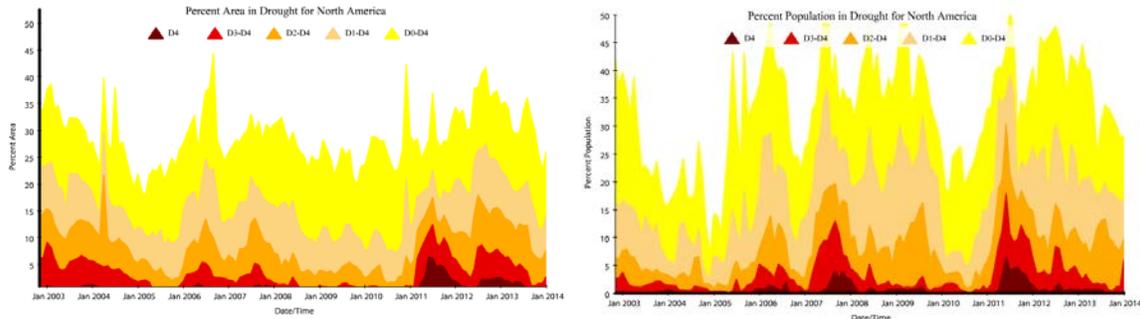


North American Drought Monitor – January 2014

At the end of January 2014, moderate to exceptional drought (D1-D4) affected approximately 14.1% of the area and 16.7% of the population of North America. These percentages are an increase of 2.5% for area and 0.4% for population compared to the values for the end of December 2013.



CANADA: The month of January saw minimal precipitation in the west and average precipitation in the east. Drought conditions worsened along coastal of British Columbia but generally improved elsewhere across the Pacific and Prairie regions. In the Central and Atlantic regions, some dryness developed in the northern areas but conditions were otherwise stable. Much of the precipitation across Canada fell as snow, and therefore has not resulted in immediate changes to soil moisture or water supplies.

In British Columbia, the dry winter continued along the coast while further inland, the Okanagan Valley began to experience abnormally dry conditions. The Moderate Drought (D1) conditions impacting Vancouver Island and the adjacent mainland expanded due to well below-average January precipitation. This region has received extremely low to record low precipitation this winter season. The Abnormally Dry (D0) area on mainland British Columbia also grew in size, stretching towards Kamloops and continuing southeast towards the Alberta border.

The Prairie region experienced a very dry January, but for the time being this has not impacted drought conditions. The central and Peace River regions of Alberta have been extremely wet this winter, so despite the lack of precipitation this past month, conditions remained stable. In Saskatchewan, the Abnormally Dry area west of Saskatoon was downgraded to normal while the drought conditions in the north shrunk considerably. Southern Alberta and Saskatchewan have received below-average to average precipitation throughout the winter and Chinooks have eliminated much of the snowpack. With little snow cover, crops and soil are poorly insulated and, in places, exposed. These conditions have the potential to lower soil moisture and cause winter kill. The probability of winter kill and soil moisture loss is increased with high degree of fluctuations in extreme temperatures which have been experienced through the region. Manitoba saw the Interlake region and the area east of Lake Winnipeg downgraded to normal. However, new Abnormally Dry areas developed in the north along Hudson Bay and in the south along the US border, next to Melita. This southern area has received well below average precipitation this winter, which could lead to soil moisture concerns in the spring.

In northern Ontario and northern Quebec, a lack of precipitation led to the classification of two Abnormally Dry areas. Also in Quebec, the dryness in the St. Lawrence and Gaspé regions expanded slightly. Otherwise, the Central region was stable throughout the month. The Atlantic region experienced another wet month and is also stable and free of drought conditions.

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- B.C. Ministry of Forests, Lands, and Natural Resource Operations – River Forecast Centre
- B.C. Ministry of Forests & Range, Wildfire Management Branch
- B.C. Ministry of Agriculture
- Manitoba Agriculture, Food and Rural Initiatives
- Manitoba Water Stewardship
- Nova Scotia Department of Agriculture
- New Brunswick Ministry of Agriculture, Aquaculture, and Fisheries
- New Brunswick River Watch
- Ontario Ministry of Natural Resources – Surface Water Monitoring Centre
- Ontario Ministry of Natural Resources – Aviation, Forest Fire and Emergency Services
- Ontario Ministry of Agriculture, Food, and Rural Affairs
- Ontario Ministry of Environment
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- La Financière agricole (Québec)
- Saskatchewan Ministry of Agriculture
- Saskatchewan Water Security Agency
- Saskatchewan Ministry of Environment Wildfire Management

