2024 Hydrology Summary

Overview

Weather Forecast Office
Albuquerque, NM
Issued January 18, 2025 9:52 AM MST

Hydrologic Summary: Burn Scar Flooding, Dams Overtopping, Rivers Rerouting and Rooftop Rescues

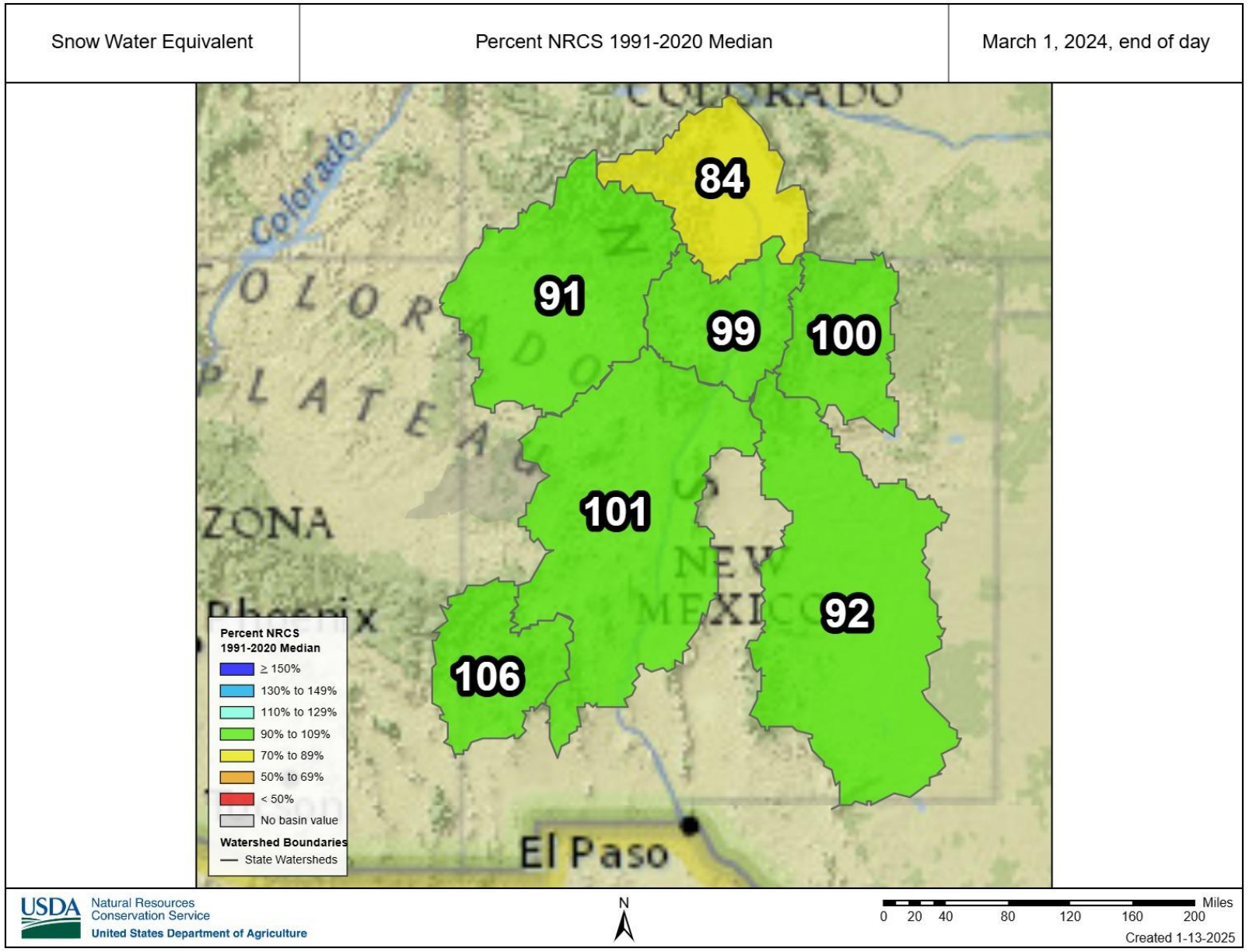
Catastrophic Burn Scar Flooding in Ruidoso 06/29/2024 – Eric Queller

Catastrophic Flash Flooding in Las Vegas 06/21/2024 – NM DHSEM

Rio Chama rerouted by sediment 06/22/2024 – Sam Garcia

Catastrophic Flooding in Roswell 10/20/2024 – R.R. Wilkinson

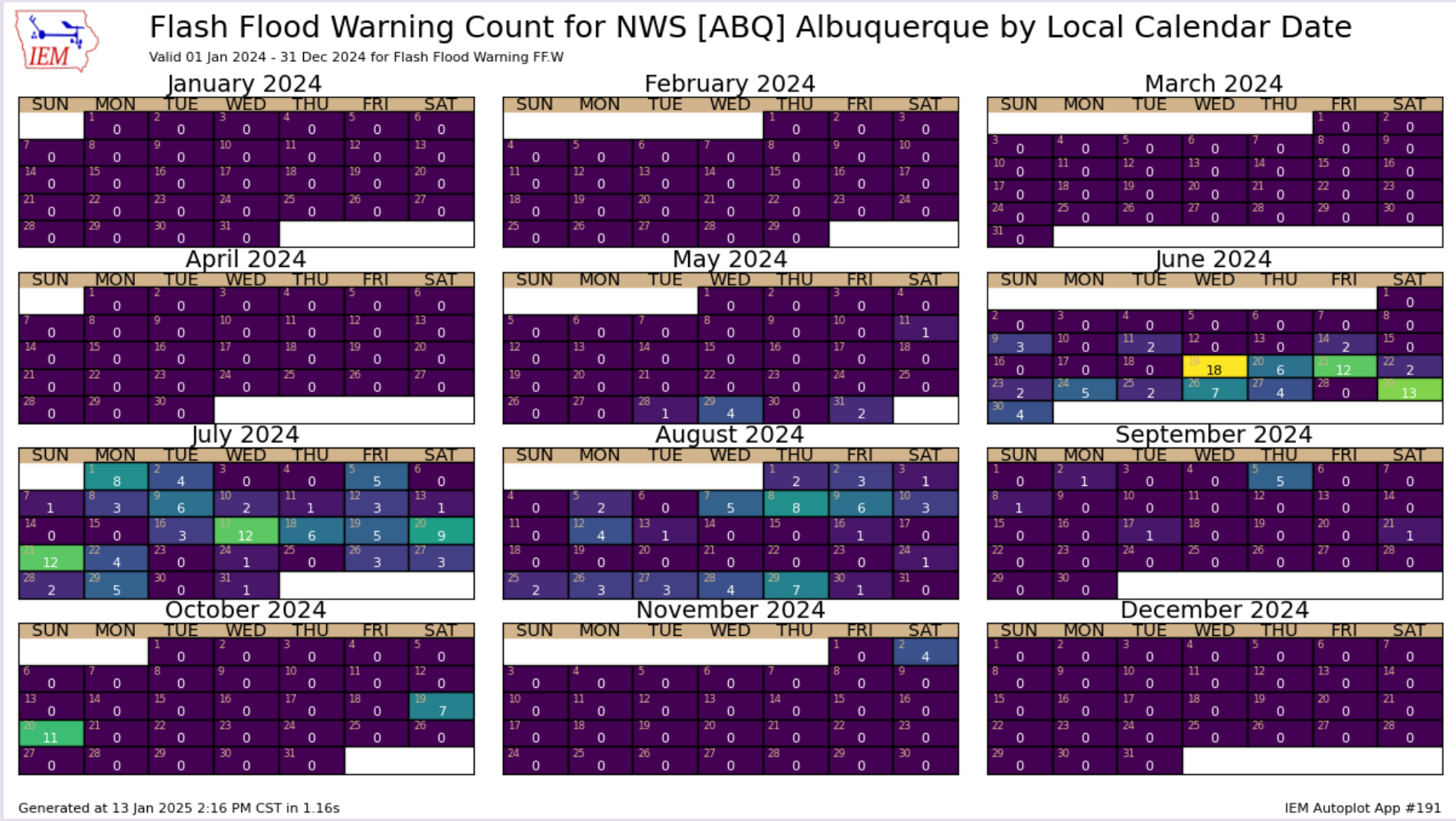
2024's Hydrologic Activity was NOT due to Spring Runoff!



The map to the left shows the snow water equivalent (the amount of water in the snowpack) as a percentage of the 1990-202 median values. The closer the number is to 100, the closer to "normal" the amount of water we have built up in the snowpack for the season. The date shown in March 1st. This date, on average, is the date of peak accumulation for snow, though we have been seeing a trend towards later snowpack development in the last decade.

