Item available for public inspection in the Clerk's office during regular business hours (Monday – Friday, 9 AM – 5 PM)

November
12, 2024
Regular
Meeting
Item #7a. Updated
Presentation

775-673-8100

NWS Reno 2024-25 Winter Outlook



weather.gov/reno

NOAA

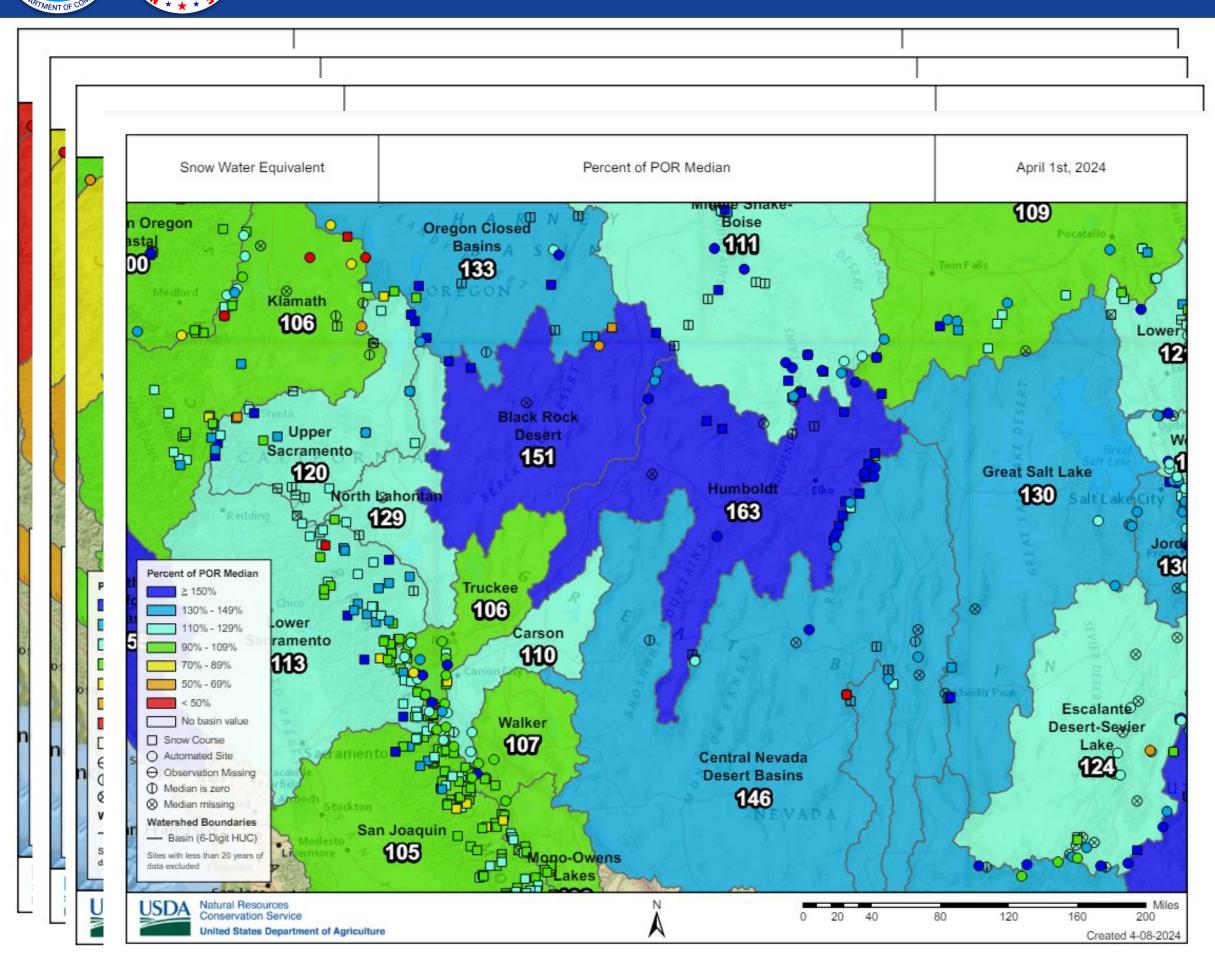


Dawn Johnson

Warning Coordination Meteorologist National Weather Service Reno, Nevada

dawn.johnson@noaa.gov

Look Back at '23-24: An Average Year of Extremes



December



January



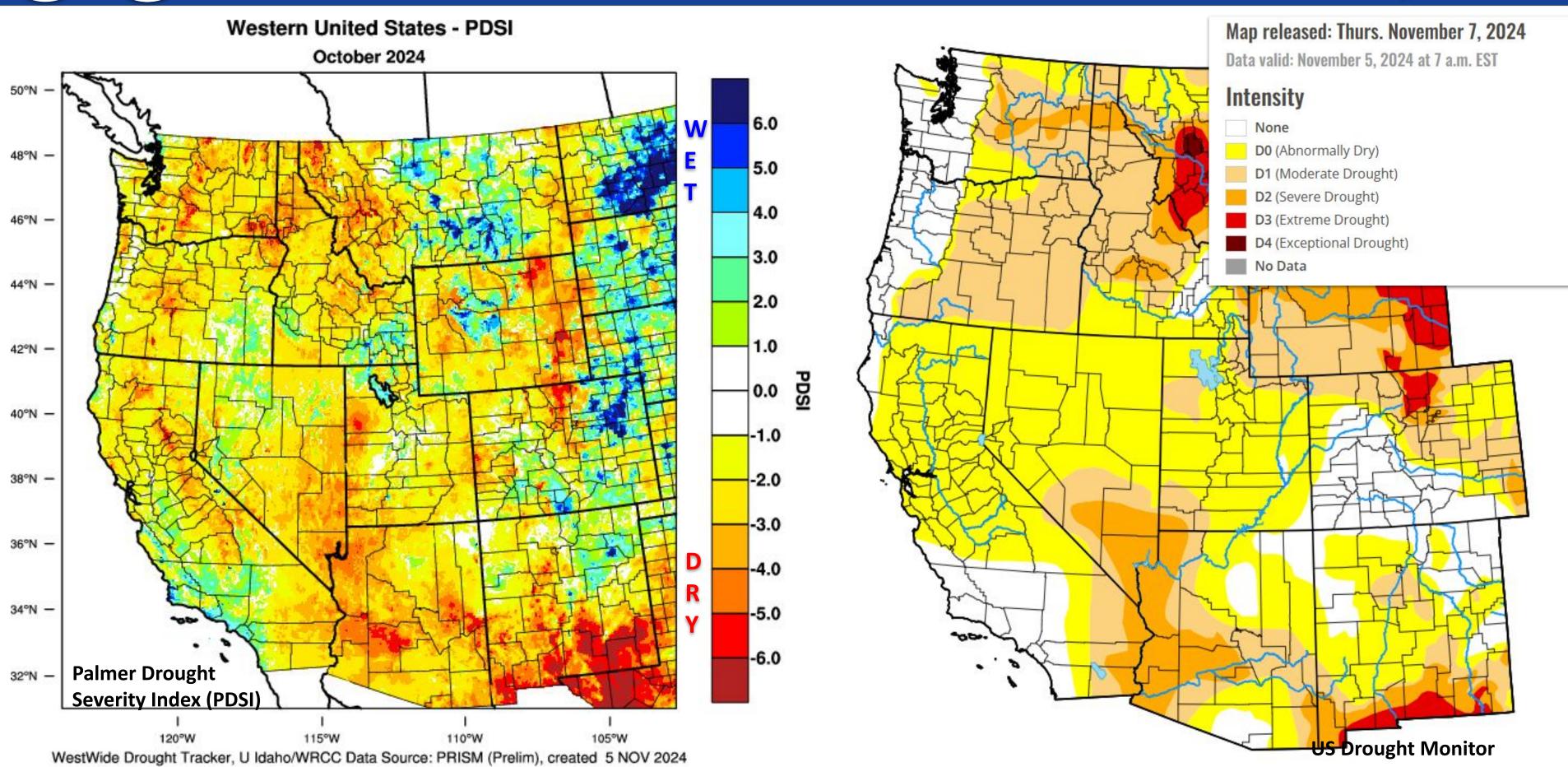
February



March

March is the new December.

Drought Creeping Back In





Fire Concerns Going into Fall





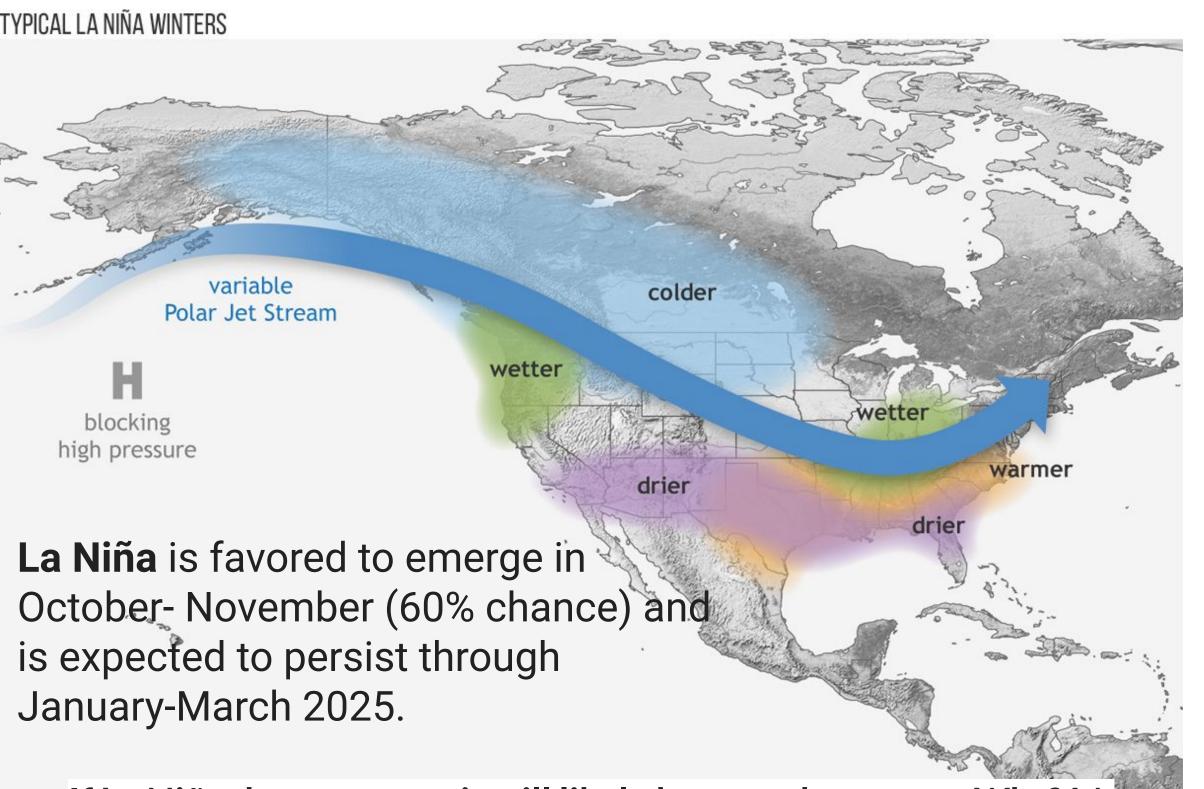
The expectation is for normal risk both at the higher and lower elevations as we head into fall/winter.



