



TEXAS CoCoRaHS OBSERVER



Winter 2024

Vol. 9 - 4



Welcome to

The

Texas CoCoRaHS

Observer Newsletter

The purpose of this newsletter is to keep observers informed of the latest news, events, training, and happenings related to the CoCoRaHS program here in Texas, as well as news about the latest weather patterns affecting each region of Texas seasonally.

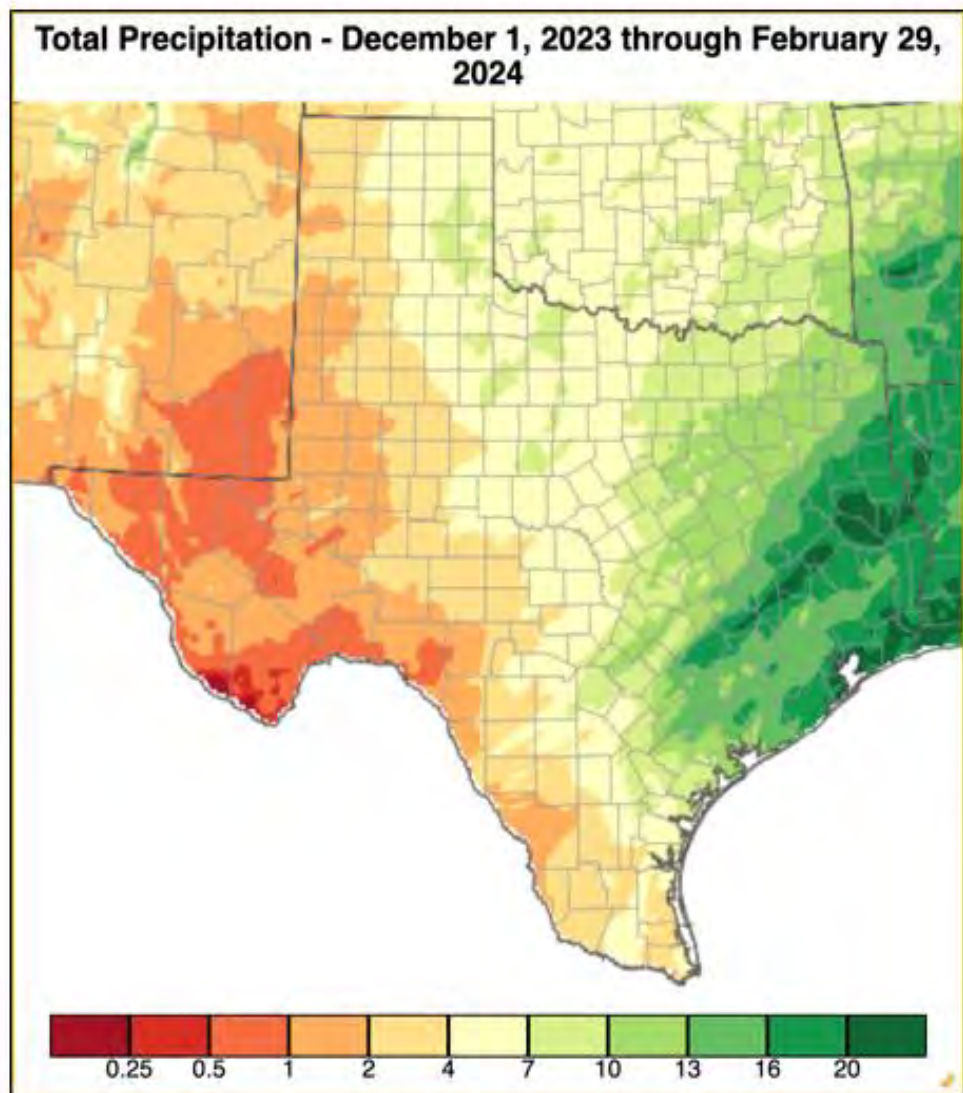
Texas Winter Weather Summary

John Nielsen-Gammon, Texas State Climatologist

Figure from the PRISM group, Oregon State University, generated using SC-ACIS

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This was the winter we were counting on.

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"Because Every Drop Counts, As Do All Zeros"

Texas Winter Weather Summary (continued)

The Pacific had just had three La Niña winters in succession. La Niña winters typically are warmer and drier than normal for Texas, so they're a good foundation for drought. And indeed, Central Texas in particular had been in the grips of long-term drought, with many reservoirs at or near historic lows. But the winter of 2023-2024 needed to be different. A strong El Niño was in place, and we needed the tendency for cool, wet winters during El Niño to hold true to form. Otherwise, when the widely expected La Niña redevelops for next winter, we could be looking at the fourth or fifth year of drought.

The last time we had drought and El Niño failed to deliver relief was in the early 1950s. That did not turn out well.

This winter turned out to be a mixed bag. Southwest Texas was dry. Northeast Texas was dry. Much of the Panhandle and Southeast Texas were wet. Other places did okay, but generally not good enough to replenish the reservoirs that were way down.

The wettest stretch was January 22-25, 2024. One CoCoRaHS observer reported over 16" of rain for the four-day period, although nearby reports were several inches lower. Another reported over 14", and there were several other CoCoRaHS reports over 12". One of our student assistants, Alonso Lopez, wondered if that was unusual. Indeed it was! I can find only two similarly wet 4-day winter periods in the historical record. The largest totals in those were 15.50" in San Marcos on December 2-5, 1913, and 14.42" in Boerne on December 19-22, 1991.

The rain gauge maps of these events show how far we've come with CoCoRaHS. Here's Dec. 2-5, 1913:

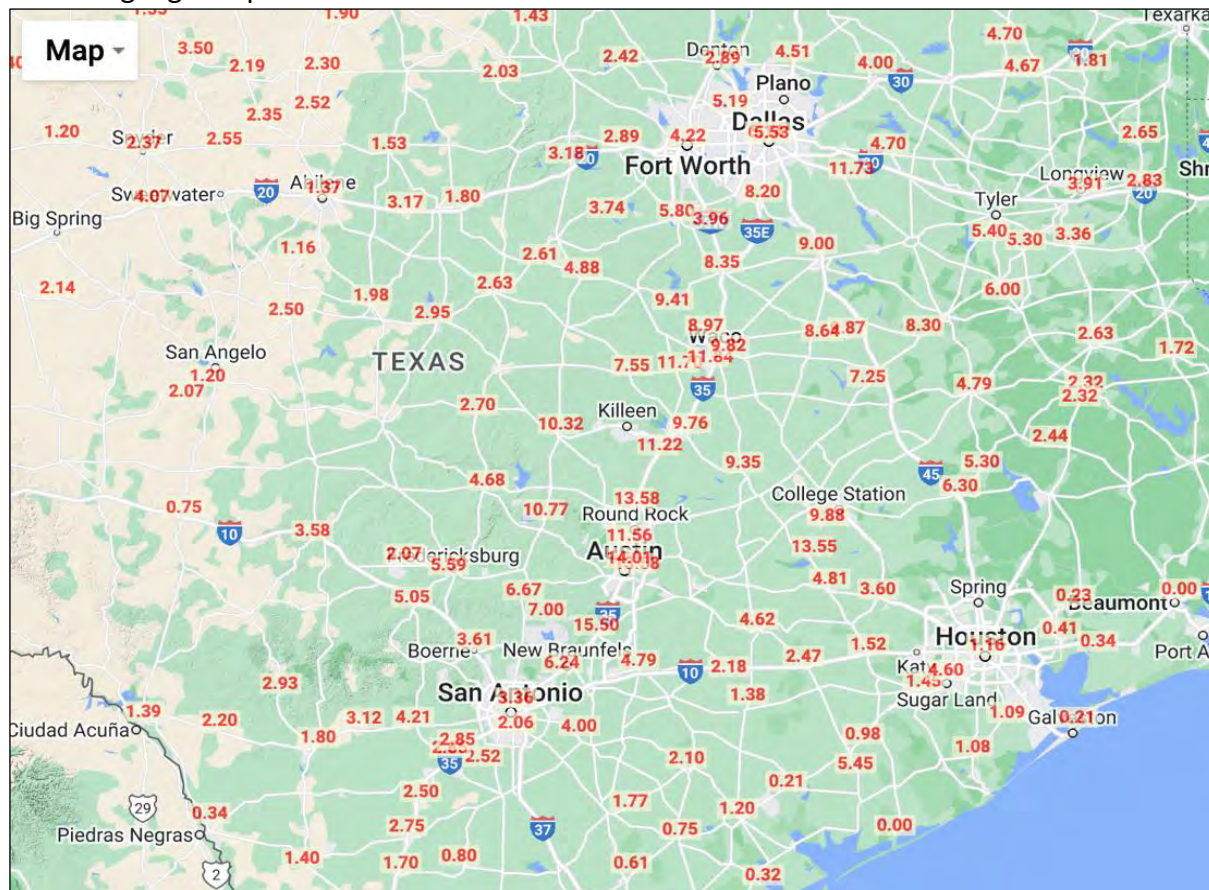


Fig.1: Map of rainfall totals, Dec 2-5, 1913, from the Applied Climate Information System (ACIS)

The largest totals were along what is now I-45. It would have been nice, though, to have at least one gauge between Austin and College Station.

Texas Winter Weather Summary (continued)

Here's Dec. 19-22, 1991:

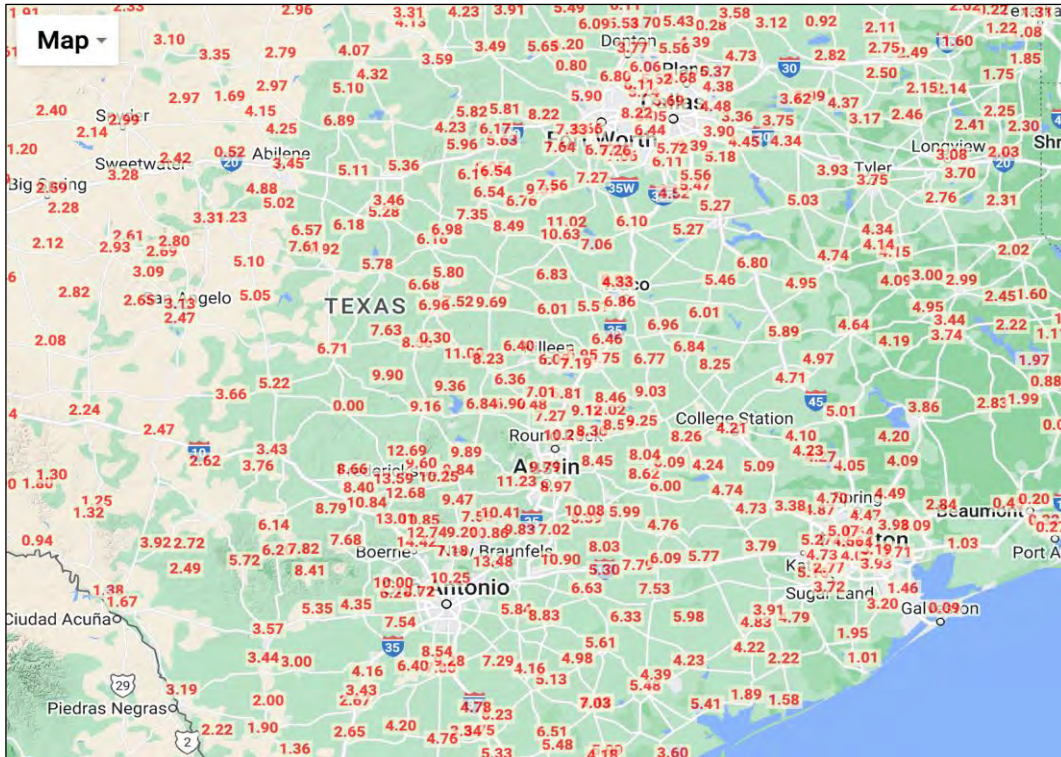


Fig.2: Map of rainfall totals, Dec 19-22, 1991, from ACIS

During that period, it was wet just about everywhere, but the Hill Country north of San Antonio received the largest amounts. If the largest totals had been between Austin and College Station, we would have eight or so stations to detect it.

Last up is the rainfall map from January 22-25, 2024:

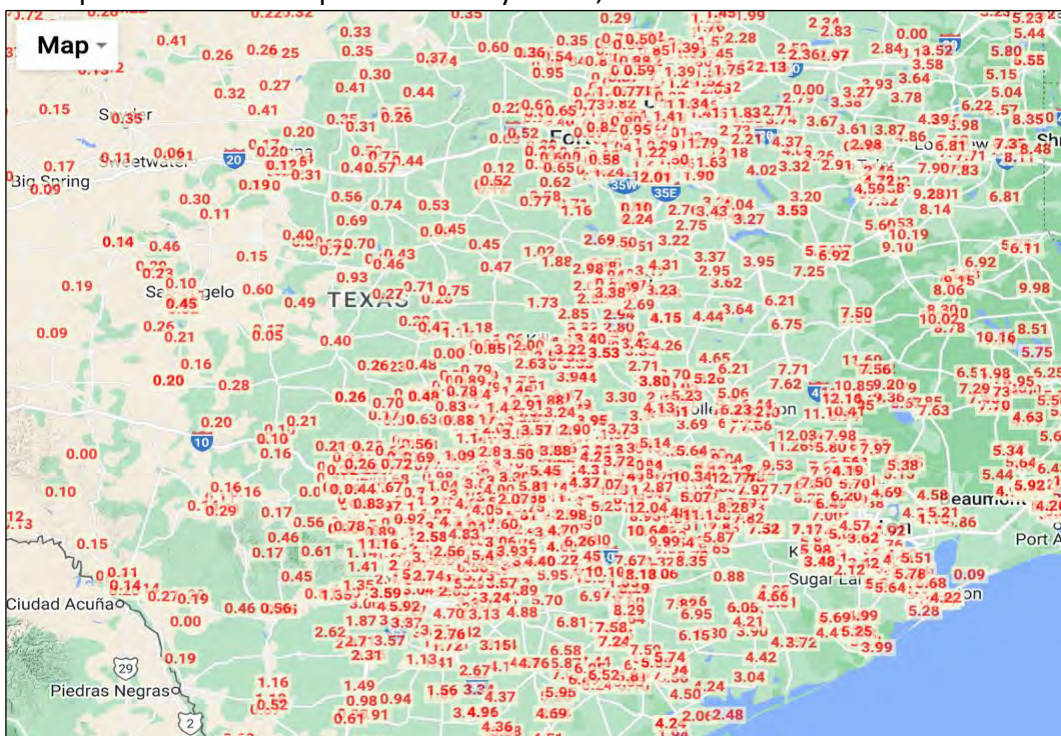


Fig.3: Map of rainfall totals, January 22-25, 2024, from the Applied Climate Information System (ACIS)

Texas Winter Weather Summary (continued)

Ah, data! There are so many reports that you can't even find Austin or College Station! Even the largest totals are hidden; you have to zoom in to see them:

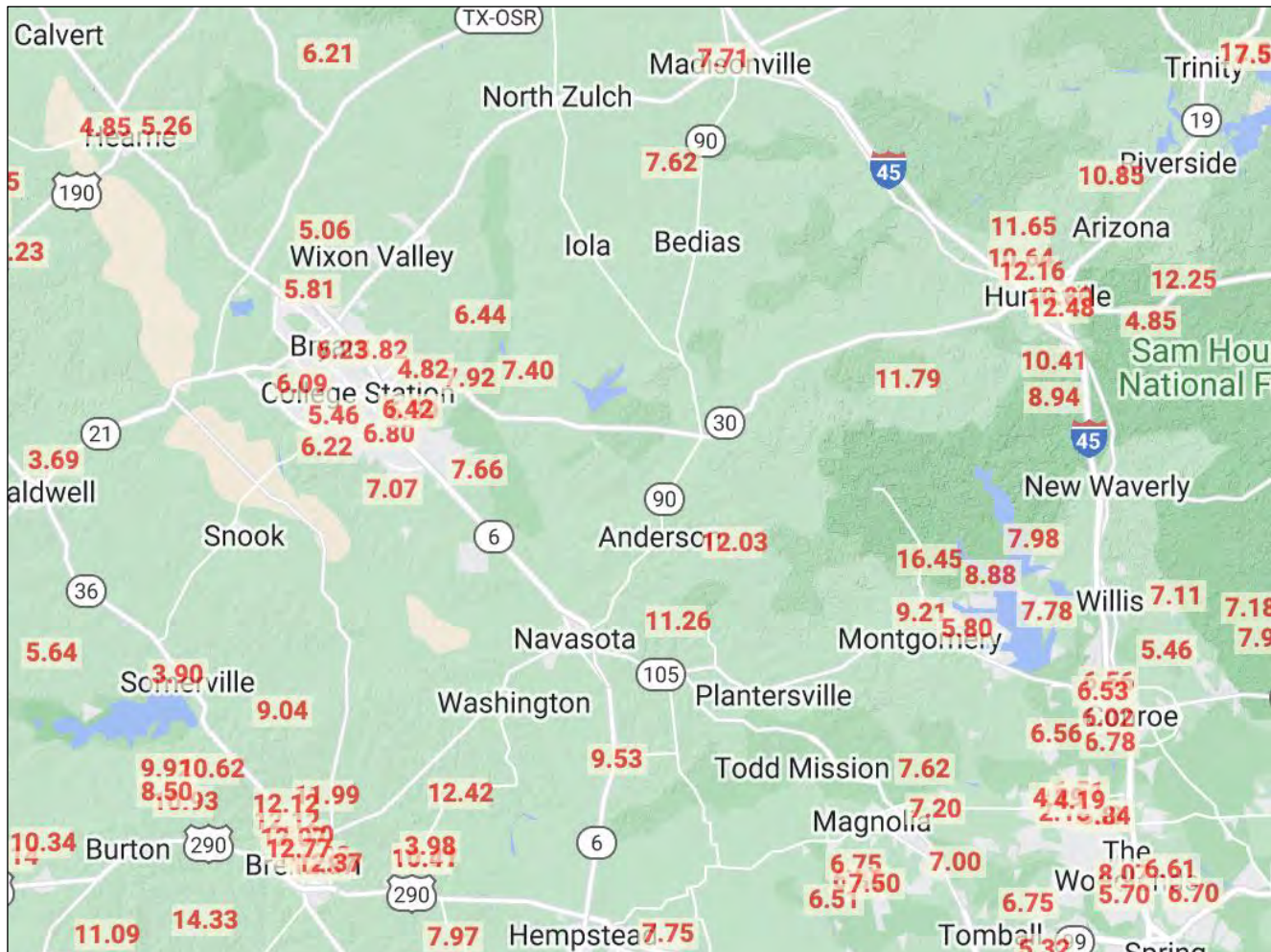


Fig.4: Close-up map of rainfall totals, Jan. 22-25, from the Applied Climate Information System (ACIS)

It would be nice to go back in time, recruit a whole bunch of CoCoRaHS observers, and find out how wet the 1913 event actually was. But at least we know that, from now on, we have the data and we can tell what actually happened.

Thank you for your observations!

Far West Texas/El Paso Regional Summary

Winter Precipitation Favors New Mexico and Arizona, Skirts Far West Texas

By: Connor Dennhardt, Meteorologist - National Weather Service El Paso

Traditionally a dry time of year for far west Texas, the 2023-24 winter season was nothing special. A strong El Niño occurred this winter, which typically signals cooler than normal temperatures and above normal rainfall. That teleconnection was verified in many parts of the U.S. Southwest. Much of the California coast, southern Arizona, and New Mexico high terrain record average or above average precipitation with favorable snowpacks. Sadly, far West Texas was not one of them. Many winter storm systems missed the region to the north, and precipitation chances were spaced out by 7-10 days. Pacific storm tracks consistently favored more progressive systems, further limiting the window for precipitation in El Paso and Hudspeth Counties.



Figure 1: Lenticular clouds over the Organ Mountains in southern New Mexico on January 14th.

December was quite dry, with only 3-4 days of measurable rainfall reported from CoCoRaHS observers. Light rain occurred on the 2nd, followed by 17 consecutive days of **0.00"**. The only notable rainfall occurred on the 20th when strong subtropical flow ahead of a Pacific storm brought some much needed moisture. Observers in El Paso County reported **0.15-0.40"**. The rain left the ground saturated over much of the area, which led to unusually dense fog spread across the Rio Grande Valley. Scattered thunderstorms raced across southern New Mexico on the 22nd, but almost entirely missed West Texas. Monthly totals ranged from **0.20-0.50"**.

Strong winds headlined the weather in January signaling an early start to spring in the borderland. Two high wind events on the 7th and 11th, resulting in widespread wind damage in El Paso and even some blowing dust. Precipitation was fairly frequent, but very light and often only traces. The only notable period of rainfall was the week of the 21st, with a few days of rain ranging from **0.10-0.25"**. Monthly totals were reported **0.25-0.50"**, just below climate normals.

February featured another long string of dry days, but rain at the start and end of the month helped get the region to climate normal. The most notable storm occurred at the end of the month, overnight from the 28th to 29th. Scattered showers and thunderstorms moved through, bringing a **0.25"** of rain and even some lightning and graupel due to the convective nature of the storms. Monthly totals ranged from **0.25-0.50"** with even higher totals focused on northeast El Paso.

Far West Texas/El Paso Regional Summary (continued)

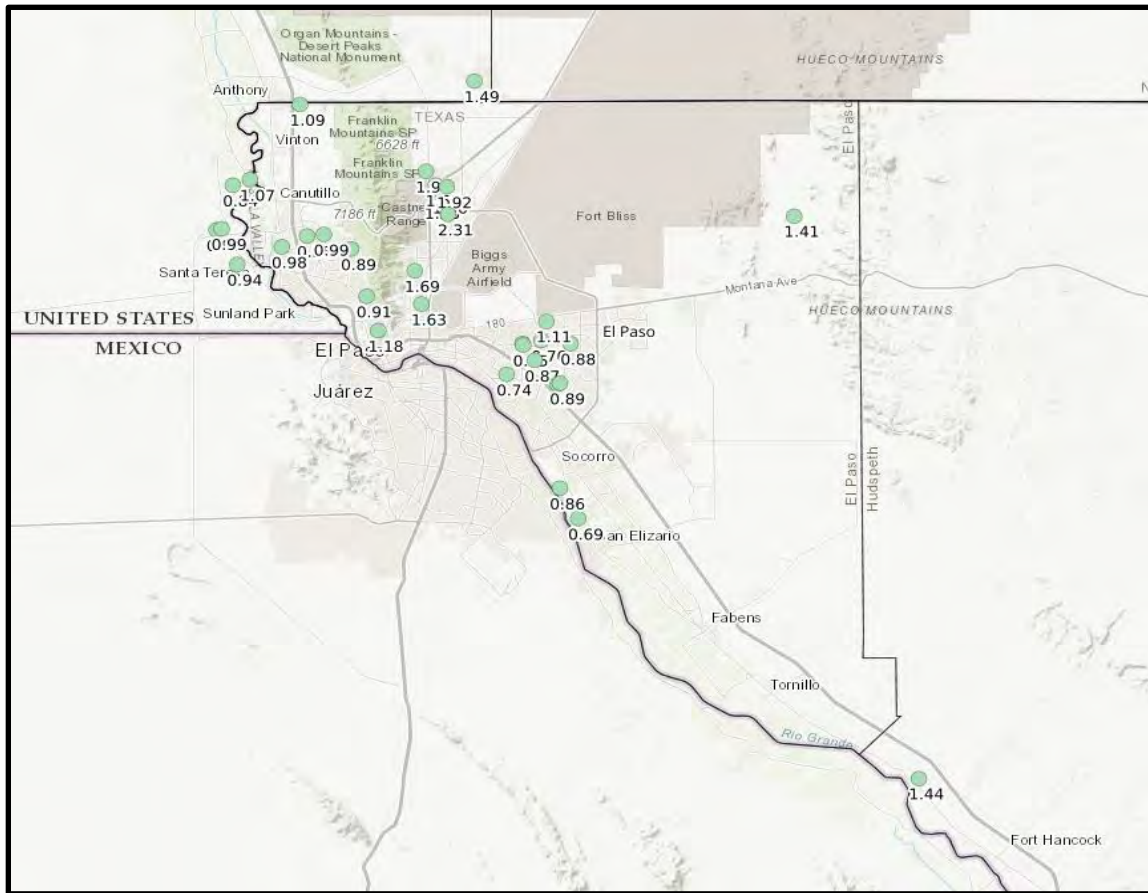


Figure 2: CoCoRaHS precipitation totals for December 2023 - February 2024 across El Paso and western Hudspeth Counties

Season precipitation totals of **0.75-1.50"** were fairly near normal for this time of year, perhaps just below climate normal. AHPS analysis shows this is generally 50-70% of climate normals, but a departure of less than **0.50"** due to the dry nature of El Paso's winters. El Paso International (KELP) recorded a season total of **0.95"** and NWS El Paso (NWSEP) recorded **0.95"**, slightly below the climate average of **1.42"**. The February 29th daily rainfall record was broken at El Paso, an odd addition to the leap year records. Little to no snow fell along the river valley this year, but the Franklin Mountains did see a light snow dusting a couple times. Drought conditions eased slightly, but remained quite arid. El Paso County remains in an Exceptional (D3) Drought Status. As we enter the spring fire season, expect dangerous wildfire conditions if March-May are dry.

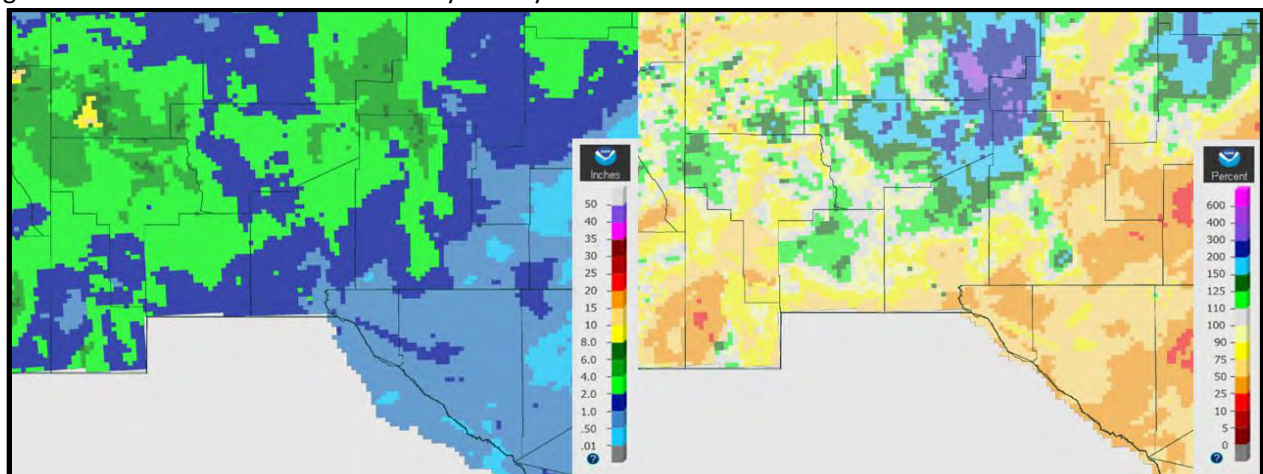


Figure 3: AHPS Observed Precipitation and Percent of Normal for Dec-Feb in far west Texas

The winter season featured 34 active observers in El Paso County, and 1 in Hudspeth County. A total of 1,943 daily reports were submitted, along with 46 multiple-day reports. Only 337 daily reports had measurable precipitation, which means 82% of total reports were **0.00"**. No Significant Weather or Condition Monitoring reports were submitted this season. Thanks again to all our local observers who participated in the 2023-24 winter season!

West Texas/Southeast New Mexico Regional Summary

Dry Conditions Continue across West Texas

By: Jim DeBerry, Meteorologist, Hydrology Program Manager, NWS Midland

December

December closed out 2023 uneventfully across West Texas and Southeast New Mexico. Most precipitation reported came from an event that occurred on December 23rd, bringing thunderstorms and unusually high rainfall amounts to the area. However, these amounts were not high enough to pose a flood threat. As such, no flooding was reported.

Monthly radar rainfall estimates ranged from nothing in the lee of the Davis Mountains to up to 3" in northeast Scurry County. The highest observed rainfall was 1.70" at Fluvanna in Scurry County. The average of precipitation reported across West Texas and Southeast New Mexico was only 0.49".

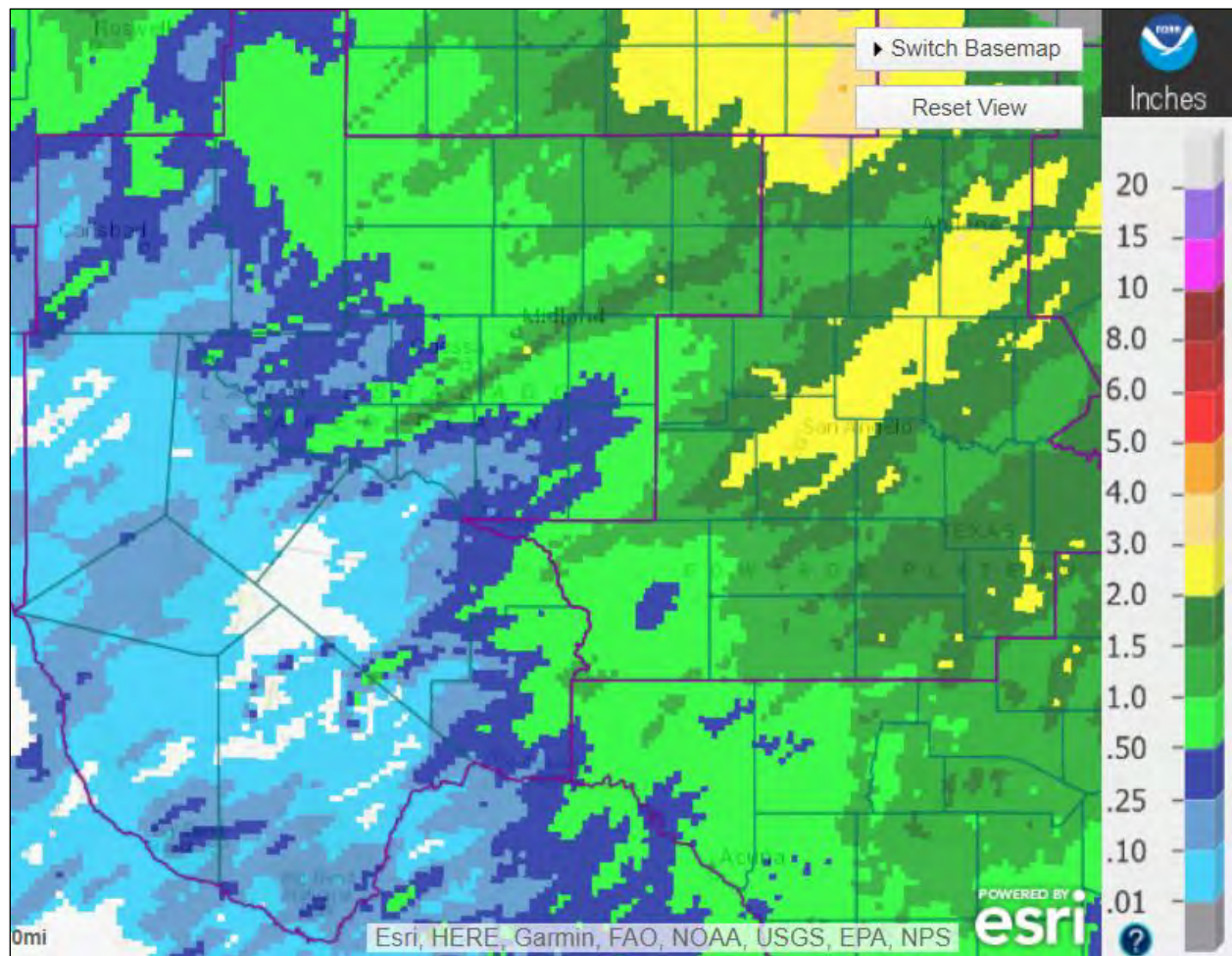


Figure 1: December Precipitation

West Texas/Southeast New Mexico Regional Summary (continued)

January

January was a dry month across West Texas and Southeast New Mexico, characterized by a couple of very strong cold spells and a dearth of low-level moisture. As a result, precipitation was scant, and no notable hydrologic event were reported.

