## Beginning of January Snow Comparison to More Years

With more snow accumulating in our mountains, let's look at how this year compares with other years that follow Strong El Nino Years. In the past, we've had some good snow and flow years following Strong El Nino Years. The easiest way to explain this is – it seems the oceans and atmosphere has a lot of energy to get rid of the following year. Let's see if we can still use the past to predict the future and how the snow is tracking.

Before we do that – Pete Parsons, Oregon Dept of Ag, Seasonal Climate Forecast Update from December 19 shows the same analog years are used as in November and are listed in table below. He still notes that analog years may require an update later as ENSO conditions change, probably because it is only a week La Nina and is likely to fade away before winter's end.

Current Analog Years	Winter Of	Water Year
1965-66 =>	1966-67	**1967**
1991-92 =>	1992-93	**1993**
2015-16 =>	2016-17	**2017**

https://www.oregon.gov/oda/programs/NaturalResources/Pages/Weather.aspx?utm_medium=email&utm_source=govdelivery

Analog years are similar years to this year and are selected by comparing current conditions to past SOI, ONI and PDO conditions as shown in following graphs from Dec 19 Update.
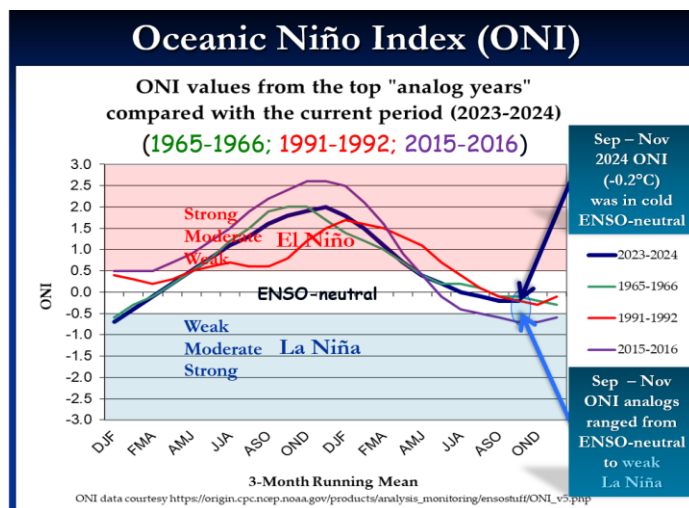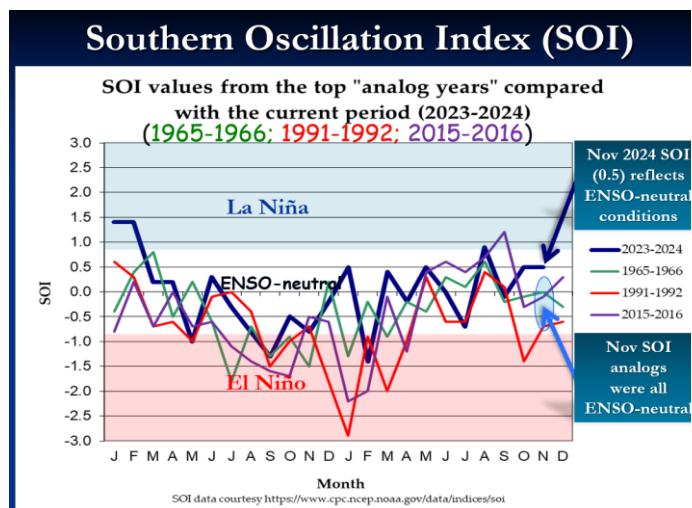
The PDO remains deeply in the "Cool" Phase compared to the other analog years. Time will tell its impact on this year or not.
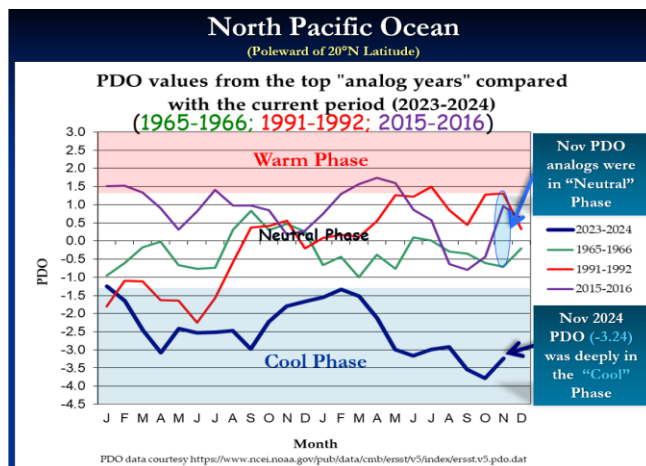
In the past ENSO was assigned based on research completed and provided by DRI and Dr. Kelly Redmond's shop in Reno. This research was based on classifying ENSO by SOI because he knew NRCS used SOI as a forecast streamflow variable. I learned later in my career the reason NRCS used SOI instead of Se Surface Temps was because of a slightly better correlation. Well, Kelly left us way too early, and his shop is no longer producing SOI classification calculations. I'm sure Kelly is still on top of this and reading every book in his new heavenly library. He was an Amazing Researcher; I just wish I had a pic of his office as he knew where every book and research papers were placed in his office. Below is original list of Strong El Nino Year used in many talks.

