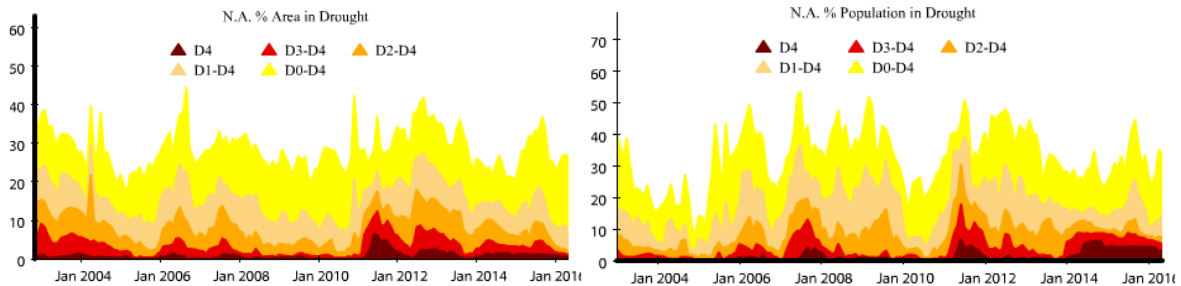


## North American Drought Monitor – May 2016

At the end of May 2016, moderate to exceptional drought (D1-D4) affected approximately 7.1% of the area and 14.3% of the population of North America. These percentages are a decrease of 1.3% for area and an increase of 2.0% for population compared to the values for the end of April 2016.



**CANADA:** The month of May brought a shift of conditions across the country; the Prairie region bode well overall while parts of B.C. and southern Ontario and Québec experienced deteriorating conditions. Large precipitation events brought much-needed moisture across much of Alberta, Saskatchewan, and Manitoba, with some regions receiving up to 125 mm of rain within the month. Abnormally Dry (D0) and Moderate Drought (D1) areas still persisted, but nonetheless improved significantly from the previous month in both terms of intensity and areal extent of drought. Shorter-term dryness emerged across southern B.C., and continued to pose a concern across central parts of the province as well. Southern Ontario and Québec saw a significantly drier month, with a large portion receiving less than 40% of normal precipitation. As of May 31, less than 12% of the agricultural land in Canada had received precipitation below the 20th percentile since April 1.

The province of British Columbia saw degrading conditions for the month of May, including areas across the southwestern and central parts of the province. Vancouver Island and the lower mainland saw a particularly marked difference in conditions, where precipitation percentiles ranked as being below the 10th percentile for precipitation in the past 2 months. Abnormally warm weather in conjunction with a very dry and early spring saw the snowpack disappearing quickly and resulted in very low streamflow and reservoir levels for the end of May. Many of the streams in the southern portion of Vancouver Island reached record lows. Since this region is heavily reliant on winter snowfall for summer water supplies, there was great concern for significant impacts to occur through the summer; these areas were depicted as D0 and D1 for this month's assessment. The interior portion of British Columbia also had a very dry month with below-normal precipitation, low streamflow levels, and above-normal temperatures; as a result, the Kamloops and Kelowna region's D0 area was expanded. Further north, central areas of B.C. continued to experience low precipitation and very low streamflow values. As such, the D1 was extended to include an area from Prince George through to Terrace. Slight improvement was seen around Fort St. John and Fort Nelson, where adequate moisture was received.

Overall conditions across the Prairie Provinces improved significantly throughout the month of May. Only 10.7% of the agricultural region was considered to be below the 40th