Monthly radar rainfall estimates ranged from nothing over the much of Presidio County to up 1.50" in eastern Scurry County. Indeed, the highest observed rainfall was 1.36" in Snyder in Scurry County. The average of rainfall reported across West Texas and Southeast New Mexico was a paltry 0.29".

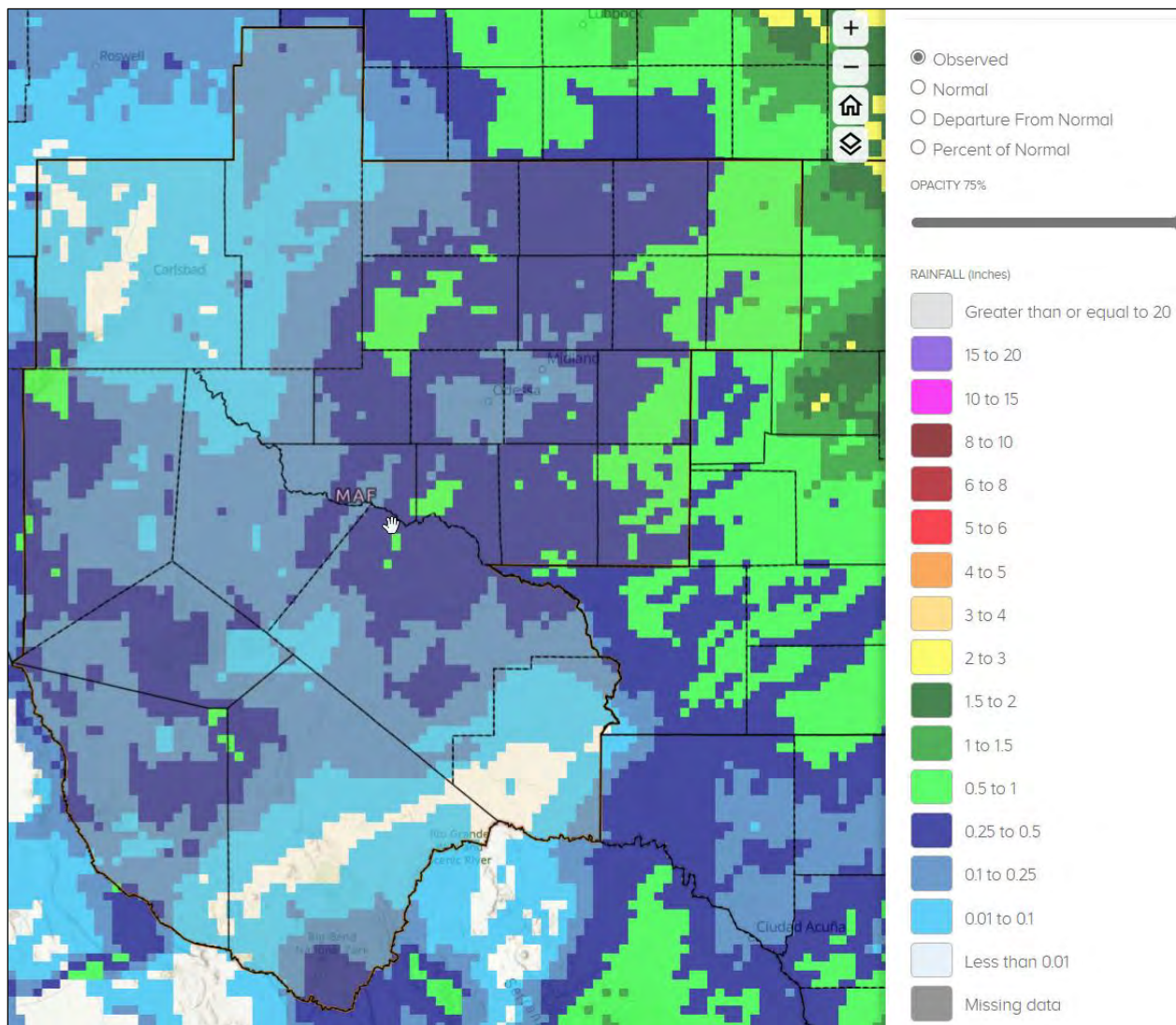


Figure 2: January Precipitation

West Texas/Southeast New Mexico Regional Summary (continued)

February

February was warm and dry. Although increased precipitation is generally favored under El Nino conditions in West Texas and Southeast New Mexico, it appears random (bad) luck has resulted in a lot of “misses” lately. All of New Mexico and West Texas and parts of Texas to the southeast can’t seem to catch a break, as noted in monthly radar rainfall plots, the U.S. Drought Monitor, and surface observations. As a result, no notable hydrologic conditions occurred during the month.

Monthly radar rainfall estimates ranged from 0.10” or less along the Rio Grande in Brewster County to up to 2” in southeastern Regan County. However, the highest observed rainfall was 1.62” at Dog Canyon in Culberson County. The average of rainfall reported across West Texas and Southeast New Mexico was 0.47”

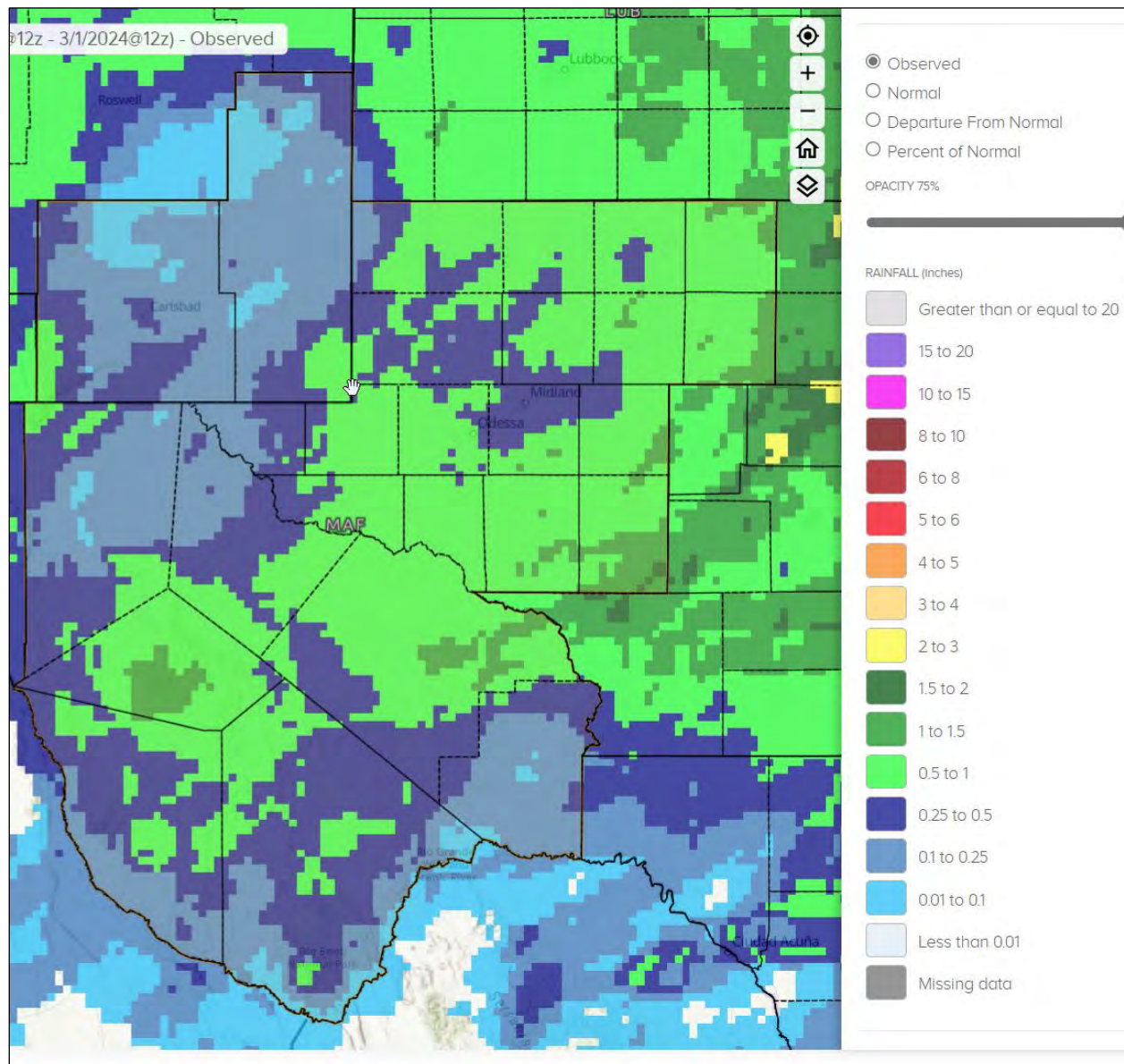


Figure 3: February Precipitation

West Texas/Southeast New Mexico Regional Summary (continued)

Winter Season ending Drought Conditions

As of the end of February, area reservoirs averaged 50.0% of conservation capacity.

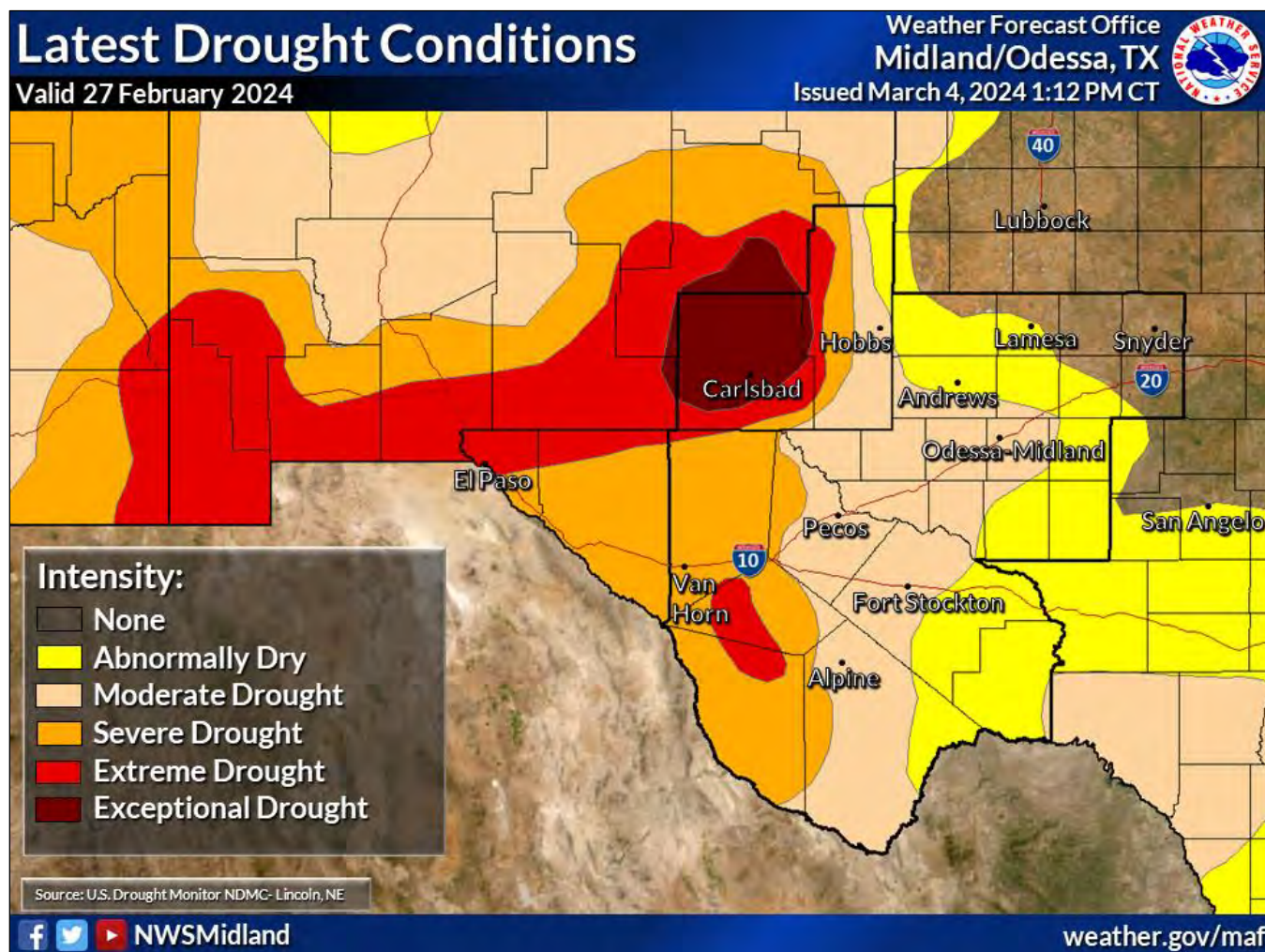


Figure 4: End of Season Drought Map

Austin/San Antonio Regional Summary

A Wet Winter for Many, but Drought Continues By Keith White – WFO Austin/San Antonio

Largely due to a single five-day period in January, significant rainfall surpluses occurred across areas near and east of Interstate 35 in south-central Texas this Winter, as much as 8-10+” above normal across Fayette County (Figure 1). The western Hill Country westward to the Rio Grande from Eagle Pass northward were not so lucky. However, since winter is typically a dry season there, 90-day rainfall deficits were only up to ~1-2”. Let’s dive into the details of how our weather played out this winter.



Figure 1: Estimated departure from normal rainfall for the 90 days ending February 29th at 6am.

While many folks were hoping to see the cooler, wetter than normal conditions that are common (but not guaranteed) in our region in an El Niño Winter, December instead came and went with warmer than normal temperatures on average and largely below normal precipitation. While the month had several systems pass through the area, only a couple brought rainfall with them. It was dry from the 1st through the 12th, but a couple days of mainly light rains on the 13th through the 15th brought widespread 0.25-0.5” amounts to all but the Coastal Plains. Amounts were closer to 1” in a few locations mainly W and NW of San Antonio. Another round of light to moderate rain developed mainly across the Hill Country and Austin Metro on the evening of the 21st. Then a stronger system brought locally heavy rainfall to portions of the Hill Country and northern I-35 corridor on the 23rd and 24th. Widespread 0.5-1” amounts were reported by CoCoRaHS observers in these regions, while portions of Burnet, Travis, and Williamson Counties had 2-3+”. These areas were the only ones to see above normal precipitation for the month. Shoal Creek in Austin briefly reached Minor Flood Stage as a result of these rains, meanwhile drought would expand across portions of the Hill Country. We’d remain dry and cool off for a week following this event, but only about 5 degrees cooler than average.

January was quite a bit more active. On the 2nd, widespread showers and a few storms brought 0.5-1.5” rainfall amounts to portions of the Hill Country and I-35 Corridor, with a few spots nearing 2” from far northern Bexar County northeastward towards far eastern Williamson County. Some lighter rains impacted portions of the region on the 4th, with a swath of closer to 1” across portions of DeWitt and Lavaca Counties. Areas of light to moderate rain would develop on the morning of the 8th ahead of the arrival of a cold front, and by the afternoon storms producing damaging winds and large hail of up to 3” would impact portions of Gonzales and Lavaca Counties. Several timely CoCoRaHS significant weather reports aided warning operations and verification for the NWS. To the west, strong non-thunderstorm winds behind the front produced gusts near 60 mph.

Austin/San Antonio Regional Summary (continued)

After a few warm, dry days, the strongest cold front of the season knocked on our doorstep by the evening of the 13th. Temperatures plummeted into the teens and 20s by the morning of the 14th, and many locations would see morning lows in the teens for 3 to 4 straight days. On the 15th, some areas set record low maximum temperatures, barely climbing into the mid-20s! In addition, very light accumulations of freezing drizzle or sleet, mainly <0.05", impacted areas along I-35. But we would quickly put the extreme cold in the rear-view, with highs back into the mid and upper 70s on the 18th.

Another quiet period was interrupted late in the evening of the 21st as we began several days of widespread moderate to heavy rain across mainly the southeast half of the region (sorry Hill Country/Rio Grande Plains!) The first round of flash flooding came through the morning hours on the 22nd along and just west of I-35 from San Antonio to Round Rock/Georgetown. By the mid-morning, that area had dozens of CoCoRaHS reports of 3-5+", with one report of nearly 6" just east of Canyon Lake. A second area of heavy rain crossed the Coastal Plains near and southeast of Kenedy to La Grange, with 3-4" there. Dozens of low-water crossings were closed due to flooding, but there was still more to come. After about a 24-hour break, another batch of slow moving heavy to at times torrential rain would develop near a warm front in the Coastal Plains on the 23rd. Widespread 2-4" rains would again fall over saturated areas, with up to 6-7" in much of Fayette County, and there was still more to come. A final round of showers and storms would result in another 2-3" of the same Coastal Plains counties on the 24th into the early morning hours of the 25th. In total, 7 CoCoRaHS observers in Fayette County recorded 4-day totals over 12", with 4-7+" amounts across almost the entirety of the I-35 corridor and Coastal Plains (Figure 2). Rivers would quickly swell and Flood Warnings were issued on the Guadalupe and Colorado Rivers. The Guadalupe River reached Moderate Flood Stage at Westhoff. Widespread road closures were reported across the Coastal Plains throughout this event, some lasting a few days. Although the rain and flooding were the main story, there were two straight nights with singular severe thunderstorms as 1.5" hail fell near Horseshoe Bay early on the 23rd and 2" hail fell near Poteet the very next night.

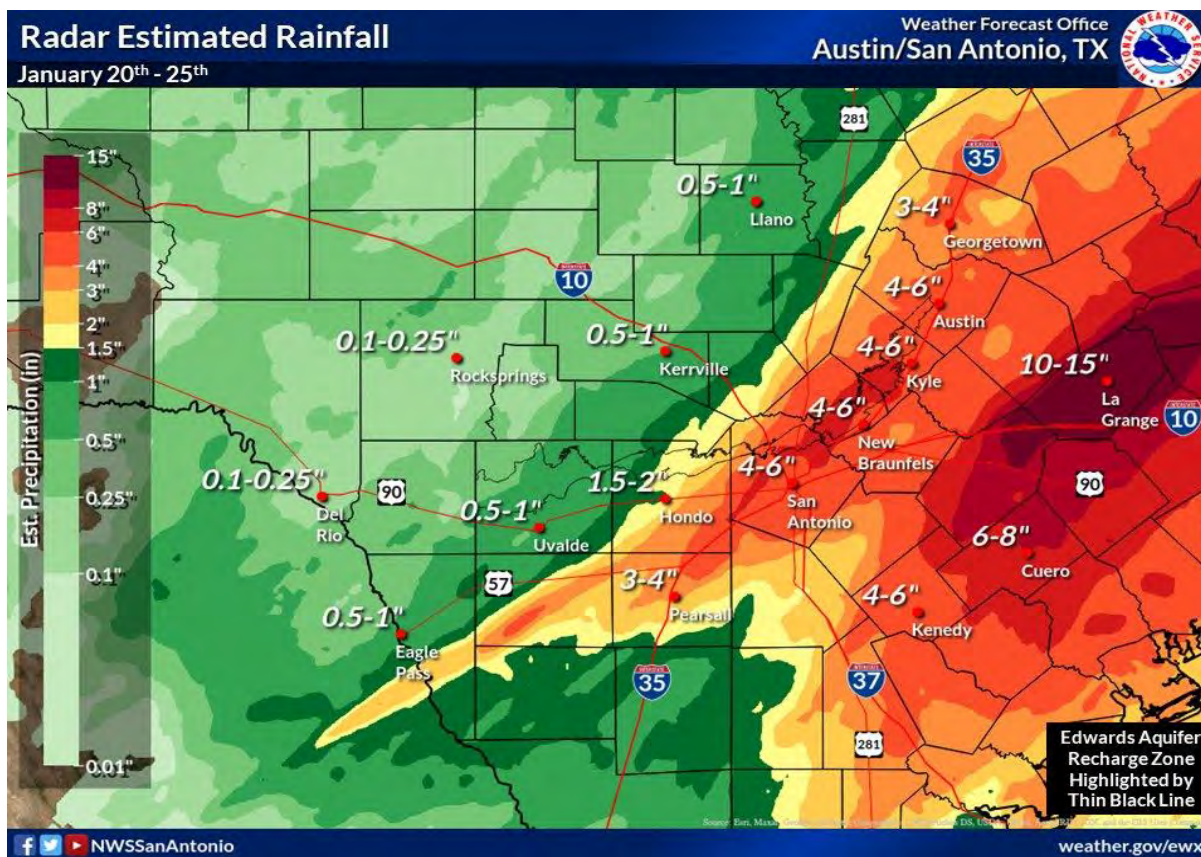


Figure 2: Estimated rainfall from the evening of Jan 21st through the early morning of Jan 25th.

As a result of the stretch of very cold weather through the middle of the month, January averaged out to be the coldest since 2007 in San Antonio and Austin. With the heavy rains, drought conditions greatly improved in the Coastal Plains and I-35 Corridor, while drought persisted or slightly worsened across the remainder of the service area. And there was still more to come!

Austin/San Antonio Regional Summary (continued)

On February 2nd, an upper-level trough and surface cold front led to the development of multiple rounds of showers and storms, a few of which produced large hail and damaging winds. The highest rainfall totals from this event were 1.5-3" generally near and south of I-10 and east of I-35, in some of the same already saturated areas. Another quiet, warm week followed, with the next wet day arriving early in the morning on the 10th. A couple rounds of showers and storms impacted mainly regions north of I-10/US-90 through just after sunrise on the 11th with 0.5-1.5" amounts, again with a few instances of large hail and locally higher rainfall up to 2".

A few days of near to slightly below normal temperatures and dry weather followed. A brief warm-up arrived on the 15th, and southern parts of the Coastal Plains picked up another 1" of rain or so on the 16th ahead of a strong cold front that would bring highs back down into the 50s for a couple of days. However, warm to downright hot weather would bring the first 80-degree day to Austin on the 20th, followed by some areas nearing 90 on the 21st! No additional meaningful rain would occur the rest of the month, but we'd end February with a chilly Leap Day.

All told, most of south-central Texas averaged out to about a degree or two warmer than normal despite the stretch of cold weather in January. Although El Niño winters can often be cooler than normal, the long-term trends in global temperature (AKA climate change) can cancel out this effect. The primary precipitation impacts of the El Niño pattern were limited to the eastern half of our region, where significant drought improvements occurred (Figure 3). Looking ahead, a warmer than normal spring is favored, as well as drier than normal conditions in the western half of the region. Drought conditions in the Hill Country, Rio Grande Plains, and southern Edwards Plateau are expected to continue (and potentially expand) as a result through Spring. The Coastal Plains have seen more than enough rain to keep drought at bay for a while.

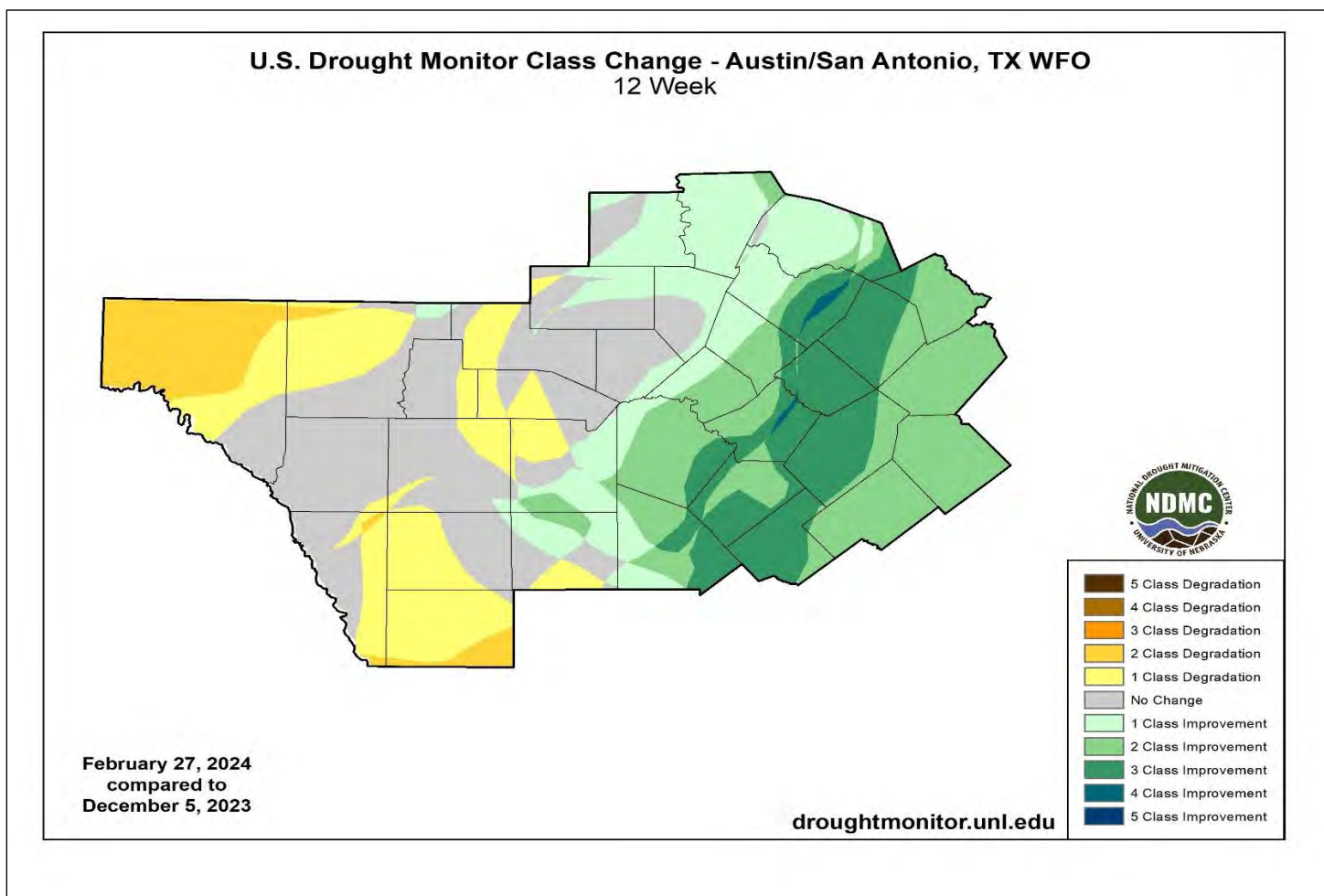


Figure 3: Twelve week change in the United States Drought Monitor classification between December 5th and February 27th.

East Texas Regional Summary

Active Weather across East Texas during January into February

By: Davyon Hill (Lead Meteorologist-National Weather Service-Shreveport)

Dry conditions settled across East Texas for the start of Winter 2023-2024. The overwhelming bulk of the precipitation fell on only two days during the month of December, the 15th and 24th. This resulted in most of the CoCoRaHS sites only seeing 1" to 2" of total rainfall, which is well below the National Weather Service average of 4" to 4.5" for the month of December. However, a much more active weather pattern unfolded for the month of January. Most of the East Texas CoCoRaHS sites reported rainfall on several mornings during the first 8 days of the month. On the 12th, a few storms triggered warnings along a cold front, with pea size hail being reported by an observer in Smith County. Also, the public reported quarter size hail on the same day around the Mount Vernon area in Franklin County. By the 14th a strong arctic airmass settled across the region bringing record cold temperatures. Several upper-level disturbances moved over that airmass, resulting in the development of wintry precipitation on the 14th and 15th. Most of it fell in the form of sleet, but there was some freezing rain across portions of Deep East Texas and some very light snow in extreme Northeast Texas. CoCoRaHS and National Weather Service sites generally reported between a trace to ½" of sleet, with freezing rain amounts generally less than 0.10". An extended period of dry weather allowed the region to thaw out following the winter weather during the middle of the month. However, by the 22nd of the month, a warm front and associated surface low settled into the region. Several days of moderate to heavy rainfall followed, as numerous sites reported over 6" of rainfall from the 22nd through the 28th, with some observers reporting over 10". This resulted in widespread flash flooding across a large portion of East Texas along with a few 24-hour record rainfall reports from the National Weather Service on the 22nd and 23rd. Overall, the month of January concluded with precipitation well above the National Weather Service monthly average of 4" to 4.5", as numerous sites along and south of Interstate 20 reported 10" to 14" of total precipitation.



Fig.1:

(Left Photo) Sleet, Marshall, TX – Jan.15, 2024

(Right Photo) Flooding, Dorough Rd., Karnack, TX – Jan.23, 2024

Images Courtesy of Harrison County Sheriff's Office

East Texas Regional Summary (continued)

A somewhat active weather pattern continued into the first portion of the month of February, with most sites reporting precipitation on several mornings through the 11th of the month. However, the precipitation on the 11th really stood out, as storms produced numerous reports of golf ball to baseball size hail across the region. Also, several CoCoRaHS sites across Deep East Texas reported 3' to 4" of rainfall on this day as well. Beyond this, dry conditions returned across the region, with record heat during the last week of the month. Eventually, widespread rainfall returned to the region on the last day of the leap year month. The good news is despite the periods of dry conditions this past winter, enough precipitation fell to essentially end drought conditions.



