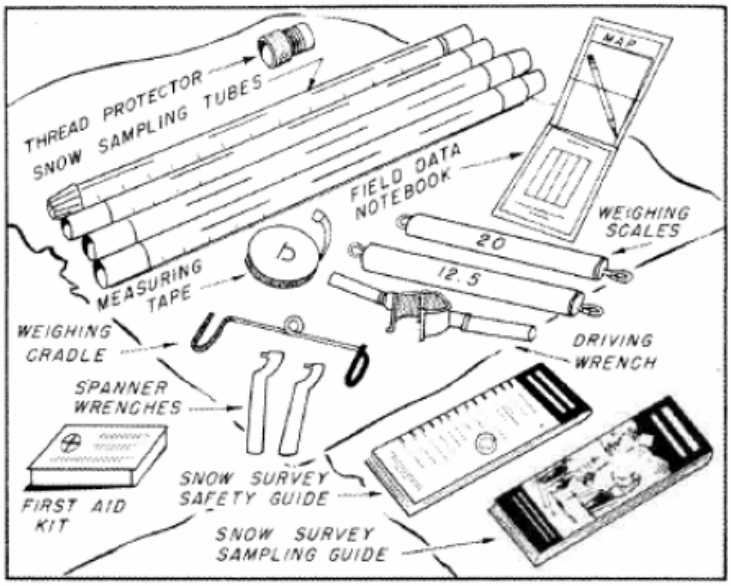
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

California Water Supply Outlook Report

January 2023

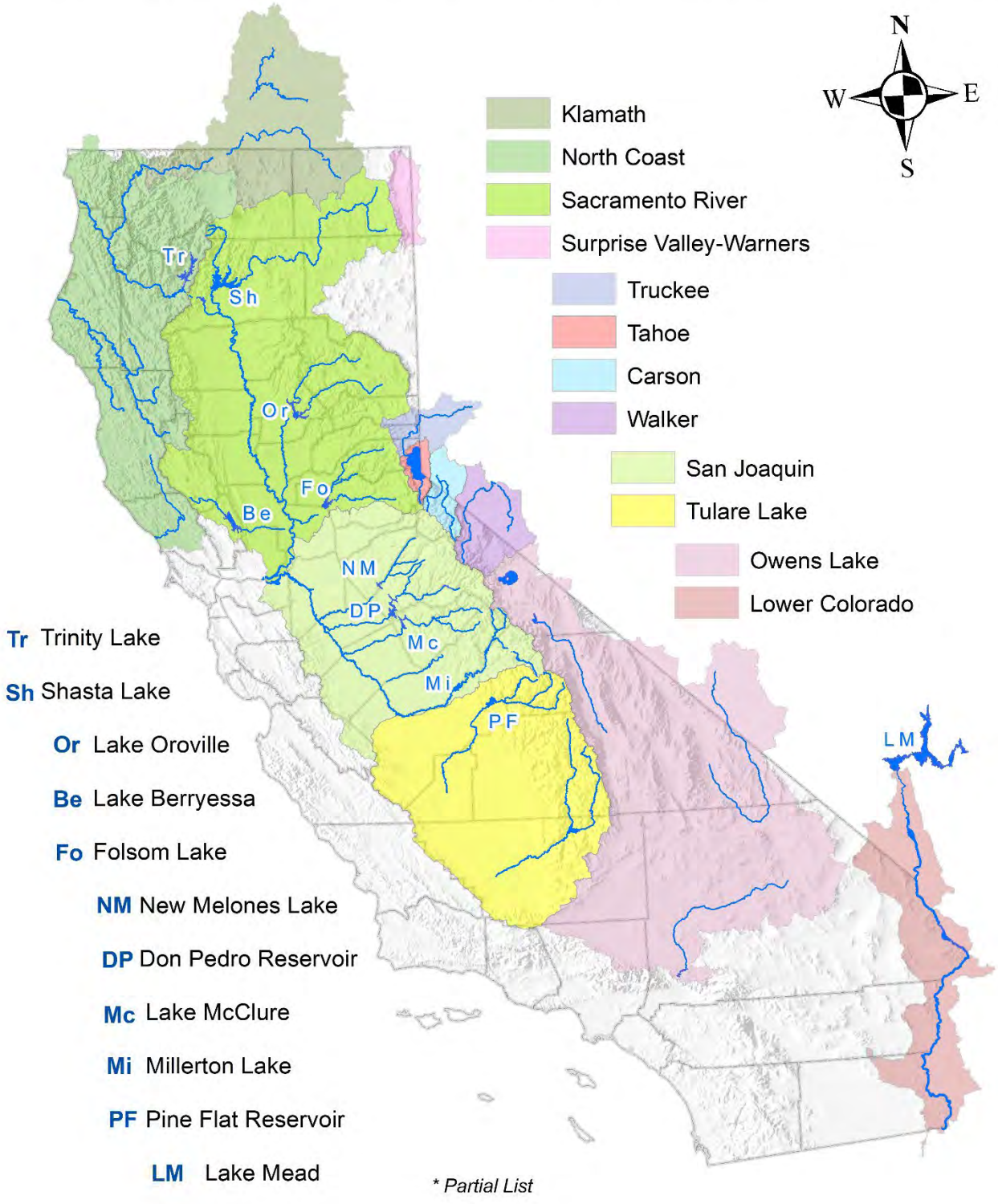
Snow Sampling Kit



Contents

Cover: From the Snow Survey Sampling Guide (USDA- Agricultural Handbook 169). Visit NRCS' Water and Climate Center's Publications site for more information.