	ENSO		ENSO	Feb-Sep	Apr-Sep	Apr-Sep	Apr-Sep	Apr-Sep	Apr-Sep
	SE Strong El Nino	Year Following a Strong El Nino		Owyhee River blw Dam	Salmon Falls Creek	Boise River nr Boise	Big Wood River blw Magic Dam	Snake River nr Heise	Spokane River nr Post Falls
Year									
1978	SE	1979	N	97	116	63	34	90	105
1941	SE	1942	SE	122	173	91	117	86	77
1988	SE	1989	SL	145	100	97	75	102	116
1966	SE	1967	N	69	88	105	151	109	113
1947	SE	1948	LN	58	86	105	66	97	176
1952	SE	1953	N	56	76	124	92	92	108
1998	SE	1999	SL	100	108	135	158	131	129
1994	SE	1995	SE	124	135	138	195	118	70
1995	SE	1996	N	124	115	152	132	148	116
1983	SE	1984	N	363	369	158	206	133	112
1973	SE	1974	SL	120	111	181	184	147	193
1942	SE	1943	N	137	150	209	259	144	150
2016	SE	2017	LN	155	161	180	266	163	112

Analysis of Streamflow for a year like 2017 that follows a Strong El Nino Year like 2016

12 years

Color coded streamflow as % of average
| <60 |
| 60-90 |
| 90-110 |
| ~111-130 |
| >130 |

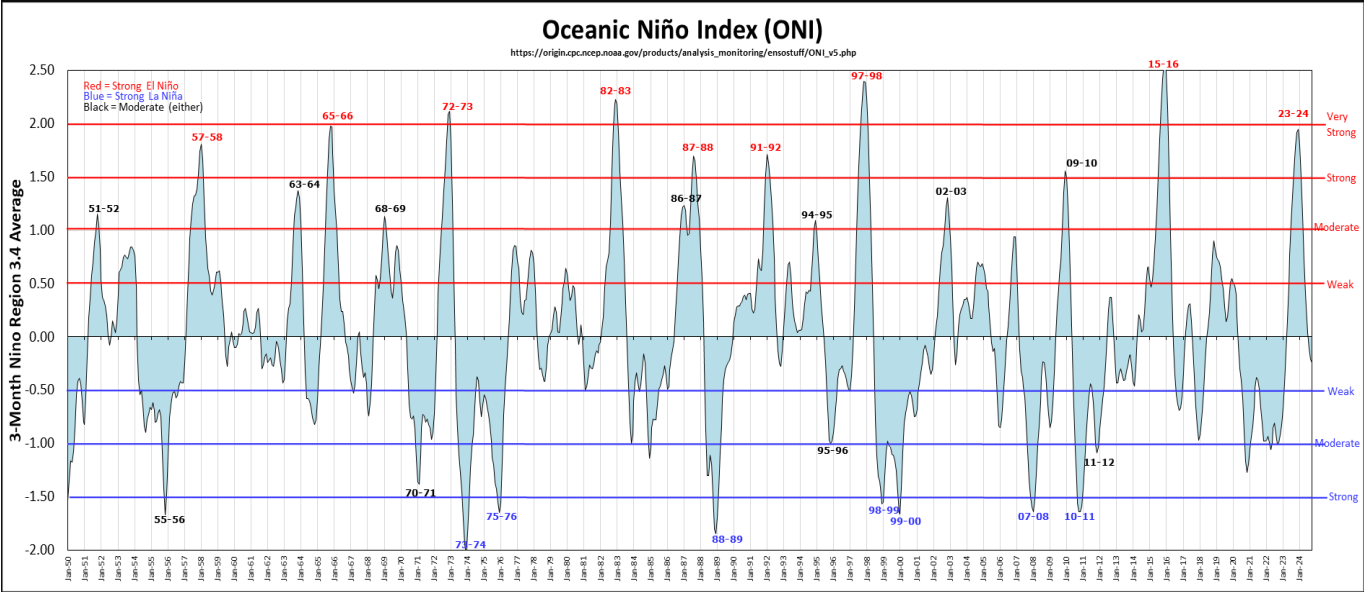1998/1999 Mt Baker set word snowfall with 95 feet of snowfall

I had to find a new source to track Strong El Nino Years. SOI and Sea Surface Temps are not always in agreement because SOI is measure of atmosphere and others are based on Sea Surface Temps. The Oceanic Niño Index (ONI) has become the de-facto standard that NOAA uses to classify El Niño and La Niña events and Pete uses too.
Let's use these 9 Strong and Very Strong El Nino years in this analysis.
https://ggweather.com/enso/oni.htm

El Niño - 27				La Niña - 25		
Weak - 11	Moderate - 7	Strong - 6	Very Strong - 3	Weak - 12	Moderate - 6	Strong - 7
1952-53	1951-52	1957-58	1982-83	1954-55	1955-56	1973-74
1953-54	1963-64	1965-66	1997-98	1964-65	1970-71	1975-76
1958-59	1968-69	1972-73	2015-16	1971-72	1995-96	1988-89
1969-70	1986-87	1987-88		1974-75	2011-12	1998-99
1976-77	1994-95	1991-92		1983-84	2020-21	1999-00
1977-78	2002-03	2023-24		1984-85	2021-22	2007-08
1979-80	2009-10			2000-01		2010-11
2004-05				2005-06		
2006-07				2008-09		
2014-15				2016-17		
2018-19				2017-18		
				2022-23		

They also have these cool graphs for 1990 thru 2024 to illustrate different strengths of El Nino and La Nino events.

Oceanic Niño Index (ONI)
https://origin.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ONI_v5.php

Here's our new table of Strong and Very Strong El Nino Years and the years that follow.
You can quickly see by the color shading that only a few are below 80% of average, and rest are near average, above average or outstanding with greater than 150% of average runoff.

			Streamflow as % of 1991 - 2020 Average						
			Feb-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul
Strong & Very Strong El Nino Years	Year Following a Strong & Very Strong El Nino Year		Owyhee R blw Dam	Boise R nr Boise	Payette R nr Horseshoe Bend	MF Salmon R at MF Lodge	Salmon R at White Bird	Selway River	Spokane R nr Post Falls
Very Strong		ENSO							
2015-16	2017	LA	155	184	164	180	148	104	110
1982-83	1984	LA	363	162	146	NA	144	126	109
1997-98	1999	LA	100	138	140	121	124	112	126
Strong									
1972-73	1974	LA	120	185	188	182	164	145	189
1991-92	1993	N	165	124	128	NA	107	94	114
1965-66	1967	N	69	107	111	NA	119	109	110
1987-88	1989	LA	145	99	91	NA	78	102	114
1957-58	1959	EL	20	89	99	NA	101	124	136
2023-24	2025	LA	?	?	?	?	?	?	?

| Sorted high to low		< 80%	
		80-110%	Streamflow %s color coded
		110-150%	
		> 150%	

Lots of years to look at here. Let's simplify and start by looking at daily SWE data in the Boise basin, which is how the above table is sorted. Unfortunately, daily data is not available for the

early years. As we progress deeper into winter, we'll see if one year stands out more than the others and use it as a guide to providing more insight for this year's rivers flow.