Fig.2: Large Hail – Feb. 11, 2024, US Hwy 155 and Loop 49 – Tyler, TX, Image Courtesy of HAM Radio Operator Thomas (KC5KCT)

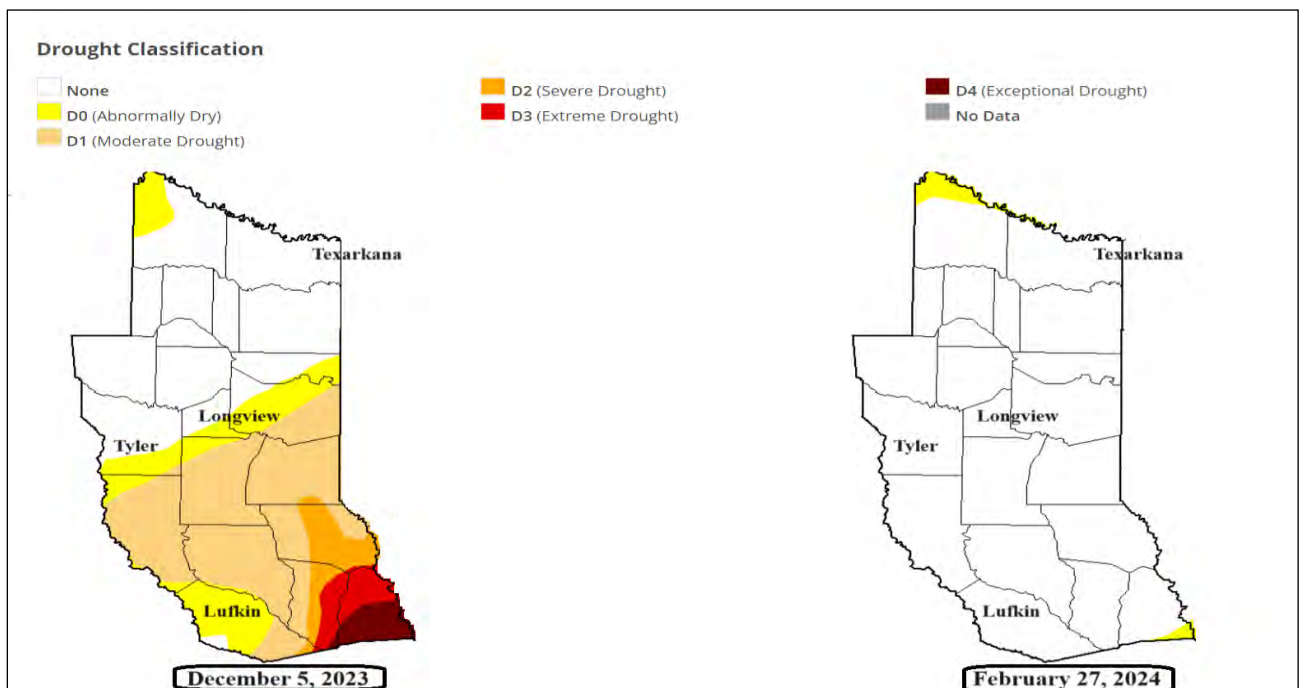


Fig.3: Drought Monitor comparing 12/5/2023 to 2/27/2024. Image Courtesy of NDMC/USDA/NOAA

North Texas Regional Summary

Precipitation Swings from Above to Below Normal this Winter

By: Greg Story, North Texas CoCoRaHS Regional Coordinator

Greetings CoCoRaHS observers from the North Texas Regional Coordinator! In this newsletter article I like to review the weather from the past several months, emphasizing the importance of your weather observations. The variability of the rainfall over north Texas stresses the need for your rainfall reports. Why? They help in determining the amount of moisture that is in the ground. Thus, areas which may flood, or locations of drought, are more easily determined. Your reports continue to be invaluable to the National Weather Service and other entities (such as the Texas State Climatologist and the National Drought Mitigation Center).

Reviewing the weather of the past several months, in August below normal rainfall was noted just about everywhere in Texas. In September it still was dry over a good part of Texas. There was an area of above normal rainfall noted over western Texas from the Concho valley to near Lubbock. But near to below normal precipitation occurred elsewhere. In October the weather pattern shifted, as above normal rainfall occurred from western into north central and Northeast Texas. Much above normal precipitation was noted over the Dallas/Fort Worth metroplex. However, parts of Southeast Texas, far West Texas and the Texas Panhandle received below normal precipitation. In November, much of Texas experienced below normal rainfall. However Deep South Texas and parts of Southwest Texas had above normal rains. In December they observed above normal precipitation over the Texas panhandle into the western parts of North Texas, but much of eastern, southern and far western Texas recorded below normal precipitation. In January there was above normal precipitation for much of eastern and southern Texas, as well as the western parts of North Texas. Only Southwest Texas had below normal precipitation. In February the weather pattern turned drier. Much of Texas had near to below normal precipitation, with only parts of south Texas observing above normal rainfall.

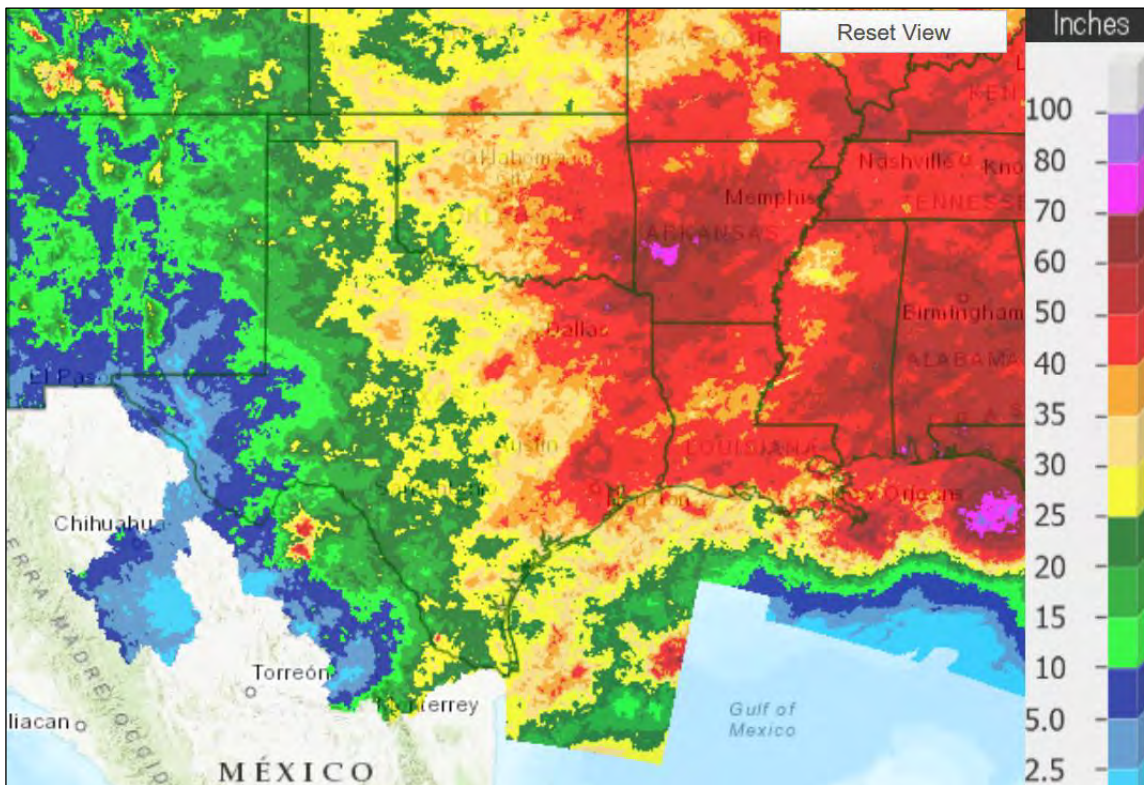


Figure 1: Total Precipitation map for 2023. The only part of Texas that seemed to receive excessive rainfall was the northeast corner of the state.

North Texas Regional Summary (continued)

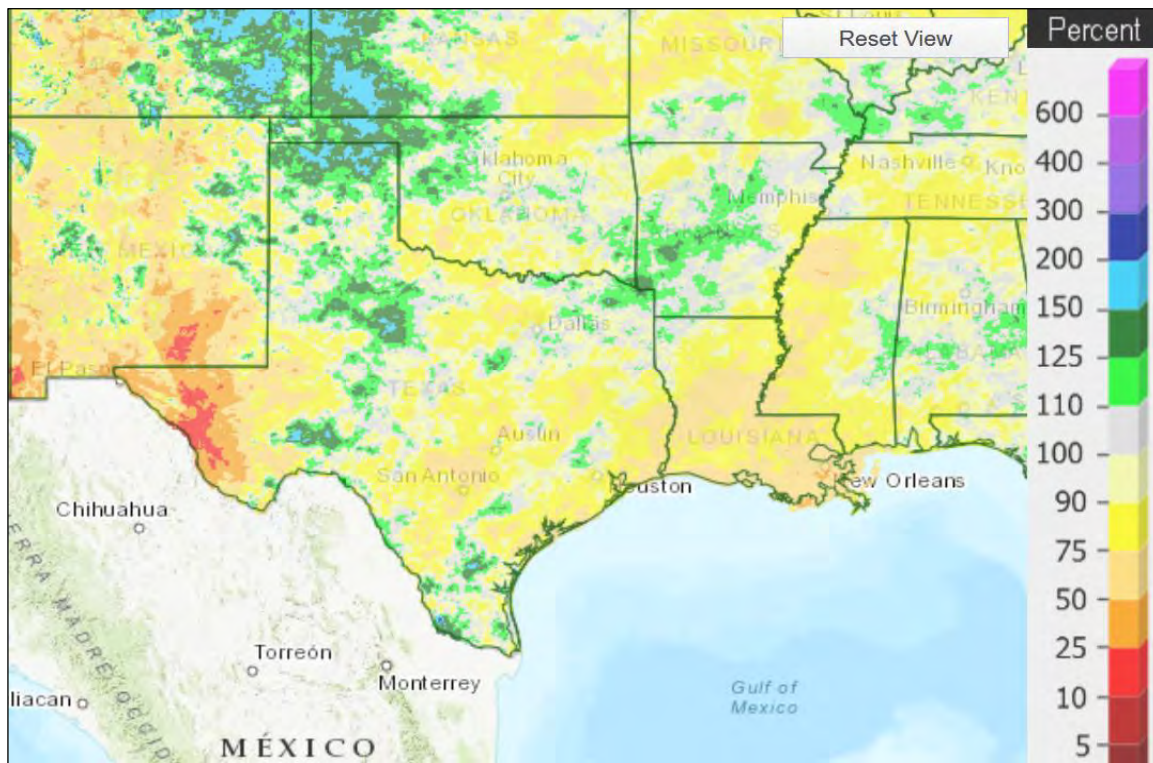


Figure 2: Percent of Normal Precipitation map for 2023. Much of Texas did have a dry year, with far northeast Texas, parts of west Texas and the northern Texas panhandle being the only spots seeing above normal precipitation.

In 2023, DFW airport received 29.31" of precipitation. The normal amount for a calendar year in DFW is 37.01" so DFW was - 7.70" below normal for 2023. In 2023, Waco had 29.34" of precipitation. The normal amount for a calendar year in Waco is 36.40" so Waco was - 7.06" below normal for 2023.

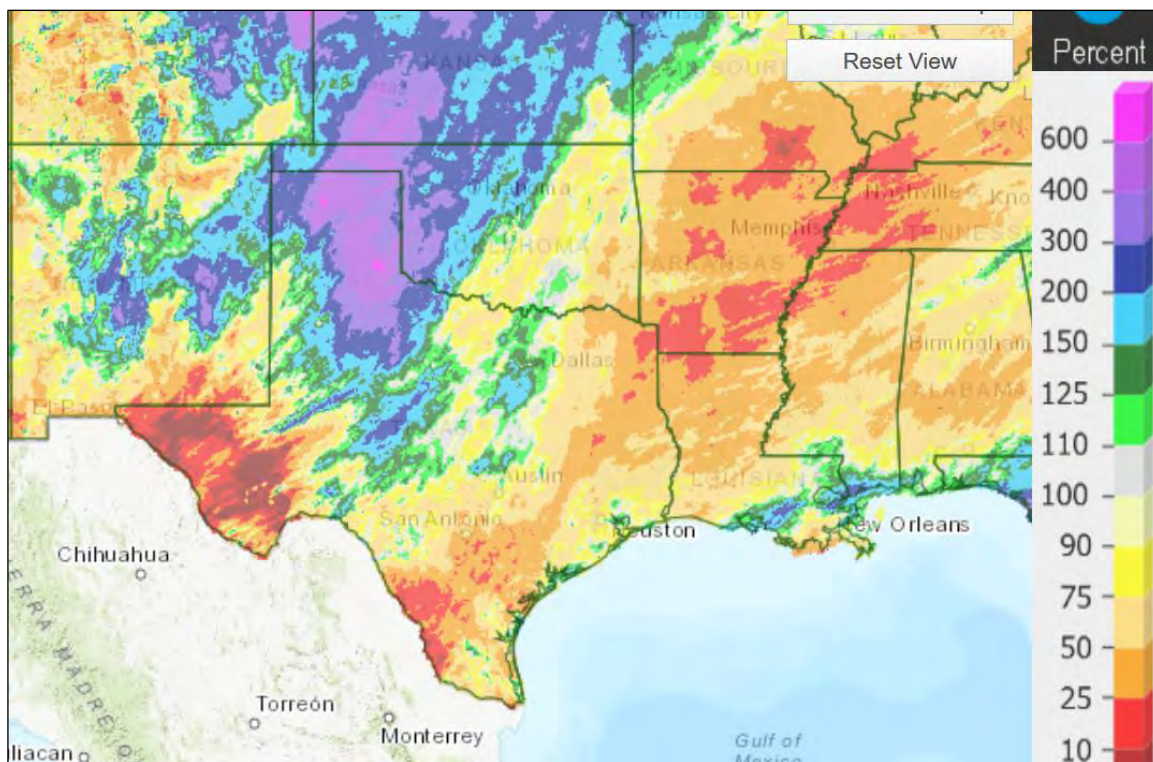


Figure 3: Percent of Normal Precipitation map for December 2023. In December there was much above normal precipitation over the Texas Panhandle into the western parts of North Texas, but much of eastern, southern and far western Texas recorded below normal precipitation.

North Texas Regional Summary (continued)

At DFW airport in December 2023 had 3.55". The normal amount of precipitation in December at DFW is 2.84" so this is +0.71" above normal for the month. In Waco for December 2023, 3.14 fell". The normal amount of precipitation in Waco in December is 2.87" so this is close to normal at +0.27" for the month.

For each month, I will highlight the more significant weather events. I know there is a lot of information given, and it is intended for you to pick your "favorite" storm or to look at a particular date each month to see what happened. Which days did you report your heaviest precipitation amounts? You can read about those days here and compare what you observed against the maximum amounts.

There were about three storm systems which affected our weather in December. Here are the highlights of the weather for the month.

December 9:

A short wave trough passed north of Texas, but was strong enough to push a sharp cold front through Texas. Showers and some thunderstorms broke out along and ahead of the front on the 9th, primarily over east central and Southeast Texas. While virtually no rain fell over North Texas, 1.05" fell at Deweyville and 0.97" at Houston - Westbury. Most of the rain ended by midnight on the 9th.

December 13 - 16:

A slow moving upper air low pressure system developed over the southwestern US and moved across the central plain states. Light rain (and even some snow in parts of the panhandle) developed on the 13th. Prior to dawn on the 13th the heaviest precipitation was over West Texas and was all less than 0.70". Then during the day on the 13th the rain persisted over the west, with maximum rainfall of 1.89" just south of Northfield and 1.59" north northeast of Childress. The rain began moving slowly eastward on the 14th, with the heaviest rainfall being over southern and western Texas. Rainfall of 4.61" fell south southeast of Corpus Christi, while out west there was up to 2.99" northeast of Aspermont. The rain spread quicker to the east on the 15th. The maximum rainfall amounts in Southeast Texas were from 2.75" west of Kenefick to 2.28" north of Montgomery. Over North Texas, Cooper received 2.13" and the area south of Sanger received 1.22". The rainfall moved east of Texas on the morning of the 16th.

December 21 - 24:

Two storm systems affected Texas just before the Christmas holiday. The first storm was weaker than the second. The first short wave trough brought mostly light rain to Texas starting on the 21st. Before sunrise on the 21st the rainfall measured was all less than 0.33". Then during the day on the 21st the rainfall became widespread and was heaviest over north Central Texas. The maximum rainfall was 1.78" north of Shady Shores, 1.71" southwest of Aubrey, and 1.63" northeast of Denton. The rainfall from the first storm weakened and moved east of Texas on the 22nd. Residual rainfall over Southeast Texas was all less than 0.40". As the second storm moved across the desert southwest, showers and thunderstorms began to move into West Texas the morning of the 23rd and the rain spread eastward. During the day and evening the rain became widespread and was heaviest over Central Texas. On the 23rd the heaviest rain in North Texas was west northwest of Pottsboro with 2.82", and the area west southwest of Cedar Hill had 2.67". In Central Texas, where the maximum rainfall in Texas occurred, 3.25" fell west southwest of Belton and 3.14" north northwest of Georgetown. The rain moved into East Texas on the 24th and pretty much moved out of the state late on Christmas Eve. On the 24th the largest rainfall amounts in North Texas were east southeast of Palestine with 2.45", north of Quitman with 2.08", and southwest of Sachse with 1.07". The largest rainfall in Texas was 3.02" at McFadden and 2.58" west of Nederland. On December 24, a daily record rainfall of 1.53" was set at Dallas/Fort Worth. That broke the old record of 1.41" set in 1975.

North Texas Regional Summary (continued)

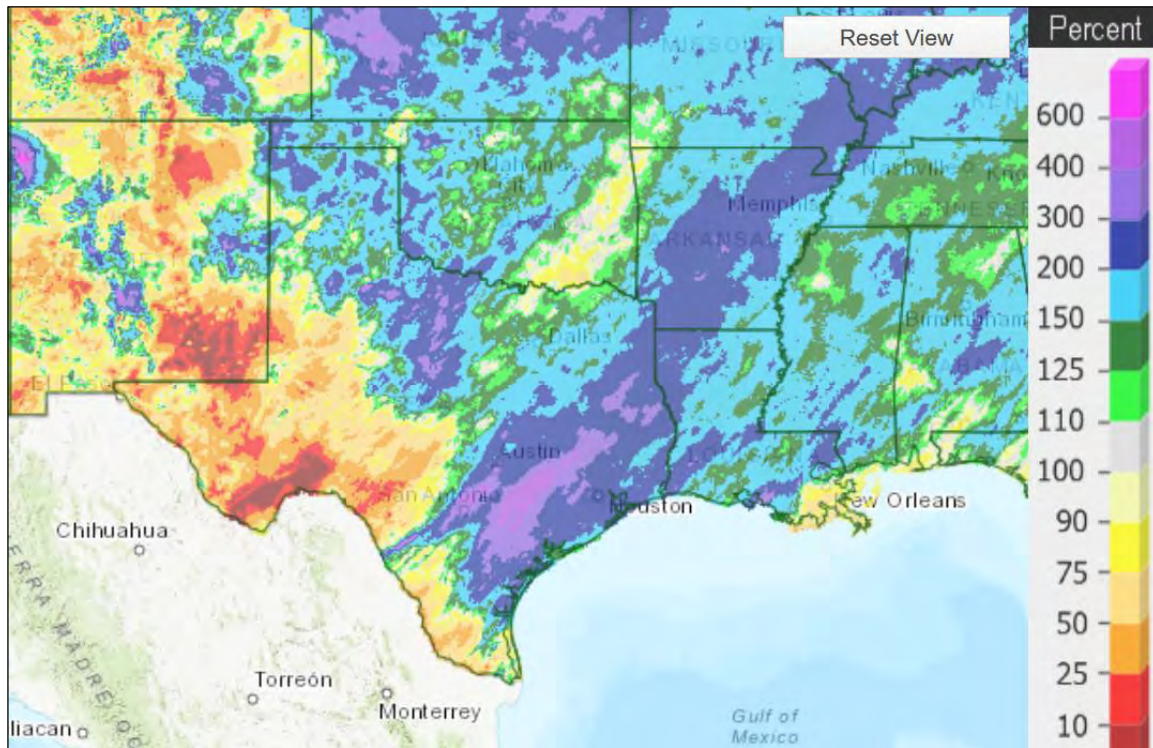


Figure 4: January 2024 Percent of Normal Precipitation map. The dark green, blue and purple colors indicate above normal precipitation; the light yellow and light green colors indicate near normal, while the orange, red and dark red colors indicate below normal precipitation. In January there was above too much above normal precipitation for much of eastern and southern Texas, as well as the western parts of north Texas. Only Southwest Texas had below normal precipitation.

At DFW in January 2024 rainfall was 3.20". The normal amount of precipitation in January is 2.53" so DFW was +0.67" above normal for the month. This included 1.50" of snow, which was also above normal.

In Waco for January 2024 rainfall was 4.55". The normal amount of precipitation in Waco in January is 2.59" so this is +1.96" above normal for the month. This included a Trace of snow.

There were about eight storm systems which affected our weather in January. Here are the highlights of the weather for the month.

January 1:

A cold front moved through Texas early on the morning of the 1st. While no rain occurred over North Texas, a few showers developed over Southeast Texas prior to dawn. The heaviest rainfall was south southwest of Beach City with 1.03" and southwest of Hedwig Village where they observed 0.87".

January 2 - 3:

A rather strong short wave trough moved across Texas. This wave produced fairly widespread rainfall, beginning the morning of the 2nd and continuing through the day. The heaviest rainfall in North Texas was southeast of Midlothian with 1.39" and southwest of Dallas where there was 1.30". Elsewhere in the state the maximum rainfall was 2.60" south southwest of Rockdale and 2.38" northeast of Elgin. The rainfall moved out of the state or dissipated before sunrise on the 3rd.

January 4 - 5:

A large closed low pressure system moved toward Texas from New Mexico late in the day on the 4th. Precipitation began to spread into West Texas on the 4th as the low approached, with snow in parts of the Texas panhandle. Thereafter the precipitation spread across the remainder of the state. The rainfall amounts in North Texas were pretty light and were all under 0.67". But elsewhere in Texas there was 3.20" just east southeast of West Columbia and 2.76" south southeast of Missouri City. The rain moved across East Texas the morning of the 5th and moved out of the state in the afternoon. Residual rainfall amounts on the 5th included 3.56" northeast of Galveston and 2.29" at McFadden.

North Texas Regional Summary (continued)

January 8 - 9:

A deep trough of low pressure formed over the four corners region of the US and moved east. Showers and thunderstorms developed quickly before sunrise on the 8th, then the rain spread eastward over much of the state (with snow and blizzard conditions in the northern Texas panhandle). The heaviest rainfall prior to dawn on the 8th was 1.32" west of Waco and 1.21" west northwest of Clyde. The maximum rainfall amounts during the day on the 8th in North Texas were north of Quitman with 1.45" and south southeast of Plano where 1.00" was measured. Elsewhere in the state, the heaviest rainfall was 2.50" east southeast of Chester and 1.87" just south of Moulton. The precipitation moved out of the state late on the 8th and early on the 9th.

January 11 – 12:

A strong cold front moved across Texas on the 12th. Showers and thunderstorms developed late on the 11th ahead of the front. Due to the speed of the thunderstorms the rainfall amounts were not that heavy. The maximum rainfall amounts were 0.85" north northwest of Josephine and 0.70" at Gilmer. The rainfall moved out of the state before sunrise on the 12th.

January 14 – 15:

Even though the precipitation was very light, a short wave trough brought enough moisture northward over a very cold airmass to produce widespread light wintry precipitation. While snow water equivalent amounts were all less than 0.25", there was 2.3" of snow east southeast of Coppell and 2" near Forney. DFW airport ended up with 1.5" of snow. The precipitation moved out of Texas on the 15th with only light icy conditions remaining.

January 21 – 25:

A series of upper air disturbances moved out of the southwestern US, all of which moved east through this period. The first trough brought rain initially to western Texas the morning of the 21st. The rain greatly increased in areal coverage by the evening of the 21st, and the rainfall intensity also increased especially across central Texas. While rainfall amounts in North Texas were generally less than 0.75", there was substantial rains to our south. The heaviest rain was 5.86" north of New Braunfels and 4.34" north northwest of San Antonio. The majority of the rain from this first storm shifted into northern and eastern Texas on the 22nd, and moved east of Texas by midnight. This first wave of rain was followed by a second round with the next short wave trough after midnight on the 23rd. The maximum rainfall in North Texas on the 22nd was west southwest of Waco with 2.14" and north northeast of Dallas with 1.62". But further south (in Southeast Texas) there was 4.13" in Huntsville and 3.65" southwest of Alto. The rain spread from west to east on the 23rd, and by the morning of the 24th the rain was confined to southern and eastern Texas. While rainfall amounts over North Texas on the 23rd were mostly 1" or less, portions of Southeast Texas were hit hard with flooding rainfall. The maximum amounts were 8.70" north northwest of Brenham and 7.00" northwest of La Grange. This second wave of rain moved into East Texas late on the 24th, but the last short wave trough brought a third wave of rain from west to east across the state. This wave pushed all the rainfall east of Texas on the morning of the 25th. The rainfall in North Texas on the 24th was generally less than 0.50". But again, over Southeast Texas large rainfall amounts were observed. The maximum rainfall was 4.90" north of Montgomery and 3.68" east of La Marque. The rainfall total for the 4-day time frame were truly astounding. There was 14.55" east of Burton, Buckners Creek near Muldoon received 13.06", and Brenham observed 12.92", and just south of La Grange there was 12.60".

January 26 – 27:

An upper atmospheric low pressure system moved across the intermountain west toward the Texas Panhandle on the 26th. As this low approached, showers and a few thunderstorms developed over West Texas the morning of the 26th, with the rain increasing across northern and southeastern Texas as the day progressed. The rain and thunderstorms moved east quite rapidly, and moved east of the state the morning of the 27th as the upper low crossed North Texas. On the 26th the heaviest rain over North Texas was at Scotland where rainfall was 1.96", and north northwest of Arlington received 1.86". The maximum rainfall in Texas was 3.67" north of Orange and 3.28" northwest of Bridge City.

North Texas Regional Summary (continued)

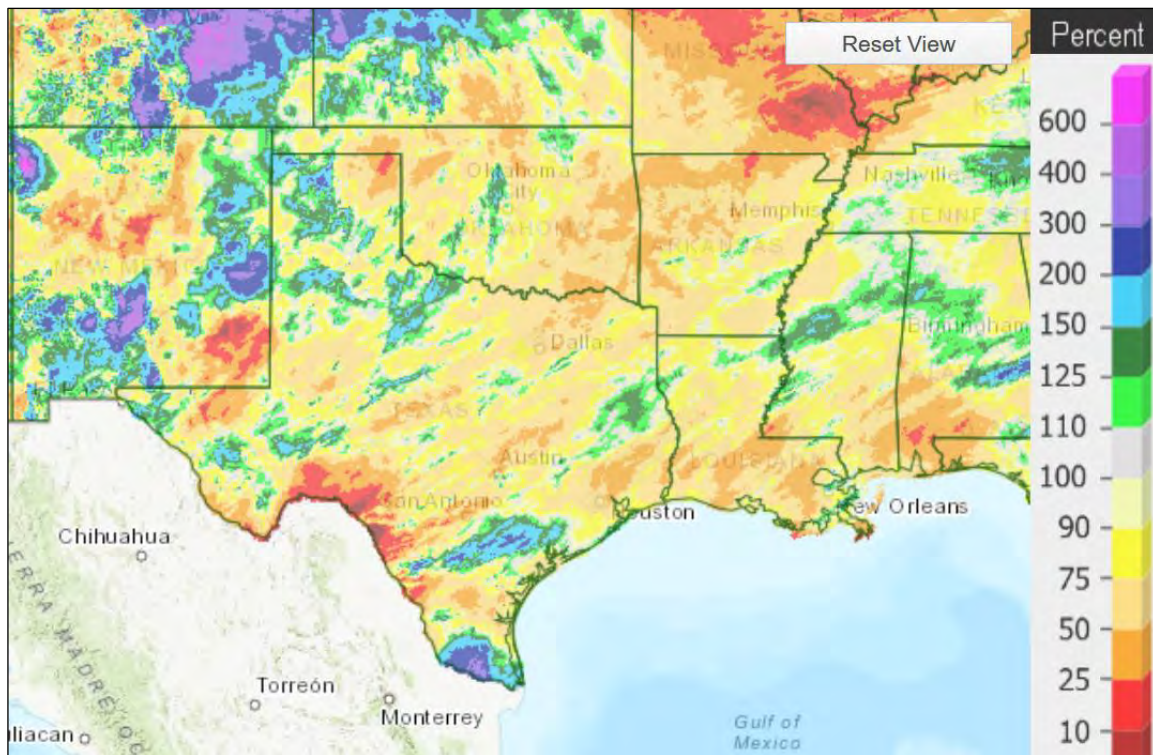


Figure 5: Percent of Normal Precipitation map for February 2024. In February the weather pattern turned drier. Much of Texas had near to below normal precipitation, with only parts of south Texas observing above normal rainfall.

At DFW in February 2024 they received 1.94". The normal amount of precipitation for a leap year February is 2.76" so DFW was -0.82" below normal for the month. In Waco for February 2024, they picked up 1.60". The normal amount of precipitation for February is 2.68" Waco was -1.08" below normal for the month.

There were about four significant storm systems which affected our weather in February. Here are the highlights of the weather for the month.

February 2 - 3:

A rather strong upper level low pressure system moved from New Mexico and the Texas Panhandle to southern Oklahoma during this period and produced showers and thunderstorms, beginning on the 2nd. Over North Texas the heaviest rain was at Hillsboro with 2.48" and at Rosser where they measured 1.73". But over South Texas they received 4.50" south of Cuero and 3.40" east of Trinity. Residual rainfall fell over eastern and southern Texas on the 3rd. The maximum rainfall was 1.06" at Zavalla and 1.02" north of Karnack.