California Forecast Basins, Major Rivers, and Large Reservoirs*



Tr Trinity Lake

Sh Shasta Lake

Or Lake Oroville

Be Lake Berryessa

Fo Folsom Lake

NM New Melones Lake

DP Don Pedro Reservoir

Mc Lake McClure

Mi Millerton Lake

PF Pine Flat Reservoir

LM Lake Mead

** Partial List*

STATE OF CALIFORNIA GENERAL OUTLOOK
January 2023

NEW 1991-2020 MEDIANS

On October 1, 2021 the NRCS updated its 30-year normals period, shifting it from 1981-2010 to 1991-2020. The normals available from the National Water and Climate Center (NWCC) include the median and average for Snow Water Equivalent (SWE), snow depth (snow courses only), precipitation, volumetric streamflow, and reservoir storage. Values are calculated from data collected by NRCS-managed stations and external agencies such as the U.S. Geological Survey (USGS), National Weather Service (NWS), state agencies, and private organizations. Normals are calculated for various durations including daily, month-to-date, semi-monthly, monthly, seasonal, and annual based on the data type.

The 1991-2020 normals update may have shifted the reported median values compared to those in previous reports for one or both of the following reasons: 1) the underlying data used to compute the statistics are not the same between the two 30-year periods; and 2) Calculation methods for 1991-2020 have also been updated. Therefore, caution is recommended when making inferences from comparisons between the 1991-2020, 1981-2010, and 1971-2000 normals. More information is available online at https://www.nrcs.usda.gov/wps/portal/wcc/home/snowClimateMonitoring/30YearNormals/.

SNOWPACK

Snow gages in the Northern-, Central-, and Southern Sierra Mountains recorded snow water equivalents on December 31st that averaged 136-, 162-, and 182 percent of normal for the date, respectively. Since the beginning of the calendar year, the statewide average snowpack has increased, from 162 percent on December 31st, to 232 percent on January 14th.

More information is available online at http://cdec.water.ca.gov/snow/current/snow/index2.html.

PRECIPITATION

The Water Year started out slow with no recorded rain in October. In November, the Northern Sierra-, San Joaquin-, and Tulare Basin Index stations received 89-, 111-, and 135 percent of average. In December, the stations received 167-, 243-, and 211 percent of average. pJanuary's wet weather patterns helped keep seasonal rainfall totals up to between 175 and 200 percent of average as of January 14, 2023.

More information is available online at http://cdec.water.ca.gov/snow_rain.html

RESERVOIRS

Total reservoir storage (excluding Lake Powell and Lake Mead) on December 31, 2022 was 76 percent of average, compared to 86 percent of average at the end of 2021. Storage at Shasta Reservoir was 57 percent of average, up from 50 percent last year. Oroville Reservoir was 69 percent of average, down from 73 percent last year. Don Pedro Reservoir was 86 percent of average, up from 79 percent of average last year. In the Colorado River Basin, the combined reservoir storage in Lake Powell and Lake Mead is 45 percent of its historical average.

More information is available online at http://cdec.water.ca.gov/snow/reservoir_ss.html.

STREAMFLOW

Forecasts in the Sacramento, San Joaquin, and Tulare basins range between 75- and 182 percent of the 1991-2020 medians between April and July. NRCS forecasts in the Tahoe, Truckee, Carson, and Walker River basins are all well above the 1999-2020 median. NRCS forecasts for stations in the Klamath Basin and North and North Coast are also above the median.. Summaries are provided below.

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Sacramento River
Streamflow Forecasts - January 1, 2023

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Sacramento River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Inflow to Shasta Lk (NWS)	APR-JUL	1090		1700	99%		2870	1710
MF American R nr Auburn (DWR)								
MF American R nr Auburn (NWS)	APR-JUL	480		725	160%		1180	453
Inflow to Shasta Lk (DWR)								
Silver Ck bl Camino Div. Dam (DWR)								
McCloud R ab Shasta (DWR)								
Sacramento R nr Red Bluff (NWS)	APR-JUL	1530		2420	100%		4130	2410
MF Feather R nr Clio (DWR)								
NF Feather R at Pulga (DWR)								
Inflow Jackson Mdws & Bowman Res (DWR)[2]								
Feather R at Lk Almanor (DWR)								
Inflow to Folsom Res (DWR)								
Pit R at Shasta Lk (NWS)	APR-JUL	525		805	75%		1240	1070
Pit R at Shasta Lk (DWR)								
Inflow to Oroville Res (NWS)	APR-JUL	1460		2280	151%		4480	1510
Inflow to Folsom Res (NWS)	APR-JUL	1220		1770	150%		2920	1180
Yuba R at Smartville (DWR)								
N Yuba R bl Goodyears Bar (DWR)								
Yuba R at Smartville (NWS)	APR-JUL	870		1350	145%		2090	934
Inflow to Union Valley Res (NWS)	APR-JUL	106		146	152%		230	95.9
N Yuba R bl Goodyears Bar (NWS)	APR-JUL	260		415	155%		625	268
Sacramento R at Shasta (NWS)	APR-JUL	182		355	122%		655	292
Sacramento R nr Red Bluff (DWR)								
S Yuba R nr Langs Crossing (DWR)								
Cosumnes R at Michigan Bar (NWS)	APR-JUL	106		176	148%		330	119
McCloud R ab Shasta (NWS)	APR-JUL	245		375	101%		600	370
NF American R at N FK Dam (DWR)								
Sacramento R at Shasta (DWR)								
SF Feather R at Ponderosa Dam (DWR)								
NF Feather R nr Prattville (NWS)	APR-JUL	255		345	123%		535	280
Inflow to Oroville Res (DWR)								

1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Sacramento River	25	195%	235%

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San Joaquin
Streamflow Forecasts - January 1, 2023