 To keep it real: How this fall evolves with rain/snow will determine the risk.



La Niña Is [Likely] Making a Return



If La Niña does emerge, it will likely be a weaker event. Why? It's getting late and it hasn't formed yet, meaning it doesn't have the positive feedbacks it needs from the ocean and atmosphere, needed for growth.

Is is a low pressure system?



Is it an atmospheric river?



A series of atmospheric rivers?

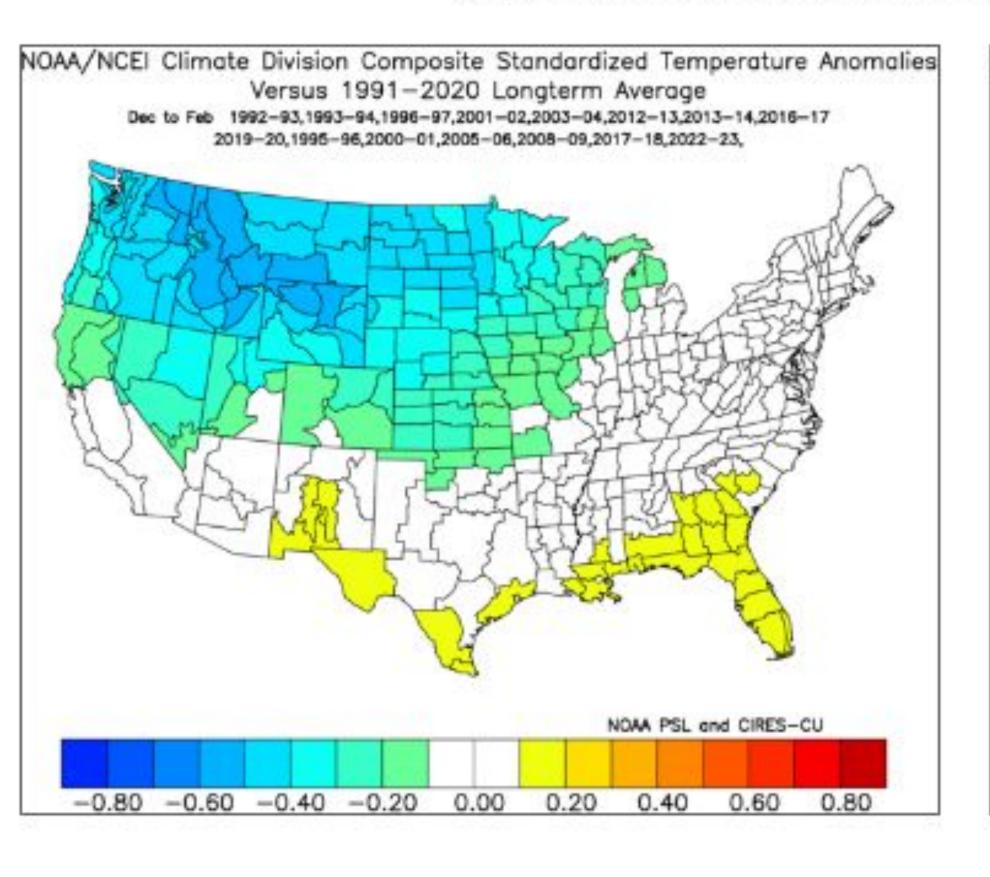


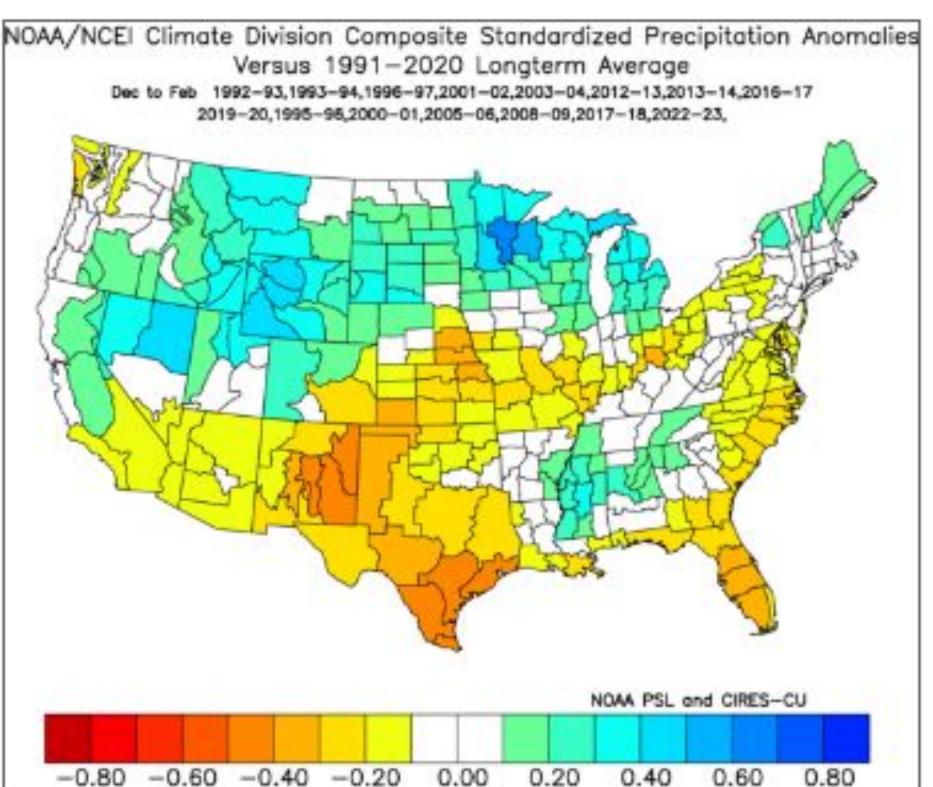


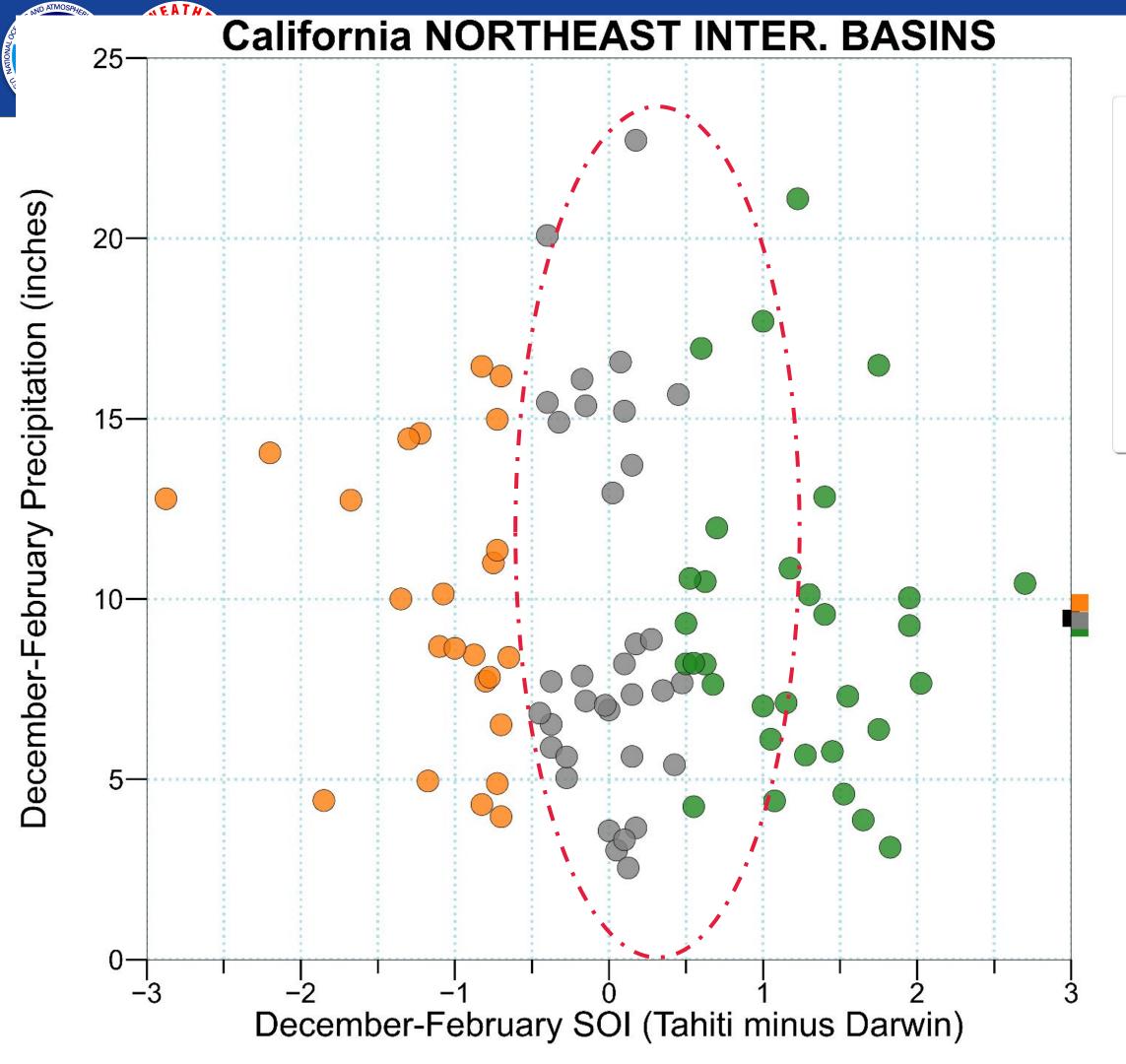
1991-2023 period only

15 seasons

ENSO Neutral and Weak La Nina combined



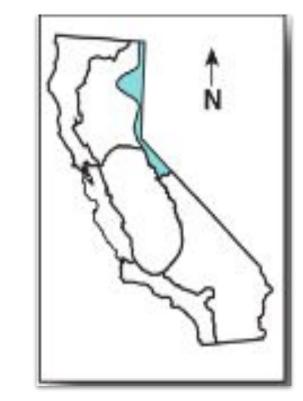




Years: 1933/1934 - 2021/2022

 $r^2 = 0.01$ Correlation = -0.11

- Mean El Niño = 9.89
- **Mean All = 9.46**
- Mean Neutral = 9.40
- Mean La Niña = 9.19







