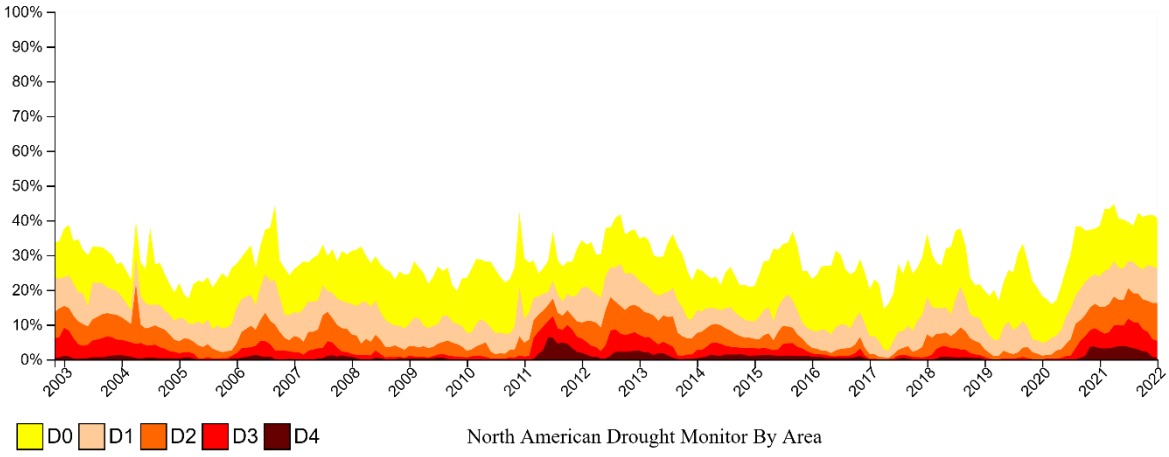
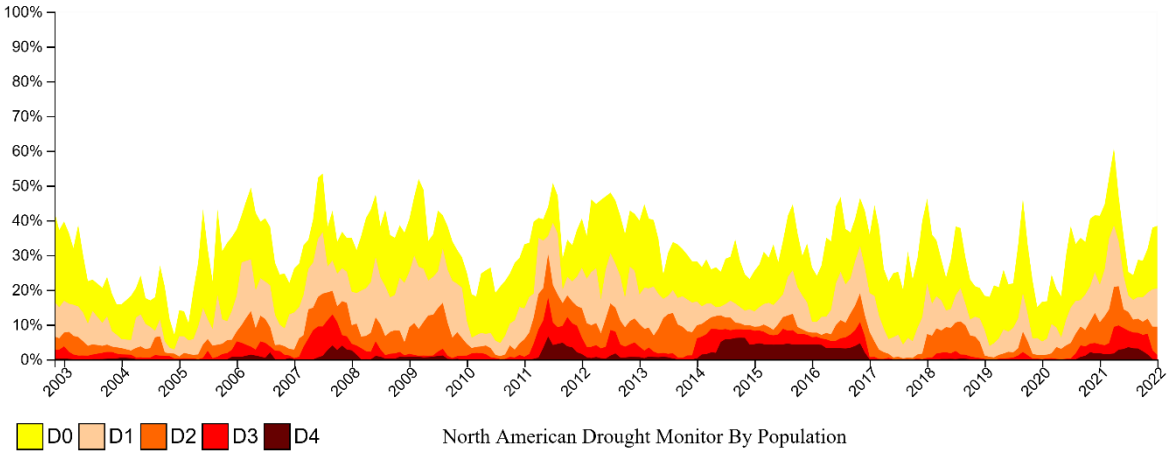
North American Drought Monitor – January 2022

At the end of January 2022, moderate to exceptional drought (D1-D4) affected 26.2% of the area and 20.4% of the population of North America. The percent area value was 0.6% less than the value for the end of December 2021. The percent population value was 0.3% more than the value for the end of December. At the end of January 2022, 68.9% of the Columbia River Basin, 68.0% of the Rio Grande/Bravo River Basin, and 70.5% of the Great Plains were in moderate to exceptional drought, and 11.3% of the Great Lakes Basin was in moderate to severe (D1-D2) drought. 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 Rio Grande/Bravo River Basin increased compared to the end of December 2021. The percent area values for the Columbia River and Great Lakes Basins decreased compared to the end of December.