SanJoaquin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
MF Stanislaus R bl Beardsley (DWR)								
Tuolumne R nr Hetch Hetchy (NWS)	APR-JUL	735		955	160%		1250	596
Big Ck bl Huntington Lk (DWR)								
Inflow to New Melones Res (NWS)	APR-JUL	710		1050	159%		1660	661
Inflow to Millerton Lk (NWS)	APR-JUL	1470		2240	184%		3160	1220
NF Mokelumne R nr West Point (DWR)								
Inflow to New Don Pedro Res (NWS)	APR-JUL	1490		1990	167%		2880	1190
Inflow to Millerton Lk (DWR)								
Cherry & Eleanor CKs, Hetch Hetchy (DWR)[2]								
Inflow to New Don Pedro Res (DWR)								
Merced R at Pohono Bridge Yosemite (DWR)								
Cosumnes R at Michigan Bar (DWR)								
SF San Joaquin R nr Florence Lk (DWR)								
Inflow to New Melones Res (DWR)								
Inflow to Pardee Res (DWR)								
Merced R at Pohono Bridge Yosemite (NWS)	APR-JUL	495		675	179%		955	377
Inflow to Lake McClure (NWS)	APR-JUL	690		1000	166%		1510	601
Inflow to Lake McClure (DWR)								
Inflow to Pardee Res (NWS)	APR-JUL	475		665	153%		1080	436
Tuolumne R nr Hetch Hetchy (DWR)								

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Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
SanJoaquin	2	265%	247%

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Tulare Lake
Streamflow Forecasts - January 1, 2023

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Tulare Lake	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Kaweah R at Terminus Res (DWR)								
Kaweah R at Terminus Res (NWS)	APR-JUL	350		515	186%		765	277
Inflow to Pine Flat Res (NWS)	APR-JUL	1690		2140	178%		2940	1200
Inflow to Isabella Res (DWR)								
Inflow to Pine Flat Res (DWR)								
Tule R at Success Res (DWR)								
Tule R at Success Res (NWS)	APR-JUL	58		105	178%		215	58.9
Inflow to Isabella Res (NWS)	APR-JUL	490		775	173%		1360	447
NF Kings R nr Cliff Camp (DWR)								
Kern R nr Kernville (DWR)								

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Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Tulare Lake	0		

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North Coast
Streamflow Forecasts - January 1, 2023

North Coast	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Trinity R at Lewiston (DWR)[2]								
Inflow to Clair Engle Lk (NWS)	APR-JUL	425		765	133%		1350	574
Scott R nr Fort Jones (NWS)	APR-JUL	87		175	107%		305	164

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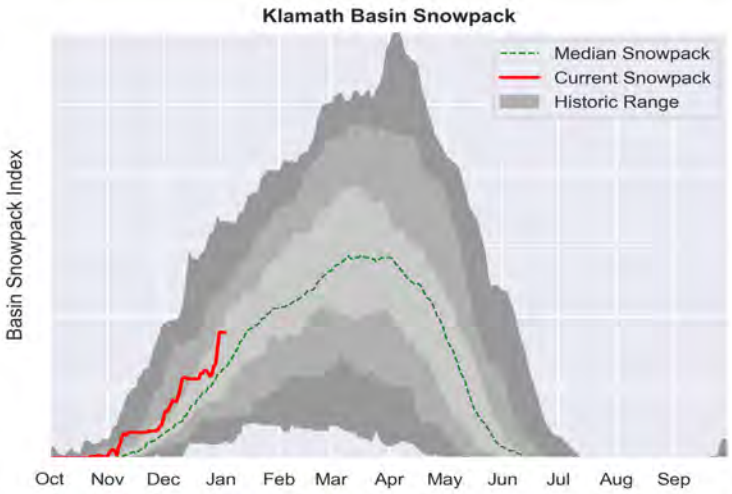
Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
North Coast	0		

Klamath Basin Summary

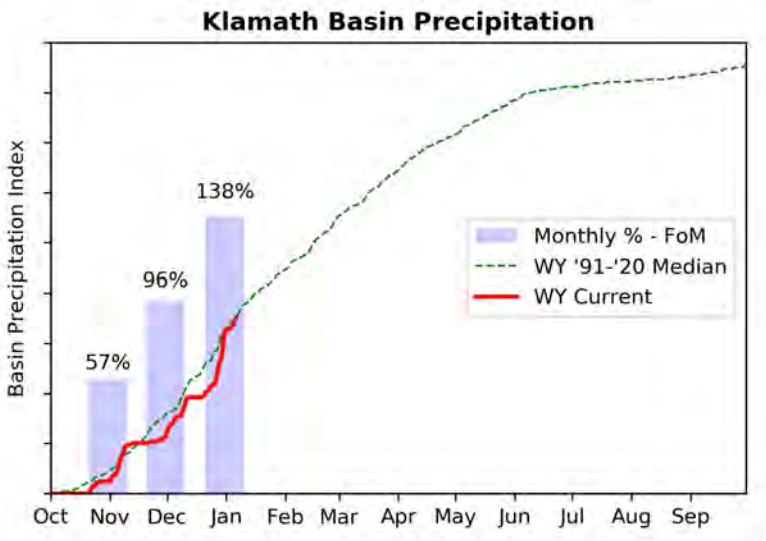
SNOWPACK



► *View snowpack for individual sites by accessing the basin data report* **here**.

As of January 1, the basin snowpack is 129% of median. This is lower than last month when the basin snowpack was 170% of median.

PRECIPITATION



► *View precipitation for individual sites by accessing the basin data report* **here**.

FoM = First of Month

December precipitation is above normal at 138% of median. Precipitation since the beginning of the water year (October 1 - January 1) has been 100% of median.

