



United States Department of Agriculture

Jan 2018

2023 Snowpack Status and Streamflow Outlook for the Eastern Sierra & Humboldt Basin



*Nevada Division of Water Resources
April 11, 2023*

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*Photo:
April 1, 2023
Willow Flat Snow Course
Little Walker Basin
37.4inches SWE, 91 inches deep
425% of April 1 median*



Willow Flat (19L09) California SNOW COURSE/AERIAL MARKER Site - 8245 ft Reporting Frequency: Monthly; Date Range: Period of Record

(As of: Tue Apr 04 13:49:51 GMT-08:00 2023)

Provisional data, subject to revision

Date	Snow Depth (in) Start of Month Values	Snow Water Equivalent (in) Start of Month Values	Median Snow Water Equivalent (1991-2020) (in) Start of Month Values	Snow Water Equivalent % of Median (1991-2020)
Apr 2023	91	37.4	8.8	425
Apr 1969	73	29.0	8.8	330
Apr 1983	59	25.0	8.8	284
Apr 1952	57	23.5	8.8	267
Apr 1995	59	23.2	8.8	264
Apr 2019	53	21.2	8.8	241
Apr 2017	47	21.1	8.8	240
Apr 2005	56	20.5	8.8	233
Apr 2011	49	19.5	8.8	222



April 1 2023
Willow Flat highest in 88 years

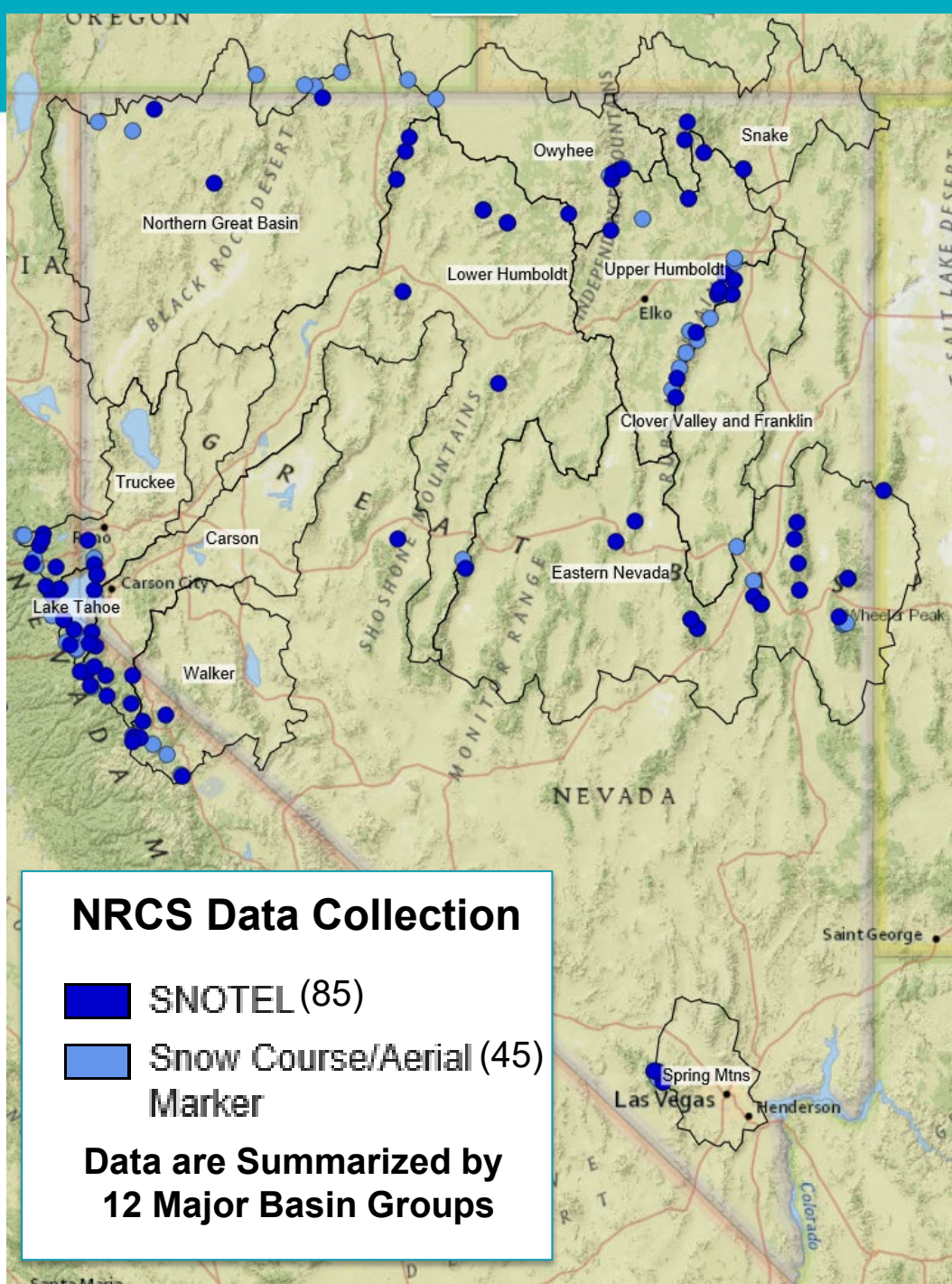
Blew away previous record from 1969 by 8.4in SWE!

Median April 1 is 8.8in

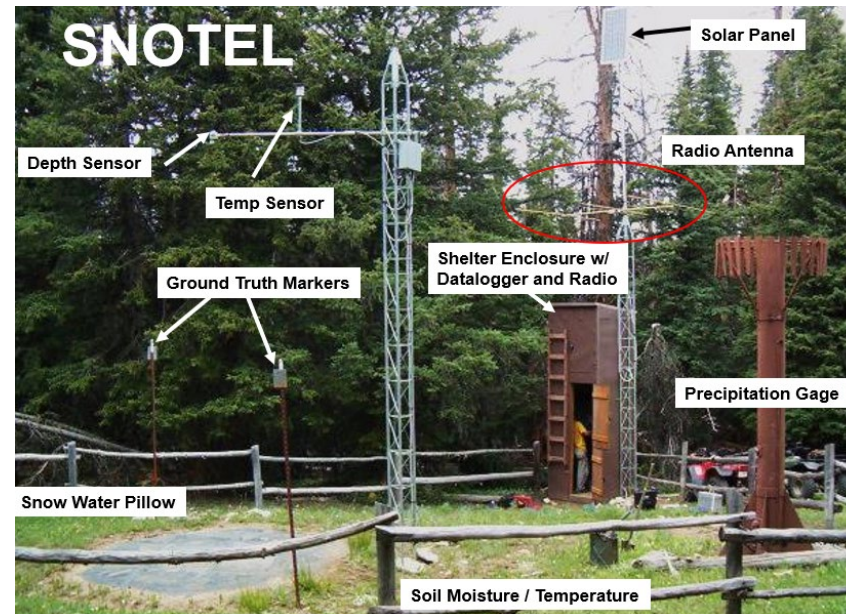


Snow Survey Overview

Key Vocab: Snow Water Equivalent (SWE)



Snow Course



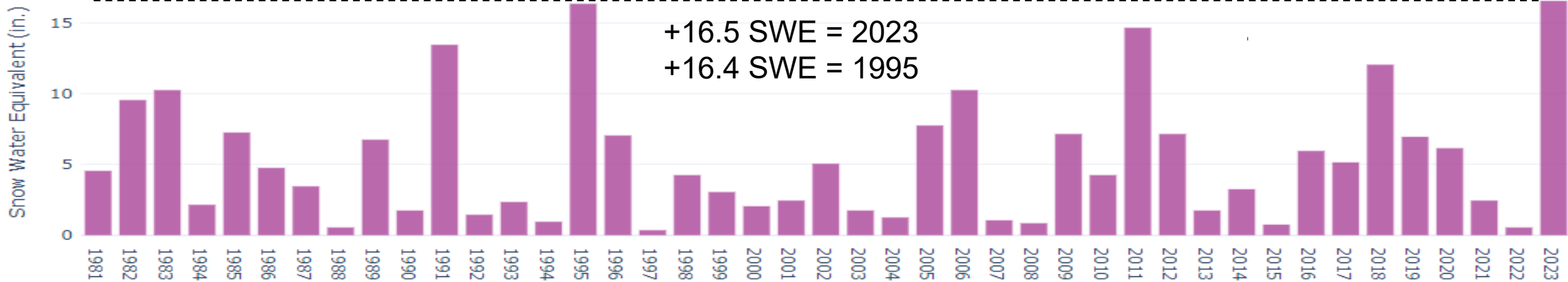
Natural
Resources
Conservation
Service

nrcs.usda.gov/

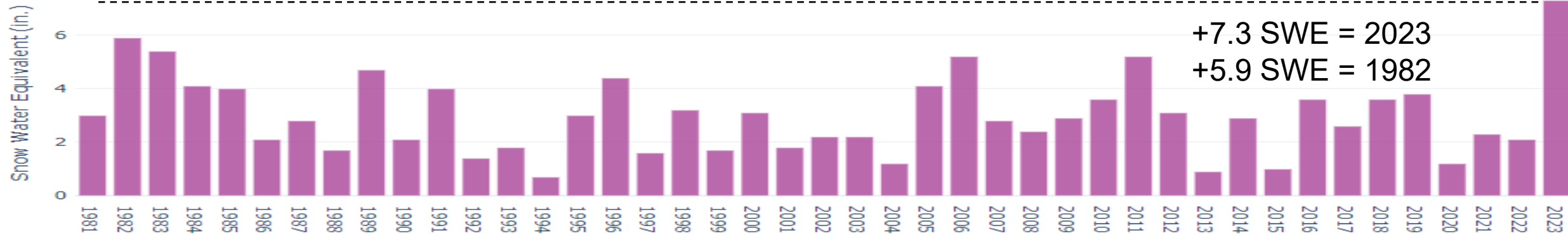
Record Setting March Snow Water Accumulation

