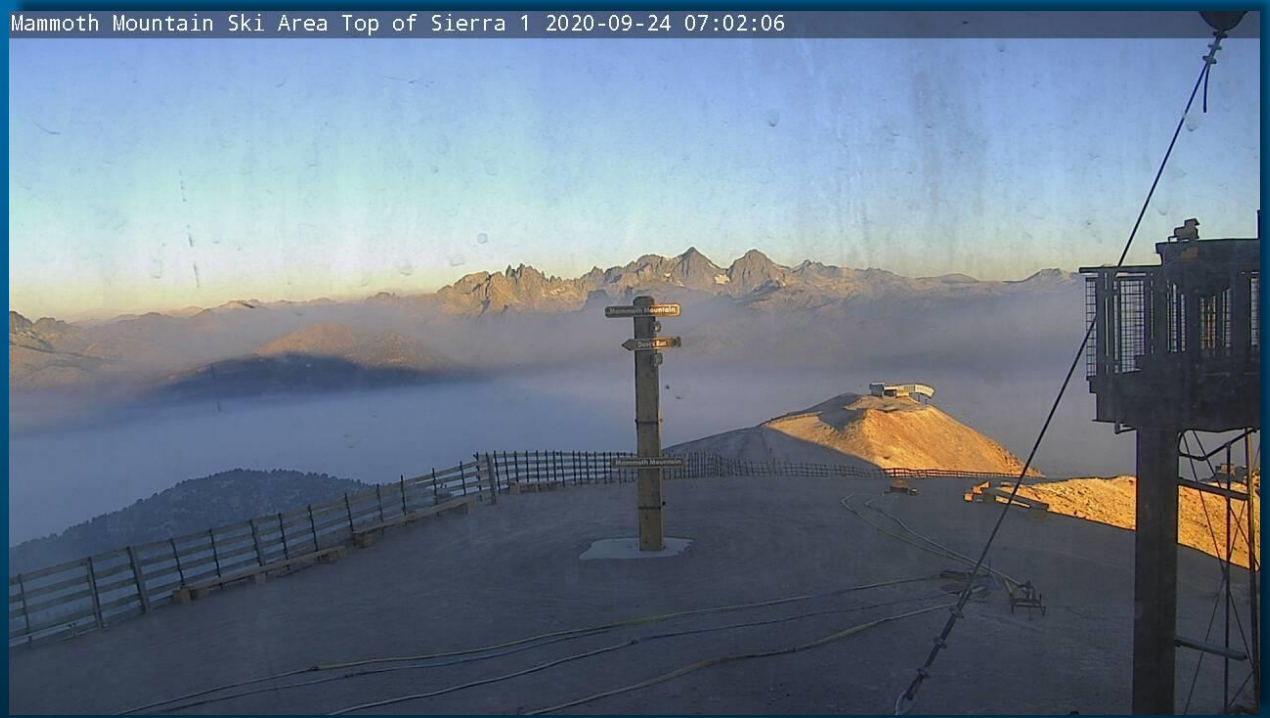
Anyone Ready for Snow Yet?

NWS Reno Winter Outlook

Chris Smallcomb
NWS Reno Meteorologist and PIO
(and Freakout Chart guy)
chris.smallcomb@noaa.gov

Summer into Early Fall - Hot and Smoky.



1,297

Peak PM2.5 AQI at Mammoth back in September. Hazardous threshold is 300.

#1

Warmest August + September at Bishop

More Summer Numbers for the Eastern Sierra

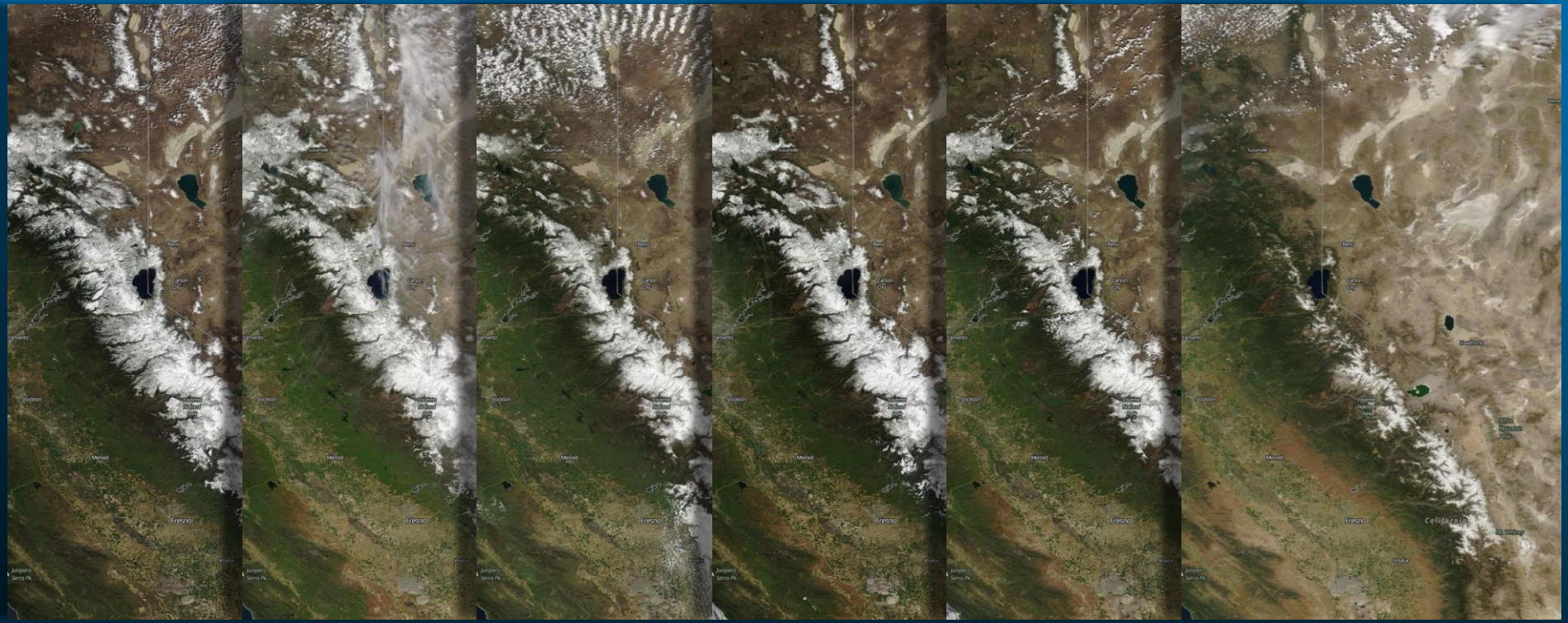
3.65”

11th Wettest Summer at Bodie State Park, back to 1963.

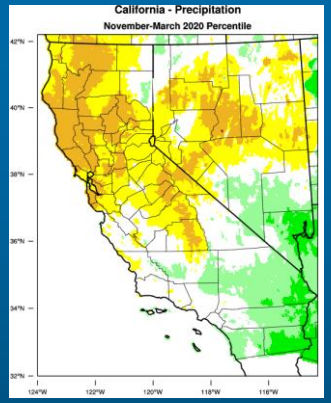
107

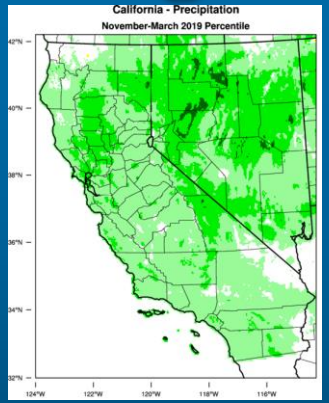
New Hottest September Temperature @ Bishop, 9/4

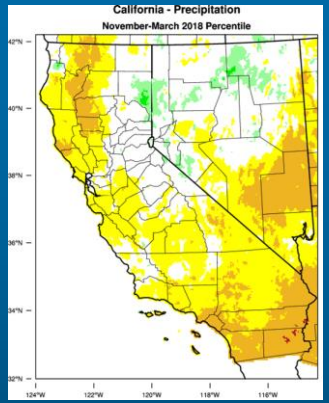
Last Six Winters on April 1st - NASA Satellite View

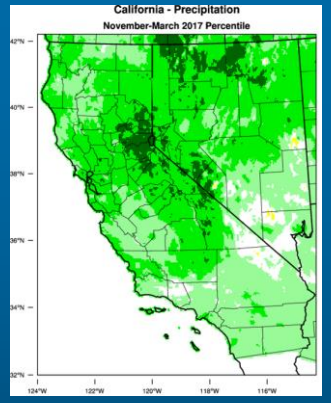


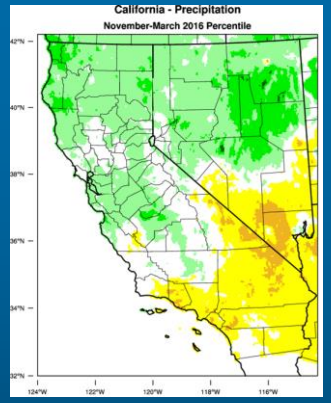
Data - Looking Back at the Past Five Winters



