At the end of August 2019, moderate to exceptional drought (D1-D4) affected 9.4% of the area and 11.7% of the population of North America. The percent area value was 1.0% more than the value for the end of July 2019. The percent population value was 2.7% more than the value for the end of July. At the end of August, 7.9% of the Great Lakes Basin was in moderate drought; 15.3% of the Columbia River Basin was in moderate to severe (D2) drought; and 14.9% of the Rio Grande/Bravo River Basin and 10.6% of the North American Great Plains were in moderate to extreme (D3) drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Columbia River Basin decreased this month, while the values for the Great Plains and Great Lakes and Rio Grande/Bravo River Basins are more than they were at the end of July.

CANADA: In August, drought conditions continued to improve throughout most regions in western Canada, while eastern Canada received abnormally low precipitation resulting in emerging short term drought conditions. Conditions in British Columbia improved gradually throughout August, particularly in south and central areas where Severe Drought (D2) condition improved to Moderate Drought (D1) or Abnormally Dry (D0). Despite significant improvements across the Prairies, Abnormally Dry (D0) conditions persist in the region with small Moderate Drought (D1) areas in southeastern and northern Alberta and a single pocket of Severe Drought (D2) around High Level. Conditions in eastern Canada deteriorated significantly with much of southern Ontario and southeastern Quebec now classified as Abnormally Dry (D0) or Moderate Drought (D1) and the Ottawa area under Severe Drought (D2) as a result of substantial August precipitation deficits. Parts of Atlantic Canada have also been classified as Abnormally Dry (D0) as a result of precipitation deficits and poor streamflow. At the end of August 2019, Moderate to Severe Drought (D1–D2) affected 4.3 percent of land area in Canada. The most significant drought conditions persisted in southern and northwestern British Columbia.
Pacific Region (BC)
Drought conditions in British Columbia saw significant improvement during the month of August. The greatest improvement was around Vancouver and the Sunshine Coast, where over the past few months precipitation values have been near normal improving dry spring conditions. Improving conditions resulted in Severe Drought (D2) areas being improved to Moderate Drought (D1) or Abnormally Dry (D0) conditions. Severe Drought (D2) remains in the Courtenay area. Conditions in both northwestern and the central interior improved due to adequate precipitation over the month of August. This has resulted in a reduction in the Moderate Drought (D1) and Abnormally Dry (D0) areas. Abnormally Dry (D0) and Moderate drought (D1) pockets remained in north western interior and southern parts of the province. Moderate to Severe Drought (D1–D2) conditions affected 10.3 percent of the area and 75.9 percent of the population of British Columbia.

Prairie Region (SK, AB, MB)
Conditions across the Prairies continued to improve in all regions during the month of August due to above normal precipitation the last few months. Despite above normal precipitation, small pockets of Moderate Drought (D1) and Abnormally Dry (D0) conditions remain and long term impacts linger from spring drought conditions. Despite adequate or abundant rainfall in July and August, as well as significantly improved pasture conditions through August, hay production and feed supplies continue to be a significant concern for agricultural producers throughout the region as a result of intense drought conditions in the spring. Twelve rural municipalities in Manitoba recently declared agricultural disaster due to the limited feed availability. Drought continues in southern Alberta despite small improvements over the month, allowing the removal of the Severe Drought (D2) and reducing the Moderate Drought (D1) pocket considerably. Northern Alberta has remained relatively unchanged due to long term deficits and Severe Drought (D2) conditions are still present with a small pocket in the High Level area. Despite a relatively dry August across much of central Alberta abundant soil moisture and excess precipitation in July has resulted in wet conditions. Saskatchewan experienced the greatest improvement of the Prairie provinces having received 150 percent (60 to 100mm) of normal precipitation in the past 30 days in most southern regions. Only small pockets of Abnormally Dry (D0) conditions remain around Kindersley, between North Battleford to Prince Albert and along parts of the eastern border due to long term conditions. Manitoba has received near normal precipitation this month with central areas having now received 60 to 85 percent of average growing season precipitation. Abnormally Dry (D0) conditions remain across much of eastern and parts of northern Manitoba due to long term precipitation deficits and poor soil moisture conditions. Moderate to Severe Drought (D1–D2) conditions affected 6.1 percent of the area and 2.3 percent of the population of Alberta in the Prairie Region.

