



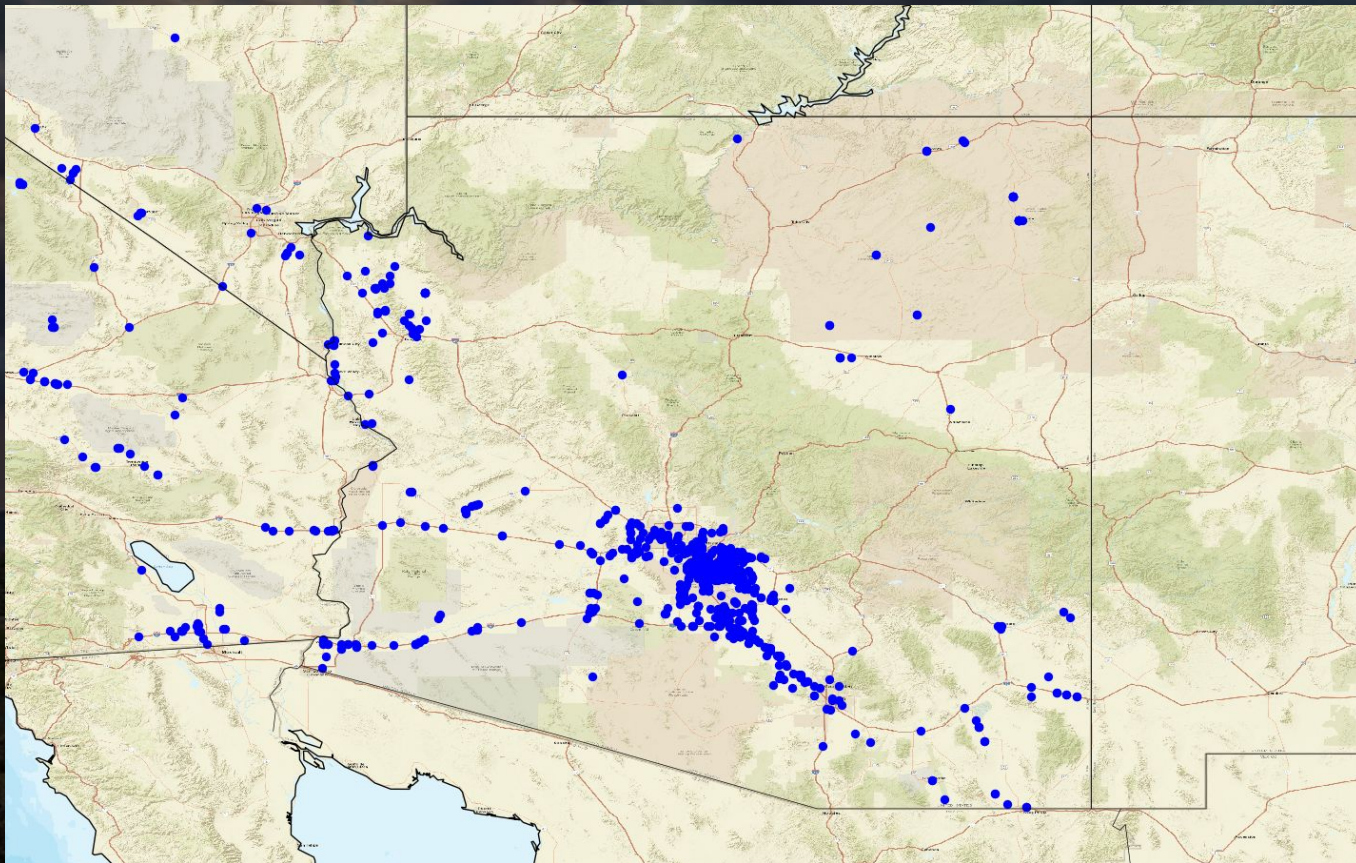
Operational Considerations for Dust Storm Forecasting

Presentation for Southern Arizona Dust Workshop

Jaret Rogers and Larry Hopper
Acting Warning Coordination Meteorologist(s)
National Weather Service, Phoenix, AZ



NWS Local Dust Storm Reports AZ-NV-CA (2005-2021)