The Boise Basin snow graph below shows this year, black line, is in the middle of the pack of the analog years. It's good to see all years ended the season with an above normal snowpack and is the reason for the good Apr-Sep streamflow as shown in above table.
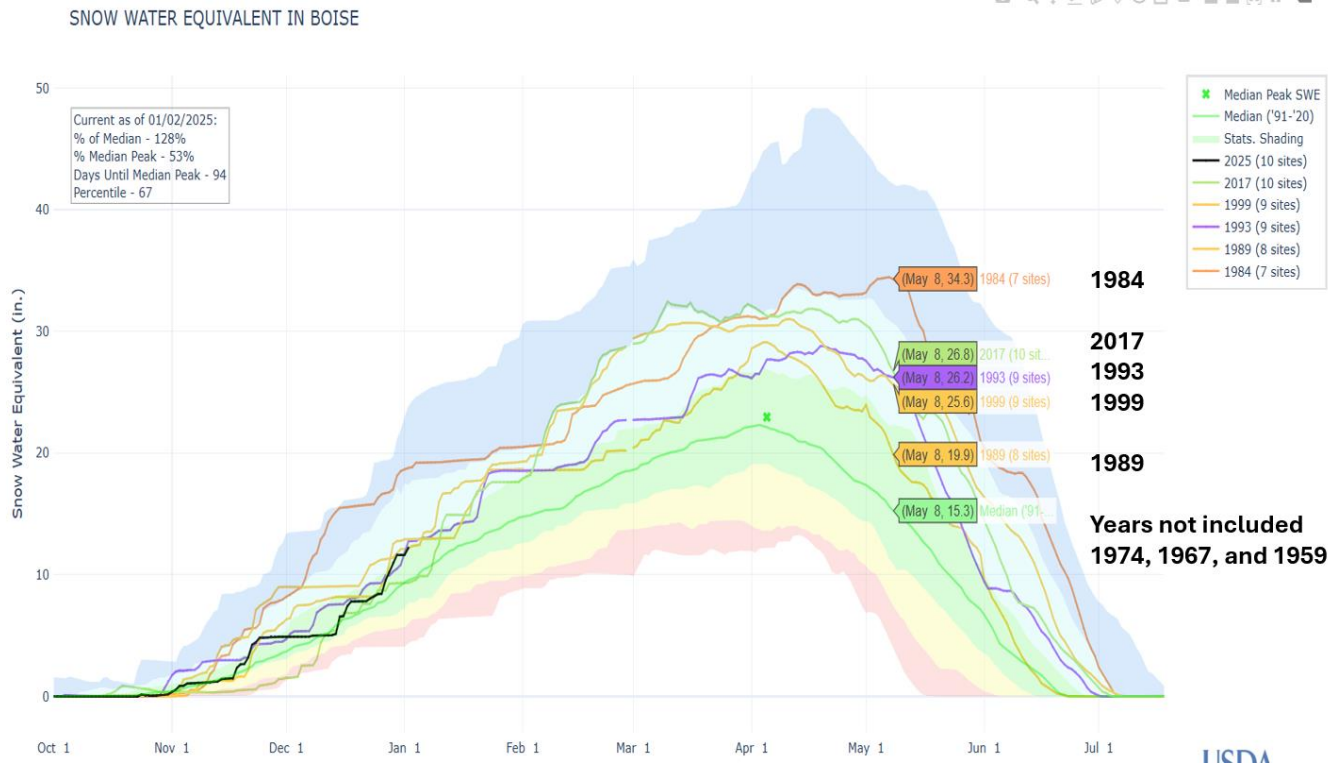

