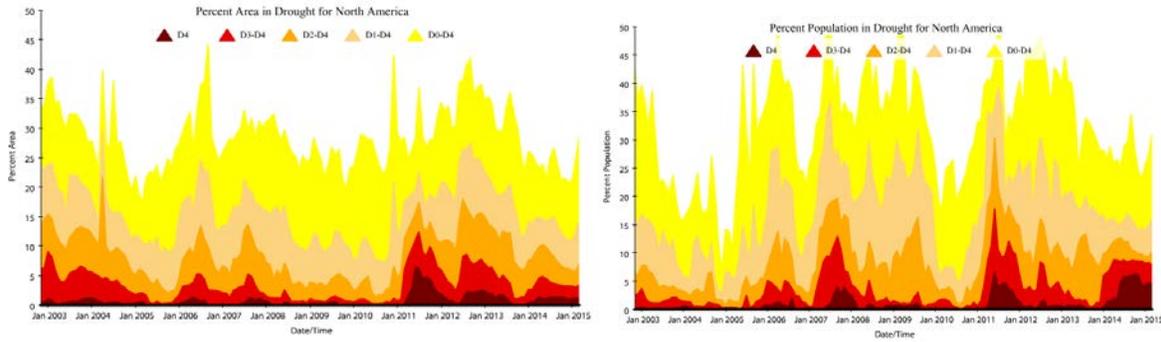


## North American Drought Monitor – March 2015

At the end of March 2015, moderate to exceptional drought (D1-D4) affected approximately 14.2% of the area and 15.9% of the population of North America. These percentages are an increase of 1.9% for area and 0.8% for population compared to the values for the end of February 2015.



**CANADA:** During March, Canada began its transition from winter to spring, as temperatures rose across most of the country and winter's snowpack began melting. At this point in the early spring, conditions have been fairly stable with no major current drought. As the season progresses, more dramatic changes in soil moisture will likely occur.

March was particularly warm throughout all of western Canada, where a weak El Niño produced above-average temperatures from the Pacific coast all the way to Northern Ontario. These warm temperatures caused much of the region's snow pack to melt fairly early, notably through the valleys in southern British Columbia and on Vancouver Island. While some of this run off did recharge soil moisture, the Abnormally Dry (D0) area has expanded norward along the southern coast. Sufficient rainfall in the late spring to early summer will be crucial for alleviating these dry conditions.

On the eastern side of the Rockies, spring runoff in Alberta and Saskatchewan has caused conditions to vary between the north and south. The current snowmelt in northern Alberta is only slightly below average; however the cumulative dry conditions north of Grande Prairie will require more substantial moisture to recover. Similarly, Northern Saskatchewan had a dry month, with less than 10cm of snow on the ground by the end of March and potential runoff well below normal. As a result, Abnormal Dryness (D0) has emerged in the area, extending towards the North West Territories. In the southern half of Alberta and Saskatchewan, areas along the central grain belt, where soil moisture was low going into winter, have received sufficient run-off and additional snowfall this past month. Farther south, less snowpack was present; however this was offset by fully charged sub-soil from wet autumn conditions.

In southern Manitoba, the Abnormally Dry (D0) area has retracted slightly following significant snowfall in the area. While the extent of the dry conditions has withdrawn, the area of Moderate Drought (D1) along the shared border with North Dakota persists. Soil moisture in the area is significantly below normal, due to a year of below average

precipitation and little to no snow available for spring runoff. This dry area is continuous with a much broader region of Moderate Drought (D1), stretching across the Midwestern United States towards northwestern Ontario.

In central Canada, notably along the Windsor-Quebec City corridor, March brought a continuation of winter's dry weather. Over the past 6 months the region has seen record dry conditions, with precipitation more than 120 mm below average. As a result, a pocket of Moderate Drought (D1) has emerged west of London; however it is likely a meteorological drought at present. Further north between Kingston and Montreal, the previous patches of Moderate Drought (D1) since January have persisted through March. While the effects of a dry winter are apparent in the region, a much more severe drought has been avoided due to a particularly cold winter and slow spring warming. Thanks to this delayed melting of snowpack, the amount of spring run-off has been near normal, despite the winter's snow drought. The progression of conditions in the area will be highly dependent on the coming spring precipitation.