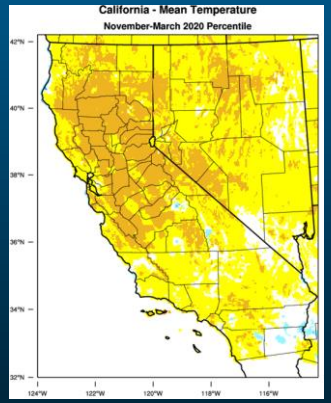


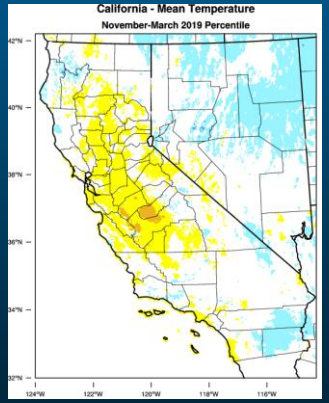


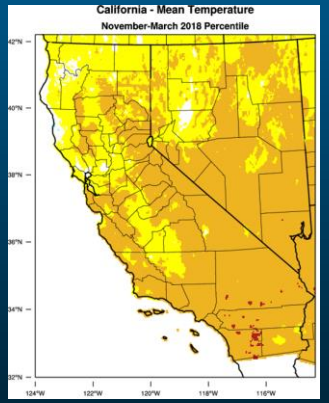


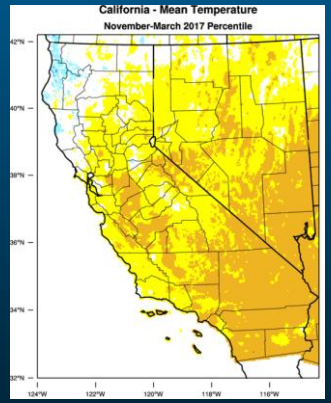


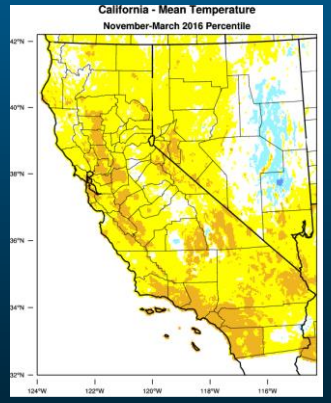
Precip









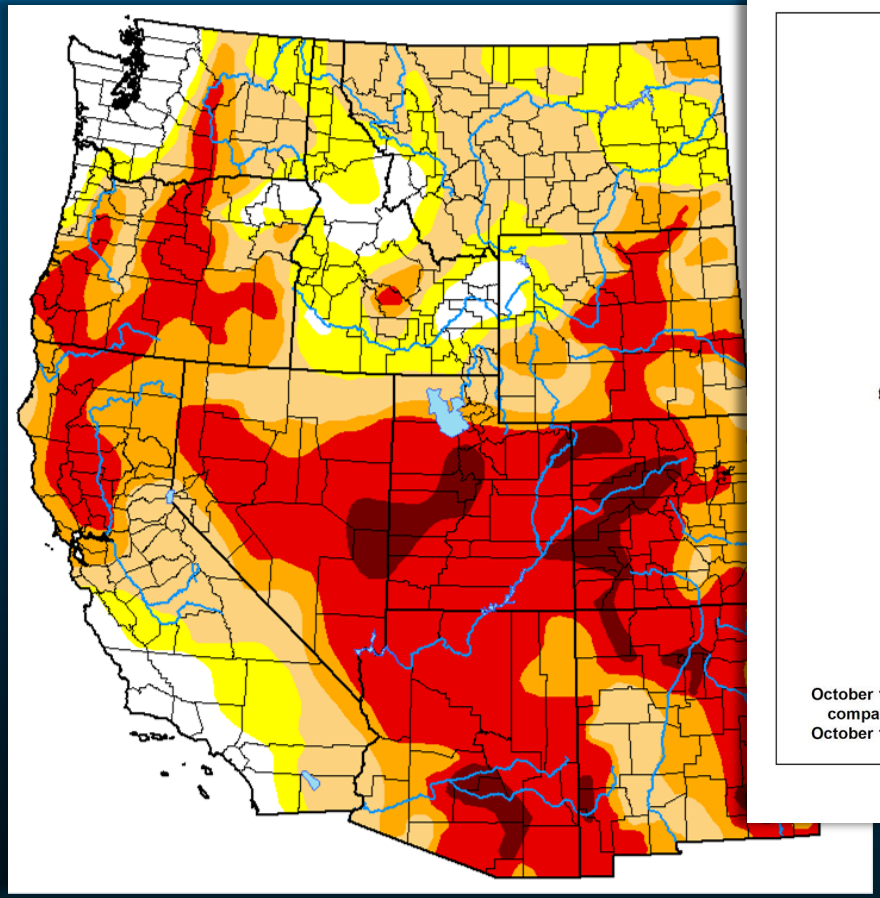


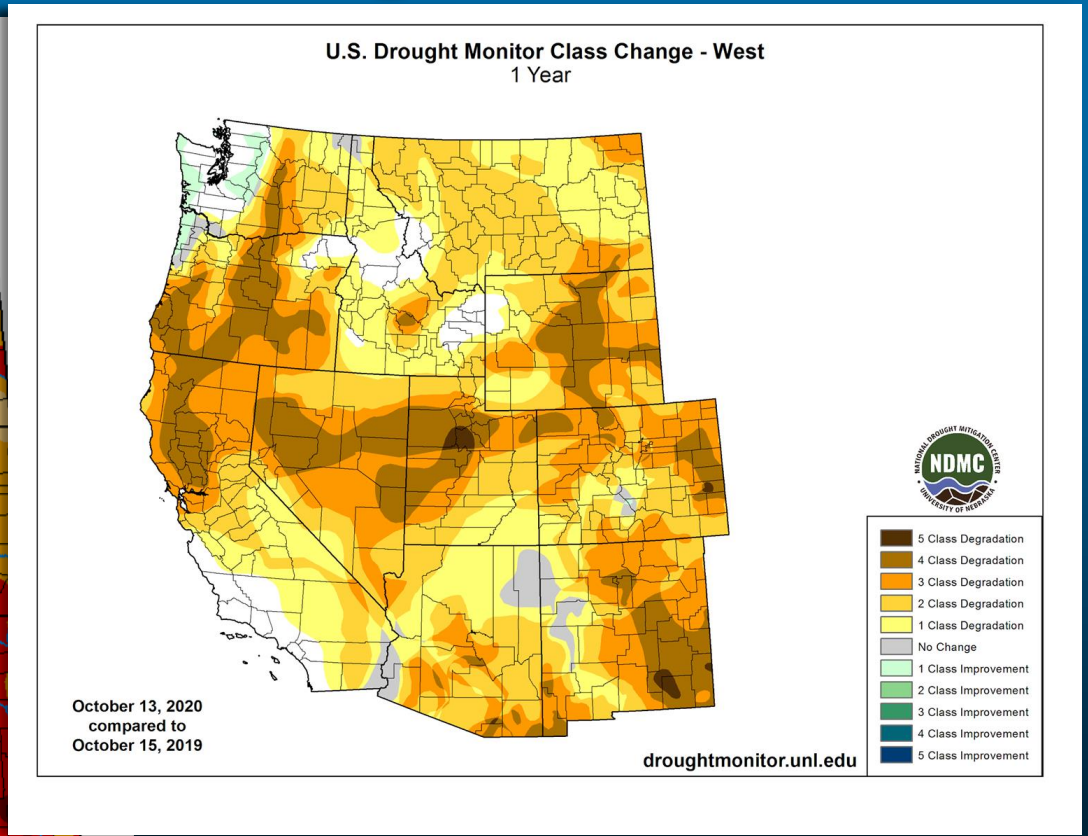
Temps

2019-20 2018-19 2017-18 2016-17 2015-16

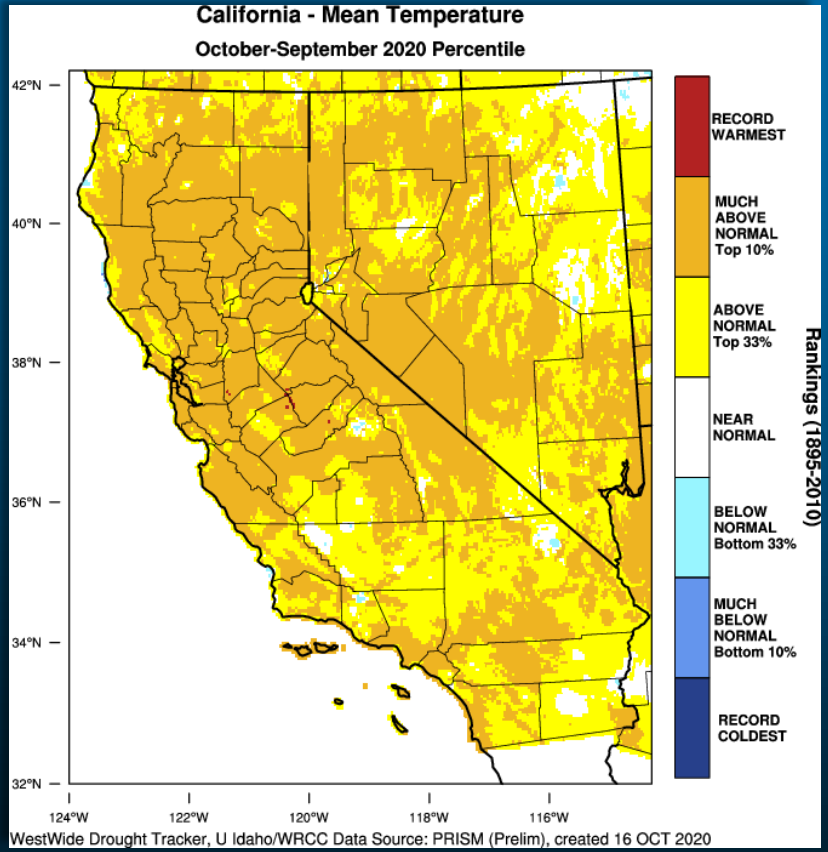
Reno National Weather Service
Forecasting for the Sierra and western Nevada since 1905