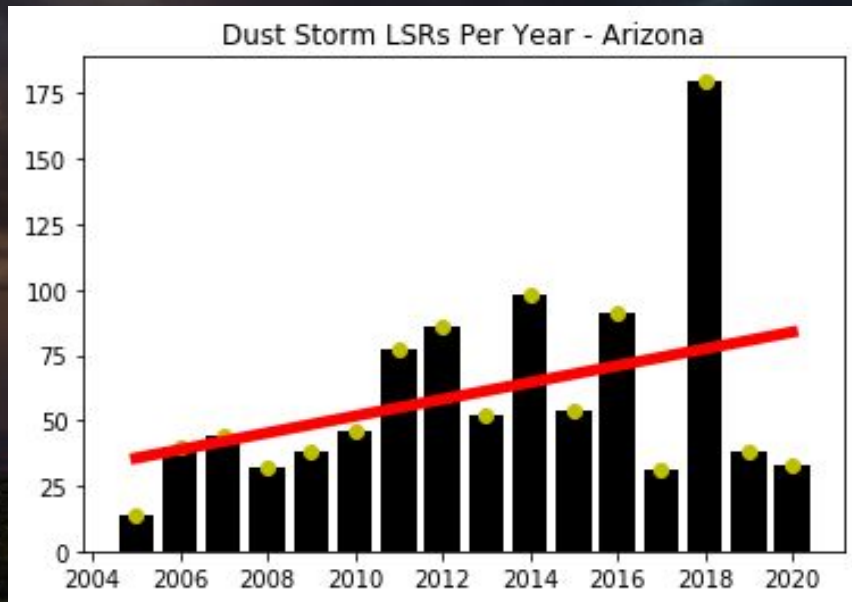


Dust Storm LSRs Per Year in Arizona



2005-2020

- After peaking in 2018, very quiet in 2019 and 2020.





Dust Storm Products

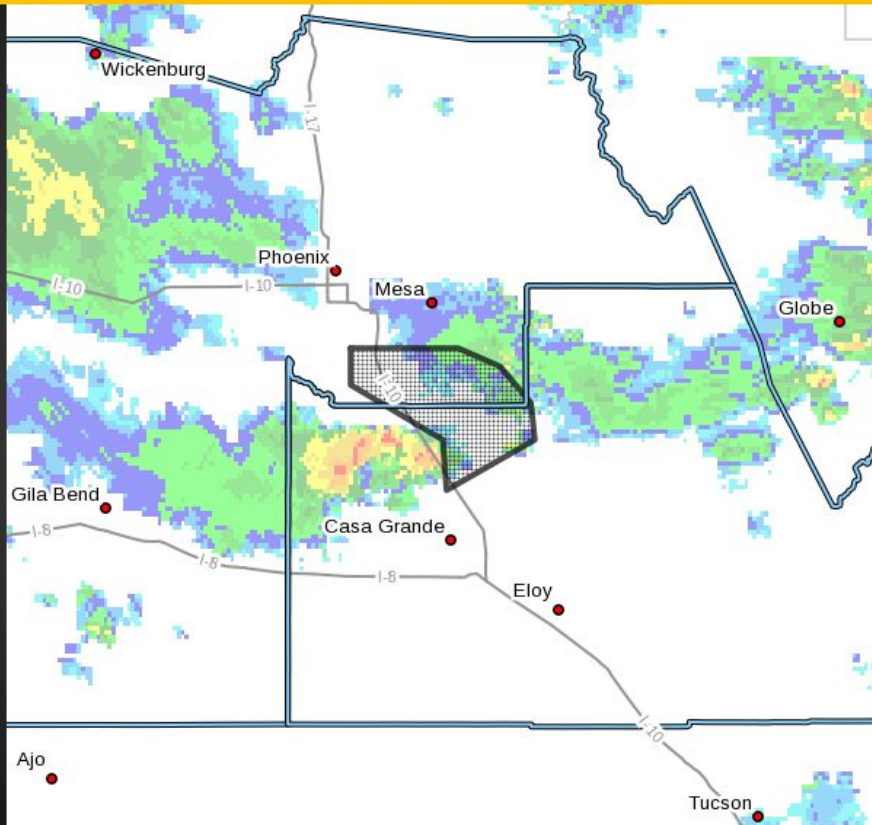


- **Dust Storm Warnings (polygon based; triggers WEA)**
Issued for localized, shorter-lived $\leq \frac{1}{4}$ mile visibility
Typically reserved for haboobs
- **Blowing Dust Warnings (zone based)**
Widespread, longer-lived visibilities $\leq \frac{1}{4}$ mile
visibility.
- **Blowing Dust Advisories (polygon or zone-based)**
 $> \frac{1}{4}$ mile but < 1 mile



Dust Storm Warning

Saturday, July 14, 2018, 6:00 pm



Affected Area: far northern Pinal and southeast Maricopa counties

Timing: Until 6:30 pm.