UNITED STATES: The upper-level circulation during January consisted of a long-wave ridge over the eastern North Pacific and western coast of North America, and a long-wave trough over eastern North America, with many wiggles, or short-wave troughs and ridges, migrating through the flow. The western ridge redirected weather systems into Alaska and created a northwesterly flow in the circulation which inhibited precipitation over the western contiguous U.S. (CONUS), while storm systems caught up in the eastern trough produced precipitation east of the Rockies. The storm track resulted in only a few areas with above-normal precipitation: the High Plains and eastern slopes of the Rockies from Montana to Colorado, the Great Lakes region, and parts of the East Coast. Essentially no precipitation fell across much of the Southwest into the Southern Plains, and monthly precipitation was below normal across the rest of the West and Great Plains, and much of the Deep South, Ohio Valley, and Appalachian chain. Most of Alaska was wetter than normal, while beneficial rains fell over parts of the Hawaiian drought areas. When integrated across the country, January 2014 ranked as the fifth driest January in the 1895-2014 record. The precipitation eliminated drought in the Northeast, but January's dryness expanded drought in the Central and Southern Plains and West. On balance, the national drought footprint expanded over 5 percent to 31.3 percent of the U.S. as a whole, according to U.S. Drought Monitor (USDM) statistics. According to the Palmer Drought Index (PDSI), which goes back to the beginning of the 20th century, 24.5 percent of the CONUS

was in moderate to extreme drought at the end of January, an increase of 6 percent compared to last month.

By the end of the month, the core drought areas in the U.S. included:

- a large area of drought in the West consisting of moderate (D1) to extreme (D3) drought with pockets of exceptional (D4) drought;
- areas of moderate to severe (D2) drought, with pockets of extreme to exceptional drought, from the Southern Plains to Central Plains, connected to the western drought by a bridge of moderate to severe drought across the Southwest;
- moderate to severe drought in the Midwest;
- moderate to severe drought in the western Gulf of Mexico coast; and
- Hawaii, where moderate to extreme drought persisted.

Historical Perspective: The January precipitation anomaly pattern of dryness in the West, Great Plains, South, and Appalachians was reflected in the state ranks, with 25 states having January precipitation ranks in the dry third of the historical record, eight of which ranked in the top ten driest category. New Mexico had the driest January in the 1895-2014 record, Arizona second driest, and California third driest. For the three-month period, November 2013-January 2014, 15 states (all west of the Mississippi River) ranked in the driest third of the historical record with California having the driest, Oregon third driest, and Washington seventh driest November-January in the 1895-2014 record. California had their driest August-January, Oregon ninth driest, and Iowa tenth driest, with nine other states (in the Northwest, Plains to Midwest, and New England) ranking in their driest third of the historical record for the six-month period, August 2013-January 2014. For the last twelve months (February 2013-January 2014), dryness dominated the West Coast and Pacific Northwest, and Central to Southern Plains, with patchy dry areas in the Southwest, Midwest, and Northeast. On the state rank map, California had the driest February-January on record, Oregon the fourth driest, and Idaho the fifth driest, with four other states (Nevada and Washington in the West and Louisiana and Texas in the South) ranking in the driest third of the historical record for February 2013-January 2014.

Drought has been especially severe in California. Except for January 2014 (third driest) and June 2013-January 2014 (second driest), all of the time periods from the last two months (December 2013-January 2014) through the last twelve months (February 2013-January 2014) have ranked driest on record for the state. In addition to the last twelve months (February 2013-January 2014) being the driest such 12-month period in the 1895-2014 record, the last five years (60 months) have been extremely dry: February 2012-January 2014 was the driest such 24-month period, February 2011-January 2014 the second driest such 36-month period, February 2010-January 2014 the seventh driest such 48-month period, and February 2009-January 2014 the twelfth driest such 60-month period. More of the state (67.1 percent) is in extreme drought than ever before in the 15-year record for the USDM, and this is the first time in the USDM record that the state has experienced exceptional drought (D4). The statewide Palmer Z Index has indicated severe short-term drought for eleven of the last 13 months, with the persistent and extreme dryness causing the California statewide PDSI to reach values rivalling the most severe droughts of the 20th

century (1990-91, 1976-77, and 1924). The prolonged dry conditions prompted a drought State of Emergency declaration by the Governor of California.