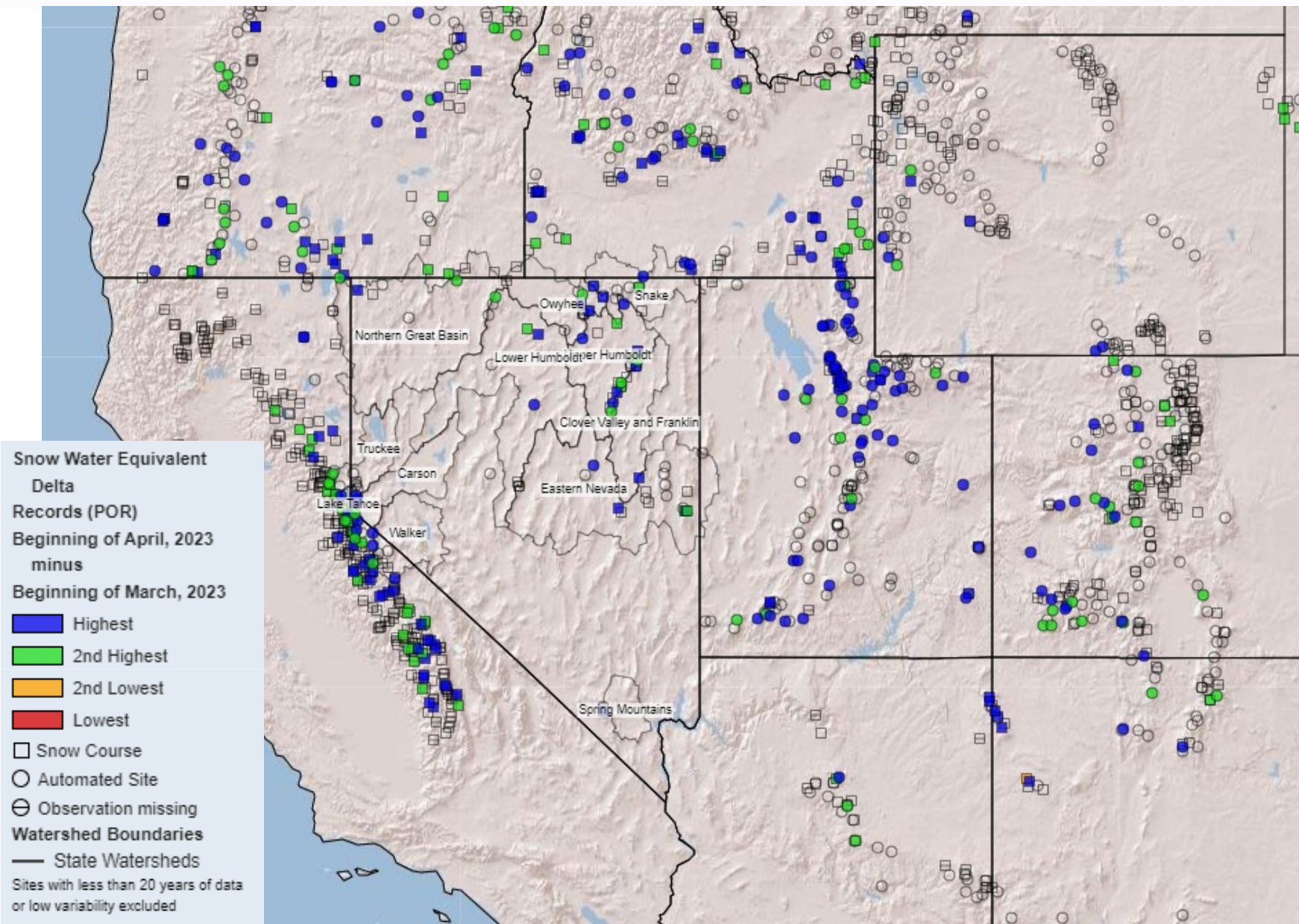


EASTERN SIERRA



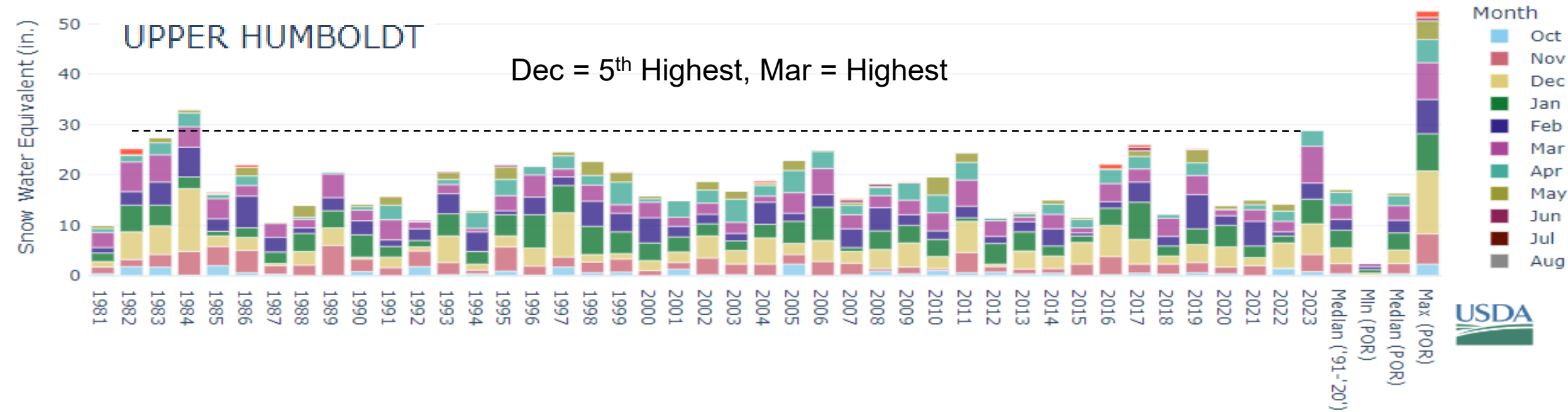
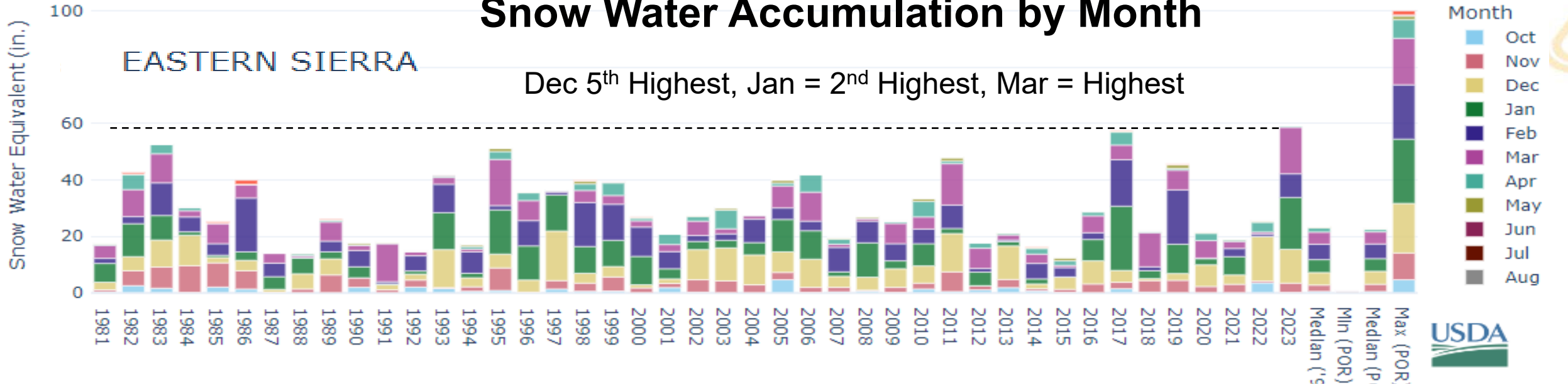
UPPER HUMBOLDT



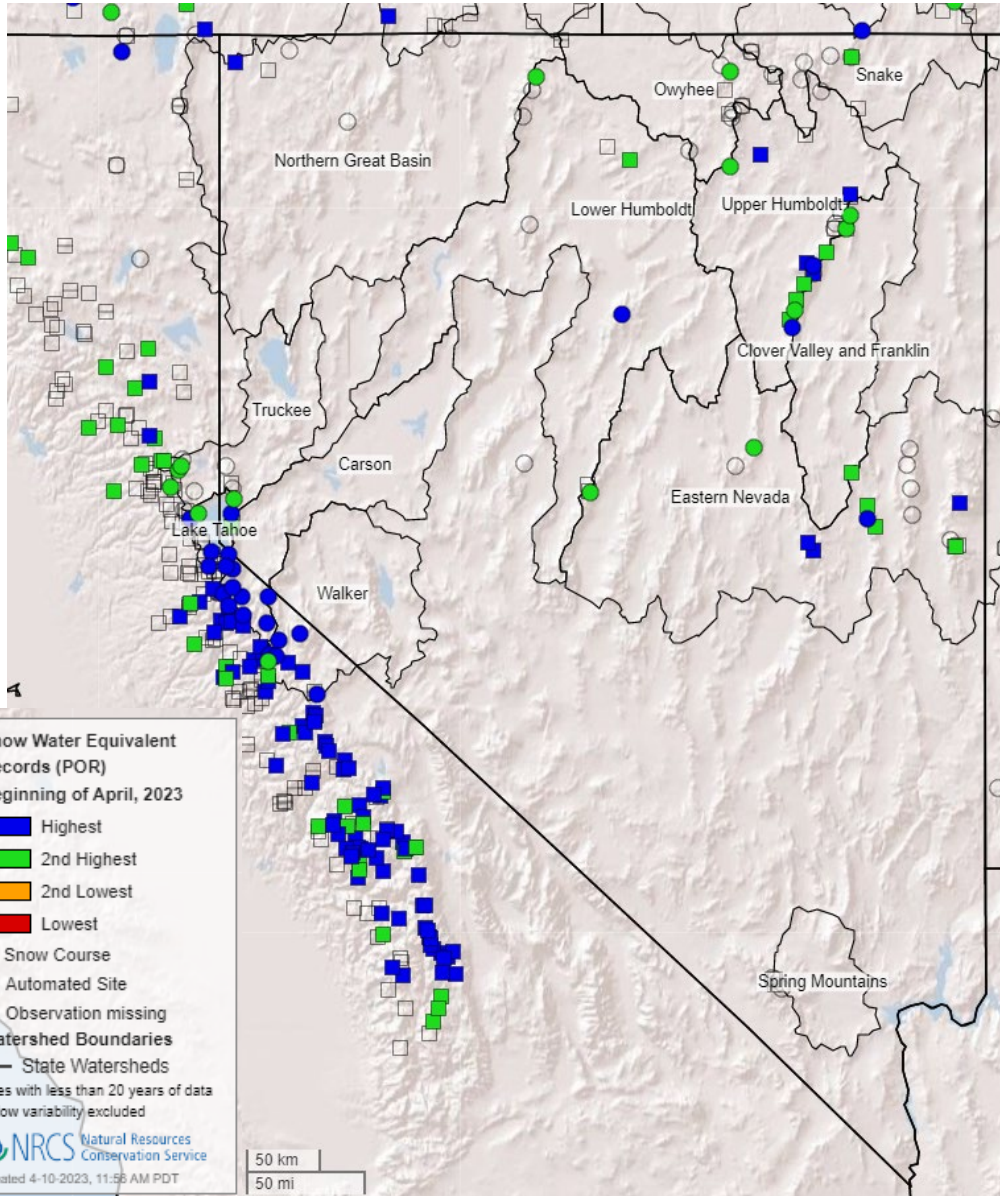


Record March across much of the west

Snow Water Accumulation by Month



All-time April 1 Snow Water Records



Notable Measurements:

Truckee Basin

Mount Rose 3rd highest in 112 years
Little Valley 2nd highest in 80 years

Lake Tahoe Basin

Marlette Lake highest in 107 years*
Hagans Meadow highest in 105 years*
Heavenly Valley highest in 55 years

Carson Basin

Blue Lakes highest in 105 years
Upper Carson Pass highest in 94 years
Poison Flat highest in 65 years*

Walker Basin

Sonora Pass highest in 89 years
Willow Flat highest in 88 years
Lobdell Lake highest in 60 years*

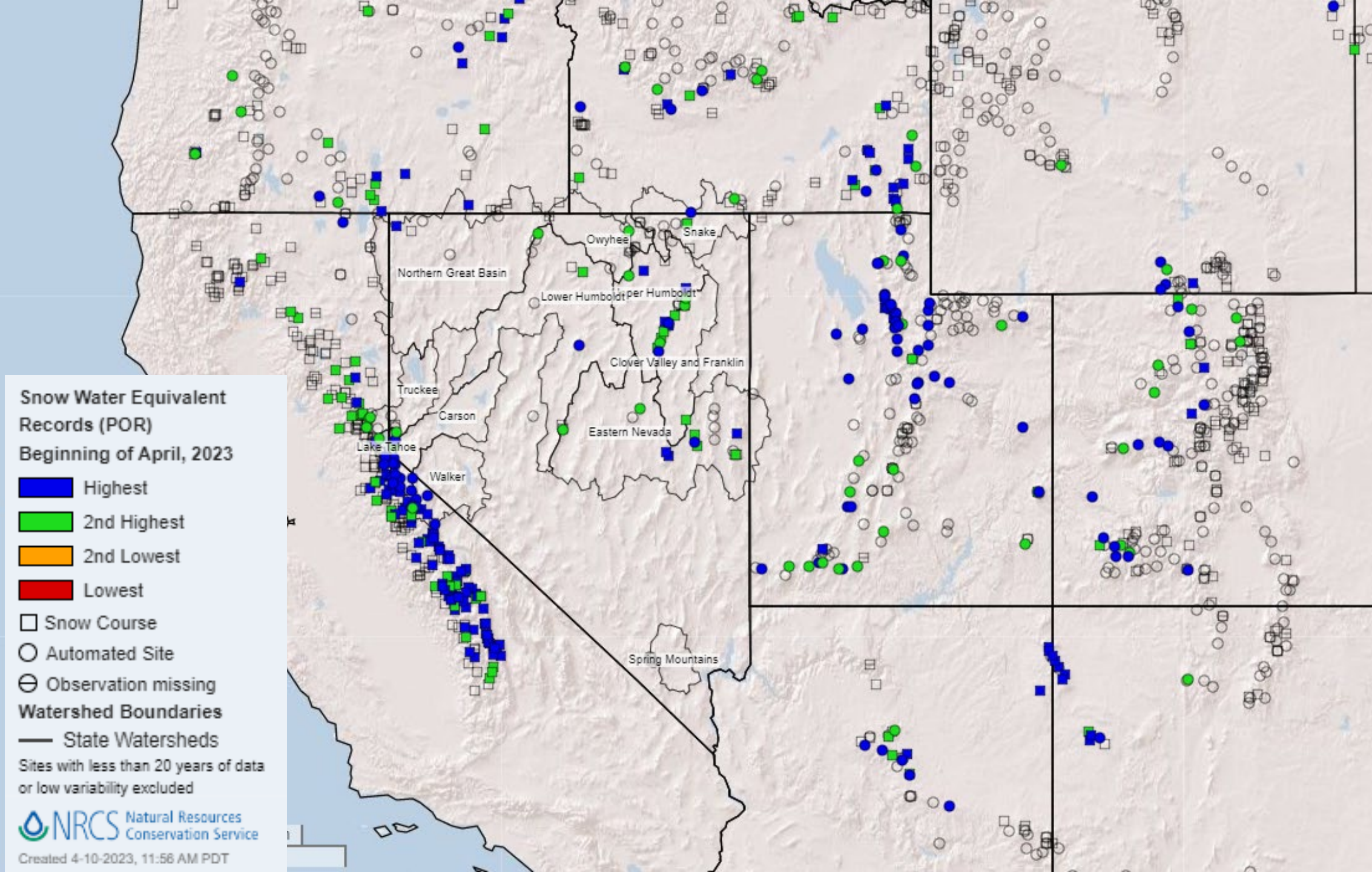
Humboldt Basin

Lamoille 1, 3* & 5 highest in 85-91 years
Tremewan Ranch highest in 81 years
Trout Ck Lower highest in 78 years

Eastern Nevada

Murray Summit 2nd highest in 84 years
Baker Ck #2 is 2nd highest in 80 years
Ward Mountain highest in 67 years*

*based on combination of SNOTEL / Snow Course data



Snow Water Equivalent Records (POR)
Beginning of April, 2023

- Highest
- 2nd Highest
- 2nd Lowest
- Lowest
- Snow Course
- Automated Site
- Observation missing

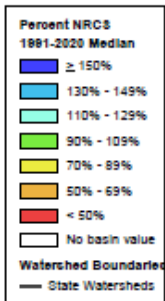
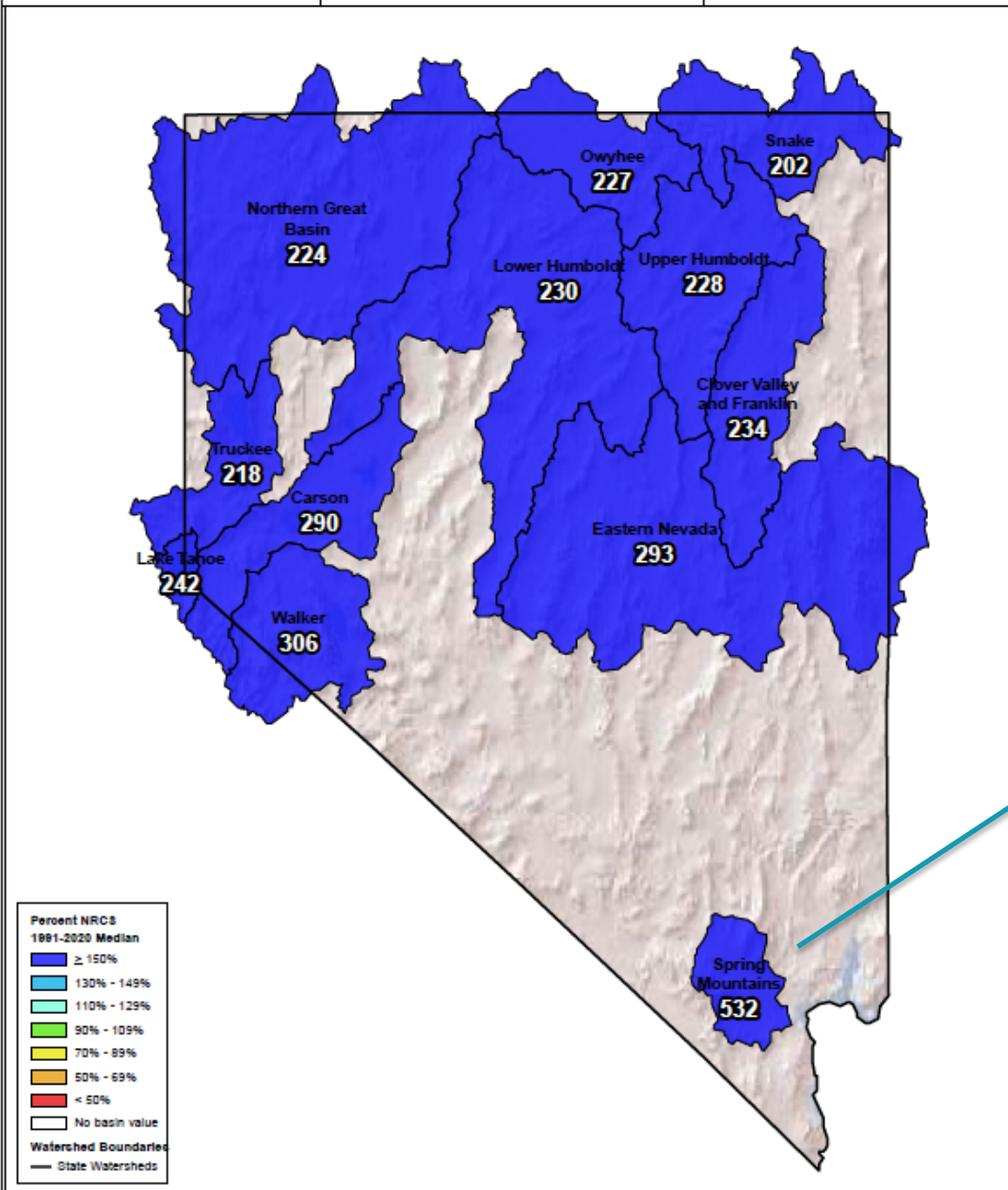
Watershed Boundaries