Moving to the Owyhee Basin, this year is also in the middle of the pack. We can probably rule out a year like 1984 happening again, unless Mother Nature brings on more storms. For now, let's not worry about 1967 and 1959 which had below normal runoff in this basin.
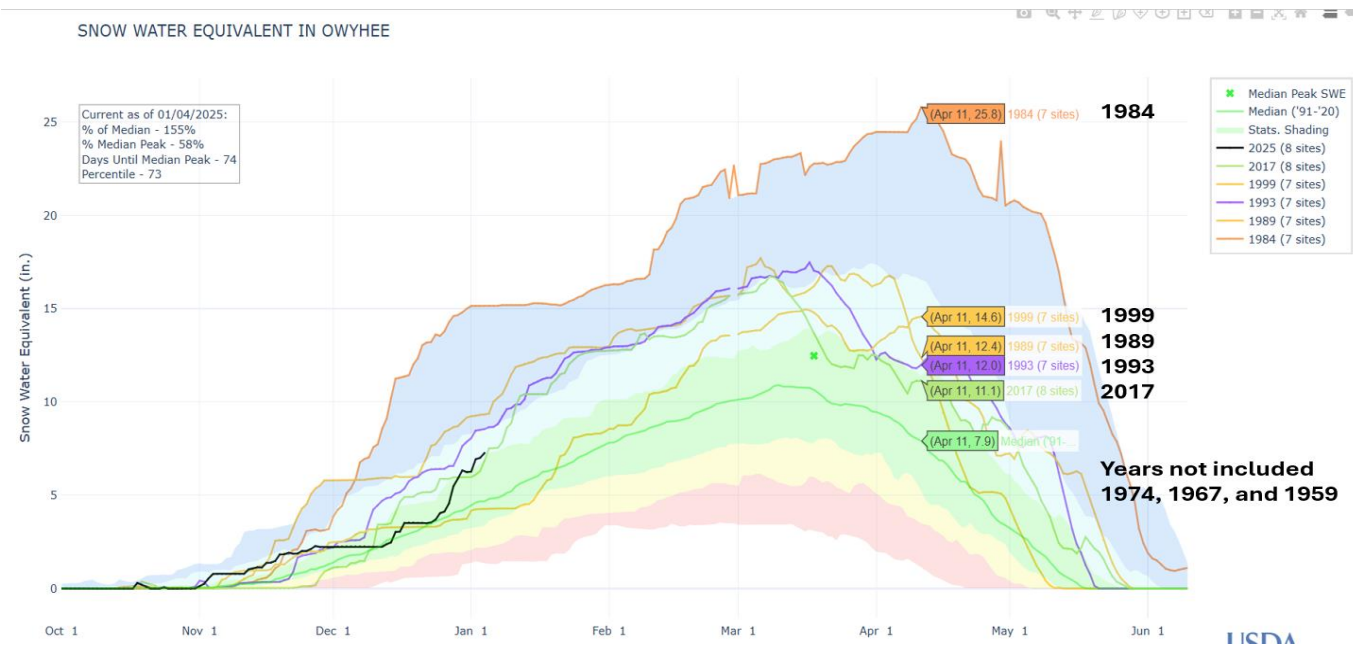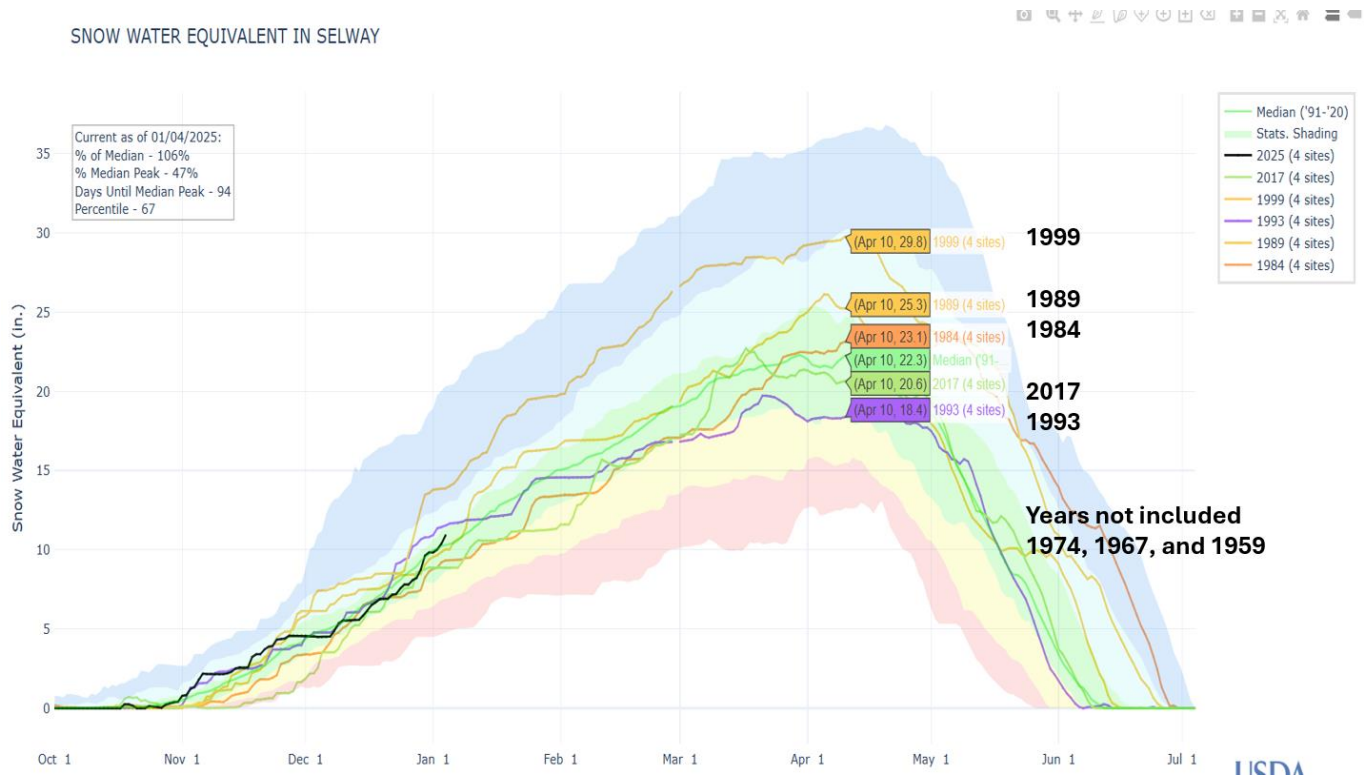
If you're dreaming about the MF and winning the lottery, this might help as we wonder what may happen. So far, this year is hanging with the other analog years. The second half of winter will tell us more about what's going to happen. If you're wondering about 1989, I bet the snow pillow went flat for one of these 3 sites around Jan 11 and only 1st of month daily data was estimated and put in the daily SWE table. It is always helpful to understand your data. The three SNOTEL sites in this index are Banner Summit, Deadwood Summit and Morgan Creek.
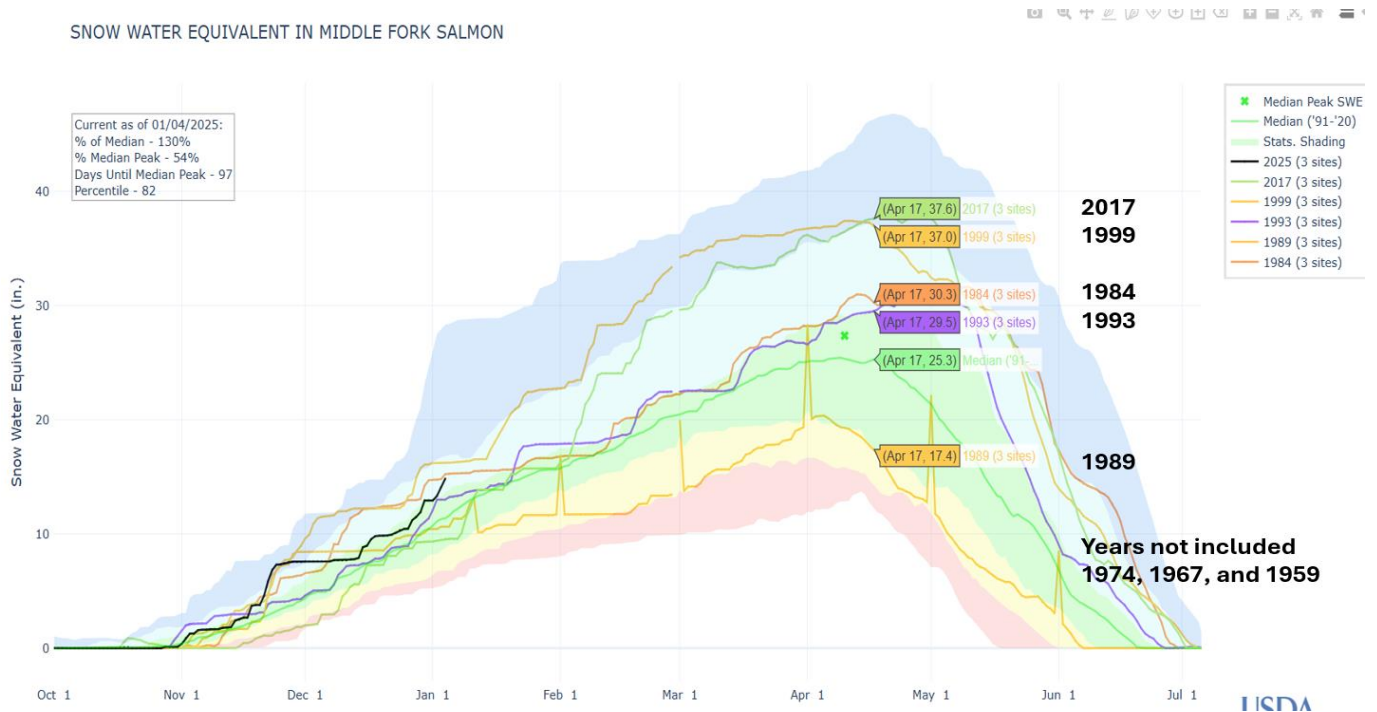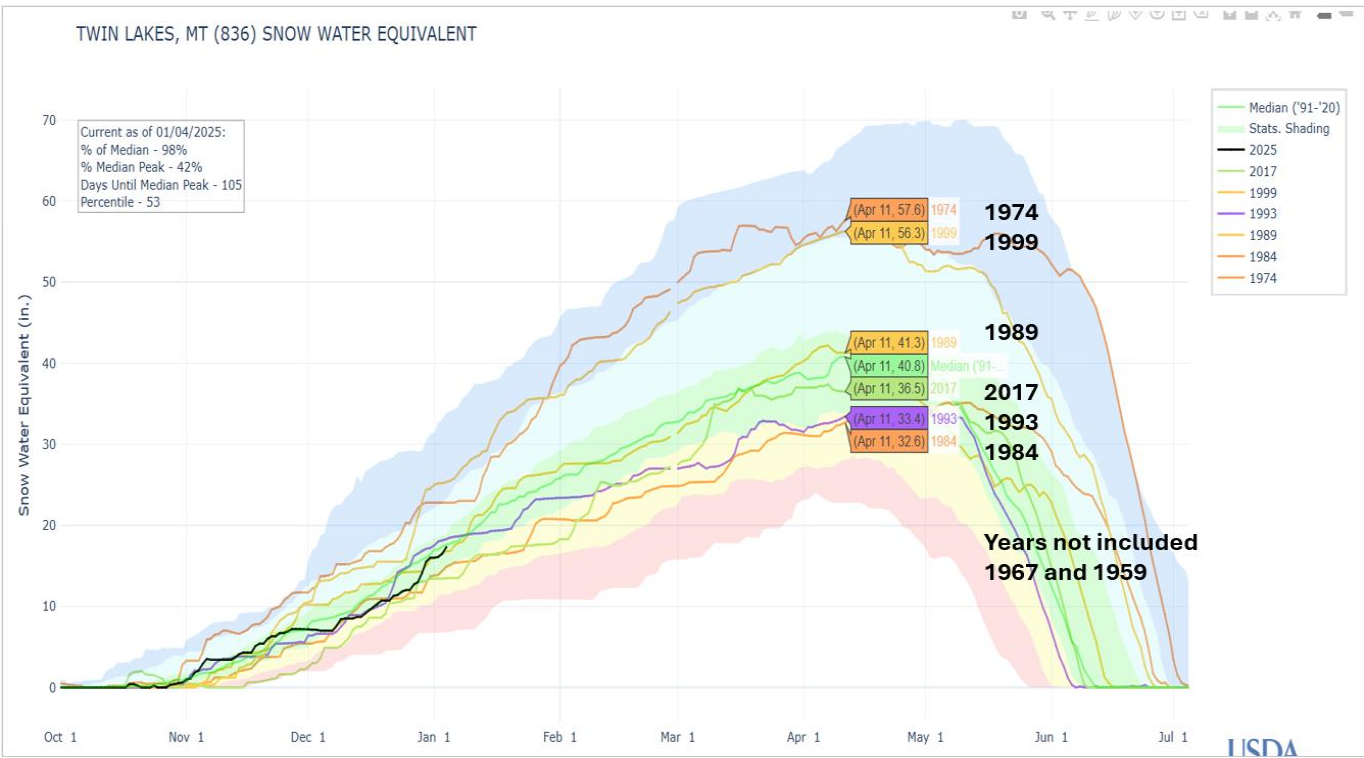