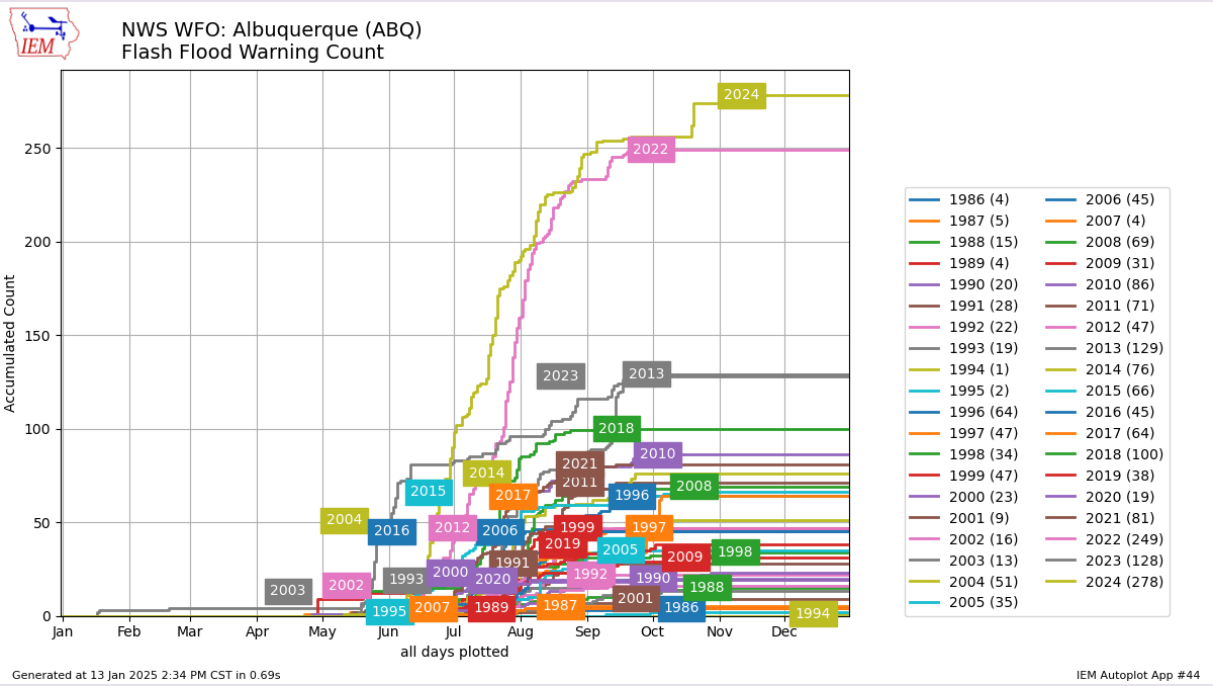
As shown here, the snowpack at the average peak accumulation point was right around normal for the entire state over the last 30 years. Given that, and the fact that most of our major flooding events were flash flood (not riverine flooding) that occurred after the onset of Monsoon season, we can confidently say that snowmelt runoff was a not a player in the hydrologic activity of 2024.

Count of Flash Flood Warnings Issued by ABQ per day of 2024



Looking at the number of Flash Flood Warnings that were issued by day of the year, we can see that the hydrologic activity was centered around several periods of extreme events. Mid-late June, Mid July and October 20. This is not to say there was no activity at other times; even one flash flood warning can be indicative of an extreme event. This just shows the greatest concentration of Flash Flood Warnings.

2024 Total Flash Flood Warnings and Flash Flood Emergencies



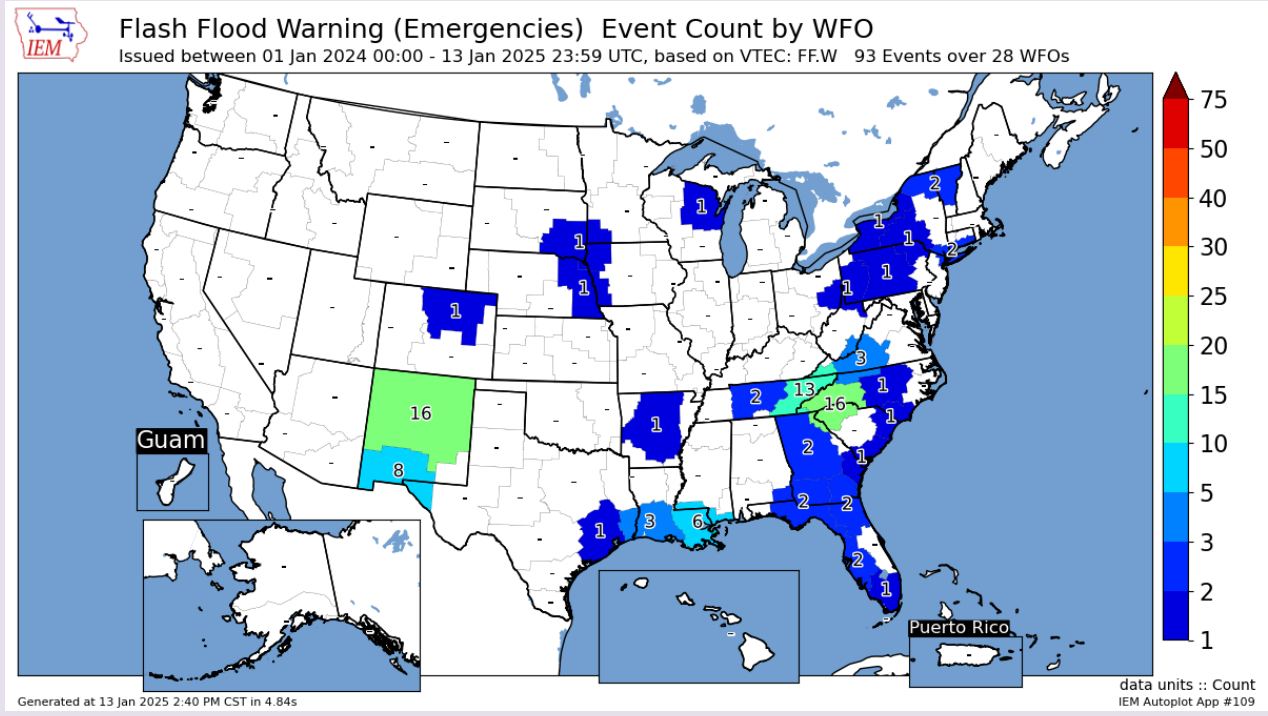
The spaghetti plot above shows the number of flash flood warnings issued by WFO Albquerque in any given year since 1985. 2024 contained the largest number of Flash Flood warnings for any year, even beating out 2022. What do these two years have in common? Burn Scars.

2022 saw the development of the Hermits Peak Calf Canyon fire, the largest fire in NM history that left a burn scar roughly the size of Los Angeles in North Central New Mexico. It was followed by one of the busier monsoon seasons we've seen and we saw near daily flash flooding events somewhere in the vast rural area covered by the burn scar.

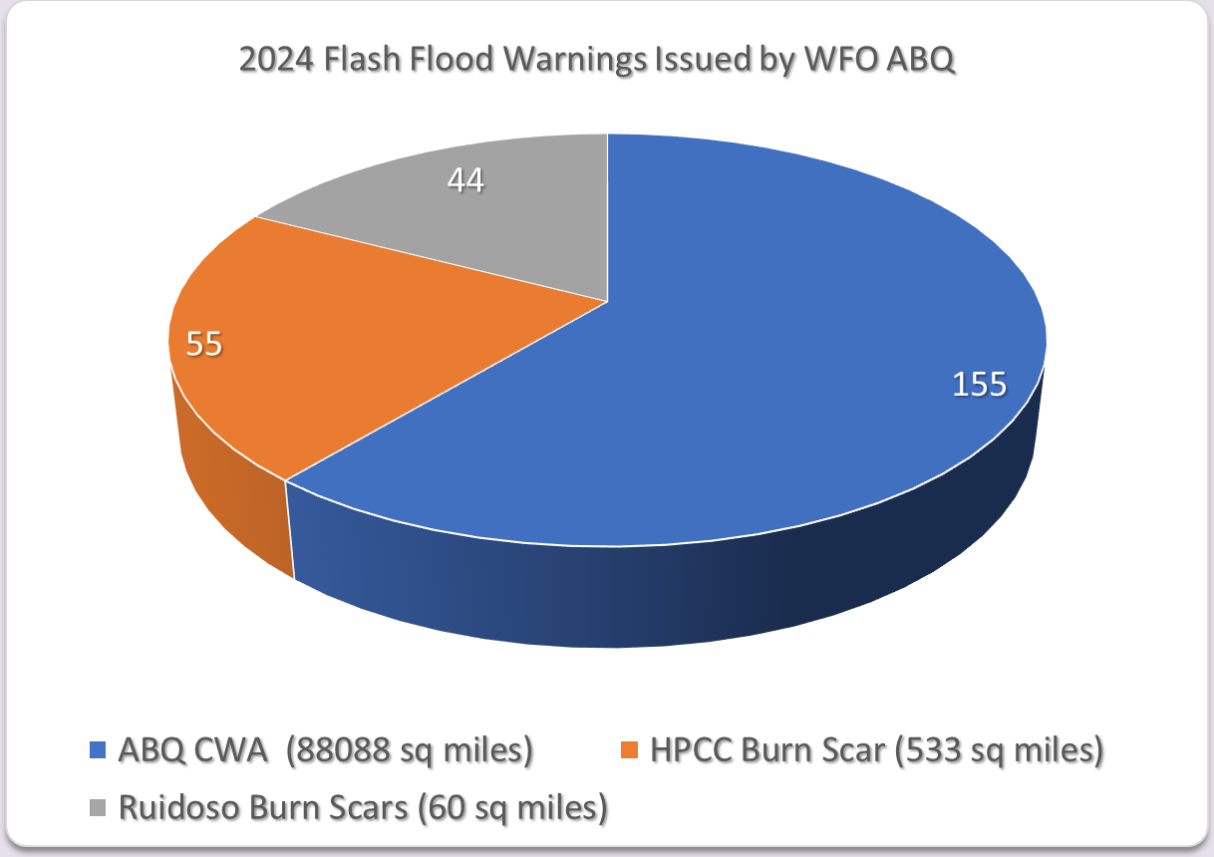
2024 saw the fires in Ruidoso NM. The burn scars from these fires came to a fraction of the Hermits Peak Calf Canyon fire. However, flooding from the burn scars directly impacts a much more densely populated area.