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Klamath
Streamflow Forecasts - January 1, 2023

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Klamath	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Sprague R nr Chiloquin								
	JAN-SEP	200	295	370	142%	450	585	260
	MAR-SEP	140	215	280	130%	350	465	215
Upper Klamath Lake Inflow[12]								
	JAN-SEP	505	765	900	119%	1050	1410	755
	MAR-SEP	305	505	615	118%	735	1030	520
Gerber Reservoir Inflow[2]								
	JAN-JUN	35	50	60	182%	71	86	33
Clear Lake Inflow[2]								
Williamson R bl Sprague R nr Chiloquin								
	JAN-SEP	355	480	570	121%	655	780	470
	MAR-SEP	250	360	435	121%	510	620	360

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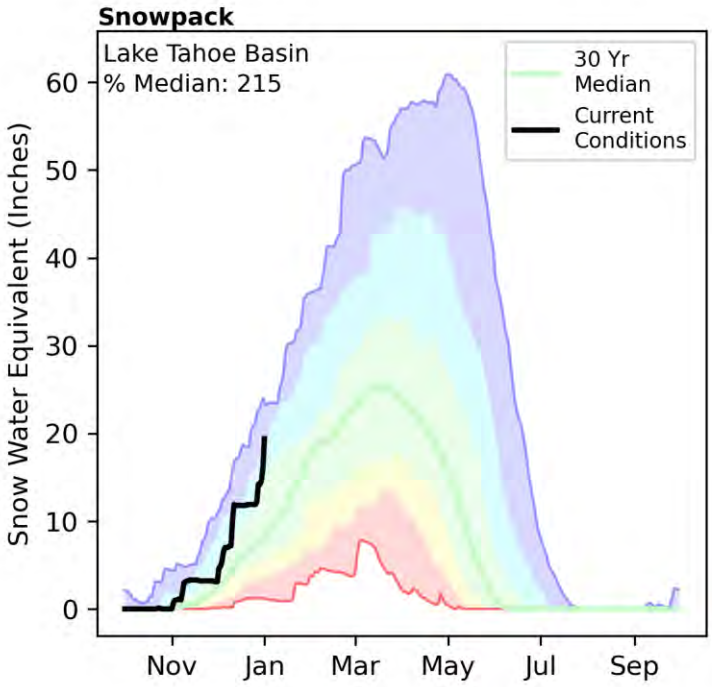
Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Upper Klamath Lake	260.5	249.2	259.7	523.7

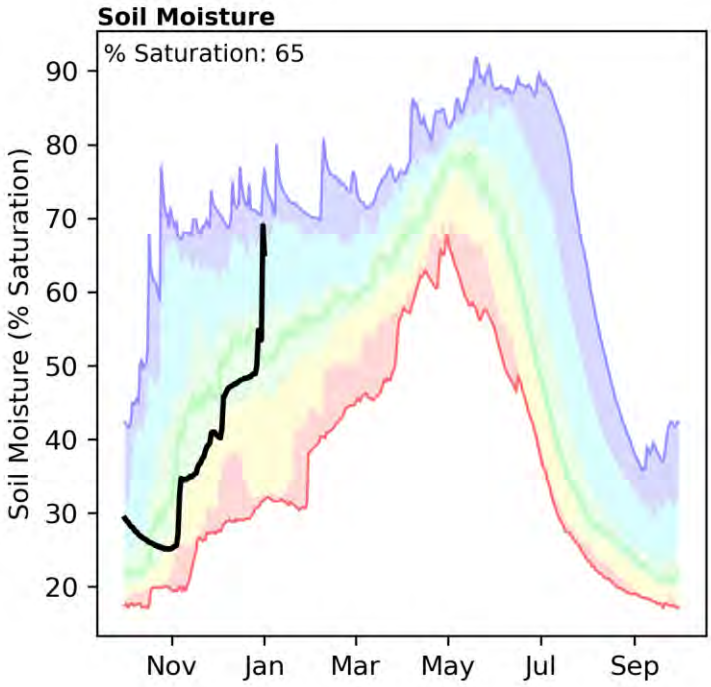
Basin Index	
# of reservoirs	

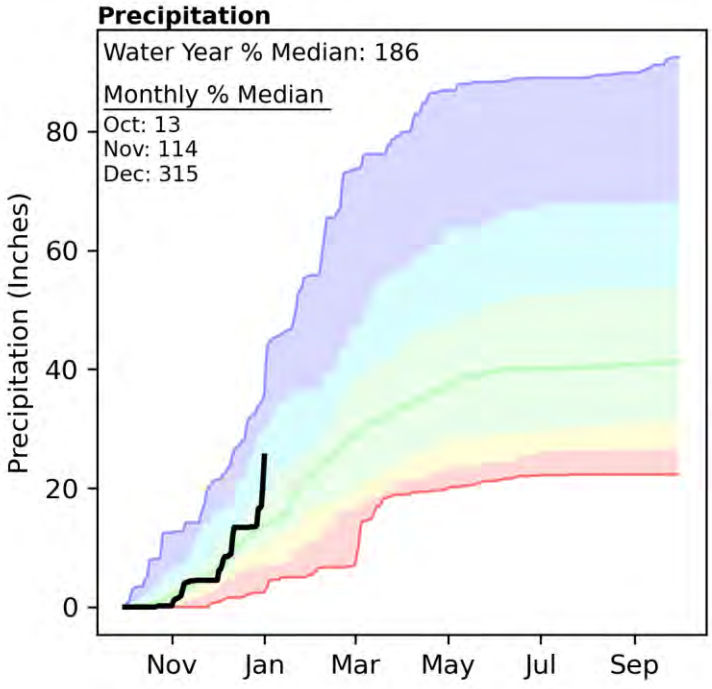
Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Klamath	24	126%	119%