Here's the big picture for the Salmon River. This snow index is based on about 20 SNOTEL sites. It also shows that this year, 2025, is tracking these years that follow a Strong El Nino Year. The blimps in 1989 are still present but is weighed much less as this index is based on 19 sites and not only three sites like in the MF headwaters.
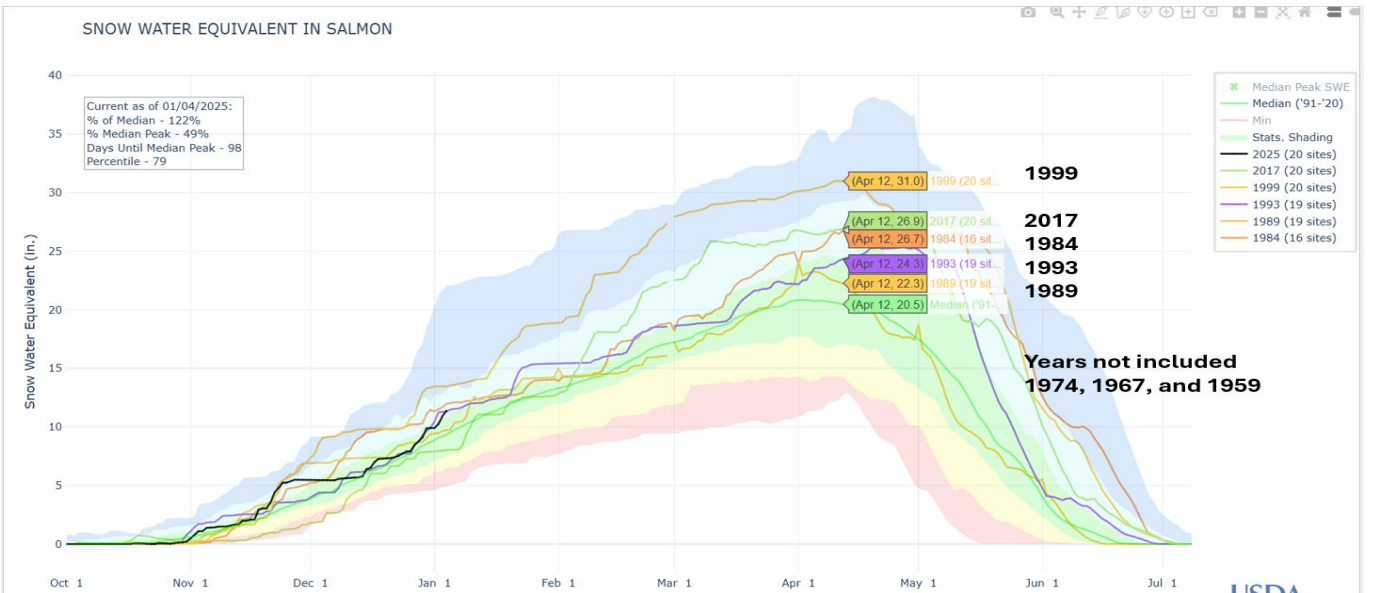
Moving north to the Selway Basin, we see 2025 is still tracking above normal, we'll soon see how this week's dry weather slows this climb. It is interesting to see the split with a couple of years peaking above normal and a couple below.