Analog Years - Rapid Transition (Nov-Mar)

		Reno	Tahoe City	Bishop	Susanville
	1964-65	Wet	Very Wet	Very Dry	Very Wet
	1970-71	Slightly Wet	Near Normal	Dry	Very Wet
,	1973-74	Wet	Near Normal	Wet	Very Wet
	1983-84	Slightly Wet	Near Normal	Dry	Wet
	1988-89	Slightly Dry	Slightly Wet	Very Dry	Wet
	1995-96	Wet	Wet	Dry	Very Wet
	1998-99	Dry	Slightly Wet	Very Dry	Slightly Dry
	2005-06	Wet	Very Wet	Very Wet	Very Wet
	2007-08	Near Normal	Very Dry	Very Wet	Dry
	2010-11	Near Normal	Very Wet	Very Wet	Slightly Wet
	2016-17	Record Wettest	Record Wettest	Very Wet	Very Wet

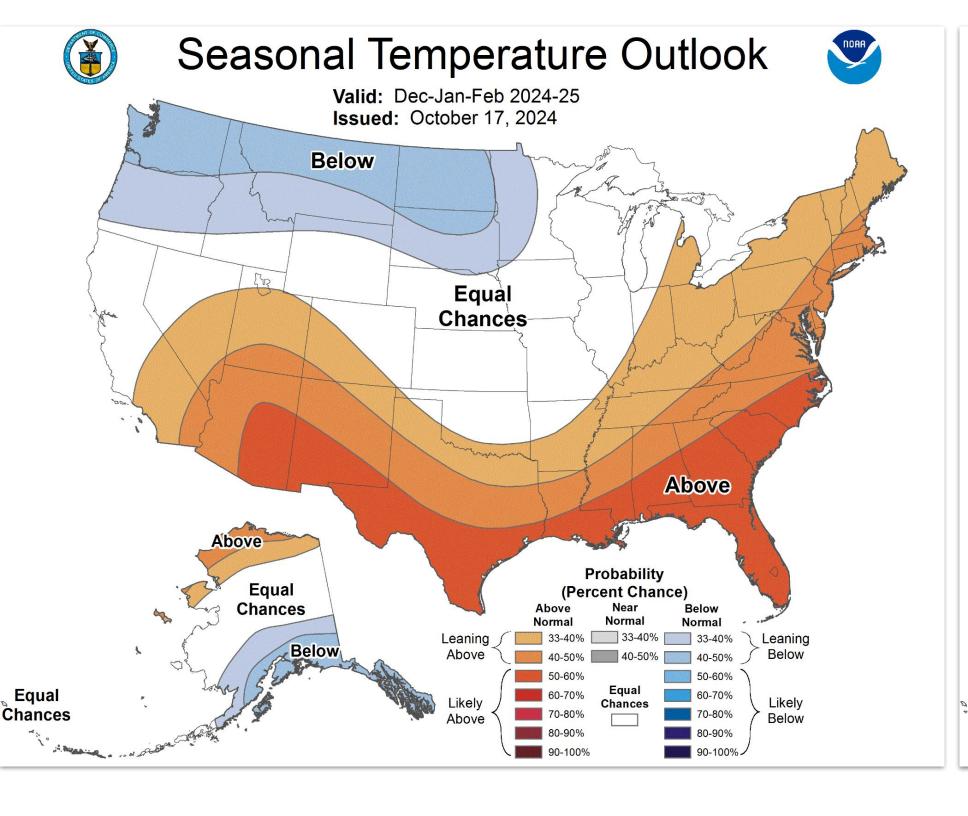


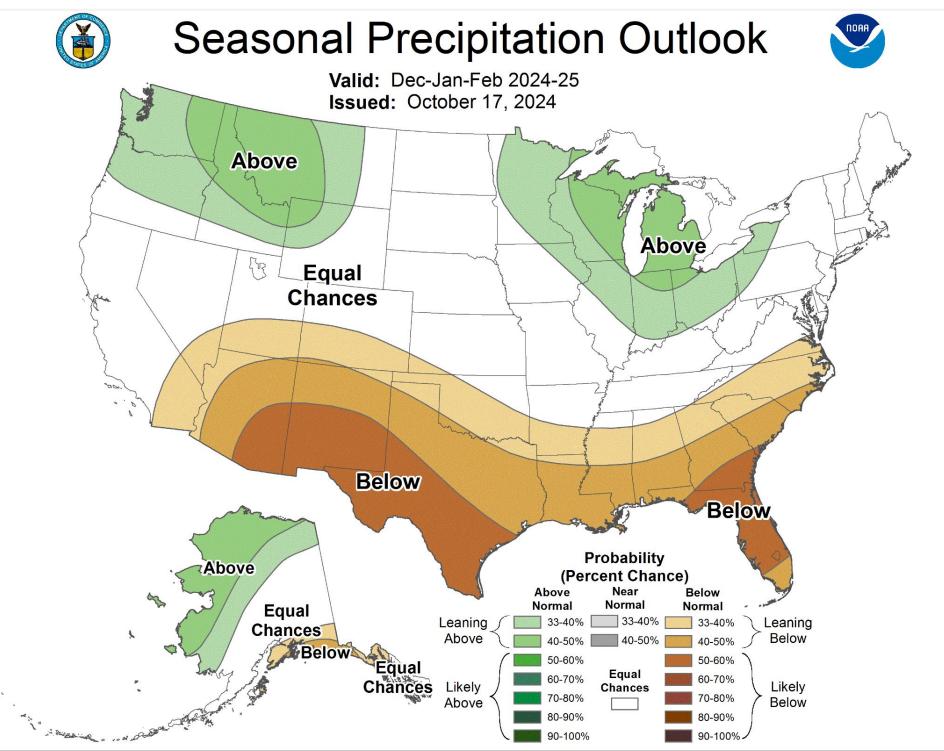
Strong El Niño last winter to a weak La Niña or ENSO Neutral this winter.

14 similar large shifts from EN to LN or neutral in historical record.

10 had well above normal water flow volumes on the Truckee, Carson & Walker Rivers





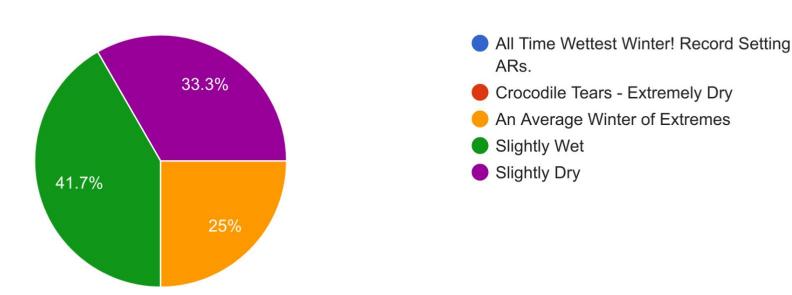


The "Very Scientific" NWS Reno Staff

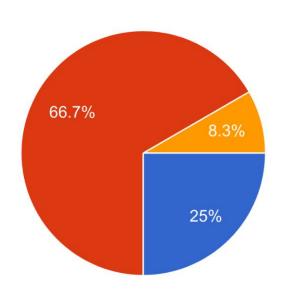
Gut-Feeling Forecast

How Wet Will The Winter Be in the Sierra and Western Nevada?

12 responses

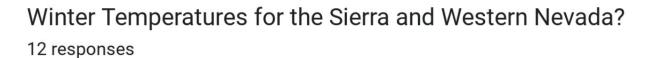


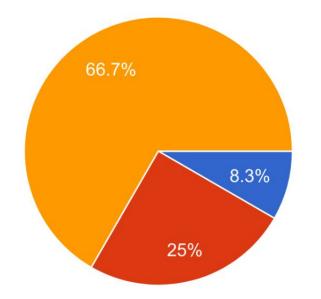
How About Wind? 12 responses



 The Garbage Can Scale Returns and Many Are Lost The Usual

Wood Burning Fire Alert: Calm Air and **Inversion City**





- This Winter will make the 2022-23 Winter Seem Warm (i.e. COLD!)
- Let's Be Real, In This Climate We're Just Warm
- Run of the Mill "Normal" Range



- We have had both incredibly wet and incredibly dry La Niña Winters, as well as unremarkable ones.
 - Larger scale climate signals such as ENSO haven't behaved as "typically" expected in more recent years
- Wet or dry episodes are going to be dependent on location and strength of high pressure in the northern Pacific Ocean.
- Fall precipitation onset, while not everything, is important to set the stage for spring runoff. Late onset = drier soils and lessened runoff.
- We can still have: big snow storms, floods, cold spells, inside sliders, and wind storms even in a "drier than normal winter".
- Fires will continue to be a concern until we get a season-ending*
 precipitation event

- Seasonal outlooks DO NOT capture how wet or dry a winter will be
 - The state of the science is just not there yet and seasonal predictability is limited, esp early into the season
- Winters are defined by individual storms that occur throughout the season, and often the number of atmospheric river events we see at our latitude.
 - These storms are usually apparent in the 7-14 day forecast window and will be highlighted in partner emails and the Forecast Discussion
 - Any single storm can produce impacts and flooding, whether it be localized and/or on a regional scale.



Changes to Cold Weather Products



On October 1, 2024, the NWS simplified its suite of cold weather products to improve messaging of these hazards and provide better decision support services.

Old New Extreme Cold Watch **Extreme Cold Watch** Consolidated to Wind Chill Watch Extreme Cold Warning **Extreme Cold Warning** Consolidated to Wind Chill Warning Wind Chill Advisory Cold Weather Advisory Replaced with

Wind Chill is not going away – Extreme Cold Watches/Warnings and Cold Weather Advisories are now based on the **Apparent Temperature**.

