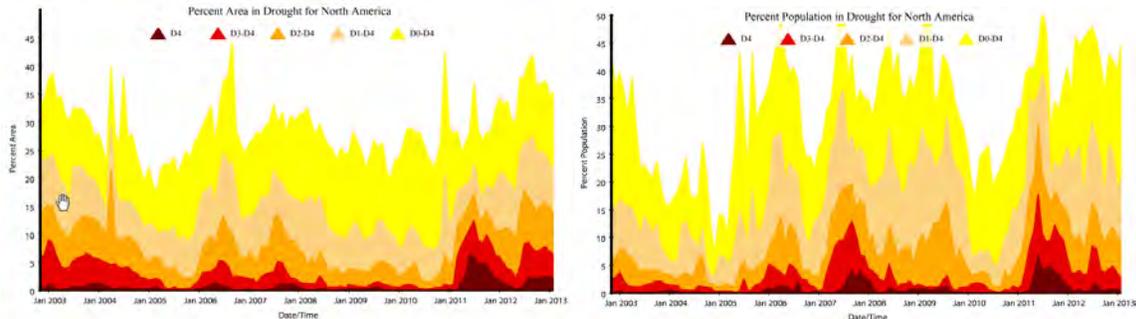


North American Drought Monitor - February 2013

At the end of February 2013, moderate to exceptional drought (D1-D4) affected approximately 21.7% of the area and 20.6% of the population of North America. These percentages are a decrease of 0.8% for area and an increase of 2.0% for population compared to the values for the end of January.



CANADA: The extent of drought across Canada increased since January, though overall the total area affected was still quite low compared to past years in February. However, many regions currently experiencing abnormal dryness could shift into significant drought nearing the spring season if forecast conditions for low precipitation prevail. This includes much of Eastern Canada, including southern Ontario and parts of the Atlantic region. The most significant drought areas in February remained in southeast Manitoba and northwest Ontario, on the edge of the significant drought encompassing much of the Great Plains States.

Parts of Northwest Ontario, including the Thunder Bay area on the north shore of Lake Superior, continued to be classified D1 (Moderate Drought). There, winter season rain and snow fall have been below 50 percent of normal since November 1 of last year. In southern Ontario, an overall abnormally dry winter brought below-normal precipitation, lack of snow accumulation and limited snow cover throughout the season. Snow that did fall did not stay for long as temperatures were generally above normal. Temperatures in February were near normal, and precipitation was slightly above average.

Great Lake water levels remained lower than average on Superior, Michigan, and Huron, and outflows for February were lower than normal on all lakes. Lakes Michigan and Huron followed a record low January level with a gain of about 50 mm (2 in) thanks to higher precipitation levels. That put the current level at month's end to approximately 25 mm (1 in) above the all-time low. Looking ahead to the next month, precipitation is expected to be below normal from southern Ontario to the east coast. That could raise the potential for drought to develop again this year in southern Ontario due to the current long-term moisture deficit.

In the Atlantic region, winter precipitation has been extremely low. Since November 1 of last year parts of New Brunswick and Nova Scotia received only half of normal or about 200 mm (8 in) less than expected. These regions were classified D0, and with a forecast of

below-normal precipitation over the next month will be monitored closely as drought conditions could develop.

In Western Canada, well above-average snowfall brought on concern for spring flooding for many areas in Saskatchewan and southwestern Manitoba. Temperatures next month are forecast to be above normal from Saskatchewan eastward. That may hasten flooding expected in southern Saskatchewan and southwest Manitoba if melting and runoff progresses rapidly.

Dry areas however remained in southeast Manitoba which was quite dry over the last summer and autumn seasons, and has had about average snow accumulation. Parts of Alberta are also drier than normal, particularly in the northwest Peace region and in the southwest. Over the past six months these regions are short 60 mm (2.4 in). Precipitation next month is forecast to be lower than normal over much of Alberta, which could bring about drought conditions ahead of spring seeding.

In British Columbia, abnormally dry areas persisted in the northern interior, which has had less than 60 percent of its normal winter precipitation. Vancouver Island and western coastal areas also remained dry, which led to a continuation of the D0 classification. Precipitation deficits in these regions are more than 300 mm (12 in) in some places since last November.