Percent area of North America in drought, November 2002-January 2022.



Percent of the population of North America in drought, November 2002-Janury 2022.

CANADA:

National Overview

Variable precipitation throughout January resulted in an overall improvement of drought in many regions of Canada, while conditions degraded in only a few areas. The Pacific Region received near- to above-normal precipitation, leading to continued drought improvement in the area. The Prairie Region received a mixture of above-normal and below-normal precipitation; with drier conditions experienced in southern and western parts of the region. As of January 31st, drought continued to be rated as Severe (D2) or worse through a significant portion of the Prairies, with long-term deficits lingering in the northern and eastern portions, and both short- and long-term moisture deficits are present in southern and western areas. Drought in Central Canada remained relatively stable, though January was significantly colder than normal. Both Atlantic and Northern Regions were drought-free in January, with only minimal areas of Abnormally Dry (D0) present.

At the end of the month, 25 percent of the country was classified as Abnormally Dry (D0) or in Moderate to Exceptional Drought (D1 to D4), including 72 percent of the country's agricultural landscape.

Pacific Region (BC): Nearly the entire Pacific region experienced near- to above-normal precipitation in the month of January. Given the significant precipitation of up to 200 percent of normal received in the last 3 months, drought conditions were reduced from the Canada-U.S. border, north towards the Peace River region. Despite experiencing significant drought throughout the 2021 growing season, only minimal Moderate Drought (D1) remained across the Okanagan region in southcentral British Columbia due to substantial winter precipitation to date. Drought improvements over last month include a reduction in Moderate Drought (D1) as well as the removal of a small Severe Drought (D2) pocket due to Above Normal to Exceptionally High precipitation values in the last 6 months, in central and eastern regions. Further north, precipitation remained near- to above-normal in the last 2 to 3 months, leading to the removal of Moderate Drought (D1) in the area. However, Abnormally Dry (D0) conditions remained due to longer-term dryness. A similar trend occurred in the Peace River region, along the northeastern border to Alberta, where Severe Drought (D2) was removed and Moderate Drought (D1) and Abnormally Dry (D0) conditions remained—but were reduced in size.

At the end of the month, 24 percent of the Pacific region was considered Abnormally Dry (D0) or in Moderate Drought (D1), including 56 percent of the region's agricultural landscape.

Prairie Region (AB, SK, MB): The month of January brought a mixed bag of both precipitation and temperatures across the Prairie Region. There was a north-south divide for precipitation, where central and northern portions of the Prairies continued to see above-normal moisture, but extreme southern Manitoba and Saskatchewan as well as central and southern parts of Alberta received Extremely Low precipitation. In regard to the temperature, Manitoba and western Saskatchewan were colder than normal, while much of Alberta was warmer than normal, up to 3 to 4 degrees above normal near the Rockies.

Drought improved throughout the region barring southern Alberta, where Extreme Drought (D3) was slighted expanded towards Calgary and Red Deer. Not only has this area been fairly dry in the last 3 months, but a significant amount of southern Alberta only received 300 mm of moisture in the last year, a departure of approximately 110 to 180 mm less than normal. Moderate to Severe Drought (D1 to D2) in this area remained similar to last month.

In contrast, remaining portions of the Prairies saw overall improvement to Drought. Since the start of the winter season, a large swath of northern Alberta towards southcentral Saskatchewan saw Exceptionally High precipitation. In all other parts of the Prairies except southern Alberta near-normal to above-normal precipitation has been received this winter season. Although this precipitation will not fully recover the long-term deficits, it has allowed for slight improvement across the region. Exceptional Drought (D4) remained near Saskatoon in central Saskatchewan given long-term impacts, though the area was slightly reduced. Extreme to Exceptional Drought (D3 to D4) in Manitoba, was significantly reduced due to both Very High precipitation in the last 6 months as well as improved long-term conditions.