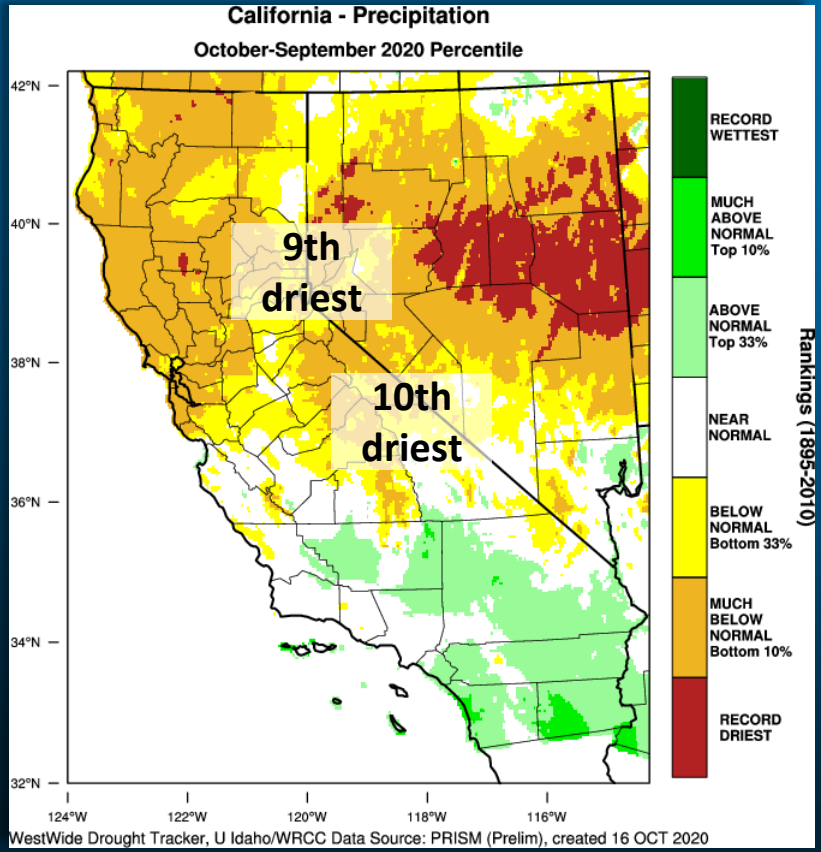
After a Few Years Break, Drought is Now Back



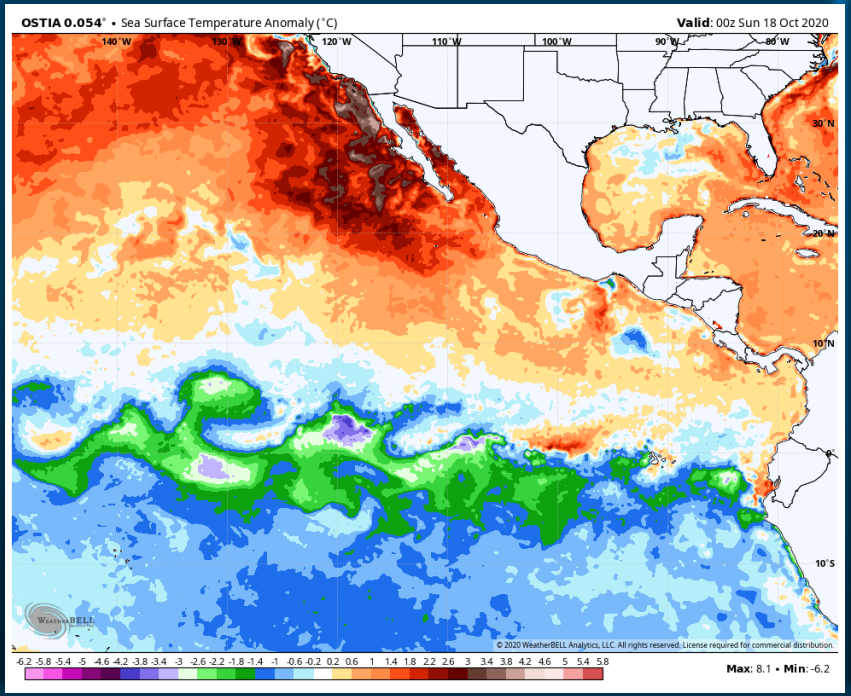


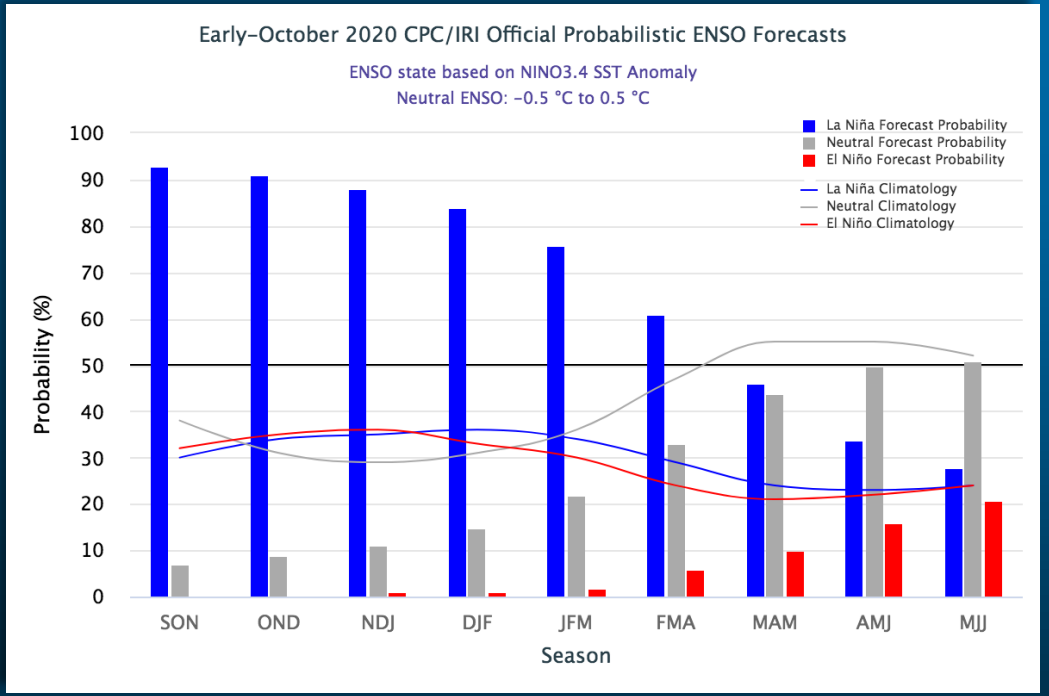
Why? Warm and Dry Water Year 2019-20





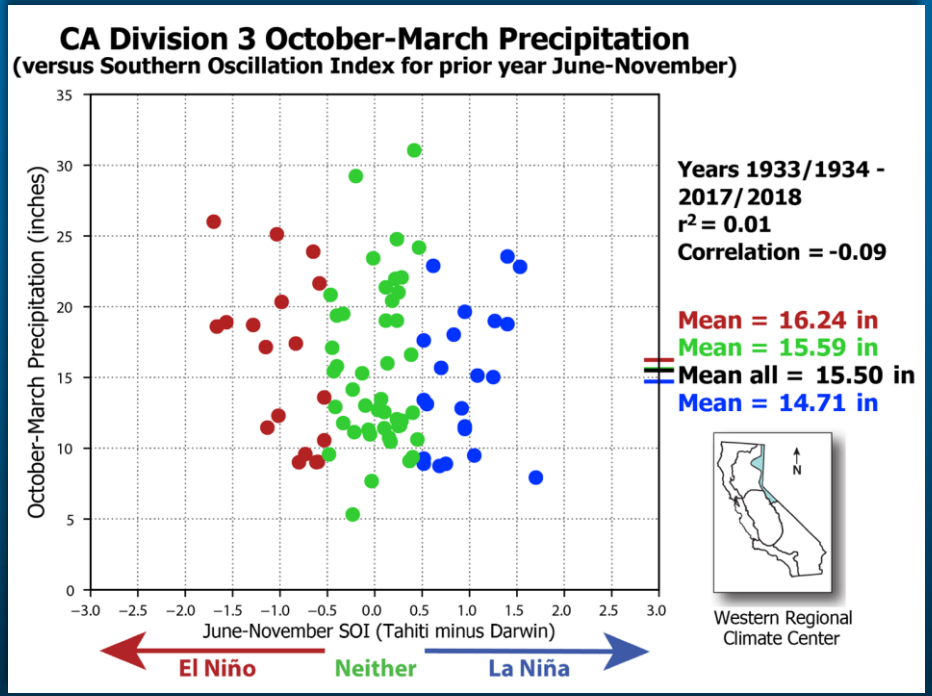
What's Going On With La Nina?

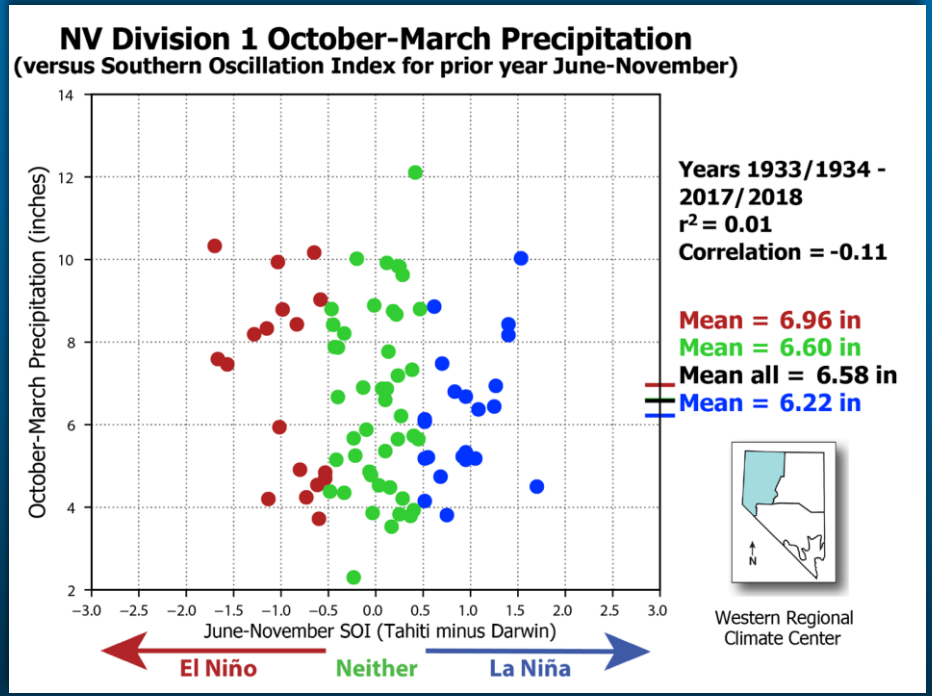




- **Weak to moderate La Nina event heavily favored in tropical Pacific for this winter.**
- **Cooler than normal water over a large area = alterations to global weather patterns.**