Winds: Over 40 mph.

Visibility: Below 1/4 mile in blowing dust.

Impacts: Hazardous driving conditions from widespread blowing dust reducing visibility below 1/4 mile at times. Includes I-10 and L-202

Interact With Us



NWSPhoenix



Weather.Gov/PSR



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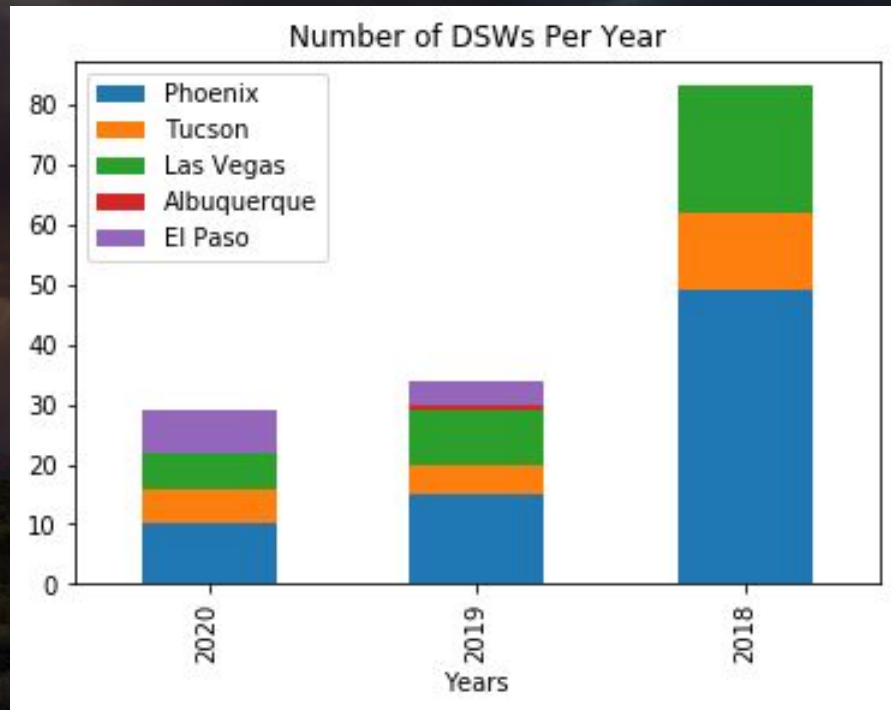


Dust Storm Warning Verification



2018 was busiest year in past 3 for Dust Storm Warnings (83).