At the end of the month, 61 percent of the Prairie Region was classified as Abnormally Dry (D0) or in Moderate to Exceptional Drought (D1 to D4), including 95 percent of the region's agricultural landscape.

Central Region (ON, QC): While nearly the entire Central Region saw a lack of moisture in January, minimal changes were made to Drought given ample moisture received over the last 6 months. Southern Ontario received less than 40 percent of normal precipitation this month, but still reported Moderately to Very High precipitation values since August. However, southern Quebec continued to report Moderately Low precipitation in the same timeframe; this, coupled with shorter-term deficits, led to the expansion of both Abnormally Dry (D0) conditions and Moderate Drought (D1) in the area.

Conditions across the rest of the region generally improved in January. Above-normal moisture over the last 6 months and near-normal long-term moisture levels led to the removal of Severe Drought (D2) around Thunder Bay, as well as a reduction in Moderate Drought (D1) in the surrounding area. Parts of northwestern Ontario, however, remained in Moderate to Severe Drought (D1 to D2) due to long-term dryness.

By the end of the month, 19 percent of the Central Region was considered Abnormally Dry (D0) or in Moderate to Severe Drought (D1 to D2), including 30 percent of the agricultural landscape.

Atlantic Region (NB, NS, PE, NL): The Atlantic Region received the most precipitation this month compared to other parts of the country. A fairly large area, from Cape Breton towards Newfoundland, received Exceptionally High precipitation in the last 30 days, while other parts of the region saw near- to above-normal precipitation. This equated to roughly 115 to 200 percent of normal precipitation in the last 3 months. Only a small pocket of Abnormally Dry (D0) conditions was reported in New Brunswick, based on low precipitation over the last 6 months, while the rest of the region remained completely drought-free.

By the end of the month, only 1 percent of the Atlantic Region was classified as Abnormally Dry (D0), including 3 percent of the agricultural landscape.

Northern Region (YK, NT): Conditions across the Northern Region in January were generally stable in January. Near- to above-normal precipitation fell across nearly the entire region this month, except for a small portion of eastern Northwest Territories including Yellowknife. Winter precipitation for much of the Yukon Territory has been above-normal, with Whitehorse reporting 170 percent of normal since November 1st, 2021. In addition, Old Crow is now reporting near-normal conditions of 110 percent in the last 3 months; this led to the removal of Abnormally Dry (D0) conditions. Only a small pocket of D0 remained near Yellowknife.

Less than 1 percent of the Northern Region was classified as Abnormally Dry (D0).

UNITED STATES:

National Overview

As 2021 ended, the water equivalency of the Sierra Nevada snowpack stood close to 15 inches, nearly 160 percent of the late-December average, according to the California Department of Water Resources. Incredibly, less than an inch was added to that snowpack during January, leaving the early-February water equivalency at 16 inches, about 90 percent of average for the date. Disappointingly low January precipitation totals were also reported across the remainder of California and the Great Basin, as well as the Southwest. In contrast, wet weather persisted early in the month across the Pacific Northwest, while periods of precipitation provided varying degrees of drought relief from the northern and central Rockies to the northern Plains.

Meanwhile, Southwestern dryness extended across the southern half of the Plains, where intensifying drought adversely affected rangeland, pastures, and winter grains. By January 23, more than one-quarter of the winter wheat was rated in very poor to poor condition in several key production states, including Kansas (31 percent), Colorado (40 percent), Oklahoma (43 percent), and Texas (71 percent). Drought impacts extended to the northern High Plains, where 65 percent of Montana's winter wheat was rated very poor to poor. On the same date, the U.S. Department of Agriculture rated topsoil moisture at least 40 percent very short to short in each of the ten states encompassing the Plains and the eastern slopes of the Rockies, ranging from 41 percent in North Dakota to 87 percent in New Mexico.