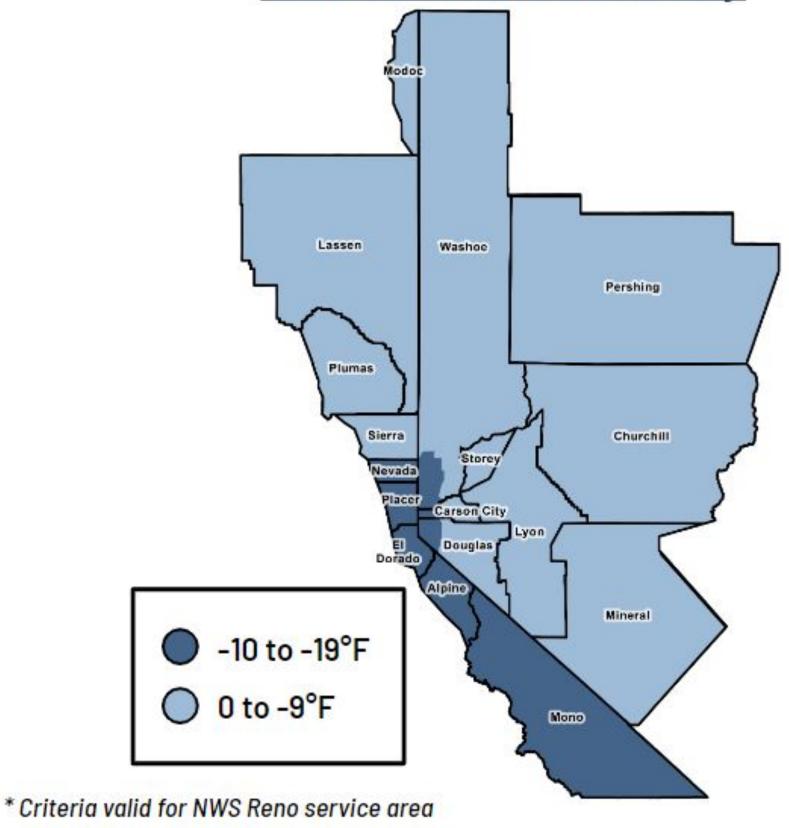


Cold Weather Product Criteria

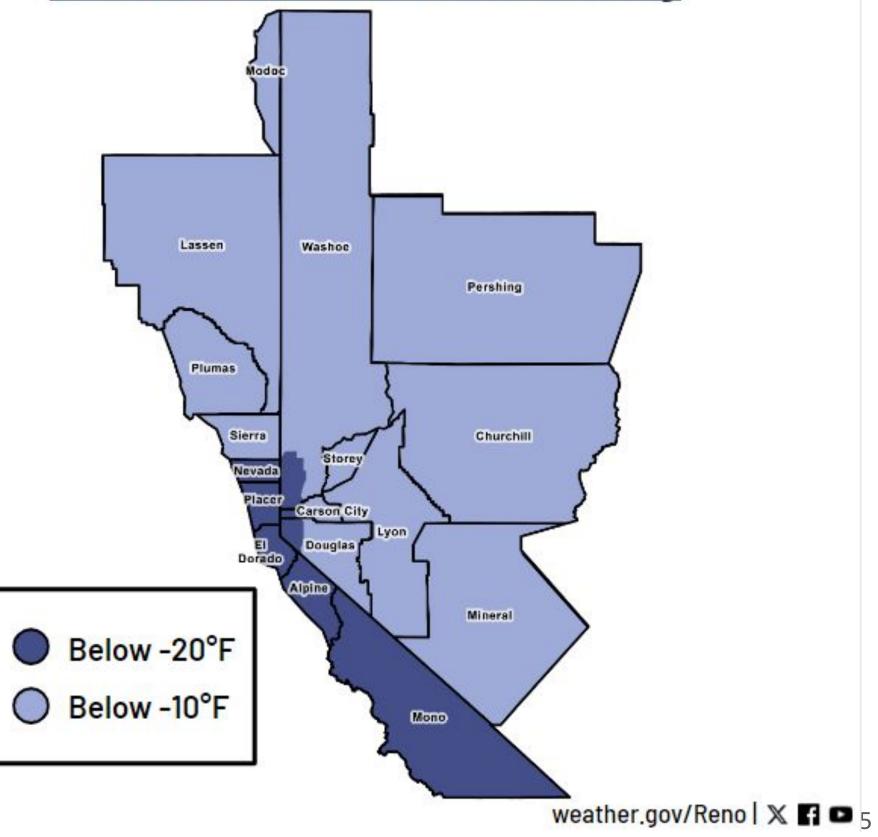
NWS RENO, NV

Eastern Sierra & Western Nevada

Cold Weather Advisory



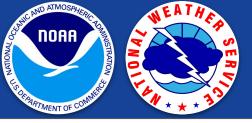
Extreme Cold Watch/Warning





TYPE	DEFINITION	THREAT	ACTION
WARNING	Hazard is occurring, imminent, or very likely	Threat to life & property	Take protective action
WATCH	Conditions are <u>favorable</u> for hazard to occur	Threat to life & property	Have a plan of action
ADVISORY	Hazard is occurring, imminent, or very likely	Threat of significant inconvenience	Use caution





Ultimate value of any weather forecast...

...was it accurate enough for you to make a good decision?



What might be lurking ahead?

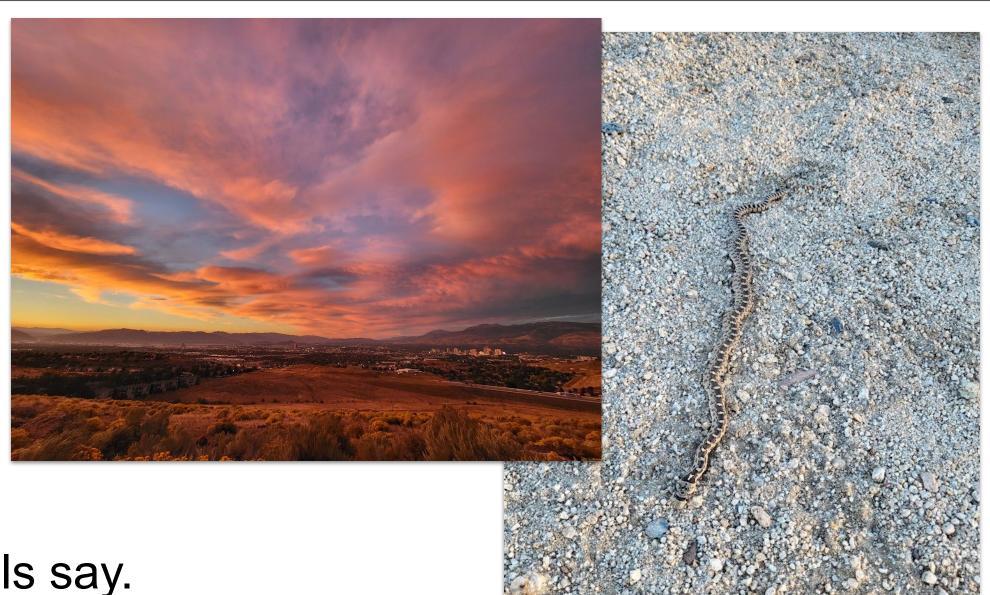


Scenarios

"Most Likely" vs "Worst Case" Being Prepared.



Forecaster experience & what the models say. High vs low confidence = different decisions.



Probabilities

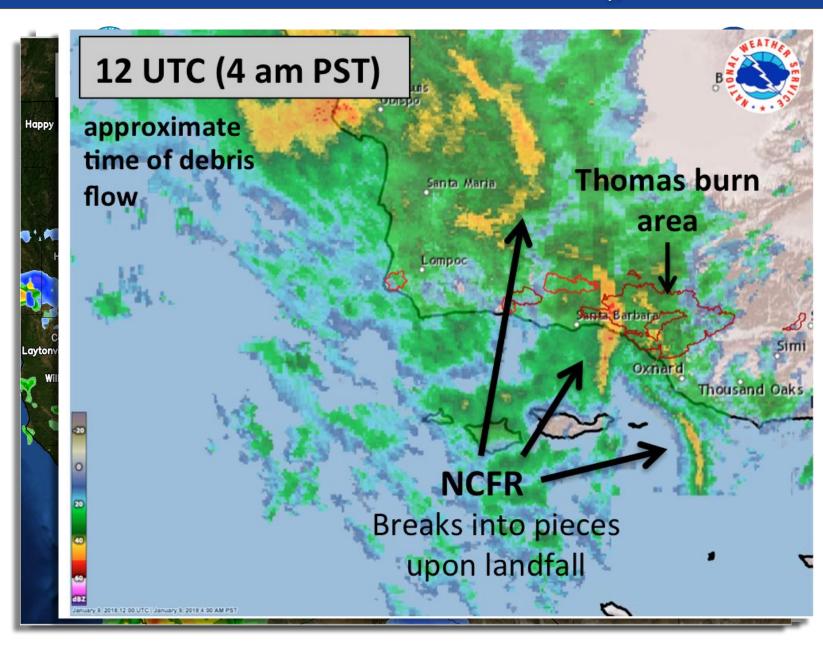
What weather is important to you and how likely is that to happen?

7-14 Days

Broad trends: wetter vs drier, heavily probabilistic outlooks (e.g. lean wet).

2-5 Days

What kind of storm: flood vs blizzard vs high wind scenarios become clearer.



6-48 Hours

Small scale but high impact features: rapid snow level drops, inside sliders, cold frontal squall lines.