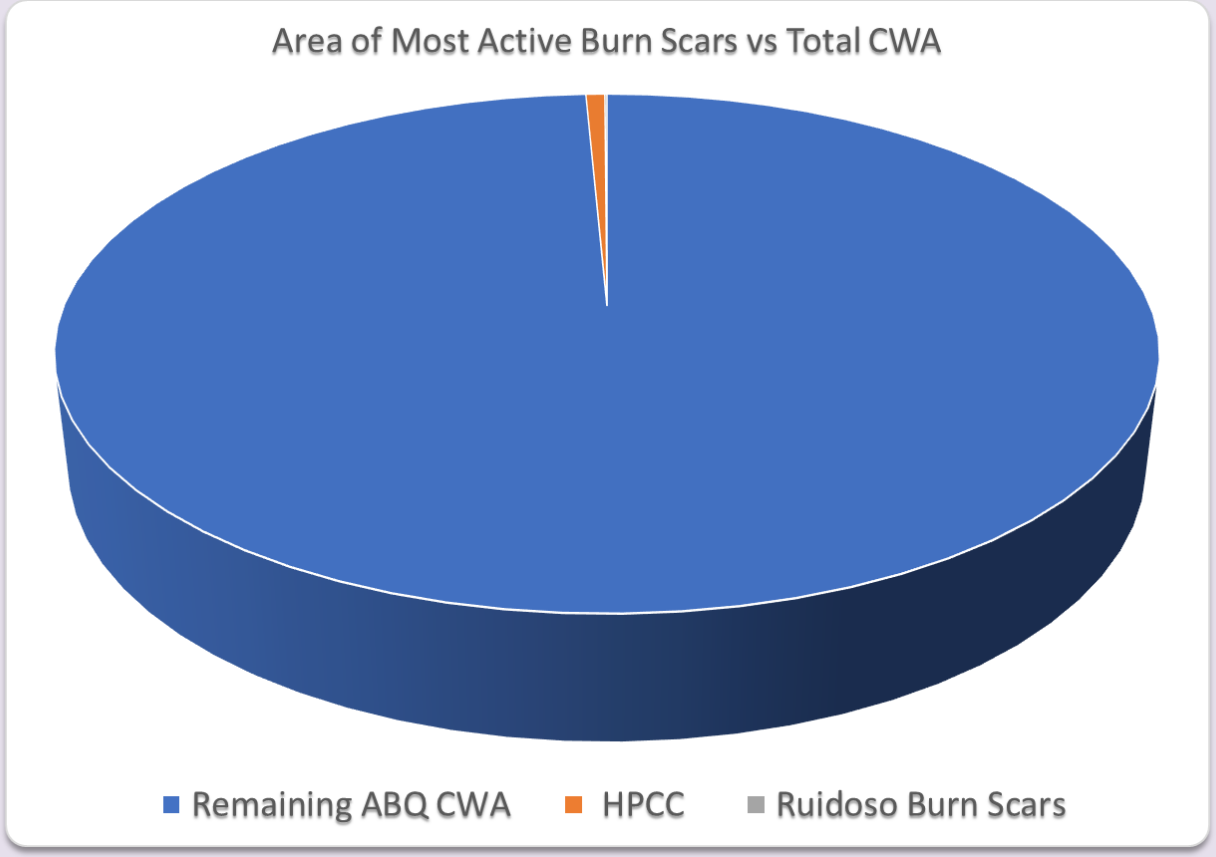
The map below shows the number of Flash Flood *Emergencies* issued by each WFO in 2024. Flash Flood Emergencies are only issued in coordination with Emergency Management personnel and only when there is and immediate threat of catastrophic loss of life and property.

In 22 years, WFO ABQ has issued 25 Flash Flood Emergencies. More than half of those were issued last year, largely due to flooding in Ruidoso, but also because of extreme events in other parts of the state. The only WFO that tied us for events was the Greenville-Spartanburg Office, with the Morristown office a close second, for their work during Hurricane Helene.



Workload Issues

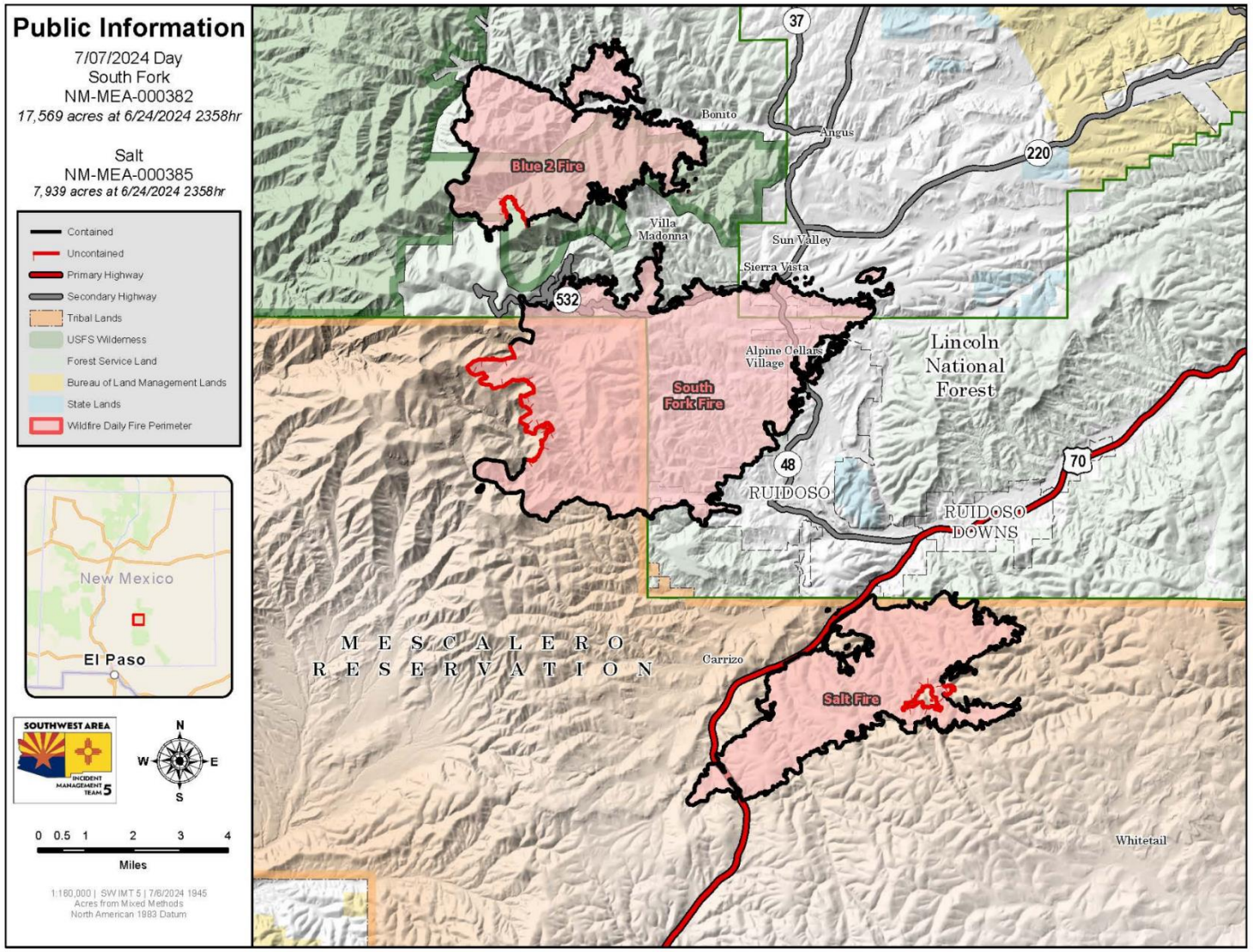




The Burn Scars had an outsized effect on our workload. The total area of the burn scars only accounts for 0.7% of our warning area. However, if you count up the flash flood warnings that went to the burn scars vs the rest of the area, you can see that 39% of our warnings were focused on 0.7% of our warning area. Burn Scars can turn into a black hole for work demand in an office.

That figure, 39% for 0.7% of our area seems like an improvement over 2022 when we issued 63% of our warnings just for the Hermits Peak/Calf Canyon area. However it really isn't. The smaller percentage doesn't mean that the burn scars were less active. It simply points to the fact that the rest of the warning area was also incredibly active. Even without the burn scars, we would have issued a record number of Flash Flood Emergencies for our office in 2024.

Ruidoso Burn Scar Flooding

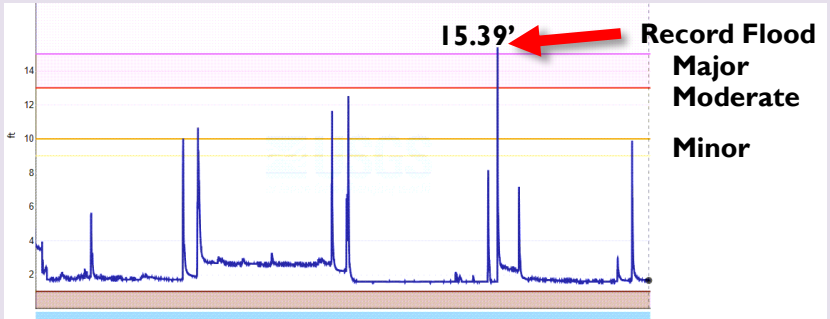


•South Fork Fire and Salt Fires

- Reported at 9:07 AM and 2:00 PM MDT respectively on 06.17.24
- By 3:00 PM MDT 06.18.24 the South Fork Fire had grown to 15,000 acres and threatened the Village of Ruidoso
- At least 1400 structures were destroyed
- 2 lives were lost
- By 06.18.24 Governor Lujan-Grisham had declared a disaster and over 7,000 people were under an evacuation order
- **By 06.19.24 NWS Albuquerque issued the first of eleven Flash Flood Emergencies (while also having a considerable tagged severe storm that produced baseball sized hail on the burn scars).**
- By 06.20.24 President Biden issued a Federal Disaster Declaration.
- There were now three fresh burn scars that could directly impact downtown Ruidoso

Ruidoso Burn Scar Flooding

Fern Trail Flash Flood | July 9, 2024
Courtesy Jesus Figueroa via Facebook



Rio Ruidoso @ Ruidoso USGS Gage Height | June 15 – July 31, 2024

Ruidoso Downs Flood | July 9, 2024
Courtesy Jake Canavan

Erosoion Along Cedar Creek Trail
Courtesy Brian Samson

From June 19 to September 1st, WFO ABQ issued 11 Flash Flood Emergencies for the Ruidoso area. Catastrophic flooding and debris flow crushed the town over and over again. Burn Scars are exquisitely sensitive to rainfall due to the hydrophobic soils left if the wake of a fire. It's akin to covering a mountain with a sheet of plastic just before the rains come. A storm that might cause a minor rise in the Rio Ruidoso will now result in record flooding on the river, as shown in the hydrograph above. These flows carry ash and debris capable of punching through buildings and destroying roads. The center photo shows the Ruidoso Downs race trac as the flooding caused a collapse of the track and built into a dangerous, dammed waterway. The final picture on the right shows a typical level of destruction seen on many roads in the area. The Fires and Subsequent flooding resulted in over a billion dollars of damages, making this as much of an economic disaster for Ruidoso as a natural one.