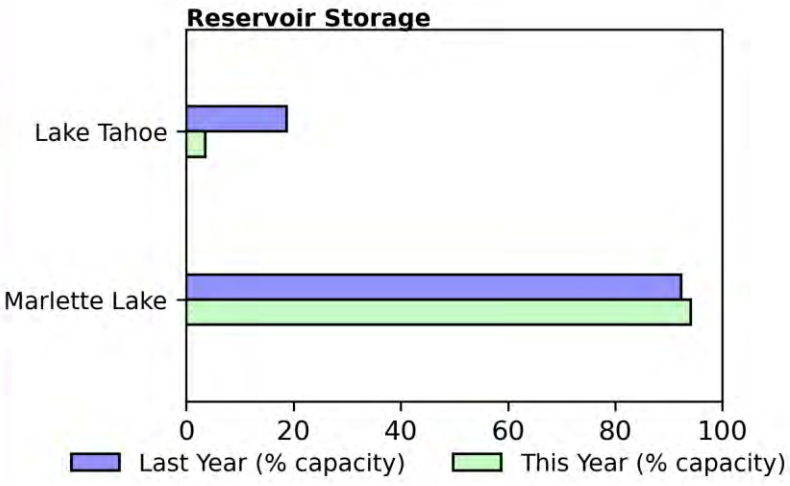
Lake Tahoe Basin | January 1, 2023

Snowpack in the Lake Tahoe Basin is well above normal at 215% of median, compared to 214% at this time last year. Precipitation in December was well above normal at 315%, which brings the seasonal accumulation (October-December) to 186% of median. Soil moisture is at 65% saturation compared to 61% saturation last year. Reservoir storage is 5% of capacity, compared to 20% last year.









Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: 30 year normal calculation description

This page was developed by NRCS NV.

Important Information about Forecast Coordination: Hydrologists with the NRCS and National Weather Service California Nevada River Forecast Center (CNRFC) coordinate Lake Tahoe Rise, Truckee River at Farad, Little Truckee River near Boca, and the Carson River at Ft. Churchill forecasts (following page) using output of their respective hydrology models at the request of the Bureau of Reclamation. The NRCS model is a statistical model based on the current data as of the first of each month. The CNRFC ensemble forecasting system incorporates near-term weather prediction and climatology into their model. These models can provide different answers because of the nature of the model systems, and from the inclusion of future weather in the CNRFC model. The hydrologists agree on forecast values using guidance from both models to best provide an accurate water supply forecast for these points.

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Tahoe

Streamflow Forecasts - January 1, 2023

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Tahoe	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Lake Tahoe Net Inflow								
	MAR-JUL	197	305	375	270%	450	555	139
	APR-JUL	158	245	300	297%	360	445	101
Lake Tahoe Rise Gates Closed[1]								
	OCT-HIGH	1.166	2.9	3.7	233%	4.5	6.2	1.59
	MAR-HIGH	0.683	1.795	2.3	164%	2.8	3.9	1.4
	APR-HIGH	0.7	1.47	2.1	181%	2.6	3.3	1.16

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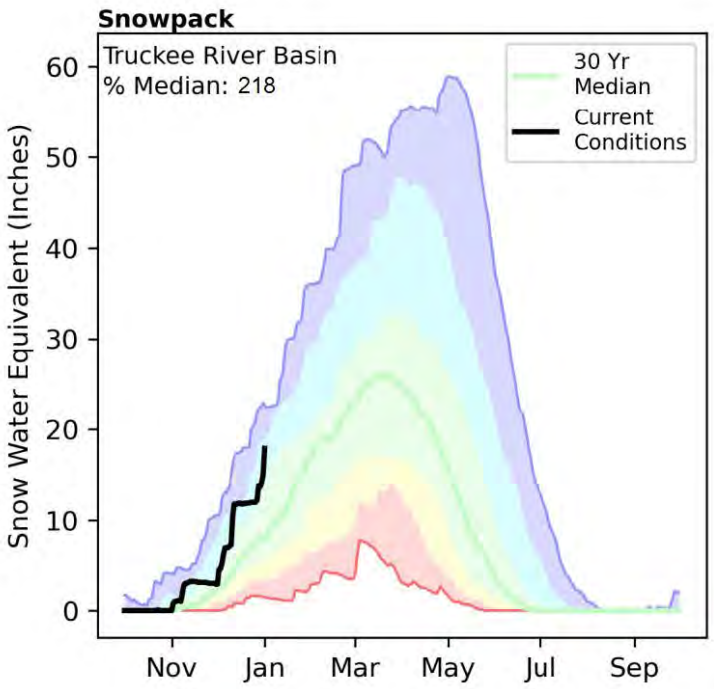
Reservoir Storage **End of December, 2022**	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Tahoe	26.7	139.6	164.0	744.5