SNOW WATER EQUIVALENT IN SELWAY

Current as of 01/04/2025:
% of Median - 106%
% Median Peak - 47%
Days Until Median Peak - 94
Percentile - 67

(Apr 10, 29.8) 1999 (4 sites) **1999**
(Apr 10, 25.3) 1989 (4 sites) **1989**
(Apr 10, 23.1) 1984 (4 sites) **1984**
(Apr 10, 22.3) Median ('91-
(Apr 10, 20.6) 2017 (4 sites) **2017**
(Apr 10, 18.4) 1993 (4 sites) **1993**

**Years not included
1974, 1967, and 1959**

Legend:
Median ('91-'20)
Stats. Shading
2025 (4 sites)
2017 (4 sites)
1999 (4 sites)
1993 (4 sites)
1989 (4 sites)
1984 (4 sites)

USDA

It is always fun to look at Twin Lakes SWE for past data because daily SWE starts in mid to late 1960s for some Montana sites. 1974 was huge and had a late melt.

TWIN LAKES, MT (836) SNOW WATER EQUIVALENT

Current as of 01/04/2025:
% of Median - 98%
% Median Peak - 42%
Days Until Median Peak - 105
Percentile - 53

(Apr 11, 57.6) 1974 **1974**
(Apr 11, 56.3) 1999 **1999**

(Apr 11, 41.3) 1989 **1989**
(Apr 11, 40.8) Median ('91-
(Apr 11, 36.5) 2017 **2017**
(Apr 11, 33.4) 1993 **1993**
(Apr 11, 32.6) 1984 **1984**