February 9 - 11:

A long wave upper trough began to approach Texas from the west. Ahead of this trough, showers and thunderstorms developed the afternoon of the 9th from central into Northeast Texas. The rain became widespread overnight on the 9th into the 10th, then the rain worked its way eastward through the day on the 10th. The heaviest rainfall on the 9th over North Texas was northeast of Cottonwood with 1.36" and at Wills Point with 1.17". But over South Texas 2.37" was measured west of Uvalde and 2.20" measured east northeast of Utopia. As the upper level storm deepened over New Mexico late on the 10th the first wave of rain moved east, but a new area of showers and thunderstorms formed over West Texas. This rain spread east early on the 11th, with snow over the Texas Panhandle. The heaviest rainfall over North Texas on the 10th was northwest of Blum with 2.41" and southwest of Powell with 2.27". The maximum rain in the state was 3.95" at Dreka and 3.87" northeast of Nacogdoches. The showers and thunderstorms moved east of the state late in the day on the 11th, but light precipitation continued over North Texas. The majority of the light precipitation ended before sunrise on the 12th. Residual precipitation on the 11th was mostly less than 1" over North Texas. But over East Texas there was 1.98" at Longview and 1.78" at Newton.

North Texas Regional Summary (continued)

February 15 - 17:

A short wave trough moved across South Texas during this period. Showers broke out ahead of this storm and produced some rain across South and Southeast Texas. While no rainfall occurred over North Texas, on the 15th rainfall was 2.40" at Edinburg and was 2.32" north of La Joya. Then on the 16th 1.73" fell near Brownsville and 1.50" fell at Buena Vista. The rain decreased and moved out of the state on the 17th as a strong cold front cleared the state. Residual rainfall over Deep South Texas was all under 0.50".

February 28 - 29:

An upper air disturbance moved out of Arizona into the Texas Panhandle during this period. Some rainfall developed late on the 28th over Southwest Texas, and this rain (and some snow over the panhandle) spread over much of the state on the 29th. On the 28th and into the early morning hours of the 29th, the maximum rainfall in Texas was 1.13" south southeast of Fort Davis and 1.08" west southwest of Alpine. During the day on the 29th the heaviest rainfall was 0.69" northwest of Springtown and 0.56" at Mineral Wells. Some light residual precipitation continued into the 1st of March over southern and eastern Texas before moving out of the state, but the measured amounts were very small.

For the winter season, DFW received 8.69" of precipitation. The normal amount for winter is 8.13" so this is +0.56" above normal for the season. This included 1.5" of snow (the normal amount for a winter season is 1.3"). For the winter season in Waco, there was 9.29" of precipitation. The normal amount in winter is 8.14" so this is +1.15" above normal for the season. This included a Trace of snow (normal winter snowfall in Waco is 0.4").

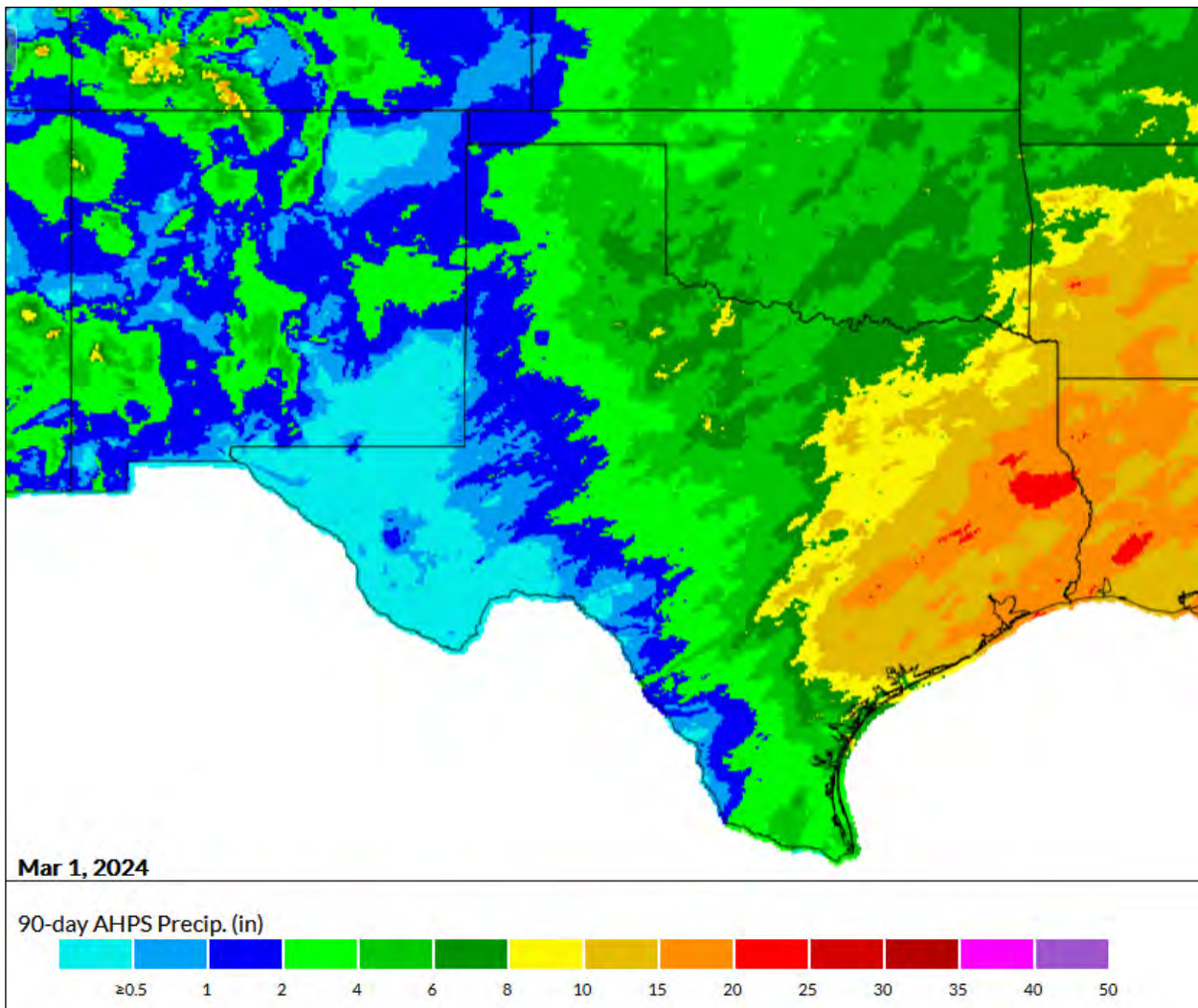


Figure 6: Winter Season Observed Precipitation map for 2023-24. The brown, orange and bright red colors indicate the largest precipitation totals, while the light green and blue colors show the lightest amounts.

North Texas Regional Summary (continued)

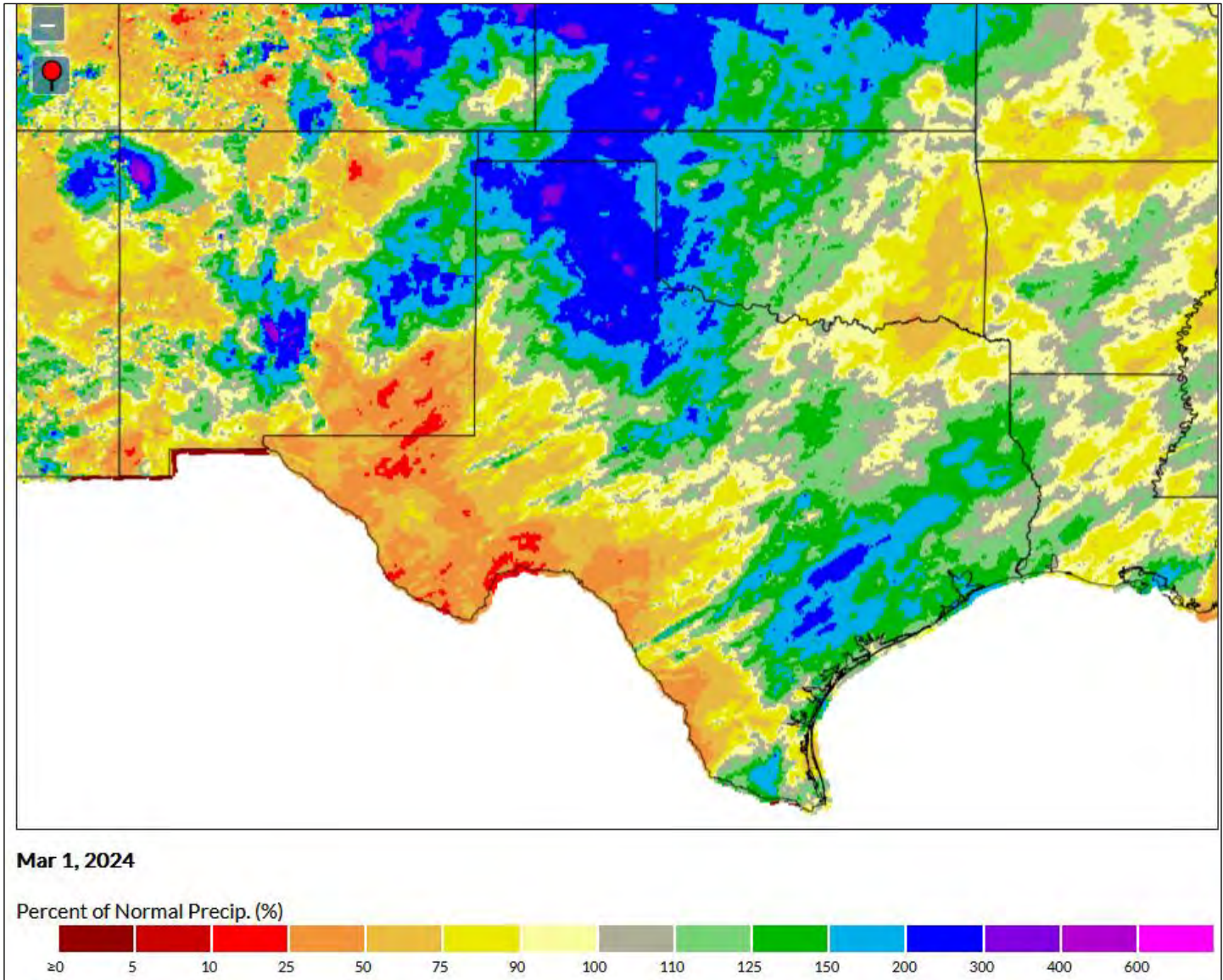


Figure 7: Percent of Normal Precipitation map for winter 2023-24. The purple, blue and dark green colors indicate above normal precipitation. The brown, orange and red colors indicate below normal amounts. It was a wet winter for the Texas Panhandle and down to the western parts of North Texas. Also it was wet over parts of East and Southeast Texas. The only severely dry location over this past winter was Southwest Texas.

North Texas Regional Summary (continued)

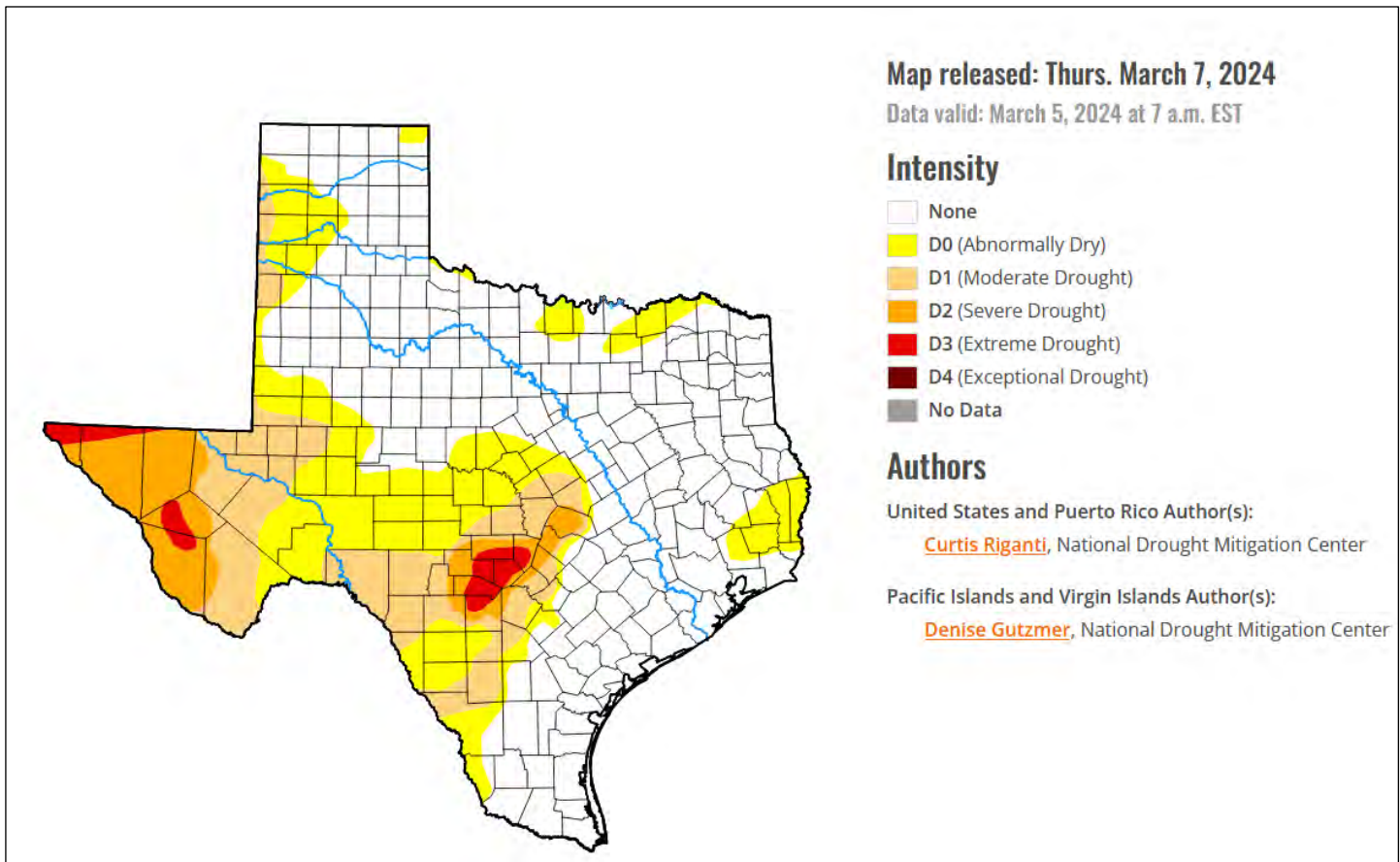


Figure 8: Current Drought Monitor for Texas as of March 7. The results of the wet weather of the past three months show up well on this drought monitor.

There are more parts of Texas that are free from drought now than there were three months ago, and a little over half of the state is free from any drought category. About 44% of the state is still experiencing abnormally dry conditions or worse. But no locations are experiencing the worst exceptional drought category. Much of West Texas continues to be in moderate to extreme drought, while Central Texas over the Hill Country is also in moderate to extreme drought. Overall, North Texas is free from drought.

Thanks again for your dedication in making all your weather observations! I'd like to share a few reminders in closing. First, on days you are not home or unable to report your 24-hour rainfall observation for any reason, you can make a multi-day accumulation report upon your return. There is now a link on the CoCoRaHS reporting page you can use for this purpose. Second, all CoCoRaHS data is quality controlled each day. The intent is for us to recognize reporting errors that may occur. So, one of us may contact you one day in case we have any question about one of your reports. If you have difficulty making your observations or have questions on how to report them, please feel free to contact me or your county coordinator. Third, your rainfall reports are used every day. As one example, CoCoRaHS data is incorporated by the National Weather Service at the West Gulf River Forecast Center for use in their soil moisture accounting flood forecasting models. So please continue to submit your reports. The more rainfall reports that our collected, the better the chances are of determining the highest rainfall totals during rainfall events. And on the flip side, with your zero reports it is easier to determine the exact location of drought when it doesn't rain. We appreciate it when you report zero rainfall daily on the dry days.

Thanks to all of you, and have a great spring season!

Corpus Christi Regional Summary

Slightly Above Average Rainfall for the Winter 2024

By: Nicholas Price, Meteorologist, NWS Corpus Christi

The winter season began well below average for rainfall. Typically, El Niño means cooler than average temperatures and above normal precipitation for Texas. This wasn't the case, as rainfall totals were down, due to below normal moisture and above normal temperatures. This lasted until January when the El Niño pattern weakened from a historic value of just over 2°C ONI (Oceanic Niño Index). Though the El Niño weakened, its effects on South Texas were felt considerably more in January with above normal rainfall totals for the month. February featured drier conditions for much of the region, excluding the northern portion of the Brush Country and Victoria Crossroads.

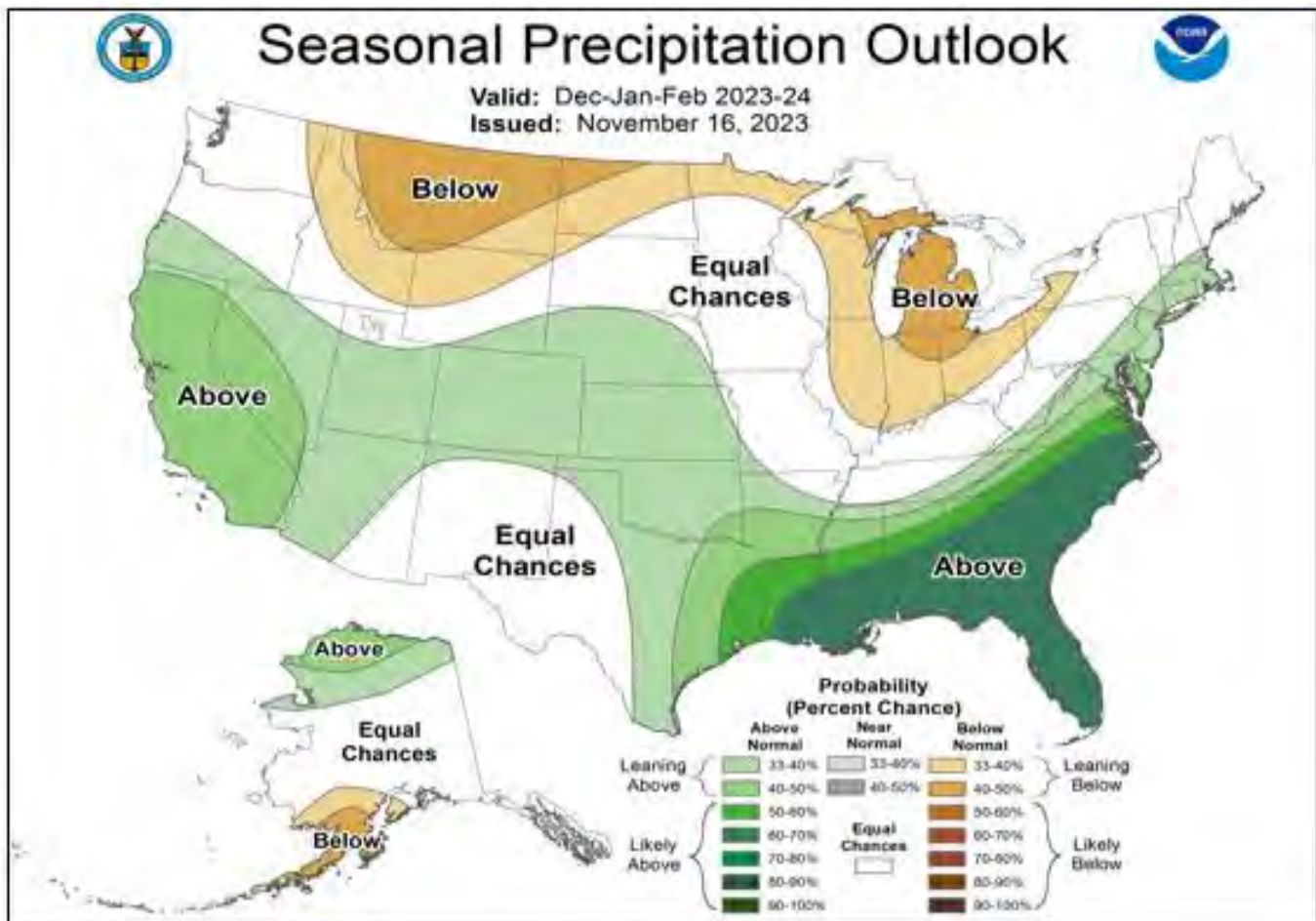


Figure 1: NOAA Climate Prediction Center Seasonal Precipitation Outlook for winter 2024.

The majority of South Texas saw below to well below rainfall totals for the month of December. Most of the rain fell due to a series of short-wave troughs in conjunction with ample moisture around the 13th of the month. The highest rainfall totals were in portions of the Coastal Plains and Victoria Crossroads where just over 1" fell in Alice, TX and just over 1.5" fell in Port Lavaca, TX. Much of the Brush Country and Coastal Plains saw well below their rainfall totals for this time of year, with Encinal only seeing 0.10" of rain for the entire month. Areas to the east received slightly more rainfall, their deficits were still about 1". The region struggled to reach 1" of precipitation across the area, as it remained pretty warm through the month with temperatures in the 70s and 80s. Ensemble models portrayed a 60% chance that precipitation would be at or below normal for the month of December. Those models also showed much of the area staying below 1" for PWAT values for much of the month outside of the 13th-15th.

Corpus Christi Regional Summary (continued)

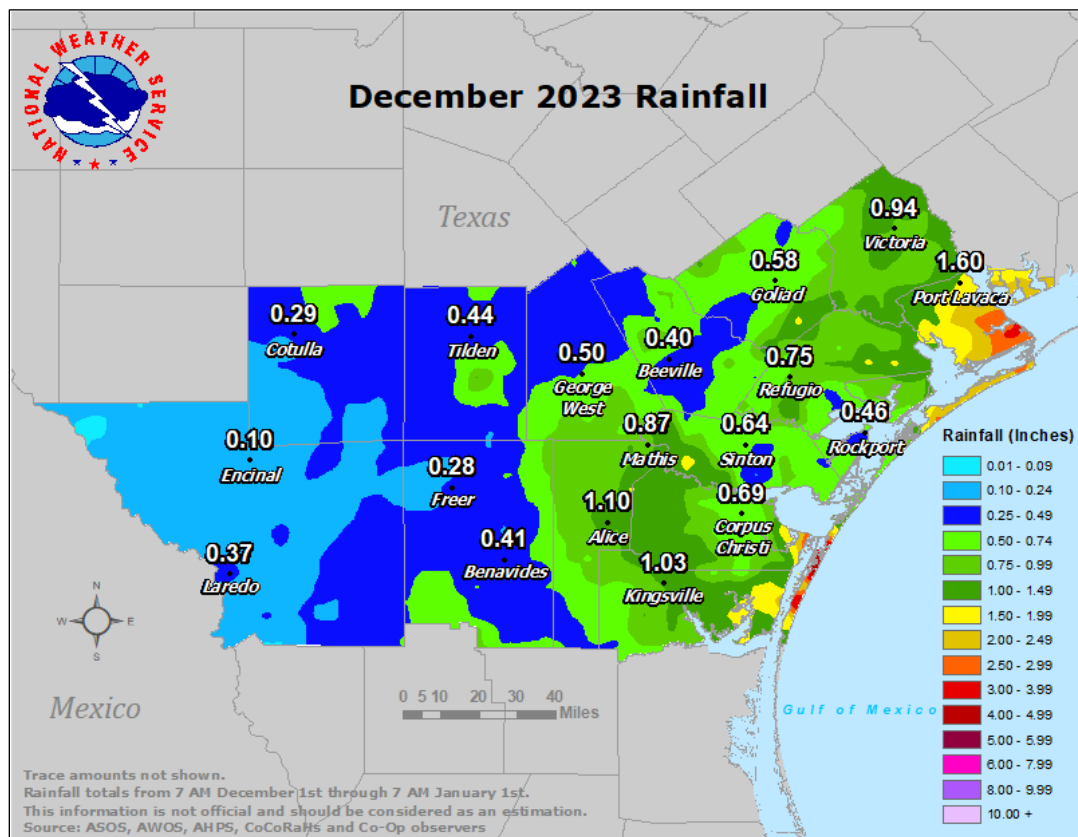


Figure 2: December 2023 Estimated Rainfall Totals

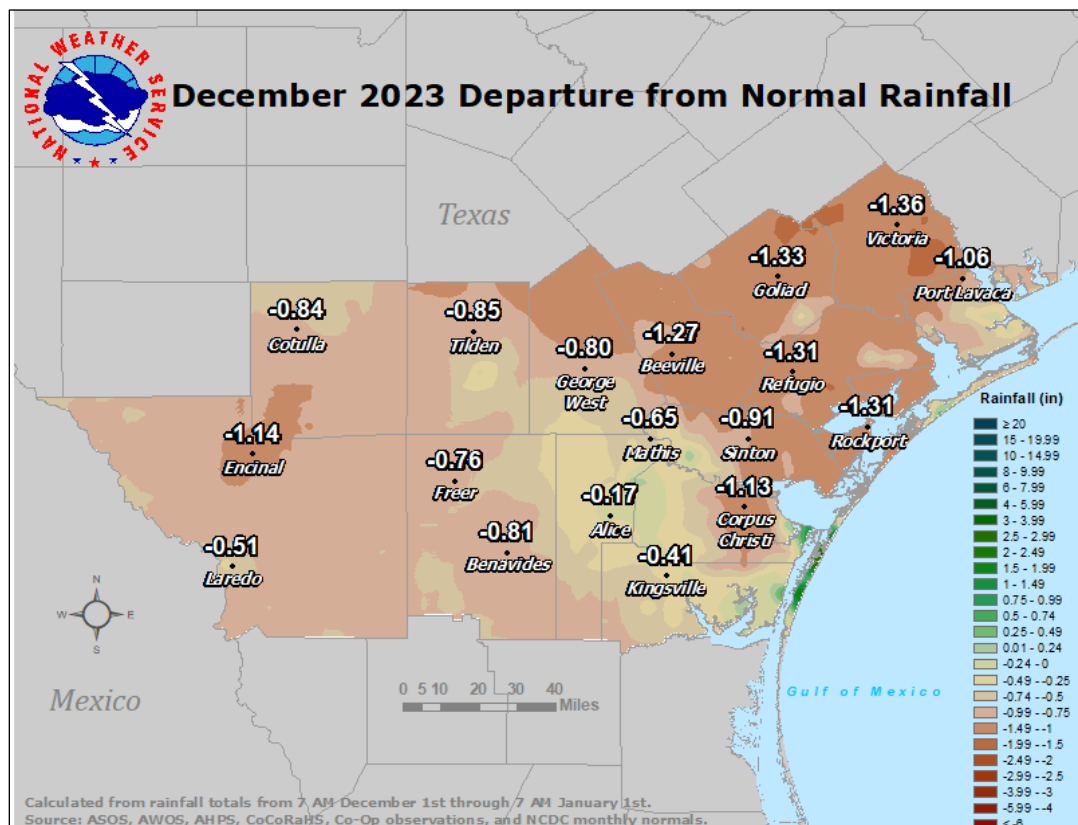


Figure 3: December 2023 Estimated Departure from Normal Rainfall

Corpus Christi Regional Summary (continued)

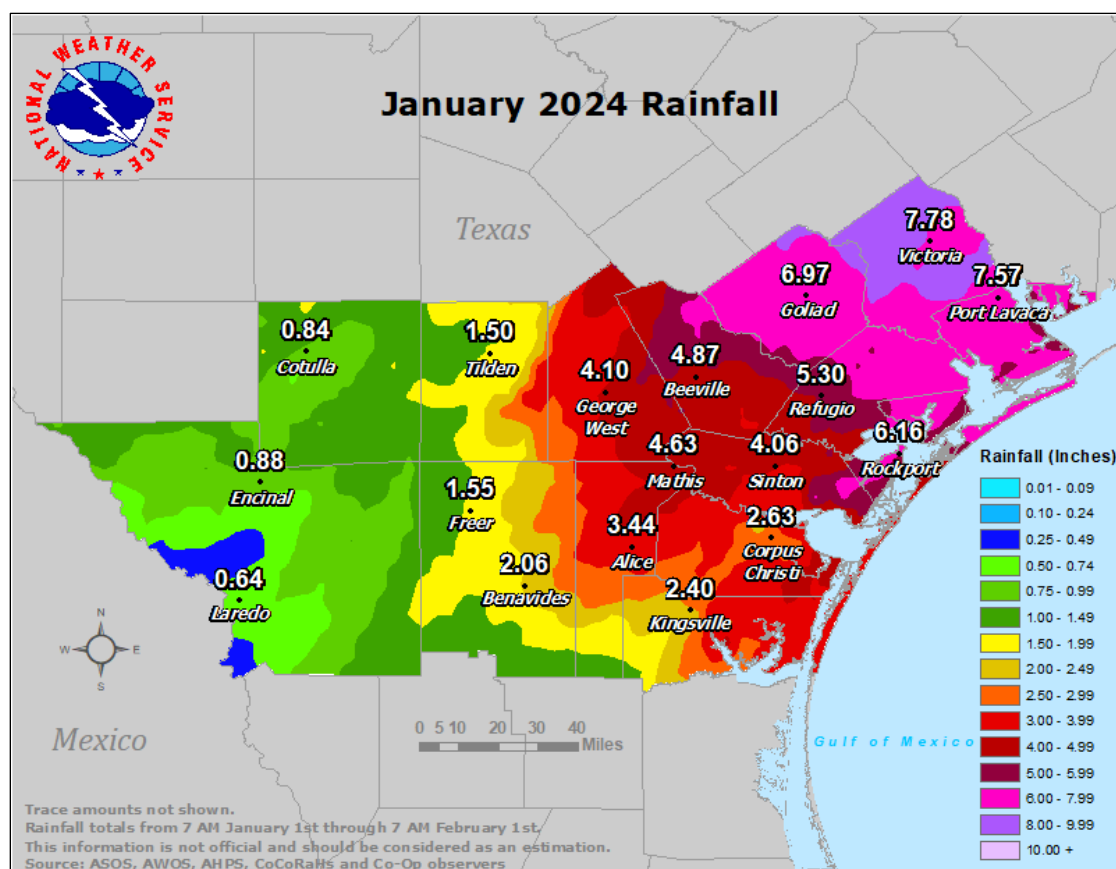


Figure 4: January 2024 Estimated Rainfall Totals

January followed a more typical El Niño pattern with, above normal rainfall totals across much of the CWA. South Texas saw this above normal rain due to an active southern storm track associated with the mature El Niño pattern. The majority of the rainfall fell in the Victoria Crossroads and northwestern portions of the Coastal Bend. Victoria saw just under 8" with Port Lavaca seeing around 7.5". Areas east of Alice and George West weren't as fortunate, as they experienced marginally above or just below normal rainfall for the month. The brunt of the rain fell later in the month, due to midlevel short wave interacting with a coastal trough during the 22nd and 24th. This prompted the Weather Prediction Center to put areas around the Victoria Crossroads in a Slight Risk for Excessive Rainfall on the 22nd. These showers and storms lasted through Wednesday (January 24th). Due to the training of storms on already saturated soils, a Flash Flood Watch was also issued through Thursday morning. During the 22nd and the 24th alone the Victoria saw a staggering 5.5" which is a full 3" above the normal rainfall over the area for January. Areas to the west didn't see as much rain and came in just shy of their normal rainfall for the month. Encinal and Cotulla saw around -0.40" departure from normal rainfall. Areas like Freer, Benavides, Tilden, and Kingsville received just above normal rainfall. The overall story of the month was that rain was plentiful in the Coastal Plains and Victoria Crossroads while the Brush Country experienced abnormally dry conditions per the U.S. Drought Monitor (Figure 5). Majority of the winter season's rainfall fell during the month of January alone!