Ruidoso Burn Scar Flooding

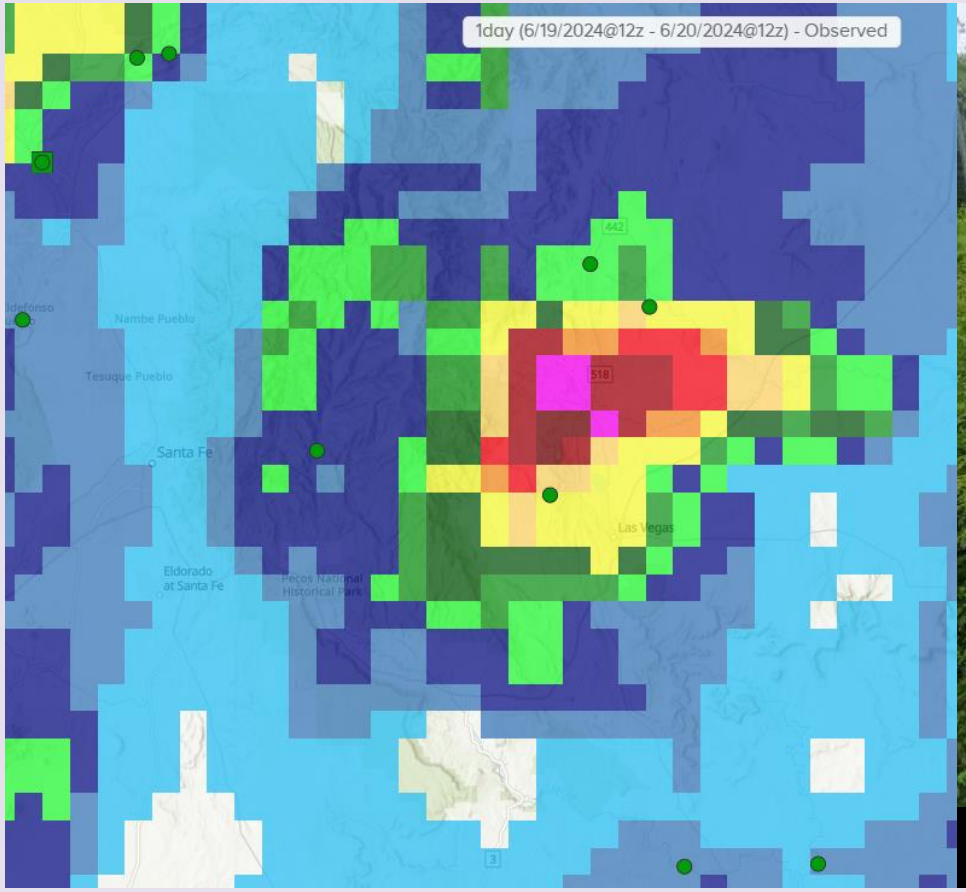
Courtesy Eric Queller

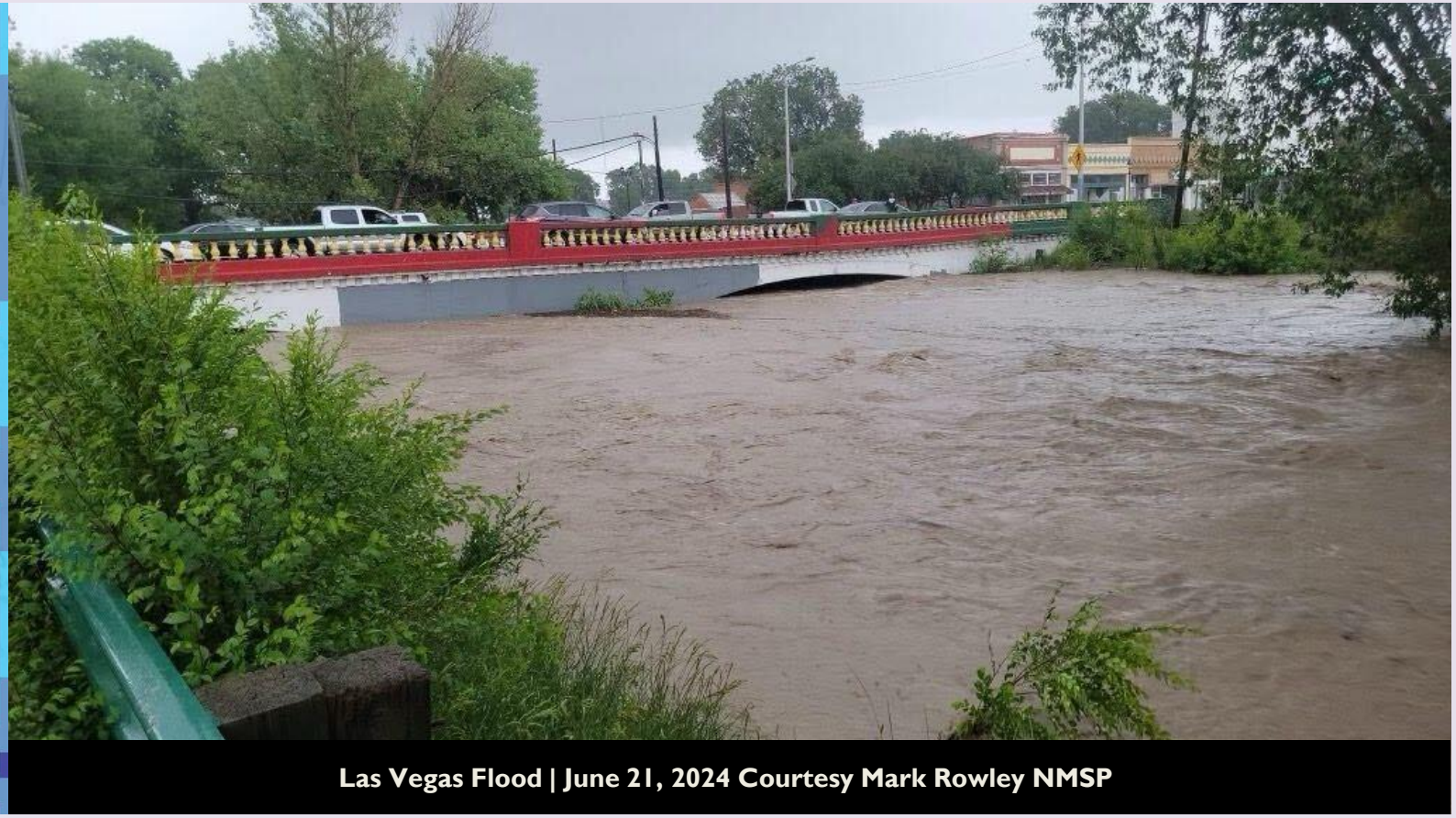
National Guard Meeting in EOC – Courtesy Eric Queller

Daily EOC Briefing – Courtesy Eric Queller

- **WFO ABQ provided 99 continuous days of in person or dedicated virtual support to the Ruidoso EOC, with weekly support on going through January of 2025.**
- **Over 5000 people from 14 different states came through the Ruidoso EOC to help with the emergency response.**
- **Swiftwater Rescue crews performed at least 120 distinct rescue operations. There were 187 shelter in place orders issued and 130 evacuation orders for flooding.**
- **Despite the challenges, no lives were lost in the flooding that followed the fires.**