**Years not included
1967 and 1959**

Legend:
Median ('91-'20)
Stats. Shading
2025
2017
1999
1993
1989
1984
1974

USDA

Looking at Hoodoo Basin which has daily SWE starting in 1967 also shows it was a good snow year. **Interesting to note that Pete's analog years were also 1967, 1993 and 2017 which all followed Strong El Nino Years.**
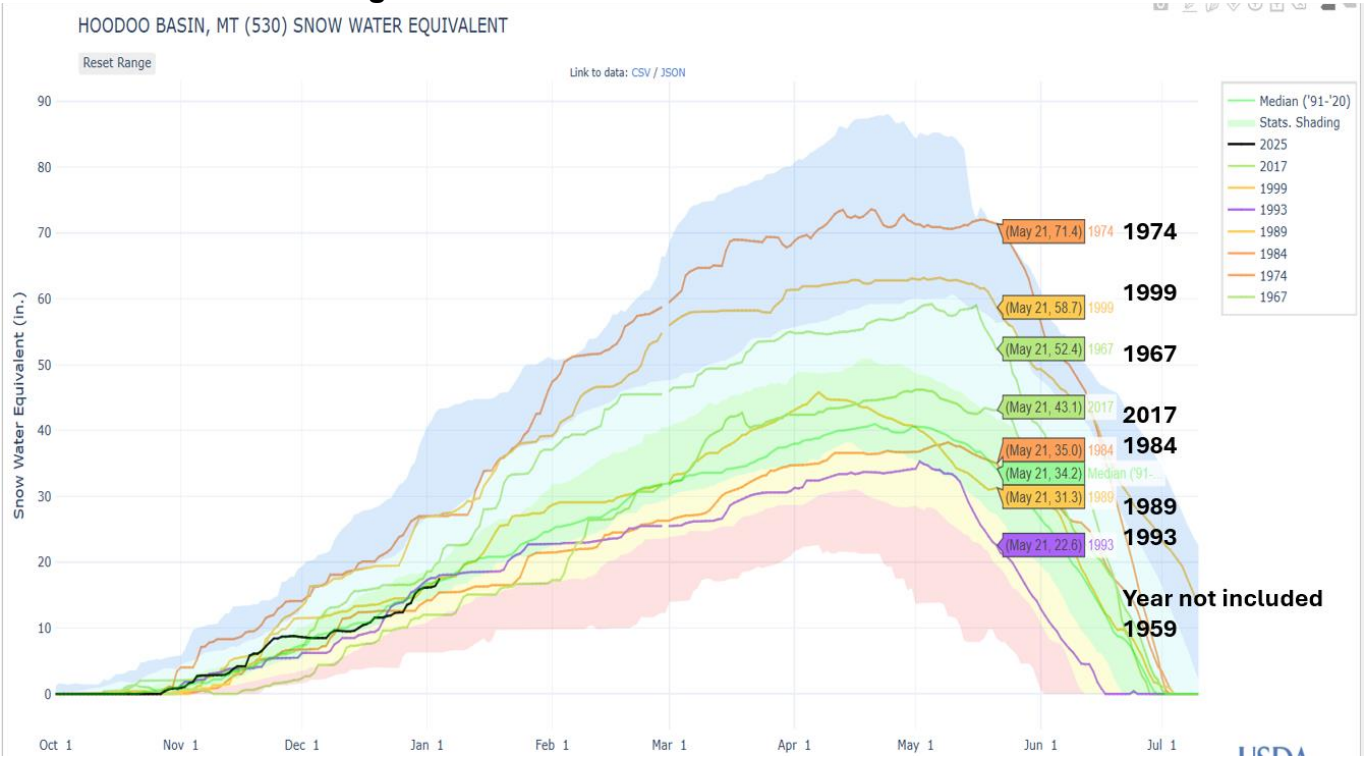
The Spokane / CDA basin snow is near normal and in same ballpark as other analog years.
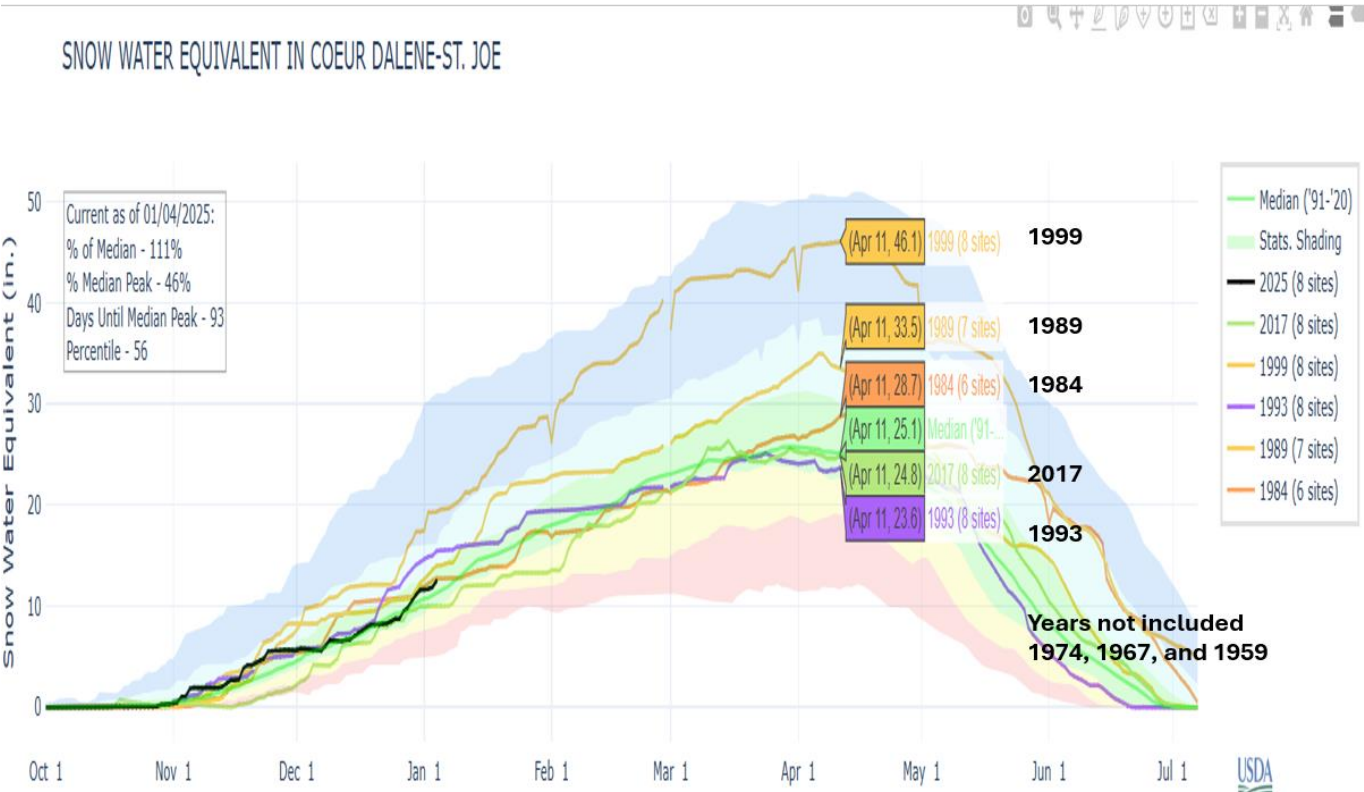
Here's the chart from above that provides a refresher about how promising the runoff was in these years that following Strong El Nino Years which are also in agreement with Pete's analog year selection of 1967, 1993 and 2017.

Strong & Very Strong El Nino Years Very Strong	Year Following a Strong & Very Strong El Nino Year	ENSO	Owyhee R blw Dam	Boise R nr Boise	Payette R nr Horseshoe Bend	MF Salmon R at MF Lodge	Salmon R at White Bird	Selway River	Spokane R nr Post Falls
			Feb-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul	Apr-Jul
2015-16	2017	LA	155	184	164	180	148	104	110
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2023-24	2025	LA	?	?	?	?	?	?	?