percentile based on precipitation since April 1. Many areas across the southern Prairies received ample precipitation, with a particularly large rain event occurring in the last 7 to 10 days of the month. This particular event dropped 30 to 40 mm over a large region with localized amounts of up to 80 to 90 mm in southeast Saskatchewan and southwest Manitoba. The Swift Current and Edmonton-Edson areas also received up to 125 mm during the month of May as well. These large precipitation events helped to alleviate concerns of drought conditions in much of the region, replenishing soil moisture and water supplies. While rainfall throughout the prairie region in May significantly improved the conditions, there were areas within the Prairies that remained in D0, D1, and Severe Drought (D2). The remaining D0, D1, and D2 regions have improved, though not fully recovered from the precipitation deficits and drought impacts. The area around Calgary and northward towards Jasper is one such area where a couple pockets of D2 and one larger area of D1 remained. A pocket of D1 was also shifted slightly in Saskatchewan, now reaching further north from North Battleford towards Meadow Lake, where an area of less than 40% of normal precipitation developed. The situation in the northern portion of the Prairies continued to persist as Abnormally Dry (D0) conditions, spreading further north to include Uranium City. However, northern Alberta saw improvement over the past month which has led to a significant change in drought conditions in the area.

Dry conditions persisted across southern regions of Ontario and Québec through May. Conditions across southern Ontario depreciated quite drastically through the month of May: nearly 90% of the Agricultural Region was below the 40th percentile class. This region reported only 50 to 75 mm of precipitation since April 1, 2016. Thus, this large area was downgraded to D0 conditions, with a large pocket of D1 developing around Lake Ontario, from Toronto towards Ottawa. Some of the dry conditions extended slightly into southern Québec as well, including Sherbrooke, Québec City and north towards Baie-Comau. Lower precipitation was also recorded across greater parts of Northern Ontario and Québec, which led to an expansion of Abnormally Dry (D0) conditions across the two provinces, stretching down towards Thunder Bay and Lake of the Woods.

While moisture over the winter was more than adequate across much of the Atlantic region, short term dryness was reported through parts of the region. Since April 1, 2016, nearly 48% of the region was below the 40th percentile, with 5% below the 20th percentile since April 1. As a result, this small area encompassing two-thirds of Prince Edward Island and into parts of New Brunswick was placed in a pocket of D0.

Minimal changes were made to Abnormally Dry (D0) conditions across the Yukon and Northwest Territories; a small pocket around Yellowknife was expanded due to low precipitation reported. An area was also extended from Whitehorse towards Fort Liard as a result of low precipitation and Drought Codes, according to the Canadian Wildland Fire Information System. Satellite-derived precipitation data indicated an area in northern Northwest Territories received between 0 and 20 mm of precipitation for the month of May, resulting in a D0 classification.

**UNITED STATES:** During May, a high-latitude atmospheric blocking pattern led to cool, showery weather in many parts of the country—with consistent warmth mainly confined to

the nation's northern tier. Some of the most persistent rain fell across the Plains, slowing fieldwork but maintaining mostly adequate to locally excessive soil moisture for rangeland, pastures, winter wheat, and spring-sown crops. By May 29, nearly two-thirds of the nation's pastures (66%) and winter wheat (63%) were rated in good to excellent condition—the highest for both at this time of year since 2010.

In contrast, drier conditions developed across the Great Lakes region, leading to more fieldwork opportunities. Following earlier corn and soybean planting delays in the eastern Corn Belt due to cool, damp field conditions, fieldwork accelerated in late May. During the week ending May 29, producers in Ohio planted 41% of their intended soybean acreage, jumping from 22 to 63%, and 33% of their corn. Planting delays persisted, however, in the southwestern Corn Belt.

Meanwhile, warmth in the Northwest contrasted with cool conditions in the Southwest. Northwestern warmth promoted a rapid crop development pace, while occasional showers maintained favorable growing conditions for winter wheat and spring-sown crops. Higher elevations of the West, primarily from the Great Basin to the central Rockies, received some late-season snow.

Elsewhere, developing drought across the interior Southeast contrasted with wet weather and fieldwork delays in the western Gulf Coast region and the middle and southern Atlantic States. Torrential rainfall induced some mid- to late-month flooding along and near the Texas coast.

During the 4-week period ending on May 31, 2016, contiguous U.S. drought coverage decreased to 12.73%—down 1.83 percentage points. Aside from lingering, long-term drought in parts of California and the Southwest, U.S. drought at the end of May was mostly short term in nature and limited to an area centered on the southern Appalachians.