Catastrophic Flooding in Las Vegas





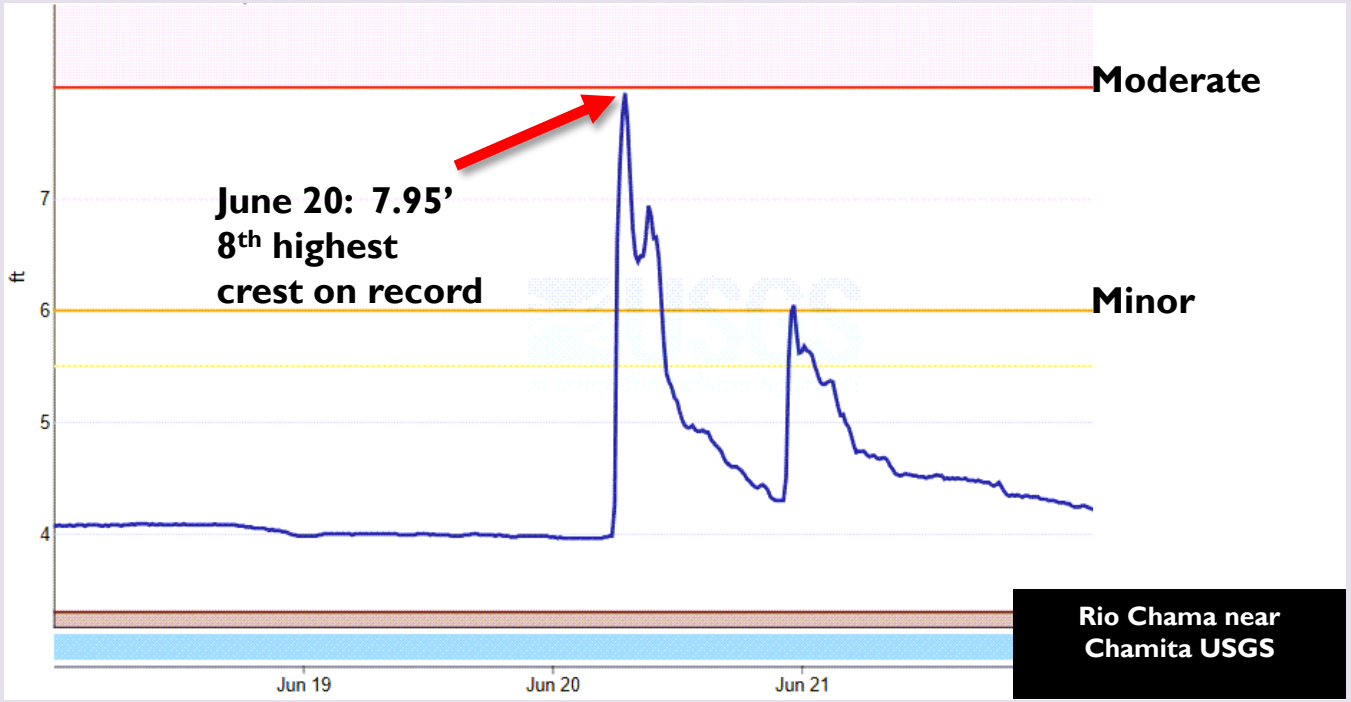
Las Vegas Flood | June 21, 2024 Courtesy Mark Rowley NMSP

On June 20th, Approximate 5-8 inches of rain fell near Las Vegas, New Mexico, partially on the still very active Hermit's Peak/ Calf Canyon Burn Scar. For reference, NOAA Atlas 14 shows that the 24 hour 1000 year rainfall amount is 6.36". Considering that we saw as much as 8 inches and that this rain fell in under 12 hours, this event exceeded the 1000 year storm by a healthy margin. Extreme storms like this are becoming more and more common in New Mexico and this is just one example from 2024 of such and event.

This storm drove the issuance of another Flash Flood Emergency from WFO Albuquerque. Several bridges over Gallinas Creek were overtopped in the City of Las Vegas with a major bridge on highway 518 came perilously close. Upstream, Brantley Dam was overtopped by 2 feet, prompting an evacuation order near the Dam and causing severe damage to the wastewater treatment plant for Las Vegas, resulting in several weeks of water restrictions.