New Tools to Help With This

DAY: Day 9 -

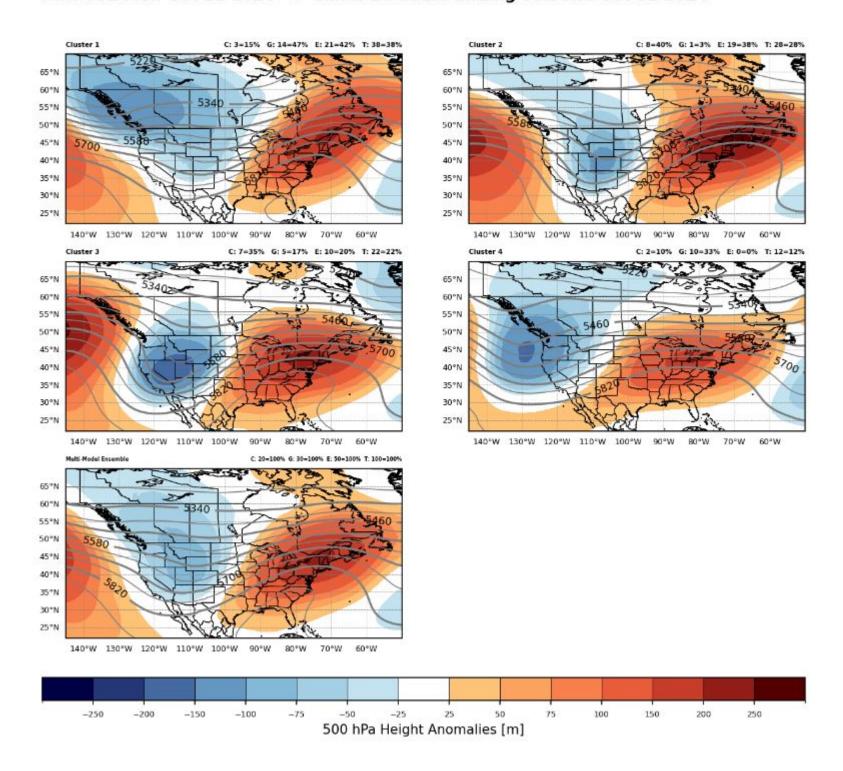
DOMAIN: CONUS+

FIELD: Cluster 500 mb Heights (Anomalies) -

INIT: 00 UTC Mon 21 Oct 2024-

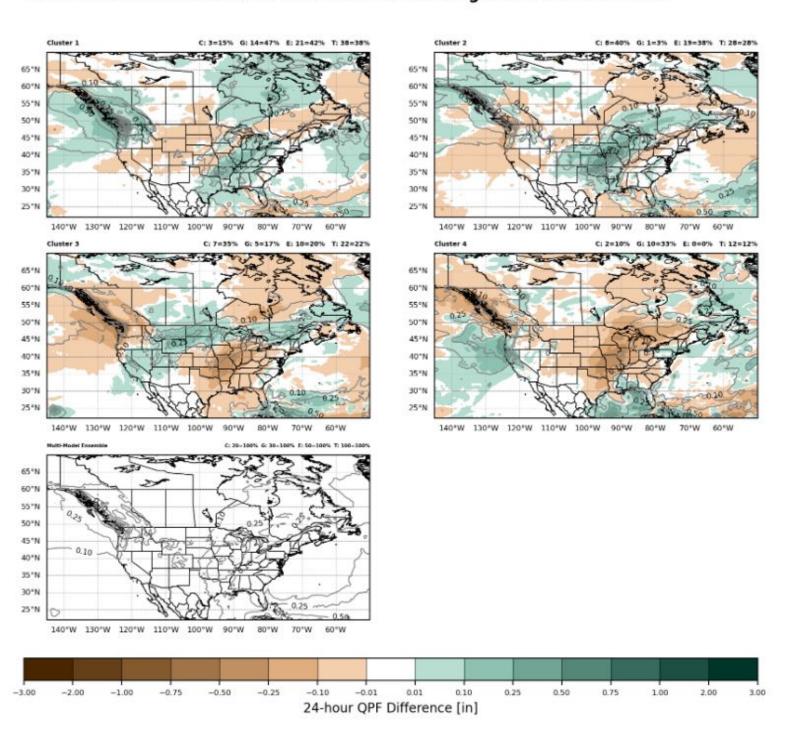
d[model]/dt

Cluster Mean 24-hour Mean 500-hPa Heights and Anomalies [meters] Init: 00Z Mon Oct 21 2024 --> Valid: 24-hours Ending 00Z Thu Oct 31 2024

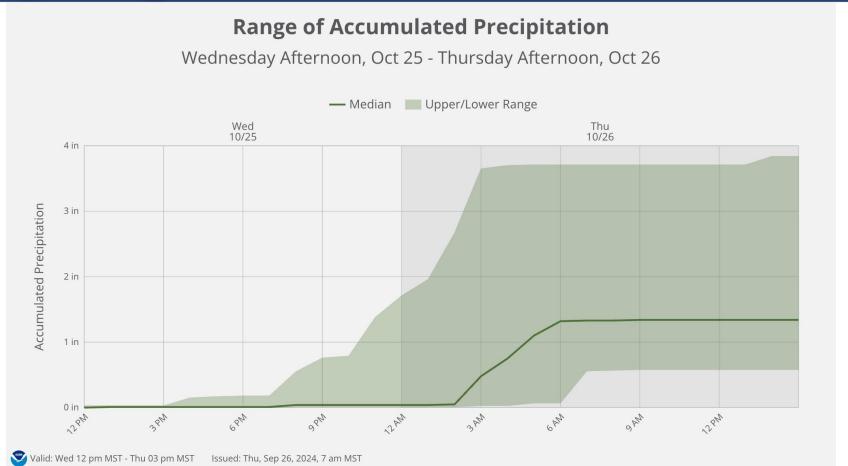


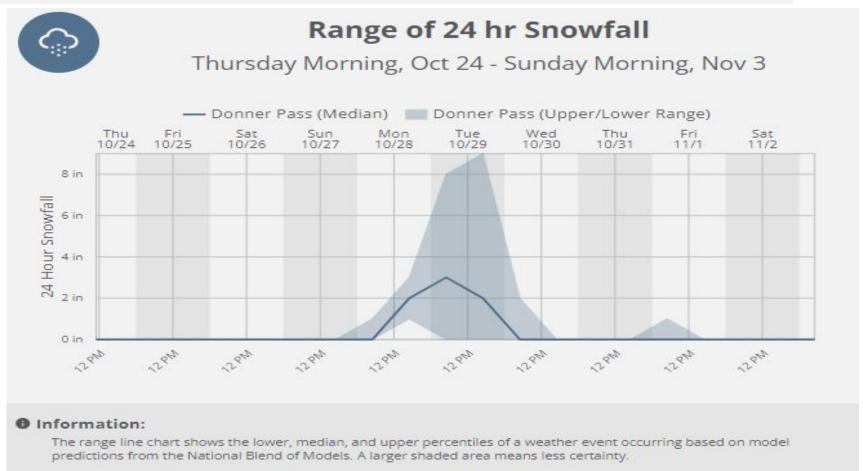


24-hour QPF Difference from Multi-Model Mean [in] Init: 00Z Mon Oct 21 2024 --> Valid: 24-hours Ending 00Z Thu Oct 31 2024



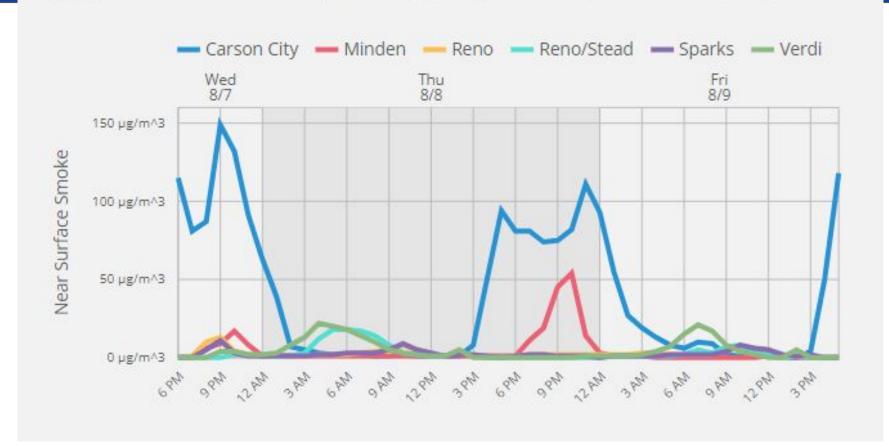
New Tools to Help With This





Near Surface Smoke

Wednesday Evening, Aug 7 - Friday Afternoon, Aug 9



Chance of 24 hr Max Gusts Greater Than 35 mph

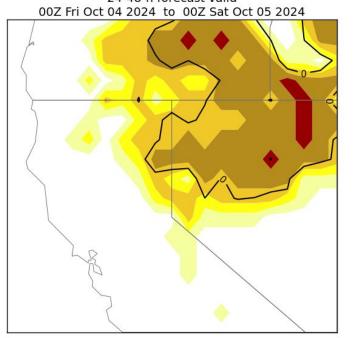
Wednesday Evening, Sep 11 - Saturday Evening, Sep 21

	Wed 9/11	Thu 9/12	Fri 9/13	Sat 9/14	Sun 9/15	Mon 9/16	Tue 9/17	Wed 9/18	Thu 9/19	Fri 9/20	Sat 9/21
Austin	97%	0%	0%	1%	20%	30%	5%	10%	3%	2%	5%
Caliente	3%	0%	0%	0%	3%	50%	5%	2%	3%	0%	0%
Carson City	85%	0%	0%	0%	25%	10%	0%	5%	0%	1%	3%
Elko	97%	5%	0%	4%	50%	50%	40%	20%	15%	5%	10%
Ely	100%	5%	5%	55%	90%	80%	30%	40%	25%	15%	15%
Las Vegas	80%	0%	0%	5%	55%	75%	15%	15%	10%	5%	5%
Laughlin	80%	10%	20%	30%	75%	90%	20%	25%	25%	20%	20%
Reno	97%	0%	0%	15%	65%	30%	20%	20%	5%	5%	10%
Tonopah	90%	25%	1%	45%	90%	70%	20%	35%	25%	10%	20%
Winnemucca	97%	0%	0%	2%	30%	30%	25%	15%	5%	5%	10%

New Tools to Help With This



ECMWF Extreme Forecast Index (shaded) and Shift of Tails (black contours) for Wind-Gust 24-48-h forecast valid 00Z Fri Oct 04 2024 to 00Z Sat Oct 05 2024



elative to the ECMWF reforecasts from a 5 week period (2003 - 2024 centered on the week this forecast was initialized

(8)					- 11			
	1	-	- '					
	1	i i		g .			N.	
	0.5	0.6	0.7	0.8	0.9	0.95	0.99	1.

		_	9				
 0.5	0.6	0.7	0.8	0.9	0.95	0.99	1.

Weather Forecast Office

Thursday, February 29

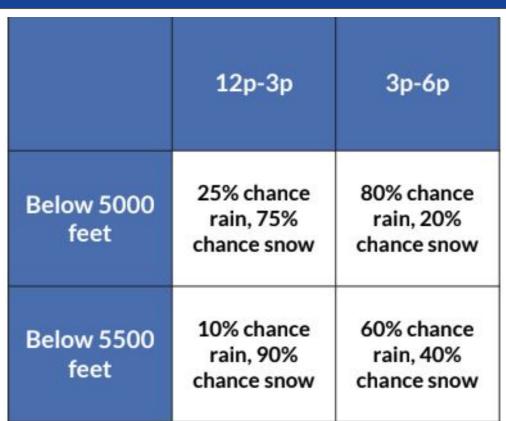
Reno, NV

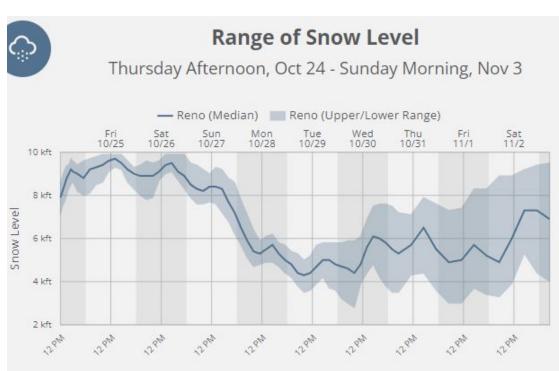
Approximate	Timing/Intensities	

	Thur	sday	Fri	day	Satu	rday	Sun	day
Location/Timing	12a - 12p	12p - 12a						
Lassen & Plumas								
Lake Tahoe								
Eastern Sierra								
Reno, Quad Co			"					

Wrap Up Travel	Impactful	Significant	Hazardous	Extreme

Here's our best guess at timing the snowfall intensities for the Thursday - Sunday with the major winter storm. Friday - Saturday AM be ready for blizzard conditions with snowfall rates exceeding 3"/hr. For Western Nevada, rain much of Thursday will transition to snow Friday PM and continue through Sunday.





