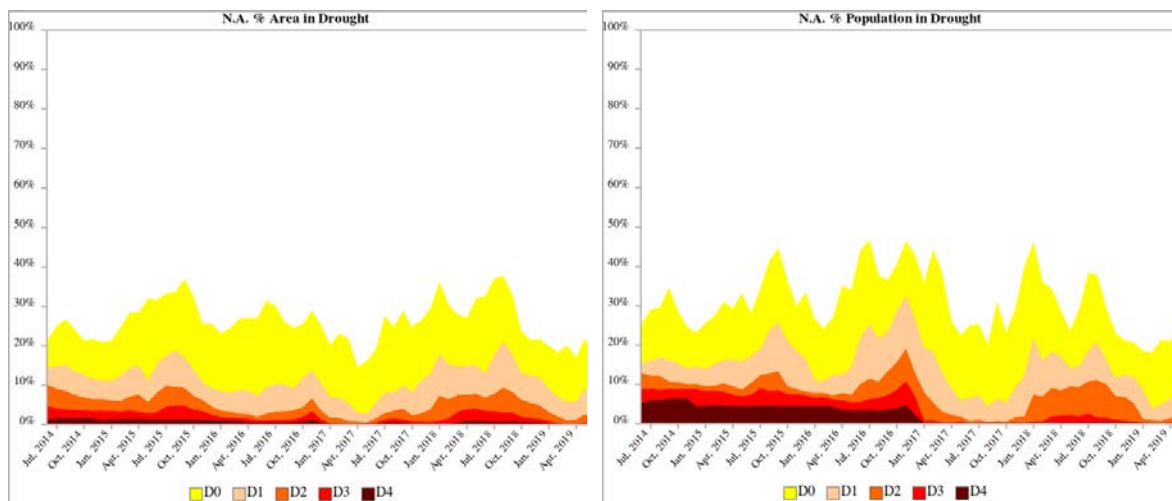


## North American Drought Monitor – May 2019

At the end of May 2019, moderate to extreme drought (D1-D3) affected 9.4 percent of the area and 8.6 percent of the population of North America. The percent area value was 3.9 percent more than the value for the end of April 2019. The percent population value was 2.6 percent more than the value for the end of April. At the end of May, 9.9 percent of the Columbia River Basin was in moderate to severe (D2) drought; 5.2 percent of the Rio Grande/Bravo River Basin was in moderate drought; 11.3 percent of the North American Great Plains was in moderate to extreme drought; and 0.4 percent of the Great Lakes Basin was abnormally dry (D0). 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 value for the Rio Grande/Bravo Basin decreased this month, while the values for the other regions are more than they were at the end of April.



**CANADA:** Drought remains a significant concern in western Canada as conditions have deteriorated due to continued precipitation deficits. As dry conditions prevailed in the west, eastern and central Canada continued to receive substantial precipitation. Most of the country experienced cooler-than-normal temperatures with the exception of British Columbia which experienced warmer-than-normal temperatures. Drought persisted in parts of British Columbia due to continued precipitation deficit in the region. Deteriorating soil moisture conditions and below-normal precipitation in the Prairie region led to worsening drought conditions. As a result of this there are increased concerns for feed supply in the growing season. In Central Canada, drought in northern Ontario led to deteriorating soil moisture. Short-term dryness in an area that experienced drought last year led to the development of a small dry pocket in eastern Quebec. A small dry pocket developed in Newfoundland where precipitation has been below normal for over 90 days. Dry conditions persisted in the Yukon and southern portions of the Northwest Territories due to below average long-term and short-term precipitation. At the end of May 2019, moderate to exceptional drought (D1-D4) affected 19 percent of the land area in Canada. The most significant drought concerns persisted in the northern Alberta, south-central Saskatchewan, south-western Manitoba, and western and northern British Columbia.