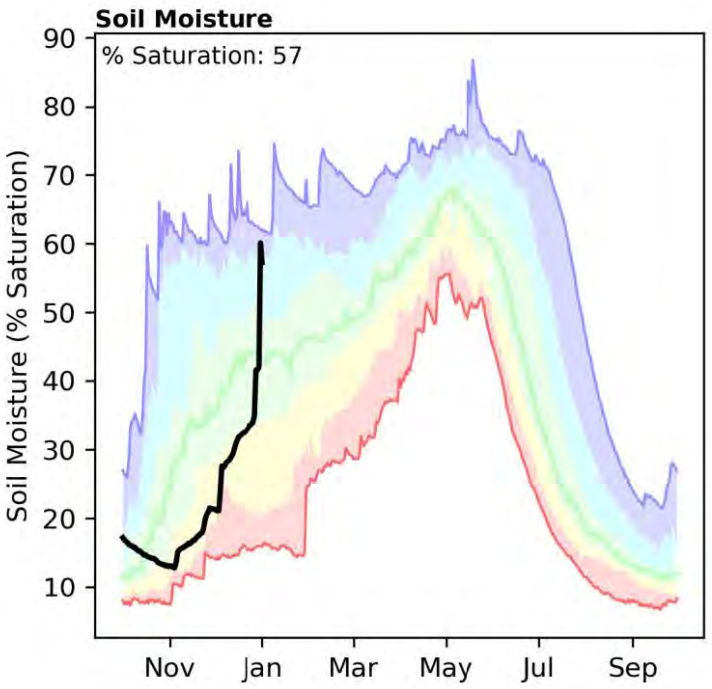
Basin Index # of reservoirs

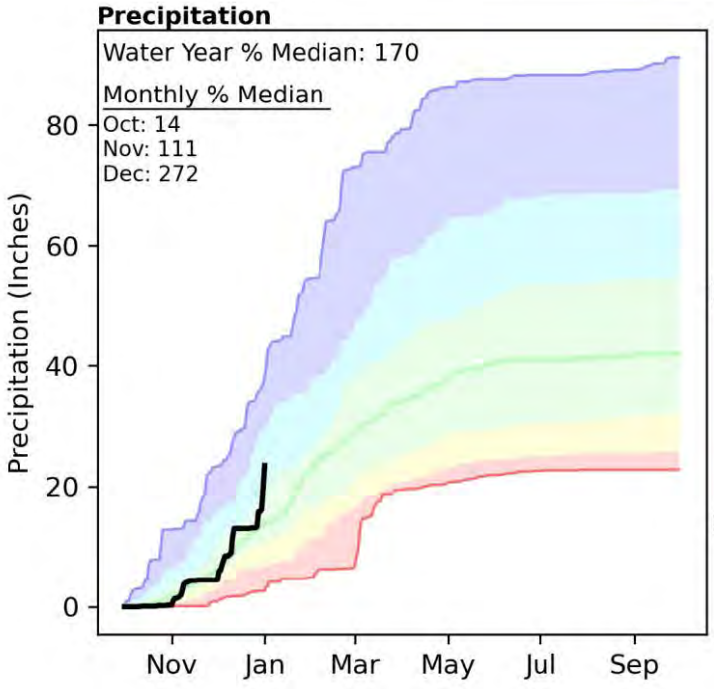
Watershed Snowpack Analysis **January 1, 2023**	# of Sites	% Median	Last Year % Median
Tahoe	14	215%	214%

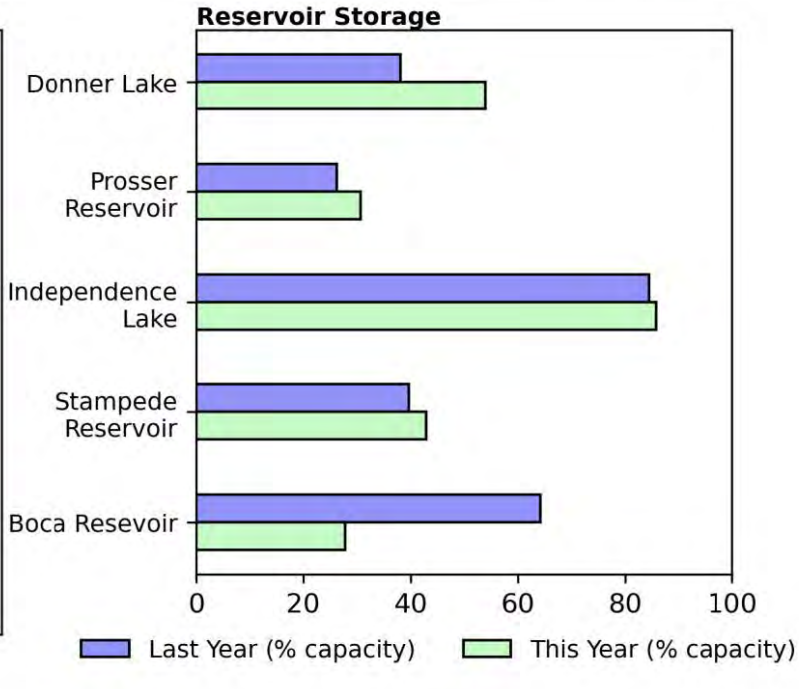
Truckee River Basin | January 1, 2023

Snowpack in the Truckee River Basin is well above normal at 218% of median, compared to 238% at this time last year. Precipitation in December was well above normal at 272%, which brings the seasonal accumulation (October-December) to 170% of median. Soil moisture is at 57% saturation compared to 58% saturation last year. Reservoir storage is 42% of capacity, compared to 44% last year.









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Truckee
Streamflow Forecasts - January 1, 2023

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Truckee	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
L Truckee R ab Boca Reservoir[2]								
	MAR-JUL	87	134	167	194%	200	245	86
	APR-JUL	75	112	140	194%	175	230	72
Independence Lk Inflow[2]								
	MAR-JUL	10	14.4	17.3	152%	20	25	11.4
	APR-JUL	8.9	12.9	15.7	150%	18.5	23	10.5
Donner Lake Inflow[2]								
	MAR-JUL	15.7	21	25	130%	29	34	19.2
	APR-JUL	12.3	16.9	20	133%	23	28	15
Truckee R ab Farad Sidewater[2]								
	MAR-JUL	70	118	151	142%	184	230	106
	APR-JUL	57	100	130	144%	160	205	90
Boca Res Local Inflow[2]								
	MAR-JUL	6	11.2	14.7	334%	18.2	23	4.4
	APR-JUL	3	6.5	8.9	586%	11.3	14.8	1.52
Stampede Res Local Inflow[2]								
	MAR-JUL	58	91	114	165%	137	170	69
	APR-JUL	44	76	97	164%	118	150	59
Martis Ck Res Inflow[2]								
	MAR-JUL	7.1	12.6	16.3	183%	20	25	8.9
	APR-JUL	4.6	9.1	12.1	212%	15.1	19.6	5.7
Sagehen Ck nr Truckee								
	MAR-JUL	2.8	6	8.2	171%	10.4	13.6	4.8
	APR-JUL	2.3	5.3	7.3	178%	9.3	12.3	4.1
Prosser Ck Res Inflow[2]								
	MAR-JUL	34	51	63	150%	75	92	42
	APR-JUL	27	44	55	157%	66	83	35
Truckee R at Farad[2]								
	MAR-JUL	245	340	405	153%	470	565	265
	APR-JUL	250	285	395	176%	510	630	225