- State Watersheds

Sites with less than 20 years of data or low variability excluded



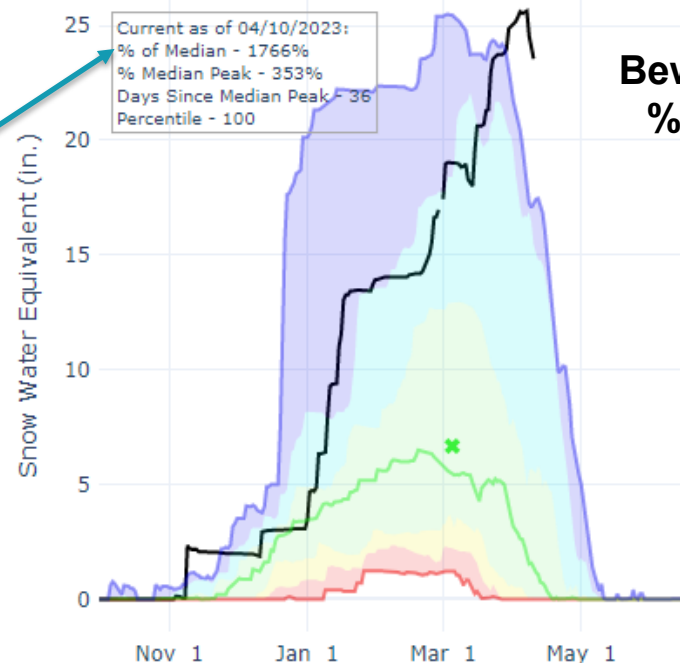
All-time
 April 1
 Snowpack
 Records
 across the
 West



April 1, 2023 Snowpack 200-300% of Median

SNOW WATER EQUIVALENT IN SPRING MOUNTAINS

Reset Range

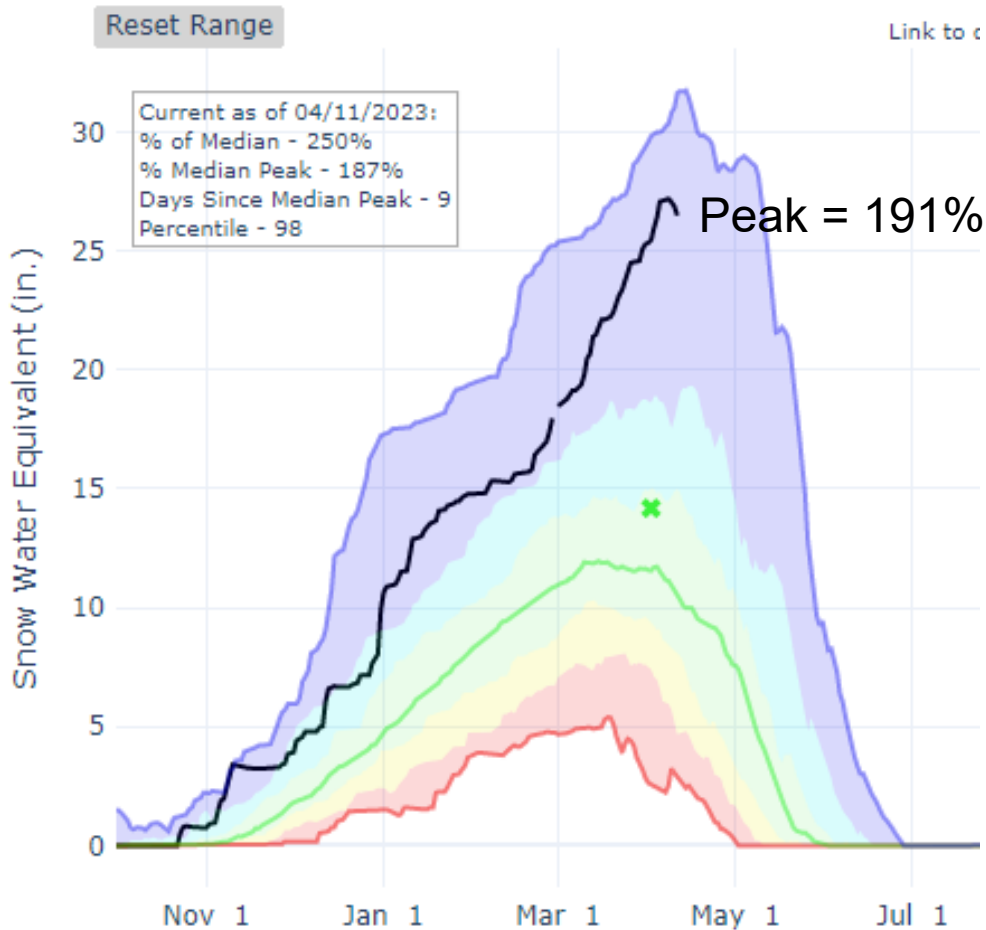


Beware of large % as median melt out

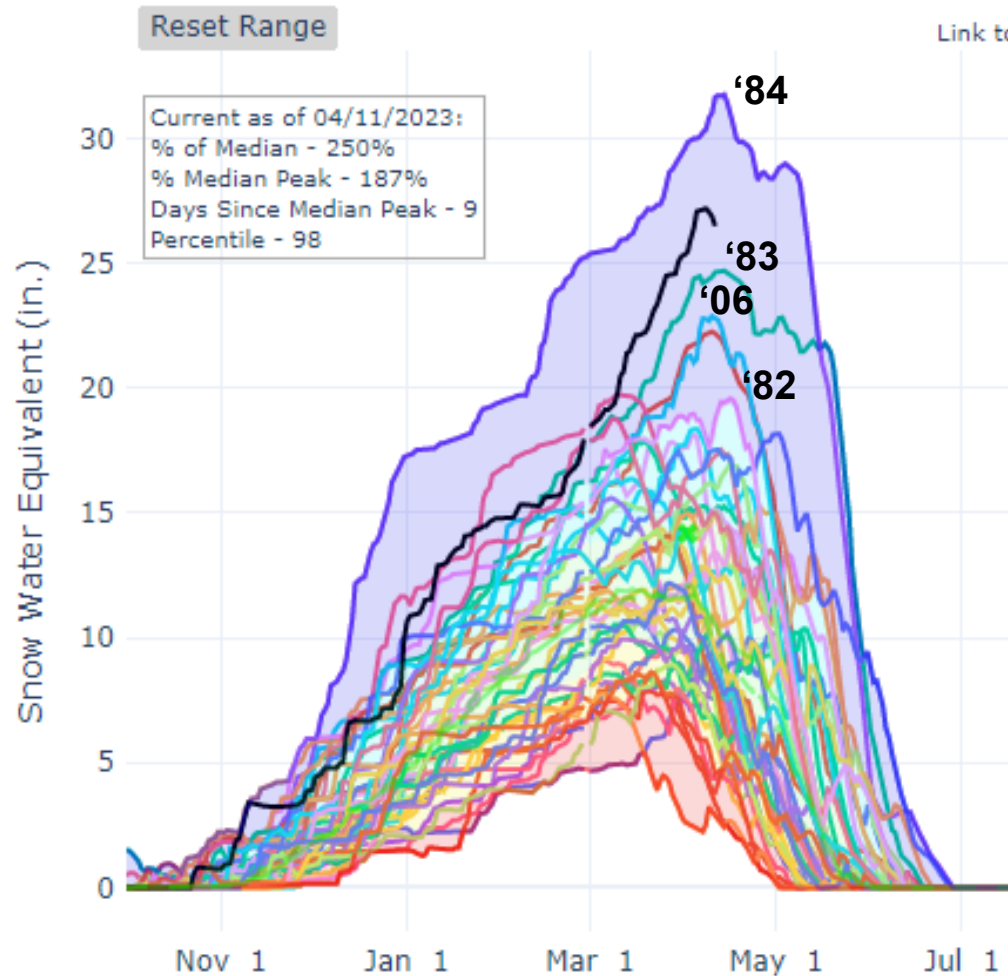
Humboldt Basin – only 1984 had more snow

