



# Monsoon 2023 Recap

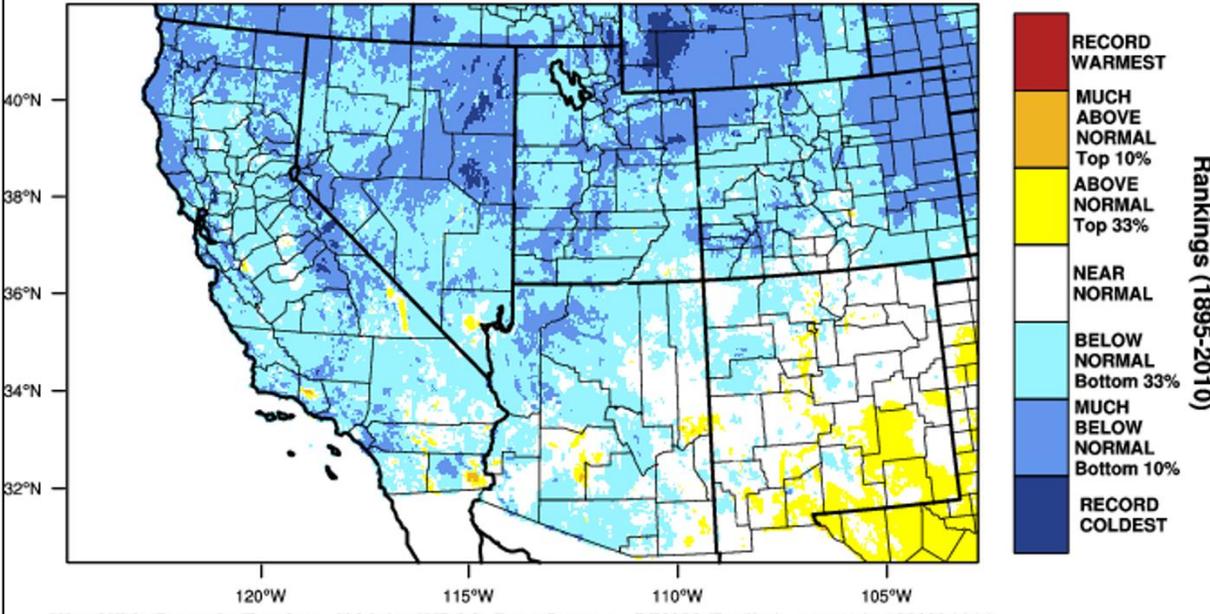
**Daniel Henz**

Flood Warning Branch Manager



### Southwest - Mean Temperature

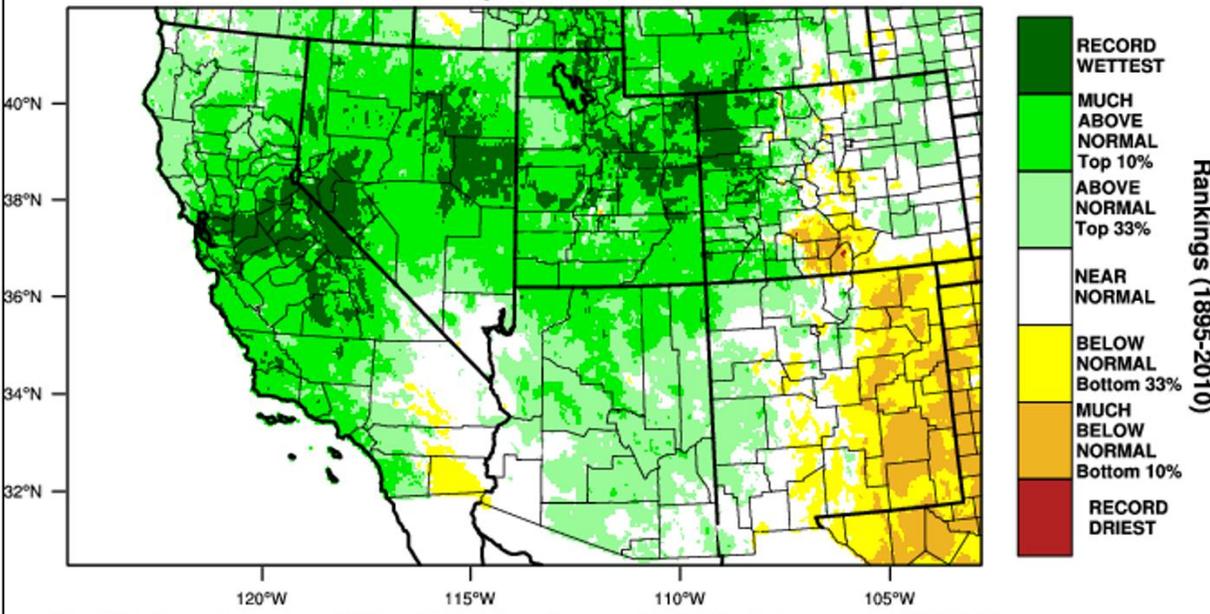
December-April 2023 Percentile



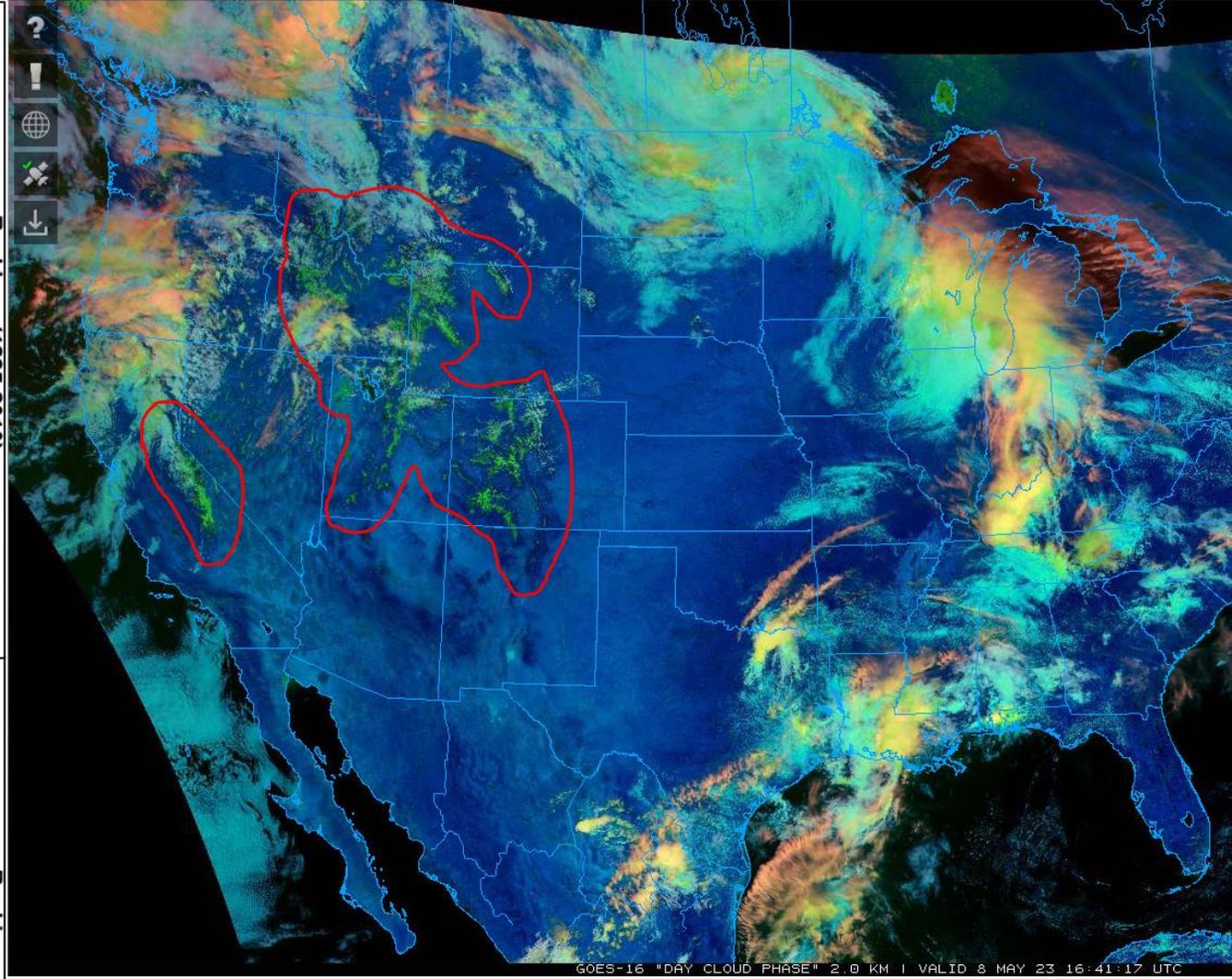
WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 5 MAY 2023

### Southwest - Precipitation

December-April 2023 Percentile

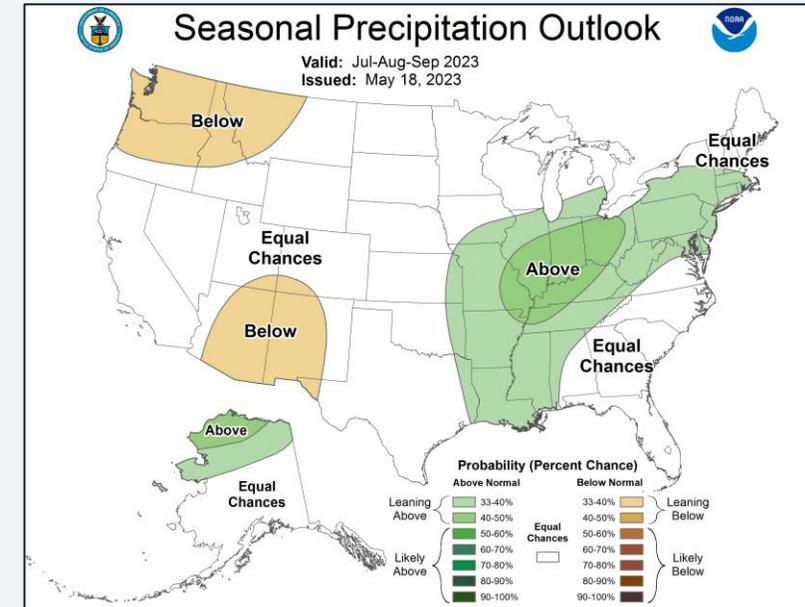
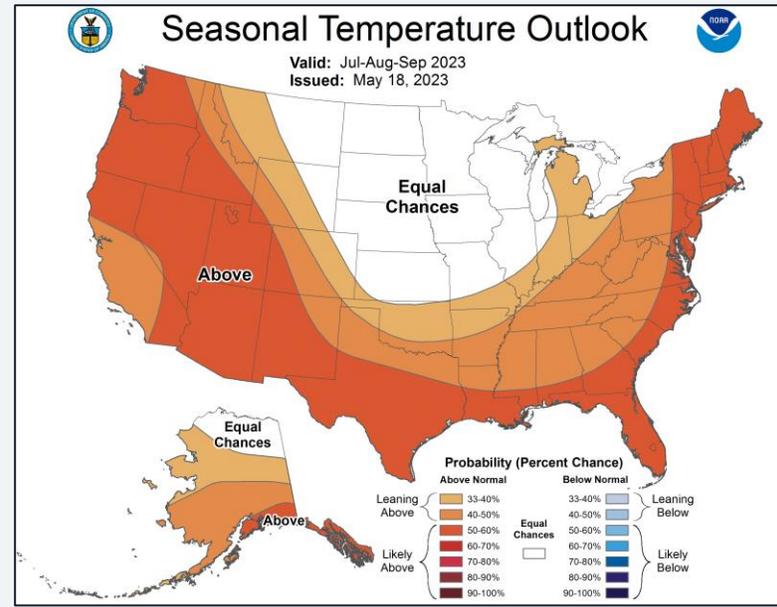


WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 5 MAY 2023



# Wet and Cold antecedent Winter/Spring Seasons

# NOAA/CPC 3-Month Outlook (JAS)

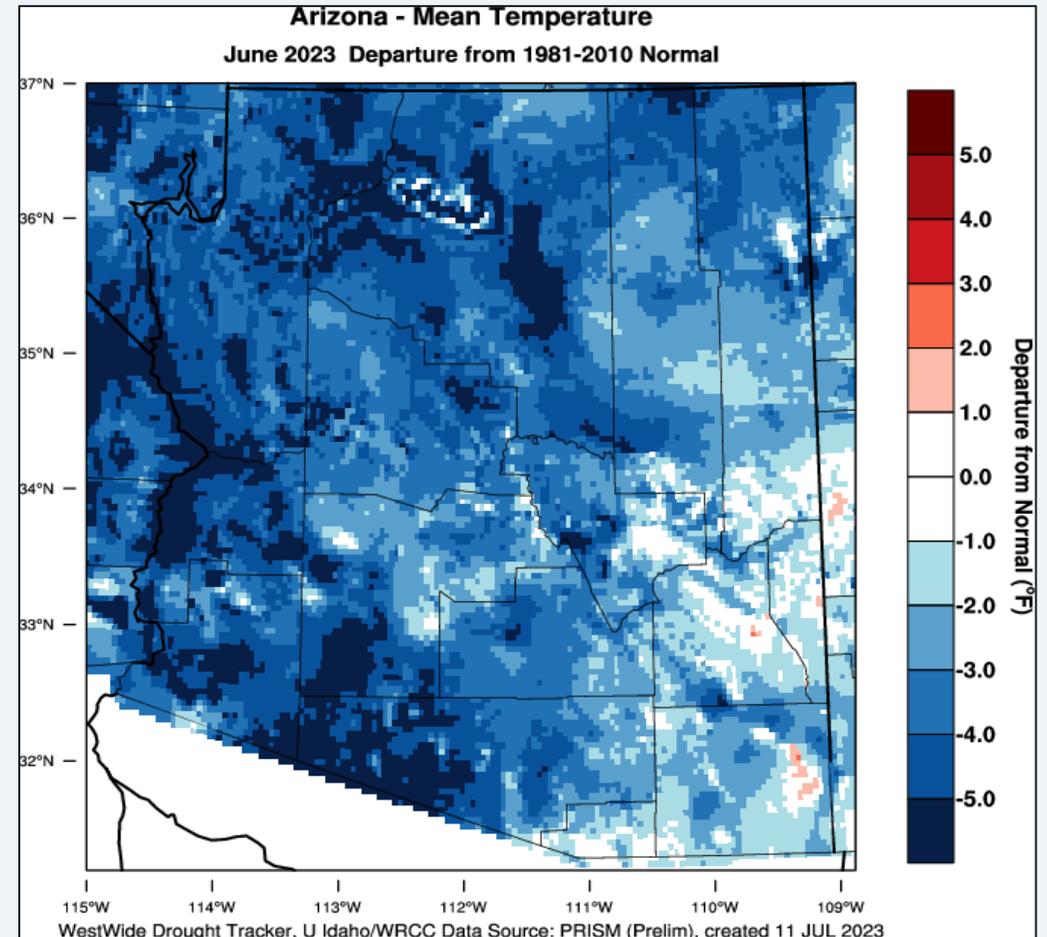
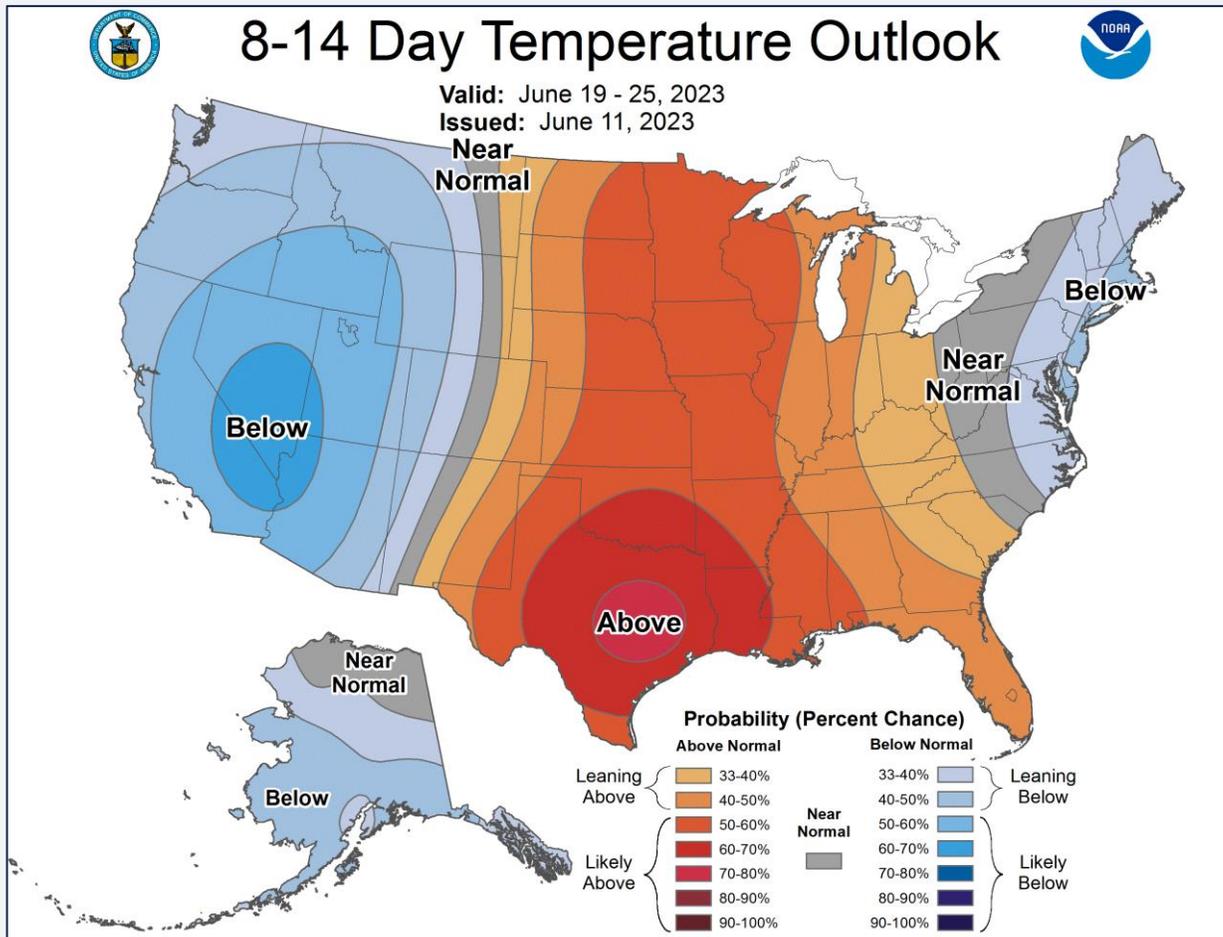


## From Monsoon Outlook: 6/13/23

- Odds favor Above Normal Temperatures and Below Normal Rainfall; likely to see a later onset or even a false start; historical evidence supports more erratic placement of Monsoon Ridge; hopefully, a late season/fall push from El Niño. Not likely to have a repeat of 2021 or 2022.

# Where Was The Typical June Heat Wave?

Below Normal Temperatures Expected the Remainder of the Month...



# Monsoon Ridge Suppressed in June...

Low Pressure Trough

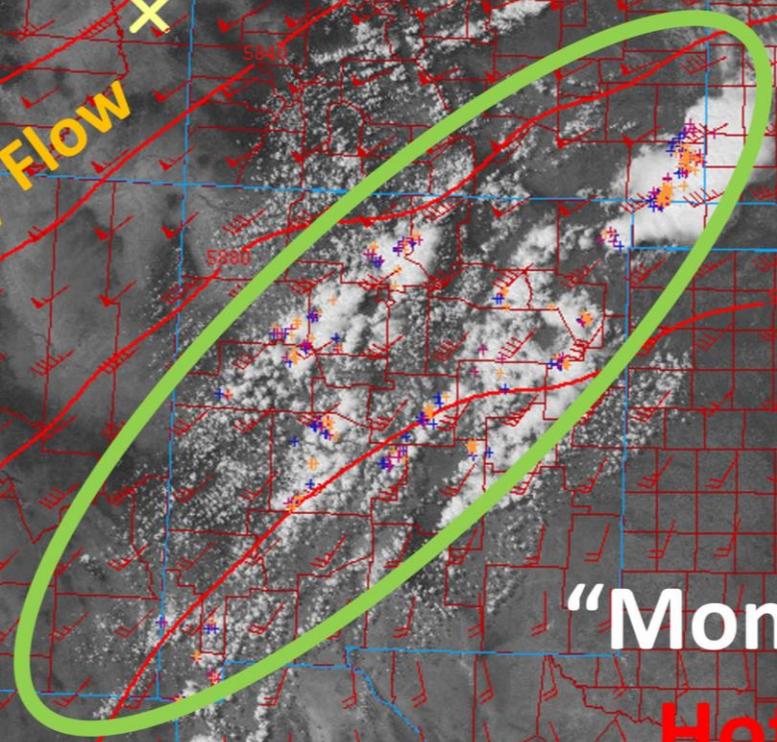
Cooler



Dry & Breezy Southwesterly Flow



Arizona



"Monsoon Ridge"