Farther east, an overall cold but quiet Midwestern weather pattern was interrupted by a mid-January storm, which delivered wind-driven snow, mainly west of the Mississippi River. In fact, parts of the upper Midwest were subjected to sustained cold weather, interspersed with periods of gusty winds and light snow, leading to rural travel difficulties and increased livestock stress. Monthly temperatures broadly averaged at least 5°F (more than 3°C) below normal from the Midwest to the interior Northeast. Cold weather occasionally reached the Deep South, culminating in freezes across parts of Florida on January 24 and 30. During the latter cold snap, Daytona Beach, Florida, experienced its first freeze since January 19, 2018.

In contrast, generally mild weather prevailed from the Pacific Coast to the High Plains, although cooler air began to settle across the Northwest late in the month. Parts of the Northwest also dealt with extended periods of air stagnation and foggy conditions. On the other side of the Rockies, windy weather frequently raked the High Plains, keeping winter wheat's protective snow cover at a minimum. On the southern Plains, windy, dry weather led to several, mid-winter grassfires, including the 1,700-acre (almost 700-hectare) Mill Creek Fire in Shackelford County, Texas, which was sparked on January 15. A rare winter wildfire—the Colorado Fire—also burned along the central California coastline near Big Sur, torching nearly 700 acres (more than 280 hectares) of vegetation, starting on January 21.

During the 5-week period ending February 1, drought coverage in the contiguous U.S. was nearly unchanged at 55 percent. According to the U.S. Drought Monitor, drought has covered more than 40 percent of the Lower 48 States for 71 consecutive weeks, since September 29, 2020, breaking the 21st century record of 68 weeks set from June 2012 – October 2013. Drought remained especially pervasive across the western half of the nation, with 88 percent of the 11-state Western region experiencing drought in early February.

Elsewhere, several rounds of wintry weather affected parts of the South and East, contributing to above-normal January precipitation in some areas. The same storm system that delivered mid-month wind and snow across the upper Midwest later produced significant snow and ice accumulations from the southern Appalachians into the Northeast. Late in the month, a rapidly intensifying coastal storm resulted in blizzard conditions for the first time in more than 4 years along the middle and northern Atlantic Coast.

According to preliminary data provided by the National Centers for Environmental Information, the contiguous U.S. experienced its 62nd-warmest January during the 128-year period of record, with a monthly average temperature of 31.0°F (-0.6°C). Although that reading was more than 0.8°F (nearly 0.5°F) above the 1901-2000 mean, it represented the coldest January in the U.S. since 2014. Meanwhile, it was the nation's 14th-driest January since 1895, with monthly precipitation averaging 1.60 inches (42.9 mm)—just 69 percent of the 20th century mean. For the Lower 48 States, this month tied 2009 for the third-driest January of the 21st century, behind 2003 and 2014.

State temperature rankings ranged from the 23rd-coldest January in New York to the ninth-warmest January in California. January warmth was prevalent in the Far West, while persistently chilly conditions were largely limited to the Midwest and Northeast. Meanwhile, state precipitation rankings ranged from the second-driest January in California and Nevada to the 20th-wettest January in Virginia. Drier January weather in California and Nevada occurred only in 1984 and 1919, respectively. Elsewhere, top-ten rankings for January dryness were observed in Utah, Michigan, Vermont, and Wisconsin.

Northeast: Northeastern coverage of moderate to severe drought (D1 to D2) held steady near 2.0 percent for much of January. In fact, drought was limited to northern New England, mainly across northwestern Maine and a sliver of northern New Hampshire. A late-January storm, which resulted in blizzard conditions in coastal New England, did not extend far enough inland to provide relief to areas experiencing long-term drought. Farther south,

several January storms eased abnormal dryness (D0) in the mid-Atlantic and central Appalachians.