### **Pacific Region (BC)**

Conditions in British Columbia worsened due to below average precipitation throughout May. At the end of the month, drought conditions existed in the southern interior, northwest, and the coastal regions. Most of the province received below 30mm of precipitation during May, and continued to experience Abnormally Dry (D0) or Moderate Drought (D1) conditions. Poor streamflow and significant short term precipitation deficits along Vancouver Island's east coast led to the development of two small Severe Drought (D2) pockets. D1 expanded along the coastal region, where precipitation accumulation throughout May was below 40% of normal. D1 conditions persisted around the northwestern and northeastern region as a result of long term precipitation deficits. D2 in the areas around Dease Lake and Terrace remained relatively unchanged due to below average precipitation. At the end of the month, fire danger in the northern half of the province was very high. At the end of May 2019, moderate to exceptional Drought (D1-D4) affected 52 percent of the area and 82 percent of the population of British Columbia.

### **Prairie Region (AB, SK, MB)**

Conditions across the Prairie Region continued to deteriorate due to below average precipitation throughout May. Much of the region has received less than 60% of normal precipitation over the past six months, and these long-term deficits have worsened over the past couple of months. Precipitation deficits for the past 60 days were up to 60mm in the more heavily impacted areas. By the end of the month, Abnormally Dry (D0) and Moderate Drought (D1) conditions enveloped a large portion of the region. Fire danger was rated as extreme across much of Alberta and southern Saskatchewan. The Severe Drought (D2) pocket in Northern Alberta expanded as a result of insufficient precipitation during May. High Level experienced the second driest spring on record; thus, an Extreme Drought (D3) pocket developed in this region. Adequate precipitation along the south-western border between Alberta and British Columbia improved drought conditions in this area. Continued precipitation deficits led to worsening conditions around south-central Saskatchewan, where D2 expanded. This area has received below 10% of normal precipitation since March and has also had persistent poor soil moisture concerns. The driest spring on record prompted the development of two D3 pockets around Saskatoon and Moose Jaw. D2 conditions also developed around areas in southwestern Manitoba as a result of continued precipitation deficits and poor soil moisture conditions. D2 persisted around Swan River, as this area experienced the third driest spring on record, receiving below 40% of normal precipitation in the past 90 days. Feed supply concerns continued to be a significant concern as drought over the past two years has significantly reduced availability. Pastures have been very slow to recover this spring and producers continue to provide supplemental feed if they have access. At the end of May 2019, moderate to exceptional drought (D1-D4) affected 37 percent of the area and 40 percent of population of the Prairie Region.

### **Central Region (ON, QC)**

Central Canada continued to receive above normal precipitation throughout May, leading to excess soil moisture with the exception to some parts of northwestern Ontario and eastern Quebec. Much of the region received near normal to above normal precipitation during the month. Coupled with cool temperature, excessive moisture levels contributed to the delay of seeding across the region. Warm and dry weather is needed to get the 2019 season moving.

A large Abnormally Dry (D0) pocket developed in northwestern Ontario as a result of poor soil moisture conditions. A small Moderate Drought (D1) formed around Dryden, where precipitation was inadequate to relieve long-term moisture deficit. A small D0 also developed in eastern Quebec due to precipitation deficits occurring in a region that recovered from drought this past winter.

#### **Atlantic Region (NB, NS, PE, NL)**

Most of Atlantic Canada received adequate precipitation and soil moisture conditions remained optimal. At the end of the month, streamflow across the region was reported as above average. Growing precipitation deficits in Newfoundland over the past 3 months led to the development of a small Abnormally Dry (D0) pocket around the southeast portion of the island.

#### **Northern Region (YK, NT)**

Conditions in Northern Canada worsened throughout the month. Abnormally Dry (D0) conditions expanded into the Northwest Territories and Yukon. A large Moderate Drought (D1) pocket also formed in these regions as a result of poor streamflow and precipitation deficits. Precipitation in these regions appear to be moderately low and streamflow also appears to be poor in the eastern part of the Northwest Territories, eastern Yukon and areas surrounding Carjacks. At the end of May, fire danger in the southernmost areas of the Region was very high.

**UNITED STATES:** While torrential rains pounded the Plains and Midwest, hot, dry weather developed in the Southeast. Late-May heat and dryness was particularly acute in the southern Atlantic States, leading to rapid-onset drought and sudden crop stress. Drought also developed or intensified along parts of the Canadian border, stretching from Washington to North Dakota. Meanwhile, long-term drought lingered in portions of the Southwest, primarily in New Mexico.