If not for the beneficial warm season monsoon rains last year, the conditions in New Mexico would be equally dire. But even last year's beneficial precipitation was not enough to erase deficits which have built up over several years. The last twelve months (February 2013-January 2014) ranked as the 67th driest (53rd wettest) such 12-month period, but the previous year (February 2012-January 2013) was second driest (behind February 1956-January 1957). The last 24 months (February 2012-January 2014) ranked as the 14th driest such 24-month period, but last year (February 2011-January 2013) ranked second driest, again behind 1956-57. The last 36 months (February 2011-January 2014) ranked as the sixth driest such 36-month period, with 2010-2013 (February 2010-January 2013) ranking seventh driest. The last 48 months (February 2010-January 2014) was the eleventh driest such 48-month period, and the last 60 months ranked 13th driest.

Agricultural and Hydrological Impacts: Drought conditions were reflected in numerous agricultural, hydrological, and other meteorological indicators, both observed and modeled. Satellite observations showed vegetative stress continuing in parts of the West, especially California, but also in the Southern Plains, and this was confirmed by reports of non-irrigated crops suffering and lack of forage causing ranchers to cull their herds. According to the U.S. Department of Agriculture (USDA), as of February 4th, 49 percent of winter wheat, 40 percent of the domestic cattle inventory, 30 percent of corn acreage, 26 percent of hay acreage, and 21 percent of soybean acreage were in drought. These percentages are all increases compared to a month ago, with a +15 percent jump for winter wheat (although the decline in winter wheat conditions was partially due to dry, windy weather and sharp temperature fluctuations). January 2014 ranked as the 14th driest and 56th warmest January, region-wide, for the Primary Hard Red Winter Wheat agricultural belt. According to the USDA, the portion of the wheat rated good to excellent fell during January from 70 to 60 percent in South Dakota; 65 to 46 percent in Nebraska; 60 to 46 percent in Montana; 63 to 36 percent in Oklahoma; and 58 to 35 percent in Kansas. Texas wheat, already stressed by drought, was rated 19 percent good to excellent and 41 percent very poor to poor by the end of January. Soil moisture was depleted across much of the Far West, Midwest, Southern Plains, and Deep South, with the most rapid drying occurring in the West and Deep South.

The lack of precipitation was reflected in below-normal monthly totals as well as lack of rain days and long runs of consecutive dry days. Streamflow in the West and parts of the Plains and Deep South averaged much below normal, with many California stream gauges measuring record low monthly values for January. The persistent dryness — for the water year to date (October-January) and longer — was reflected in below-normal groundwater and springwater observations, snow cover and mountain snowpack and snow water content observations in the West, and, for California and most of the western states, below-normal reservoir levels.

MEXICO: January 2014 had very few rains, which occurred mostly in the north-central and the southeast parts of the country and were mainly caused by fast-moving frontal systems which traversed Mexico. Nationwide, it was the eighth driest January over the past

74 years. Heavy rains early in the month flooded some municipalities in northern Chiapas, but the rest of the country ended the month drier than normal. Cold air masses behind the frontal systems led to sudden drops in temperature in the highland areas of Chihuahua and Coahuila and snowfalls (40 to 60 cm) were reported again in the Sierra de Arteaga of southern Coahuila. By the end of January, around 85% of the country remained free out of drought, but that was in response to above-normal rains observed at the end of 2013.

As a result of poor rains this month, the nationwide area of abnormally dry conditions (D0) to severe drought (D2) grew to fifteen percent, an increase of eight percent from last month. These drought intensities are the less severe categories but they triggered warnings, since the medium-term rainfall outlook predicted drier-than-normal conditions and also most of the country is in the dry season. The worst drought category observed in January was D2 (severe drought), which grew 0.32% compared to the previous month and was located in the northwest of the Baja California Peninsula, in addition to Sonora and Chihuahua.

The mean temperature at the national level of 16.5 °C was 0.5 °C below the 1971-2000 normal, resulting in the 15th colder January since 1971. The largest positive anomalies were located in the northwest where Chihuahua with +1.7 °C recorded its 11th warmest January, Sonora with +1.3 °C had its third warmest, and both Baja California and Baja California Sur experienced their warmest January since 1971. In contrast to the northwest, the northeast and southeast were colder than normal. Tamaulipas, with a -1.0 °C anomaly, had its fourteenth coldest January, Yucatan its ninth, and Veracruz with -7.0 °C below normal had its coldest January since 1971. These well-below-normal temperatures were due to cold air masses which followed behind ten frontal systems; this is the third most frontal systems, being surpassed only by fourteen frontal events observed in 1993 and by eleven fronts in 2000.

About 152 forest fires have affected the country in at least eighteen states from January 1 to February 6. It's the second lowest such period with fires, with 2010 having only 62 reports, and much below the 967 fires reported in the similar period of 2011. These forest fire statistics are based on the 1998-present record from the National Forestry Commission (CONAFOR).