Rerouting of the Rio Chama

Rio del Oso Medanales | June 20, 2024
Courtesy City of Espanola

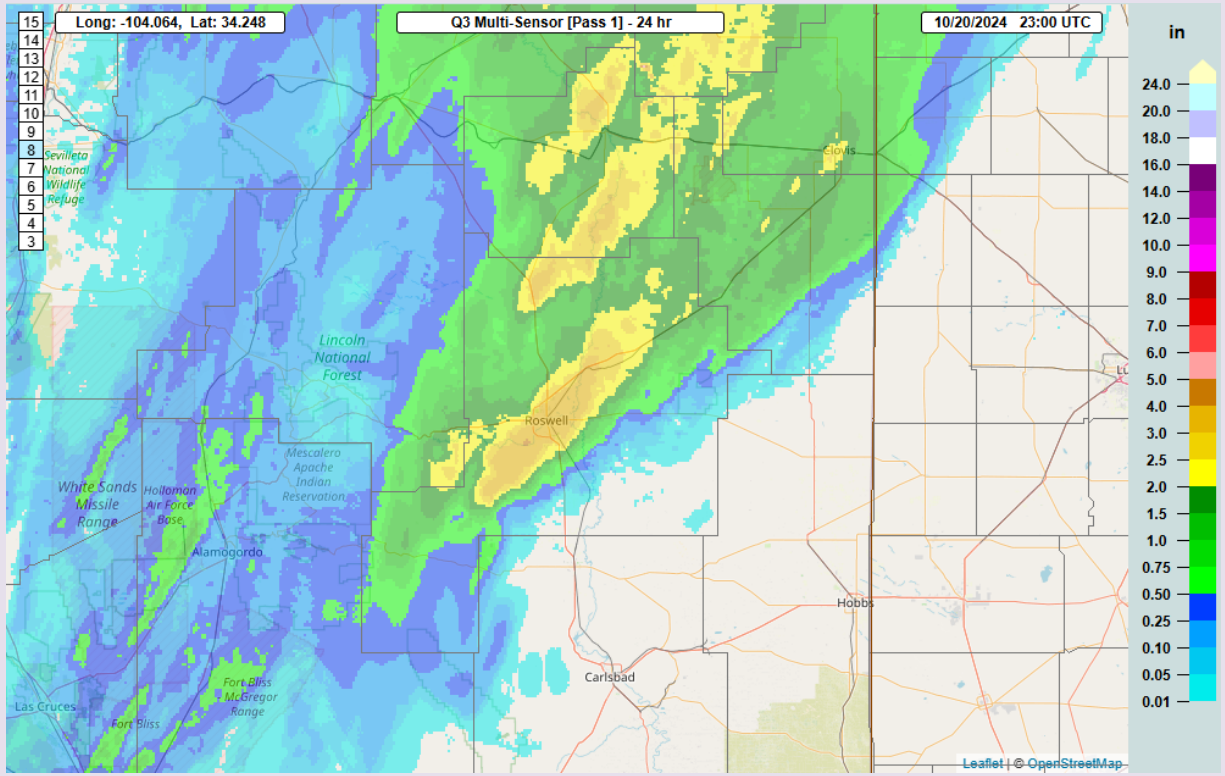


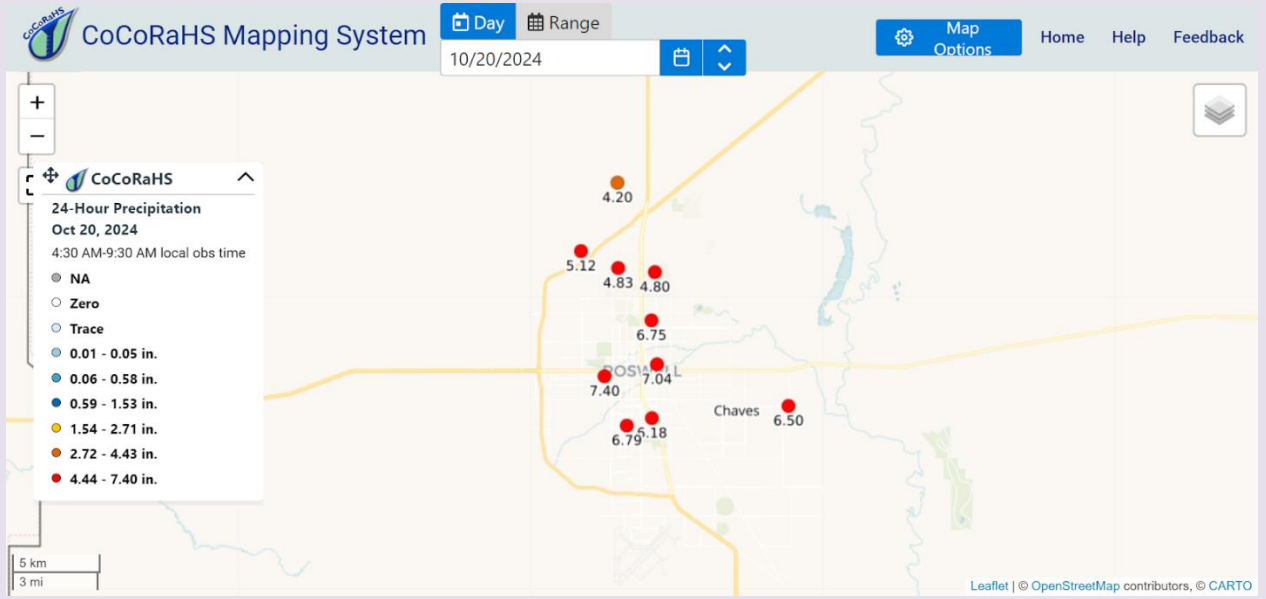
Rio Chama near Chamita USGS

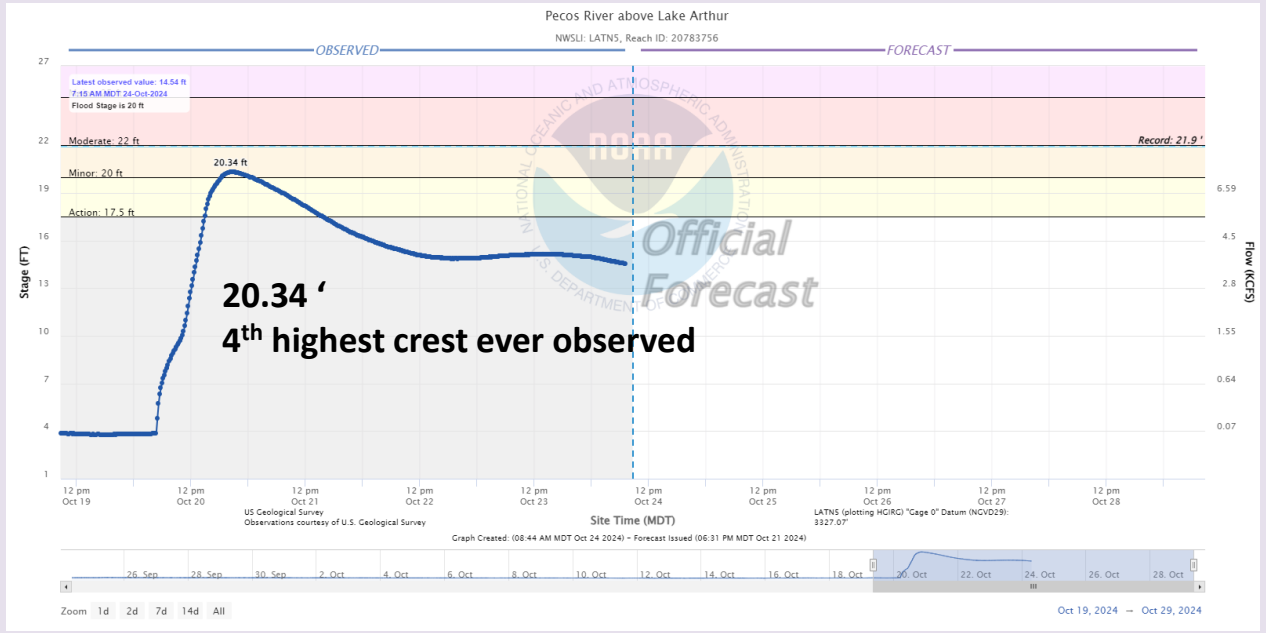
In north-central New Mexico, approximately 12 inches of rain fell on the NE slopes of the Jemez mountains over 24 hours ending on June 20th. This amount of rainfall is another example of an extreme weather event in New Mexico and indeed approached the probable maximum precipitation (PMP) amount calculated for the area. Literally, this was the worst case scenario for rainfall.

Water and sediment rushing down the La Madera arroyo trapped residents, eroded foundations beneath homes and put so much sediment into the Rio Chama that the river was rerouted and jumped it's northern bank, runn

Catastrophic Flooding in Roswell, Dexter and Hagerman





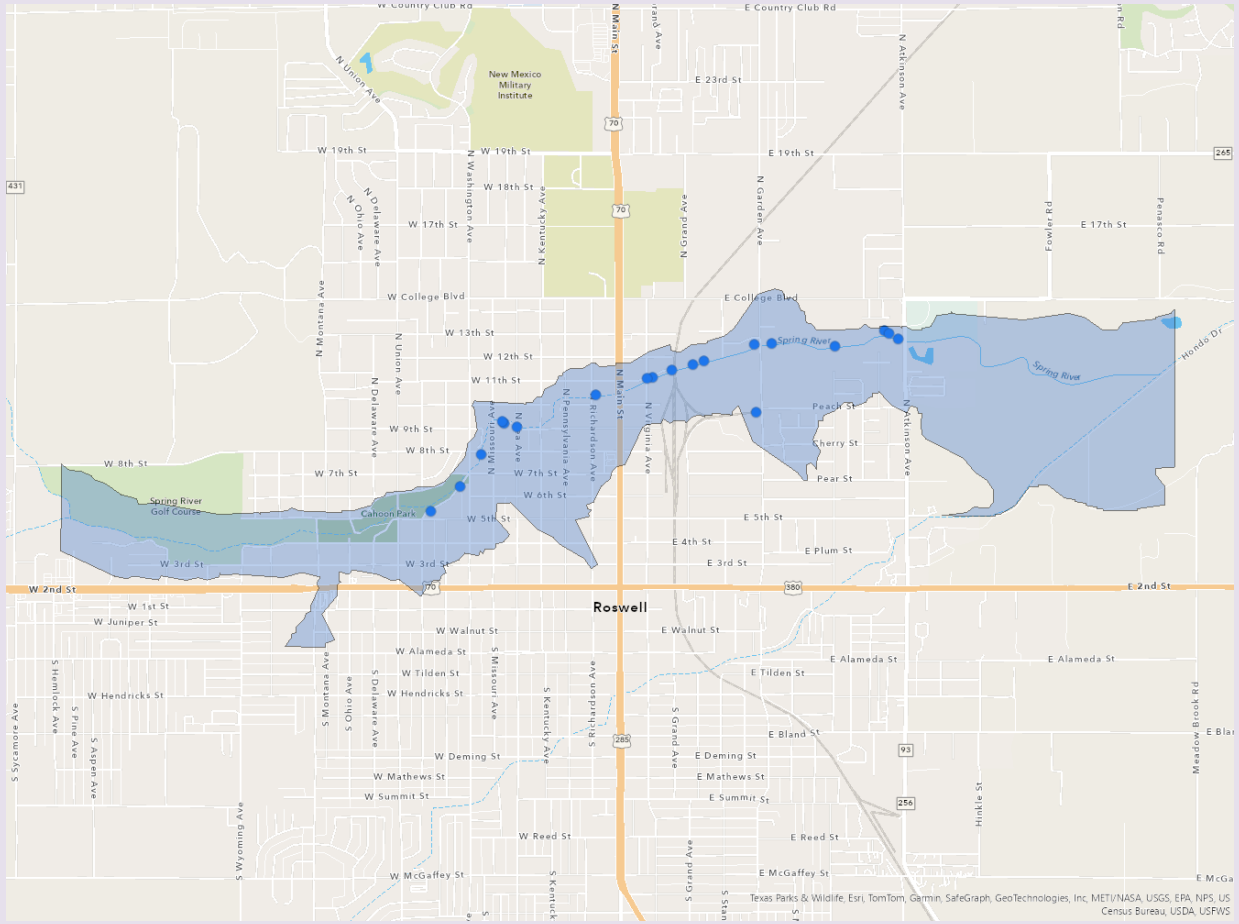


On October 20, a series of storms brought torrential rain over Roswell, NM and much of Chaves county. Radar badly underestimated the amount of rain falling. While it shows 2-4 inches of precip, gage analysis in the area saw 5-7 inches falling in just a few hours. That much rainfall in that time span exceeds the 1000 year storm value from NOAA Atlas-14.

WFO ABQ issued it's final Flash Flood Emergency of 2024 for this event, which caused millions in damages to Roswell as well as the nearby towns of Dexter and Hagerman. The Pecos River and Lake Arthur, downstream of the worst of the flooding saw a crest of 20.34 ft, the fourth highest crest seen at that sight.

2024

Catastrophic Flooding in Roswell, Dexter and Hagerman



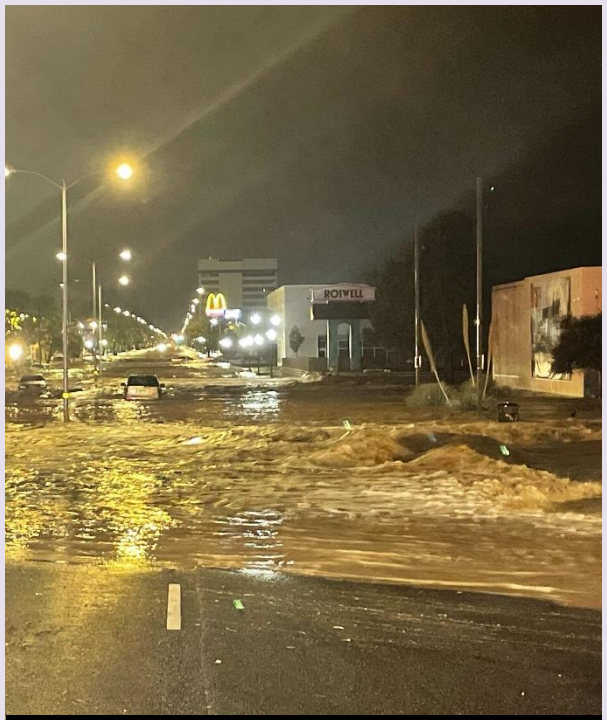
In Roswell itself, the main effect was seen on the Spring River canal that runs through the city. Shown above is a modeled flood inundation map showing the areal extent of flooding. This map was confirmed by field surveys and shows that the Spring River flooded to an average depth of 16' above the channel bed.

Water flowed quickly into the Roswell Civic Center, where an event was being held. Citizens fled to the roof and stayed there overnight until they could be rescued by air the next day.