Hot & Humid

T-storms

H

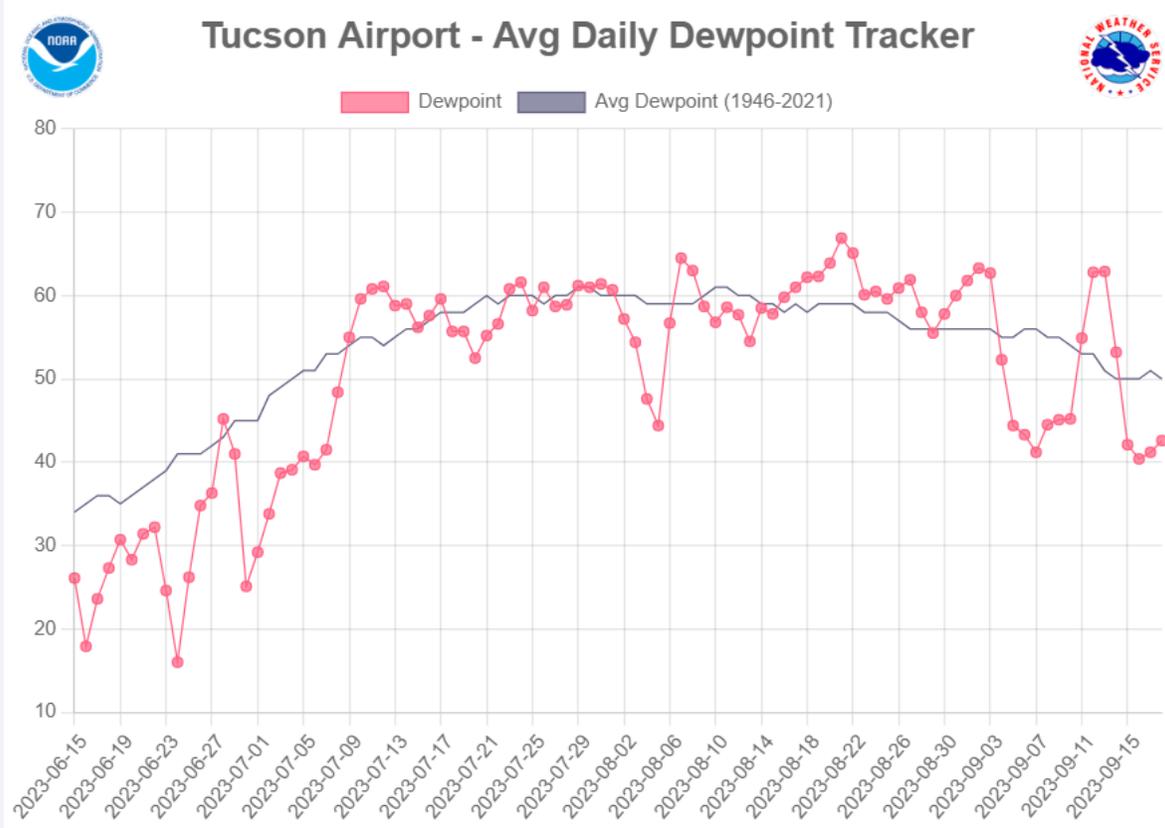
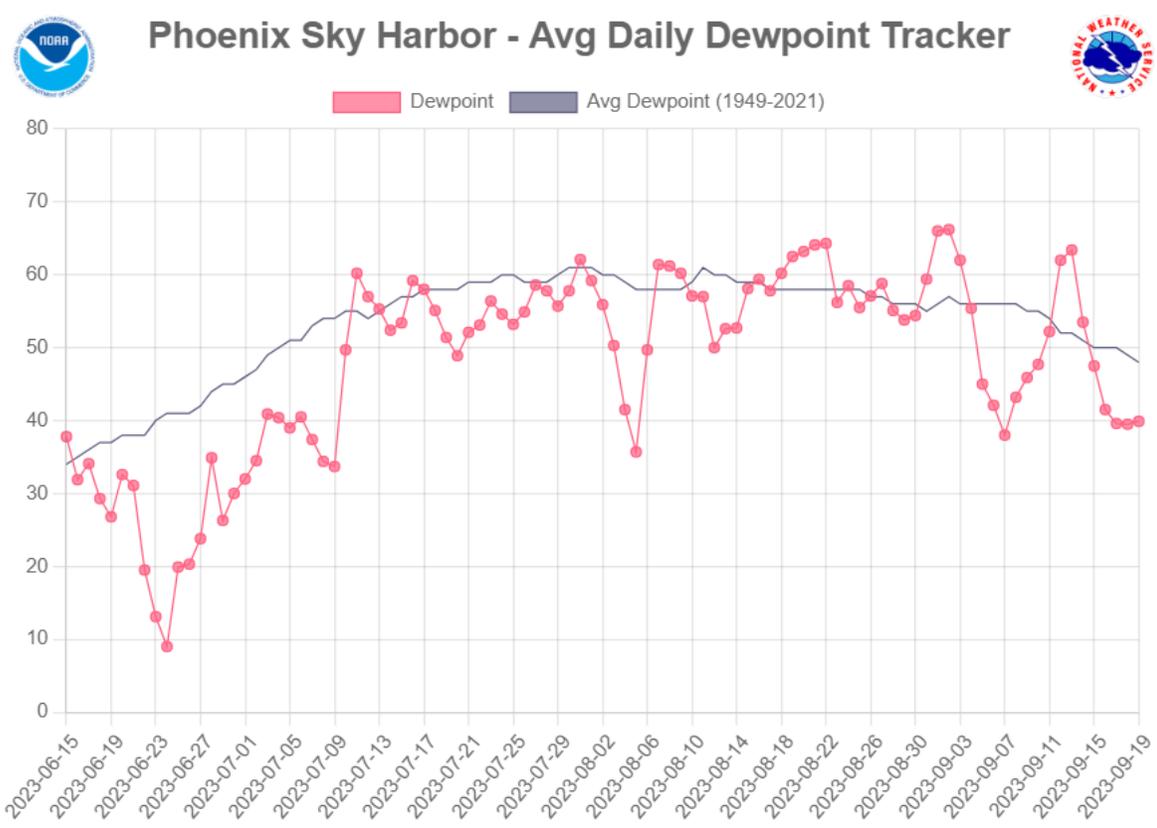
+ 20: 31: 17 - 20: 36: 17  
+ 20: 36: 17 - 20: 41: 17  
+ 20: 41: 17 - 20: 46: 17