Chance of Min Temperatures Less Than 32°F

Friday Morning, Oct 4 - Monday Morning, Oct 14

	Fri 10/4	Sat 10/5	Sun 10/6	Mon 10/7	Tue 10/8	Wed 10/9	Thu 10/10	Fri 10/11	Sat 10/12	Sun 10/13	Mon 10/14
Bridgeport	0%	3%	1%	2%	10%	15%	30%	45%	65%	75%	70%
Lee Vining	0%	0%	0%	0%	0%	0%	1%	5%	20%	30%	20%
Mammoth/June Lak	0%	5%	3%	3%	20%	25%	45%	60%	75%	80%	75%
Markleeville	0%	0%	0%	0%	0%	0%	0%	0%	3%	5%	3%
Sierraville	0%	0%	0%	0%	0%	0%	0%	4%	20%	25%	25%
South Lake Tahoe	0%	0%	0%	0%	2%	2%	15%	35%	55%	55%	50%
Tahoe City (Coop)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Truckee Tahoe	0%	0%	0%	3%	5%	10%	30%	50%	70%	65%	65%
					Perc	ent C <mark>ha</mark> nd	ce (%)				



Atmospheric Rivers - Winter's Moisture Tap

A strong AR transports an amount of water vapor roughly equivalent to 7.5–15 times the average flow of water at the mouth of the Mississippi River.

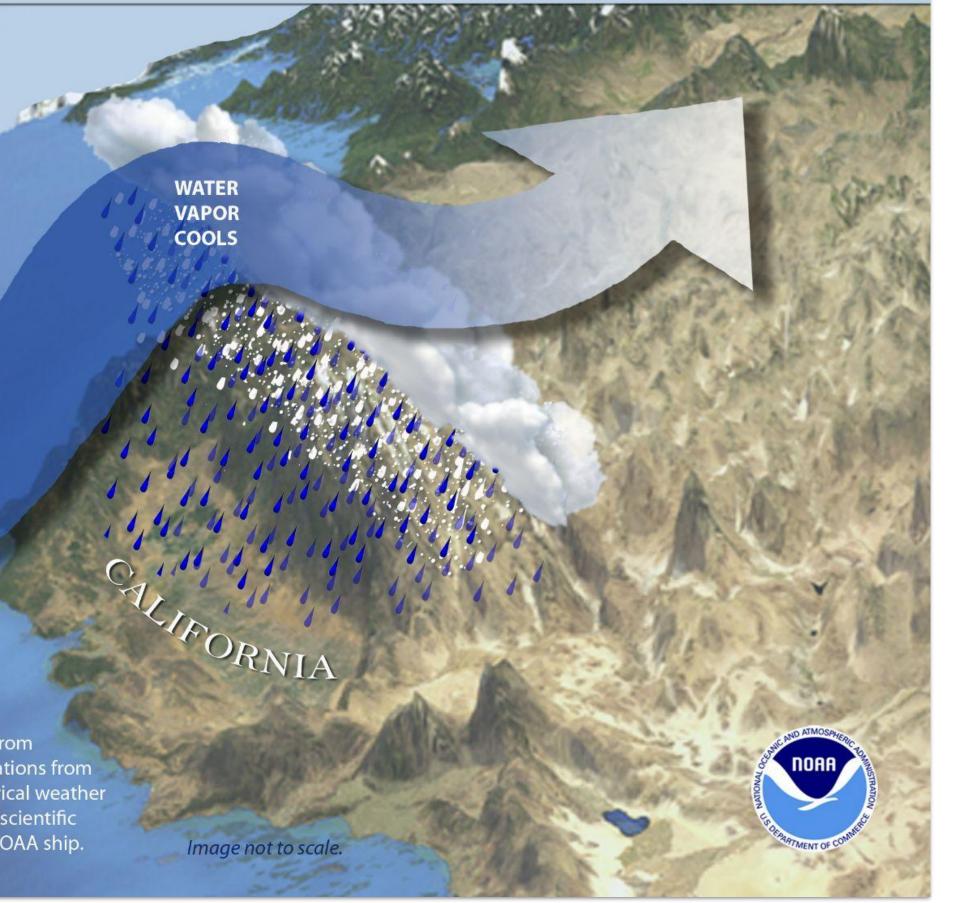
ARs are a primary feature in the entire global water cycle and are tied closely to both water supply and flood risks, particularly in the Western U.S.

> On average, about 30-50% of annual precipitation on the West Coast occurs in just a few AR events and contributes to the water supply — and flooding risk.

> > ARs move with the weather and are present somewhere on Earth at any given time.

ARs are approximately 250-375 miles wide on average.

> Scientists' improved understanding of ARs has come from roughly a decade of scientific studies that use observations from satellites, radar and aircraft as well as the latest numerical weather models. More studies are underway, including a 2015 scientific mission that added data from instruments aboard a NOAA ship.







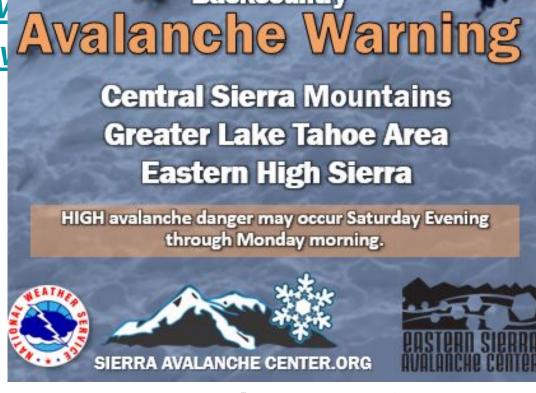
Avalanche Weather Support from NWS

Nev

Mono Co: v Invo Co: w

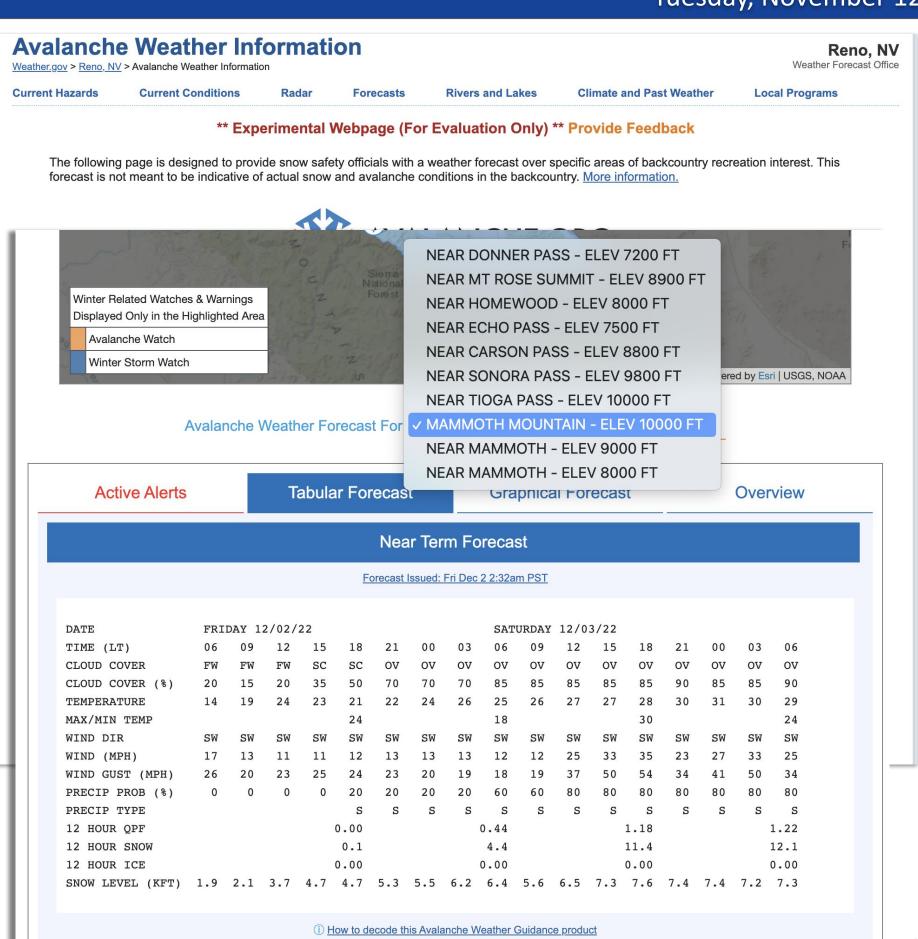


roduct=avgvef



Avalanche Warnings

NWS will disseminate SAC & ESAC alerts via social media, web, weather radio, broadcast media partners.





- Avalanche Watch Fri Dec 2 8:29 AM PST 2022
- Winter Weather Statement Fri Dec 2 4:50 AM PST 2022

```
Mono County
Lake Tahoe
                           Observations
                                         Avalanche Advisory
  2 Day Mountain Forecast
                       Forecast Discussion
                                         Snow Level Forecasts
   Mono County Sierra Crest from 8000 to 10000 feet-
   545 AM PST Fri Dec 2 2022
    ...WINTER STORM WATCH IN EFFECT FROM THIS EVENING THROUGH LATE
   SUNDAY NIGHT...
   Sky/Weather....Sunny.
   Snow Level.....Below 7000 feet.
   Chc Rain/Snow...0%.
   Lightning......None Forecast.
   Temperature.....25 to 31.
   Mid Slope Wind.. Southwest around 15 mph. Gusts up to 45 mph
                   decreasing to 35 mph in the afternoon.
   Snow......No accumulation.
   Liquid Amount...None.
   Sky/Weather.....Partly cloudy then becoming mostly cloudy. Slight
                   chance of snow after midnight.
    Snow Level.....Below 7000 feet.
   Chc Rain/Snow...15%.
   Lightning.....None Forecast.
   Temperature.....15 to 21.
   Mid Slope Wind.. South 15 to 25 mph. Gusts up to 40 mph increasing
                    to 55 mph after midnight.
   Snow......90% probability of 1 to 3 inches.
                   10% probability of up to 5 inches.
   Liquid Amount...Up to 0.15 inch.
   Sky/Weather....Mostly cloudy. Snow likely.
   Snow Level.....Below 7000 feet increasing to 7500 feet in the
                    afternoon.
   Chc Rain/Snow...60%.
   Lightning.....None Forecast.
   Temperature....31 to 37.
   Mid Slope Wind.. South 15 to 20 mph with gusts to 45 mph increasing
                   to 15 to 30 mph with gusts to 55 mph in the
                    afternoon
   Snow......60% probability of 3 to 9 inches.
                   40% probability no accumulation.
   Liquid Amount...Up to 0.70 inch.
    Mono County Sierra Crest Above 10000 Feet-
```

Backcountry Forecast Summary Specific Elevation Bands with **Snowfall Scenarios**