However, rain—which triggered multiple rounds of flooding—dominated the nation’s weather headlines during May. From the Southwest to the Plains and upper Midwest, cooler-than-normal conditions accompanied the frequent showers. Exceptions to the cool pattern included the aforementioned Southeastern heat, as well as above-normal temperatures in the Pacific Northwest.

In late May and early June, record flooding developed along the Arkansas River, while a stretch of the middle Mississippi River climbed to its highest level since July or August 1993. The heavy rain also delayed agricultural fieldwork. By June 2, only 67 percent of the nation’s corn and 39 percent of the soybeans had been planted, breaking 1995 records of 77 and 40 percent, respectively.

Contiguous U.S. drought (D1 or worse) coverage stood at 5.28% on June 4, up from a U.S. Drought Monitor-era record low of 2.28% on April 23. Starting in late March and continuing into June, extreme and exceptional drought (D3 and D4) was absent from the Lower 48 States for the first time since June 2017. During May, however, there were increases in drought coverage in parts of the Southeast, Pacific Northwest, and North Dakota. By June 4, drought

covered 69% of Georgia, 50% of South Carolina, 44% of Washington, 29% of Florida, 14% of Alabama, 12% of North Dakota, and 11% of North Carolina.

Outside of the contiguous U.S., Alaska's coverage of moderate to extreme drought (D1 to D3) on June 4 stood at just under 3%—all in the southeastern part of the state. The introduction of D3 in Alaska on May 21 was the state's first observance of extreme drought since the creation of the U.S. Drought Monitor. Meanwhile, Hawaii's short-term drought worsened during May, with coverage increasing from 24 to 55% during the 4-week period ending June 4. Elsewhere, Puerto Rico reported 16% drought coverage on June 4, nearly unchanged from 4 weeks earlier.

**Historical Perspective:** According to preliminary data provided by the National Centers for Environmental Information, the contiguous United States experienced its 37th-coolest, second-wettest May during the 1895-2019 period of record. The nation's average temperature of 59.5°F (15.3°C) was 0.7°F (0.4°C) below the 20th century mean, while precipitation averaged 4.41 inches (112.0 mm)—152 percent of normal. It was also the nation's second-wettest month at any time of year, behind only 4.44 inches (112.8 mm) in May 2015. During the last 125 years, only nine months—five of them in May—have featured at least 4 inches (101.6 mm) of rain, on average, across the continental U.S.

Temperature rankings ranged from the fourth-coolest May on record in Arizona and South Dakota to the hottest May on record in Florida. Elsewhere, it was the fifth-coolest May in Colorado and the sixth-coolest May in Nebraska and Utah, but among the ten hottest in Alabama, Washington, West Virginia, and the Atlantic Coast States as far north as Delaware and Maryland. Meanwhile, precipitation rankings ranged from the 14th-driest May in North Carolina to the wettest May on record in Kansas, Missouri, and Nebraska. Top-ten rankings for May wetness were observed in a dozen other states spanning the country from California to New Jersey.

**Agricultural and Hydrological Highlights:** By early June, drought was affecting parts of the Southeast and Southwest, as well as a few areas along the Canadian border. According to the U.S. Department of Agriculture, topsoil moisture was rated at least one-half very short to short on June 2 in five Southeastern States: South Carolina (95% very short to short), Georgia (88%), Alabama (76%), North Carolina (58%), and Florida (57%). On the same date, New Mexico's topsoil moisture was 53% very short to short. Topsoil moisture was about one-quarter very short to short in Oregon (26%) and Washington (24%).

Southeastern heat and drought hit at a particularly bad time for grain corn, which on June 2 was rated 40% very poor to poor in South Carolina and 30% very poor to poor in North Carolina. In addition, Southeastern pastures started to show some signs of stress during May. In Georgia, 28% of the pastures were rated very poor to poor on June 2. New Mexico led the nation on June 2 with 37% of its rangeland and pastures rated very poor to poor, reflective of long-term vegetation health issues. Meanwhile, only 9% of the U.S. winter wheat crop was rated in very poor to poor condition on June 2, with crop-quality issues often more related to wetness than drought. Oregon's winter wheat was rated 18% very poor to poor on that date, lower than the values in excessively wet states such as Ohio (34% very poor to poor), Michigan (22%), and Illinois (22%).