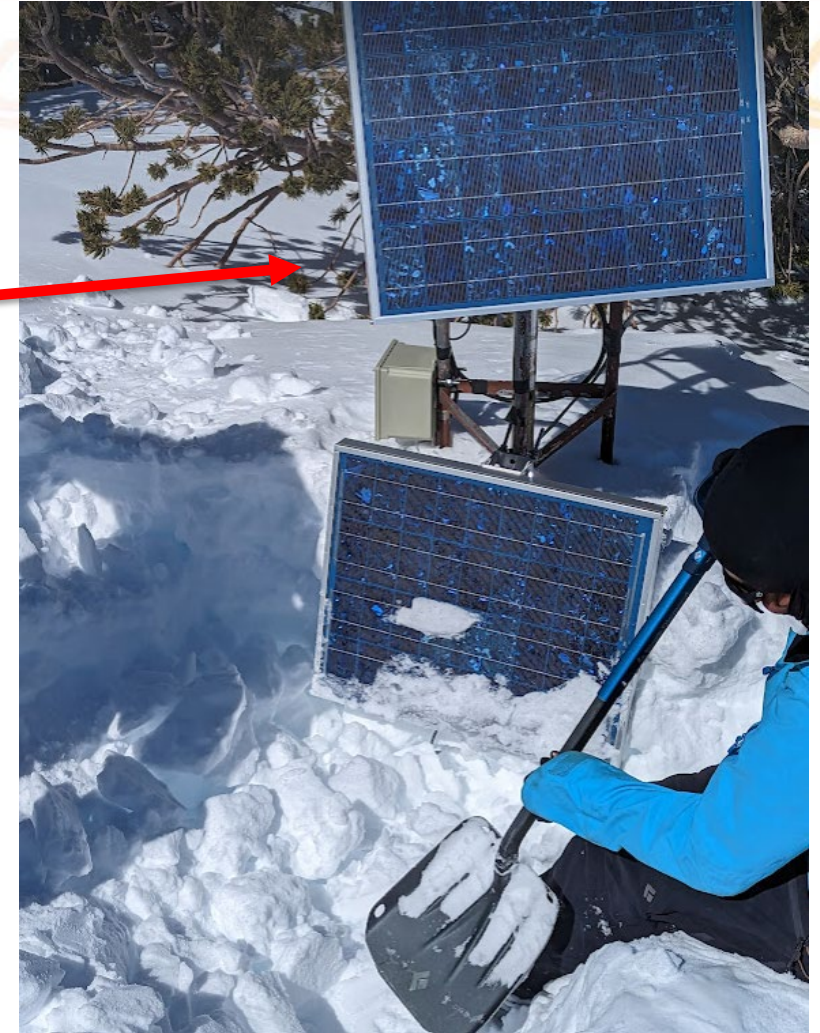


SNOW WATER EQUIVALENT IN UPPER HUMBOLDT



SNOW WATER EQUIVALENT IN UPPER HUMBOLDT





Leavitt Lake SNOTEL max depth so far 270in depth Mar 29
Current SWE 110.7in

Credit: USFS Joe Soccio

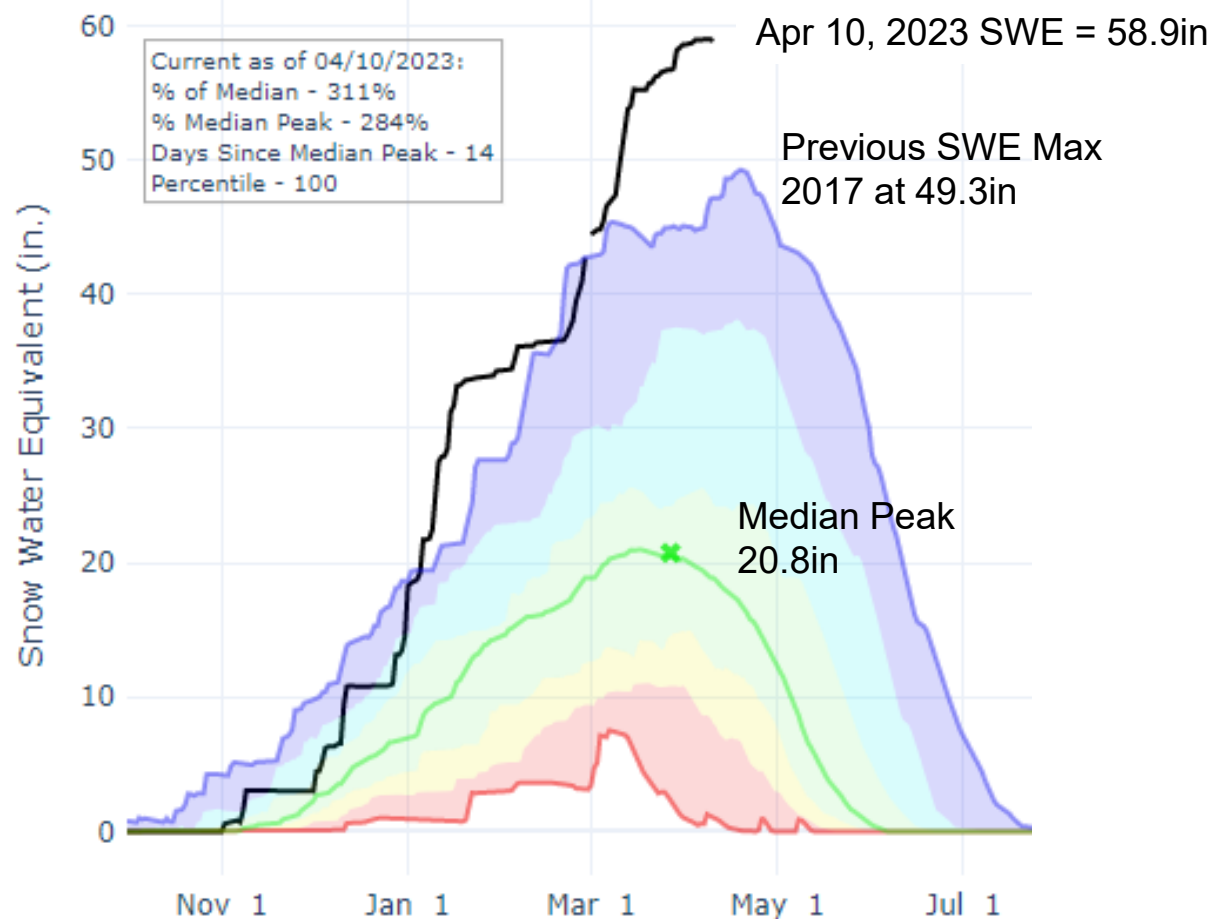


Current Basin SWE ~10in SWE > 2017



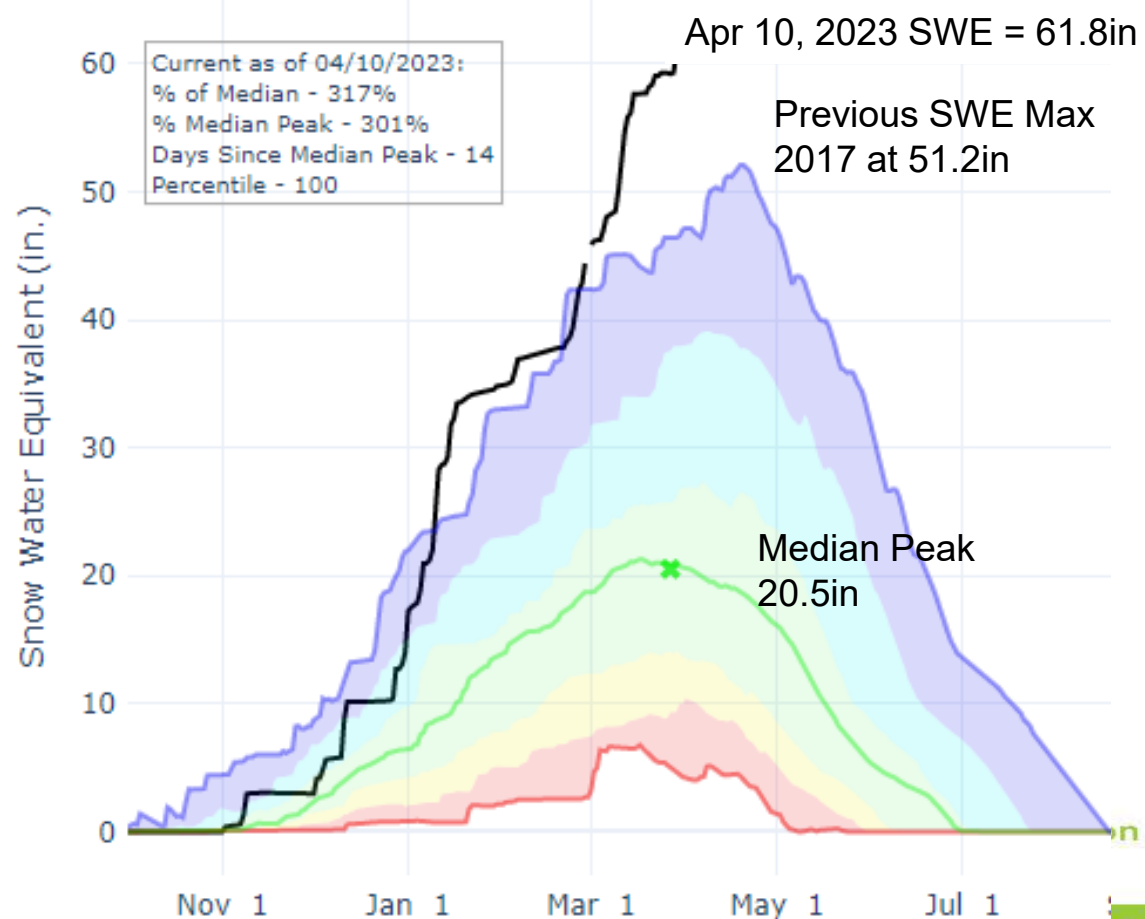
SNOW WATER EQUIVALENT IN CARSON

Reset Range



SNOW WATER EQUIVALENT IN WALKER

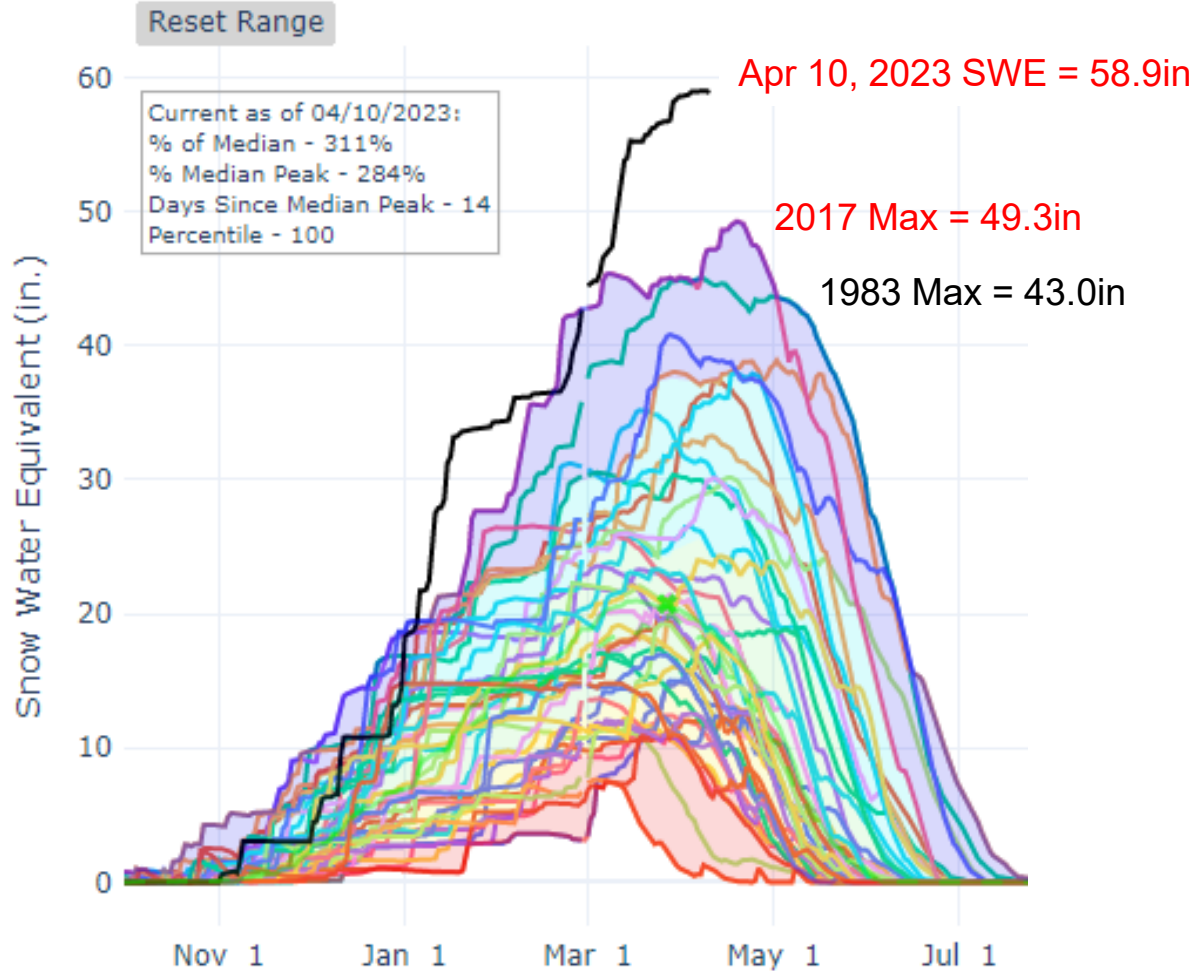
Reset Range



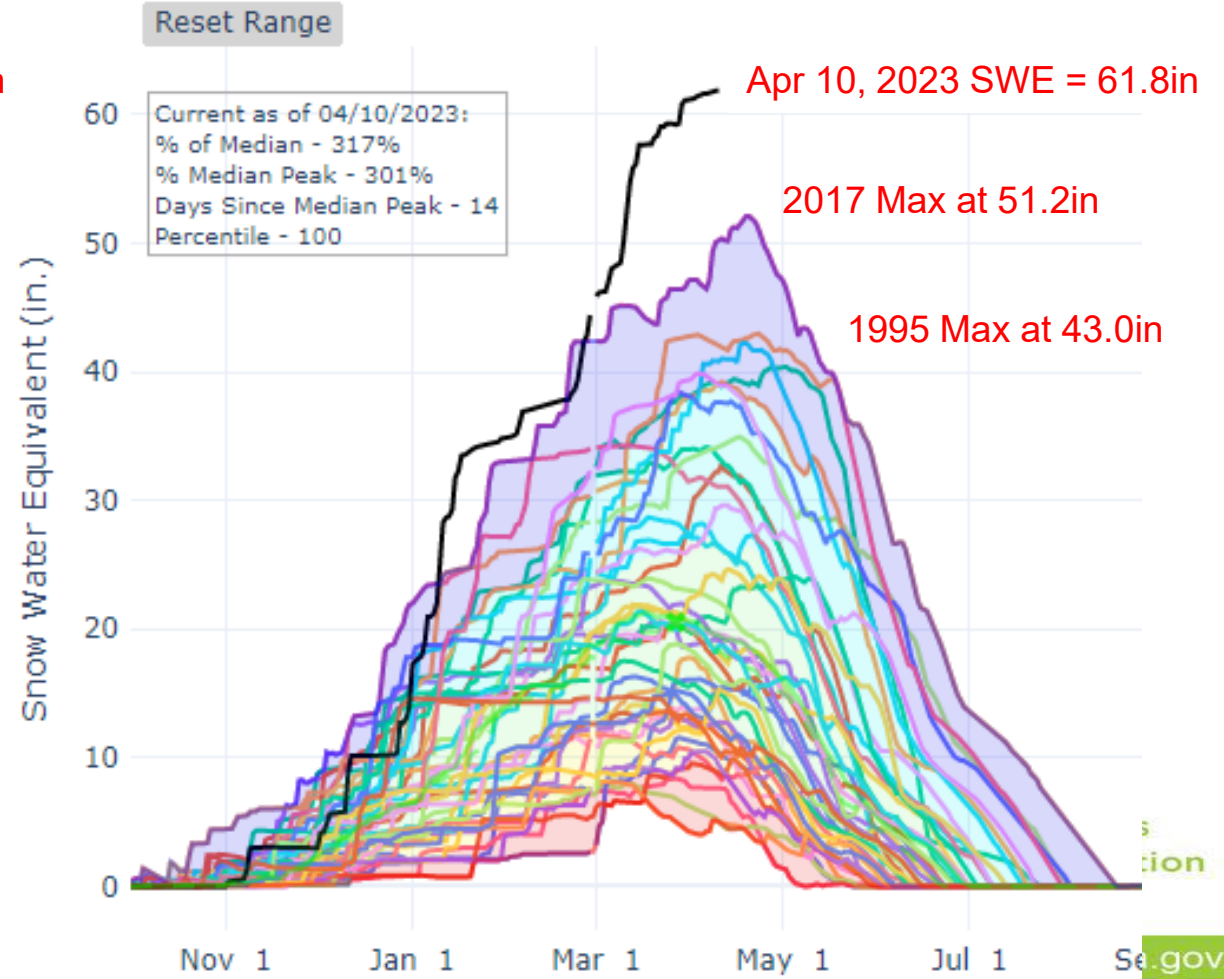
We thought 2017 set a high bar...



SNOW WATER EQUIVALENT IN CARSON



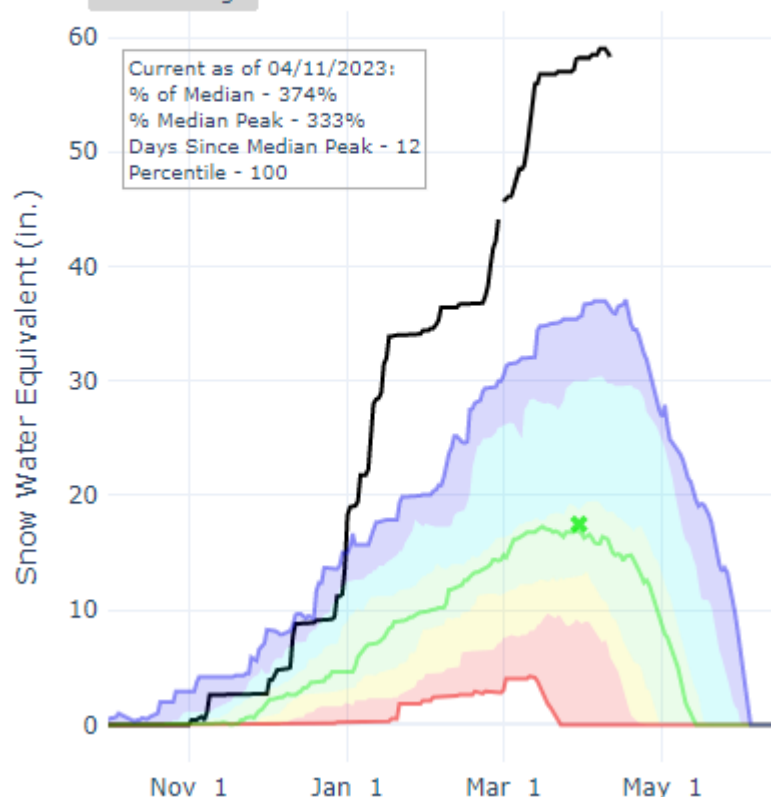
SNOW WATER EQUIVALENT IN WALKER



Peak SWE at SNOTELs in Carson and Walker beating previous records by 15-20in of SWE!