Corpus Christi Regional Summary (continued)

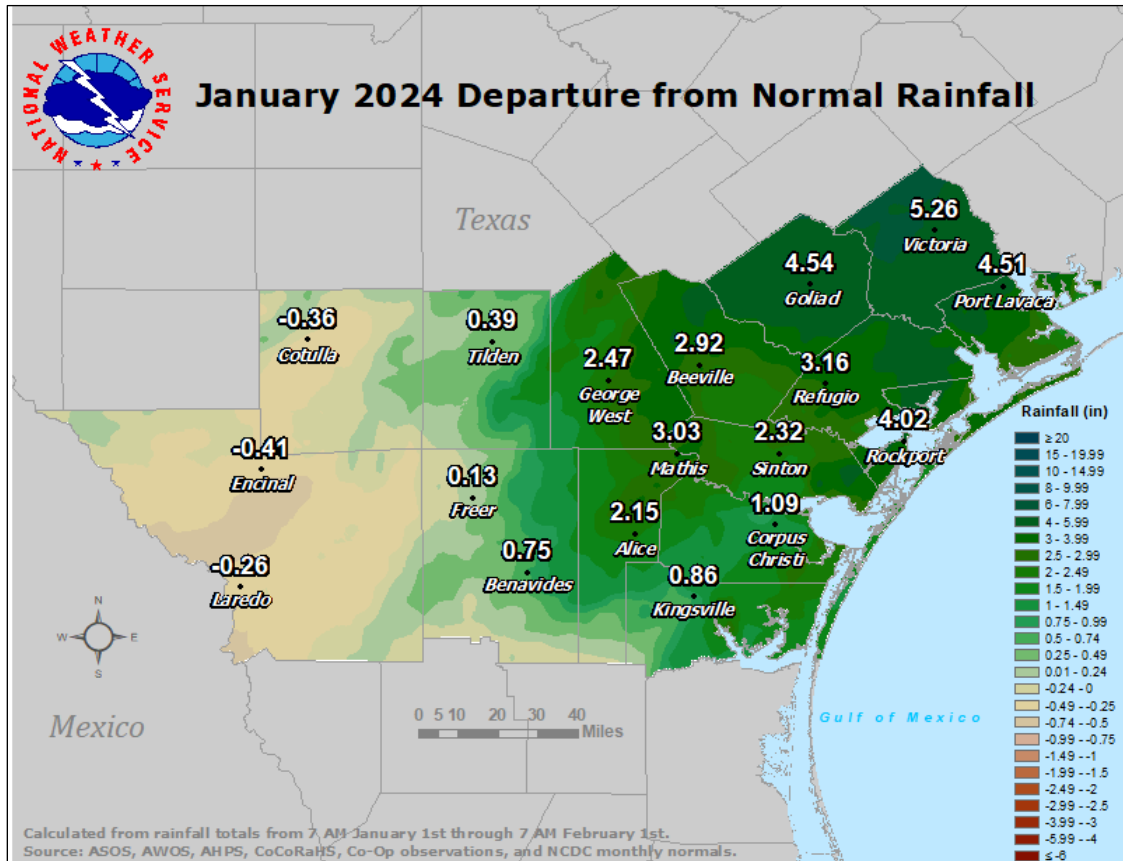


Figure 5: January 2024 Departure from Normal rainfall

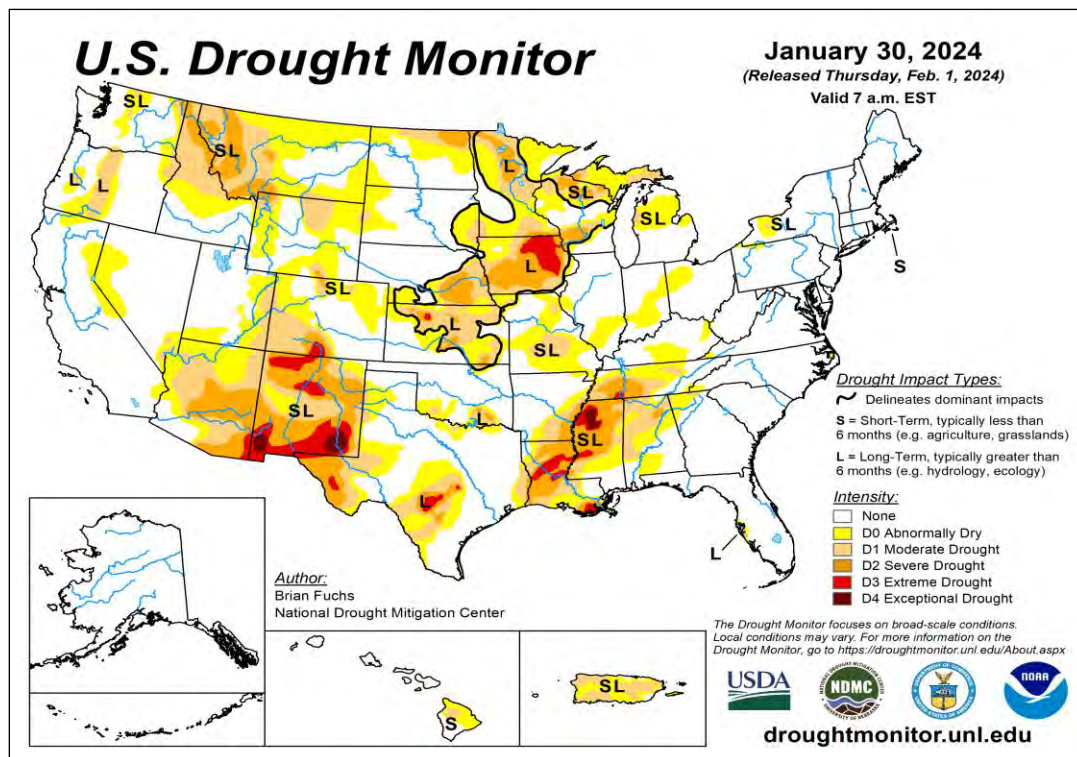


Figure 6: U.S. Drought Monitor Summary for the month of January

Corpus Christi Regional Summary (continued)

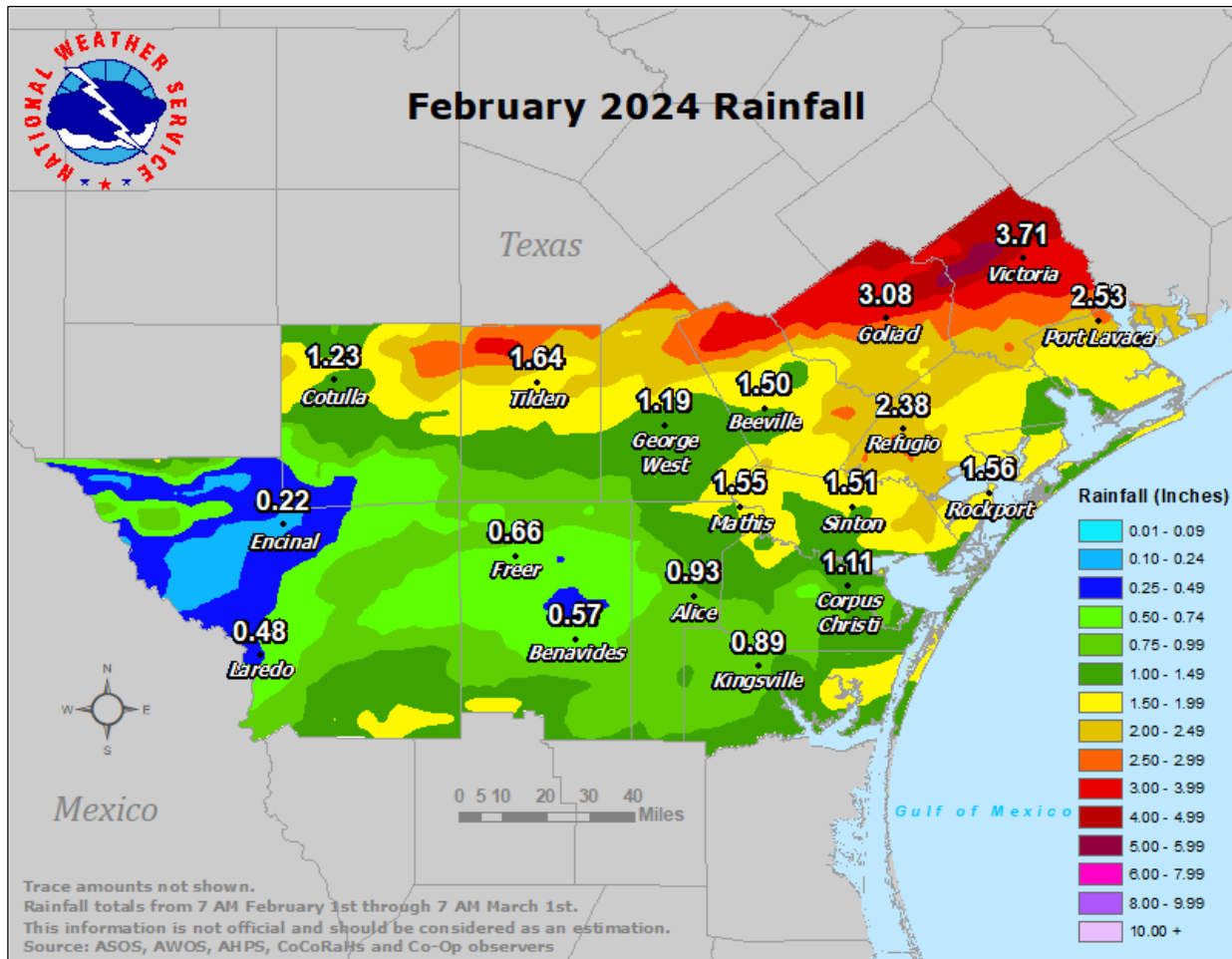


Figure 7: February 2024 Estimated Rainfall Totals

In the month of February, the trend of below normal rainfall, was similar to December except for the northern portions of the CWA. The heaviest rain fell earlier in the month across the Victoria Crossroads. Which was due a Pacific cold front pushing through South Texas on the 2nd of the month. There was ample moisture in the area coupled with efficient upper level support, which was a driving factor for multiple rounds of storms. The Storm Prediction Center had the CWA in a Marginal Risk for severe weather, while the Weather Prediction Center had the eastern portions of the CWA in a Marginal Risk for excessive rainfall. Some areas in the Victoria Crossroads saw around 2-3 inches with isolated locations seeing close to 5 inches. There were a few upper level disturbances that contributed to some more rainfall across the Southern Plains and Victoria Crossroads around the middle of the month. Amounts totaled to under a half an inch. Regardless of the fact that northern portions of the Brush Country and Victoria Crossroads saw a lot of rainfall, much of the area still received below normal rainfall for the month. Last month's abnormally dry conditions were attributed to the lower than normal rainfall amounts, with departure from normal amounts ranging from 0.00 at Refugio to -0.99 at Benavides. Portions of Webb and La Salle Counties are experiencing Moderate Drought conditions. For the remaining portions of Webb County abnormally dry conditions are persisting and have expanded slightly east since the previous month

Corpus Christi Regional Summary (continued)

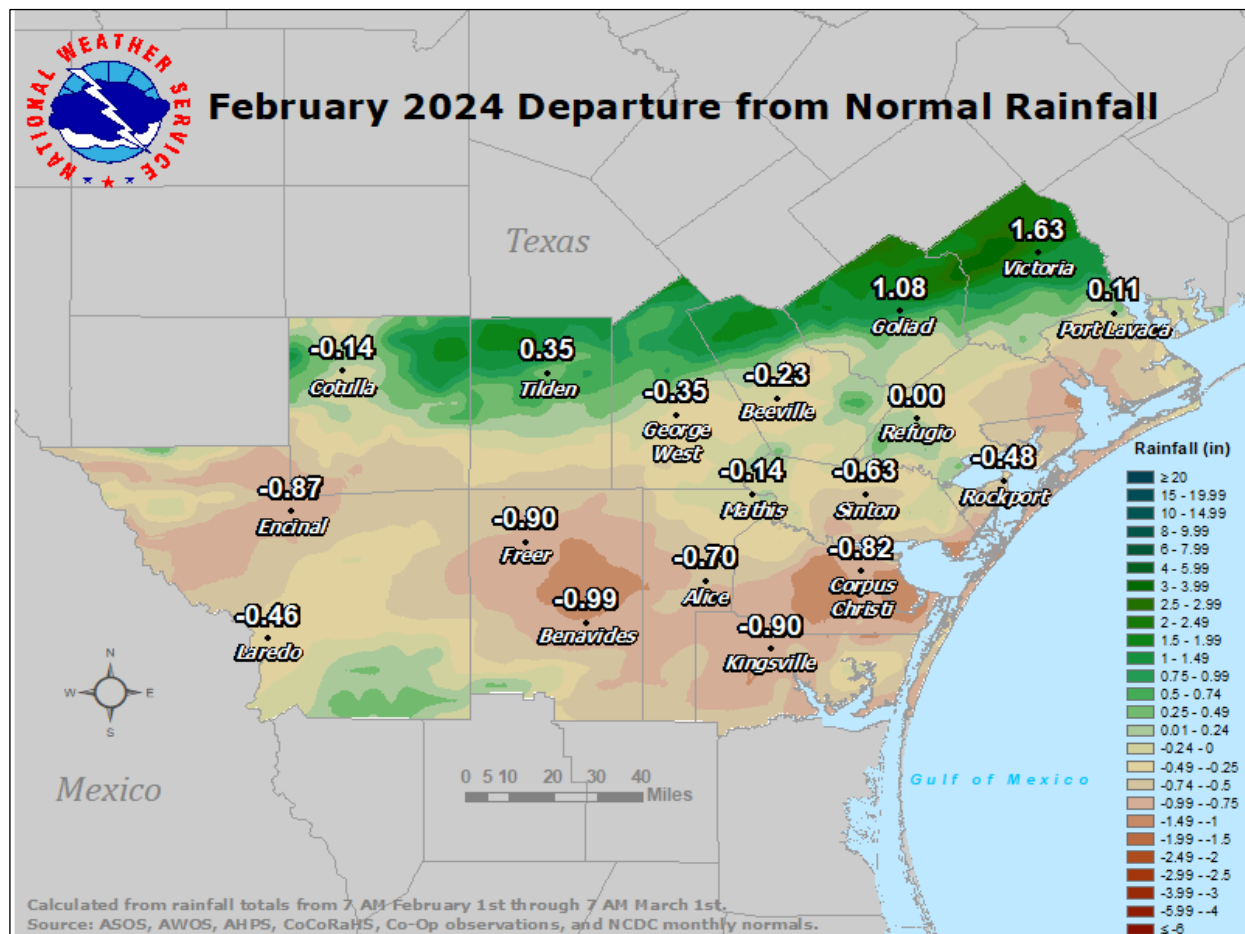


Figure 8: February 2024 Departure from Normal rainfall

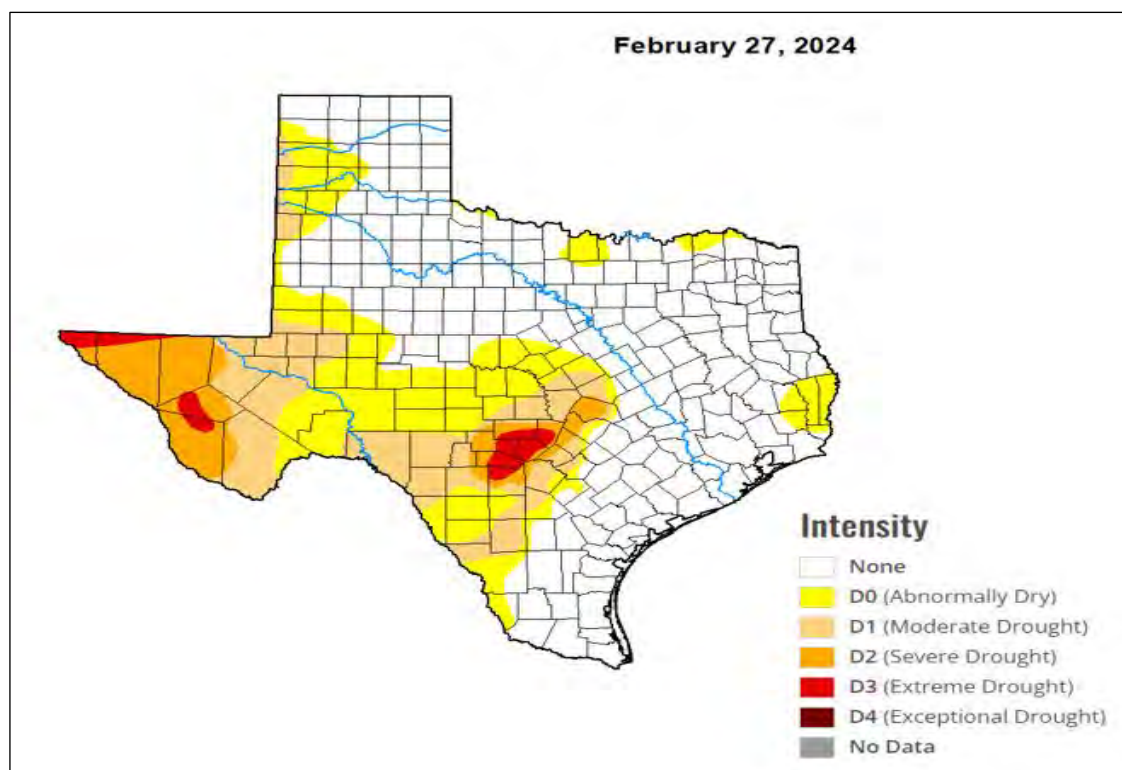


Figure 9: U.S. Drought Monitor Summary for the month of February

Rio Grande Valley Regional Summary

Winter 2023/2024 Weather Story for the Rio Grande Valley: Quiet Start, Frozen Middle, Wet End

By Barry Goldsmith

Warning Coordination Meteorologist
NWS Brownsville/Rio Grande Valley

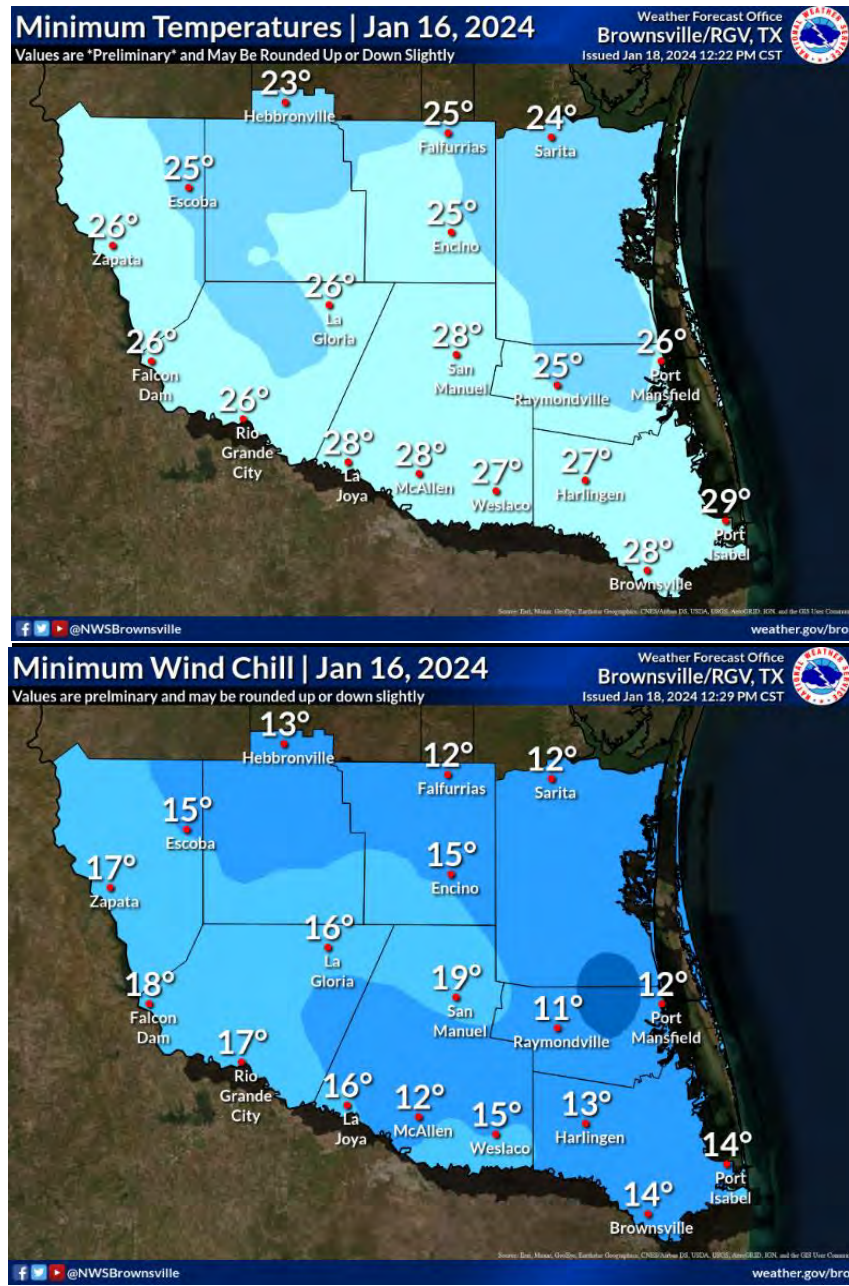


Figure 1. The memorable event from winter 2023/2024 was the coldest temperatures and “feels like” temperatures in mid-January, bottoming out on January 16th, with the coldest levels since February 15th, 2021

Rio Grande Valley Regional Summary (continued)

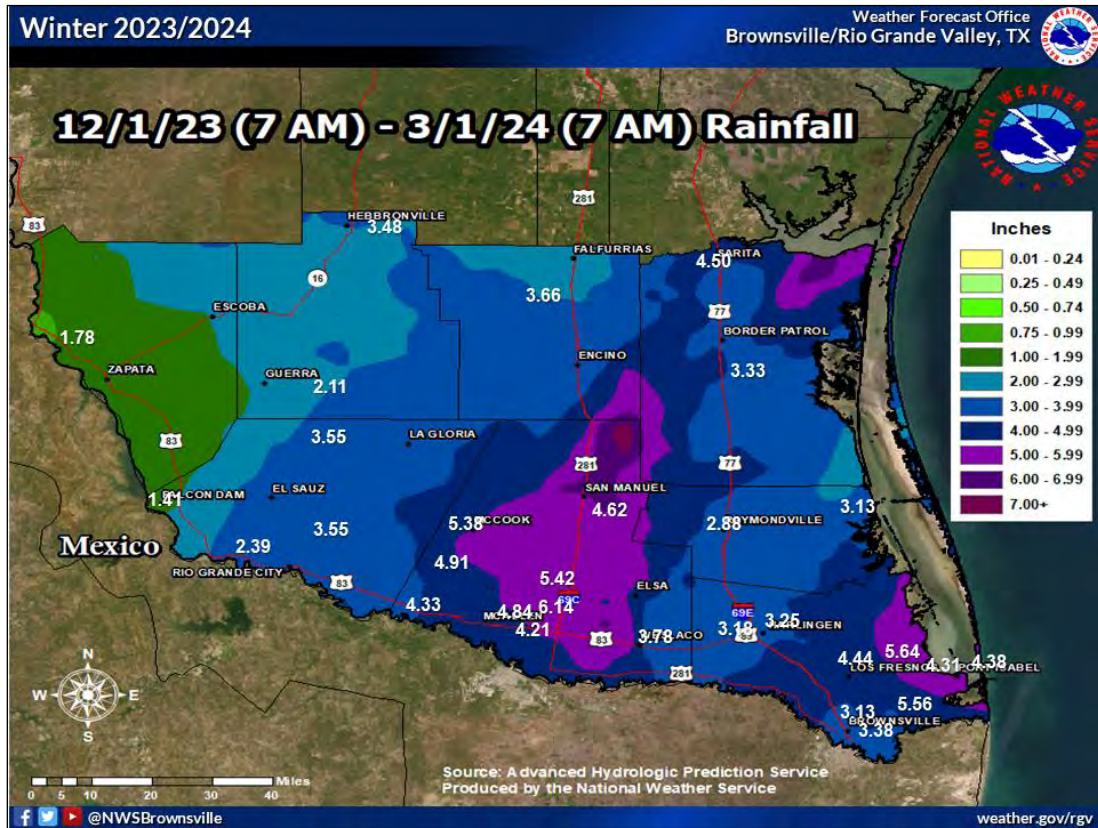


Figure 2. Total rainfall for December 1 2023 through February 29, 2024. The Rio Grande Plains remained on the dry side, while the Brooks/Hidalgo County area were winners, especially with the one heavy rain event of the season in mid-February. Periodic rains near the coast in December and January pushed numbers up in Cameron County.

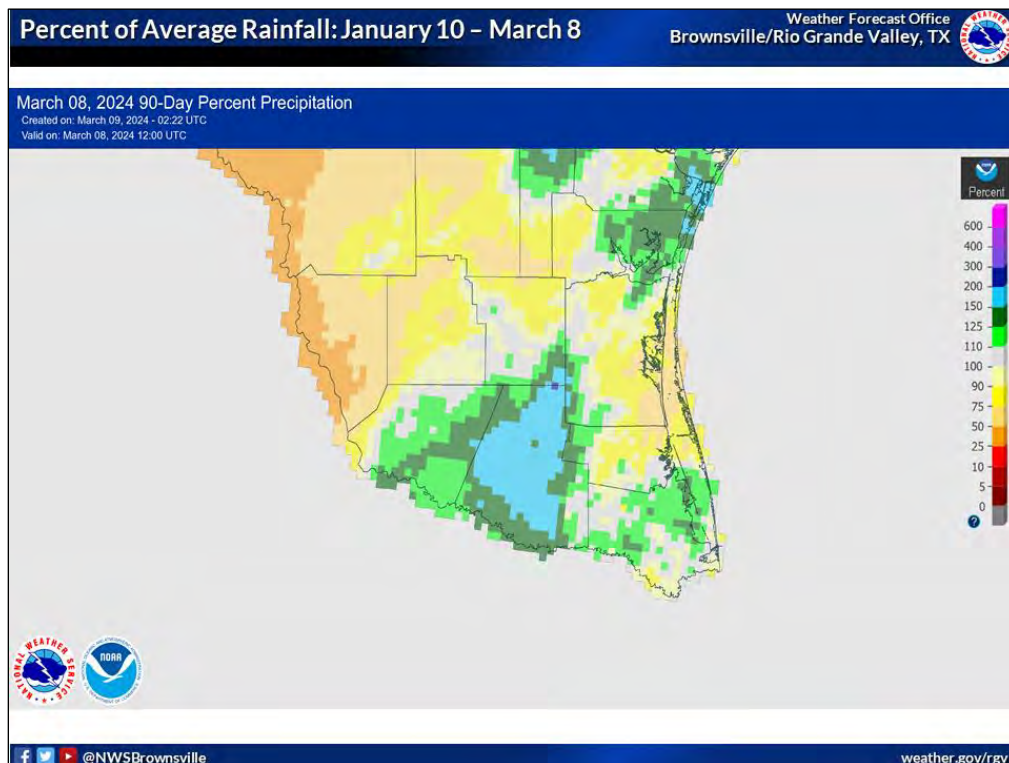


Figure 3: 90-day rainfall from December 10, 2023, through March 8, 2024. The aforementioned heavy rain event in mid-February showed up with 150 to 200 percent of average rain across most of Hidalgo County. Lacking a bit were Brooks and Jim Hogg, as well as parts of Willacy and Kenedy. Zapata saw 25 to 50% of average, which returned abnormal dryness there.

Rio Grande Valley Regional Summary (continued)

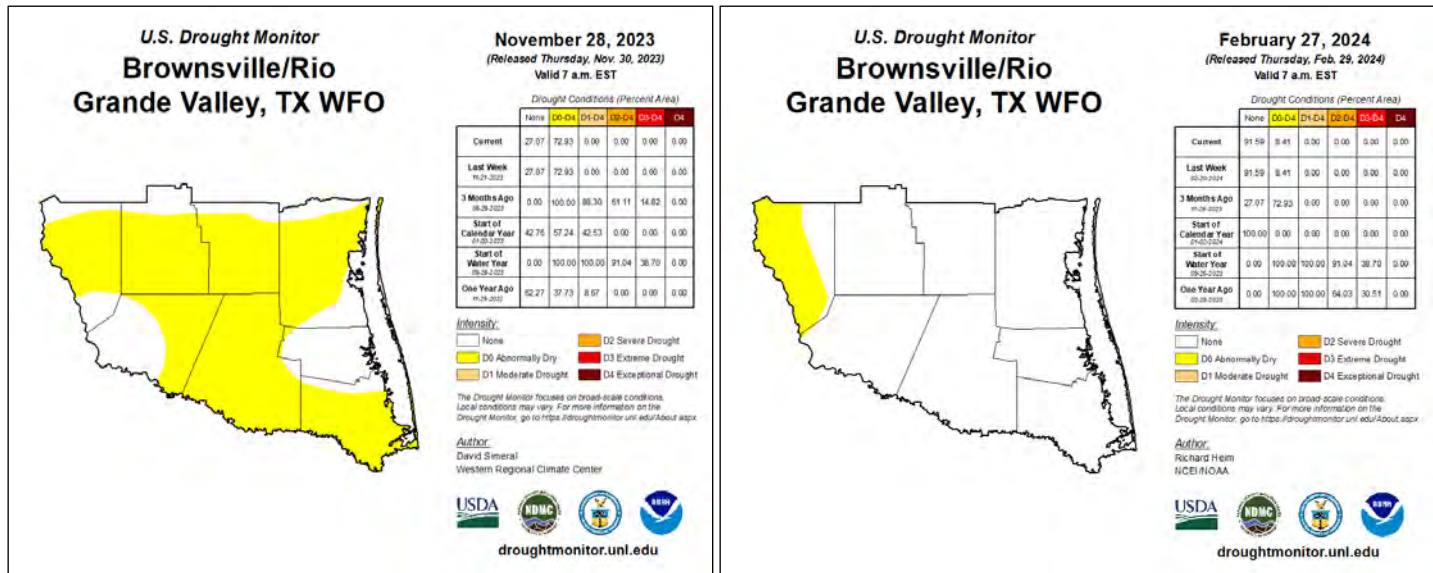


Figure 4: Area-wide abnormal dryness to begin December would be removed soon after, and continue into mid-January before dryness returned across the Rio Grande Plains and nudging into western Jim Hogg/Starr County by mid-February, before helpful rains pulled back the drought back to Zapata to close the season.