Southeast: The passage of several winter storms resulted in a significant reduction in coverage of abnormal dryness (D0) and moderate drought (D1). Severe drought (D2) which covered 10.5 percent of the Southeast on December 28, was eradicated by mid-January. During the 5-week period ending February 1, Southeastern coverage of D1 declined from 28.0 to 4.9 percent, while D0-D1 coverage was reduced from 61.4 to 31.1 percent.

South: Worsening drought was noted during January in many areas from the Mississippi Delta westward. Regionally, drought (D1 to D4) coverage increased from 54.0 to 69.8 percent during the 5-week period ending February 1. Exceptional drought developed by mid-January in western Oklahoma, marking the South's first appearance of D4 since June 2021. Texas had a particularly notable increase in severe to extreme drought (D2 to D3), with coverage vaulting from 36.6 to 69.2 percent between December 28 and February 1. Texas had no D2 or D3 as recently as mid-September 2021. According to the U.S. Department of Agriculture, 63 percent of the rangeland and pastures in Texas were rated in very poor to poor condition on January 30.

Midwest: The was little overall change in Midwestern drought coverage during January. In fact, the 5-week period ending February 1 featured a miniscule increase in coverage of moderate to severe drought (D1 to D2) from 16.1 to 16.6 percent. In upper Midwestern areas where some drought persisted, cold January weather and periods of generally light snow were conductive to neither drought development nor eradication.

High Plains: Dryness (D0) and drought (D1 to D4) crept eastward and slowly intensified across the High Plains during January, amid a weather regime featuring breezy conditions and rapid temperature fluctuations. By early February, D1 to D4 covered 66.1 percent of the region, up slightly from 65.2 percent on December 28. Regional coverage of D0 or worse expanded from 87.6 to 91.0 percent during the 5-week period ending February 1. Several factors, including lack of snow cover, limited soil moisture, windy weather, and temperature oscillations, maintained stress on a portion of the winter wheat crop, as well as some rangeland and pastures. On January 23, nearly one-half (49 percent) of the rangeland and pastures in Wyoming were rated in very poor to poor condition, according to the U.S. Department of Agriculture.

West: Following notable improvement in the Western drought depiction during December, there was no further relief in January. In fact, near-record January dryness in California and the Great Basin left the drought situation in limbo, with about 2 months left in the Western snow-accumulation season. Statistically, there was little change in Western drought (D1 to D4) coverage during the 5-week period ending February 1—a nominal improvement from 90.9 to 87.9 percent. Meanwhile, Western coverage of extreme to exceptional drought (D3 to D4) stabilized with coverage just under one-fifth (19.7 percent on February 1) of the 11-state Western region, after being above 50 percent as recently as mid-October 2021. In areas where rangeland and pastures were harmed by the heat and drought of the summer of 2021, any recovery has been exceedingly slow. In Montana, for example, 93 percent of the rangeland and pastures were rated in very poor to poor condition in late January, according

to the U.S. Department of Agriculture. In addition, statewide reservoir storage remained significantly below average for this time of year in California, Colorado, Nevada, New Mexico, and Oregon.

Alaska, Hawaii, and Puerto Rico: Ample winter precipitation across Alaska has prevented the return of any abnormal dryness (D0), which last existed in August 2021. Meanwhile, neither dryness nor drought was observed in Hawaii for part of January, following an extremely wet December. However, with the return of persistent dryness in January, short-term moderate drought (D1-S) returned by month's end across Hawaii and Maui Counties, while abnormal dryness (D0-S) developed across Hawaii's western islands. Elsewhere, parts of Puerto Rico experienced worsening drought impacts, such as low streamflow and poor pasture conditions, with coverage of moderate to severe drought (D1 to D2) increasing from 28 to 39 percent during the 5-week period ending February 1.

MEXICO:

National Overview

Precipitation across the country during January is typically similar to that which occurs during December, where the main precipitation is the result of the influence of frontal systems. Accumulated precipitation in January 2022 was mainly concentrated in southern part of the country, southern Gulf of Mexico coast, the Yucatan Peninsula, and the specific northern areas of Tamaulipas and northeastern Nuevo Leon. These precipitation patterns were promoted by the passage of cold fronts; typically, December and January account for the greatest number of frontal passages. The January 2022 national average was 17.0 mm, placing this month in the driest one-third, as the 20th driest January recorded. Despite above-average rainfall in some eastern areas, drier-than-normal conditions were observed in most of the country, mainly along the Sierra Madre Occidental.