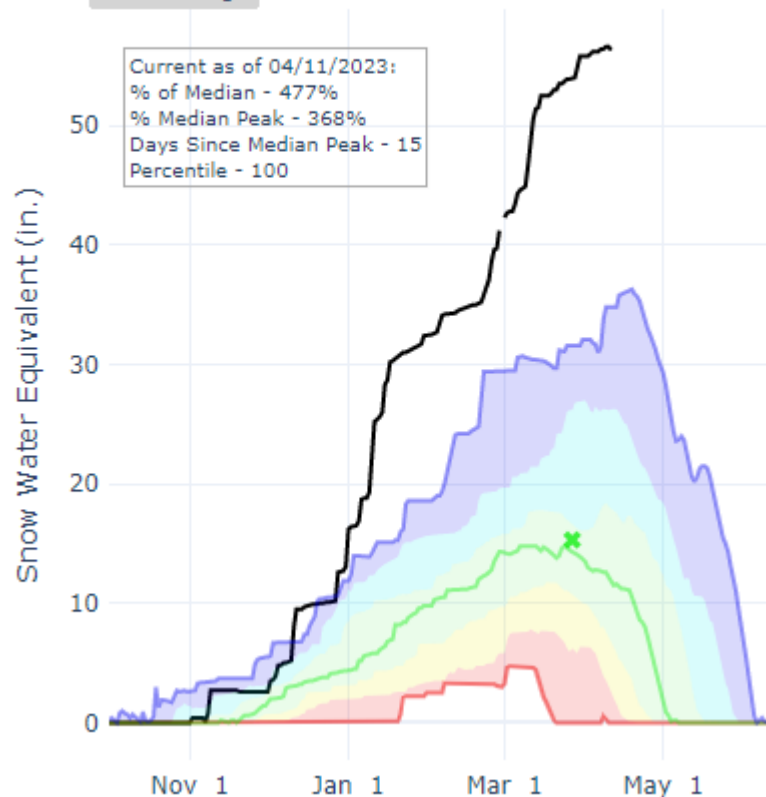
SNOW WATER EQUIVALENT AT POISON FLAT

Reset Range



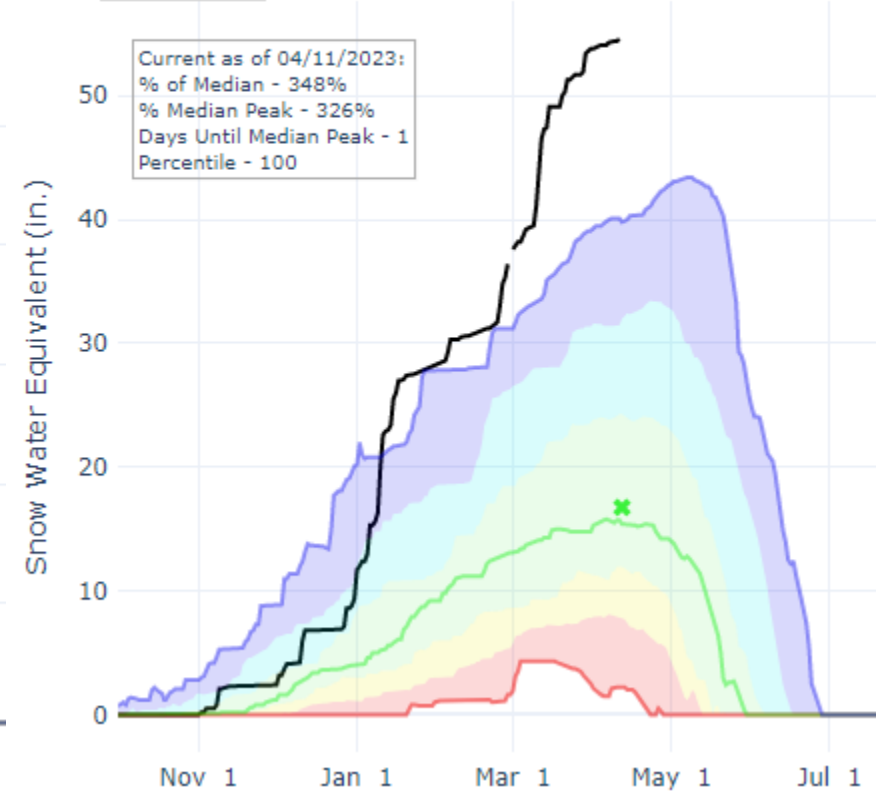
SNOW WATER EQUIVALENT AT MONITOR PASS

Reset Range

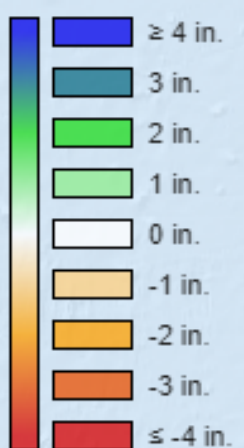


SNOW WATER EQUIVALENT AT VIRGINIA LAKES RIDGE

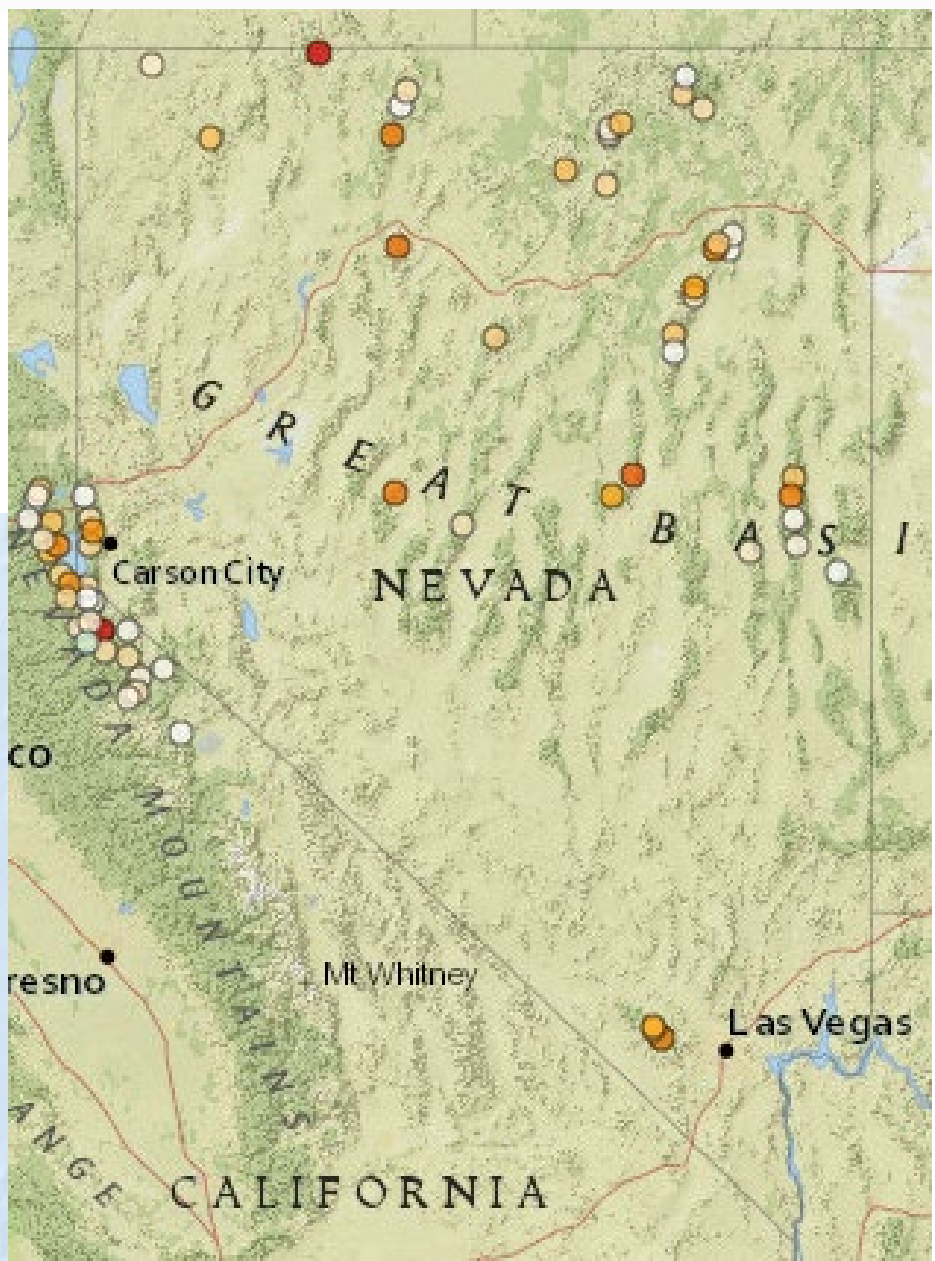
Reset Range



**Snow Water Equivalent
Delta**
April 11, 2023 minus
April 8, 2023, first of day

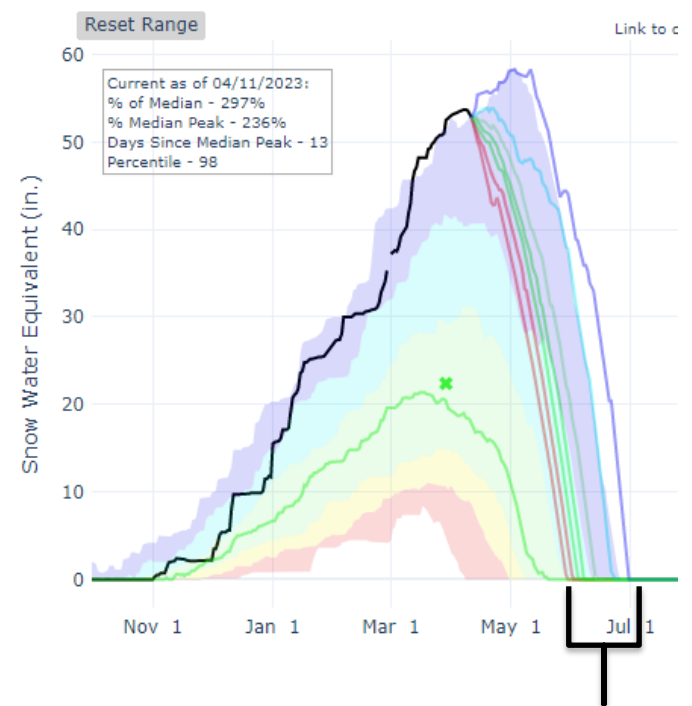


⊖ Observation missing
NRCS Natural Resources Conservation Service
 Created 4-11-2023, 10:03 AM PDT