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- B.C. Ministry of Agriculture and Lands
- Environment Canada
- Manitoba Agriculture, Food and Rural Initiatives – Ag-Weather Program
- Manitoba Water Stewardship
- Natural Resources Canada – Canadian Forest Service
- Ontario Ministry of Natural Resources – Surface Water Monitoring Centre
- Ontario Ministry of Natural Resources – Aviation, Forest Fire and Emergency Services
- Saskatchewan Ministry of Agriculture
- Saskatchewan Watershed Authority
- Saskatchewan Environment Fire Management and Forest Protection Branch

UNITED STATES: The polar jet stream and associated storm track were very active during February 2013, with a series of strong upper-level weather systems propagating across the United States. Winter storms moving in the jet stream flow tapped Gulf of Mexico moisture to drop above-normal precipitation across coastal New England, the Southeast, and parts of the Plains to Upper Midwest, while weather systems moving over the West were moisture-starved, resulting in a generally drier-than-normal month from the Rockies westward. Heavy rain eased drought conditions in the Southeast, a series of snowstorms nibbled at the edges of the Great Plains D3-D4 (extreme to exceptional) drought area in spite of massive twelve-month precipitation deficits, and welcomed rains

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

- a large area of moderate (D1) to exceptional (D4) drought stretching from the West, across the Great Plains, into the Upper Midwest, with the most intense drought centered in the Plains states;
- a reduced area of moderate to severe drought in the Southeast; and
- much of Hawaii, where moderate to extreme (D3) drought persisted.

Monthly precipitation totals exceeded ten inches (254 mm) across northwest Florida and the southern parts of Alabama and Georgia, with locally 15 inches (381 mm) or more. This excessive rainfall reduced the drought area in the Southeast, eliminating D3-D4. In the Central Plains, a series of snowstorms dropped several inches of snow, with monthly precipitation (liquid equivalent) totals ranging from less than an inch (25.4 mm) in the northwestern sections to locally over three inches (76.2 mm) in the southeastern sections. But the February precipitation was not enough to erase deficits accumulated over 2012, which have been significant. In Nebraska, which is in the core of the Plains drought area, February 2013 precipitation averaged 0.76 inch (19.3 mm) statewide but the 2012 annual *deficit* was 11.16 inches (283.5 mm). In Kansas, just to the south of Nebraska, February precipitation was 1.57 inches (39.9 mm) statewide compared to a 2012 annual deficit of 9.78 inches (248.4 mm). By the end of February, D4 coverage topped 10% in Nebraska (77%), South Dakota (30%), Kansas (21%), Colorado (21%), and Wyoming (10%). Only a few areas in the western U.S. had above-normal precipitation during February, mainly in the Central Rockies and parts of the Great Basin. Most of the West had less than 75% of normal precipitation with large areas less than 25% of normal. The last two months have been excessively dry after a moist start to the winter season, especially along the west coast. A small area of D1 remained in the Koyukuk Basin of Alaska where the water content of the snowpack and water-year-to-date (October-present) precipitation were low. Hawaii ended the month with about 45.3% D1-D3 coverage. February was another very dry month for Puerto Rico, with much of the island having below-normal rainfall for the last two to three months.

The February precipitation helped reduce the moderate-to-exceptional national (contiguous U.S.) drought footprint from 57.7 percent at the end of January to 54.2 percent at the end of February. According to the Palmer Drought Index, which goes back to the beginning of the 20th century, 39.6 percent of the contiguous U.S. was in moderate to extreme drought at the end of February, a decrease of about 6 percent compared to last month.

Historical Perspective: According to preliminary information provided by the NOAA National Climatic Data Center (NCDC), the contiguous U.S. experienced its 49th warmest and 58th driest February on record (since 1895). The Nation's average temperature of 34.8°F (1.5°C) was 0.8°F (0.4°C) above the 1901-2000 mean, while the nationally-averaged precipitation of 2.00 inches (50.8 mm) was 0.02 inch (0.5 mm) below the long-term mean (99% of the long-term mean). A negative Arctic Oscillation helped keep temperatures for February 2013 below the 1981-2010 normal for much of the country. But temperatures for the last 30 years have averaged warmer compared to the average over the entire 20th

century, so February 2013 temperatures were near or above the 20th century average everywhere except in the Southwest, where five states ranked in the cold third of the long-term (119-year) historical record.

The near-average national precipitation for February masked considerable regional variation. Five states in the Southeast and Northeast had a top ten wettest February, based on the 1895-2013 record, with Georgia having the wettest February on record. Two states in the west (California and Oregon) ranked in the top ten driest category. When the dryness of January is combined with the dry February, California ranks driest for January-February 2013.

For the winter (December 2012-February 2013), the contiguous U.S. ranked 19th warmest and 25th wettest. Three states in the east had a top ten warmest winter and seven states in the Southeast and Great Lakes regions had a top ten wettest winter. The recent cold weather has not been enough to counter the record warmth of 2012, with the 12-month period ending in February still ranking as warmest for the nation and for eight states. In spite of the recent wetness, long-term dryness still predominated nationally with March 2012-February 2013 ranking as the 29th driest such 12-month period for the contiguous United States. Regionally, the long-term dryness was most severe in the Central Plains and Rockies, where Nebraska and Wyoming had the driest March-February on record.