Title over streamflow columns: Streamflow as % of 1991 - 2020 Average

Sorted high to low

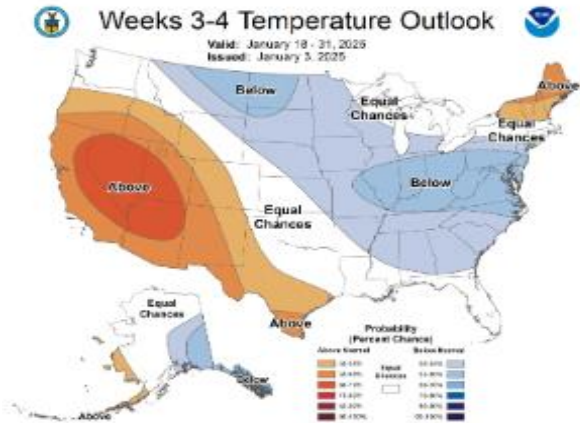Streamflow %s color coded:
- < 80%
- 80-110%
- 110-150%
- > 150%

Stay tuned as we get through this early January dry spell as cold and stormy weather tracks east of the Continental Divide and into the mid-West and East. Four long range indicators are looking at a return of Western weather around January 20 or so.
What are the odds of all four outlooks being wrong or being right!
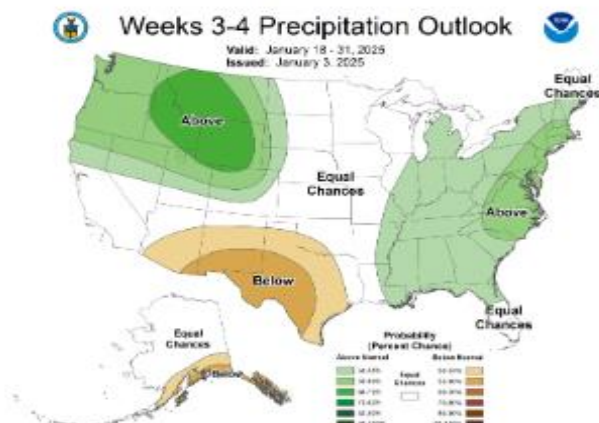
Week 3-4 Outlooks
Valid: 18 Jan 2025 to 31 Jan 2025
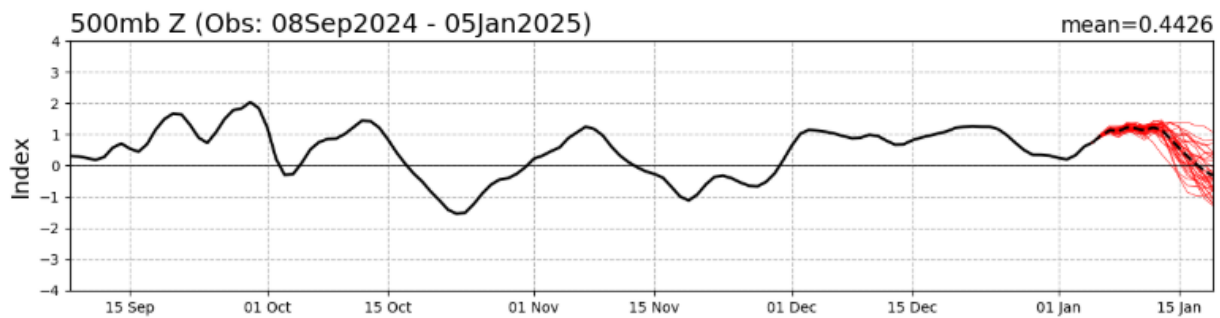### Updated: 03 Jan 2025

Temperature Probability

Weeks 3-4 Temperature Outlook
Valid: January 18 - 31, 2025
Issued: January 3, 2025

Precipitation Probability
(Experimental)

Weeks 3-4 Precipitation Outlook
Valid: January 18 - 31, 2025
Issued: January 3, 2025

PNA Index: Observed & GEFS Forecasts

500mb Z (Obs: 08Sep2024 - 05Jan2025)   mean=0.4426

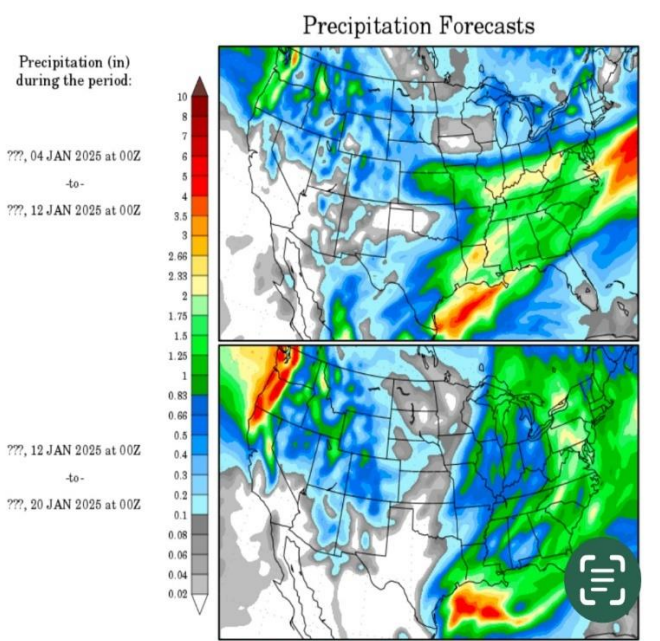### The Powder Buoy
17m · 🌐

Genuine Buoypop right there, should last 4-5 days, that puts MLK weekend+ on the radar. Between now a... See more

Precipitation Forecasts

Ready to give it a try? You still have time…   From Winter Wildlands Alliance:

Take the National Snowpack Prediction Challenge
Snow is our source of water! Do you have what it takes to be a snow hydrologist?
We want to know your prediction for how much snow you think there will be in your local mountains during winter 2024-25! Whoever makes the most accurate prediction wins!
Predictions are due by February 7th 2025 to be in the Early Winter Division. Predictions are due by March 7th 2025 to be in the Late Winter Division.
Participating is easy:

https://winterwildlands.org/national-snowpack-prediction-challenge-2/