Snow melt is finally started

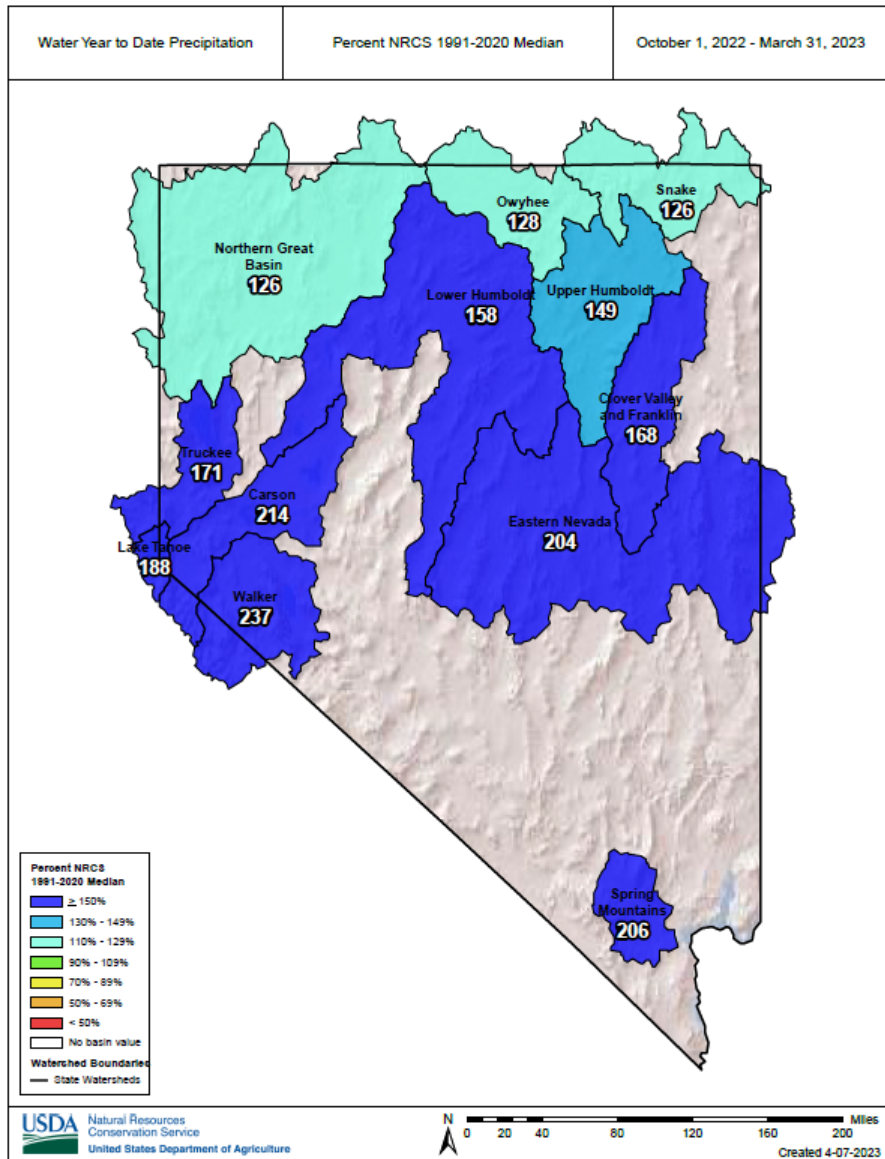
SNOW WATER EQUIVALENT PROJECTIONS AT MARLETTE LAKE



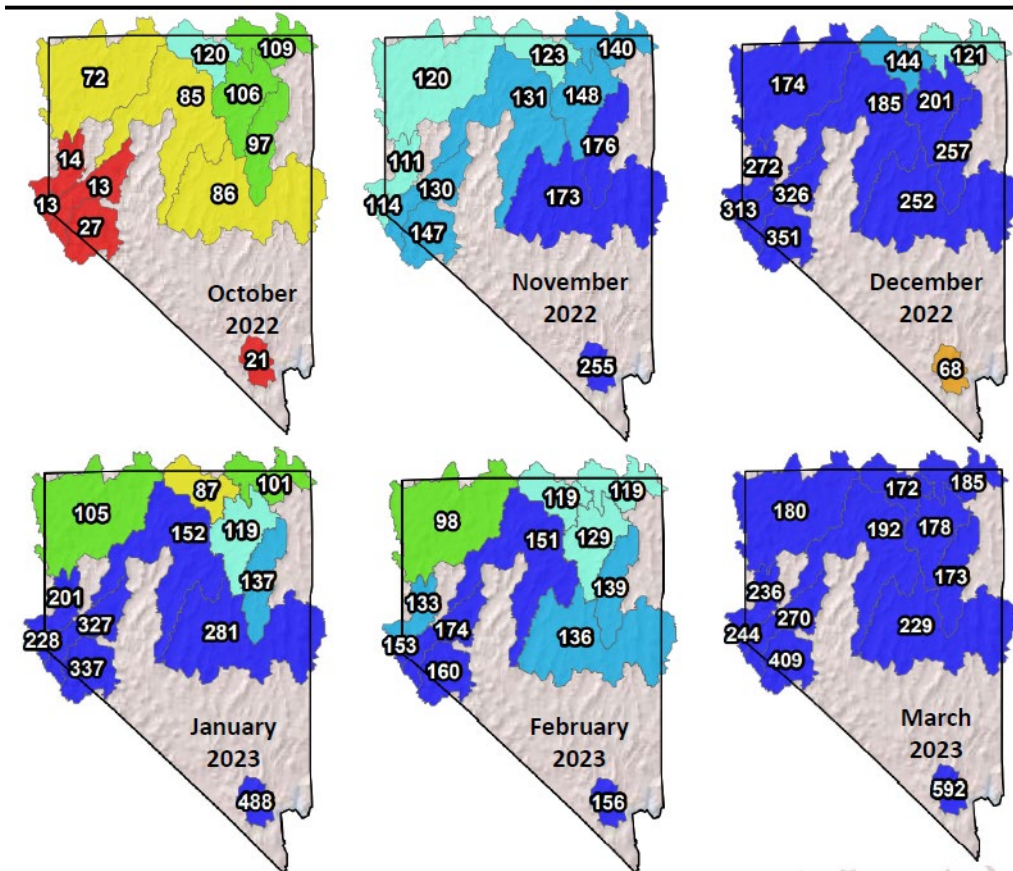
Projected Melt-Out dates
 Memorial Day - June 30
 50% Projection is June 7

Natural Resources Conservation Service

April 1, 2023 Water Year Precipitation**

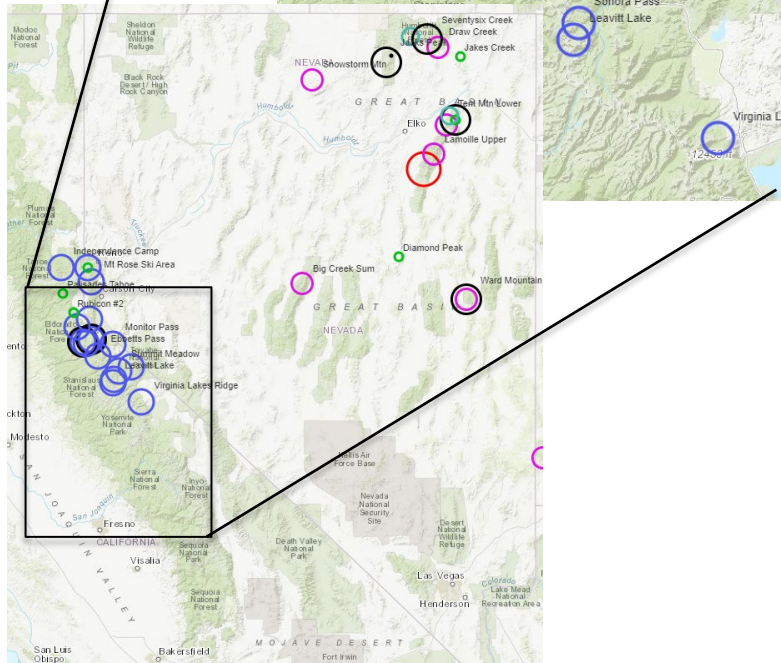
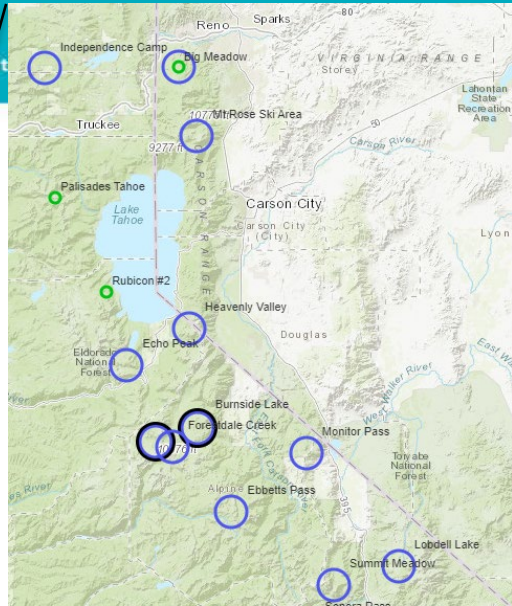


Monthly Precipitation as Percent of Median – Water Year 2023



**Due to snow plugs, precip data has largely been based on snow pillow accumulation and historic catch ratios





Precipitation Gage Issues

Snow plugs in the gage (common)



Snow caps on top of the gage (uncommon)



Buried Gage (New issue 2023)



Sonora Pass 1/24/23

Ebbetts Pass 3/3/23

Likely Poison Flat

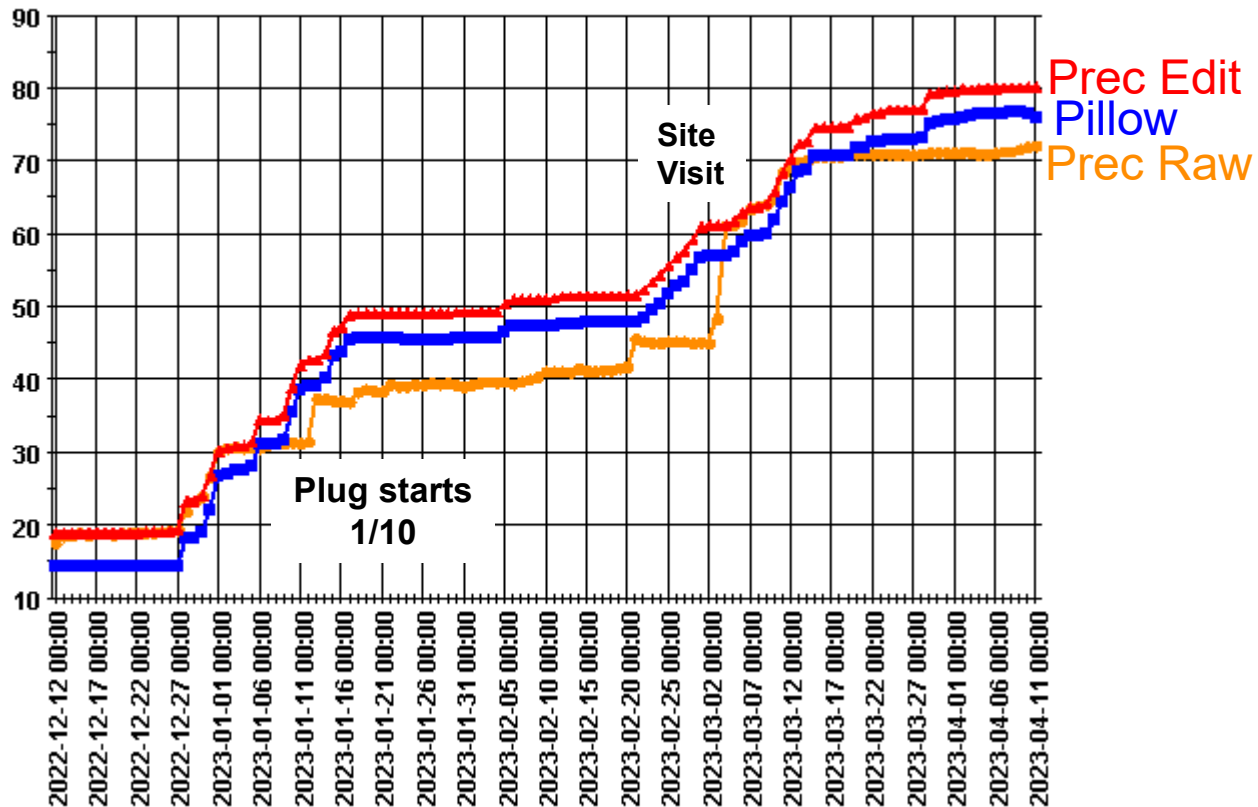


SNOSTAT Map

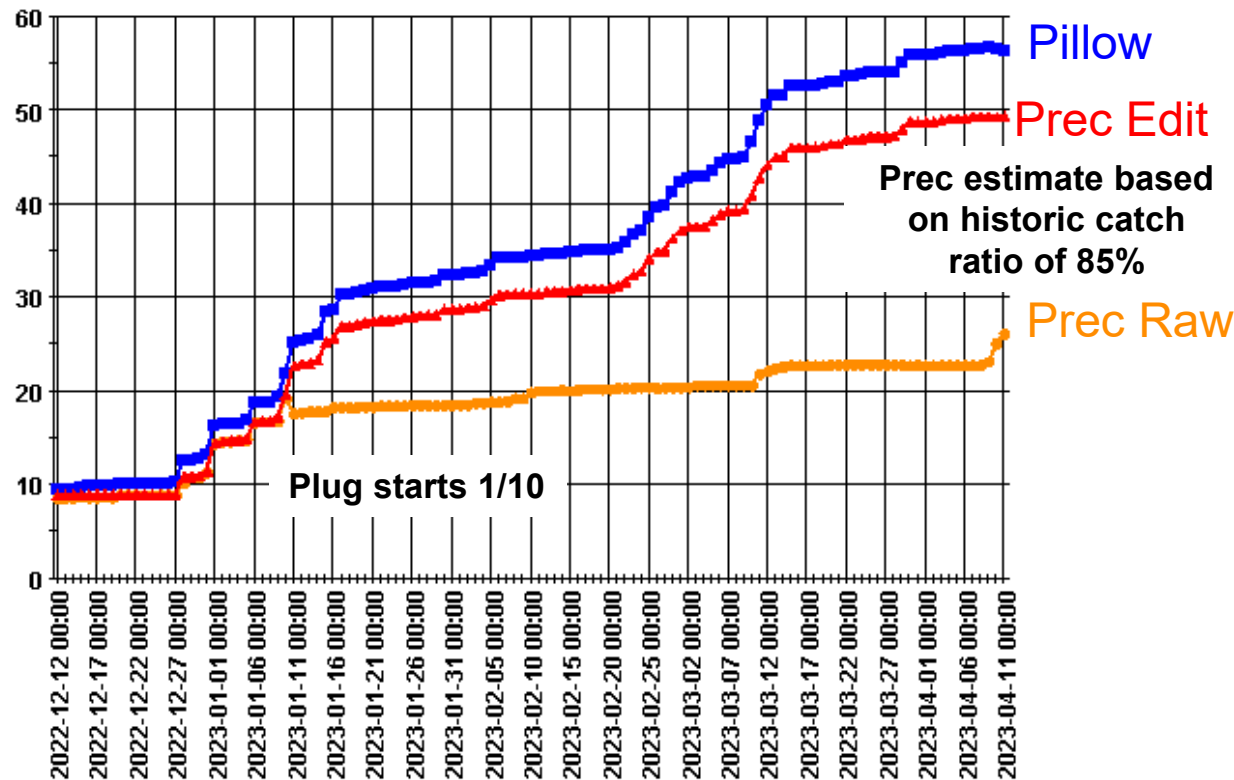
<https://www.arcgis.com/home/webmap/viewer.html?webmap=c698a52f0f59490da12a9f751099a1af&extent=-124.5021,34.3531,-98.6183,43.938>

Precipitation Edits Based on Pillow Accumulation

462-EBBETTS PASS



633-MONITOR PASS



Sites Visited this winter to deal with precip plugs

Tahoe/Truckee - Mt Rose, CSS Lab, Rubicon #2, Heavenly, Palisades Tahoe, Fallen Leaf, Independence Lake, Marlette Lake
 Carson - Carson Pass, Blue Lakes, Ebbetts Pass.
 Walker - Leavitt Lake, Sonora Pass, Lobdell Lake, Virginia Lakes