Source: https://www.weather.gov/rev/Avalanche

Webpage Resources

Weather Forecasts, Graphs, and Tables

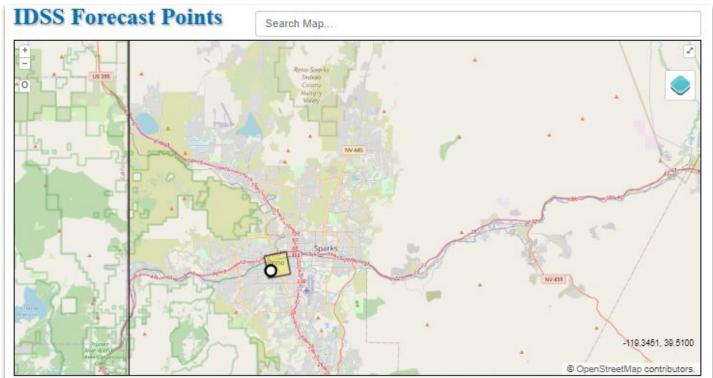


Table updated: 131 pm PDT Wed. 10/2/2024 (Last Update: 20 minutes ago)

Click for Text Forecast REV Forecast Discussion 3 miles SE of Reno, NV

Weekly Summary	Wed Oct 2	Thu Oct 3	Fri Oct 4	Sat Oct 5	Sun Oct 6	Mon Oct 7	Tue Oct 8
Max Temp, °F	91	89	85	86	85	83	82
Min Temp, °F	68	52	57	56	57	55	53
Max Heat Index, °F	87	85	81	82	80	79	79
Max Wind, mph	9	13	21	9	12	10	10
Min Wind, mph	3	2	7	5	3	3	2
Max Wind Gust, mph	16	21	31	15	18	16	16
Max Prob. of Precip., %	0	0	2	0	2	2	1
Max Prob. of Thunder, %	0	0	0	0	0	0	1
Max Dew Point, °F	30	33	36	39	35	31	30
Min Dew Point, °F	27	28	31	33	27	25	23
Max RH, %	22	42	39	51	48	46	45
Min RH, %	11	12	18	18	17	17	15
Max Cloud Cover, %	3	5	15	23	17	33	18
Min Cloud Cover, %	2	1	2	2	4	7	6
Min Snow Level, x1000ft.	11	10.8	11.3	11.4	11.2	10.6	10.3

Day of week:	Wed	Ines	day 1	10/2								Thursday 10/3					
Time:	1PM	2PM	3РМ	4PM	5 _{PM}	6РМ	7 PM	8PM	9РМ	10PM	11PM	12AM	1 _{AM}	2 _{AM}	3 _{AM}	4AM	5AN
Weather:						•			0		0		9		0	0	9
Temperature (°F):	87	89	90	91	89	86	82	76	73	70	68	65	63	60	59	56	55
Heat Index, °F:	83	85	86	87	85	83	80	76	73	70	68	65	63	60	59	56	55
Wind Speed (mph):	3	8	8	8	9	9	9	6	6	6	6	6	6	5	5	5	3
Wind Gust (mph):	10	16	16	16	16	16	16	12	12	12	10	10	10	8	8	8	6
Wind Direction (°):	230	260	260	260	260	260	260	270	270	270	280	280	280	250	250	250	310
Wind Direction:	*	+	+	+	+	+	+	-	-	→	+	*	*	*	*	*	*
Prob. of Precip. (%):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prob. of Thunder (%):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Precip. Amount (in.):		0.	00				0	.00					0.0	0			
Snow (in.):		0	.0				(0.0					0.0)			
Dew Point (°F):	30	28	29	29	28	30	30	28	28	27	28	28	29	29	29	29	29
RH (%):	13	11	11	11	11	13	15	17	19	20	22	25	27	30	32	35	37
Sky Cover (%):	2	3	3	3	2	2	2	3	3	3	3	3	3	2	2	2	2

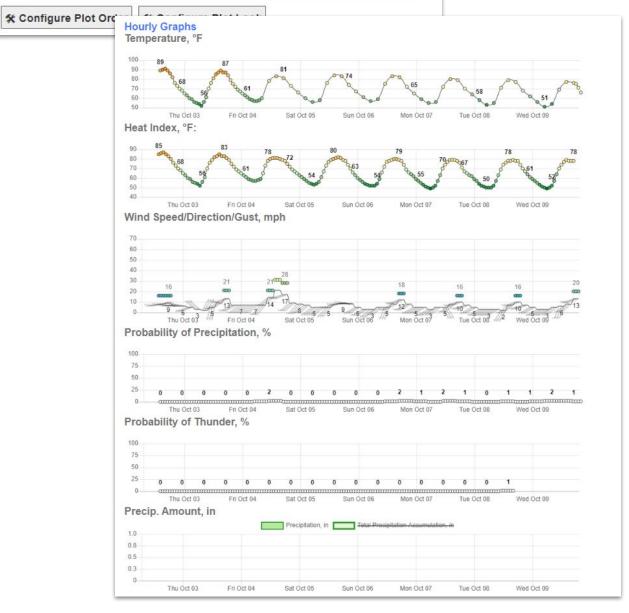
IDSS Forecast Points https://www.weather.gov/forecastpoints/



Available anywhere in the United States!

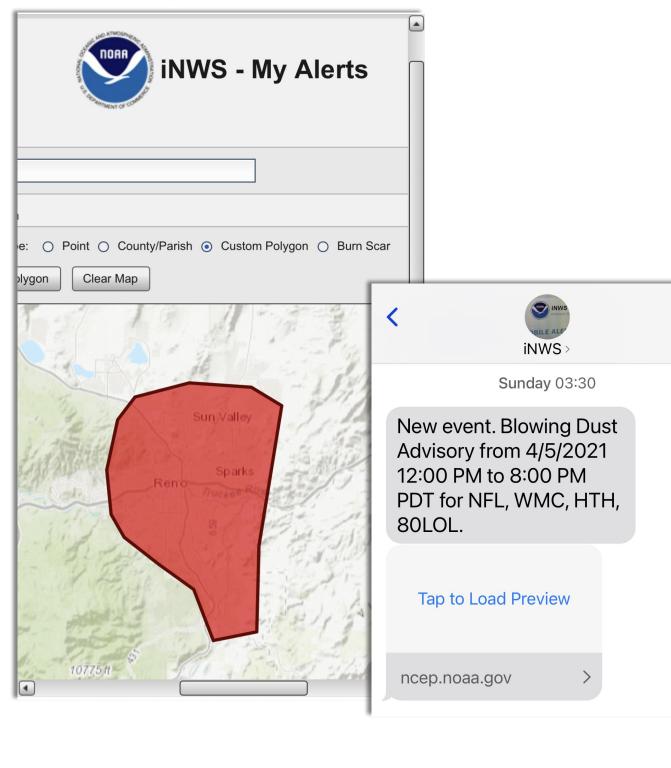
Includes:

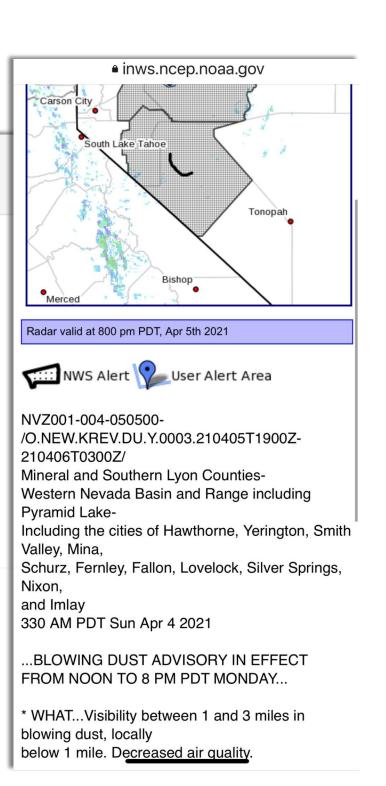
Temp, winds, gusts, probability of precip, snow, snow level, humidity, & more





Staying Weather Aware with iNWS





iNWS Alerts

Probably the best way to get notified of t-storm, fire weather, and flood alerts issued by NWS.

Text and/or email.

inws.ncep.noaa.gov



What Does This Mean?

notential and forecaster

confidence levels.

No worries



NWS Partner Emails, aka "The Freakout"

Early heads up of impending weather prior to traditional watches and warning.



Moderate

freakoutness

freakoutness 💙

Weather Forecast Office Reno, NV Thursday, February 1

	Thu ^{2/1}	Fri ^{2/2}	Sat ^{2/3}	Sun ^{2/4}	Mon ^{2/5}	Tue ^{2/6}	Wed ^{2/7}	W2 ^{2/8-2/14}		
Wind		Strong SW winds, widespread travel and recreation impacts.		lleys with breezy ges.	Breezy.	Gusty SSW winds.	Strong SW winds.			
Snow	Heavy snow in the Sierra with major travel impacts and near zero visibility. Snow impacts spread to W. NV Thu PM-Fri PM, commute impacts.		Snows diminishing from north to south.	Looking good for storm recovery efforts.	10-20% chanc	e of light showers.	Next round of snow arrives in the Sierra.	Favoring colder winter storms to continue.		
Flooding				Too cold.				continues		
Unusual Temps				5-10° below average.	8					
Air Stagnation		All good.					Active pattern keeps air mixed.			



Weather Forecast Office Reno, NV Wednesday, Oct 2, 2024

Autumn Heat Continues, Elevated to Critical Fire Weather Conditions Possible Friday

Good morning! Though we planned for a briefing later in the week, winds have trended up for Friday with elevated to critical fire weather conditions possible for western Nevada. One thing that hasn't changed is the unseasonable heat... expect that to stick around through the remainder of the week.