# **Monsoon Heatwave**

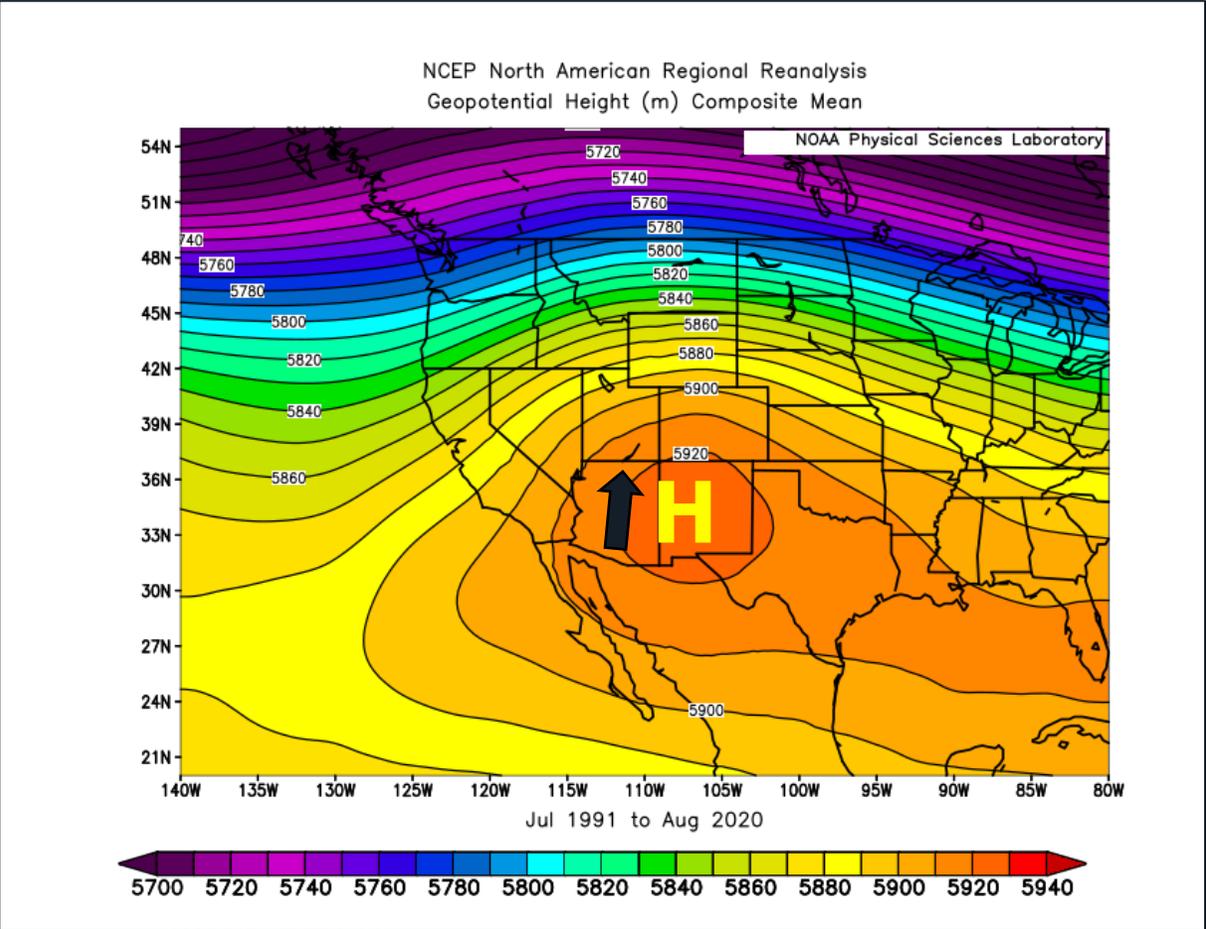
**Where was the moisture?...**

# Monsoon Moisture Tracker

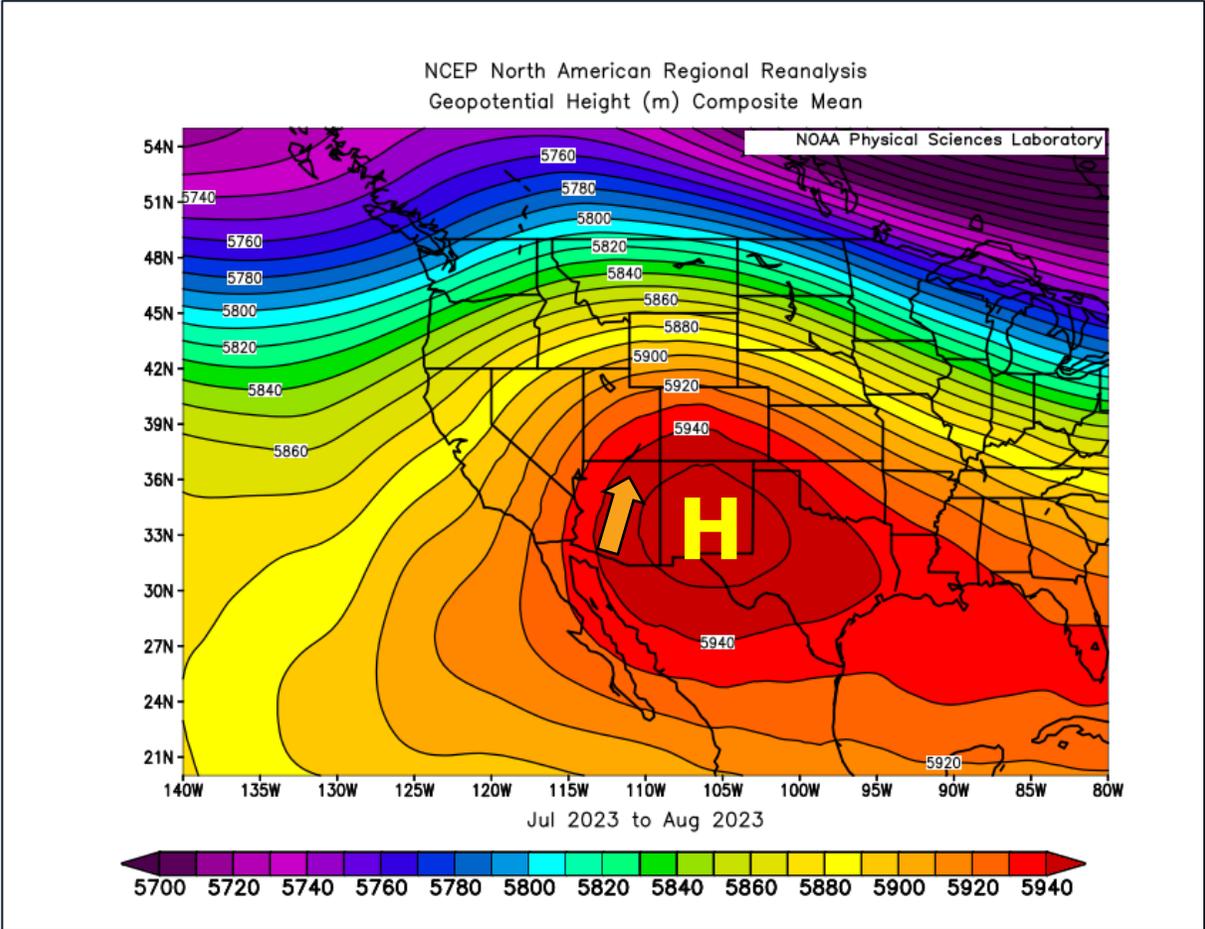


# Monsoon Ridge Seasonal Placement

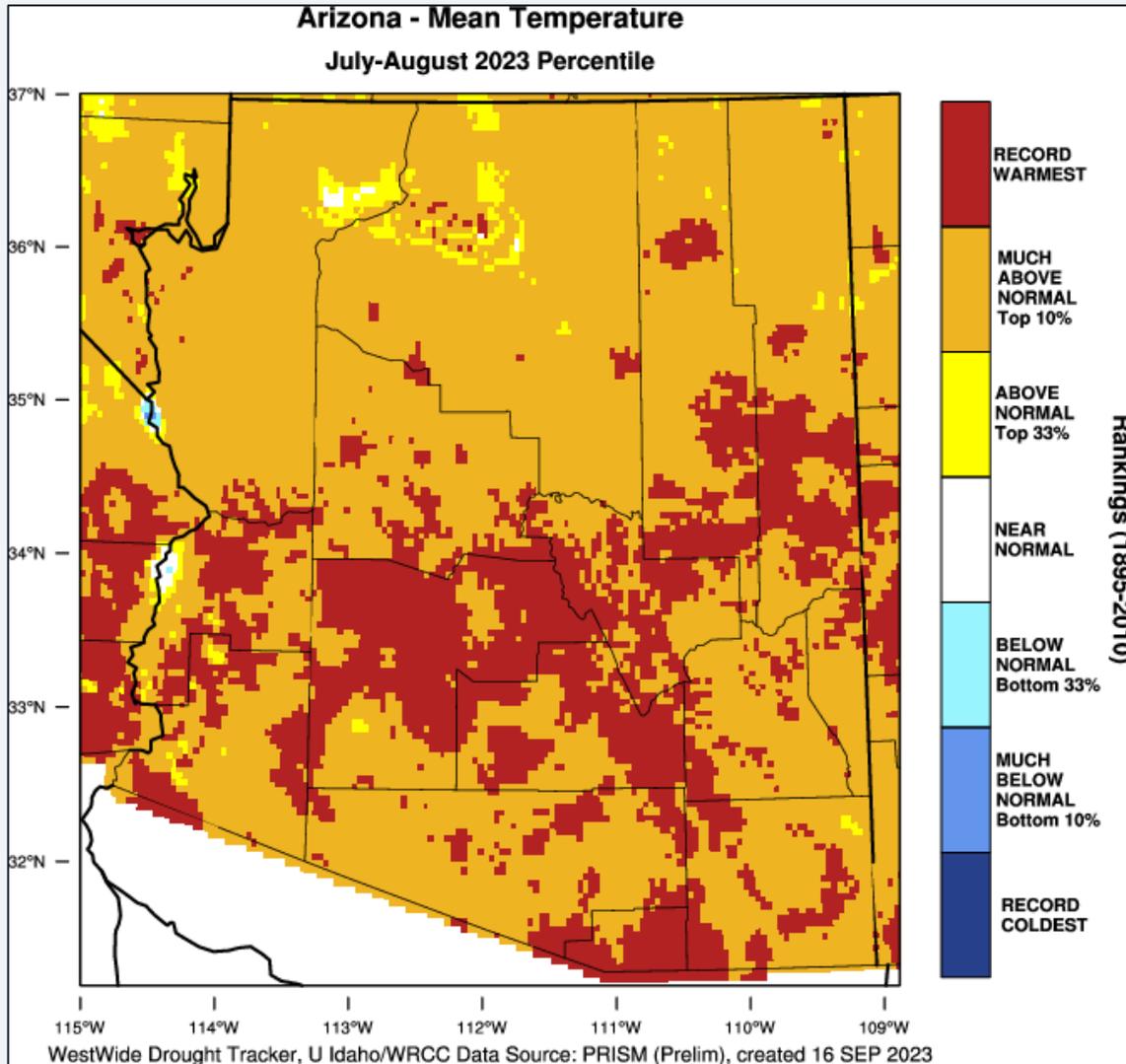
July-August 1991-2020 Mean



July-August 2023 Mean Position



# Historic July & August Heat!

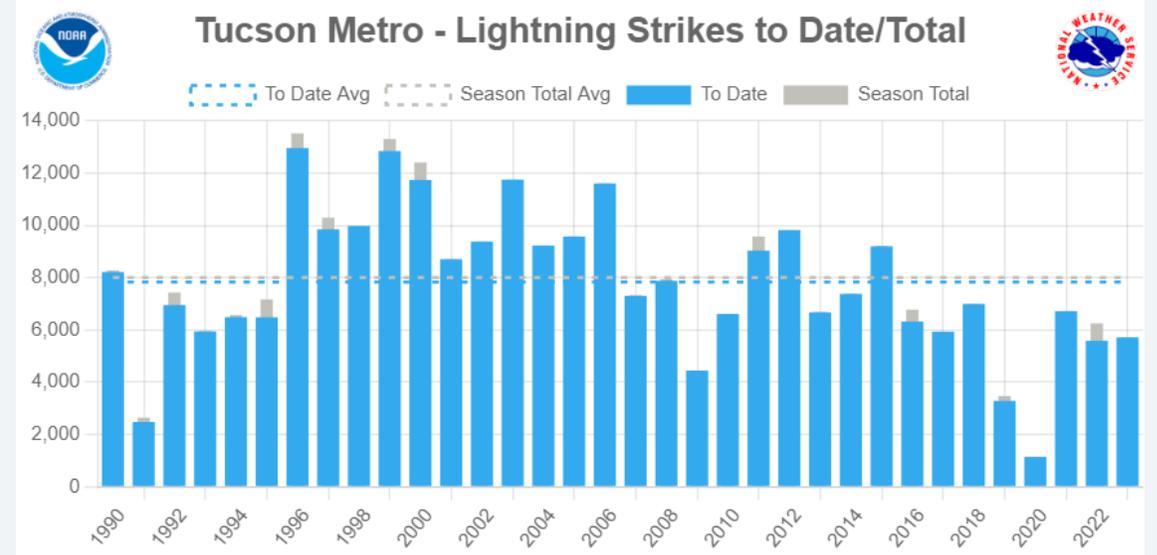
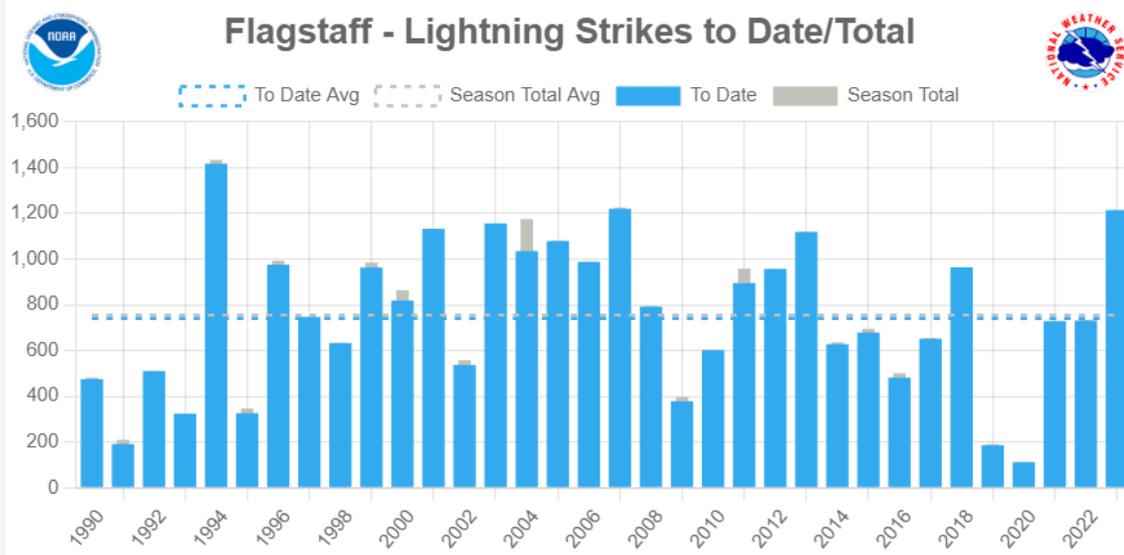
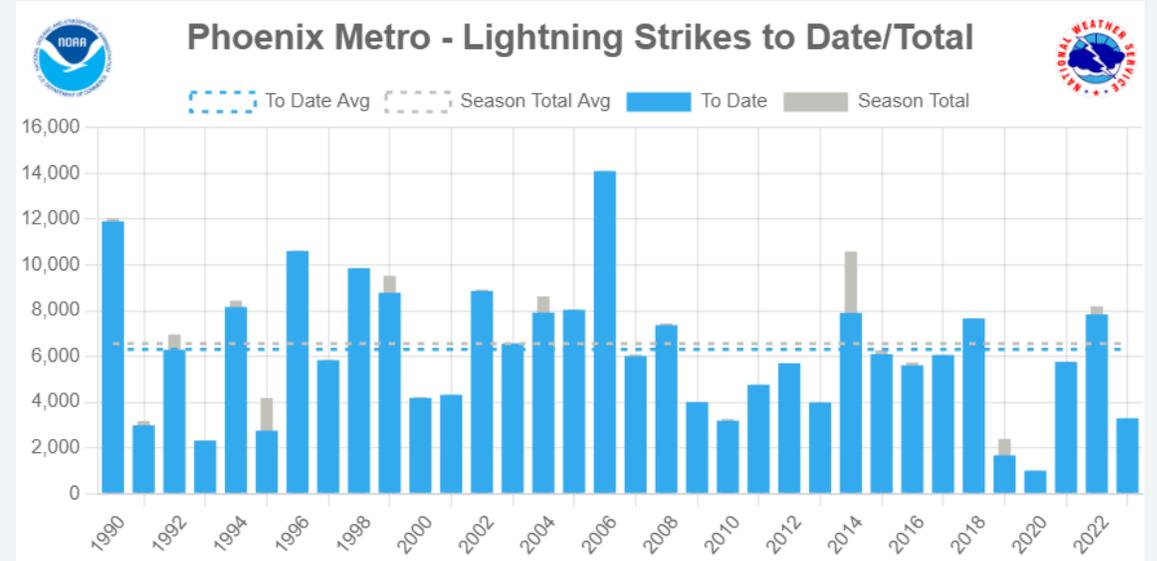
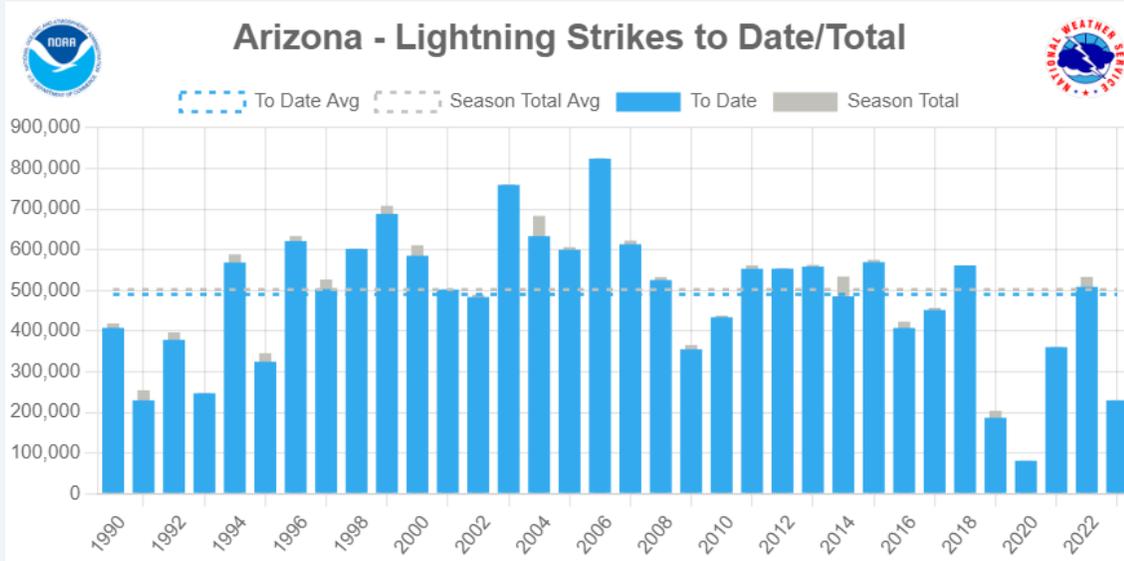