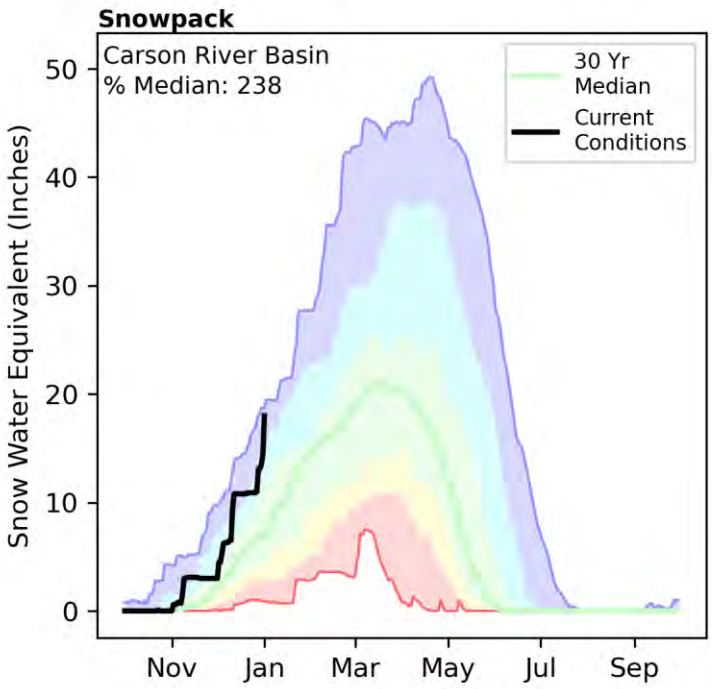
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

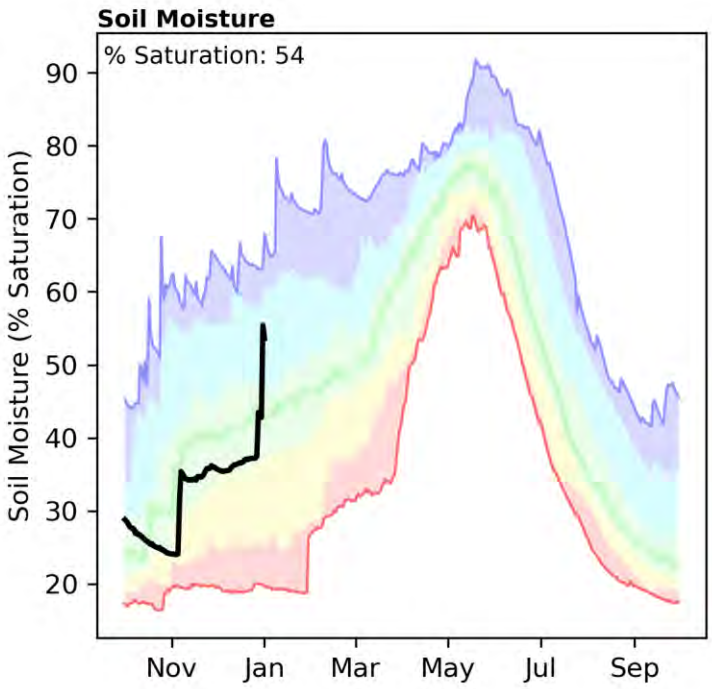
Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Independence Lake	14.8	14.6	14.0	17.3
Martis Reservoir		0.9	0.8	35.8
Stampede Reservoir	97.0	89.8	150.2	226.5
Donner Lake	5.1	3.6	3.4	9.5
Boca Reservoir	11.3	26.2	9.2	40.9
Prosser Reservoir	9.1	7.8	9.7	29.8

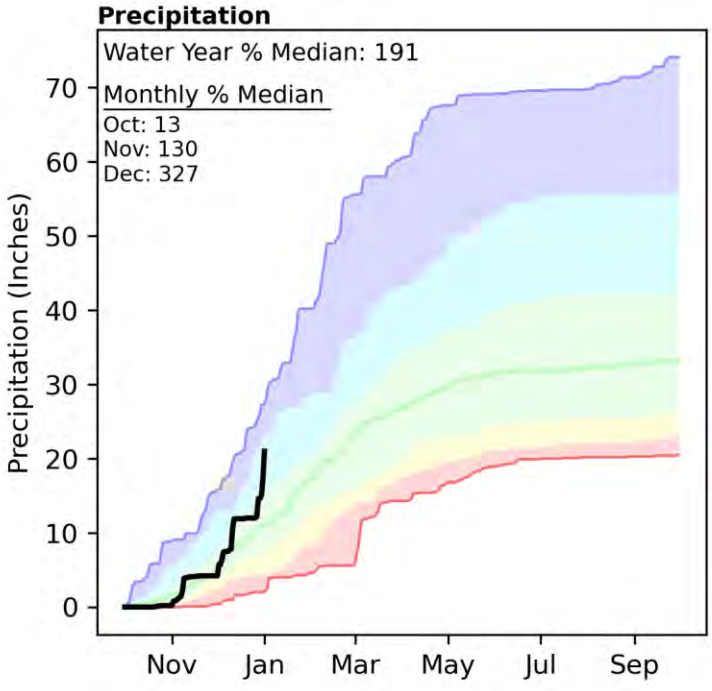
Basin Index # of reservoirs			
Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Truckee	11	223%	238%