Cars Swept away during Roswell Flood – Courtesy Scott Overpeck

Canal damage from Roswell Flood – Courtesy Scott Overpeck

Cars Swept away during Roswell Flood – Courtesy R. R. Wilkinson



Catastrophic Flooding in Downtown Roswell 10/20 – Courtesy Eric Queller

Catastrophic Flooding in Roswell, Dexter and Hagerman

Cars Swept away along HWY 2 in Hagerman 10/20/2024 – Courtesy FM 106.5

Drone Footage of Areal Flooding in Dexter 10/20/2024 – Courtesy Gabriel Aguilar

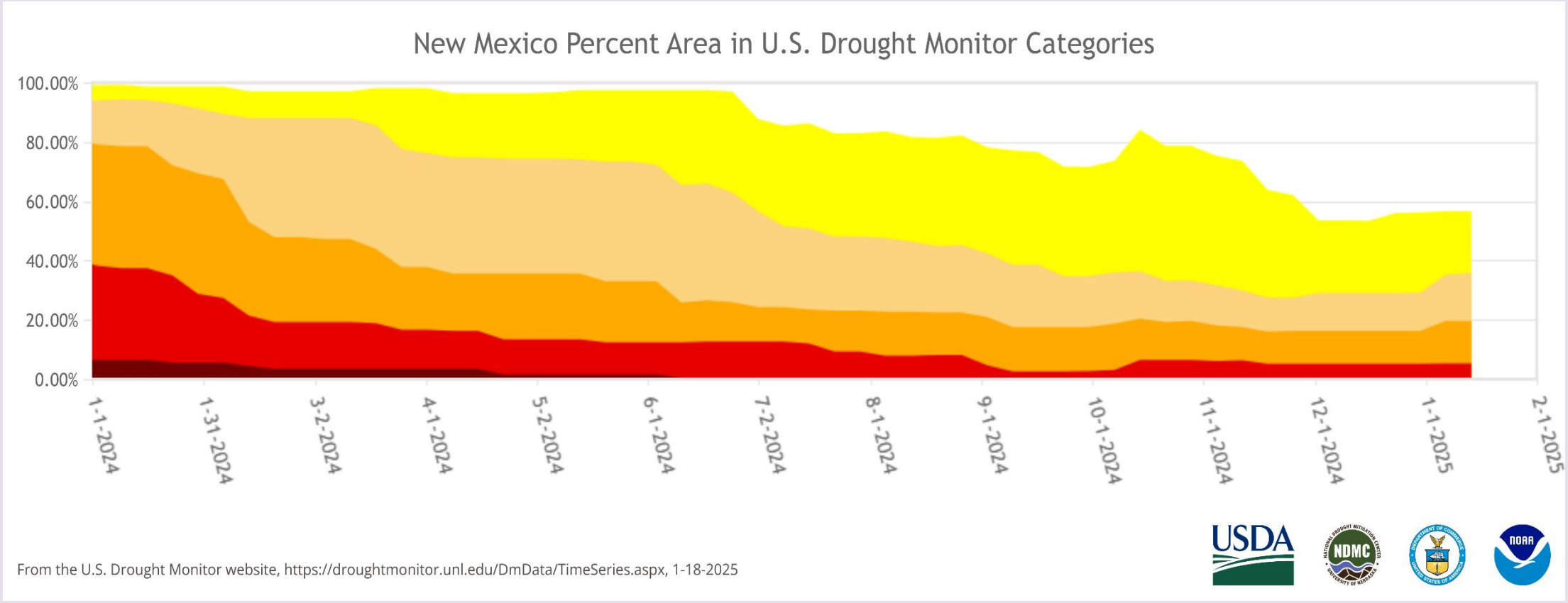
Flood Damage to HWY 285 Bridge over Rio Felix Near Dexter 10/20/2024 – Courtesy Craig Schinnerer

South of Roswell, Chaves county saw catastrophic and possibly record flooding along the Rio Felix. The USGS gage at that location was quickly destroyed. Surveys show that the Rio Felix reached a depth of 25-30 ft above the channel bed in some locations. These flows damaged the main roads in the area and caused ongoing traffic problems for weeks afterwards.

Flooding was not confined to rivers however, with 5-7 inches of rain, much of the county was simply inundated with overland flows.

2024 Drought Status

The very hot and dry monsoon season from 2023 set the stage for drought conditions to linger well into the beginning of 2024. The winter season of 2023-2024 was less robust than the previous year which allowed for only very slow improvements through the spring season. Another active summer monsoon in 2024 followed by a very wet fall season helped conditions improve even further through late 2024. A very dry December flatlined any drought improvements.



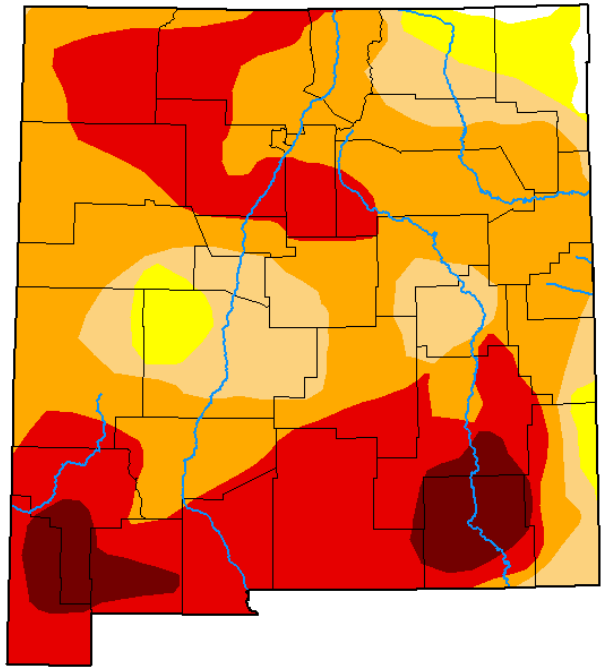
From the U.S. Drought Monitor website, https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx, 1-18-2025

2024 Drought Status

Drought conditions peaked early in 2024 followed by gradual improvement throughout the year. An active monsoon season followed by several very wet storm systems through the fall continued to help conditions improve through early December.

U.S. Drought Monitor

New Mexico



January 2, 2024

(Released Thursday, Jan. 4, 2024)

Valid 7 a.m. EST

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

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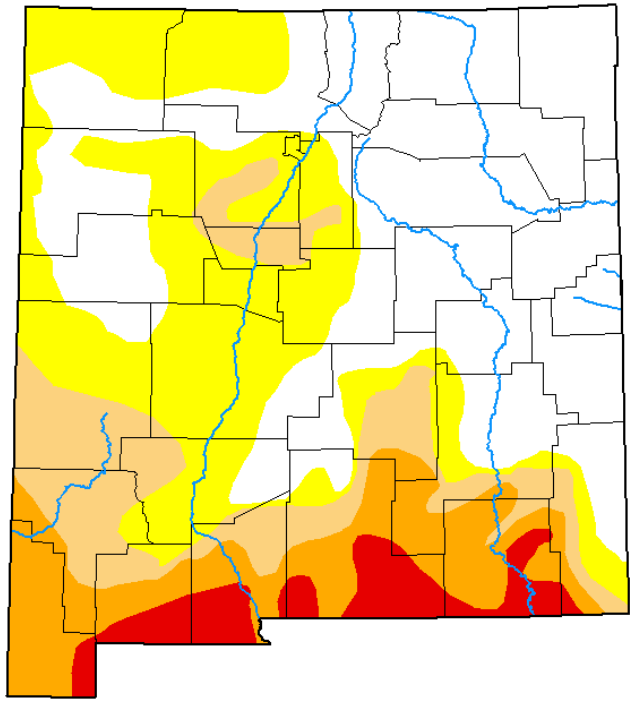
droughtmonitor.unl.edu

U.S. Drought Monitor

New Mexico



December 31, 2024

(Released Wednesday, Jan. 1, 2025)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.74	56.26	29.19	16.25	5.19	0.00
Last Week 12-24-2024	44.02	55.98	29.05	16.25	5.19	0.00
3 Months Ago 10-01-2024	28.35	71.65	34.73	17.54	2.80	0.00
Start of Calendar Year 01-02-2024	0.71	99.29	94.04	79.22	38.39	6.48
Start of Water Year 10-01-2024	28.35	71.65	34.73	17.54	2.80	0.00
One Year Ago 01-02-2024	0.71	99.29	94.04	79.22	38.39	6.48

Intensity:

- None
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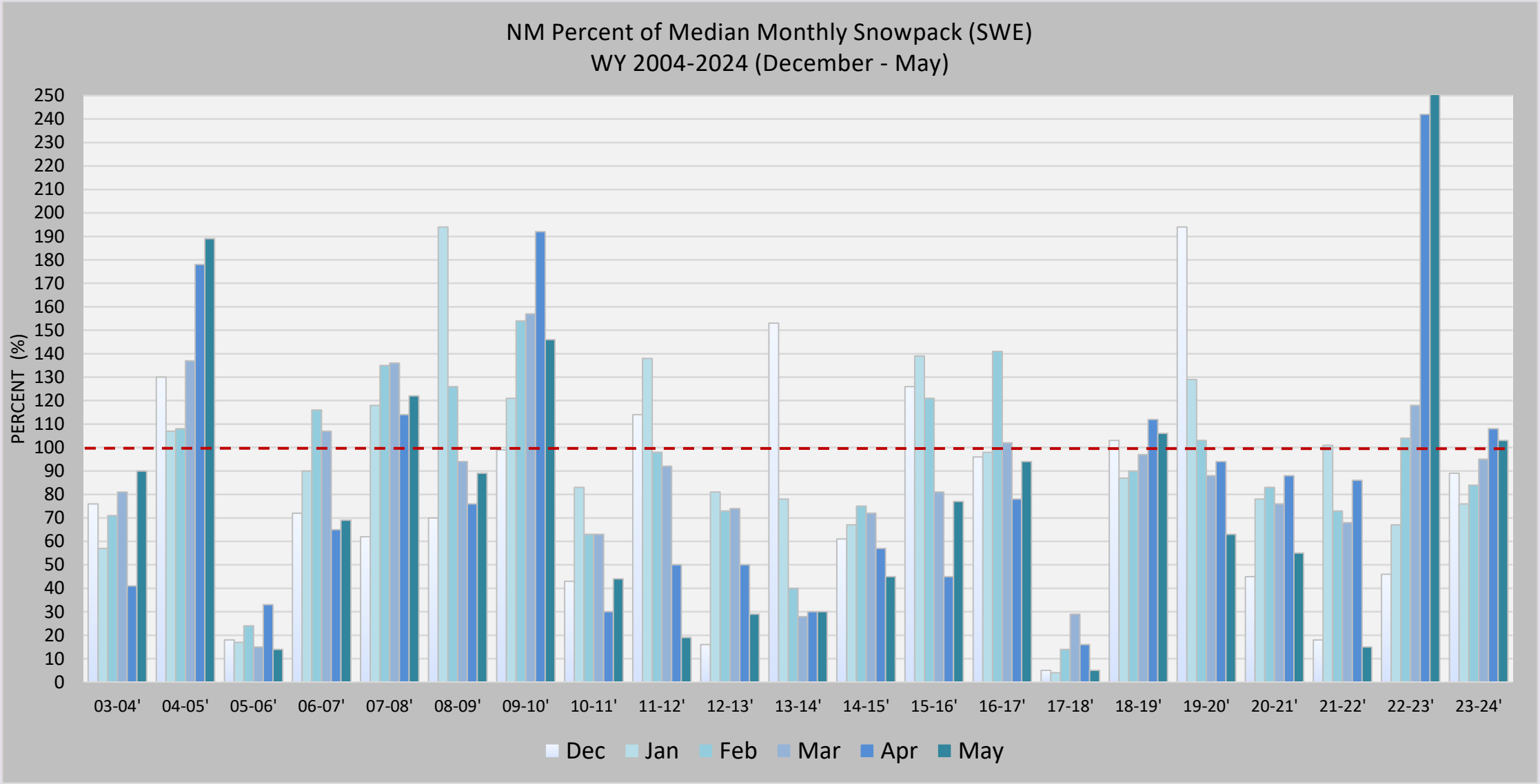
NCEI/NOAA

