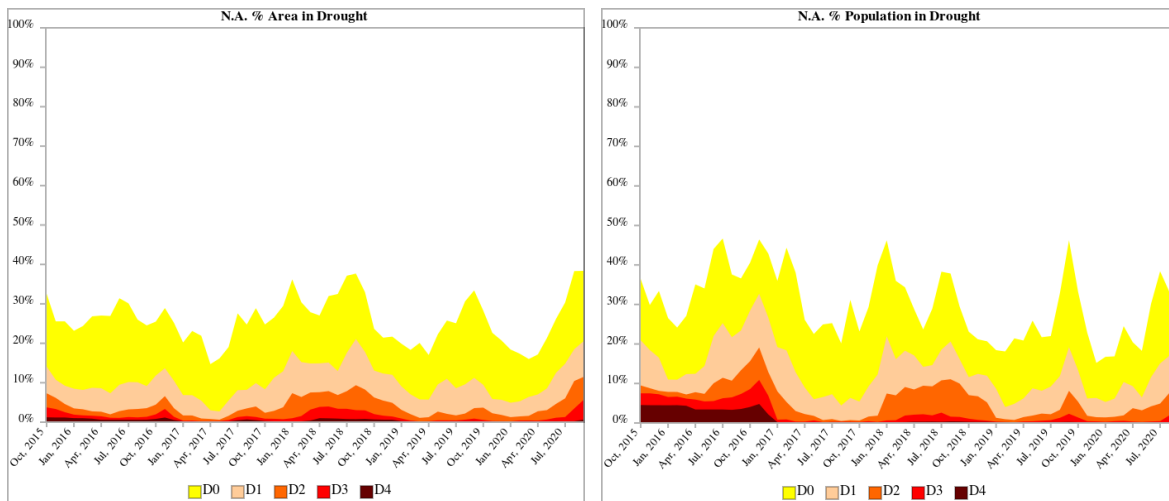


North American Drought Monitor – September 2020

At the end of September 2020, moderate to exceptional drought (D1-D4) affected 20.4% of the area and 17.0% of the population of North America. The percent area value was 2.0% more than the value for the end of August 2020. The percent population value was 0.1% more than the value for the end of August. At the end of September, 71.2% of the Rio Grande/Bravo River Basin and 38.7% of the Great Plains were in moderate to exceptional drought, 48.7% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 5.6% of the Great Lakes Basin was in moderate to severe drought (D1-D2). 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 values for the Great Plains and the Columbia River Basin increased this month, while the values for the Great Lakes and Rio Grande/Bravo River basins decreased compared to the end of August.



CANADA:

National Overview

September conditions across western Canada continued to be dry, while eastern Canada experienced some reprieve from drought as post-tropical storm Teddy brought much-needed moisture to the region. Below-normal precipitation across parts of the Prairies helped farmers continue their harvest operations. Above-normal temperatures and limited moisture caused drought to expand from southern British Columbia into the foothills of Alberta. Central and eastern Canada saw improved moisture, though significant moisture deficits continue to plague New Brunswick and Prince Edward Island due to a lack of precipitation over the last several months. Northern Canada remained relatively unchanged, but small improvements in abnormally dry (D0) conditions were observed due to improved moisture throughout the region. More than 23% of the country was considered abnormally dry or in drought; this includes nearly 60% of the agricultural landscape.

Pacific (British Columbia)

In September, abnormally dry and moderate drought (D1) conditions expanded across much of British Columbia. Across southern British Columbia, a general lack of precipitation led to the persistence and expansion of abnormally dry conditions from Chilko Lake toward the Canada-U.S. border and north toward McBride. Satellite soil moisture data indicated areas in the Okanagan valley were particularly dry, leading to a larger pocket of moderate drought, specifically around Penticton and Kelowna; this area only saw 40% of normal precipitation in the last 3 months. In southwestern British Columbia, conditions also deteriorated from Golden to Creston, leading to the expansion of moderate drought. This expansion of D0 and D1 conditions was the result of moderately low precipitation, between the 10th and 20th percentile, in the last 90 days. This dryness is also indicated by the Standardized Precipitation Evapotranspiration Index (SPEI) product over the last two to three months. Areas along the coastline and Vancouver Island were not included in categories of drought as the region received more than 500mm (19.69 inches) of precipitation in the last 30 days. There also continues to be no drought or abnormally dry conditions in northern British Columbia. Approximately 21% of the province was classified as abnormally dry, in moderate drought or in severe drought (D2), up 7% compared to last month; this includes more than 47% of the agricultural landscape.