## Phoenix Summer Heat Stats:

- 21 Daily High Temperature Records Tied/Broken
- 25 Daily Warm-Low Temperature Records Tied/Broken
- Total 110°F+ days, 54
- Total 115°F+ days, 17
- Total 90°F+ Lows, 33
- 31-day streak of 110°F+ Highs
- 16-day streak of 90°F+ Lows
- July Monthly Mean 102.7°F
  - ✓ Hottest in Phoenix and any major US City
- Mean Daily Avg T Summer, 97.0°F
- All-Time Record Warm-Low Temperature, 97°F 7/19
- There are still many more...

<https://www.weather.gov/psr/heat>

# Monsoon Lightning Tracker

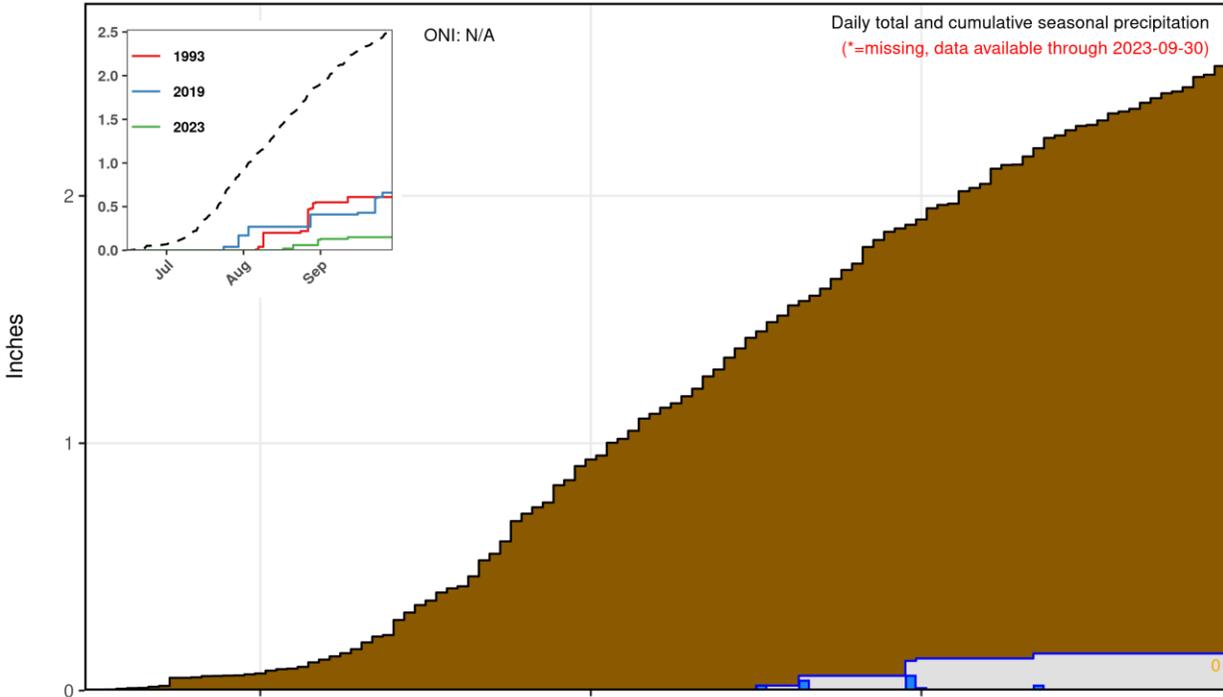
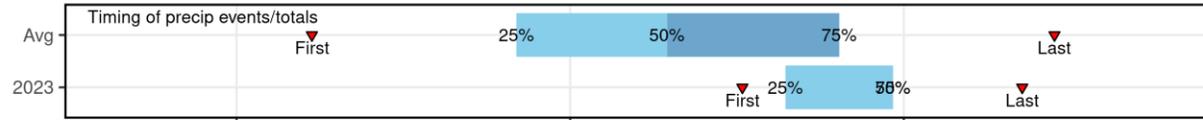


# Starting with Phoenix Sky Harbor...

Monsoon Statistics for Phoenix Sky Harbor (1896 - 2023)

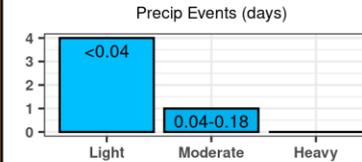
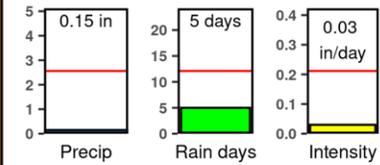
Top 10 Wettest Monsoons		Top 10 Driest Monsoons	
1) 9.56" / 1984	6) 6.96" / 1951	1) 0.15" / 2023	6) 0.66" / 2019
2) 9.31" / 1911	7) 6.34" / 2014	2) 0.35" / 1924	7) 0.74" / 2007
3) 7.45" / 1946	8) 6.15" / 1943	3) 0.51" / 1914	8) 0.78" / 1980
4) 7.30" / 1939	9) 6.03" / 1897	4) 0.61" / 1932	9) 0.79" / 1910
5) 7.20" / 1896	10) 5.99" / 1955	5) 0.61" / 1993	10) 0.86" / 1944

## Station Climate Summary: 06-15-2023 to 09-30-2023 (Monsoon Season)



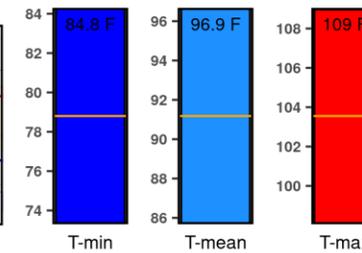
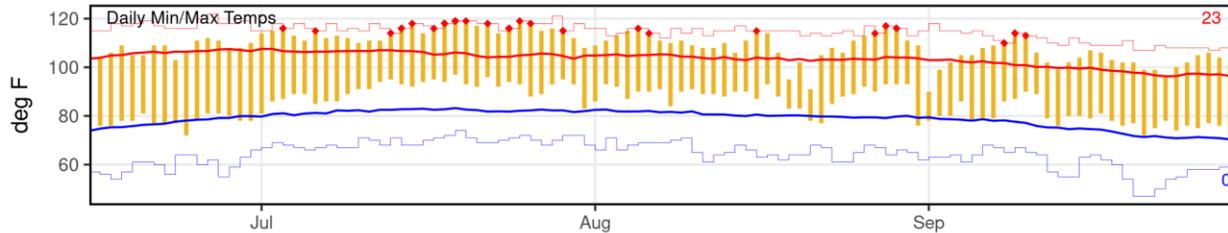
### PHOENIX AIRPORT

Elevation (ft): 1113  
 Period of record: 1948-2023  
 Years in record: 76  
 Precip rank: 76 (1-wettest)  
 Temp rank: 1 (1-warmest)  
 Missing in 2023: 0  
 Total snow (in): 0 (NaN % avg)