Agricultural and Hydrological Highlights: As of February 26, 56% of hay, 58% of winter wheat, and 66% of cattle were in drought. With drought concentrated across the nation's mid-section, a large portion of the Hard Red Winter wheat (HRW) crop continued to struggle. By February 24, the U.S. Department of Agriculture (USDA) reported that approximately one-third to two-thirds of the HRW was rated in very poor to poor condition in all of the Plains States except Montana. South Dakota topped the list, with 66% of the HRW rated very poor to poor, followed by Oklahoma (54%), Nebraska (50%), Texas (45%), and Kansas (36%). In addition, rangeland and pastures on the Great Plains continued to exhibit the effects of long-term drought by February 24, with more than four-fifths rated very poor to poor in Kansas (83%) and Oklahoma (82%).

Monthly streamflow levels for February, monitored by the U.S. Geological Survey, were much below normal (in the lowest tenth percentile) for some basins in the Central and Southern Plains, Southwest, and California. The USDA Natural Resources Conservation Service reported that March 1st snowpack was below normal across much of the West and less than 70% of normal in many California and Central and Southern Rockies basins and in some Pacific Northwest basins. A thick and extensive winter snowpack is an important source of spring and summer meltwater for the West. End-of-February USDA statewide summaries revealed significantly below-normal reservoir storage for this time of year in Arizona, Colorado, Nevada, New Mexico, and Oregon.

MEXICO: Hot and dry weather dominated over most of Mexico during February 2013, resulting in the second driest February since 1941 and the twelfth warmest since 1971. These conditions allowed the progress or development of drought and dryness which have persisted these last months. The national average for mean temperature was 18.2 °C (64.7

°F), 0.6 °C above normal (1971-2000) and the monthly precipitation was 6.4 mm (0.25 in), 65.7% below the long-term mean since 1941.

Despite the dry pattern, rainfall thorough the month was above normal in small portions of Veracruz, Tabasco, Chiapas and Campeche. Most of this rainfall was associated with three frontal systems which combined with the limited moisture carried out by the westerly winds. Regarding the mean temperature, the warm pattern dominated over most of the country, except for the northwest (Sinaloa, Sonora and Baja California Sur) and some portions in northern Chihuahua and Guerrero in southern Mexico. The statewide classification for temperatures placed fifteen states as having the warmest February (Campeche, Chiapas, Federal District, Hidalgo, Mexico State, Morelos, Nuevo Leon, Oaxaca, Puebla, Queretaro, San Luis Potosi, Tabasco, Tamaulipas, Tlaxcala and Veracruz) and another four states (Aguascalientes, Guanajuato, Quintana Roo and Yucatan) as the second warmest. Among the first group, San Luis Potosi and Oaxaca reached more than 4 °C above normal, and for the second states group, Guanajuato had a departure of +2.6 °C. By contrast, the effect of sporadic snowfall and frozen days in Sonora and Sinaloa ranked these states as the third and thirteenth coldest since 1971.

At the end of February, the country's portion in D0-D4 increased about 5.3 percent compared to the end of January. The most evident changes regards to the southward displacement of extreme drought (D3) in the northeast, this is 2% of the country –compared to the 0.5% quantified the previous month. Nuevo Leon saw the hardest progression in (D3), as a result of the sudden drop on its statewide rainfall classification, moving from a rank of tenth wettest for the Nov2012 to Jan2013 3-month period to a rank of twentieth driest for the Dec2012 to Feb2013 3-mont period. The Palmer Drought Index calculated in early March showed values between -3 and -5 in the far north of Nuevo Leon, while the Vegetation Health Index was between 6 and 11% (100% denotes the best health). All these combinations allowed the advancement and development of extreme drought in that region.

The coverage of the country from moderate (D1) to exceptional drought (D4) also increased by 2%, changing from 15 to 17%. The most important changes were observed in the northwest, specifically in Sonora. At the same time, (D1) development occurred between Nayarit and southern Durango, and the emergence of new (D1) dots in the State of Mexico and Chiapas. In Sonora, snowfalls earlier this month and frozen days did more damage to the natural vegetation, but the region was downgraded to D1 due to low levels of storage dams (below 25% capacity). In the central and southern portions of the country, abnormally dry (D0) and moderate drought continued to increase. For the central region of the Valley of Mexico (including the country's capital), 41% of the territory was quantified in moderate drought (D1); this may result in some restriction policies in water management for urban or domestic use for the next months.

The Information System for Agri-food and Fishing (SIAP) indicated that February concluded the Spring-Summer 2012 crop season and the sowing stage for the Autumn-Winter 2013, so most crops are now in their growing season. The total yield in Spring-Summer 2012 exceeded the target by only 0.7%, mainly thanks to favorable weather conditions that helped the production performance over the rainfed agriculture. The best

results were evident in forage production (oats, corn and sorghum, mainly) following recommendations to substitute crops requiring less water.

The total area burned by forest fires in 2012 was only 830,000 hectares (2.05 million acres), much less than the 2.7 million hectares (6.6 million acres) reported in 2011. The occurrence of forest fires in the first two months of the year was very similar, but slightly less than that seen in the same period during 2006, 2008 and 2011. This represents a decrease of 23.9% area burned over 2006, 26.5% in 2008, and 27% in 2011.