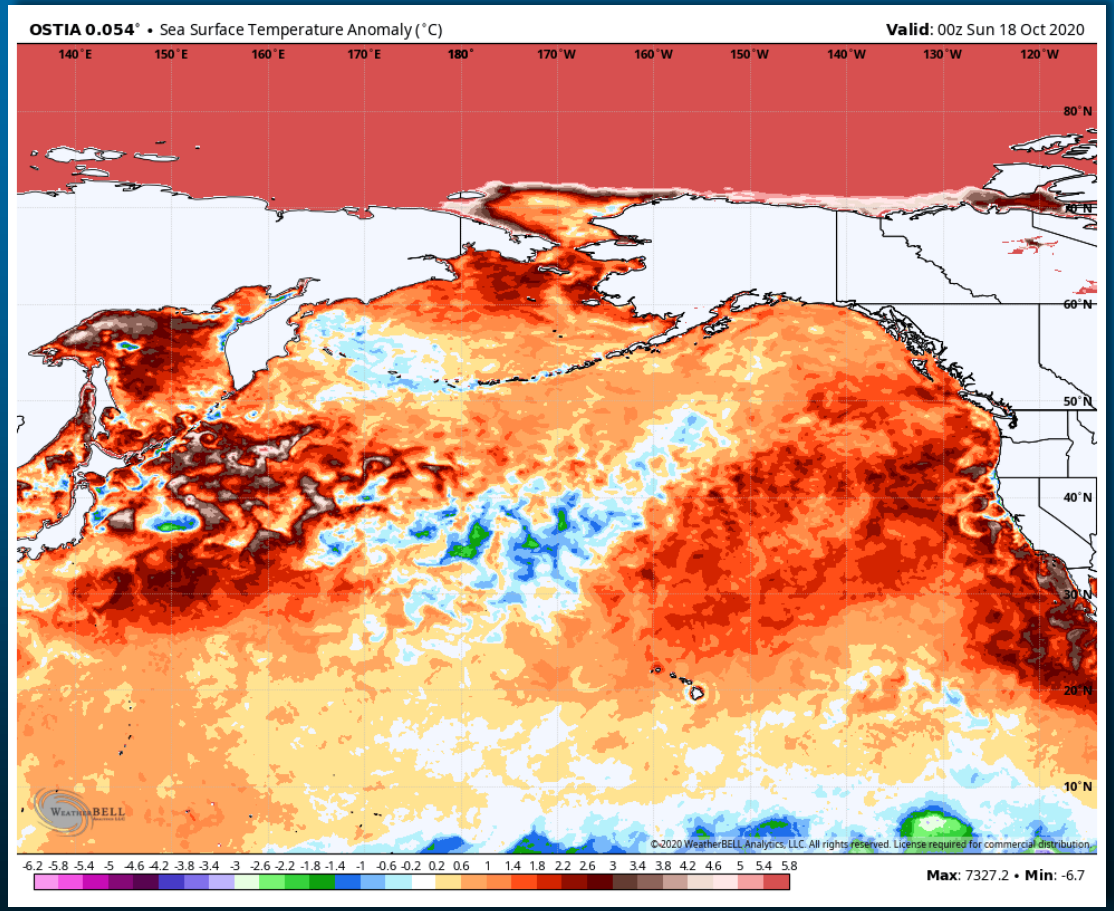
What Does That Mean for Our Winter?





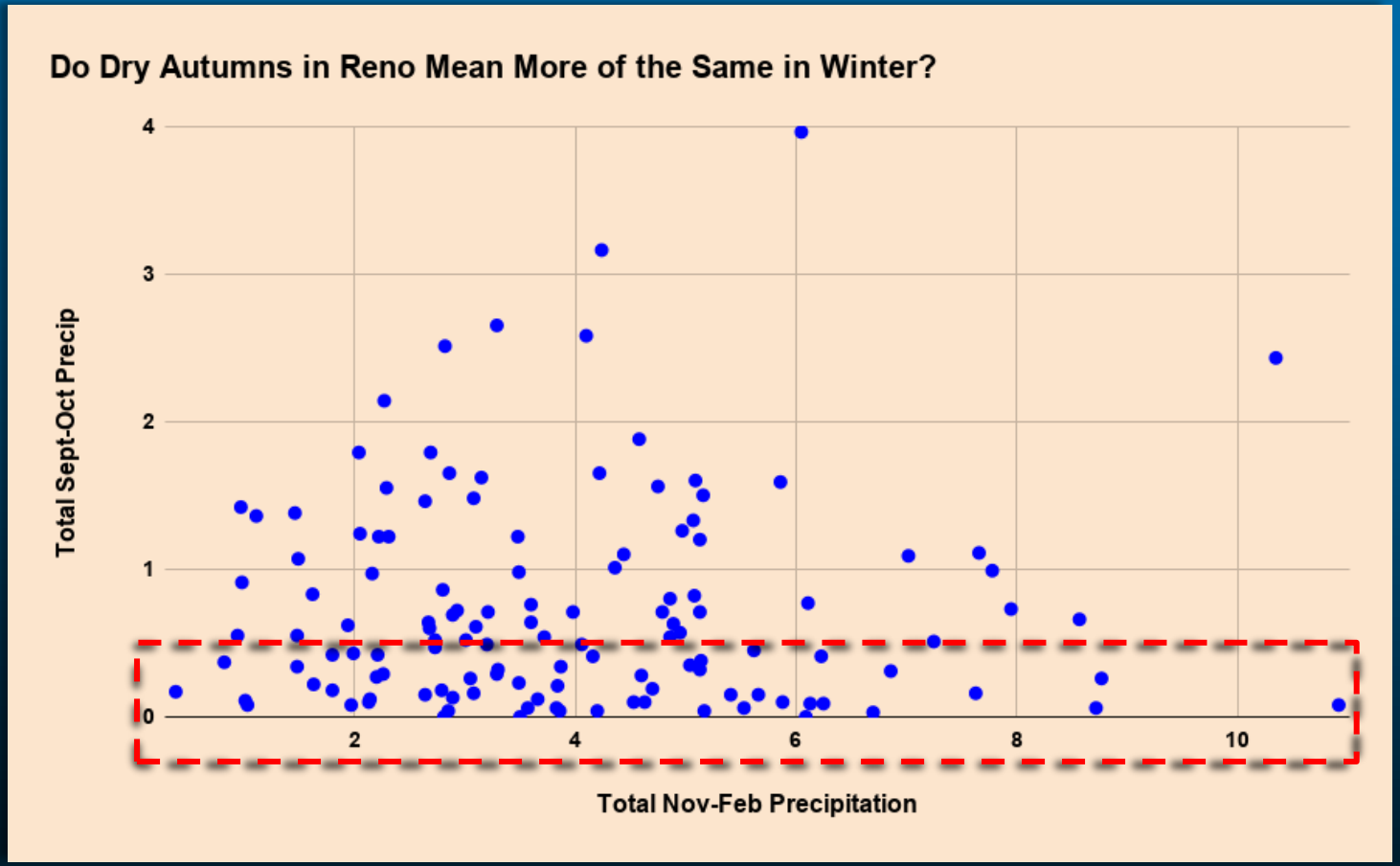
- El Nino or La Nina (ENSO) basically mean nothing for winter precipitation at our latitude.
- There's been some correlation with floods and weak La Nina's but not perfect rule of thumb.