NWS Phoenix issues most per year, followed by Las Vegas and Tucson



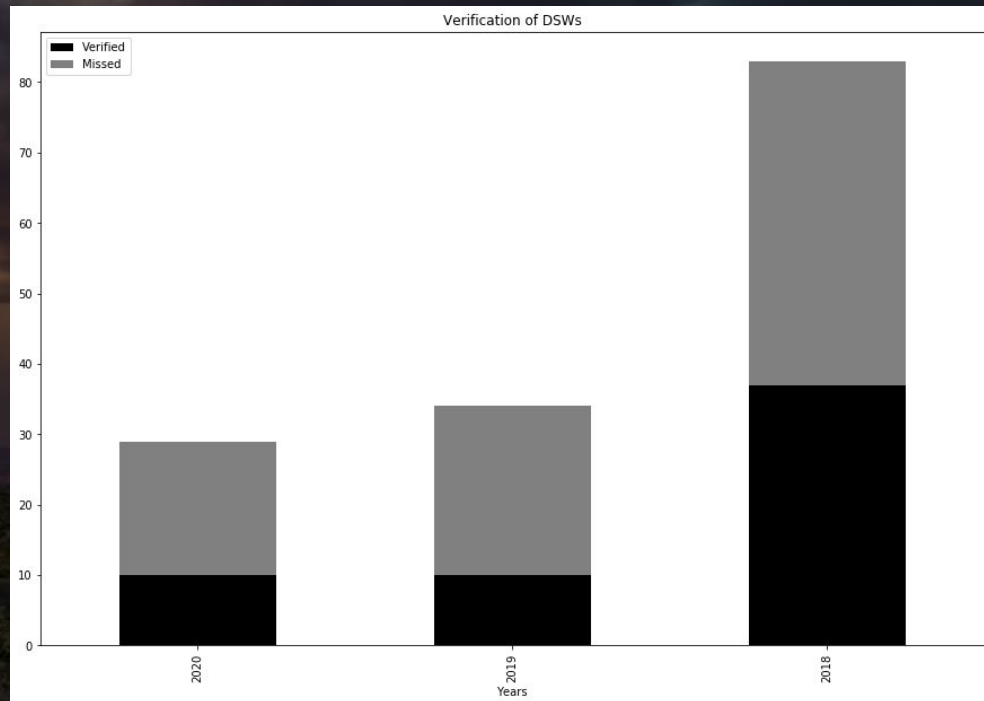


Dust Storm Warning Verification - Reports Verified



For 5 southwestern NWS offices (PSR, TWC, EPZ, ABQ, VEF), DSWs verify roughly 33-50% per year.

Reporting practices vary by office





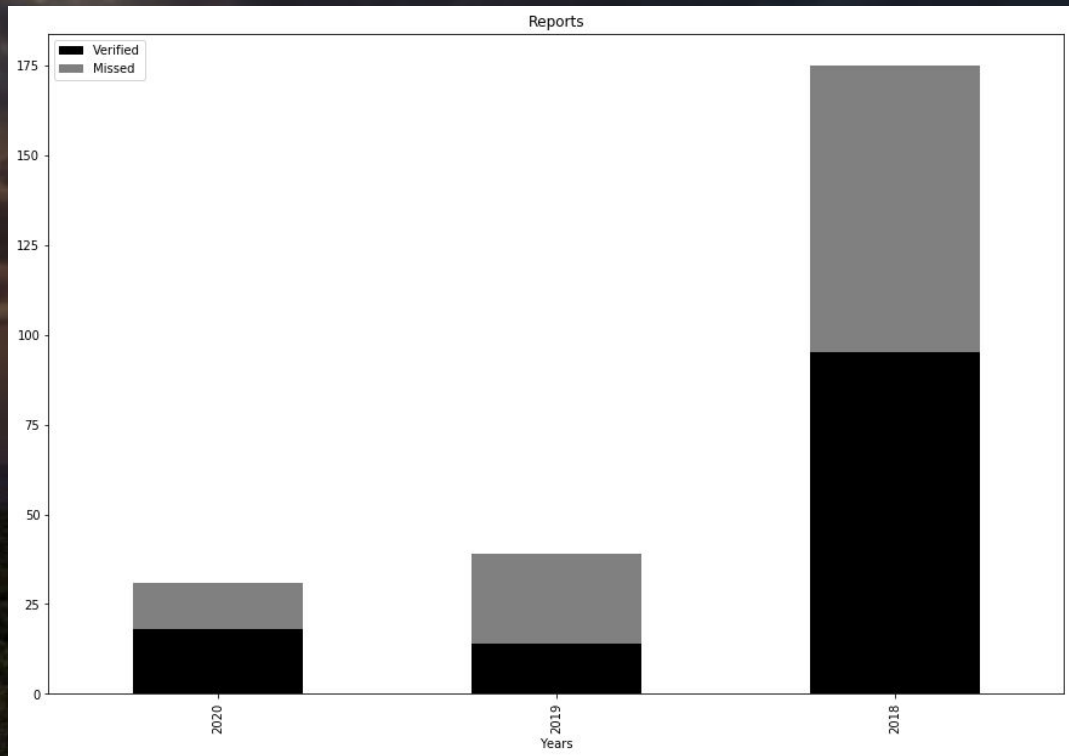
Dust Storm Warning Verification - Reports Warned



Number of reports captured by a DSW varies from year to year (35-60%).