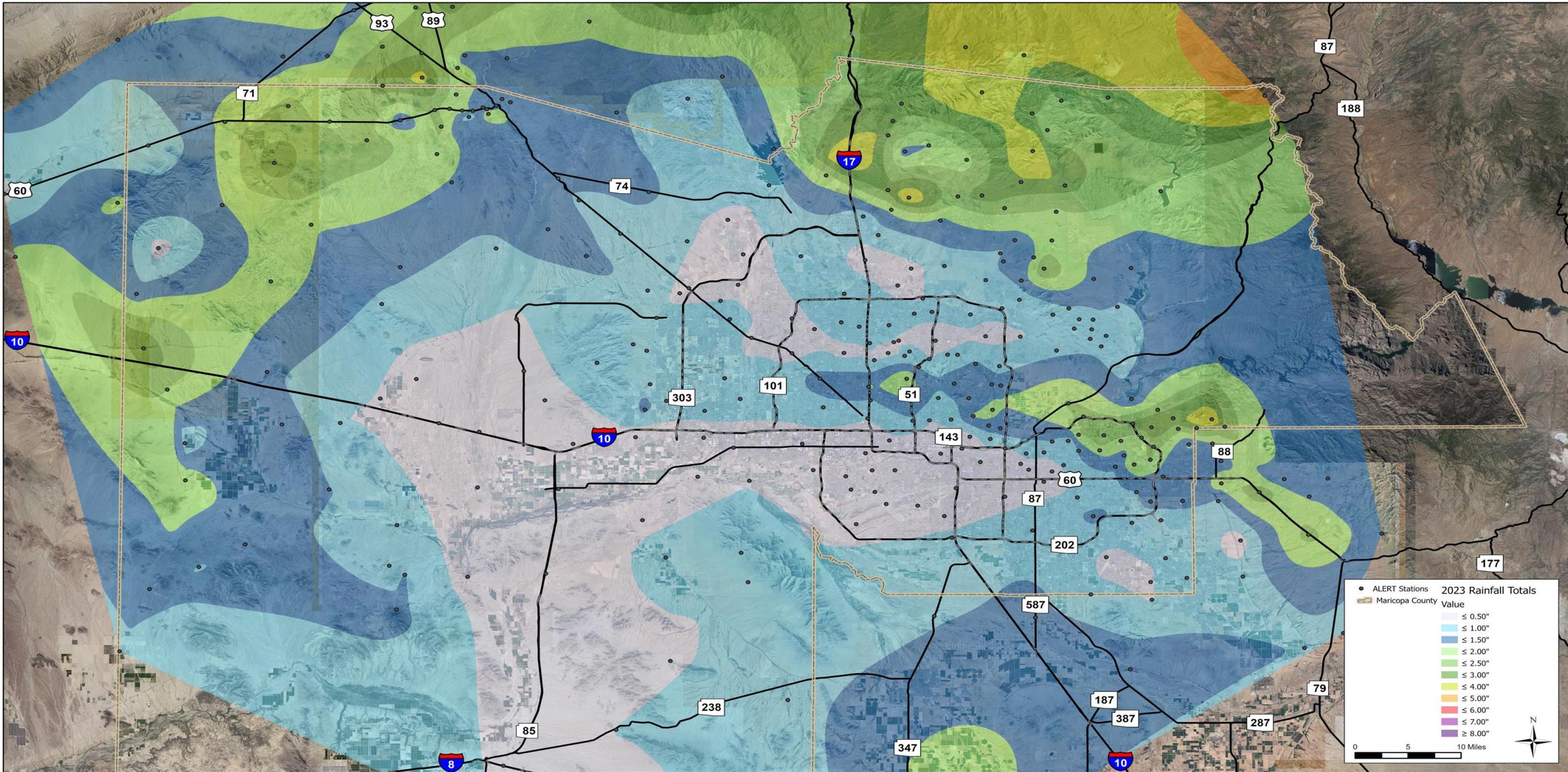
### Dry Spells

Avg length: 12 days (avg: 7)  
 Max length: 63 days (avg: 31)



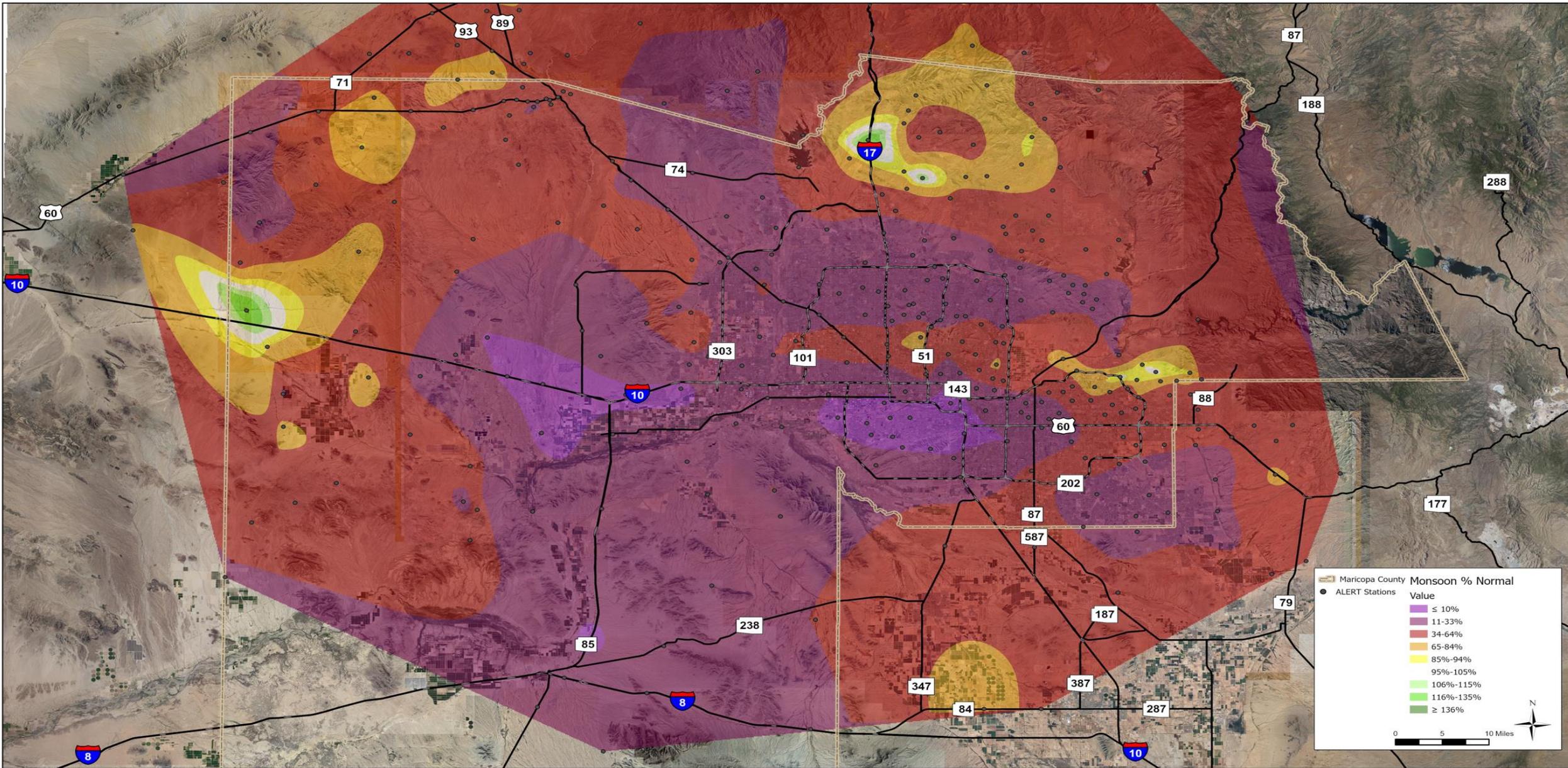
Data from <http://www.rcc-acis.org/>  
 Plot created: 10-10-2023  
 The University of Arizona  
<https://cals.arizona.edu/climate/>

# Monsoon Rainfall



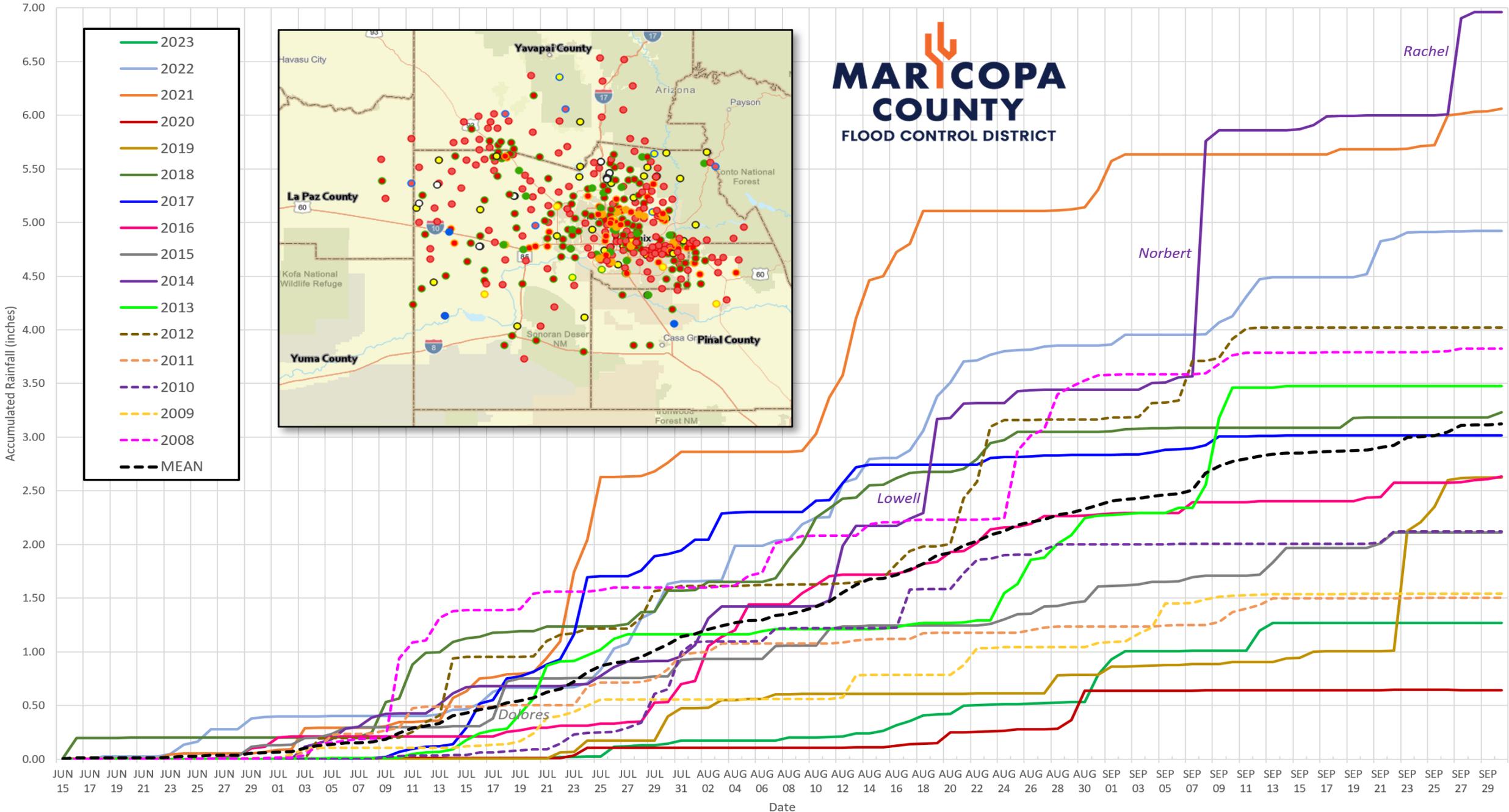
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# Monsoon Rainfall as Percent of Normal