Prairies (AB, SK, MB)

Overall precipitation in the month of September was quite varied across the Prairies: northern areas received the greatest amount of precipitation (upwards of more than 150mm [5.91 inches]), while parts of the agricultural region saw less than 5mm (0.20 inches). These dry conditions helped producers continue their harvest operations, but led to persisting or worsening drought across southern Alberta and Saskatchewan. An area extending southward from the foothills of Alberta toward Crowsnest Pass experienced further deterioration of conditions as precipitation ranked between the 10th and 2nd percentiles over the last 2 months. This resulted in the extension of moderate drought as well as the development of severe drought. Central Alberta also received very little precipitation in September, but early growing season precipitation helped to alleviate soil moisture concerns. Due to this pre-existing moisture, only abnormally dry conditions expanded in the region, from Grand Prairie toward Cold Lake. Within Saskatchewan, 89% of crops were combined as of September 28, which is well ahead of the five-year average of 67%, thanks to the favorable harvest conditions. The southwestern portion of the province saw up to 50mm (1.97 inches) of precipitation in September, which helped alleviate dryness previously reported in August. South of Regina, however, less than 5mm (0.20 inches) of rain fell in September and only 10mm (0.39 inches) was received in August. Percentile values were reported as extremely low to exceptionally low in this area, leading to the development of a severe drought pocket. Low root zone soil moisture was also reported across much of southeastern Saskatchewan given limited moisture throughout the growing season. Despite sufficient precipitation in July, moderate drought was expanded in the region. Conditions in southern Manitoba remain relatively unchanged as precipitation was reported to be near normal; this excludes a couple of pockets around Winkler and west of Brandon, where 40-60% of normal precipitation fell over the last 2 months. Abnormally dry conditions were also retained near Dauphin given satellite-derived soil moisture dryness. Almost 35% of the Prairie region was classified as either abnormally dry, in moderate drought or in severe drought; this includes over 71% of the region's agricultural landscape.

Central (ON, QC)

Precipitation throughout central Canada improved in the last 30 days, with some exceptions. Upwards of 150mm (5.91 inches) of precipitation was received across northwestern Ontario and as a result, much of the abnormally dry classification in this area was reduced. Moderate drought was also removed in the area from Lake of the Woods toward Thunder Bay and Nipigon. However, abnormally dry conditions persist from Thunder Bay north toward Fort Albany as streamflow levels are as low as the 5th percentile, in addition to soil moisture deficits. Although precipitation over the last 30 days in southern Ontario and Quebec has been minimal, concerns of dryness were minimized by significant precipitation received in July and August; near-normal conditions were also depicted by the 3-month SPEI product. For this reason, portions of abnormally dry conditions were reduced and all pockets of moderate drought were removed from London to Cornwall, Ontario. However, streamflow values across southern Quebec continued to be in the lowest percentile and thus the area remained in moderate drought. Satellite-derived precipitation and soil moisture data depicted a slight worsening in drought conditions for northern Quebec. The pockets of abnormally dry and moderate drought were expanded as a result. Although drought still remains on the Gaspé Peninsula, the area impacted by moderate drought conditions was reduced due to near-normal percentile data in the last 90 days. Given the significant reduction in drought, 26% of the central region remains in either abnormally dry or moderate drought, an improvement of 9% from last month; this includes 29% of the agricultural landscape.