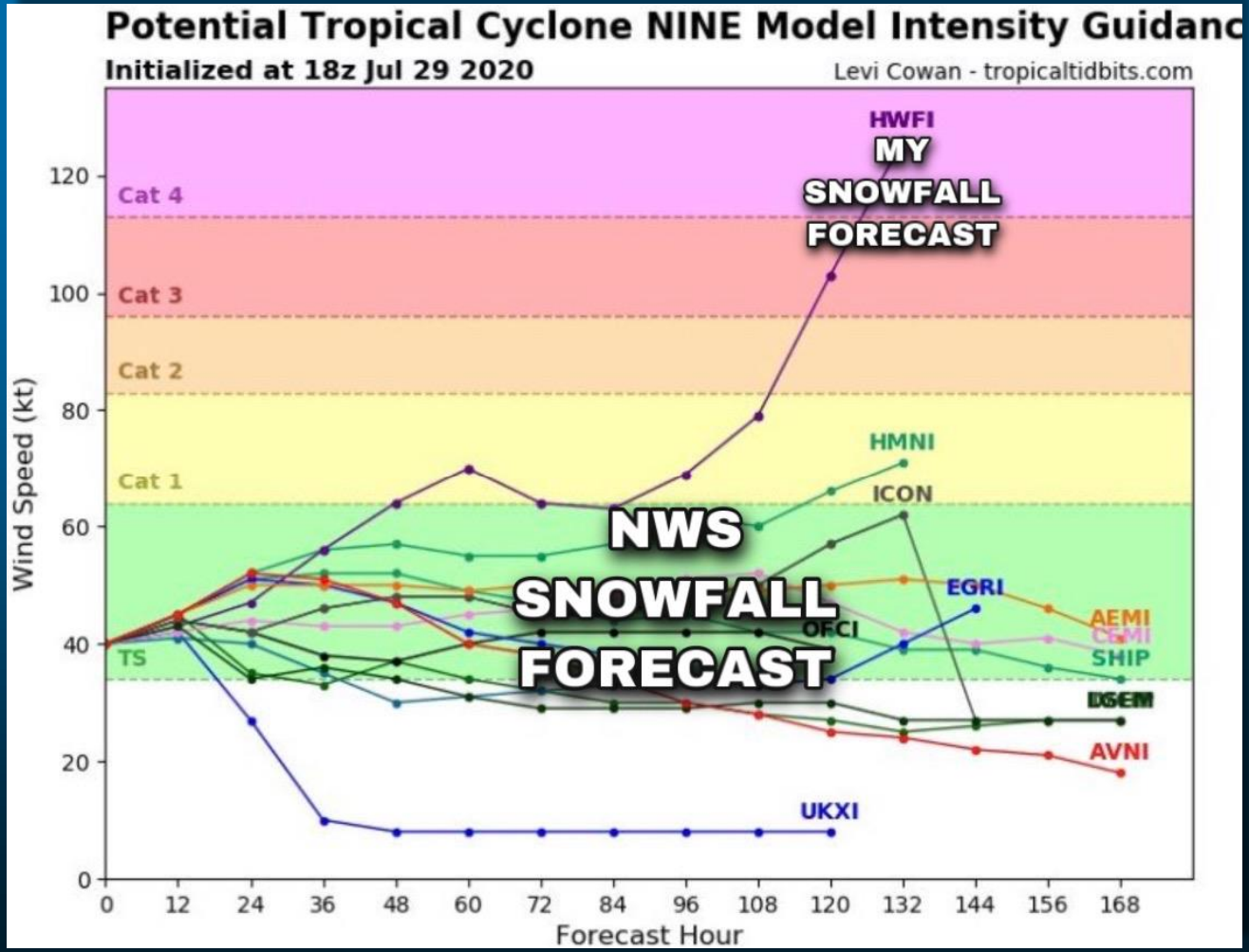
Our Friend "The Blob" is Back



- Highly unusual warmth in NE Pacific ocean much of this year.
- Not connected to ENSO.
- Has been informally associated with drier than normal weather in CA/NV but no physical link yet established. Not perfect either - September 2016 was similar...
- More likely: Could help storms we do get to become **warmer** (higher snow lines) and/or **wetter** (warmer ocean water produces more humidity)

Correlation Between Fall and Winter Weather?

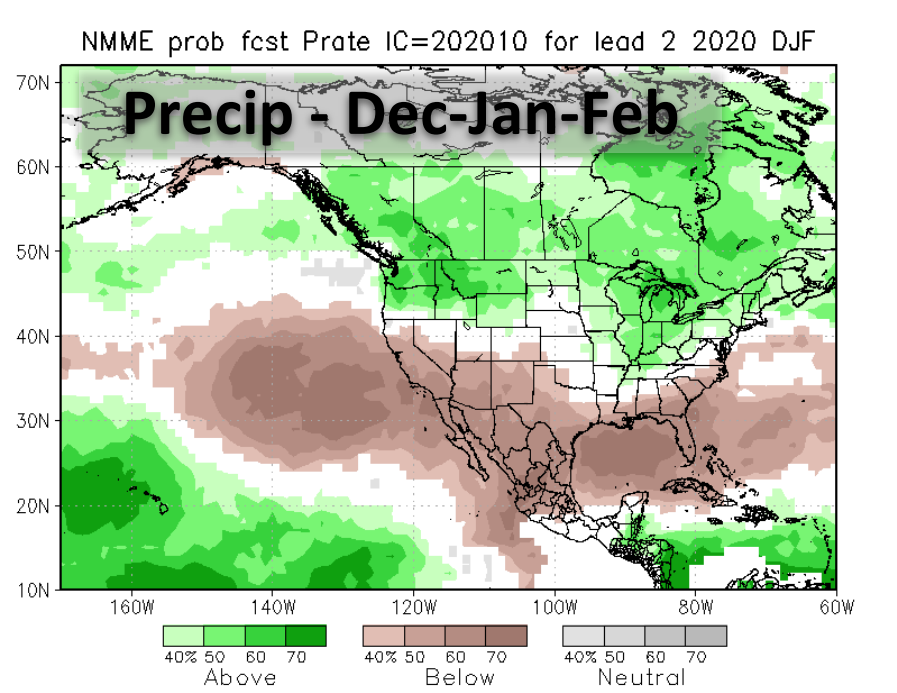


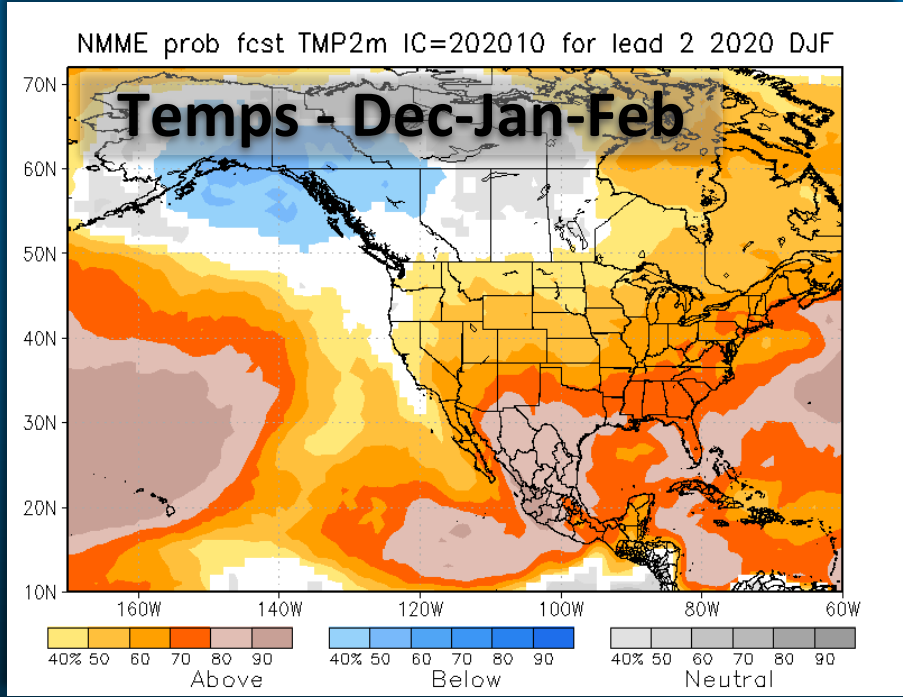


So What Does Weather Twitter Say??

@stormchasernick

OK, What Do The Models Actually Show?

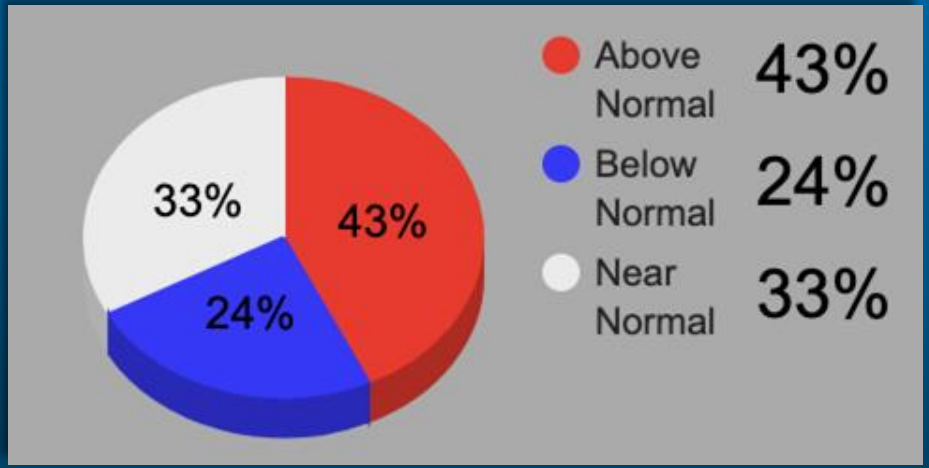




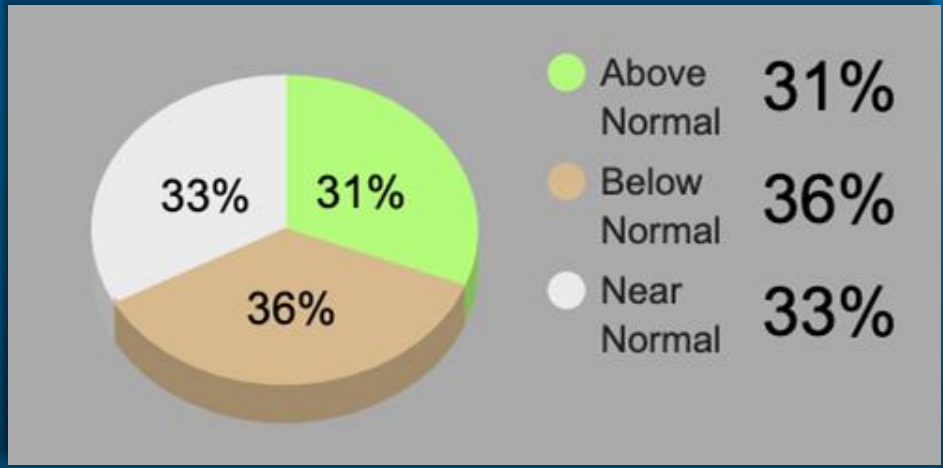
- **Seasonal forecasts struggle in the Sierra and much of Nevada. Lack of ENSO relationship.**
- **Multi-model projections: lean dry and warm but it's only a soft signal for our region.** [data]

If You Like Pie (Charts)…

Temperature - DJF



Precipitation - DJF



- **These pie charts clearly show <u>any scenario is still on the table</u>.**
- **The slight lean is toward a drier and warmer than normal winter. But again, it's a <u>slight</u> lean.**