KEY POINTS

- Autumn Heat Continues
- Gusty Winds on Friday
- "Cooling" this Weekend, Still Above Average

CHANGES FROM PREVIOUS BRIEFING

. Chances for gusty SW winds have increased for Friday

WEATHER RISK OUTLOOK

Risk levels incorporate potential impacts from weather hazards and likelihood of occurrence for a reasonable worse case

	Wed 10/2	Thu 10/3	Fri 10/4	Sat 10/5	Sun 10/6	Mon 10/7	Tue 10/8
Wind			Increasing SW winds, gusts 30- 40 mph →				
Fire Weather	Very dry across W. NV →		Potential for critical conditions W. NV				
Lightning							
Snow							
Flooding							
Unusual Temps	Highs 10-15°F above average. Cool nights →		Some cooling but still above average →				
Smoke/AQ							
Risk Levels Li		tle to None	Minor	Modera	ite Ma	jor Extre	:me

DETAILS

- · High temperatures more typical of mid-August will be in place through Thursday with low 90s expected for W.Nevada valleys. Reno has a >80% chance of breaking its record high temperature of 90° this afternoon.
- Gusty southwesterly winds expected across western NV on Friday, with gusts 30-40 mph mainly north of US-50. This will yield elevated to critical fire weather concerns, in addition to choppy lakes and areas of blowing dust.
- . It won't be quite as warm toward the weekend, but highs still run 5-10° above average. We'll continue our dry pattern with no prospects for precipitation into early next week. Highs could return closer to average by the latter





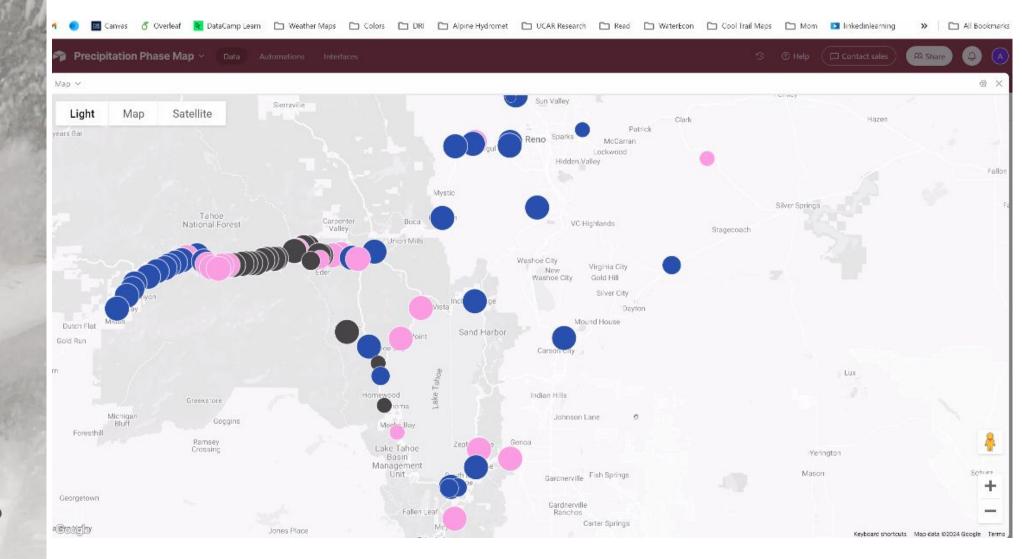


Scan or text WINTER to 855-909-0798 to sign up.



Partnership with DRI

Goal: Improve the ways we track changes in rain, snow, and mixed precipitation







Hydrologist Tim Bardsley briefing Nevada DEM in the State EOC.

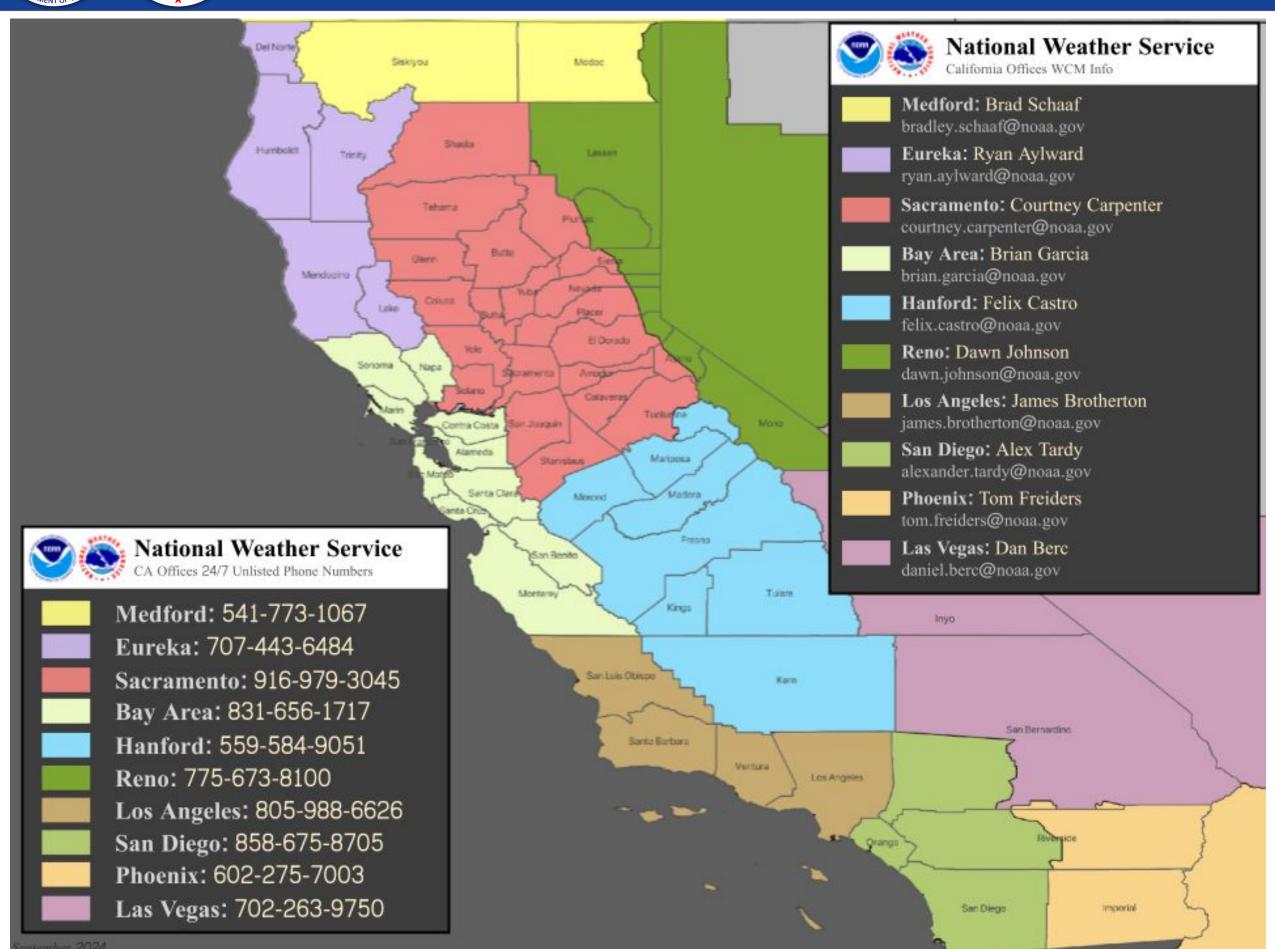
- Forecast Discussion, 2x/day [link]
- Social media: Facebook and X
 @NWSReno
- Call Us (775.673.8107 for 24/7 weather support non-public #)
- weather.gov/rev/winter







Contacts for Surrounding Offices





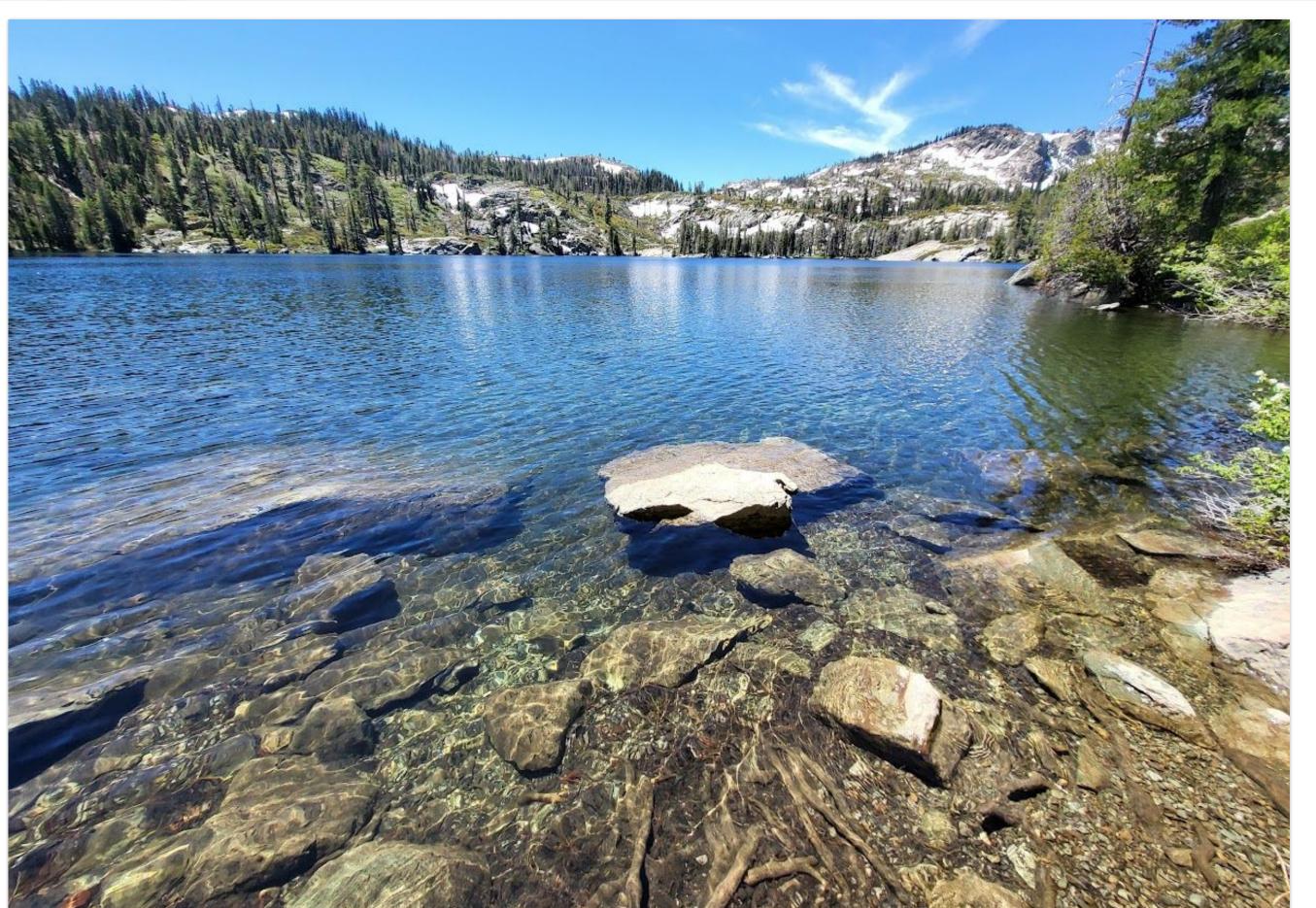
Las Vegas: Dan Berc

(<u>Daniel.Berc@noaa.gov</u>) 702-263-9750

Elko: Trent Davis and Derek Williams

Trenton.Davis@noaa.gov and

Derek.Williams@noaa.gov) 775-778-6716



Dawn Johnson

Warning Coordination
Meteorologist
National Weather Service
Reno, Nevada
dawn.johnson@noaa.gov