Atlantic (NB, NS, PEI, NL)

Significant moisture deficits from the month of August have improved slightly in the Atlantic region, but much of the drought remains in place, specifically throughout New Brunswick and Prince Edward Island. Approximately 19% of the Atlantic region is classified as in drought; this includes 71% of the region's agricultural landscape. Severe drought persists across much of New Brunswick as 50% below-normal precipitation has been received in the last two months and 25-50% below-normal precipitation in the last three months. Although recent precipitation fell across the Bouctouche and Moncton area, severe drought remains in place because of short- and long-term dryness, especially over the last six to nine months. Furthermore, a pocket of extreme drought (D3) emerged this month near Grand Falls, New Brunswick as very little precipitation, from 25mm (0.98 inches) to less than 5mm (0.20 inches) in some areas, was received. Soil moisture and other drought indicators such as SPEI also show this pocket of New Brunswick continuing to struggle with significant precipitation deficits. Moderate drought continues to plague northern New Brunswick as well. Across Newfoundland and Labrador, the lowest precipitation amounts received this month were from Cape Ray toward Twillingate. This area received 75% below-normal precipitation with only 50mm (1.97 inches) received, thus leading to the expansion of abnormally dry conditions. Post-tropical storm Teddy impacted the Atlantic region near the end of the month, but much of the precipitation from this event fell across Nova Scotia. As a result of this precipitation, drought conditions improved with reductions in moderate drought and severe drought classifications, particularly in southern Nova Scotia.

Northern (YT, NWT)

The northern region of Canada received fairly average precipitation for the month of September; in many areas, this was upwards of 50mm (1.97 inches). There was no drought reported in the region for this month, and the minimal area covered by abnormally dry conditions was reduced further. Only a few pockets of D0 remain, including one around Old Crow, Yukon, which received approximately 8mm (0.31 inches) of precipitation; this is far below the average of 29mm (1.14 inches), at only 30% of normal precipitation. In addition, small pockets of D0 persist on the Yukon-Northwest Territories border and east of Fort Good Hope, from Tulita to Colville Lake. Only 5% of the northern region is classified as abnormally dry.

UNITED STATES:

National Overview:

The western third of the U.S. experienced above-normal temperatures in September, which further exacerbated drought conditions. Temperature departures generally ranged from 2 to 6°F (1-2 degrees C) above normal. California and Oregon had their warmest September on record, with Nevada, Arizona, Washington, Utah, and Idaho ranking in the top 10 warmest. Temperatures in the middle third of the U.S. were generally below normal, with areas of Kansas, Oklahoma, and Texas experiencing departures of at least 4°F (2 degrees C) below normal. Temperatures were more varied throughout the eastern third of the U.S., but most areas were within 2°F (1 degree C) of normal.

September was very dry for much of the West, the northern and central Plains, and the Northeast. Very little precipitation fell across California, Nevada, Utah, and Arizona, where precipitation was less than 5% of normal. Maine had its driest September on record, while Arizona, California, New Hampshire, Utah, Nevada, and North Dakota made it into the top 10 driest. Meanwhile, a combination of tropical and non-tropical systems dropped heavy rains across portions of the southern Plains and the Southeast. The wettest areas included central Texas, the Florida Panhandle, and southern Alabama, where precipitation exceeded 300% of normal. Georgia had its 9th wettest September on record. Pockets of wetness could also be found in the Midwest and the Pacific Northwest.

Continued dryness in September led to the intensification of drought conditions across the West, the northern and central Plains, and the Northeast. Several areas of exceptional drought (D4) developed in the West. With the exception of central portions of the Big Island, drought conditions worsened over Hawaii as well. However, several tropical systems and non-tropical, multi-day rain events led to improvements in conditions. The greatest drought relief came to central and eastern Texas, as well as Iowa and northern Illinois, where 2- to 3-class improvements occurred. Conditions in Alaska improved as well. Overall, over the course of the month, drought conditions degraded slightly nationwide, with nearly 56% of the U.S. and Puerto Rico experiencing drought or abnormal dryness (D0-D4).

Northeast:

Drought conditions continued to deteriorate across the Northeast in September. Temperature departures varied across the region, with some areas above normal and other areas below normal. But September was rather dry for almost the entire region, with much of New England receiving less than 50% of normal precipitation. Extreme drought was introduced to areas of Maine, New Hampshire, Massachusetts, and Connecticut, and almost the entire state of Rhode Island was placed in D3 as well. Severe drought expanded across a large portion of Maine, New Hampshire, Massachusetts, and Connecticut, while also extending into eastern Vermont. An area of D2 was introduced to central Pennsylvania. Moderate drought expanded across parts of New York and Pennsylvania. By the end of the month, approximately 45% of the Northeast was experiencing drought. According to the U.S. Drought Monitor, drought has not been this extensive in the Northeast since 2016.