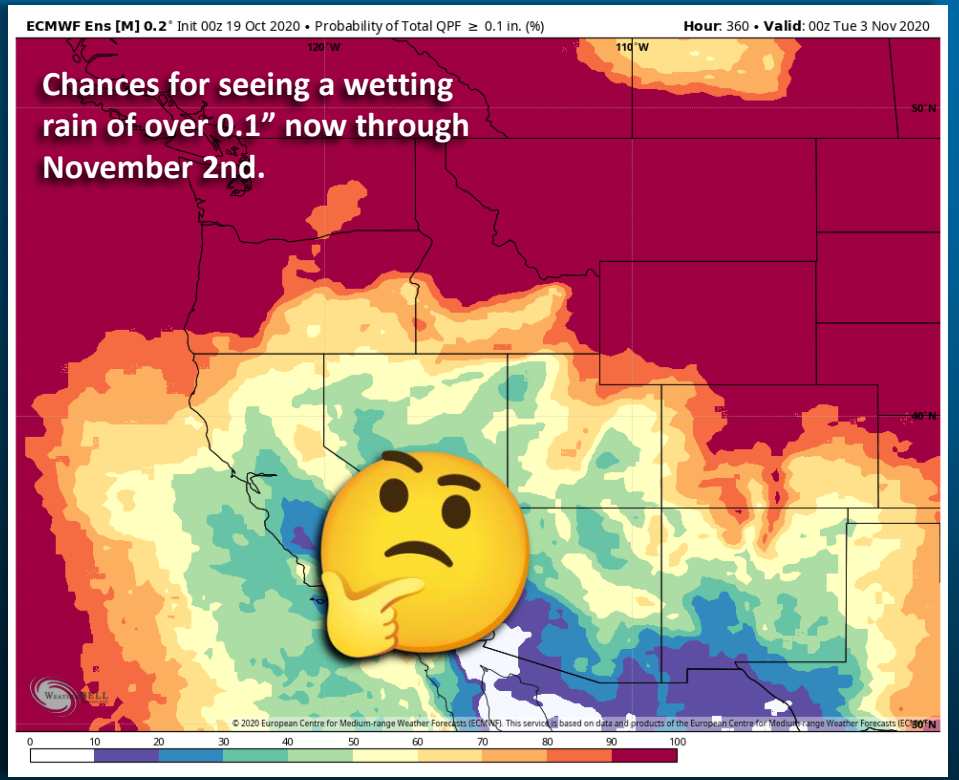
Typical First Wetting Rains - Coming Up??

October 8

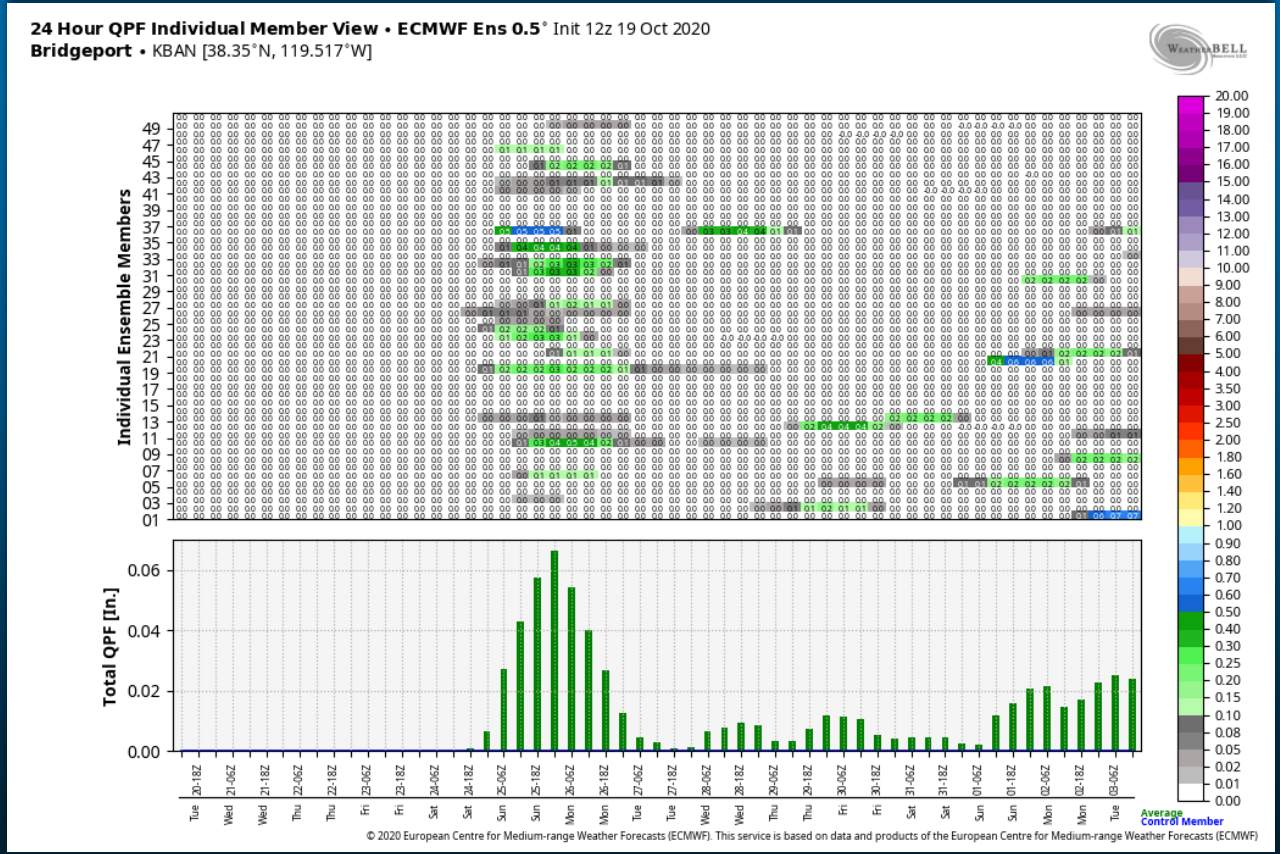
Reno (0.1” or more)

October 4

Tahoe City (0.25” or more)



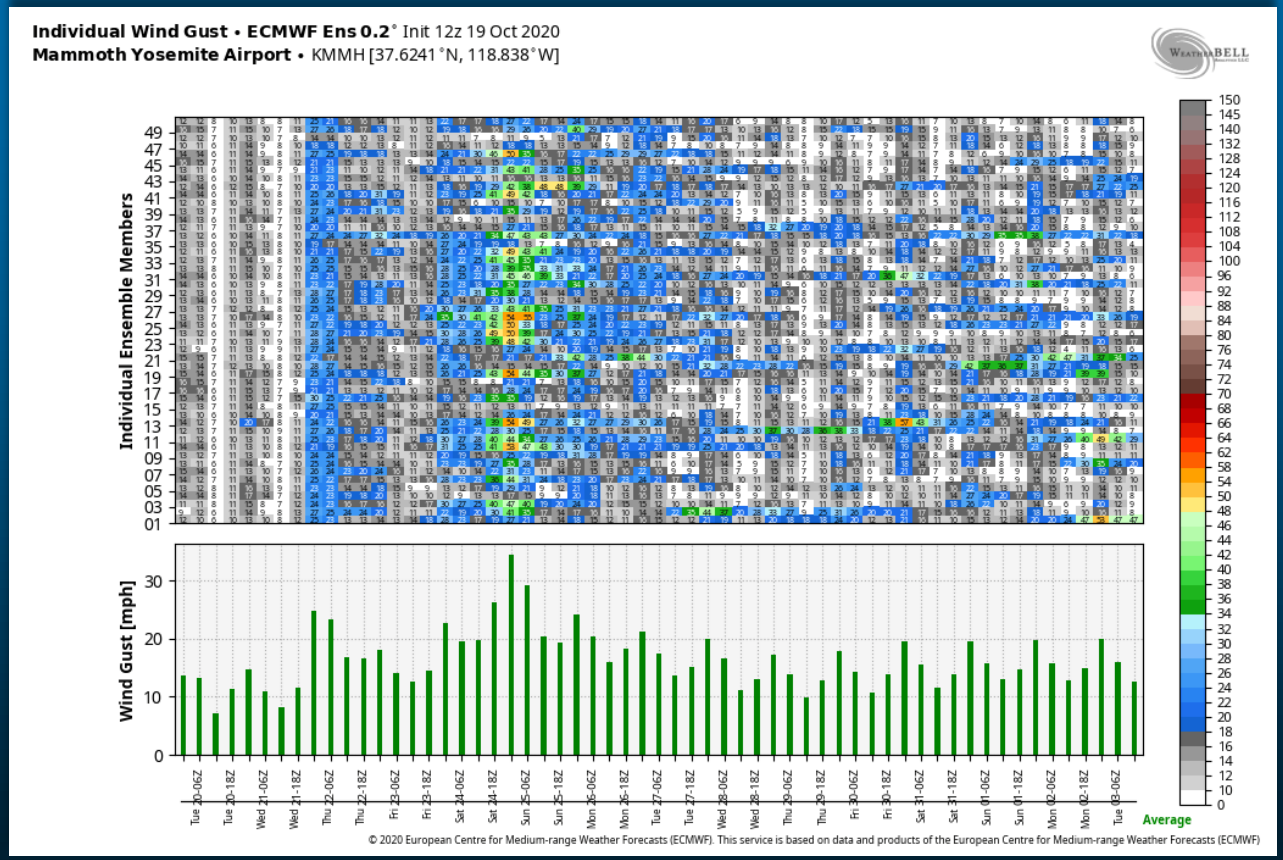
Deeper Dive - First Wetting Rain?



Ensemble Forecasting

- Run a ton of simulations each with varying initial conditions. Replicates chaos in atmosphere.
- The percent of simulations showing rainfall essentially translates to confidence levels in that rainfall occurring. But can also provide scenarios too.
- Looking at the weekend: The leading scenario keeps most mountain areas dry (3 in 5 chance). A slightly less likely but still feasible scenario produces 0.1”-0.3” of rainfall (2 in 5 chance).