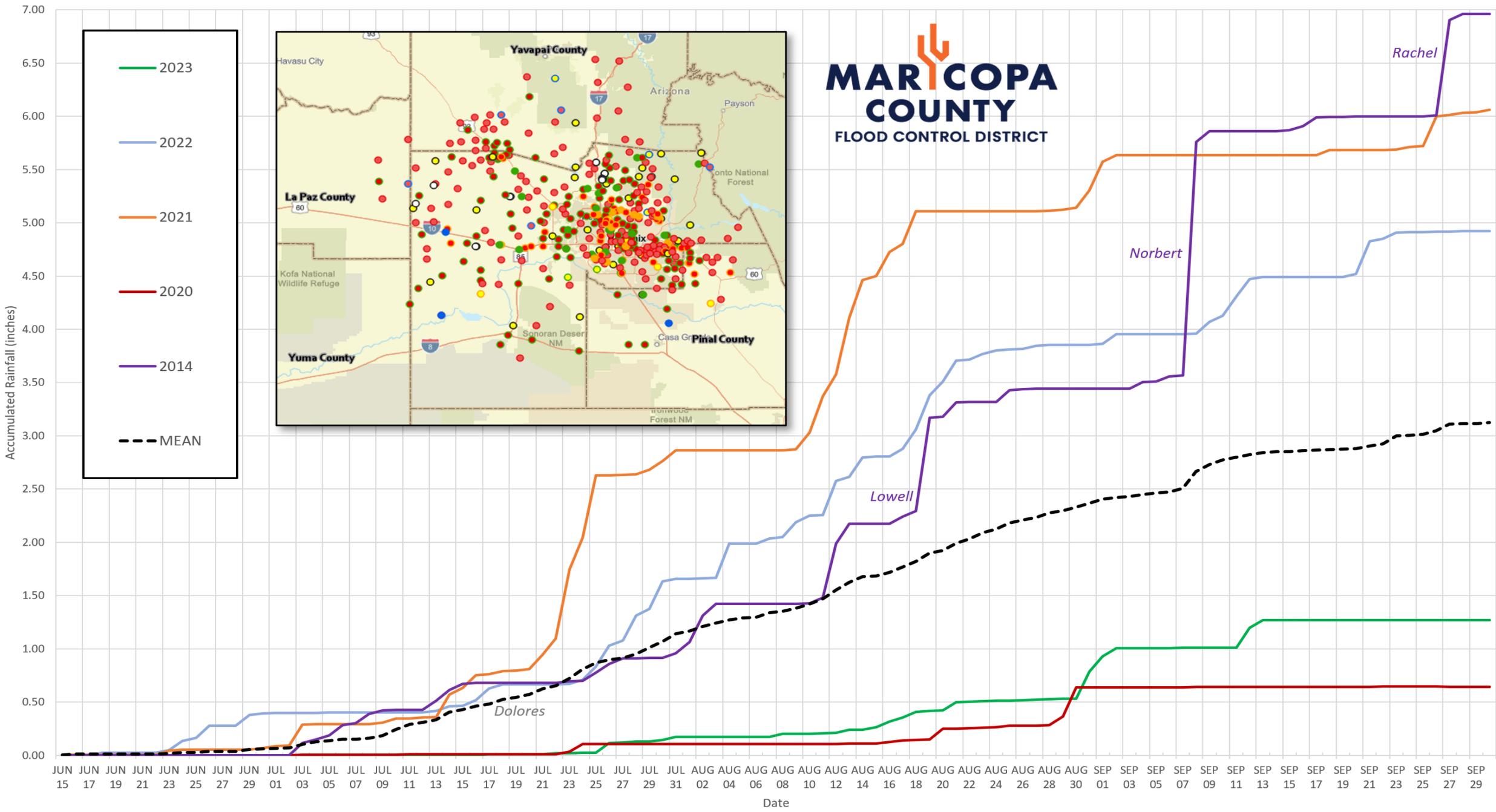


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# Central AZ Accumulated Mean Monsoon Rainfall - Past 16 Years (297 Index Gages)

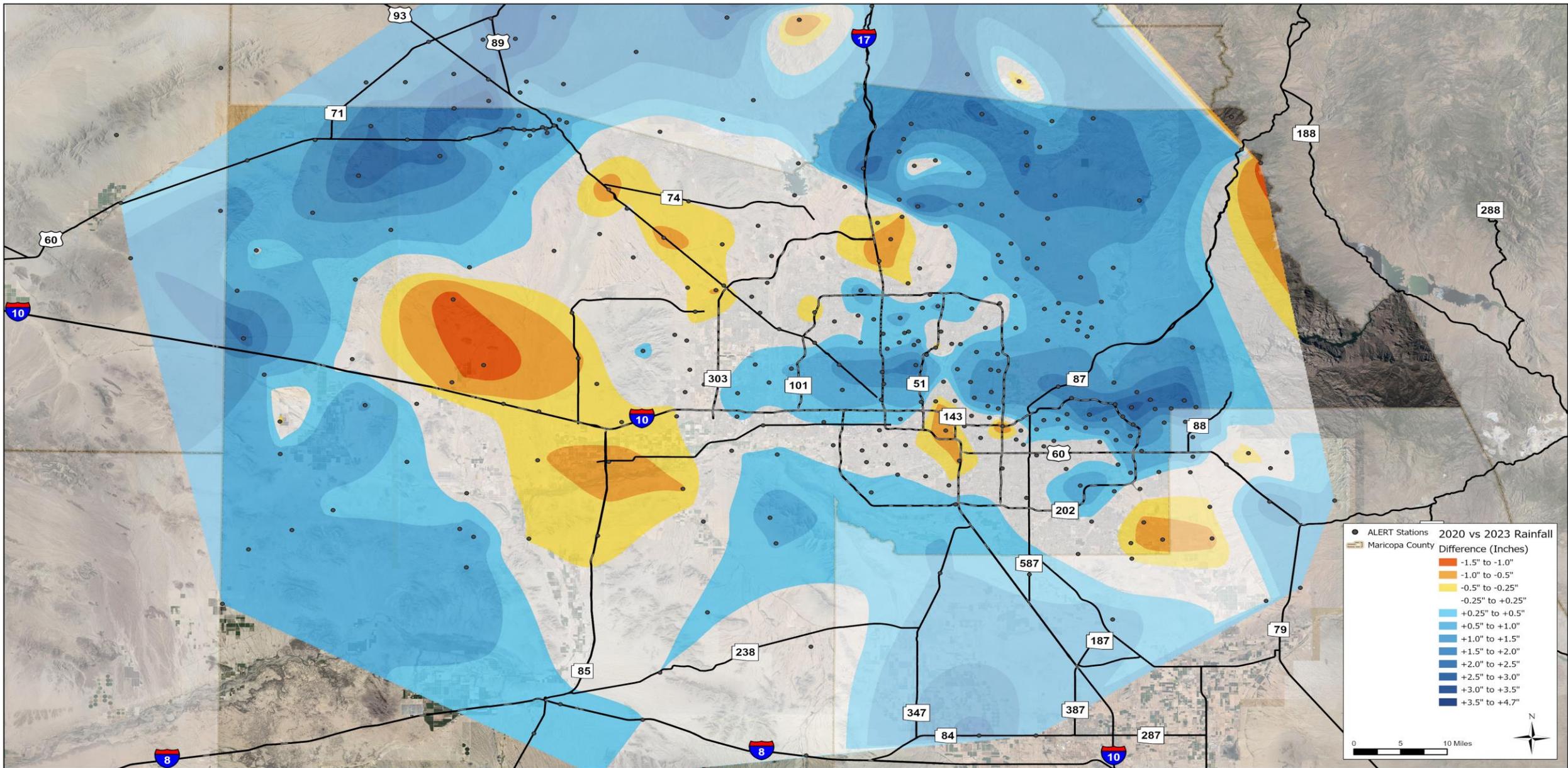


Central AZ Accumulated Mean Monsoon Rainfall - Past 16 Years (297 Index Gages)