Effects of Data Products caused by Data Issues

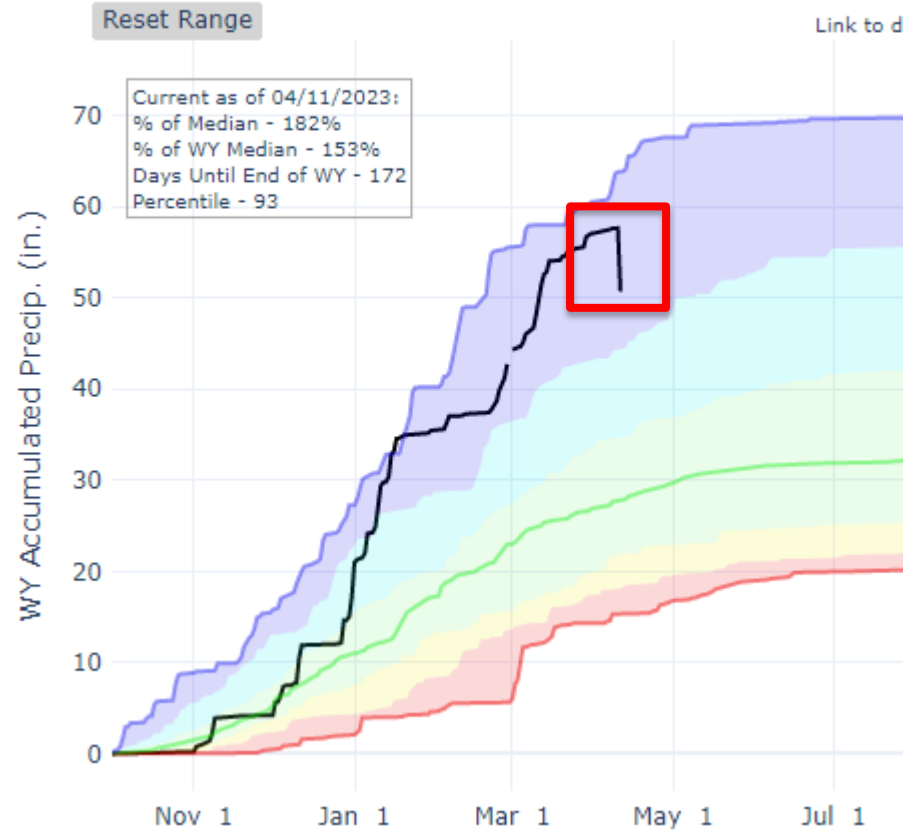


Missing Data in Update Report

California/Nevada SNOTEL Snow/Precipitation Update Report							
Based on Mountain Data from NRCS SNOTEL Sites							
Provisional data, subject to revision							
Data based on the first reading of the day (typically 00:00) for Monday, April 10, 2023							
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water Year-to-Date Precipitation		
		Current (in)	Median (in)	Pct of Median	Current (in)	Median (in)	Pct of Median
CARSON RIVER							
Ebbetts Pass	8661	76.4	30.6	250	-M	41.0	*
Horse Meadow	8557	55.1	16.1 ₍₁₇₎	342	44.2	19.2 ₍₁₇₎	230
Heavenly Valley	8534	58.5	19.8	295	-M	24.0	*
Carson Pass	8360	-M	27.8 ₍₁₆₎	*	-M	32.6 ₍₁₆₎	*
Monitor Pass	8306	56.6	12.2	464	-M	16.3	*
Burnside Lake	8129	54.5	18.8 ₍₁₇₎	290	-M	32.9 ₍₁₇₎	*
Blue Lakes	8067	74.5	25.8	289	64.1	33.0	194
Forestdale Creek	8017	78.6	32.0 ₍₁₇₎	246	-M	39.3 ₍₁₇₎	*
Marlette Lake	7884	53.6	18.3	293	-M	24.2	*
Hagans Meadow	7742	50.3	9.2	547	48.0	23.6	203
Poison Flat	7736	58.7	16.2	362	50.2	24.1	208
Spratt Creek	6063	15.8	0.0	*	50.8	23.1	220
Basin Index (%)				318			209*
WALKER RIVER							
Leavitt Lake	9604	110.7	55.2	201	-M	42.6	*
Virginia Lakes Ridge	9400	54.5	15.7	347	-M	19.7	*
Summit Meadow	9313	61.9	18.0 ₍₁₇₎	344	-M	18.6 ₍₁₇₎	*
Lobdell Lake	9249	52.3	11.4	459	-M	17.8	*
Sonora Pass	8770	54.8	22.0	249	-M	27.0	*
Monitor Pass	8306	56.6	12.2	464	-M	16.3	*
Leavitt Meadows	7198	39.2	2.2	1782	54.7	25.0	219
Basin Index (%)				315			219*

Sudden Drops in Basin Charts

PRECIPITATION IN CARSON



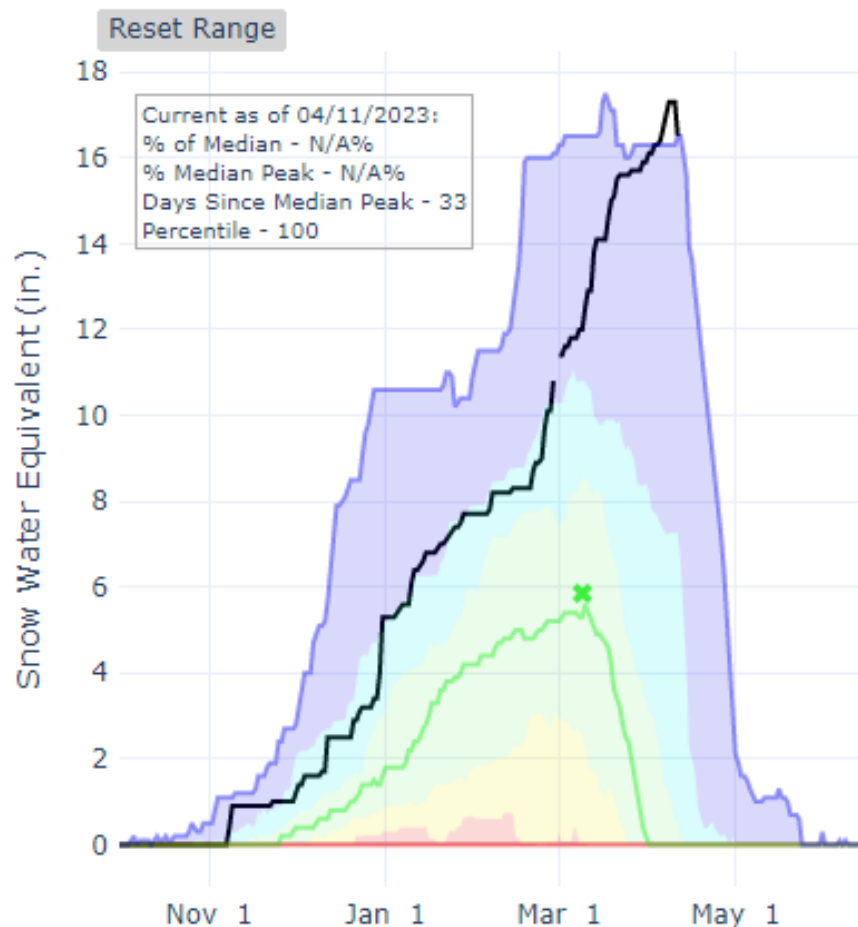
Once daily QC / estimates are made these correct themselves