Month-by-Month Summary

December was non-descript across the Lower Rio Grande Valley, with temperatures ending up about 1 to 2.5 degrees above average and rainfall 25 to 75 percent of average for all but a few locations, including the immediate Cameron County coast (a little above average), a section of Brooks County (100 to 150 percent of average), and Zapata County (little to no rainfall). The warm average was set during the first nine days of the month; alternating modest cooling and warming only modified the departure closer to average – but still above. Much of the month was rain-free, but an upper-level disturbance moving through the southwest U.S. combined with broad easterly low level flow to bring generally light rainfall from the 13th through 15th – heaviest along the coast. The same flow pattern pushed ocean water toward or just into the dunes on South Padre Island at high tide late on the 14th and 15th.

Rio Grande Valley Regional Summary (continued)

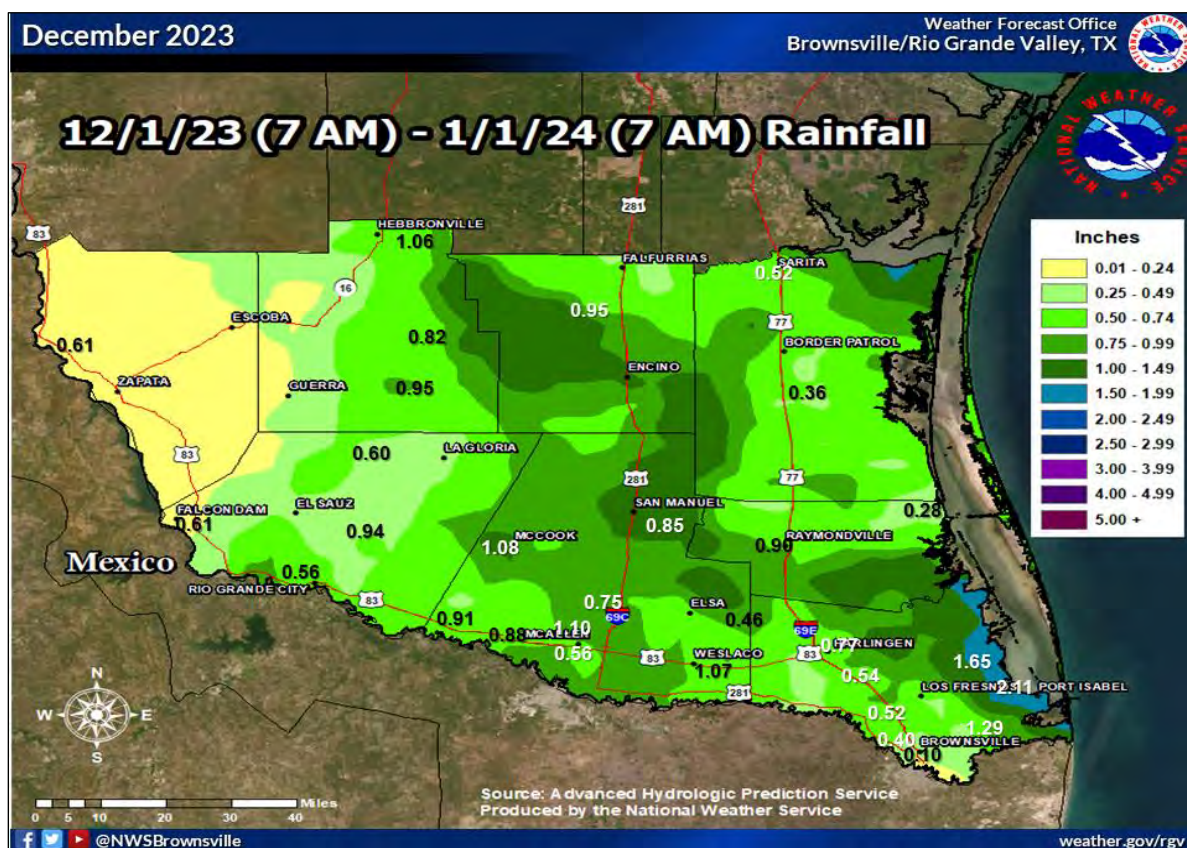


Figure 5: Radar estimated rainfall, with a combination of CoCoRaHS, NWS, and FAA, and Texas Mesonet platform values overlaid, for December 2023 across the Lower Rio Grande Valley and Deep South Texas ranchlands.

The weather script changed in **January 2024**. After a pleasant start to the New Year, a minor banded rain event dropped 0.25" to more than 0.5" in eastern Cameron County early on the 5th. A few days later, a vigorous upper-level disturbance moved into West Texas. A deepening trough of low pressure slid into the Lower Valley, while relative high pressure remained over the western Gulf. The difference between these systems produced screaming gradient southerly winds across Cameron and Willacy County during the late morning through late afternoon of the 8th, with gusts peaking at hurricane force (74 mph) in Brownsville, and 55 mph in Harlingen. Fair and near-average (temperature) conditions followed for the next week, before the second hard freeze in a little more than a year descended on the entire region.

A piece of the circumpolar vortex (which flows around the north pole year-round) broke away and moved southeastward from the Arctic Circle (Canadian Northwest Territories) beginning around the 10th of the month, then continued across the Big Sky country before turning east, with the "breakaway" arctic system covering most of southern Canada and the northern tier of the USA (Figure 6). Two waves of frigid surface high pressure with source air in the Arctic ripped southeastward, and by the morning of the 15th, had reached the Lower Valley. Subfreezing temperatures reached all but the immediate coast that morning, and light freezing precipitation (freezing rain and sleet, assumed) joined the party across some areas.

A hard freeze (below 28 degrees for at least 2 hours) reached Kenedy, Brooks, and Jim Hogg County on the 15th. A second wave of surface high pressure followed during the overnight of the 15th/16th, and a widespread hard freeze occurred in nearly all areas; even South Padre Island fell in to the upper 20s. Clearing skies on the afternoon of the 16th set the stage for a radiational hard freeze from late on the 16th through mid-morning of the 17th, with some locations of the Rio Grande Plains falling into the upper teens. Eastern Cameron County was spared a third morning of freezing temperatures as cloud cover held values in the mid to upper 30s. Details of this event can be found [here](#).

Rio Grande Valley Regional Summary (continued)

After a brief warmup, another front returned the chill to the Lower Valley by the 19th, and the month's most prominent region-wide rain followed as southwest flow well above the surface helped to develop weak low pressure along the Lower Texas coast, with the forcing providing the necessary lift for light to moderate rainfall between the 20th and 22nd. Much heavier rain, and even some flooding, occurred along and inland from the middle and upper Texas coast. For far South Texas, these rains pushed monthly totals to or just above average in a few pockets, including northern Kenedy, northeast Hidalgo, northern Brooks/Jim Hogg, and much of Cameron. Unfortunately, other locations in the Brush Country and Rio Grande Plains either missed the action between the 20th and 22nd, or saw little to no additional rainfall at other times during January, leaving their monthly averages at 25 to 75 percent of the 1991-2020 average. Figure 7 shows the total rainfall for January 2024.

The three-morning freeze (January 15-17), followed by the three-day chill (January 19-21), was enough to tip the temperature scales into below average territory – but enough warm periods at other times kept the departure in check, generally ending at 1 to 2 degrees below the 1991-2020 average.

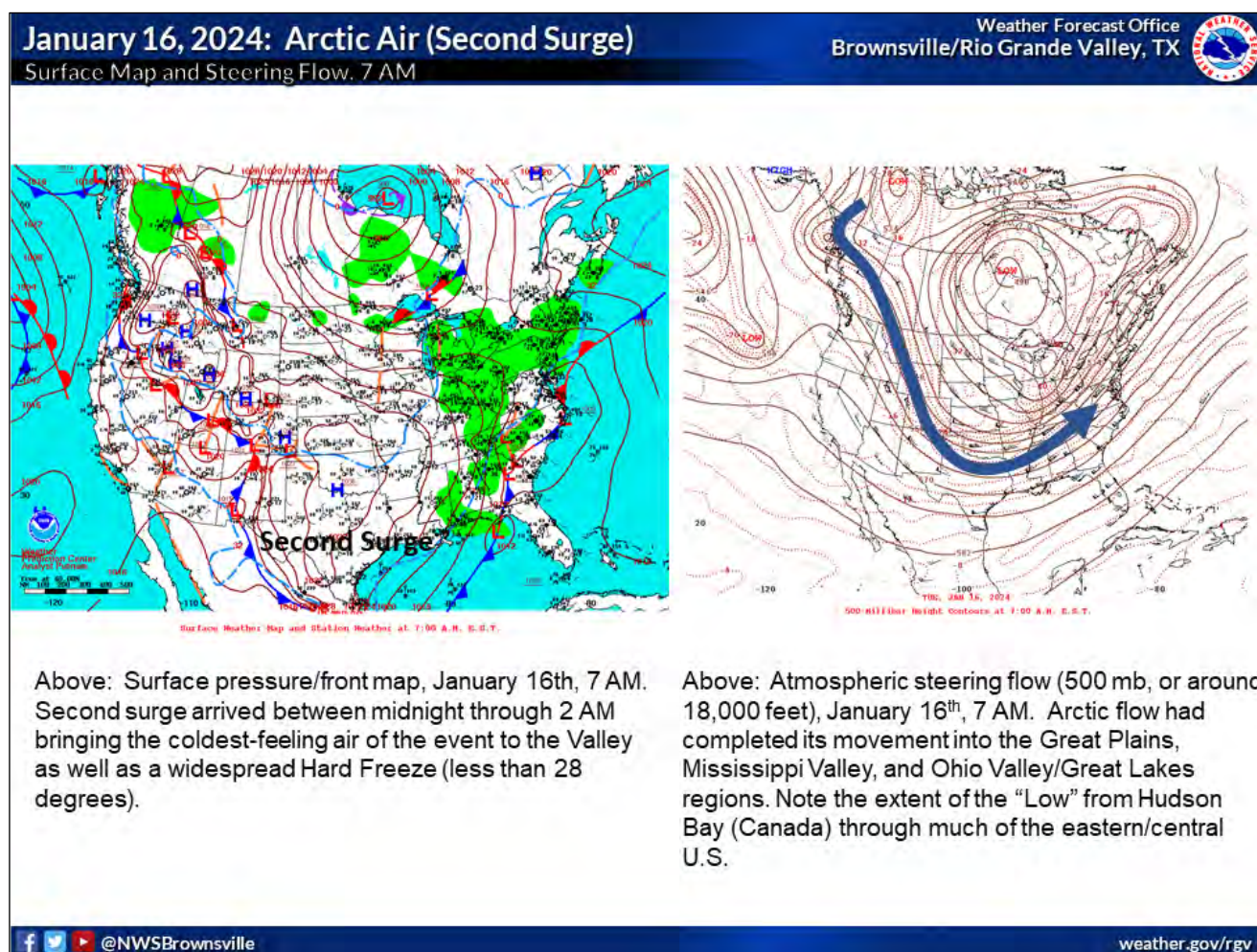


Figure 6: Surface pressure pattern (left) and 500 mb flow pattern (right) at 7 AM, January 16th, 2024.

Rio Grande Valley Regional Summary (continued)

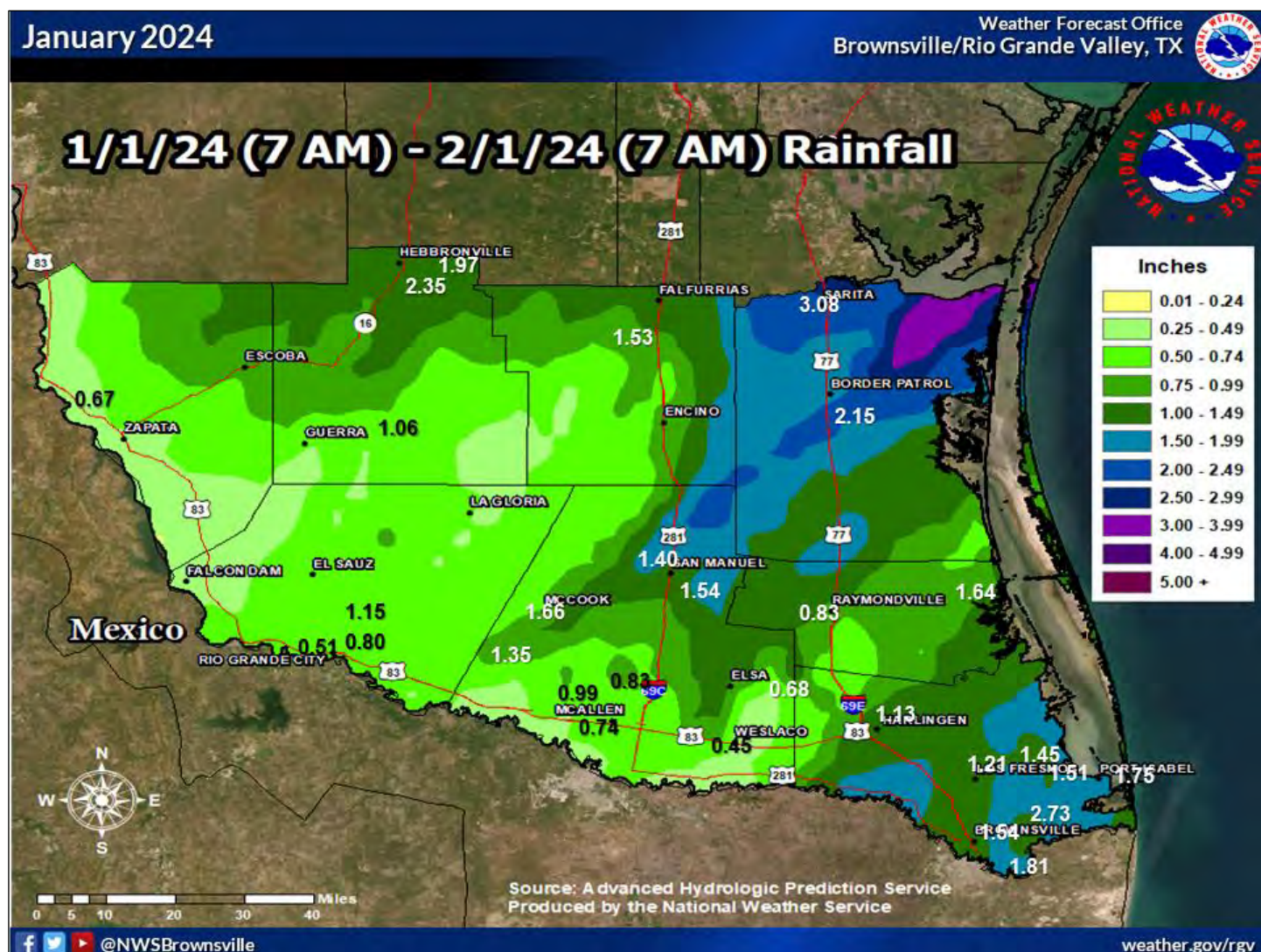


Figure 7: Radar estimated rainfall, with a combination of CoCoRaHS, NWS, and FAA, and Texas Mesonet platform values overlaid, for January 2024 across the Lower Rio Grande Valley and Deep South Texas ranchlands.

February began with a spring temperature burst by day with plenty of dry air to keep overnights/early mornings cool between the 3rd and 7th. One of those warm days came with strong and drying northwest winds (February 4th), which ran over recently “cured” grasses and brush courtesy of the January 15-17 freeze/hard freeze event. On that day, a spark created a rapidly spreading wildfire in Garceño (Starr County), which destroyed one home and threatened others. A spell with warm days and mild/muggy overnights (8th through 11th) was followed by another round of pleasantly mild days/cool nights following a dry front (12th through 14th) before the month’s memorable event arrived late on the 15th, continuing through the 17th.

For only the second time since November 10-13, an “El Niño Connection” event set up on the 15th (Figure 8), and dropped between 1” and 4” across most of the four-county Lower Rio Grande Valley area (Figure 9). Observed rainfall for the period was highest in Hidalgo County, where 2 to more than 4 inches fell – up to 400 percent of average, for the entire month! A CoCoRaHS observer 2.4 miles northeast of McAllen led the pack, with 4.17”. Between 3 and 4” fell in the McAllen metropolitan area, with 2 to 3” elsewhere across the county. Central/eastern Starr, Willacy, and Cameron fared nicely as well; a CoCoRaHS observer 1.9 miles east-southeast of Brownsville recorded 2.6”. Brownsville/South Padre Island International Airport recorded 1.68” (more than 150 percent of the monthly average), Harlingen/Valley International Airport recorded 1.3”, nearly 200 percent of the monthly average.

Rio Grande Valley Regional Summary (continued)

A couple of chilly nights (30s to around 40) followed the rain (February 18th and 19th) before warm days and comfortably cool nights returned. Humidity joined the warm weather to close out February, bringing somewhat muggy overnights – and percolating the additional moisture into “green up” of trees, grasses, brush, etc., especially along/east of Interstate 69C from the McAllen metropolitan area to the Brownsville/Harlingen area. The warm start and finish were enough to nudge monthly temperatures to about a degree above the 1991-2020 average.

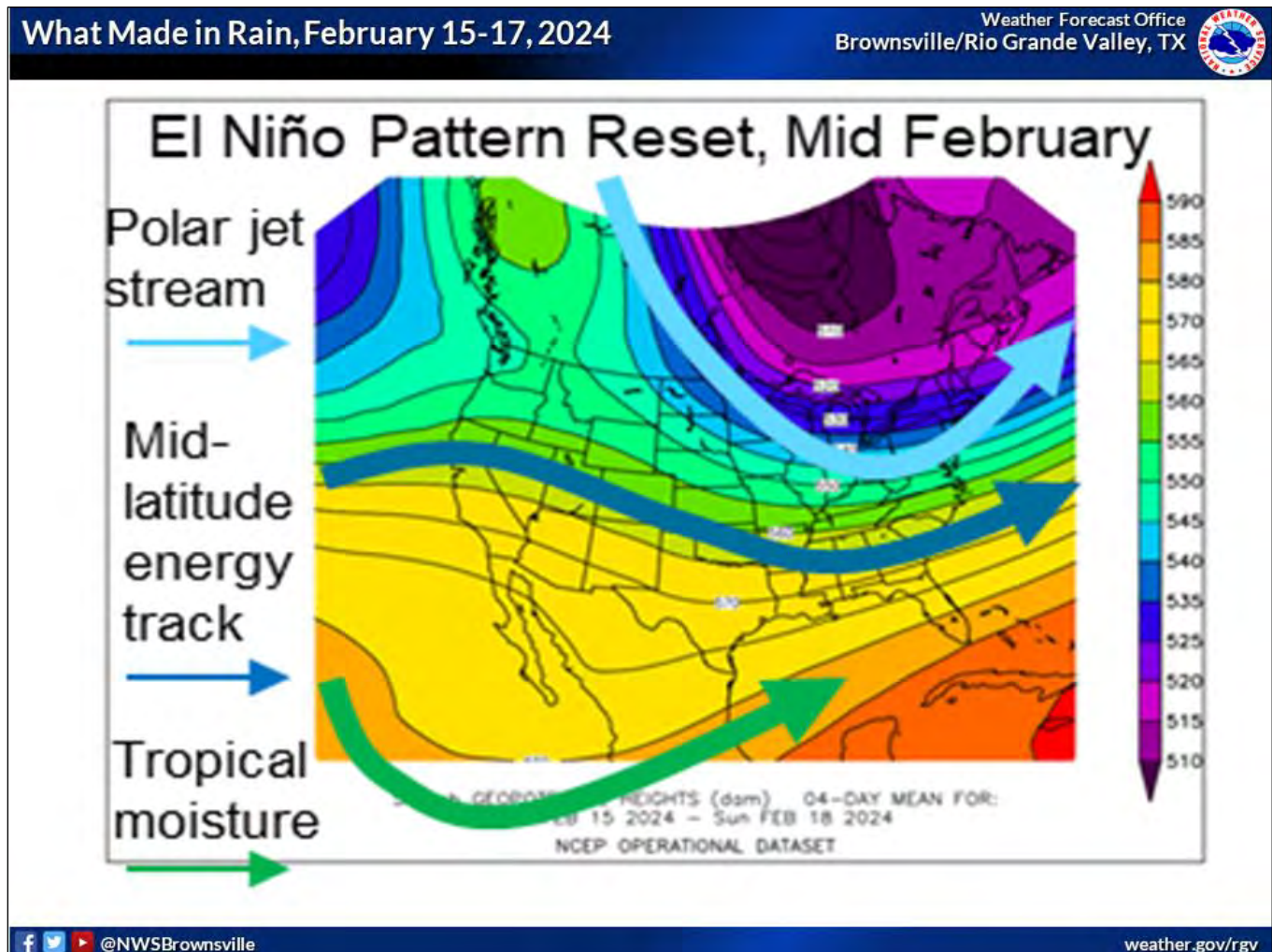


Figure 8: The steering pattern from February 15-17, 2024. The combination of the polar and mid-latitude jet stream bring a slow-moving front southward, while the moisture that arrives from the eastern tropical Pacific Ocean overruns the cooler air. The weak trough across southwest Texas provided the lift, especially during the late afternoon and evening of the 15th, to produce the heavy rainfall observed in Hidalgo County.

Rio Grande Valley Regional Summary (continued)

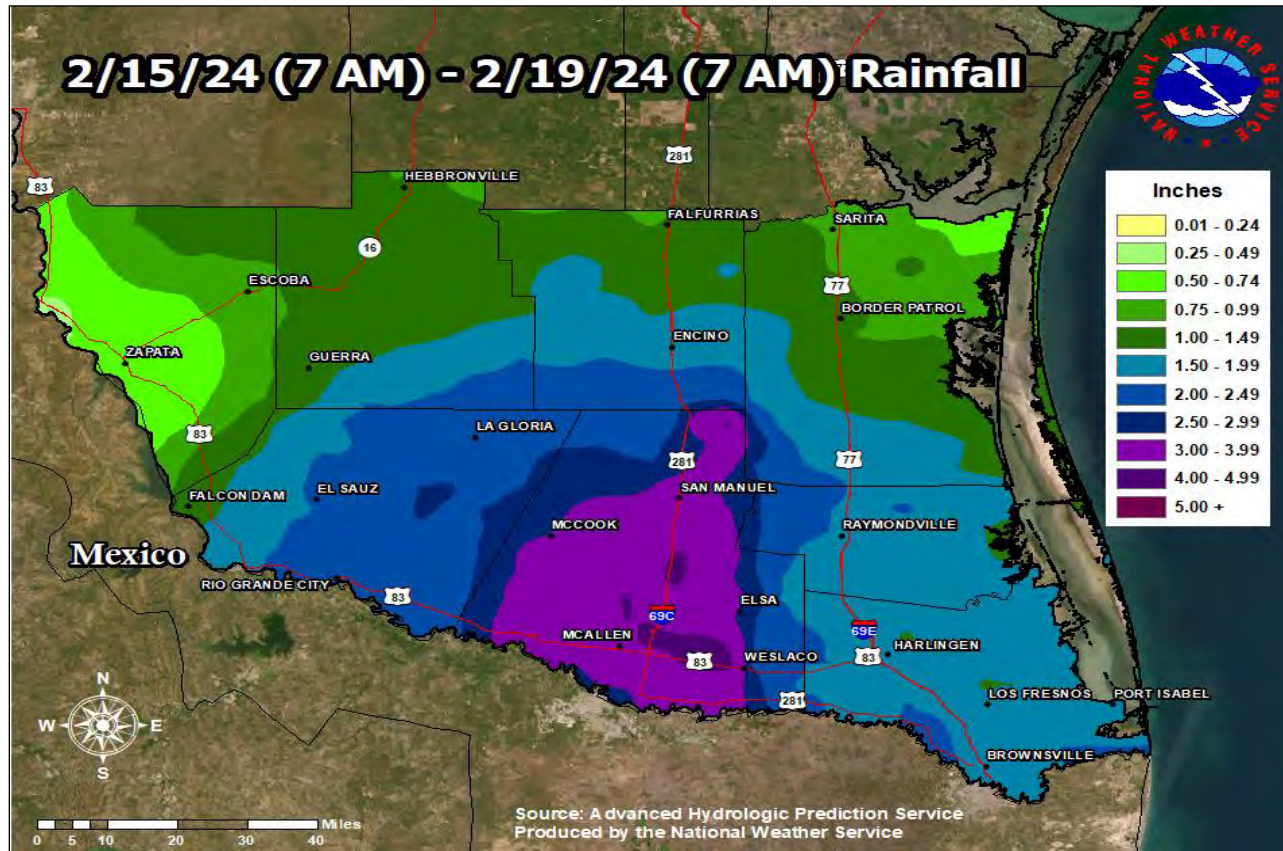


Figure 9: Bias-corrected radar estimates of rainfall during the mid-February 2024 event across the Rio Grande Valley. The Rio Grande Plains, northern Brush Country, and northeastern Kenedy County missed out on the more beneficial rains.

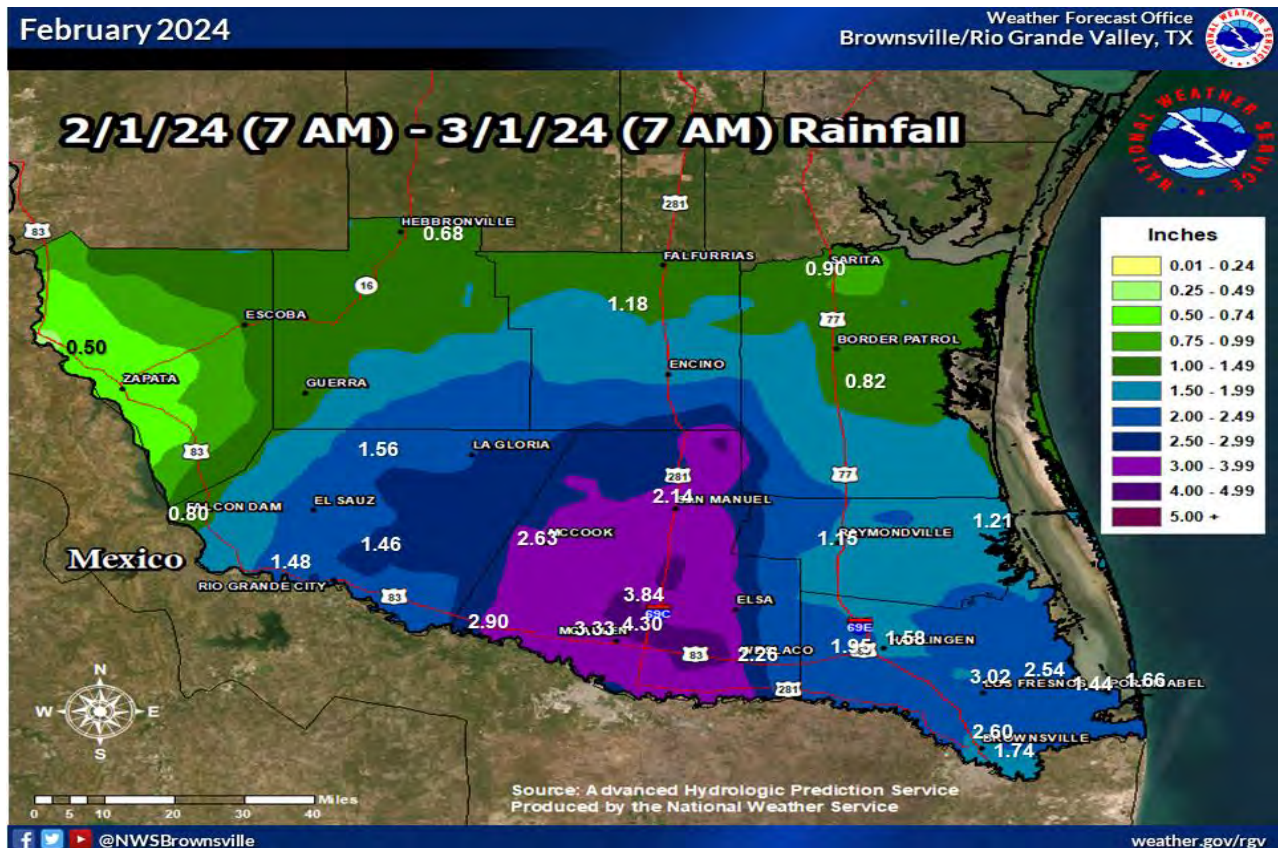


Figure 10: Radar estimated rainfall, with a combination of CoCoRaHS, NWS, and FAA, and Texas Mesonet platform values overlaid, for February 2024 across the Lower Rio Grande Valley and Deep South Texas ranchlands

Rio Grande Valley Regional Summary (continued)

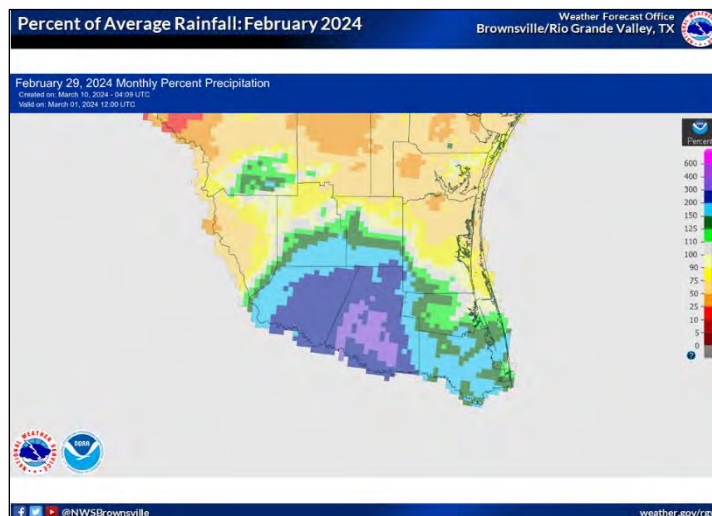


Figure 11: Percent of average rainfall, February 2024. 200 to more than 300 percent of average fell in Hidalgo and eastern Starr, and about 150 percent of average. A sharp drop off was noted farther north and west, with an arc from Zapata through northern Jim Hogg, northern Brooks, and much of Kenedy at 50 to 75 percent of average.