Northern California continued to experience incremental improvement from long-term drought, while southern California headed into a fifth year of drought. On May 31, nearly 84% of California remained in drought, down from 97% as recently as March 8. However, California's coverage of exceptional drought (D4) has fallen from 46 to 21% since October 1, 2015. Meanwhile in the Southwest, drought covered 59% of Arizona and 37% of New Mexico on May 31. Farther east, short-term drought across the interior Southeast expanded by May 31 to cover 47% of Tennessee, 28% of Georgia, 27% of Alabama, 11% of North Carolina, and 10% of South Carolina.

Outside of the mainland U.S., coverage of abnormal dryness (D0) in Alaska decreased during May from 23 to 16%. Despite unusual Alaskan warmth, above-normal May precipitation across the southeastern part of the state contributed to the reduction. Meanwhile, Hawaiian rainfall continued to trim drought coverage and intensity, mainly in windward locations. Between May 3 and 31, Hawaii's drought coverage decreased slightly from 61 to 57%. Elsewhere, Puerto Rico's drought situation was unchanged during May, with moderate drought (D1) coverage steady at 5%.

**Historical Perspective:** According to preliminary information provided by the National Centers for Environmental Information, the contiguous U.S. experienced May precipitation and temperatures that were very close to historical averages. For the contiguous U.S., the May average temperature of 60.3°F (15.7°C) was just over 0.1°F (just under 0.1°C) above the 1901-2000 mean. It was the 61st-warmest May during the 122-year period of record. State temperature rankings ranged from the 25th-coolest May in Oklahoma to the 11th-warmest May in Washington. Meanwhile, U.S. precipitation averaged 3.04 inches (77.2 mm), 104% of the long-term mean. State precipitation rankings ranged from the 15th-driest May in Alabama to the fifth-wettest May in Delaware and Virginia. In addition to Alabama, May rainfall totals were among the thirty lowest values on record in Mississippi, New Hampshire, New York, and Washington.

The U.S. experienced a warm, wet spring, despite the overall normal conditions during May. It was the nation's sixth-warmest, 18th-wettest spring during the 1895-2016 period of record. The March-May average temperature of 53.7°F (12.0°C) was 2.8°F (1.5°C) above the 20th century mean, while precipitation averaged 9.03 inches (229.3 mm), 114% of normal. It was the warmest U.S. spring since 2012. Six of the eight warmest U.S. springs on record have occurred in the last two decades. More than a dozen states across the northern and eastern U.S. experienced a top-ten spring for warmth. Washington tied with 1992 for its second-warmest spring behind only 1934. Meanwhile, state precipitation rankings ranged from the ninth-driest spring in New York to top-ten values for March-May wetness in Nebraska (fifth wettest); Louisiana (seventh wettest); and Texas (eighth wettest).

**Agricultural and Hydrological Highlights:** By May 31, only 2% of the U.S. winter wheat production area was affected by drought, down from a spring peak of 19% on April 12. Based on USDA crop conditions reported for May 29, U.S. winter wheat was rated 63% good to excellent and 8% very poor to poor. In the last two decades, only 1998, 1999, and 2010 featured higher late-May crop ratings for U.S. winter wheat.

At the end of May, drought was affecting just 10% of the U.S. cattle inventory, down from a recent maximum of 19% on April 12. Similarly, only 8% of the nation's hay area was in drought, down from 12% on April 12. Not surprisingly, given the widespread spring rainfall, nearly two-thirds (66%) of the U.S. rangeland and pastures were rated in good to excellent condition on May 29. During the last 22 years, U.S. rangeland and pasture conditions were higher at the end of May only twice—in 1995 and 2010. All three—1995, 2010, and 2016—featured El Niño in progress as the year began.

On May 31, the nation's corn and soybean production areas remained mostly free of drought – less than 1% drought coverage for both commodities. On May 29, the first U.S. corn condition report of the season indicated that crop was rated 72% good to excellent and just 4% very poor to poor—on par with, but slightly below, the ratings at the same time last year (74% good to excellent and 3% very poor to poor). Early-season (late-May) corn condition ratings were also slightly higher in several other years, including 1998, 1999, 2007, 2010, the drought year of 2012, and 2014.