Central Region (ON, QC)
Drought conditions emerged in central Canada as the region received below normal precipitation during the month of August. Departure from normal precipitation in southern and central Ontario was 50 to 100 mm and in southeastern Quebec was 30 to 50 mm in the past 30 days. In the northern agricultural region around Ottawa this deficit represents a one in 50 year event. As a result of this short term precipitation deficit Abnormally Dry (D0) and Moderate Drought (D1) pockets expanded significantly across southern and central Ontario and also southern and eastern Quebec. As a result of the precipitation deficit a Severe
Drought (D2) pocket developed around Ottawa. It should be noted that conditions in central Canada are considered short term in nature as spring and earlier summer conditions were wet. Precipitation levels average out or be slightly above average when viewed from a longer term perspective. Due to wet spring conditions agricultural crops developed shallow root systems which has made these crops more vulnerable to late season drought. Moderate to Severe Drought (D1–D2) conditions affected 3.9 percent of the area and 7.2 percent of the population of the Central Region.

**Atlantic Region** (NS, NB, PE, NL)
Most of Atlantic Canada received below normal precipitation during the past 30 days. Parts of New Brunswick, Prince Edward Islands and Nova Scotia experienced precipitation deficit and poor streamflow which lead to the development or expansion of small Abnormally Dry (D0) pockets. These conditions are short term but are impacting agriculture, particularly potato size in P.E.I. Abnormally Dry (D0) conditions affected 9.6 percent of the area and 29.5 percent of the population of the Atlantic Region.

**Northern Region** (YK, NT)
Conditions in Northern Canada improved throughout the month of August. Although the Moderate Drought (D1) persists in pockets of the Yukon and Northwest Territories. There was, however, some improvement in moisture conditions in the northwestern Yukon and south of Yellowknife reducing the extent of Moderate Drought (D1) in the area. Northern regions of the Northwest Territories saw the emergence of Abnormally Dry (D0) conditions as a result of precipitation deficits and poor stream flow. Moderate drought (D1) conditions affected 5.1 percent of the area and 1.6 percent of the population of the Northern Region.

**UNITED STATES:** During August, near- or below-normal temperatures covered the northern half of the Plains and the Midwest, while persistent heat gripped many other areas of the country—especially from the Pacific Coast to the southern Plains and into parts of the Southeast.

The southern Plains’ heat was accompanied by erratic rainfall, leading to rapid drought development. Minimal rain also fell in large sections of the Four Corners States and environs, largely due to a sub-par Southwestern monsoon. Some drought also affected the Northwest.

Farther east, variable mid- to late-summer rainfall in the Midwest left some areas with patchy, short-term drought, a remarkable development considering the excessive wetness of the first half of the year. Elsewhere, pockets of drought were generally confined to the Southeast.

**Historical Perspective:** According to preliminary data provided by the National Centers for Environmental Information, the contiguous United States experienced its 13th-hottest, 45th-wettest August during the 1895-2019 period of record. The nation’s August average temperature of 73.9°F (23.3°C) was 1.8°F (1.0°C) above the 20th century mean, while precipitation averaged 2.74 inches (69.6 mm)—105 percent of normal.

State temperature rankings ranged from the 32nd-coolest August in Iowa to the second-hottest August on record in Arizona, New Mexico, and Texas. In those three states, August
was hotter only in 2011. Elsewhere, top-ten rankings for August heat were also noted in California, Colorado, Florida, and Utah. Meanwhile, state precipitation rankings ranged from the sixth-driest August in Arizona and Utah to the wettest August on record in Kansas and Nebraska. Top-ten rankings for August wetness were reported in Missouri and South Dakota.

**Agricultural and Hydrological Highlights:** By early September, drought covered just over 10% of the contiguous United States, up from 3.5% in late July. Some of the greatest increases in drought coverage during August occurred in the Southwest. For example, drought covered more than one-quarter (26%) of Arizona on September 3, whereas no drought had been observed in the state on July 30. Similarly, drought coverage in Michigan increased to 17% by September 3, up from no drought just 5 weeks earlier. Besides the Southwest and parts of the central and eastern Corn Belt, drought was noted in early September across parts of the Northwest and Southeast.

According to the U.S. Department of Agriculture, some of the most significant topsoil moisture shortages by September 1 were observed in the south-central and southwestern United States. On that date, Texas led the Great Plains with topsoil moisture rated 84% very short to short, while New Mexico paced the Southwest at 68% very short to short. In the Northwest, topsoil moisture was rated at least one-half very short to short on September 1 in Oregon (73%), Idaho (55%), Wyoming (53%), and Washington (53%). Elsewhere, Virginia topped the Southeast with topsoil moisture rated 61% very short to short, while Michigan (45% very short to short) led the Midwest.

Crop stress related to drought was relatively minor across the country. However, the combination of spring flooding, poor crop establishment, and late-summer dryness left at least one-quarter of the corn rated in very poor to poor condition on September 1 in Indiana (27%) and Ohio (25%). Similarly, 26% of Indiana’s soybeans were rated very poor to poor on that date. In Texas, more than one-fifth (21%) of the cotton was rated in very poor to poor condition on September 1, in part due to late-summer heat and drought. As August ended, more than 40% of the rangeland and pastures were rated in very poor to poor condition in California (50%), Texas (45%), New Mexico (42%), and Washington (42%), compared to a national value of just 18%.