Above: Neighborhood in Brownsville with naturally green grass and leafed-out trees in background after a wet mid-February, followed by warm and humid weather to end February and begin March 2024.

Winter Overall

February's rainfall – in one of the driest months of the year – was enough to bring the sense of winter to “wet” for much of the Lower Rio Grande Valley. Unfortunately, those rains missed the critical inflow regions for both Falcon and Amistad International Reservoirs, which remained at a combined record calendar-period low since their combined “constitution” (construction completion) in the early 1970s. Additional releases from Amistad from late January through the end of February lowered their levels to record lows, with the total water storage just below 21 percent of conservation capacity. The spring temperature and precipitation forecast, especially headed into April and May, did not look favorable for any relief – and water restrictions remained an issue unless there were dramatic increases in inflows to the Mexican and USA Rio Grande Basin watershed.

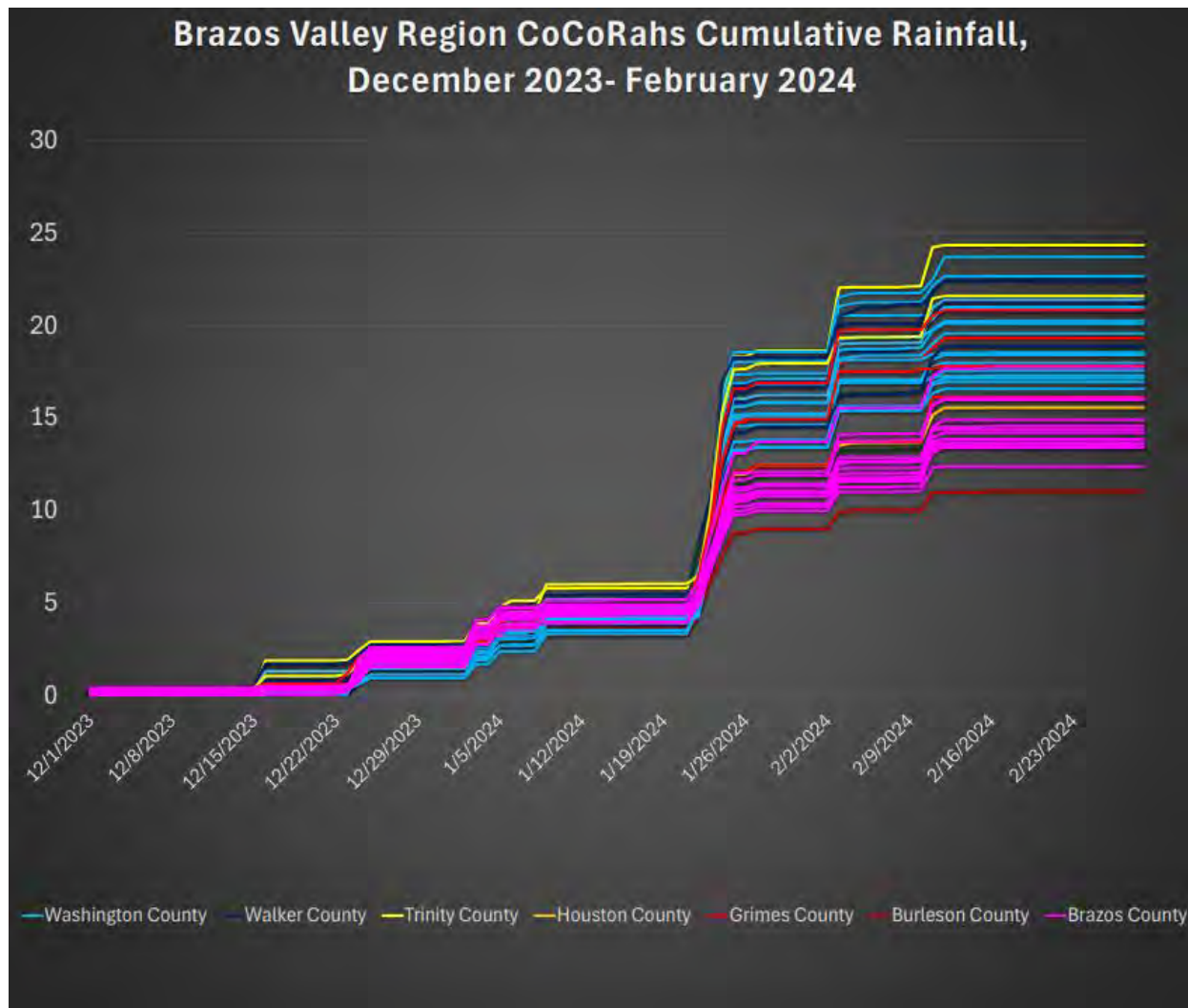
As for temperature...while the mid-January freeze/hard freeze put a dent in the long-term above average trends, “dent” is all it was – courtesy of the event only lasting two full days, and with daytime temperatures recovering nicely following the final morning of subfreezing temperatures on the 17th. For the season, temperatures were about 1 degree above the 1991-2020 average – a possible harbinger of much warmer conditions to come this spring and summer. For Brownsville, Harlingen, and McAllen, winter 2023/2024 ended up among the top 25 warmest on record.

Brazos Valley Regional Summary

Winter 2023-2024 Precipitation Summary

Bryan-College Station/Brazos Valley Region, Texas

Alonso Lopez, Texas A&M University, Office of the State Climatologist of Texas



Summary:

From a precipitation standpoint, we notice that January was the wettest month of the three for every station. A monumental rain event from January 22-28, 2024 had rain gauges working overtime as single day rainfall totals from one to over nine inches were seen across the Brazos Valley area! The highest daily values were generally on January 24th, with this rain event resulting in an obvious spike in rainfall accumulation in the graphic above as many stations reported over 50% of their *total seasonal precipitation* in that time period. Looking deeper we find that the January 22-28 rainy period accounted for as little as 38.7% of the seasonal total (in Brazos county) to as much as 66.7% of the seasonal total (in Washington county) After the dousing of rain seen by many in late January, a couple of rounds of precipitation compounded a few more inches to the total during the month of February, before an extended dry spell took hold to round out the month.

Brazos Valley Regional Summary (continued)

Observer Statistics:

Throughout the winter season, we had 63 active observers reporting their precipitation totals with 38 observers missing no more than 10 days of reporting. Of these, 18 did not miss a single day. Overall, 46 stations were used to calculate this season's records. We thank you for your valuable contributions! In weather and climate, continuity in observations is crucial for properly assessing the past, the present, and the future. Your participation in CoCoRaHS allows meteorologists and climatologists to make connections that would otherwise be overlooked, so you, the observer, are an invaluable part of our efforts to get to know the atmosphere around us!

Season Statistics:

Wettest Day: **9.10"** in **January 24, 2024** in Washington County

-This was over 42% of the station's three month total

Wettest Seasonal Total: **24.35"** in Trinity County

- That was the wettest winter ever recorded in Trinity County, the previous record being 23.21" in 1923-1924

Driest Seasonal Total: **11.04"** in Washington County

Soggy Socks Award: (longest spell with measurable rain): **7 days; January 22-28, 2024**, in Walker County

Dusty Soles Award: (longest spell without measurable rain): It's a tie! - **18 days and counting; from February 12-29, 2024** in Washington, Walker, and Brazos Counties.

Abilene/San Angelo Regional Summary

A Brief Winter across West Central Texas

By: Joel Dunn, Observation Program Lead, NWS Abilene/San Angelo

December 2024

West Central Texas experienced an unusual deviation from typical winter weather patterns as temperatures consistently remained above normal throughout the month. Despite the seasonal expectation of cooler conditions, afternoon high temperatures consistently hovered in the 50s and 60s, presenting an uncharacteristically mild climate for this region.

Moreover, West Central Texas concluded December with a noteworthy surplus of precipitation, defying the dry tendencies often associated with winter months. The increased rainfall made a notable improvement to the drought conditions in the area. This wetter-than-normal trend brought a refreshing change to a landscape that might typically be more accustomed to arid conditions during the winter season.

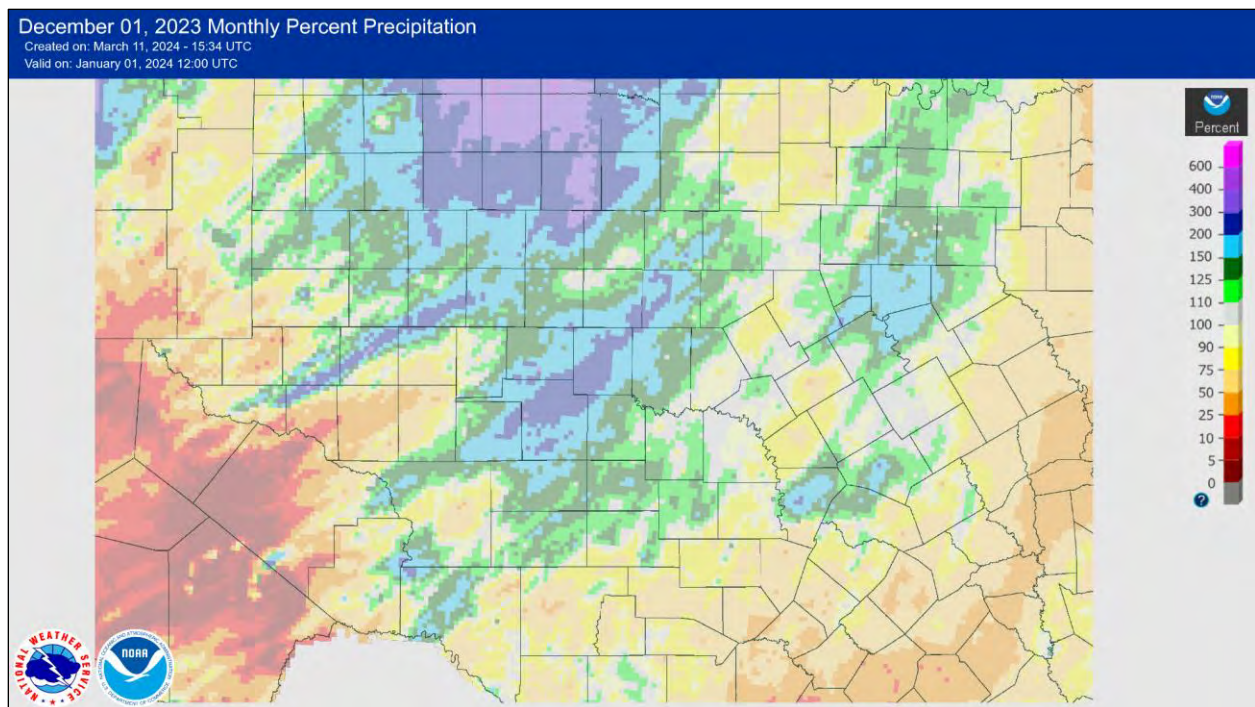


Image 1 - December Percent of Normal Precipitation

Within the broader context of West Central Texas, the Concho Valley stood out with its December precipitation levels exceeding expectations. The area received over an inch of precipitation above the usual December average, underscoring the localized impact of the weather anomalies observed throughout the region.

Abilene/San Angelo Regional Summary (continued)

A particular meteorological highlight occurred on the 15th of December when San Angelo, a key city in West Central Texas, experienced a record-breaking rainfall event. A remarkable 1.20” of rain this day marked the breaking of a 39-year-old record, emphasizing the exceptional nature of the precipitation event. This singular occurrence added a historical dimension to the month's weather, contributing to a memorable December in West Central Texas.

| City | Observed Precipitation | Normal Precipitation | Departure Normal | From |
|------------|------------------------|----------------------|---------------------|------|
| Abilene | 1.44” | 1.11” | 0.33” | |
| San Angelo | 2.16” | 0.77” | 1.39” | |
| Junction | 1.07” | 0.93” | 0.14” | |

Table 1 - Precipitation statistics for the month for Abilene, San Angelo, and Junction

January 2024

With the coming of January also came winter. Though December 21 marks meteorological winter, the temperatures in January proved the season had truly arrived. The month began colder than normal and despite a brief warm-up, the area quickly returned to below-normal conditions. On the 13th of January, an Arctic cold front swept through the region, leaving its mark on the temperatures. Overnight lows plummeted to single digits in the Big Country area, while south of Interstate 20 temperature dropped into the teens. West Central Texas, in particular, experienced an extraordinary 30 degrees below normal, making it the coldest episode of the season. Along with frigid temperatures, the arctic front also brought snowfall. Though very little was expected, some areas including the Concho Valley reported nearly an inch of snowfall. With temperatures remaining below freezing the light blanket of snow was able to stick around until the following day. Yet, this snowfall brought little moisture to the area as it melted to nearly a hundredth of an inch of liquid.

January brought a mixed bag of precipitation to the region. The Big Country area saw above-average rainfall, contributing to a wetter-than-normal month. However, a notable exception was observed south of Interstate 20, where areas experienced drier conditions than typical for this time of year. This precipitation duality added complexity to the overall weather narrative for the month.

Abilene/San Angelo Regional Summary (continued)

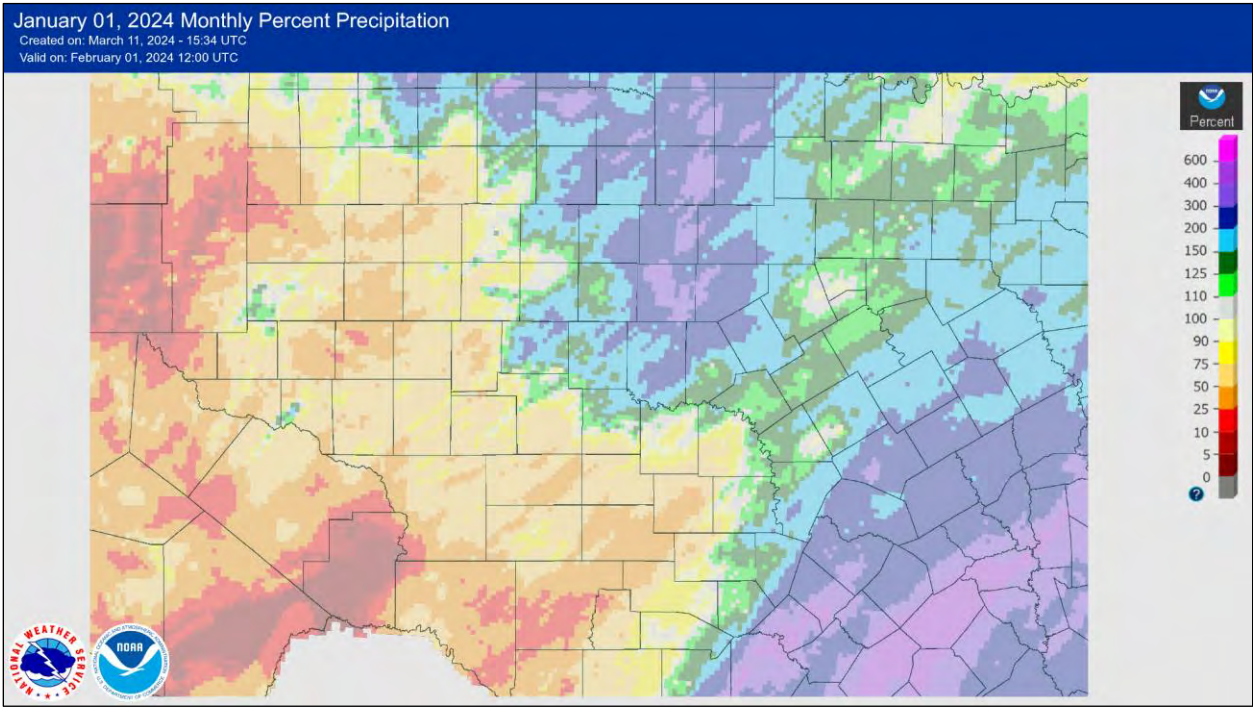


Image 2 - January Percent of Normal Precipitation

In summary, January in the region unfolded as a tale of contrasts, with an Arctic cold front making a dramatic entrance, leaving a wintry imprint, while precipitation patterns showcased the variability that characterizes Texas weather. Residents experienced the spectrum of winter conditions, from bitter cold temperatures to the scenic beauty of a light snowfall, creating a memorable start to the year.

| City | Observed Precipitation | Normal Precipitation | Departure Normal | From |
|------------|------------------------|----------------------|---------------------|------|
| Abilene | 2.29" | 1.10" | 1.19" | |
| San Angelo | 0.51" | 0.92" | -0.41" | |
| Junction | 0.27" | 0.89" | -0.62" | |

Table 2 - Precipitation statistics for January across Abilene, San Angelo, and Junction

February 2024

Despite being a winter month, February in our region felt more like spring, with temperatures consistently 5-6 degrees above the normal range throughout the month.

In terms of precipitation, areas north of Interstate 10 received over an inch of rainfall, providing some relief to those regions. However, the overall precipitation remained below normal across West Central Texas, contributing to drier-than-average conditions

Abilene/San Angelo Regional Summary (continued)

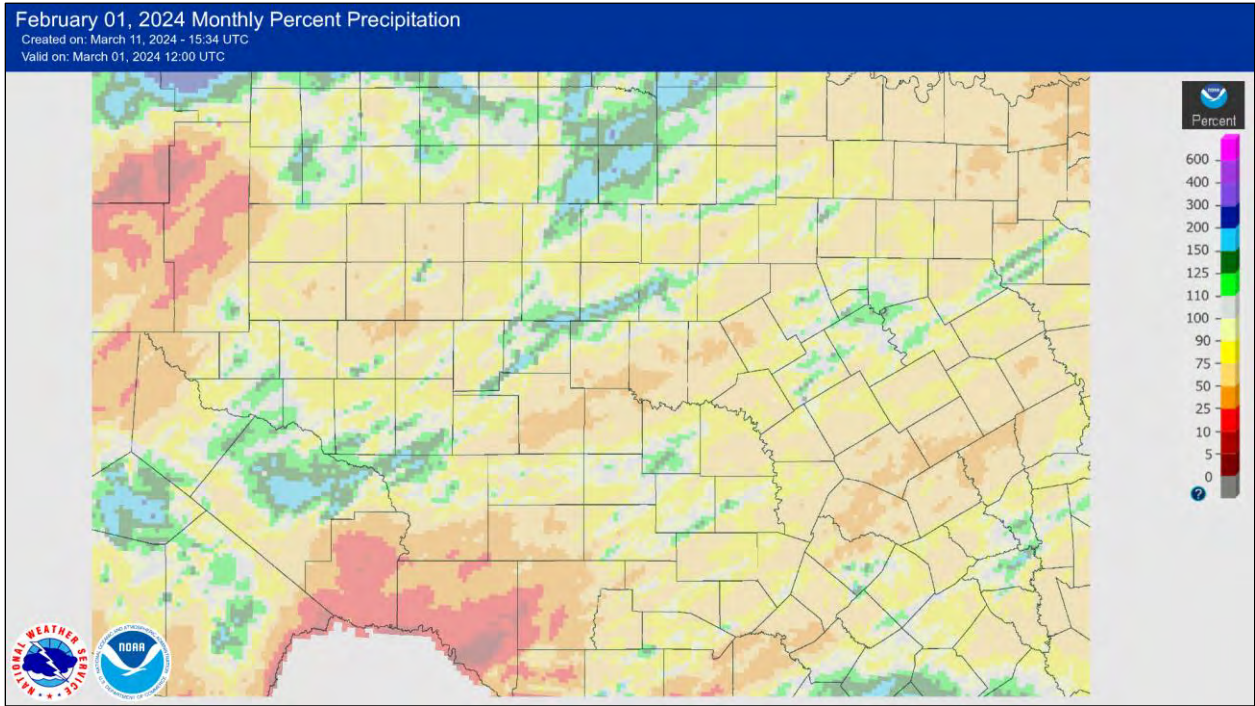


Image 3 - February Percent of Normal Precipitation

Winter made a brief return during the weekend of February 18th, as overnight low temperatures dropped below freezing, reminding residents of the season's unpredictability.

A notable deviation from the typical weather patterns occurred this February, as the average first 90-degree day, which usually arrives around the 1st of April, surprisingly occurred on February 26th, marking an early onset of warmer temperatures.

The month turned out to be a rollercoaster of temperatures, showcasing the variability that can be expected during February. As the month concluded, it was no surprise that February finished drier than normal, underscoring the unpredictable nature of this transitional winter-to-spring period.

| City | Observed Precipitation | Normal Precipitation | Departure From Normal |
|------------|---------------------------|-------------------------|--------------------------|
| Abilene | 1.12" | 1.29" | -0.17" |
| San Angelo | 0.63" | 1.20" | -0.57" |
| Junction | 1.01" | 1.12" | -0.11" |

Table 3 - Precipitation statistics for February

Wichita Falls Regional Summary

Rounds of Precipitation Bring Drought Relief during Warm Winter

By Charles Kuster

NSSL

Our region experienced above normal precipitation and above normal temperatures this winter (Figure 1). The western third of our region saw the most precipitation, but all areas experienced at least slightly above normal precipitation. The days with the heaviest precipitation were December 15, 2023 and January 27, 2024. On December 15, multiple CoCoRaHS observers recorded over 1.25" of rain in 24 hours across our western counties (Figure 2a). On January 27, the heaviest rain was centered in the Wichita Falls area where multiple CoCoRaHS observers recorded over 1.50" of rain during the 24-hour period (Figure 2b).

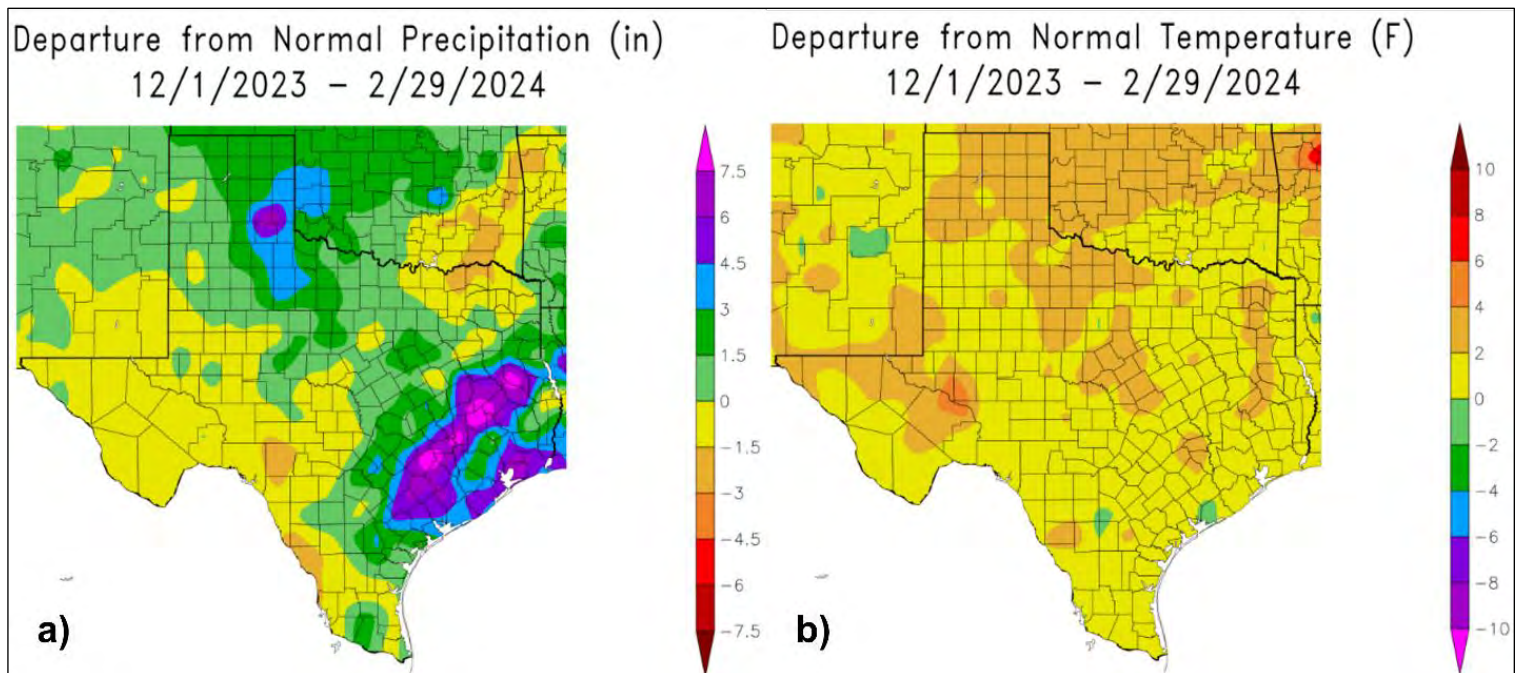


Figure 1. Departure from normal a) precipitation and b) temperature for the beginning of December 2023 through the end of February 2024. Warm colors indicate below normal precipitation (a) and above normal temperatures (b), while cool colors indicate above normal precipitation (a) and below normal temperatures (b).

Wichita Falls Regional Summary (continued)

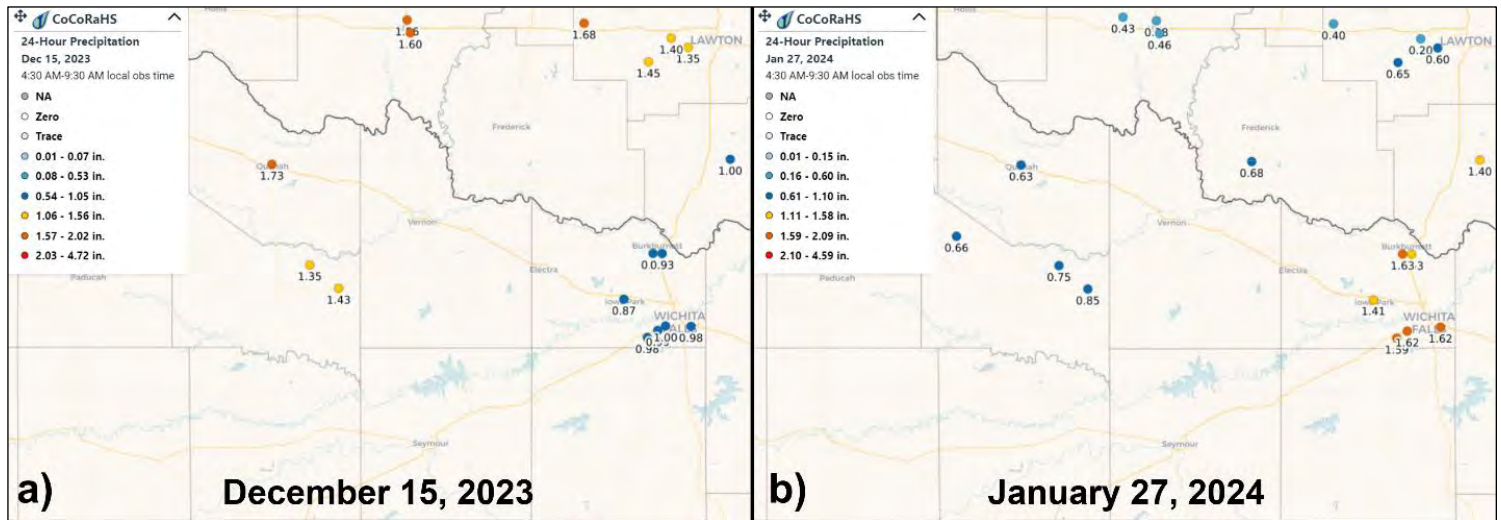


Figure 2. CoCoRaHS precipitation observations for the 24-hour period ending at 7am on a) December 15, 2023 and b) January 27, 2024.

In total, our region saw 72 dry days (all CoCoRaHS stations reported less than 0.05") and 19 wet days. These numbers were remarkably extremely similar to last winter when our region saw 72 dry days and 18 wet days. The above normal precipitation also brought drought relief to our area (Figure 3). By the end of the winter, only a few small areas were experiencing abnormally dry conditions compared to widespread moderate to severe drought back in early December, according to the U.S. Drought Monitor (available at <https://droughtmonitor.unl.edu/>).

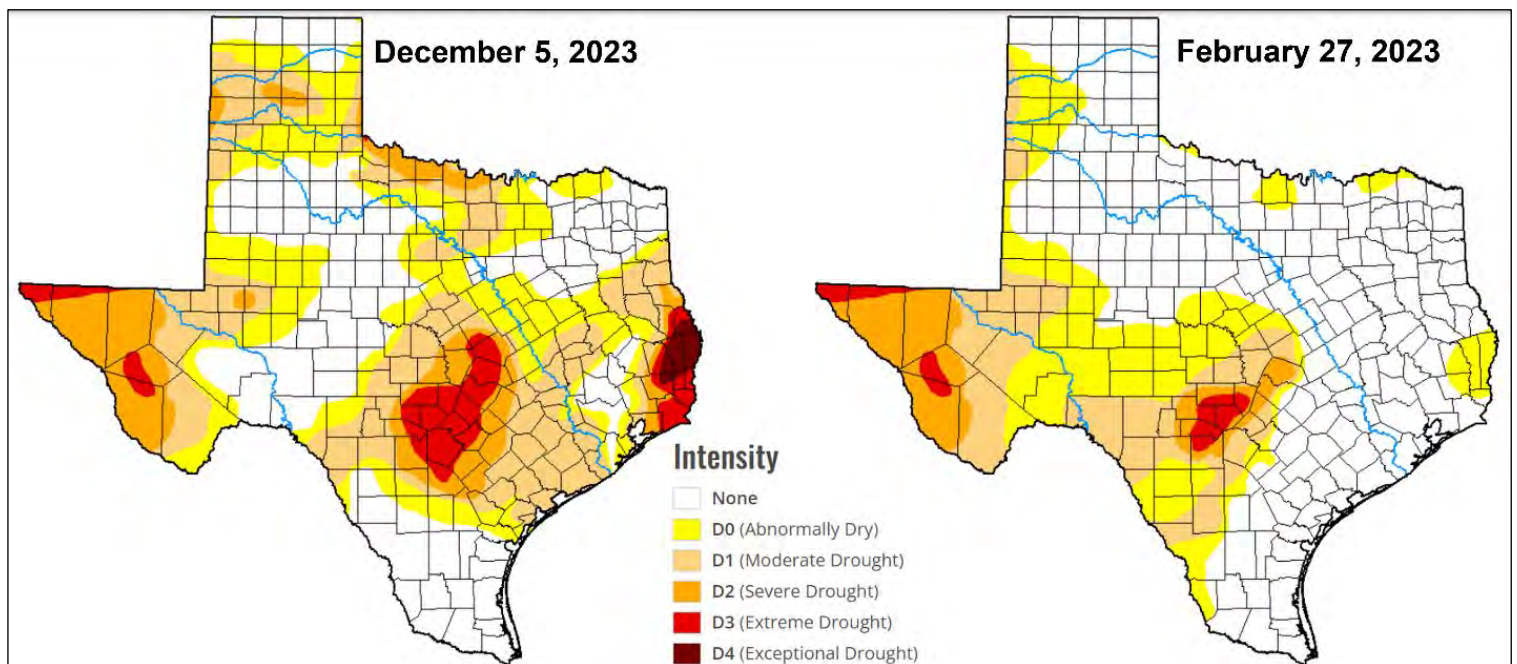


Figure 3. Change in the U.S. Drought Monitor from near the beginning of the winter (left) to near the end of the winter (right).