On June 1, 2016, reservoir storage as a percent of average for the date was significantly below average in several Southwestern States. Specifically, statewide storage was less than

75 percent of average in Arizona, Nevada, and New Mexico. Meanwhile in northern California, gradual recovery from long-term drought was apparent in statewide reservoir storage. However, California's recovery was uneven, with a general trend toward lower storage (and drought persistence) in southern watersheds. By the end of May, California's surface water storage was 87% of the historic average for the date, compared with 52% on November 30, 2015. Storage in California's intrastate reservoirs more than doubled during the 6-month period ending May 31.

**MÉXICO:** With the exception of the northeast, the central region, and Chiapas, May 2016 was drier than normal. From the western part of the country into northern and northwestern Mexico, rainfall was close to normal. Meanwhile the greatest precipitation deficits were observed along the coast of the Gulf of Mexico from Veracruz to Tabasco, Oaxaca, and Guerrero, in addition to the Yucatan Peninsula. The monthly average precipitation of 37.2 mm was 8.2% or 3.3 mm below the long-term mean and ranked as the 30th driest May at the national level, while the mean temperature of 25.1°C was 1.5°C above the 1981-2010 normal and was ranked as the fourth-warmest May.

Three frontal systems; low pressure located from the northeast to the south; and incoming moisture from the Pacific Ocean were the main producers of rain. The lack of rainfall was related to the displacement of a mid-level high pressure system over southern and western Mexico, which blocked the moisture to these regions. As a result of favorable rainfall over the last month in Morelos, Tlaxcala, Nuevo Leon, and Tamaulipas, these states are free of drought; among them, Nuevo Leon and Tamaulipas had their tenth- and fourth-wettest May, respectively. At the end of May, the country's moderate to extreme drought (D1-D3) coverage stood at 14.3%, 0.1% below the April 30 figure.

By the end of May, drought had increased in Campeche and Yucatan, but contracted in central Mexico and changed slightly in Veracruz, Oaxaca and Chiapas. In Veracruz, moderate to severe drought (D1-D2) reached 43.2%, an increase of 4.2% compared to the end of April. D1-D2 stood at 30.3% in Chiapas, while moderate drought (D1) expanded to 15.3% in Chihuahua. Abnormal dryness (D0) decreased in Baja California Sur, Sinaloa, Jalisco, Michoacan, Guerrero, and Tabasco, while long-term extreme drought (D3) was slightly reduced in northwestern Baja California from nearly 10% at the end of April to 5% on May 31.

May was warmer than normal for most of the country, while the northwest and northern Coahuila averaged close to normal. Parts of Michoacan, Mexico State, Morelos, and Puebla were below normal. Five states in central Mexico experienced their warmest May on record: Aguascalientes, Hidalgo, Jalisco, Queretaro, and Tlaxcala, along with two states (Campeche and Chiapas) in southern Mexico.

In May 2016, the Information Service for Agri-Food and Fishing (SIAP) reported about 48.5 thousand hectares damaged by frost, drought, excessive wetness, and low temperatures in states such as Sinaloa, Nayarit, and Tamaulipas, that together accounted for more than 70 percent of the national losses. In Guanajuato, losses were caused by hail. The Secretariat

of the Interior issued a declaration of emergency due to severe rain and flooding on May 31 and June 1 in Reynosa, Tamaulipas.

The late onset of seasonal rain brought an increase in forest fires in the country throughout May, with about 166,519 hectares burned in the period from January 1 – June 2, 2016. This ranked as the ninth-greatest burned area on record, according to the weekly report of fires from the National Forestry Commission (CONAFOR). The main states with the largest area burned were Jalisco, Oaxaca, Michoacán, Guerrero, Sonora, Puebla, Chiapas, Durango, Chihuahua, and Mexico.