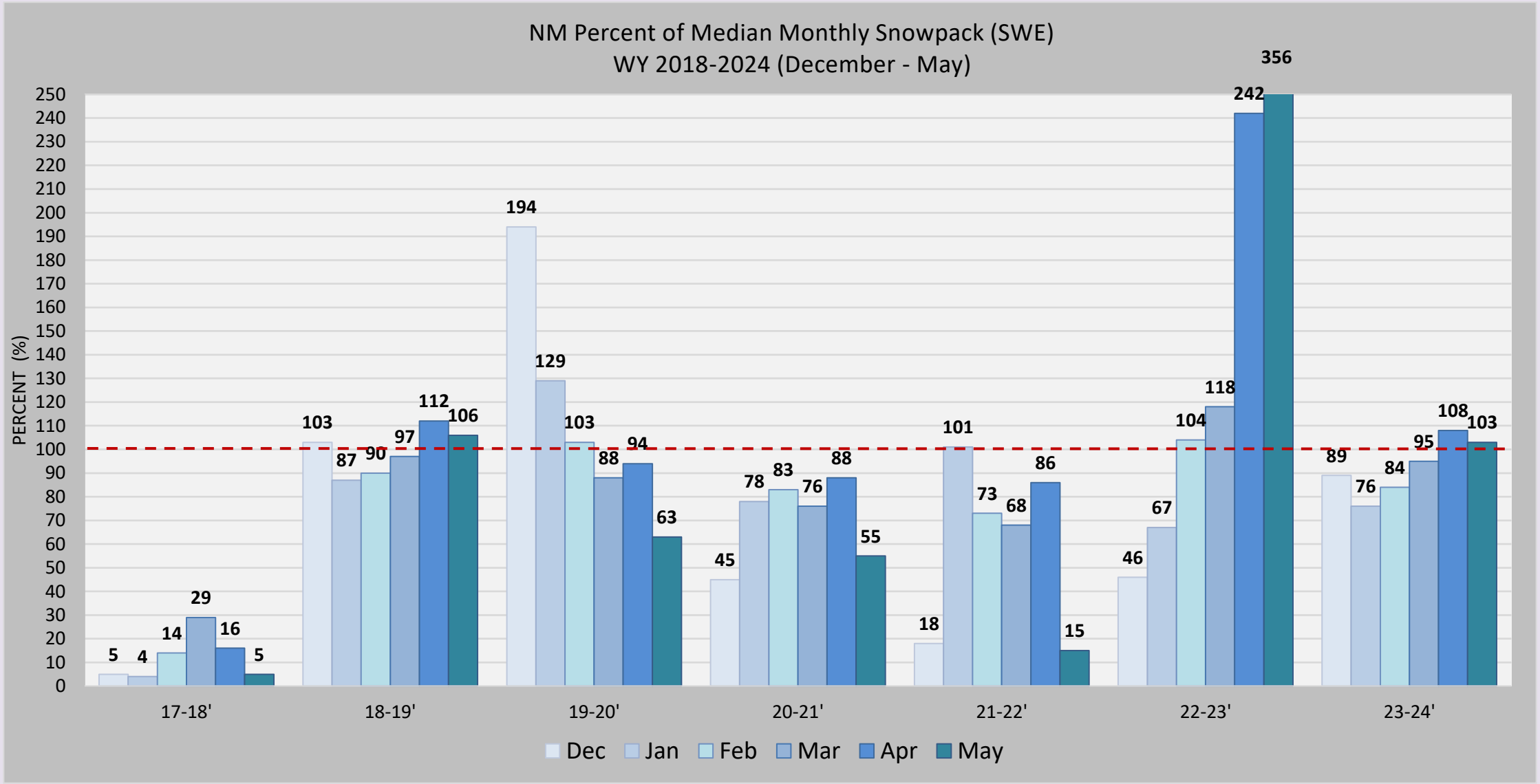
droughtmonitor.unl.edu

2004-2024 New Mexico Median Monthly Snowpack



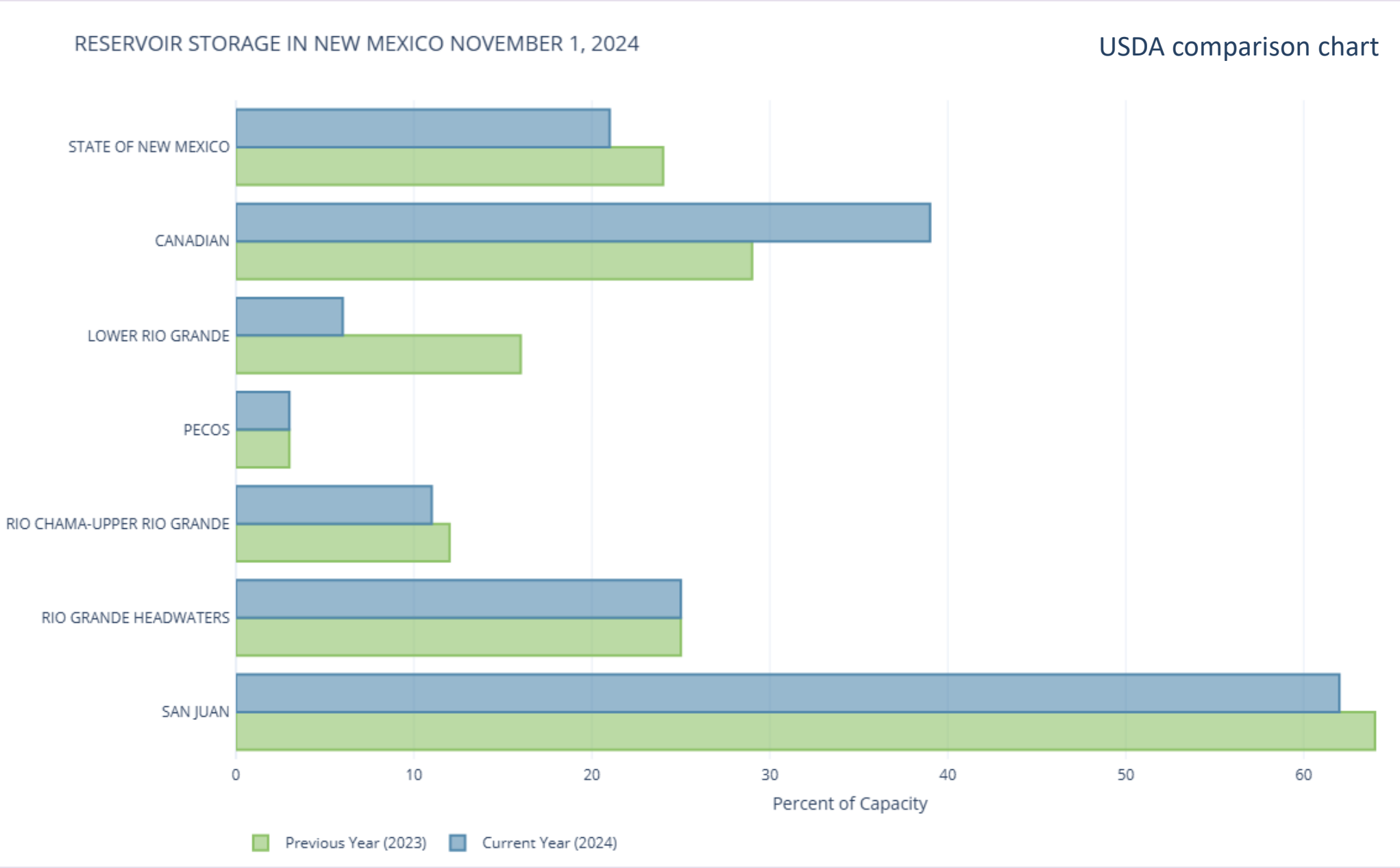
The chart above shows the percent of median monthly snow water equivalent (SWE) since 2004 for NM (1981-2010 and 1991-2020 climatology). The 2022-2023 season was the best seasonal snowpack across the region since 2009-2010. The May 2023 SWE value was literally off the chart. The 2023-2024 was close to normal for most of the season. A hot and dry monsoon season leading up to the 2023-2024 winter season paved the way for a less than ideal runoff season in the spring of 2024 given poor antecedent conditions beneath the snowpack.

2018-2024 New Mexico Median Monthly Snowpack



The chart above is the same as the previous slide but for 2018 to 2024. The 2017-2018 season was practically snow-free. The following 2018-2019 season made a big comeback with close to median snowpack through the entire season. 2019-2020 started out great then trailed off by late spring. 2020-2021 was fair followed by more struggles in 2021-2022. The 2022-2023 season ramped up in January with impressive SWE by the spring. 2023-2024 ended up near normal for much of the season.

2024 Basin Reservoir Storage in NM 2024 (blue) vs 2023 (green)



Resources

- USGS Water Dashboard
- NM Water Data Dashboard
- US Drought Monitor
- NM Drought Status
- USGS Water Data
- USGS Groundwater Watch
- City of Albuquerque Groundwater Monitoring
- NRCS Basin Data Reports
- Office of the State Engineer – Hydrology Bureau
- Healy Collaborative Groundwater Monitoring Network
- Questions?: sr-abq.webmaster@noaa.gov
- NWS Albuquerque Facebook
- @NWSAlbuquerque & #nmwx