Precipitation varied in the two fortnights of the month; during the first fortnight, rainfall was confined to the Yucatan Peninsula and Veracruz. These accumulations were due to the passage of cold fronts 19 and 21 (SMN numbering), which crossed the coast of the Gulf of Mexico. However, in central and northern regions, rainfall was scarce. In the second half of the month, the passage of cold fronts 22, 23, 24, and 26 provided significant wetness in the Isthmus of Tehuantepec and the Yucatan Peninsula, as well as the northeast tip; although there were a greater number of cold fronts, they did not provide sufficient precipitation as in the first half of the month. National precipitation was similar both fortnights, 8.8 mm in the first half of the month and 8.2 mm for the rest. In the second half of January, drier-than-normal conditions prevailed in central, northern, and northwest sections of the country, causing these regions to have monthly precipitation around 25% of normal.

Regarding temperatures, the national mean was 16.6 °C, 0.1 °C above average, placing in the warmest one-third, as the 26th warmest January on record. Overall, above-average temperatures covered the Pacific Coast and northwest, with anomalies of up to +2.0 °C in some areas; on the contrary, cooler-than-average temperatures occurred in northeast and

northern areas, with monthly averages less than 1.0 °C below average; temperatures along the Gulf of Mexico coast were similar to average.

According to data from the National Forestry Commission (CONAFOR), from January 1 to 28, a total of 98 forest fires were recorded, which affected an area of 1,471.96 hectares. At the national level, as of January 31, 45.57% of the country was not affected by drought, and there was no exceptional drought (D4). Compared to December 2021, where the percentage without affectation was 48.28%, there was a decrease of 2.71% of the area without drought affectation; this was reflected in the increase in all drought categories at the national level.

However, in some regions there was a decrease in drought. The Northwest region had a decrease of 1.9% in moderate drought category (D2), the Northeast region had a decrease of 2.5% in abnormally dry category (D0). The Gulf of Mexico, South Pacific and Yucatan Peninsula had a decrease in moderate drought category (D1) with values of 4.6, 3.8, and 1.8%, respectively. The decrease in drought in these three regions was courtesy of precipitation brought by cold fronts that moved along the Gulf of Mexico coast. Although coverage in some of the remaining regions also decreased, overall, they all saw an increase in at least two drought categories.

The Northwest region increase 2.6% in moderate drought (D1) but decrease 1.9% in severe drought (D2). The Northern region had an increase from moderate to extreme drought (D1 to D3) of 5.8%. The Northeast region had a decrease of 2.5% in abnormally dry (D0) conditions, but an increase of 1.8% from moderate to severe drought (D1 to D2). Central-West has the largest increase (33.8%) in abnormally dry areas (D0), while moderate drought increased by 3.55%. Finally, the Central-South increased 0.3% in moderate drought (D1).

Northwest or North Pacific (Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit): All states had precipitation deficits of up to 40 mm, with the largest deficits observed in Baja California and Sonora. Warmer-than-average conditions prevailed in all five states; Baja California Sur, Sinaloa and Baja California recorded their second, third and sixth warmest January, respectively. Although, climatologically, cold fronts tracks are common in this region in January, this month the region did not receive a significant amount of precipitation associated with these weather systems. In fact, it was the third driest January in Baja California. These conditions led to an increase of 2.6% in moderate drought conditions (D1), despite a decrease in severe drought (D2) of 1.9%. Overall, 78.4% of the region was under drought conditions.