Average lead times (first event) range from 16-32 min for PSR, VEF, and TWC:

- 26-38 min average lead times for all events





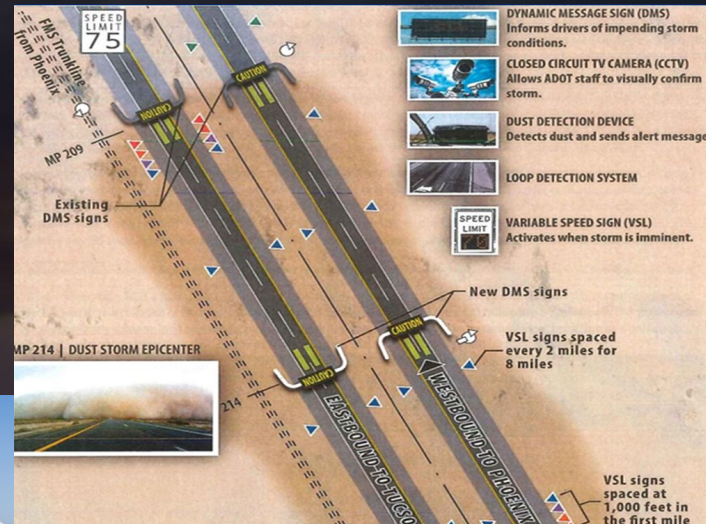
Dust Storm Warning Initiatives with ADOT



NWS receives ADOT dust sensor visibility notifications

ADOT radar installed near I-10 and Picacho.

ADOT and NWS coordinate extensively during monsoon.

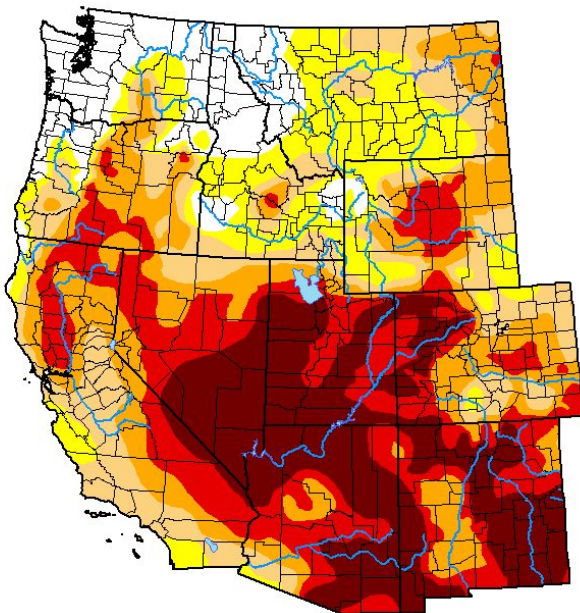




Current Drought Monitor and Outlook



U.S. Drought Monitor West



March 16, 2021
(Released Thursday, Mar. 18, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	10.69	89.31	74.92	58.63	39.74	20.32
Last Week 03-09-2021	10.91	89.09	76.58	61.20	41.41	20.39
3 Months Ago 12-15-2020	11.50	88.50	78.38	65.22	46.64	22.16
Start of Calendar Year 12-29-2020	11.57	88.43	78.63	65.18	46.49	22.16
Start of Water Year 09-29-2020	8.51	91.49	76.07	54.55	33.11	2.31
One Year Ago 03-17-2020	51.28	48.72	26.13	3.55	0.00	0.00

Intensity:



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:
Brad Pugh
CPC/NOAA



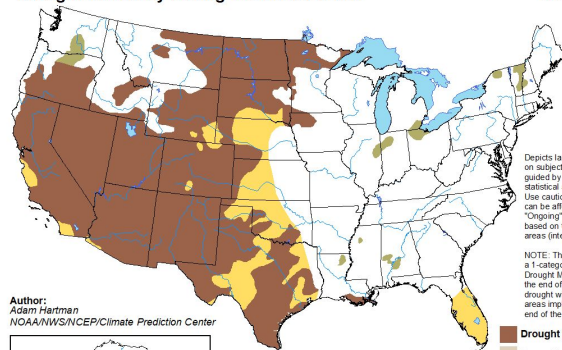
droughtmonitor.unl.edu

99%+ of dust-generating area (AZ-NV-CA) in drought

- Similar to 2018 (more D3-D4) with drought persisting

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

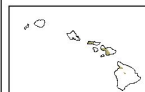
Valid for March 18 - June 30, 2021
Released March 18