On September 1, statewide reservoir storage as a percent of average for the date was significantly below normal in New Mexico and Washington. In New Mexico, for example, combined storage in 16 major reservoirs was 70% of average.

By September 10, year-to-date wildfires across the country had charred 4.25 million acres (1.72 million hectares) of vegetation, well below the 10-year average of 5.92 million acres (2.40 million hectares). More than 60% of the total, or 2.59 million acres (1.05 million hectares), occurred in Alaska, which has experienced a very active wildfire season. By comparison, the nation’s wildfires burned more than 10 million acres (more than 4 million hectares) twice in the last 4 years, including a modern-era record of 10.13 million acres (4.10 million hectares) in 2015.
MEXICO: Low wetness dominated over one of the summer months that contributes most to the annual rainfall nationwide. Typically, August contributes 18.1% of the annual rainfall, just below July and September; which contribute 18.2% and 18.3%, respectively. Like last month, ten tropical waves traveled away from the country and their wetness contribution was minimal; precipitation in the few areas with above-average rainfall was due to low-pressure systems and trough lines. This was another month without tropical cyclones influencing the weather along the eastern national coastal, which further exacerbated water stress there. In addition to dryness, temperatures again increased with several States classified as their top warmest August. Overall, it was the 15th driest August according to rainfall data since 1941, and the warmest August according to temperature records dating from 1953.

In August 2019, the subtropical high, or high-pressure belt that migrates from north to south throughout the year, was more intense than normal over most of the country, resulting in above-average temperatures, setting new temperature records in some places. The subtropical high kept skies clear, increasing temperatures in low-levels, although Atlantic surface winds were normal, with only a fork observed in the Isthmus of Tehuantepec region and the Caribbean, due to the low level jet (LLJ).

The climatic conditions over the last month caused worsening drought conditions in the regions affected most during previous months. Drought is affecting sugarcane production areas and the greatest damage is concentrated in the Huasteca region, southern Tamaulipas, Veracruz, Quintana Roo, Tabasco and Campeche, in the eastern corridor of the country. Losses in sugarcane yields are estimated at greater than 40%, with other sugarcane fields a total loss and cannot be harvested, according to local reports. Producers in this region are seeking support mechanisms under the Federal Government and the Ministry of Agriculture to reduce current losses; however, drought effects will persist in the coming months because of bankruptcy resulting in a shortage of sugar and sugar mills and, consequently, an increase in sweetener importations. In northern Veracruz, the lack of rain resulted in the lowest levels in the last fifty years of the Chicayan Dam. Local authorities have piped in water to the region, but they are not sufficient for such high demand due to human consumption as well as agricultural and livestock activities. Reports in southern Tamaulipas include cattle deaths and more than 90% of the planted soybean crop in loss; this situation was worsened also by high temperatures in the region. Economic impacts are unknown for farmers, small producers, ranchers and the fishing sector at this time.

August 2019 ranked as the fifteenth driest August nationwide with 110.8 mm of rainfall, 17.8% below the August 1981-2010 mean of 134.7 mm. It was the driest August on record in Tabasco, Tamaulipas and Veracruz, which were three of the most drought affected states; in addition, Hidalgo and Yucatán received little rainfall and ranked fourth and sixth driest August, respectively. The states that had a positive balance of rainfall were those of the Pacific – Sinaloa recorded its wettest August while Nayarit and Sonora ranked 14th and 25th wettest for August, respectively. Moderate to exceptional drought (D1-D4) persisted in portions from Durango to the west, and along the entire slope of the Gulf of Mexico and the Yucatan Peninsula. Slight recovery occurred in the North Pacific and some portions in the central part of the country, in southern and western Chiapas, where D0 to moderate (D1) drought coverage decreased. As of August 31, 2019, moderate to exceptional (D1 to D4)
drought coverage nationwide was 30.70%, 0.26% lower than compared with values one month ago.

August 2019 was the warmest August on record at the national level, but it also became the warmest month of all months according to statistics since 1953, with a national mean of 27.0 °C, 3.3 °C warmer than the August 1981-2010 average. The previous warmest month of all months was June 2017 with a national mean of 26.8 °C, which was the same as the records of July 2016, June 2013 and farther away than June 1953. For this month, twelve states had their warmest August: Durango in the north; Coahuila, Nuevo León, San Luis Potosí and Tamaulipas in the northeast; Mexico City, Hidalgo and Querétaro in central regions; Chiapas and Tabasco in the southeast; and finally Yucatan and Quintana Roo in the Yucatan Peninsula. Combined, Tabasco and Tamaulipas had their driest and warmest August on record.