Southeast Texas Regional Summary

Dry December & February, very wet January

By: Ron Havran, Southeast Texas CoCoRaHS Regional Coordinator, HCFC

December 2023

December was a dry month in most places except coastal locations near Galveston Bay and south of Beaumont. Orange County and Chambers County had the most rainfall for the month. Temperatures were slightly above normal. Not much to talk about this month with lack of rainfall to ease dry conditions across the region. Mostly quite month.

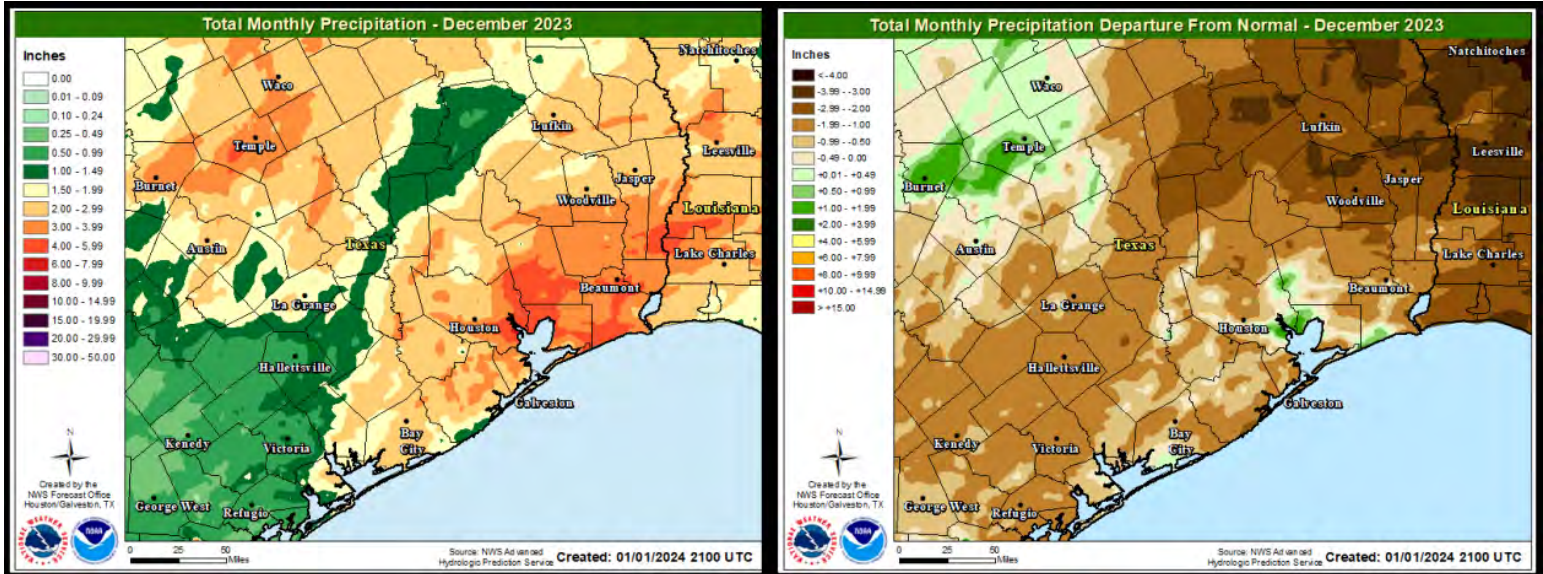


Figure 1: December Total Monthly Precipitation and Departure from Normal.

January 2024

Rainfall in January was much above normal across all of the region. Arctic air moved into the region from the 14th through the 17th with very cold morning. Freezing rain and sleet were observed by CoCoRaHS observers in many places. The big story of the month was the widespread heavy rainfall event from the 21st to the 26th. River flooding occurred on several rivers in the region. Heaviest rains were located from far western portions to far northeastern portions of the region. January rains provided about 65% of the precipitation for the whole winter season. See chart 1 and chart 2 on page 50 for all the precipitation stats this winter season. Drought conditions ended after these rains.

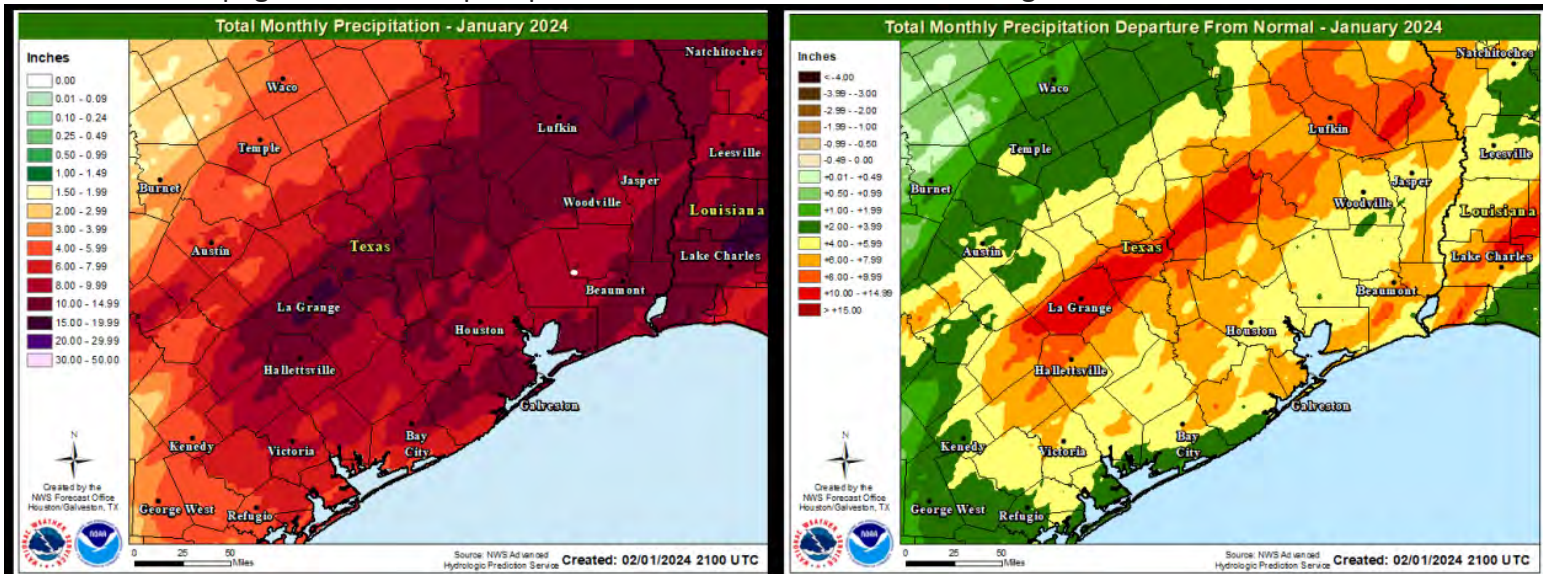


Figure 2: January Total Monthly Precipitation and Departure from Normal

Southeast Texas Regional Summary (continued)

February 2024

The month started off good with some rain in parts of the region, but once again dry conditions returned during the rest of February with very little rainfall for most observers. Just about all observers had under 3.00" of rainfall for the month. Temperatures were much above normal region wide. See chart 3 and 4 on page 51.

Don't forget to do a little maintenance on your manual rain gauge with spring blooming of trees and plants in progress. Proper maintenance of your manual gauge will make it last longer, take more accurate observations, and you will be ready for those heavy rains this spring season. Send us pictures of your gauge you read every morning.

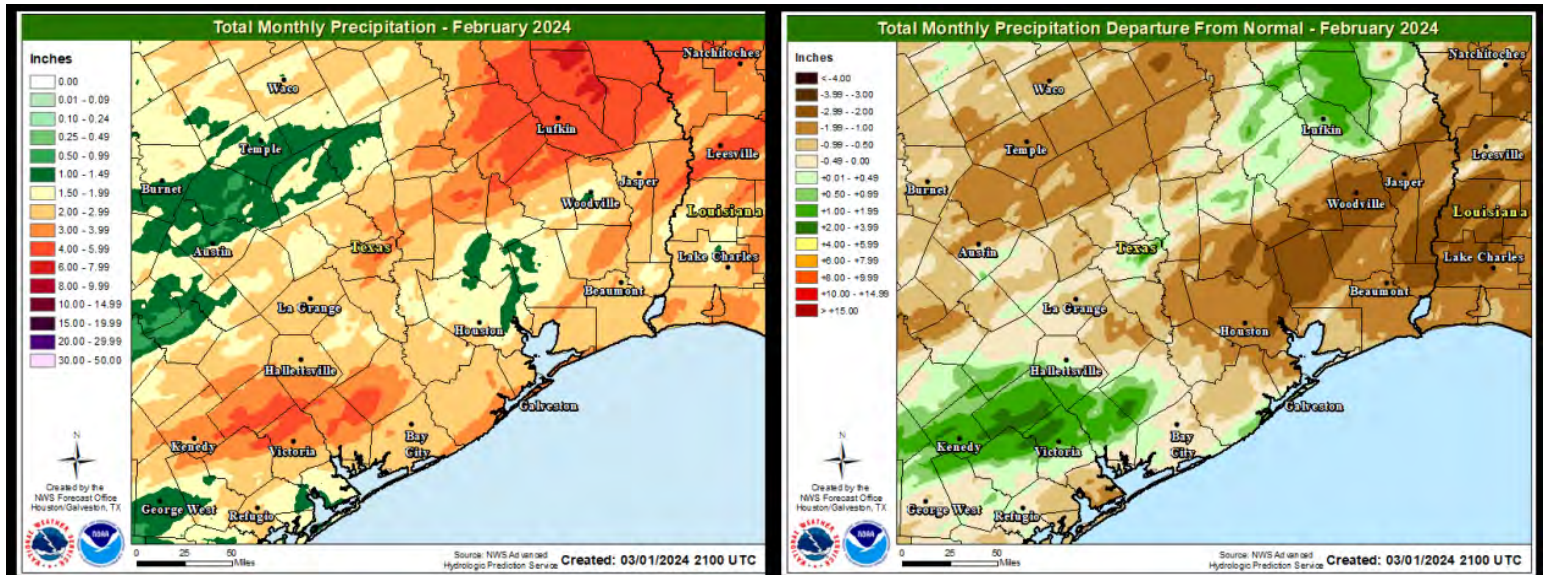


Figure 3: February Total Monthly Observed Precipitation

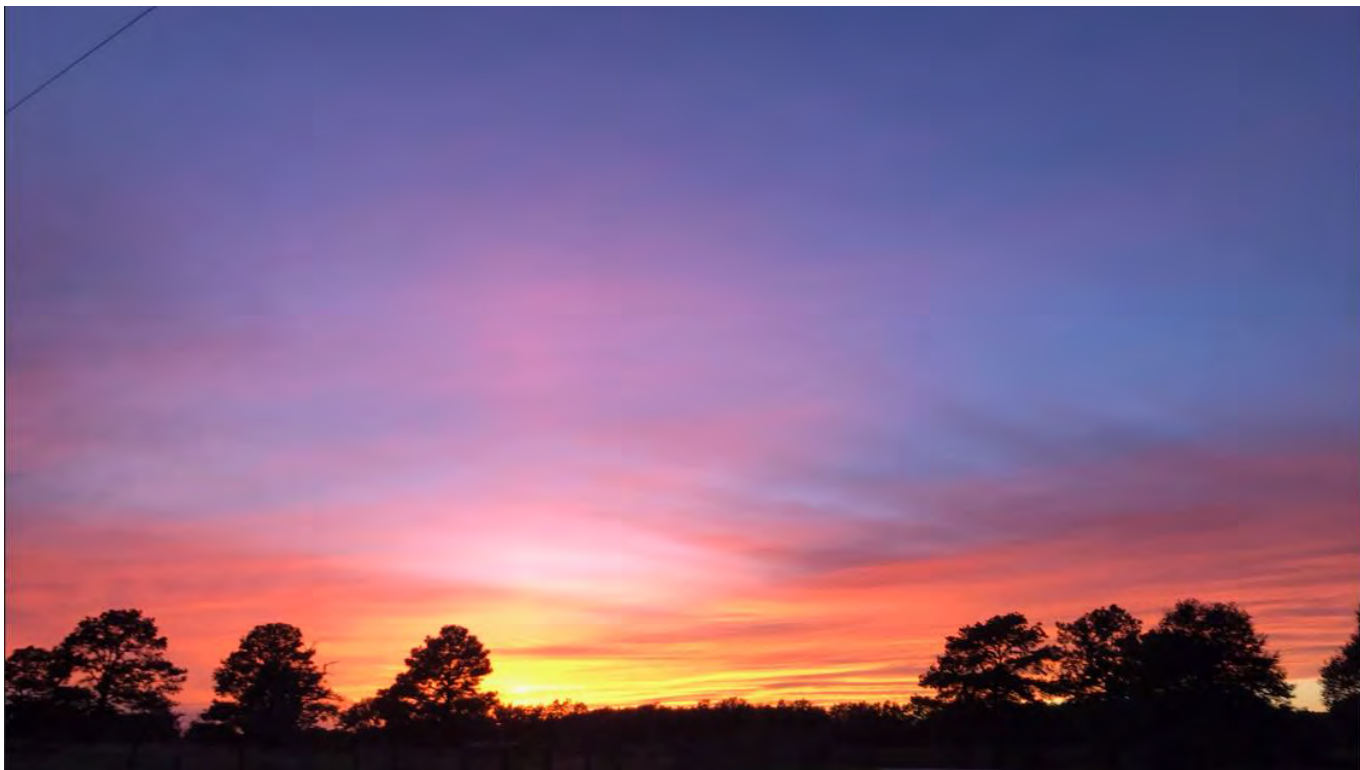


Figure 4: Dry conditions and mostly clear skies with cirrus in December and February made Southeast Texas have brilliant sunsets.

Southeast Texas Regional Summary (continued)

Below is the seasonal average CoCoRaHS observer county rainfall totals for this past winter. In each section of Southeast Texas the monthly rainfall county average for January was about twice the amounts of December and February put together. Thanks to all observers in Southeast Texas for taking your time every morning to record and send in your observation amount or zero amount. The more observers in each county that are part of this organization the more accurate the data sets are that go into computer model forecasting at the West Gulf Forecast Center in Fort Worth.

| Winter 2024 CoCoRaHS SE Texas Houston/Galveston Section Rainfall | | | | |
|---|----------|---------|----------|--------------|
| CoCoRaHS Station measured county rainfall averages in inches per month | | | | |
| County | December | January | February | Winter Total |
| | AVG. | AVG. | AVG. | Dec. - Feb. |
| Austin | 1.93 | 10.39 | 2.21 | 14.53 |
| Brazoria | 2.88 | 9.39 | 2.45 | 14.72 |
| Chambers | 3.35 | 7.98 | 4.34 | 15.67 |
| Colorado | 1.36 | 10.72 | 2.03 | 14.11 |
| Fort Bend | 2.13 | 8.44 | 1.98 | 12.55 |
| Galveston | 3.24 | 10.14 | 2.63 | 16.01 |
| Harris | 2.77 | 8.93 | 1.88 | 13.58 |
| Jackson | 1.17 | 8.43 | 2.17 | 11.77 |
| Liberty | 3.18 | 7.99 | 1.37 | 12.54 |
| Matagorda | 2.01 | 8.35 | 2.59 | 12.95 |
| Montgomery | 1.94 | 9.37 | 1.64 | 12.95 |
| Polk | 2.87 | 11.87 | 2.61 | 17.35 |
| San Jacinto | 2.49 | 11.52 | 2.88 | 16.89 |
| Wharton | 1.94 | 8.06 | 2.90 | 12.90 |
| Region Totals | 2.38 | 9.40 | 2.41 | 14.18 |



 Color indicates highest avg. rainfall total for a county in a month
 Color indicates lowest avg. rainfall total for a county in a month
Note: Counties without a significant # of observers reporting are not listed on the chart.

Chart 1: Southeast Texas Houston/Galveston Section counties rainfall averages by month.

| Winter 2024 CoCoRaHS SE Texas Golden Triangle Section Rainfall | | | | |
|--|----------|---------|----------|--------------|
| CoCoRaHS Station measured county rainfall averages in inches per month | | | | |
| County | December | January | February | Winter Total |
| | AVG. | AVG. | AVG. | Dec. - Feb. |
| Hardin | 3.54 | 8.81 | 3.21 | 15.56 |
| Jasper | 3.47 | 10.12 | 2.55 | 16.14 |
| Jefferson | 3.84 | 10.85 | 2.51 | 17.20 |
| Newton | NA | NA | NA | NA |
| Orange | 3.92 | 12.19 | 2.18 | 18.29 |
| Tyler | 2.39 | 10.71 | 2.32 | 15.42 |
| Region Totals | 3.43 | 10.54 | 2.55 | 16.52 |



 Color indicates highest avg. rainfall total for a county in a month
 Color indicates lowest avg. rainfall total for a county in a month
Note: Counties without a significant # of observers reporting are not listed on the chart.

Chart 2: Southeast Texas Golden Triangle Section counties rainfall averages by month.

Southeast Texas Regional Summary (continued)

Below are temperature and rainfall averages for first order stations at airports in Southeast Texas for the winter season. January was like the typical winter forecast for an El Nino pattern in the Pacific Ocean affecting Southeast Texas. December and February were drier than normal months in most areas with slightly warmer temperatures. Storm systems had a tendency to pass Southeast Texas to the north during these months. There were more sunny days during December and February. January had more cloudy days and colder temperatures. Artic air outbreaks during January had temperatures below average.

Houston/Galveston Temperature & Rainfall Data for 2024 Winter Season

| December Climate | | | | | | | |
|------------------------------|------|------|------|-----------|------|--------|-----------|
| Site Location (record start) | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Bush Airport (1888) | 67.7 | 47.0 | 57.3 | 1.9 | 2.57 | 4.03 | -1.46 |
| Hobby Airport (1930) | 68.2 | 50.2 | 59.2 | 2.3 | 2.71 | 4.34 | -1.63 |
| Galveston (1871) | 66.5 | 55.1 | 60.8 | 2.3 | 2.94 | 4.23 | -1.29 |
| Sugar Land (2000) | 68.6 | 47.4 | 57.8 | 1.3 | 2.05 | 3.76 | -1.71 |
| January Climate | | | | | | | |
| Site Location (record start) | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Bush Airport (1888) | 61.2 | 40.4 | 50.8 | -3.0 | 8.77 | 3.76 | 5.01 |
| Hobby Airport (1930) | 61.8 | 43.1 | 52.5 | -2.5 | 8.41 | 4.09 | 4.32 |
| Galveston (1871) | 61.2 | 47.1 | 54.1 | -1.9 | 8.59 | 4.30 | 4.29 |
| Sugar Land (2000) | 62.1 | 40.3 | 51.2 | -3.6 | 8.45 | 3.63 | 4.82 |
| February Climate | | | | | | | |
| Site Location (record start) | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Bush Airport (1888) | 72.6 | 51.2 | 61.9 | 4.2 | 1.91 | 2.97 | -1.06 |
| Hobby Airport (1930) | 72.7 | 53.2 | 62.9 | 4.1 | 1.84 | 2.85 | -1.01 |
| Galveston (1871) | 68.3 | 55.2 | 61.8 | 2.5 | 2.85 | 3.56 | -0.71 |
| Sugar Land (2000) | 72.6 | 51.0 | 61.8 | 3.0 | 1.53 | 2.83 | -1.30 |

Chart 3: Temperature and rainfall averages for first order stations at airports in the Houston/Galveston Section.

Golden Triangle Temperature & Rainfall Data for 2024 Winter Season

| December Climate | | | | | | | |
|--------------------------|------|------|------|-----------|-------|--------|-----------|
| Site Location | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Port Arthur Airport | 68.1 | 46.6 | 57.4 | 1.8 | 4.05 | 4.98 | 0.93 |
| Beaumont Research Center | 66.5 | 45.4 | 56.0 | 1.8 | 7.43 | 5.04 | 2.39 |
| Orange 9N | 66.2 | 40.9 | 53.6 | 1.4 | 6.13 | 5.26 | 0.87 |
| January Climate | | | | | | | |
| Site Location | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Port Arthur Airport | 62.0 | 40.5 | 51.3 | -2.4 | 11.31 | 5.32 | 5.99 |
| Beaumont Research Center | 59.9 | 38.5 | 49.2 | -2.9 | 9.44 | 4.77 | 4.67 |
| Orange 9N | 60.2 | 35.5 | 47.9 | -2.6 | 11.33 | 5.65 | 5.68 |
| February Climate | | | | | | | |
| Site Location | Hi | Lo | Mean | Departure | Rain | Normal | Departure |
| Port Arthur Airport | 71.5 | 50.5 | 61.0 | 3.5 | 2.28 | 3.09 | -0.81 |
| Beaumont Research Center | 69.8 | 43.9 | 59.6 | 3.7 | 2.42 | 3.62 | -1.20 |
| Orange 9N | 70.7 | 47.1 | 58.9 | 4.9 | 1.73 | 4.18 | -2.45 |

Chart 4: Temperature and rainfall averages for first order stations at airports in the Golden Triangle Section.

Texas Spring Weather Outlook

Pattern of El Nino to Continue into Middle of Spring

By: Bob Rose, Meteorologist, Lower Colorado River Authority

Springtime offers some of the best weather of the entire year to Texas. But spring is also the wettest and stormiest season of the year for most of the state. It offers the last chance for significant rain and tolerable temperatures before the drier and much hotter months of summer take hold. The possibility for significant rain this spring will be especially important for the western half of Texas, where fall and winter rains were below normal and significant drought persists.

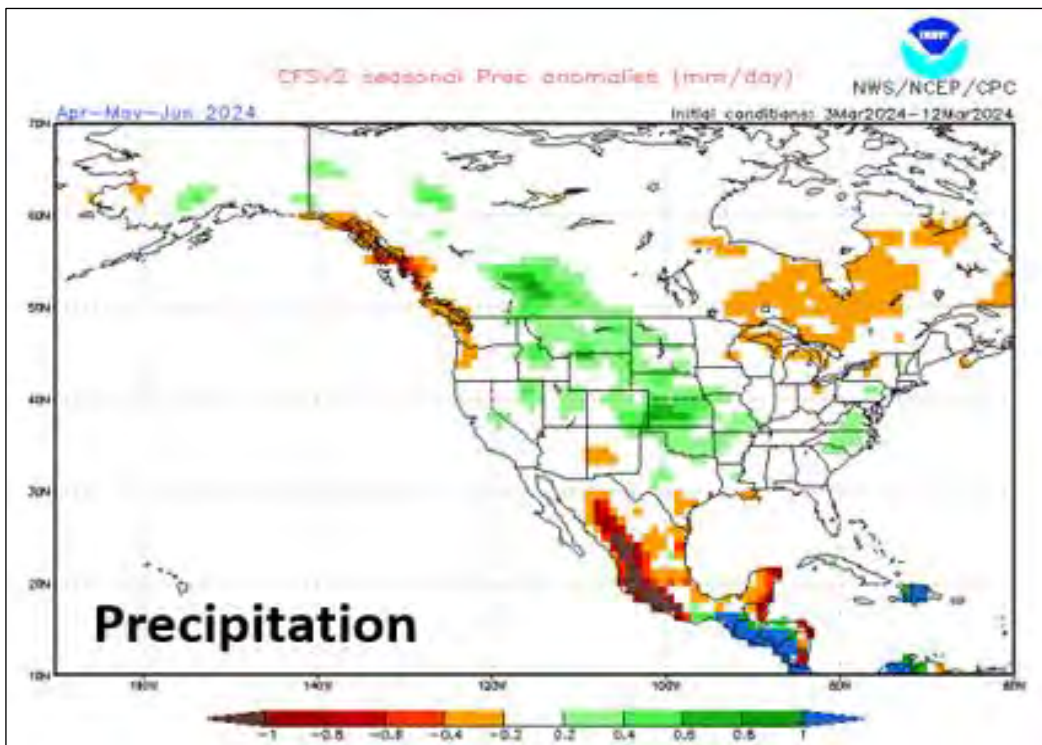
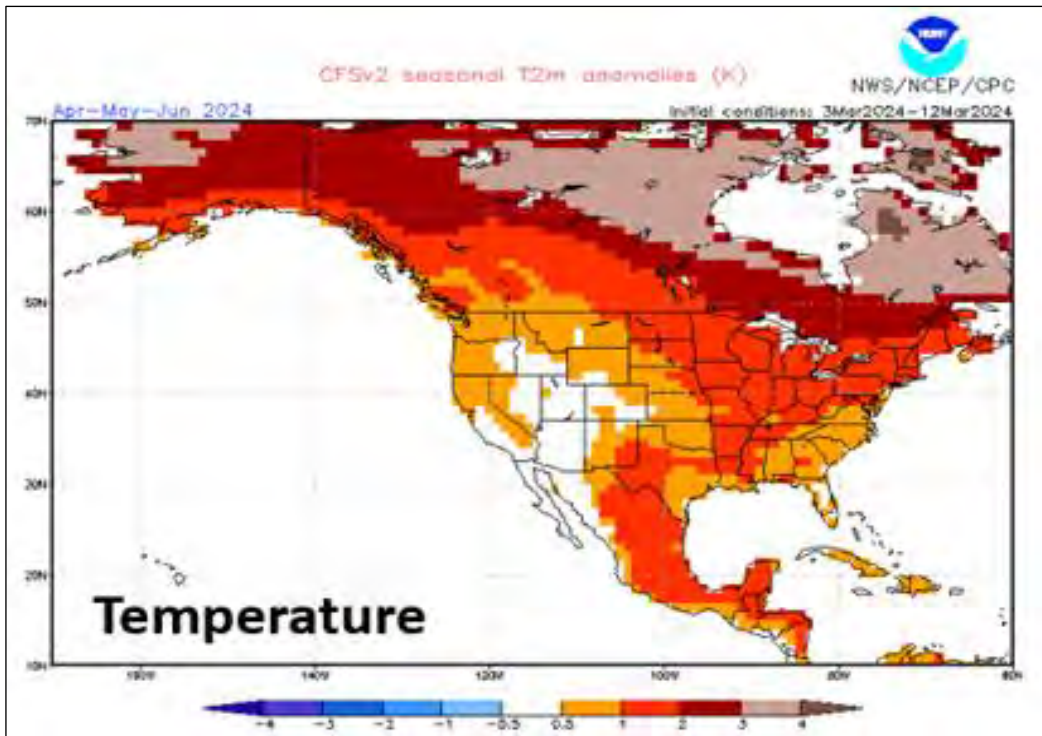
One of the biggest influences on Texas weather this past fall and winter was from El Niño. El Niño developed last summer and continued through the fall and winter months. El Niño refers to development of a large belt of unusually warm water in the tropical Pacific Ocean, between the west coast of South America and the International Date Line. This belt of warm water tends to promote the development of, and frequent feed of clouds and moisture from the eastern Pacific Ocean to the southern U.S. through the cooler months. Because of this, most El Nino autumns and winters across the southern U.S. have historically been characterized by wetter than normal and slightly cooler than normal weather conditions.

While El Niño did influence fall and winter's weather pattern, it wasn't a great match to what we've seen with most historical El Nino's. El Niño did help to deliver above normal rainfall to the eastern half of the state, but rainfall was only near normal, to below normal for the western half. In addition, Texas experienced one the warmest winters on record. Apparently, El Niño's influence on the winter pattern was there, but it was overwhelmed by other persistent features in the atmospheric circulation, resulting in a somewhat different outcome than most historical El Nino's.

As of early March, a moderate El Niño was still in place and engaged with the atmosphere. But El Niño peaked in intensity in January and has been slowly weakening. Forecasts call for El Niño to continue weakening March through April, then fade away completely sometime in May. ENSO-neutral conditions are forecast for June. Historically, El Niño has been shown to have some influence on Texas weather even through the spring months. Similar to fall and winter, it helps to create a wetter and slightly cooler than normal weather pattern for most of the state. This year, the influence from El Niño looks to diminish during June.

The outlook for spring considers a continued influence from El Nino April through May. At the same time, it acknowledges other features in the atmospheric circulation will likely continue to overwhelm the influence from El Nino from time to time. Based on these considerations, my spring outlook calls for near normal temperatures for April, with readings trending warmer than normal for May and June. Near normal rainfall is forecast for most areas during April and May, with some areas possibly seeing above normal totals. A trend toward below normal rainfall is forecast for June. Averaging the three months together, temperatures are forecast to average above normal, with the precipitation averaging near normal.

Spring Weather Outlook (continued)



Temperature and Precipitation Anomaly Forecast for April/May/June from NOAA's Climate Forecast System Version 2 (CFSv2) forecast model.

Keep in mind, this is an outlook for general weather conditions for all of spring. There will likely be some dry stretches, big storms and even brief cooldowns from time to time. Overall, some typical springtime weather can be expected during April and May, followed by an early summer weather pattern in June. Hopefully, the forecasted spring rains will bring much-needed drought improvement to the western half of the state.

Scheduled CoCoRaHS Webinars & Information

Webinar #90 - Thursday, May 16, 2024 - 1PM EDT

Monitoring Climate Change at the World Meteorological Organization (WMO)



Claire Ransom

World Meteorological Organization
Geneve, Switzerland



Beginning in 1873 as a forum for exchanging weather data and research, the WMO today is the UN's leading voice on weather, water and climate. One of the lesser known specialized agencies of the UN, the WMO plays a critical role in many matters related to data exchange, climate change and socioeconomic development. This webinar will present WMO, its history and some of the work that it does, with a specific focus on climate change and its impact to sustainable development.

Questions, Comments, and Suggestions about this newsletter are welcomed at the above email addresses.

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