Drier than normal conditions were observed in most of Georgia and the Florida Panhandle, with the driest areas found along the East Coast, especially in northeast Florida and the South Carolina coast south of

Charleston. Monthly precipitation totals in the areas not affected by the tropical storms ranged from 70 to less than 25 percent of normal. The Melbourne, FL airport (1942-2018; 1st driest) received only 1.40 inches (36 mm) for the month, 6.24 inches (159 mm) drier than normal. Daytona Beach, FL (1923-2018; 2nd driest) received 1.44 inches (37 mm) of rain, 5.54 inches (140 mm) drier than normal. Albany, GA (1947-2018; 1st driest) received only 0.50 inches (13 mm) during the month. Drier than normal conditions were also observed across all of Puerto Rico and the US Virgin Islands, with amounts ranging from 1.7 to 6.1 inches (43 mm to 155 mm) drier than normal across the islands. Those dry conditions led to the expansion of drought across that area. In contrast to the dry areas in the central part of the Southeast, areas along the tracks of the tropical systems received very heavy rainfall. Late on September 4, Tropical Storm Gordon moved inland along the Florida Panhandle, bringing heavy rain to Pensacola, FL and northwest into much of Alabama and ending the drought which had been occurring in that region. Pensacola, FL (1879-2018; 3rd wettest) received 18.25 inches (464 mm) of rain for the month, 12.27 inches (312 mm) wetter than normal; of that, 6.40 inches (163 mm) fell on September 5 alone as a feeder band from T. S. Gordon brought hours of rain to the station. The rainfall total from Gordon in Pensacola was 12.73 inches (323 mm). In Alabama, the highest rainfall from Gordon was 8.53 inches (217 mm) north of Bay Minette in the southeast part of the state. Later in the month, Hurricane Florence made landfall near Wrightsville Beach, NC on September 14 as a Category 1 storm. Florence moved very slowly westward over the region for a period of three days and continued to drop very heavy rain, before mid-latitude steering currents finally turned the system to the north. The highest rainfall amount from Florence in North Carolina, 35.93 inches (913 mm) northwest of Elizabethtown and 23.63 inches (600 mm) west of Loris in South Carolina, are likely to become new record hurricane rainfalls for those two states. Most of southeastern North Carolina and parts of northeastern South Carolina received rain in excess of a 1000-year return period. Wilmington, NC (1871-2018; wettest month and September on record) received 24.13 inches (621 mm) for the entire month, 16.29 inches (414 mm) wetter than normal, largely due to rain from Florence. Farther inland, Mount Mitchell, NC (1980-2018; 3rd wettest) received 20.70 inches (526 mm) for the month, 13.24 inches (336 mm) wetter than normal; of that 11.14 inches (283 mm) was from Florence. Rocky Mount, VA (1905-2018) reported 14.90 inches (378 mm) for the month, 10.31 inches (262 mm) wetter than normal. Extreme rainfall in the region over several days led to many new record crests for rivers in the area, leading to the displacement of thousands of residents and hundreds of water rescues. At the end of September, the Waccamaw River near Conway, SC had just dropped below the previous record flood level from Hurricane Matthew in 2016 and was expected to continue as a major flood until October 8. The largest storm surges reported from Florence were in New Bern and Emerald Isle, NC, where water levels reached 10.1 feet and 7.0 feet (3.1 m and 2.1 m) above ground, respectively. Wilmington, NC (1935-2018) reported a new high water level (storm tide) of 3.60 feet (1.10 m) above the high tide mark, surpassing the old record of 3.48 feet (1.06 m) set on October 8, 2016 during Hurricane Matthew. Fifty deaths have been confirmed from the storm as of the end of September; many of the early deaths from the storm were due to vehicles driven through flooded roadways.

- There were 167 severe weather reports across the Southeast during September, which is 167 percent of the median monthly frequency of 100 reports during 2000-2016. At least one severe weather report was recorded on 19 days during the month, but the majority of reports were made during the passages of Tropical Storm Gordon through western Florida and southern Alabama on September 1 through 4 and Hurricane Florence in North Carolina and Virginia on September 13 through 16. There were five hail reports during the month, three in North Carolina and one each in Florida and Virginia. A total of 37