# Monsoon Rainfall 2020 vs 2023 (Difference at ALERT Station +/-)

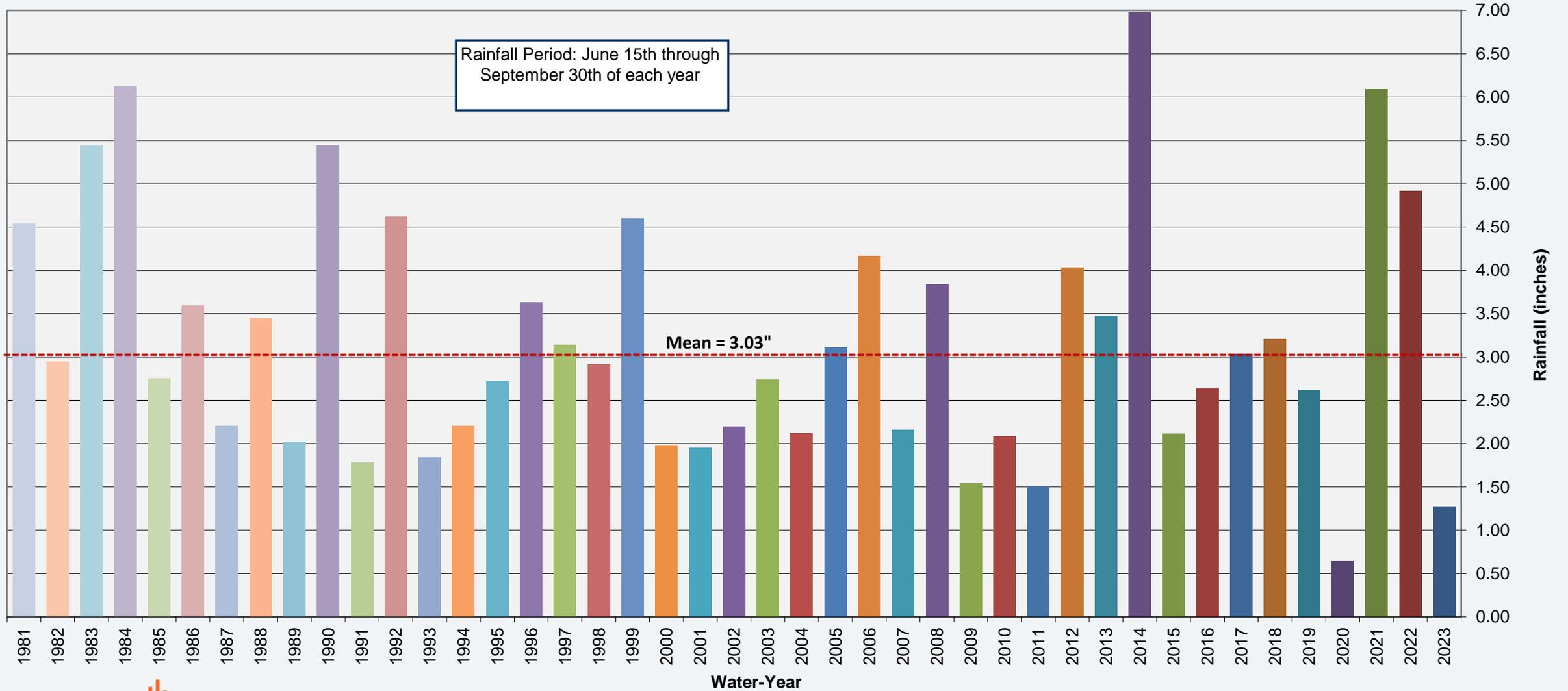
June 15, 2023 - September 30, 2023



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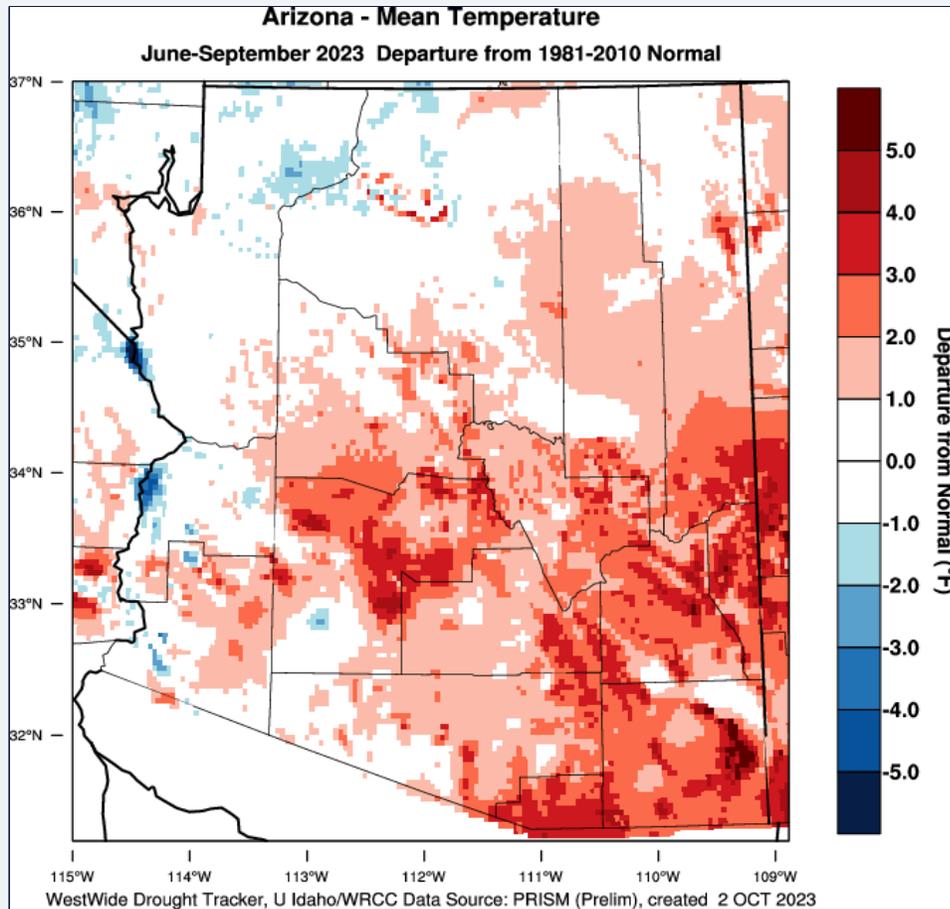
# Average Summer Thunderstorm (*Monsoon*) Season Rainfall - Past 43 Years

Flood Control District of Maricopa County ALERT Rain Gages

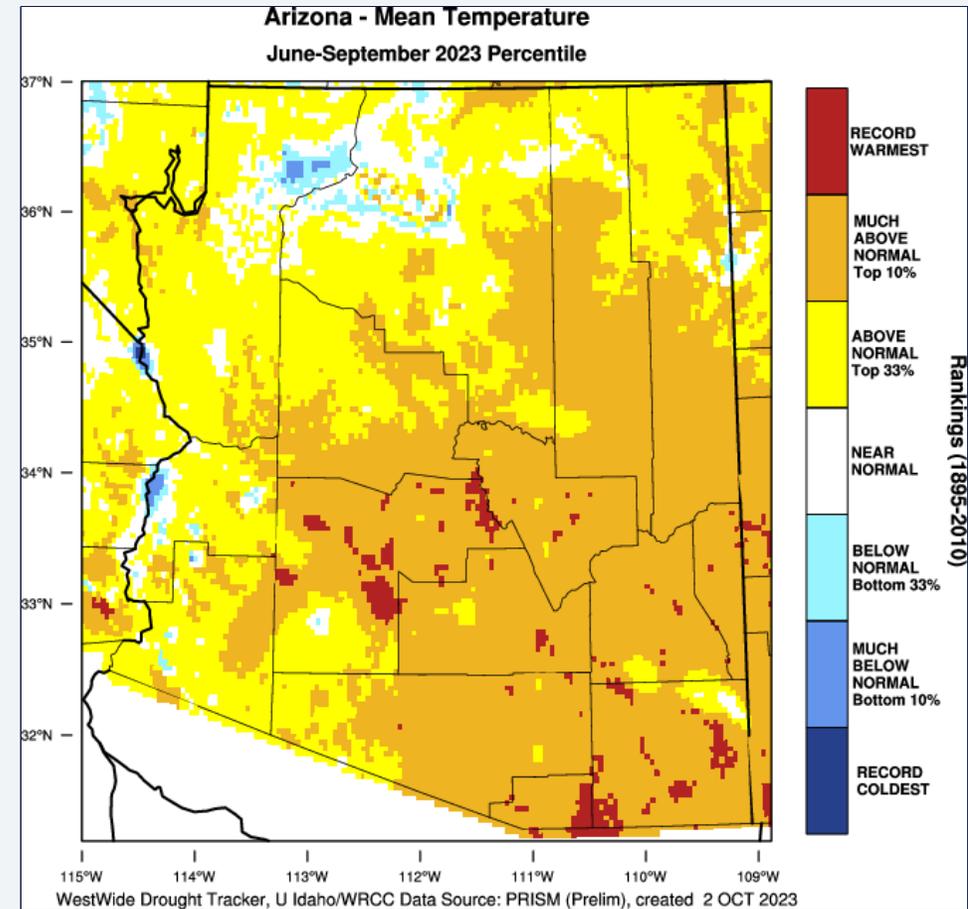


# Full Arizona Monsoon Summary

## June-September 2023 Percent of 1981-2010 Normal

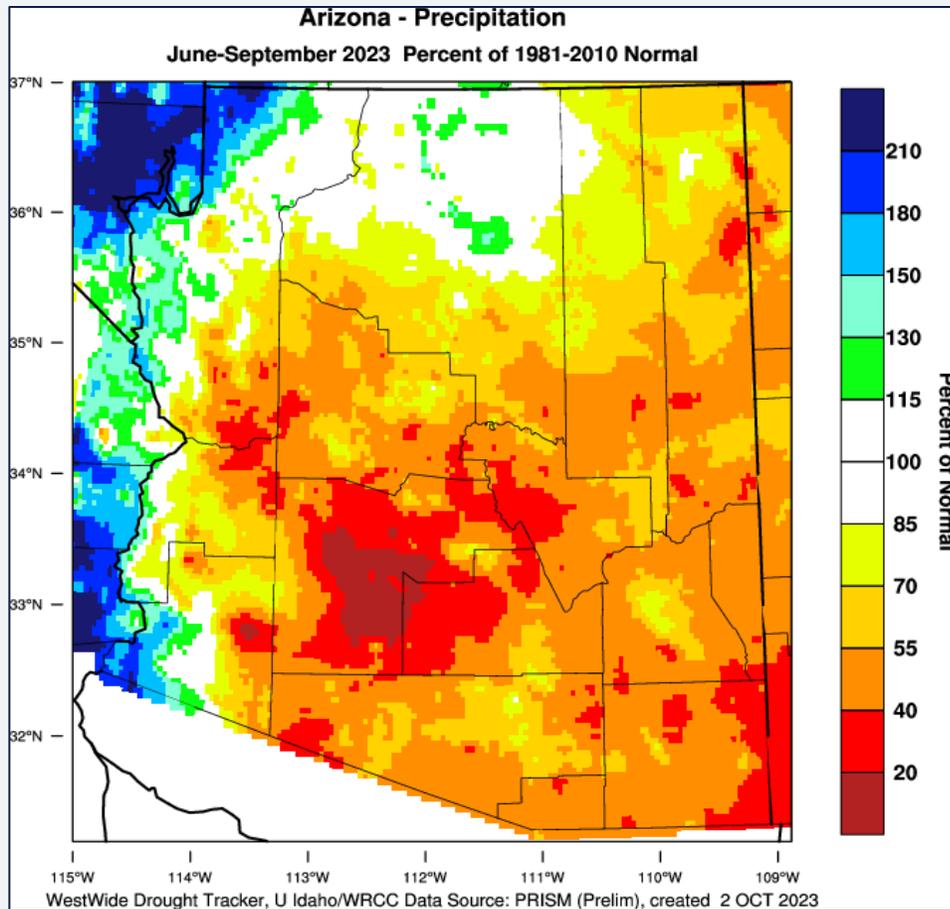


## June-September 2023 Percentile

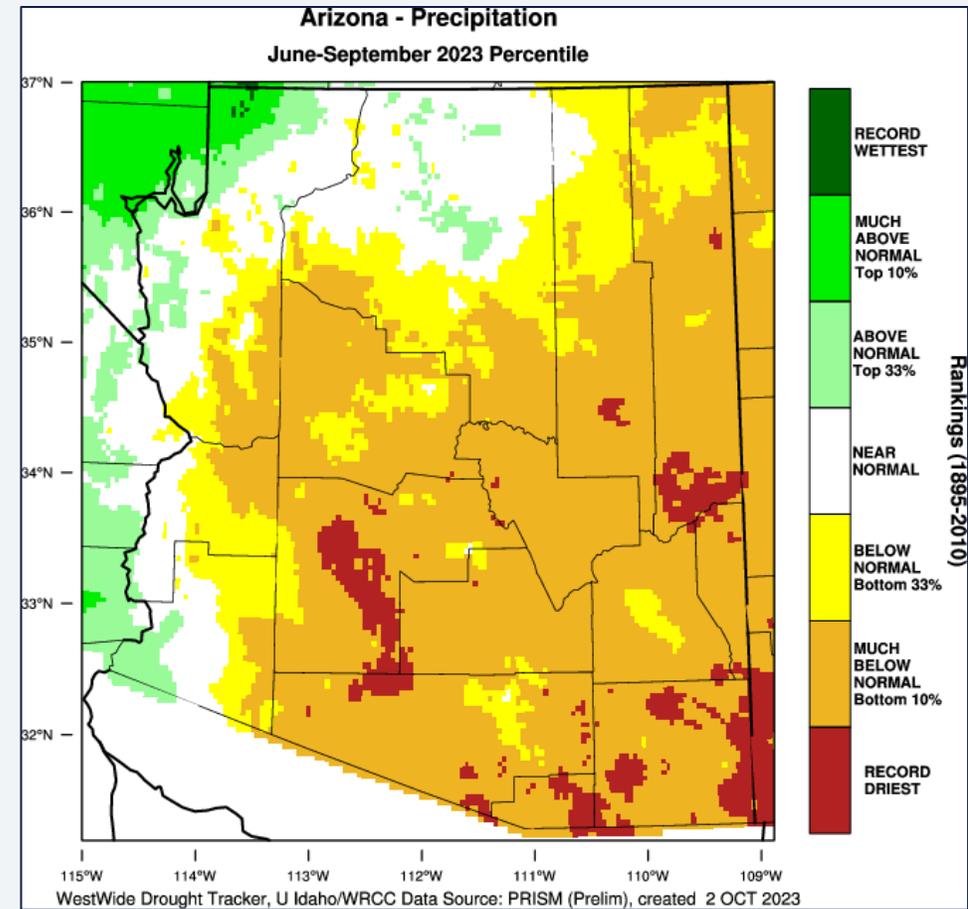


# Full Arizona Monsoon Summary

June-September 2023 Percent of 1981-2010 Normal



June-September 2023 Percentile



# Final Thoughts

- Mother Nature flipped-off the monsoon switch after back-to-back wet seasons across “most” of AZ. **IT WAS HOT!!!**
- 2023 was the 2<sup>nd</sup> driest season across Maricopa County in 40+ years but still saw nearly twice the rainfall compared to 2020!
- Monsoon Recap & Forecast Verification Report available late October here: <https://www.maricopa.gov/759/Publications>



# Contact Us



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# What Questions Do You Have?



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