On June 1, statewide reservoir storage as a percent of average for the date was significantly below normal—about 62% of average—in New Mexico and slightly below normal in Colorado and Washington. Reservoir storage should improve in Colorado as abundant snowpack continues to melt. However, some water-supply shortages are likely to persist in New Mexico, despite the snowy winter of 2018-19 in many watersheds, and may develop in parts of Washington.

**MEXICO:** The rainy season began in the second half of May, mainly in southern regions of the country. Contributing to wetness throughout the month were seven frontal systems over the northern and eastern portions; low-pressure systems; trough lines; the subtropical jet stream, and the low-level jet. Tropical waves remained far from the Mexican coasts. With an accumulated average precipitation of 31.8 mm (8.7 mm below the long-term average), May 2019 was ranked as the 19th driest May nationwide, according from data since 1941. The average temperature in May 2019 was 24.8°C, 1.2°C above average the seventh-warmest May, according to temperature data since 1953.

Two rainy periods were observed, one starting on May 5 and the other at the end of the month, although almost every day of the month featured rainfall below the national average total. Rain in Chiapas helped to slightly reduce the effects of the drought, but it will be necessary to have greater rainfall to achieve a total recovery. Chiapas recorded its 15th-wettest May. However, near Chiapas, the situation did not improve. Tabasco received an average of 76.5 mm of rain, barely 60% of the monthly average, as drought continued to degrade conditions. Seasonal forecasts indicate that rain will continue to be below average in this region. The extreme drought (D3) that covers portions of Tabasco and Chiapas has extended to southern Veracruz in the last month. The main drought and dryness recovery area was noted in northern areas of Coahuila, Nuevo León, and San Luis Potosí, due to the wetness and rainfall contributed by frontal systems. However, coastal areas of the Pacific such as Colima, Michoacán, Guerrero, and Oaxaca, have begun to experience moderate drought (D1). As of May 31, national coverage with moderate to extreme drought (D1-D3) was 19.02%, an increase of 2.31% compared to last month and 12.41% more than the amount of drought quantified on January 31, 2019.

The drought in Veracruz is also a concern; the local government requested a Drought Declaration in seven municipalities for a period comprised of 12 consecutive months from May 2018 to April 2019. Several of these municipalities are located in parts of southern Veracruz that are currently experiencing extreme drought (D3). With this Declaration, the local government will be able to access federal resources from the Natural Disasters Fund (FONDEN) to mitigate part of the damages. Another of Veracruz's drought effects is evident in low water levels on rivers such as Tuxpan in the north, La Antigua in central region, and Las Choapas in southern Veracruz. The long-term drought in Veracruz, Chiapas, and Tabasco is evident in 3- and 6-month rainfall deficits. For example, it was the 11th-driest period in the last 6 months for Veracruz and the driest in the last 3 months. Chiapas and Tabasco ranked in the driest one-third of the distribution over the last 3 months. In the last 12 months, from June 2018 to May 2019, the states with least rain received with respect to their averages were Hidalgo, San Luis Potosí, Tabasco and Chiapas.

In mid-spring, only the Northwestern States, including Baja California, Sonora, and Sinaloa, as well as portions of the South Pacific States of Guerrero and Oaxaca, had below-average temperatures. The rest of the country had above-average mean temperatures, with the Northeast being the region with the highest positive anomalies, up to 5°C above average. It was the seventh-warmest May nationwide according to data since 1953. The national mean temperature of 24.8°C was 1.2°C above May's long-term mean. Seven states recorded their warmest May; all of them located from central-east to the southeast, including Hidalgo, Puebla, Queretaro, Quintana Roo, San Luis Potosi, Tabasco, and Yucatan. Conversely, Sonora, in the northwest, recorded its second-coldest May.