**UNITED STATES:** During the 4-week period ending on March 31, 2015, contiguous U.S. drought coverage climbed to 36.84%—an increase of nearly five (4.96) percentage points. March featured warmer- and drier-than-normal weather in most areas from California to the Great Plains and the upper Midwest. As a result, drought development or expansion was noted during March in a broad area covering the Intermountain West, the Great Plains, and the upper Midwest. Drought developed during the month in much of central and northern Wisconsin, with 55% of the state in moderate drought (D1) by March 31. Similarly, 22% of Nebraska was experiencing moderate drought by the end of March, up from 0% just 4 weeks earlier. Substantial jumps in drought coverage were also reported during March in Minnesota (from 6 to 92%), South Dakota (from 5 to 43%), Kansas (from 42 to 69%), and North Dakota (from 10 to 21%). In Colorado, coverage of severe drought (D2) increased from 12 to 40% during March.

With the western U.S. winter wet season nearing an end, the March warmth and dryness ensured a fourth consecutive year of drought for California and the Great Basin. In addition, Western warmth triggered premature melting of already meager mountain snowpack. Farther east, dry conditions in the upper Midwest contrasted with saturated soils in the Ohio Valley and the mid-South. In fact, March rainfall and melting snow triggered widespread lowland flooding in a broad area stretching southwestward from the Ohio and Tennessee Valleys to the western Gulf Coast region, including the northern Mississippi Delta. Elsewhere, generally drier-than-normal conditions prevailed in the Northeast and Southeast, although frigid weather in the former region contrasted with warmth farther south.

**Historical Perspective:** According to preliminary information provided by the National Climatic Data Center, the contiguous U.S. experienced its 12th-warmest, 19th-driest March during the 121-year period of record. The nation's average temperature of 45.4°F (7.4°C) was 3.9°F (2.2°C) above the 1901-2000 mean, while precipitation averaged 2.08 inches (52.8 mm)—82 percent of normal.

State temperature rankings ranged from the eighth-coldest March in Rhode Island to the second-warmest March in the three Pacific Coast States. In fact, top-ten values for March warmth were noted in all eleven Western States, along with South Dakota, Nebraska, and Florida. In California, where the monthly average temperature of 57.0°F (13.9°C) was 8.2°F (4.6°C) above normal, the only warmer March occurred in 1934. California also completed its warmest October-March “cold season” on record, with an average temperature of 53.9°F (12.2°C)—5.8°F (3.2°C) above the 20th century mean. California’s previous warmest “cold season” had been 1933-34, with an average temperature of 51.8°F (11.0°C). Meanwhile, top-ten March dryness in nine states from California to Vermont contrasted with the fourth-wettest March in Texas. In South Dakota, it was the second-driest March behind 1926.

**Agricultural and Hydrological Highlights:** With California’s drought moving into a fourth year, and Extreme to Exceptional Drought (D3 to D4) covering two-thirds of the state, large reductions in agricultural output can be expected again in 2015. According to USDA’s *Prospective Plantings* report, issued on March 31, planting intentions for cotton, corn, oats, barley, wheat, rice, and sunflowers total 1.72 million acres (696,059 hectares) in 2015, down from 1.90 million acres (768,903 hectares) in 2014 and 2.44 million acres (987,433 hectares) in 2013. The intended cotton acreage of 155,000 acres (62,726 hectares), if realized, will be down 45% from 2 years ago, while the planted acres for the other crops listed will be down 20 to 30% from 2013 levels.

During the winter and early-spring months, wheat conditions declined sharply in several states across the nation’s mid-section. Between November 23, 2014, and April 5, 2015, the portion of the winter wheat crop rated in good to excellent condition plunged from 69 to 34% in Nebraska; 68 to 29% in South Dakota; and 61 to 33% in Kansas. Depending upon location, the declines in condition have been attributed to drought, winter weather extremes, or a combination of both. For U.S. winter wheat as a whole, the condition of this year’s crop was slightly better than a year ago. Nearly half (44%) of the winter wheat was rated in good to excellent condition on April 5, 2015, compared to 35% at the same time last year. Much of the increase in condition was attributable to a healthier winter wheat crop in Texas and Oklahoma. In Texas, for example, only 13% of the crop was rated in good to excellent condition a year ago, compared to 54% on April 5, 2015.