Southeast:

It was another relatively wet month for the Southeast, thanks in part to Hurricane Sally and the remnants of Tropical Storm Beta. Precipitation exceeded 300% of normal in portions of the Florida Panhandle and southern Alabama. Several small areas of abnormal dryness were eradicated by heavy rains in September. The only D0 remaining in the region by the end of the month was in a few small pockets in western Alabama, eastern Georgia, and coastal South Carolina, which were largely missed by September rains.

South:

Heavy rains vastly improved drought conditions across central and eastern Texas and southwestern Oklahoma in September, with some areas receiving as much as 300% of normal precipitation from multiple rain events. The landfall of Tropical Storm Beta along the middle Texas coast also contributed to improvements in conditions. Some areas of Texas saw as much as a three-class improvement on the U.S. Drought Monitor, starting the month in severe drought and ending the month free of drought and abnormal dryness. However, drought conditions deteriorated in western Texas and areas of northern Oklahoma, which were quite dry in September. By the end of the month, there were three pockets of exceptional drought, all in western Texas. While the pocket of D4 farthest south was present at the beginning of the month, the other two pockets were introduced at the end of September where year-to-date precipitation was well below normal and crops were suffering. Meanwhile, recent dryness popped up in eastern Mississippi, where D0 conditions were introduced. Moderate drought and abnormal dryness spread into northwestern Arkansas from southwestern Missouri as well.

Midwest:

Both improvements and degradations in drought conditions occurred in September in the Midwest. Drought-stricken areas of Iowa and northern Illinois received some relief due to a couple of multi-day rain events early in the month. Extreme drought was removed in western Iowa, and by the end of the month, no D3 conditions were present in the region. Moderate drought was removed in eastern Iowa and most of northern Illinois. However, farther south, it was dry in September.

Abnormal dryness spread from southern Missouri northeastward across southern Illinois, southern Indiana, and into parts of southern Ohio. Moderate drought was introduced to west-central Indiana, extending westward into eastern Illinois. Both moderate and severe drought expanded in southwestern Missouri as well.

High Plains:

September was very dry in the High Plains, with most of the region receiving less than 70% of normal precipitation. Unfortunately, this resulted in the further expansion and intensification of drought and dryness across the region. As conditions in the Nebraska Panhandle continued to deteriorate, extreme drought was introduced and connected to the area of D3 in eastern Wyoming. A new area of D3 was warranted in northeastern Nebraska, and moderate drought spread across the central part of the state. Conditions in North Dakota worsened as well, as severe drought was introduced to the northwestern part of the state and moderate drought spread across central portions. Much of the eastern High Plains region that had previously not had dryness issues was filled in with D0 by the end of the month, resulting in about 93% of the region experiencing drought or abnormal dryness. Meanwhile, there were some improvements in conditions, most notably in the Omaha Metro and surrounding areas of eastern Nebraska where D3 improved to D2, as well as in southeastern Kansas where moderate drought was removed, thanks to beneficial precipitation.

West:

The West received very little relief during September, as drought continues to grip much of the region. September was warm, with temperature departures of at least 2°F (1 degree C) above normal for most areas, and very little precipitation fell, with large areas of California, Nevada, Utah, and Arizona receiving no more than 5% of normal precipitation. Wildfires continued to rage across the West due to warm, dry, and windy conditions. Several new areas of exceptional drought were introduced, which included western Colorado, southeastern New Mexico, western New Mexico, southern Arizona, and an area encompassing eastern Nevada into western and central Utah. The three large areas of extreme drought in these states were connected, and other areas of D3 in Wyoming, Oregon, and California expanded as well. One of the only areas lucky enough to receive beneficial precipitation in September was the Pacific Northwest, but improvements in conditions were quite small and localized.