Update Report is immediate

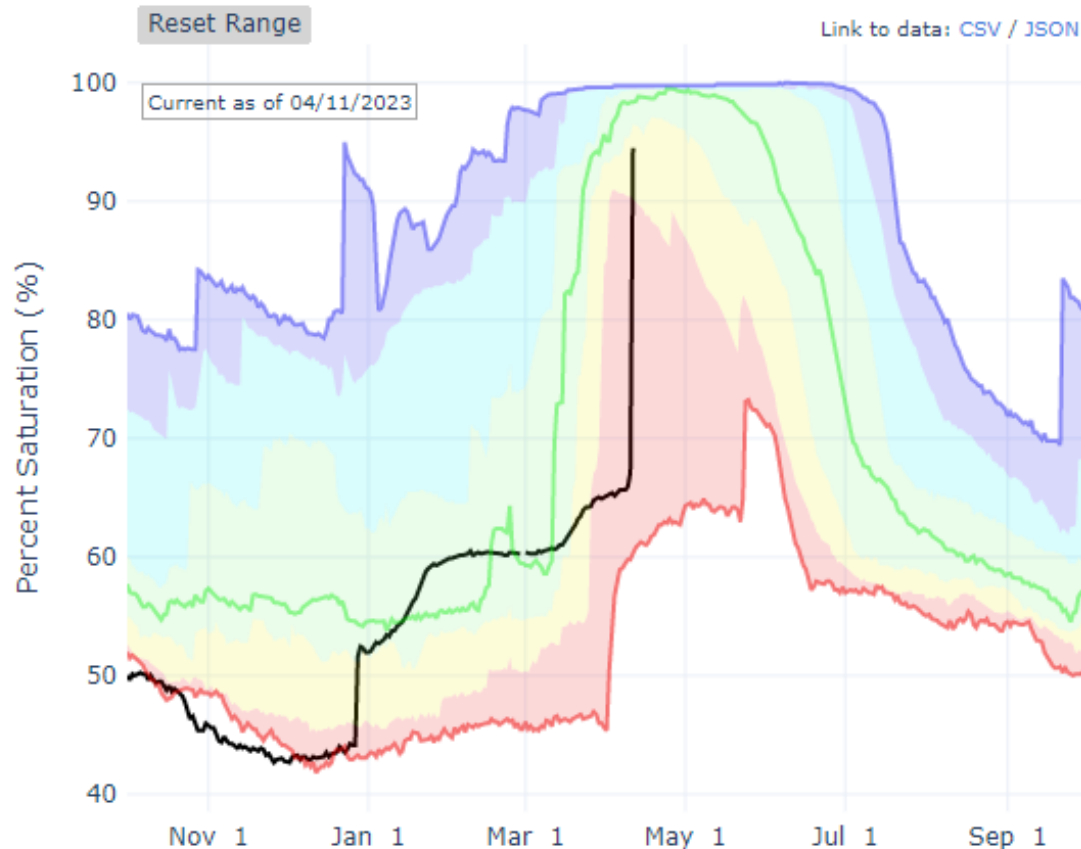
Charts take up to 4 hours

Soil moisture increasing rapidly where melt is happening

SNOW WATER EQUIVALENT AT TAYLOR CANYON

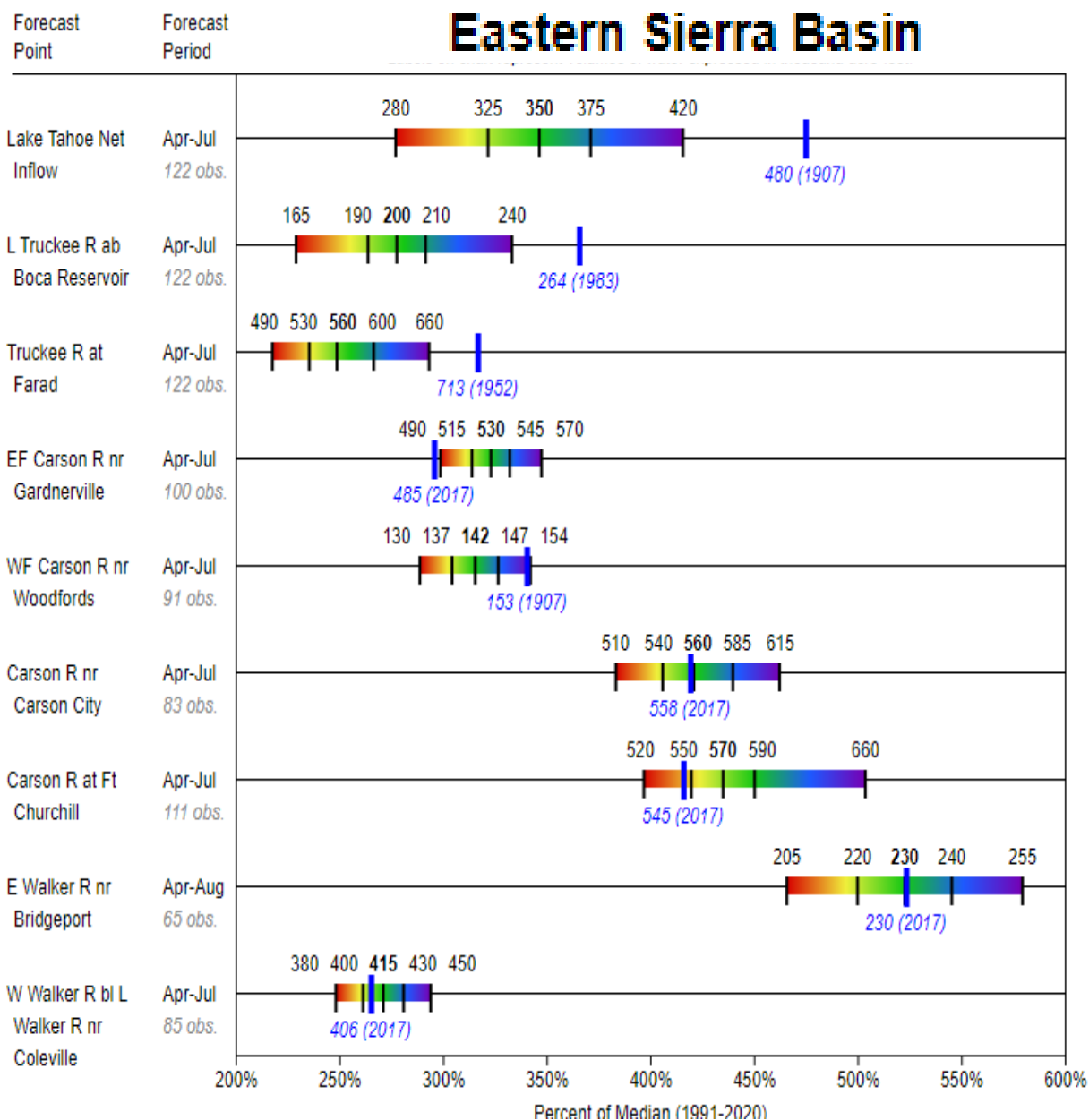


DEPTH AVERAGED SOIL SATURATION AT TAYLOR CANYON

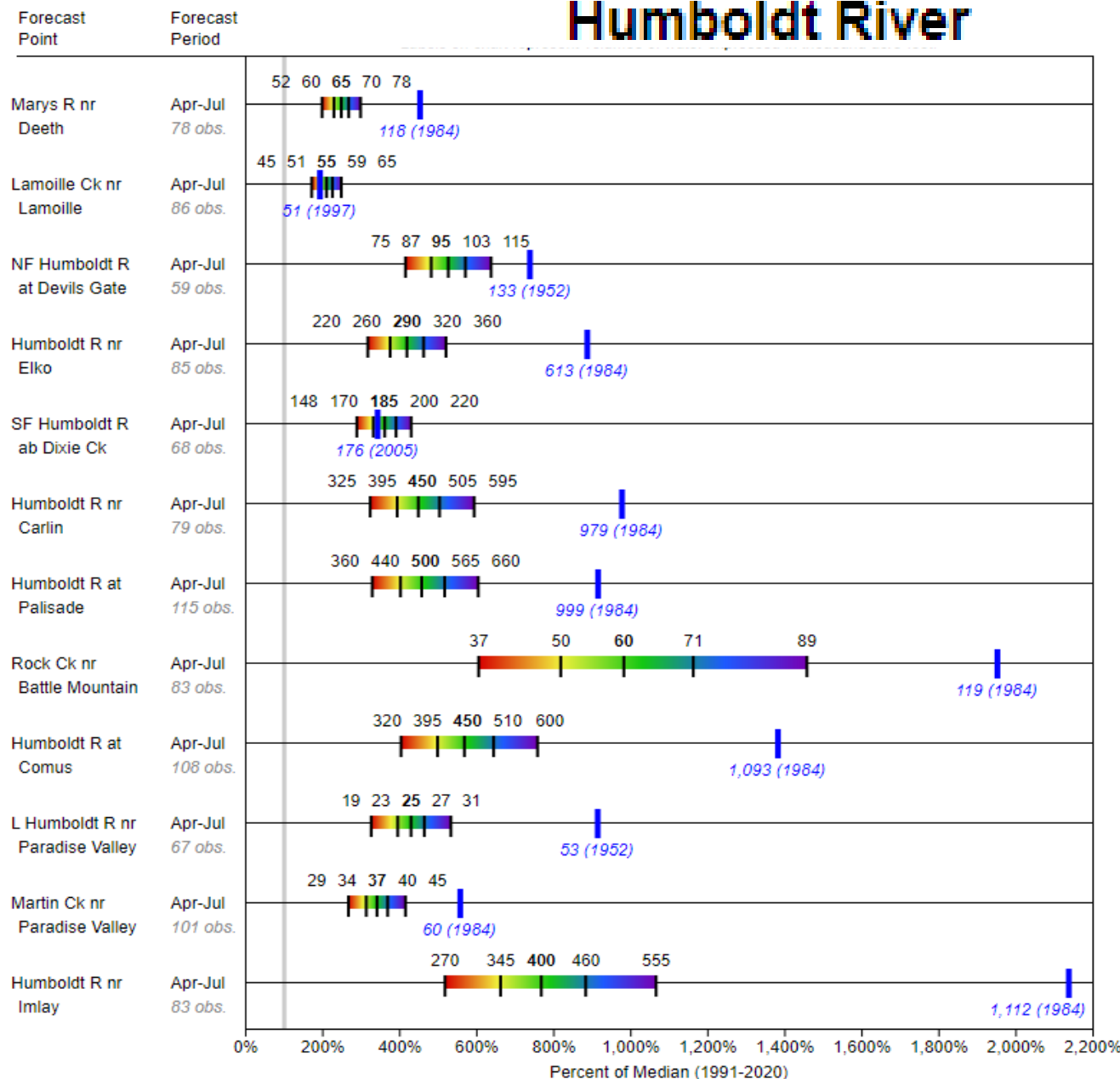


April 1, 2023 Streamflow Forecasts

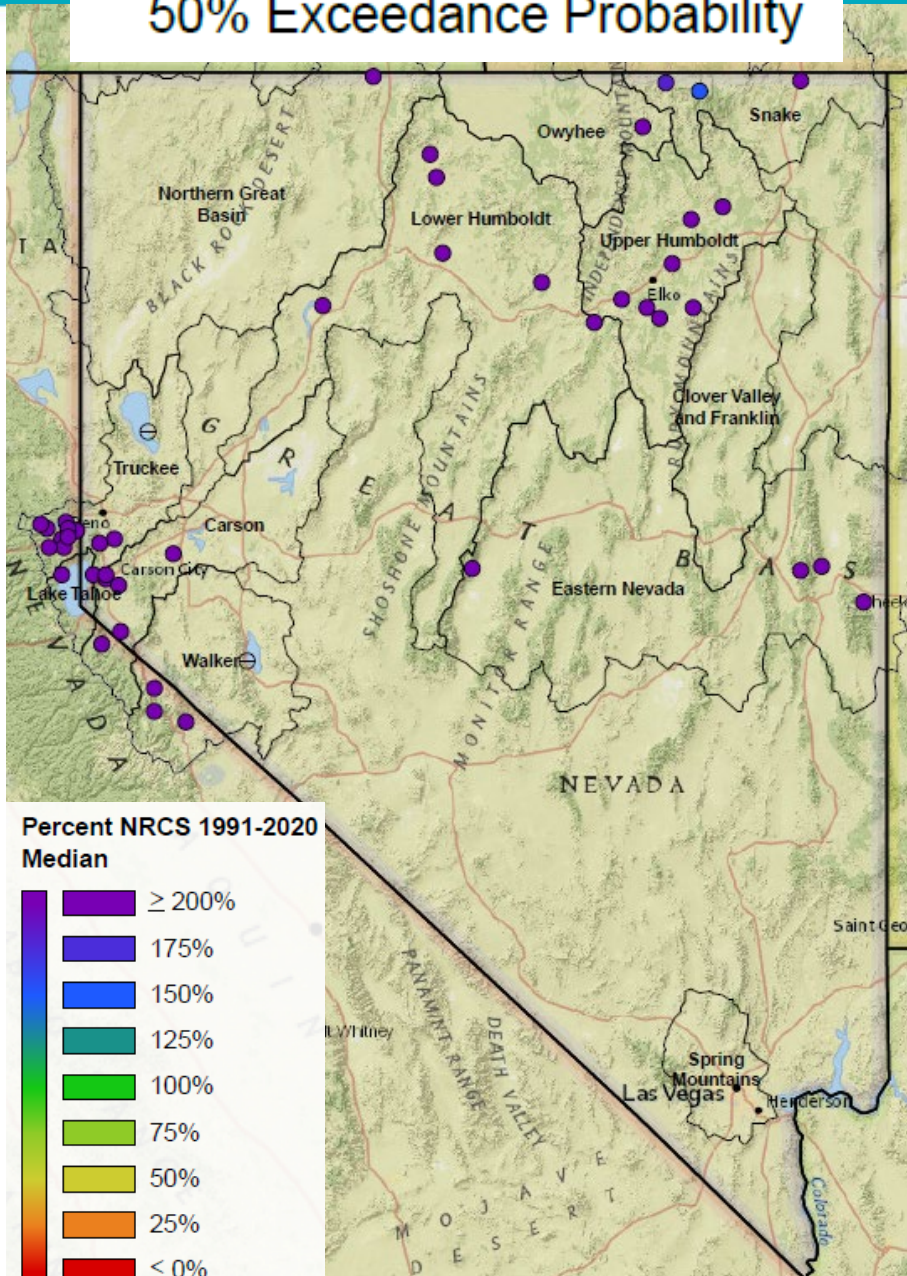
Eastern Sierra Basin



Humboldt River



Streamflow Forecast Volume 50% Exceedance Probability



Forecast Points Most Likely to Set New Records

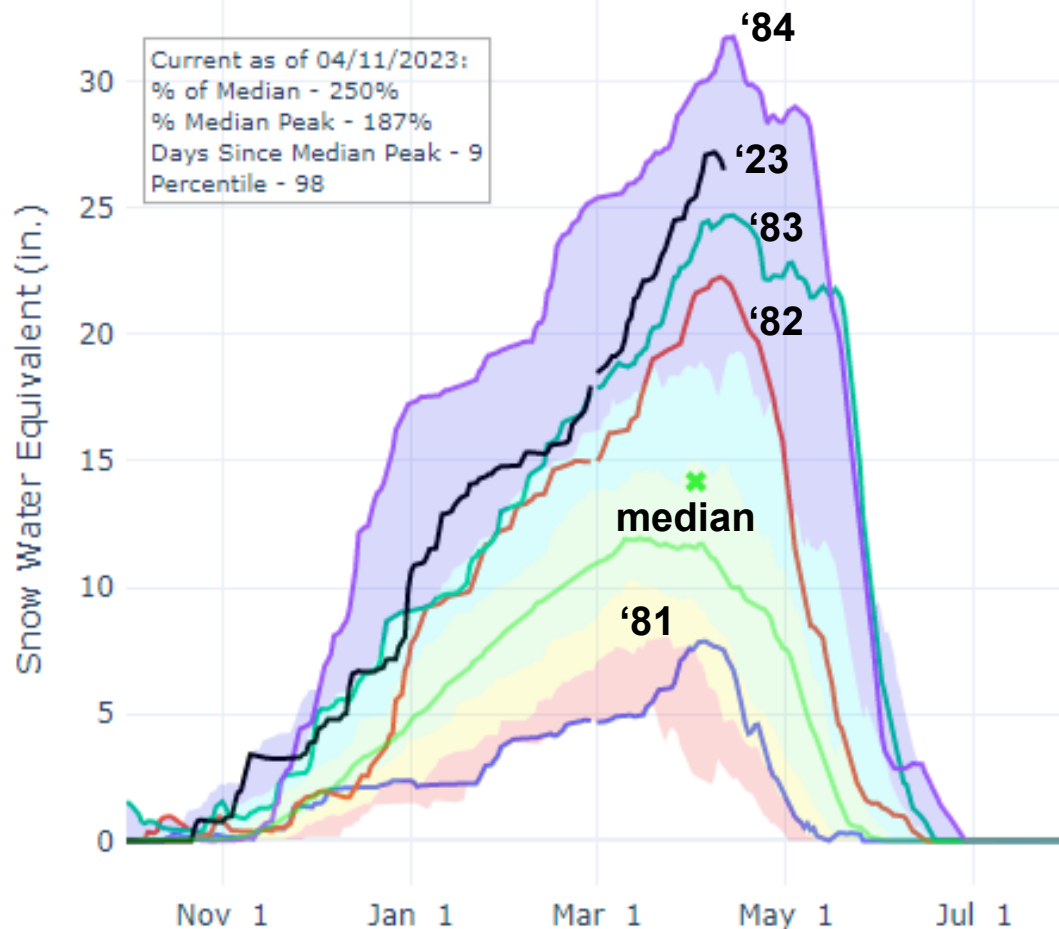
Forecast Point	Forecast Period	April 1, 2017 Forecast Exceedances - KAF <---drier future-----wetter future-->					Record	Record Year
		90%	70%	50%	30%	10%		
Marlette Lake Inflow	Apr-Jul	2.8	3.1	3.3	3.5	3.8	3.5	1983
Galena Creek	Apr-Jul	8.8	9.5	10	11	11	9.3	1996
Independence Lake Inflow	Apr-Jul	21	22	23	24	25	25	1983
EF Carson R nr Gardnerville	Apr-Jul	490	515	530	545	570	485	2017
WF Carson R at Woodfords	Apr-Jul	130	137	142	147	154	153	1907
Kings Canyon Creek	Apr-Jul	0.92	1.1	1.3	1.4	1.6	1.5	1983
Ash Canyon Creek	Apr-Jul	2.5	2.8	3	3.2	3.6	3.2	2017
Carson R nr Carson City	Apr-Jul	510	540	560	585	615	558	2017
Carson R nr Fort Churchill	Apr-Jul	515	550	570	590	625	545	2017
E Walker R nr Bridgeport	Apr-Aug	205	220	230	240	255	230	2017
W Walker R bk L Walker R nr Coleville	Apr-Jul	380	400	415	430	450	406	2017
W Walker R nr Coleville	Apr-Jul	385	405	415	430	445	376	2017
Lamoille Creek	Apr-Jul	47	53	57	61	66	51	1997
SF Humboldt abv Tenmile Ck	Apr-Jul	157	176	190	205	225	162	2019
Lehman Creek nr Baker	Apr-Jul	5.3	6.1	6.6	7.1	7.9	7.8	2005
Steptoe Creek nr Ely	Apr-Jul	7.6	8.7	9.4	10	11	8.8	1983

Forecast Volume Equals or Exceeds Existing Record

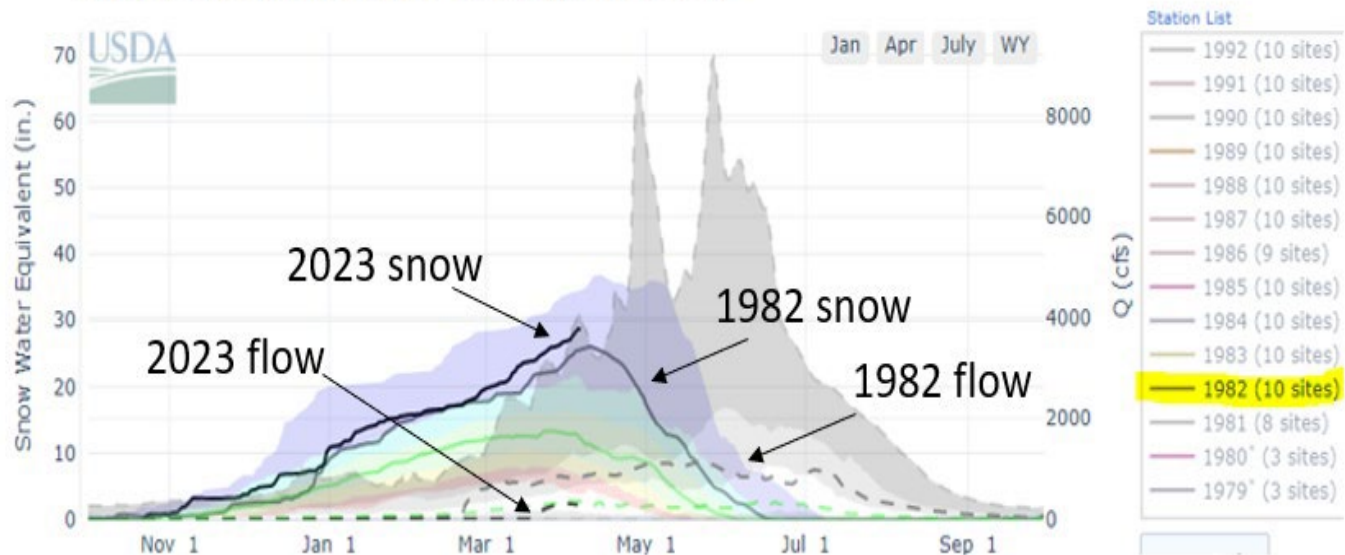
SNOW WATER EQUIVALENT IN UPPER HUMBOLDT

Reset Range

Link to data



Snow to Flow Relationship for Humboldt R nr Imlay



Snow Statistics Percentile Classes					Snow	Flow Statistics Percentile Classes					Flow
Min - 10%	10% - 30%	30% - 70%	70% - 90%	90% - Max	—	Min - 10%	10% - 30%	30% - 70%	70% - 90%	90% - Max	***
Much Below Median	Below Median	Near Median	Above Median	Much Above Median	in.	Much Below Median	Below Median	Near Median	Above Median	Much Above Median	cfs

Forecast Point	Forecast Period	April 1, 2023 Forecast Exceedances - KAF					1982 KAF	1983 KAF	2019 KAF
		<---drier future-----wetter future-->							
		90%	70%	50%	30%	10%			
Humboldt R nr Elko	Apr-Jul	220	260	290	320	360	211	301	286
Humboldt R at Palisades	Apr-Jul	360	440	500	565	660	315	599	487
Humboldt R nr Comus	Apr-Jul	320	395	450	510	600	264	735	386
Humboldt R nr Imlay	Apr-Jul	270	345	400	460	555	212	641	253

Greater than 1982

Greater than 1983





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