Northern (Chihuahua, Coahuila, Durango, Zacatecas and San Luis Potosí): This region had an increase in extreme drought (D3), the only region in the country with this category. Drier-than-average conditions were observed during the month, with a greater than 40 mm deficit observed in Chihuahua and Durango. For these states, January rainfall was classified as the third and fifth driest on record, respectively. In terms of temperatures, some regions in northern Chihuahua, Coahuila, and Durango had close to normal or below-average temperatures; however, there were also positive anomalies in the rest of the region, with most of states in the region having a top ten warmest January. Zacatecas recorded its second warmest January. At the end of the month 23.2% of the region was in moderate to extreme drought (D1-D3).

Northeast (Nuevo Leon and Tamaulipas): Northern Tamaulipas and the eastern tip of Nuevo Leon had above-average precipitation, greater than 20 mm; the rest of the region had deficits around 10 mm. In terms of temperature, most of the region was influenced by air masses associated with cold fronts, which resulted in monthly average temperatures less than 1 °C below average. Above-average rainfall allowed for a 2.5% decrease in the abnormally dry category (D0); however, moderate to severe drought categories (D2-D3) increased by 1.8%. Taking into account changes in drought categories, 4.5% of the region was in moderate to severe drought (D1-D2) at the end of the month.

Midwest (Aguascalientes, Jalisco, Guanajuato, Colima and Michoacán): In the Central-West, dry conditions prevailed, with the states having the greatest deficits being Jalisco and Colima. Warmer-than-normal conditions prevailed throughout the region, with some areas recording anomalies greater than 1.0 °C above average. For both Guanajuato and Jalisco, January 2022 was the third warmest January on record. These conditions led to a 3.5% increase in moderate drought and a 33.8% increase in abnormally dry conditions. At the end of the month, there were no drought concern in the region.

Central-South (Querétaro, Hidalgo, State of Mexico, Tlaxcala, Puebla, Morelos and Mexico City): Conditions were mixed in Central-South, with a surplus in the east and a precipitation deficit in the west. Tlaxcala and Morelos received precipitation that placed January 2022 among the fifteen wettest on record. Regarding temperatures, most of the region was influenced by warmer-than-average conditions; Mexico City and Tlaxcala recorded their third warmest January on record. Like the Central-West, the Central-South region only showed increases in abnormally dry conditions and moderate drought.

Gulf of Mexico (Veracruz and Tabasco): Highest rainfall accumulations of the month were concentrated mainly in northern Veracruz and eastern Tabasco, where surplus rainfall of more than 20 mm was received. These accumulations were due to the passage of five cold fronts that brought moisture to the region. Veracruz had its fifteenth wettest January and the fourteenth coolest January. These conditions allowed the Gulf of Mexico region to have a decrease in drought and dryness categories, with a decrease of 4.6% in both categories. At the end of the month, 5.2% of the region was in moderate drought.

South Pacific (Guerrero, Oaxaca and Chiapas): Conditions were slightly drier than normal in the state of Guerrero, but wetter in the states of Oaxaca and Chiapas. Northern Chiapas received precipitation more than 80 mm above average. However, warmer-than-normal conditions dominated the month, specifically in Guerrero, where mean temperatures were 2.0 °C above average. Above-average rainfall in Oaxaca and Chiapas allowed for a decrease in moderate drought (D1); the reduction was 3.8%, the second highest value among all regions. At the end of the month, 5.8% of the region was in moderate drought.

Yucatan Peninsula (Campeche, Quintana Roo and Yucatan): In January 2022, the Yucatan Peninsula received above-average rainfall, with excess amounts greater than 40 mm in some portions; only northern Yucatan had below-average rainfall. Rainfall in the region was due to the passage of frontal systems and their interaction with dry lines. This region received a considerable amount of rain, as it was the fifth wettest January in Yucatan.

Temperatures were close to average in most of the region, although Quintana Roo recorded its twelfth warmest January. The precipitation received during January allowed the Yucatan Peninsula region to have a decrease in its areas of abnormal dryness (D0) and moderate drought (D1). This region saw the greatest decrease in drought, and at the end of the month only 0.7% of the region was in moderate drought (D1), the lowest percentage of all the regions analyzed by the Mexican Drought Monitor.