Deeper Dive - High Wind Potential Outlook



Ensemble Forecasting

- Run a ton of simulations each with varying initial conditions. Replicates chaos in atmosphere.
- Percent of simulations showing strong winds essentially translates to confidence levels in those winds occurring, but can also provide scenarios too.
- Looking at Saturday: Virtually certain we'll see gusty winds. Leading scenario (4 in 5 chance) is for gusts 25-40 mph in E Sierra. Less likely but still feasible scenario produces gusts 45-55 mph (1 in 5 chance).

Spectrum of Predictability for Winter Weather

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

2-3 Weeks: general regional trends (e.g. turning wet in the west towards Christmas)

5-8 Days: storm pattern taking shape (e.g. winter storm possible Christmas travel week)

2-4 Days: severity, character, locations affected (e.g. heavy snow pattern likely for Sierra, W Nevada)

1-2 Days: details on timing, rain vs snow, historic? (e.g. severe and prolonged travel disruptions for Sierra)

Scenarios We Freakout About - Extreme Winds

The Easy Forecasting Parts

- Can usually see these coming 3-5 days in advance. Or more sometimes.
- We know the wind prone spots are for each wind direction (e.g. Washoe Valley, Walker Lake, Mammoth Airport for S/SW winds)

The Tricky Forecasting Parts

- How much of those intense winds at mountain top level will make it into the valleys? And when?
- Knowing in advance an event will be historic. Getting 90+ mph winds in cities can happen but minimal/zero lead time.

Scenarios We Freakout About - Winter Fires!?

The Easy Forecasting Parts

- Can usually see wind and low humidity events coming 3-5 days in advance.
- We know we're in a drought and/or dry spell in winter. We're watching vegetation.

The Tricky Forecasting Parts

- May only be 1-2 days lead time knowing that the wind event will be intense enough to cause a major fire hazard.
- Convincing the public of the threat. It's winter - why do I need to worry about fire!?

Scenarios We Freakout About - Burn Scar Floods

The Easy Forecasting Parts

- We know where the fire was and typically how "cooked" the soil is.
- Usually takes high intensity rainfall to cause problems. Typically more of a summer t-storm issue, but Narrow Cold Frontal Rainbands can trigger in winter.

The Tricky Forecasting Parts

- Anticipating that brief high intensity rainfall with any meaningful lead time.
- Often debris flows & mudslides occur within minutes of rainfall - so little or no warning is the norm.


Hwy 395 @ Topaz 2018 - NDOT Pic

More Deets on Burn Scar Flooding

Flow on the Walker Fire burn scar, N Plumas County - July 2020

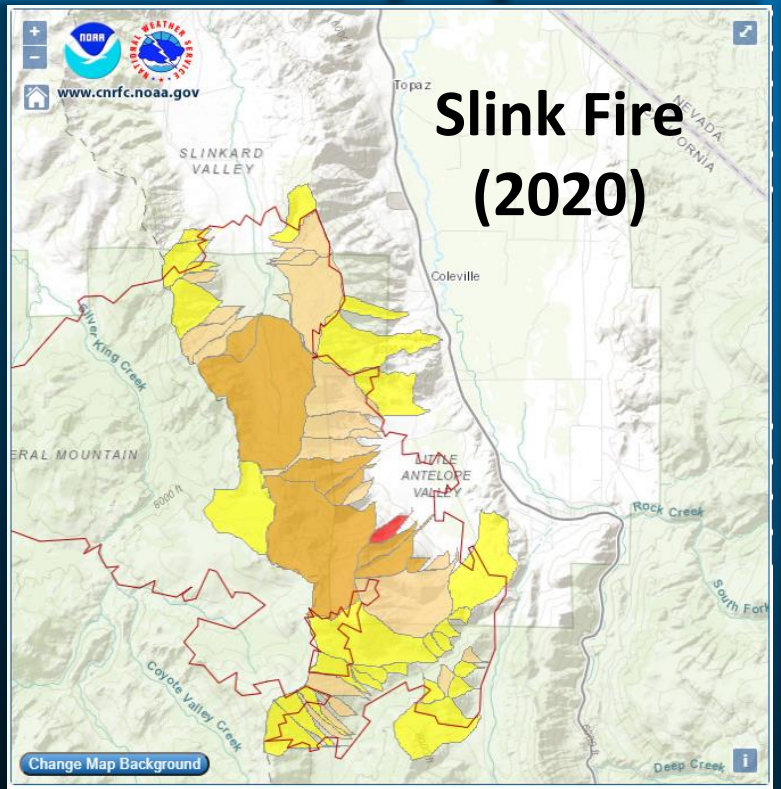
Soils Get Baked!

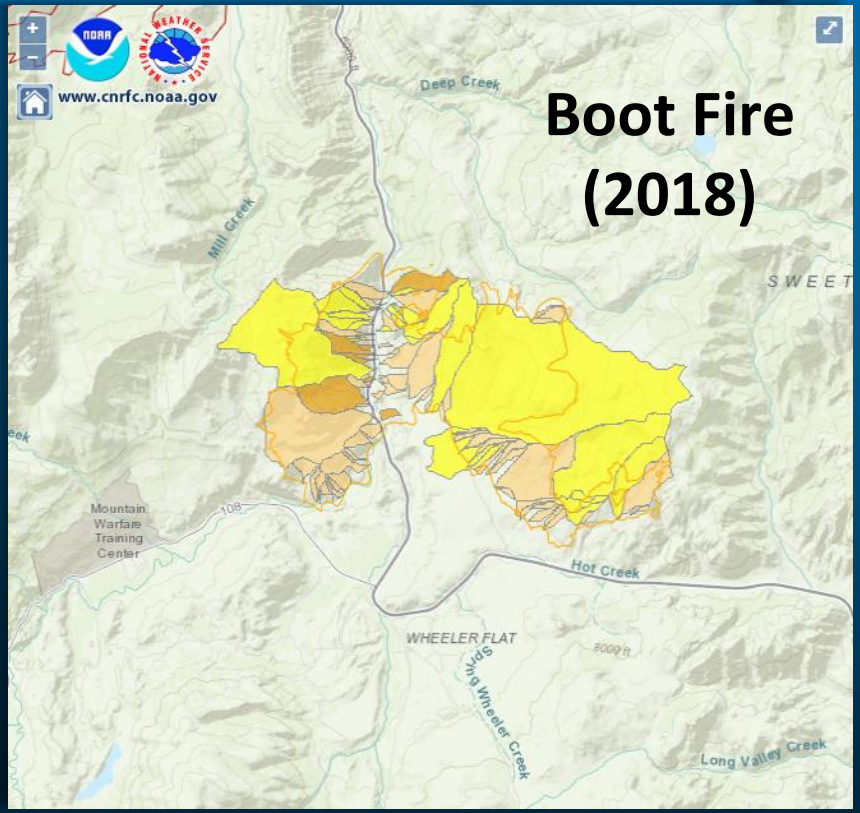
- Low intensity burns - fast moving grass and sage fires - minimal increase in flood risk.
- High intensity burns - such as plume dominated forest fires or pinon juniper - have much greater risk of flooding and debris flows especially in steep terrain.

When to Panic

- Each fire is different based on burn intensity, soils, and terrain slope. Thresholds vary.
- 0.5-1.0”/hour rate for higher risk burn areas.
- But, only 5-15 minutes of intense rainfall is enough. 0.25” in 15 mins used on many fires.

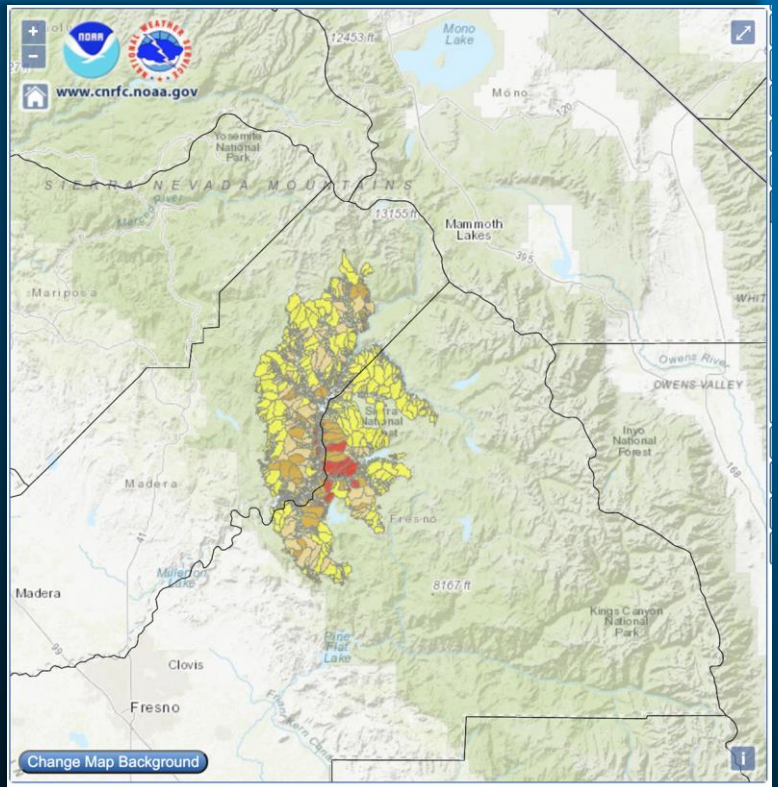
Mono County Specifics - Flood Risk Modeling