Alaska, Hawaii and Puerto Rico:

Heavy precipitation fell in the right areas to lead to improvements in conditions in Alaska. Moderate drought was removed from Kodiak Island, and abnormal dryness was removed from portions of central and southern Alaska. A small area of moderate drought in northwestern Alaska remained. A dry September across Hawaii led to further degradations in drought conditions across almost all of the islands. Extreme drought developed on portions of Molokai and Maui. Severe drought was introduced to Niihau, Oahu, and the Big Island and spread further across Molokai, Lanai, and Maui. Abnormal dryness and a sliver of moderate drought were introduced to Kauai. Only the Big Island experienced relief from drought in September, as moderate drought was removed from the central part of the island thanks to locally heavy rain. In Puerto Rico, continued

dryness prompted the northward expansion of abnormally dry conditions in the southeastern portion of the island.

MEXICO:

Climatologically, September is the month with the highest annual rainfall contribution (approximately 18% of the yearly total). National rainfall in September 2020 was 128.2 mm (5.05 inches), 7.3 mm (0.28 inches) or 5.4% below the September's long-term average (135.5 mm/5.33 inches). It was the 29th driest September, according to records since 1941.

In September, above-average rainfall fell over central-north, western, central and southern regions of the country which typically receive above average rainfall during the North American monsoon, and the first four cold fronts of the 2020-2021 season occurred. Other meteorological phenomena throughout the month were the passage of five tropical waves, atmospheric instability over the north and the proximity of a low pressure system in the Gulf of Mexico that later became Tropical Storm Beta. According to rainfall classification on a state level, only the state of Morelos was in the top ten wettest, recording their rainiest September. Tabasco recorded their 15th wettest September and Colima and Puebla their 16th wettest September. For the July-September period, Morelos and Colima received the most rainfall, recording their second and third wettest period, respectively.

The rains in September helped improve conditions in the eastern part of the state of Chihuahua, northern Durango and Coahuila, where areas with moderate to extreme drought (D1-D3) decreased. In Chihuahua, the area of extreme drought decreased slightly from 5.3% at the end of August to 4.4% on September 30, while the area in moderate to extreme drought (D1-D3) went from 51.0% to 30.5% in Durango and from 40.7% to 32.5% in Coahuila over the last month. Abnormally dry conditions and moderate drought (D0-D1) also decreased in other regions, such as central-south and southeastern areas of the country.

On the other hand, below-average rains continued in large portions of the country; the most marked deficits were evident in the northwest. The driest states in September were Sonora, San Luis Potosí and Baja California Sur, which recorded their third, fourth and seventh driest September, respectively. Over the July-September period, Sonora and Chihuahua had their fourth driest period, while San Luis Potosí had their fifth and Baja California their sixth-driest July-September period. Precipitation deficits worsened drought conditions in those regions. In southern Tamaulipas and Las Huastecas, abnormally dry conditions and moderate drought (D0-D1) increased, while in the South Pacific coastal region, areas with moderate to extreme drought (D1-D3) increased slightly. The highest increase was seen in the northwest, where moderate to extreme drought areas (D1-D3) expanded in Sonora, Sinaloa and northwest Chihuahua. As of September 30, moderate to extreme drought coverage (D1-D3) at the national level was 29.77%, 4.12% higher than one month ago.

The national average temperature was 24.9°C (76.8 F), 1.9°C (3.5 F) higher than the 1981-2010 September average of 23.0°C (73.4 F). It was the fourth warmest September, according to records kept since 1953. Temperature departures of up to 5.0°C (9 F) above average covered regions of Chihuahua, San Luis Potosí, Querétaro, Hidalgo and Chiapas. The states that recorded their

warmest September were Sinaloa, Sonora, and Yucatán, followed by Baja California Sur, which saw their second warmest September. It is worth mentioning that three of these four states that reached their warmest September are located in the northwest, where drought conditions worsened in September.

The state of Sonora saw the greatest increase in moderate to severe drought (D1-D2) this month, so drought impacts have become evident. The president of the Sonora Regional Livestock Union noted that drought has spread throughout the summer, causing problems for the agri-food sector (livestock and agriculture). Agricultural producers trying to plan for the fall-winter season are concerned. Producers inside the irrigation district 038 (Río Mayo) indicated that this summer (from May to September), 176 million cubic meters (6.2 billion cubic feet) were drained through the basin of Río Mayo, compared to the average of 640 million cubic meters (22.6 billion cubic feet); this, coupled with the poor water capture in the dams, has affected cattle ranchers and beekeepers.