By March 31, drought covered 22% of the U.S. corn production area and 18% of the soybean area. Those numbers were up sharply from March 3, when just 6% of the corn and 5% of the soybeans were in drought. Despite drought development in the upper Midwest, producers are still optimistic for a favorable growing season if spring rains develop—especially since the dry conditions heading into spring should allow for rapid planting progress.

At the beginning of April 2015, storage in California’s 154 intrastate reservoirs was 68% of the historical average, nearly the same as a year ago. Reservoir storage is similar to a year ago, rather than lower, because much of the winter precipitation fell as rain and has already spilled into storage lakes. By April 1, the average water content of the high-elevation Sierra Nevada snowpack stood at a record-low 5% of average—indicating that drought-lowered reservoirs will not receive much, if any, runoff during the remainder of the spring

and summer. Statewide reservoir storage was also critically low in several other Western States, including Arizona, Nevada, and New Mexico.

Long-term water-supply issues also persisted across parts of the Great Plains. Despite recent wetness in Texas, the state's reservoirs were cumulatively just 70% full on April 1, 2015, compared to a historic average near 83% at this time of year. Farther north, a record-low surface elevation of 1,507.4 feet (459.5 meters) was reported on April 6 at Wilson Lake in north-central Kansas—more than a foot (0.3 meter) below the December 2006 low-water mark.

**MEXICO:** The national average precipitation of 69.6 mm in March 2015 (the wettest since 1941) was 54.9 mm above the long-term mean, setting a new record for March precipitation. Most of the country had above-normal precipitation, except Baja California, parts of Sonora, the coastal region of Oaxaca in southern Mexico, and the Yucatan Peninsula. Two winter storms, four cold fronts, and moisture from the Pacific produced the highest amount of rainfall during this month.

Unprecedented rainfall occurred between the second and third week of the month, as a result of an interaction between the ninth winter storm (SMN numbering) and the jet stream. These storms helped to set new March precipitation records in seventeen states. Aguascalientes, Coahuila, Colima, Chihuahua, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Mexico State, Michoacán, Morelos, Puebla, Queretaro, San Luis Potosi, Tlaxcala, and Zacatecas experienced the wettest March on record, while Campeche, Nayarit and Tamaulipas had their second wettest, and Baja California Sur, Nuevo León, and Sonora the third wettest March in the 1941-2015 period.

A favorable result of these storms was the reduction of Abnormally Dry regions (D0) and Moderate Drought (D1) in Sonora, Chihuahua, Durango, Jalisco, Michoacan and Guerrero. In addition, frontal systems helped to reduce Extreme Drought (D3) in northern Coahuila and aided recovery from Abnormal Dryness (D0) in Queretaro, San Luis Potosi, Hidalgo and northern Veracruz. Although frontal systems moved to the Gulf of Mexico's coastal states, Oaxaca, Chiapas, and the Yucatan Peninsula did not receive sufficient moisture, thus drought or dryness increased. The high pressure system (anticyclone) dominating the western United States extended to Baja California, causing a rise in temperatures and reduction in rainfall; as a result, drought grew from Moderate (D1) to Extreme (D3) in Baja California.

The eastward spread of storms from the Pacific, and the subsequent above-normal precipitation, also resulted in below-normal temperatures across a wide region of the north-northeast covering eastern Chihuahua, Durango, Zacatecas, Coahuila, Nuevo León, Tamaulipas, and San Luis Potosi. Below-normal temperatures also occurred in Tlaxcala, Puebla, northern Oaxaca, Veracruz, and Tabasco. Among these states, Tamaulipas had its fifth coldest March and Coahuila its fourth, while Veracruz and Zacatecas reached their third coldest March since 1971. In contrast, warmer-than-normal weather was observed in the northwest, west-central Mexico, and the Yucatan Peninsula. Sonora had its third warmest March, and the two states of the Peninsula of Baja California had their warmest

March; whereas to the south of the country, Campeche, and Yucatán had their sixth and fourth warmest March, respectively, since 1971.

The National Forestry Commission (CONAFOR) reported 1,474 forest fires affecting 28 states and 15,907 hectares in the period from January 1 to April 2 of 2015. The area burned this year is slightly higher than that reported in the same period in 2014 (13,866 ha), but represents only 13.6 % of those reported in the same period in 1998, when 116,264 hectares were affected. The greatest increase in area burned was observed in Oaxaca (797 hectares reported on March 5 versus 5,428 on April 2). Moderate Drought (D1) affects this state near the Tehuantepec Isthmus.