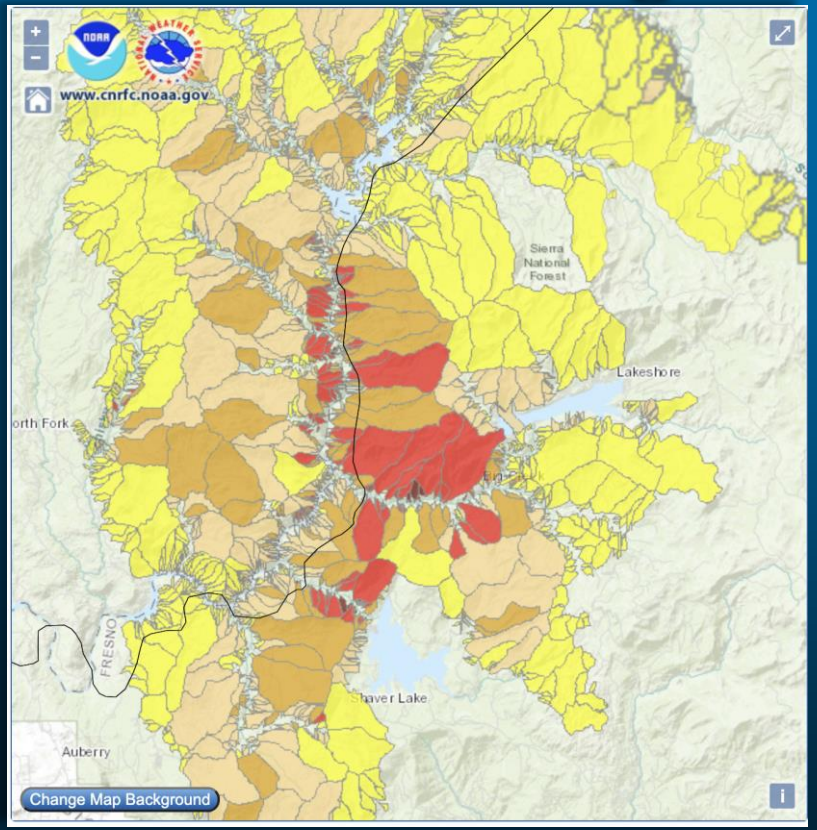




Source - California-Nevada River Forecast Center website

For Your Awareness: Creek Fire Modeling





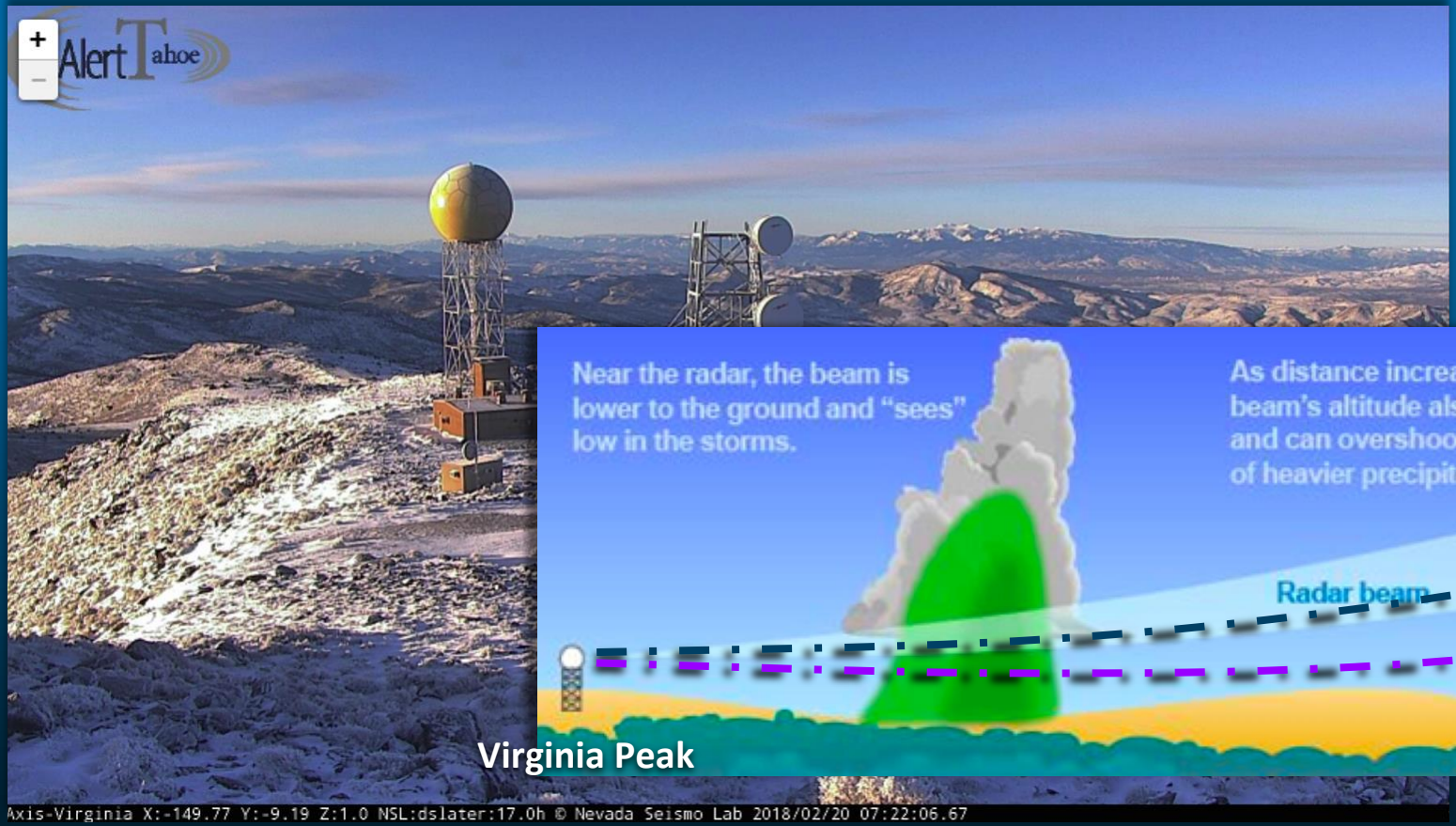
Debris Flow Probability

0-20%	20-40%	40-60%	60-80%	80-100%

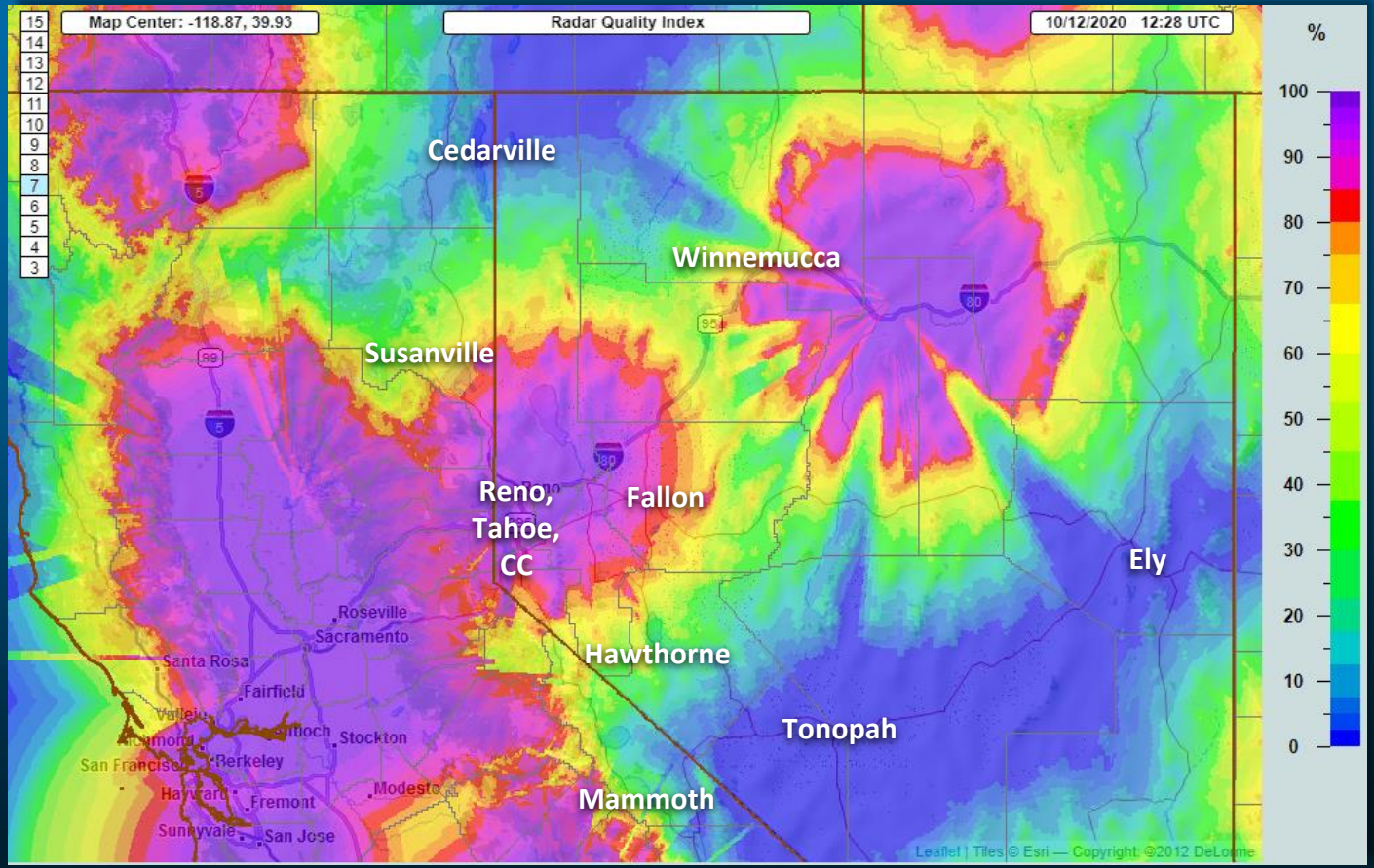
Likelihood of a debris flow in response to the design rainstorm with a peak 15-minute rainfall intensity of 24 mm/hr (0.94 in./hr). Data courtesy USGS.

Source - California-Nevada River Forecast Center website

Radar Upgrade - Better Low Altitude Data



Still a Few Large Holes in Low-Altitude Coverage



Fantastic

Decent

It Will Do

Good Luck!

Thanks for Listening!

Chris Smallcomb

NWS Reno Meteorologist and PIO (and Freakout Chart guy)

chris.smallcomb@noaa.gov