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short-lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Adam Hartman
NOAA/NWS/NCEP/Climate Prediction Center

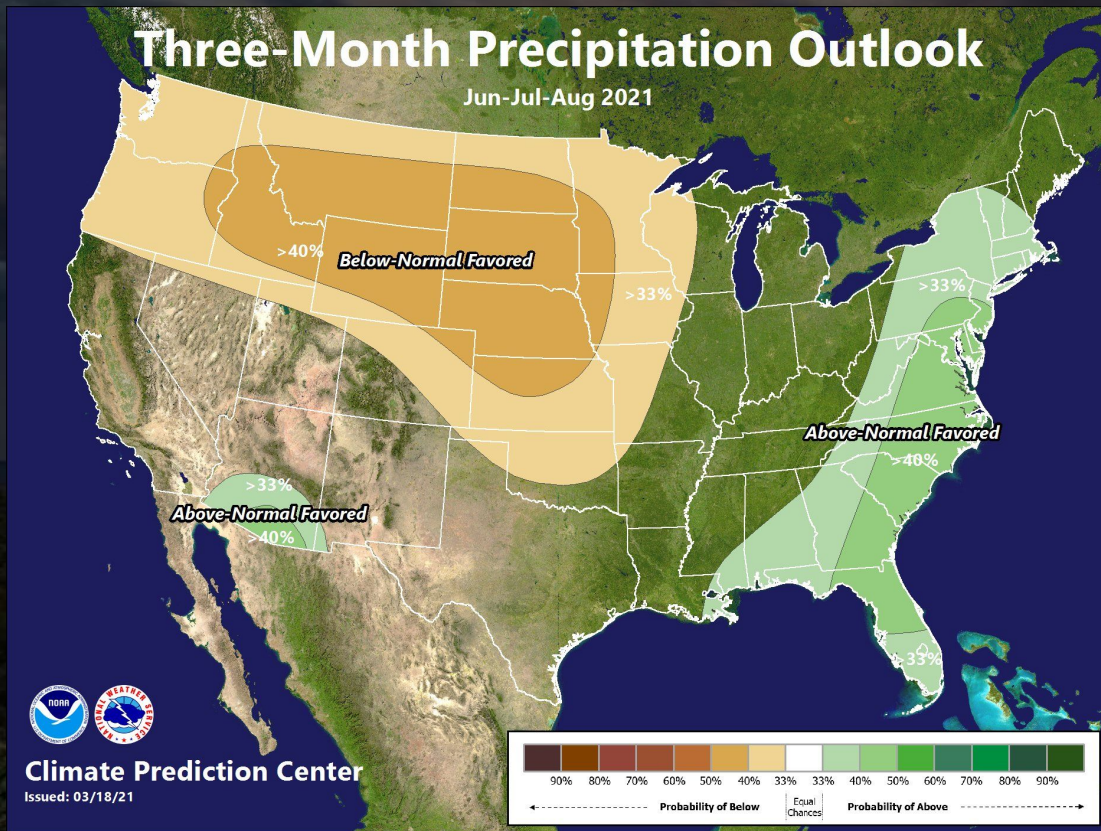


- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely

<http://go.usa.gov/3eZ73>

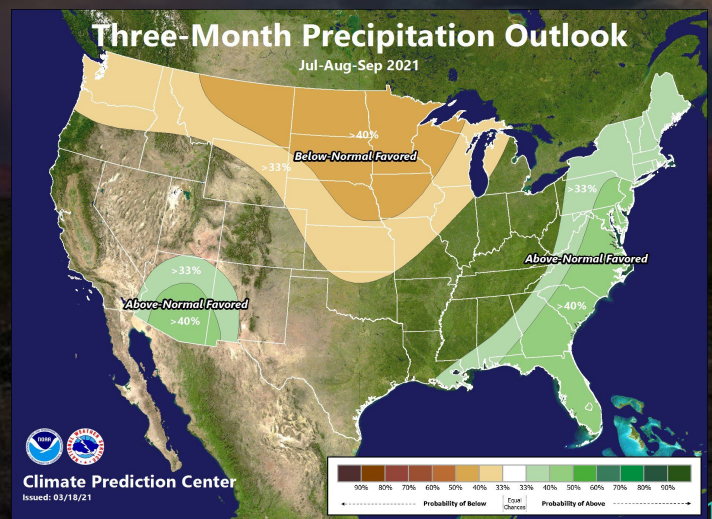


CPC Precipitation Outlooks for 2021 Monsoon



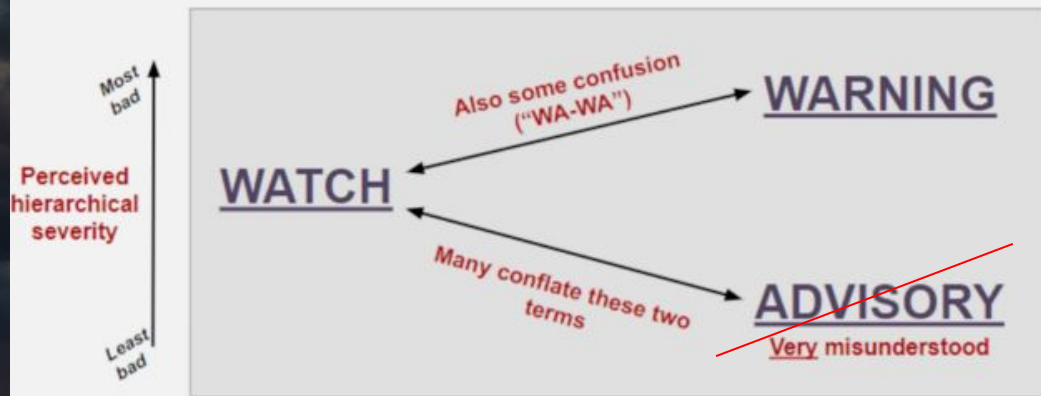
Odds slightly tilted towards above normal precipitation

- Earlier onset than last 2 years and/or more t-storms?





Future Changes to Advisories (as early as 2024)



Current NWS WWA System



**Headline
Confusion**

**Too Many
Products &
Product Types**



The table consists of a grid of approximately 10 columns and 15 rows of small, multi-colored boxes. Each box contains a small icon and text, representing different weather products and types. The colors of the boxes vary, including red, yellow, green, blue, purple, and grey. A legend or key is visible at the top center of the grid, but the text is too small to read. The overall appearance is that of a complex, multi-faceted system with many different components.



Future Changes to Advisories (as early as 2024)

WATCH



WARNING

Prepare for a possible significant event

Take Action for an imminent or occurring significant event

NWS searching for ways to simplify messaging, including eliminating the “advisory” term

Plain-language statements or other solutions will replace:

- Blowing Dust Advisories
- Dust Advisories
- Wind Advisories

Seeking feedback over next few years to handle these changes

Does an “Advisory” Just Become a “Statement”?

No! We suggest just using plain language...

So instead of:

“A Winter Weather Advisory has been Issued for...”

You could say:

“NWS expects 2-4” of snow for...”

Or

“NWS says expect a light snowfall today...”

Key Message: We Don't Want to Introduce a *New Third Term!*

WATCH



WARNING



~~STATEMENT~~



NWS Phoenix Contact Information

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Save the Date!

Monsoon Awareness Week

June 13-19, 2021





Operational Considerations (PHX Example)



Issuing warnings for point locations challenging:

- Airport Weather Warning (AWW) verification for dust storms not as good as wind

Issuing DSWs (or AWWs) for rare (4-5 yr ARI) dust storms with ≤ 35 knot (40 mph) gusts

Concurrent SVRs and DSWs

Dust Storms at PHX with Wind Gusts ≤ 35 knots:

1974-09-13 22:00:00	35.0 (at wind criteria)
1977-07-11 03:15:00	35.0 (at wind criteria)
1980-07-24 02:30:00	29.0
1982-07-23 02:42:00	34.0
1983-08-14 01:34:00	35.0 (at wind criteria)
1984-07-07 01:16:00	29.0
1991-06-06 01:00:00	33.0
1997-08-29 01:56:00	26.0
2003-07-16 03:48:00	35.0 (at wind criteria)
2009-07-19 02:09:00	19.0
2011-07-06 03:12:00	33.0
2013-07-21 17:17:00	25.0
2016-08-22 00:43:00	30.0
2020-08-16 01:56:00	27.0

10/2/2010 Radar Study of Observed Dust Storm Locations (3+ Reports) from 2010-2019