tornado reports were issued during the month, nearly 3.4 times the median frequency of 11 tornadoes observed from 2000 to 2016. Strong winds (125 reports) comprised 75 percent of all severe weather reports. The strongest winds from Tropical Storm Gordon were reported at Dauphin Island, AL (74 mph; 33 m/s), Mobile, AL (57 mph; 25 m/s), and Pensacola, FL (52 mph; 23 m/s) on September 4, as the center of circulation approached the coast. One confirmed tornado was reported from T. S. Gordon in Santa Rosa County, FL on September 4. Strong winds and tornadoes associated with Hurricane Florence were observed in coastal North Carolina on September 13, as the eye of Florence moved slowly through the region, and tornadoes were observed through September 17 as the remains of Florence turned northward. In all, there were 28 confirmed reports of tornadoes from Florence, including one EF-2 tornado in Chesterfield County, VA, eleven EF-1 tornadoes, and 16 EF-0 tornadoes. The Virginia tornado caused the second death from Florence in the state, an employee of a flooring company located where the tornado touched down just south of Richmond. In North Carolina, Wilmington reported a wind gust of 105 mph (47 m/s) and Lumberton reported 69 mph (31 m/s) on September 14. Cape Hatteras reported a wind gust of 67 mph (30 m/s) and New Bern reported a gust of 56 mph (25 m/s) on the 13th. A buoy 30 miles SE of New River Inlet reported a wind gust of 112 mph (50 m/s), as Florence approached shore. In South Carolina, Florence and North Myrtle Beach each reported wind gusts of 59 mph (26 m/s) and Charleston reported a gust of 53 mph (24 m/s) on the 14th. Farther inland, Augusta, GA reported a peak wind gust of 39 mph (17 m/s) and Raleigh-Durham, NC reached a peak wind gust of 47 mph (21 m/s). Hurricane Florence weakened to a Category 1 storm before making landfall, and the most severe impacts of the storm came not from the winds but from the 10-foot storm surge followed by the extreme impacts of more than 30 inches (762 mm) of rain across a large portion of southeastern North Carolina. At one point, more than a dozen river gauges in North Carolina alone had reached major flood stage; portions of I-40 and I-95 were both closed due to the flooding, and traffic was rerouted westward through Chattanooga, TN. In New Bern, NC, storm surge from Florence damaged or destroyed more than 4,300 homes and 300 businesses, resulting in a loss of \$100 million in combined residential and commercial damage. The North Carolina Division of Public Safety reported that 5,214 people and 1,067 animals were rescued from the high waters. Rain from the remains of Florence were observed all the way into New England as the storm was absorbed into a frontal system. The total economic impact from the storm was preliminarily estimated at \$38-50 billion, and since many areas were still inaccessible, these estimates are likely to rise, as more properties are inspected. After Florence passed, only a few reports of severe weather were reported for the rest of the month. On September 18, Brunswick, GA reported a 58 mph (26 m/s) wind from a thunderstorm. On September 27, strong storms brought scattered high winds and one likely tornado to a region stretching from west central Georgia to north central North Carolina, including a likely tornado in Anderson County, SC.

- Dry conditions in areas of the Southeast that were not affected by tropical storms led to the development of moderate drought in northern Alabama, central Georgia and southern South Carolina during the month. Many agricultural producers noted that crop development came to a virtual standstill due to the dry conditions, with soybeans, cotton, and pecans all suffering from losses in yield due to lack of moisture, stressing the plants. Peanut farmers noted that it was so dry they could not even dig up peanuts to do maturity checks and observed that the ground was so hard that it would be difficult to dig the peanuts when they were ready. Livestock producers were forced to start feeding hay early when pastures dried up and hay production came to a halt due to the lack of forage growth. In Puerto Rico, the area of abnormally dry conditions contracted even though precipitation was less than normal across the island. In areas affected by Tropical Storm Gordon and Hurricane Florence, dry conditions were

wiped out by the heavy rain, but damage to agriculture was much more severe than in dry areas. In western Florida, southwest Georgia and southern Alabama, winds and rain from Gordon hit fields just as cotton and peanut harvest was underway. Many cotton plants blew over in the high winds and were not expected to straighten up, resulting in rotted bolls due to contact with the wet ground and difficulty running harvesters through the fields. Estimates of damage to peanuts were awaiting the results of harvest while the peanuts are still in the ground. The winds from Gordon also blew down many pecans in Alabama just before harvest, resulting in significant loss in yield. Heavy winds, storm surge, and extreme floods from heavy rains due to Hurricane Florence caused huge impacts for North and South Carolina as well as lesser impacts in Virginia. In South Carolina, agricultural losses alone were estimated to surpass \$125 million, including an estimated loss of 75 percent of the cotton crop (\$56 million). Peanuts, soybeans and vegetables were also affected in South Carolina. In North Carolina, estimated losses to agricultural alone top \$1.1 billion. Losses to row crops such as corn, soybeans and tobacco were estimated at \$987 million, including 50 to 100 percent of unharvested tobacco. Other losses include \$70 million to commercial forests, \$30 million for lawn and landscaping, \$27 million for vegetables and horticultural crops, and \$23 million for livestock. The storm killed an estimated 5,500 hogs and 4.1 million chickens and turkeys. The total estimated losses from Florence from Moody's Analytics range from \$38 to \$50 billion, including the losses to agriculture, infrastructure, buildings and businesses.