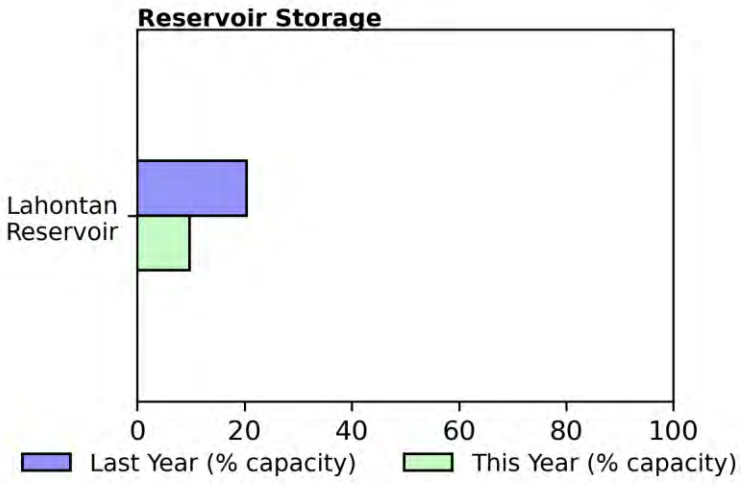
Carson River Basin | January 1, 2023

Snowpack in the Carson River Basin is well above normal at 238% of median, compared to 200% at this time last year. Precipitation in December was well above normal at 327%, which brings the seasonal accumulation (October-December) to 191% of median. Soil moisture is at 54% saturation compared to 56% saturation last year. Reservoir storage is 10% of capacity, compared to 20% last year.









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Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: 30 year normal calculation description

Important Information about Forecast Coordination: Hydrologists with the NRCS and National Weather Service California Nevada River Forecast Center (CNRFC) coordinate Lake Tahoe Rise, Truckee River at Farad, Little Truckee River near Boca, and the Carson River at Ft. Churchill forecasts (following page) using output of their respective hydrology models at the request of the Bureau of Reclamation. The NRCS model is a statistical model based on the current data as of the first of each month. The CNRFC ensemble forecasting system incorporates near-term weather prediction and climatology into their model. These models can provide different answers because of the nature of the model systems, and from the inclusion of future weather in the CNRFC model. The hydrologists agree on forecast values using guidance from both models to best provide an accurate water supply forecast for these points.

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Carson
Streamflow Forecasts - January 1, 2023

Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

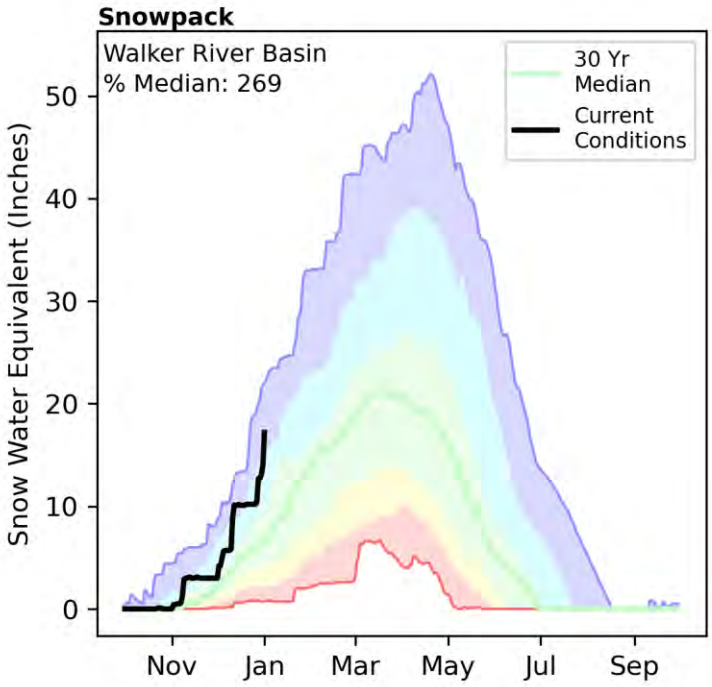
Carson	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
EF Carson R nr Gardnerville								
	MAR-JUL	171	250	305	166%	360	440	184
	APR-JUL	155	230	275	168%	325	400	164
	200 cfs	11 Jul	31 Jul	13 Aug		26 Aug	15 Sep	14 Jul
	500 cfs	13 Jun	05 Jul	19 Jul		02 Aug	24 Aug	20 Jun
WF Carson R nr Woodfords								
	MAR-JUL	48	71	87	174%	103	126	50
	APR-JUL	43	65	80	178%	95	117	45

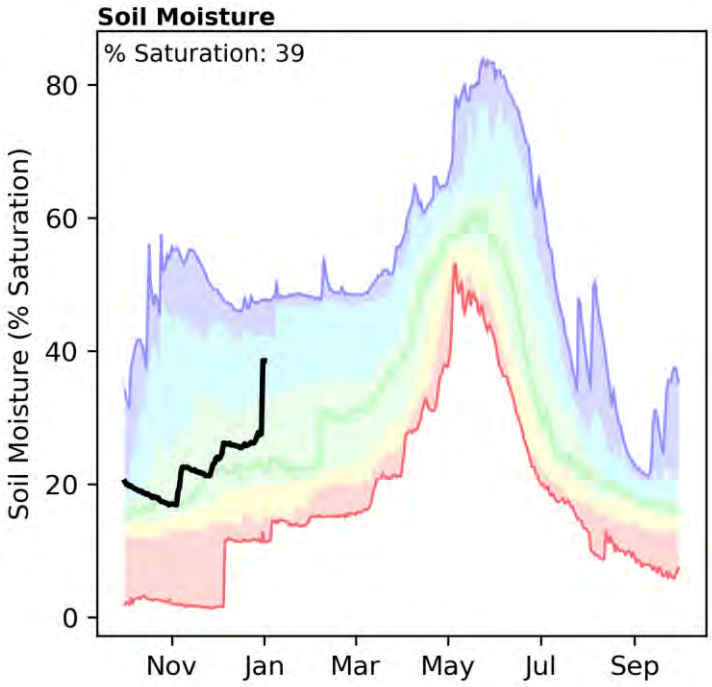
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

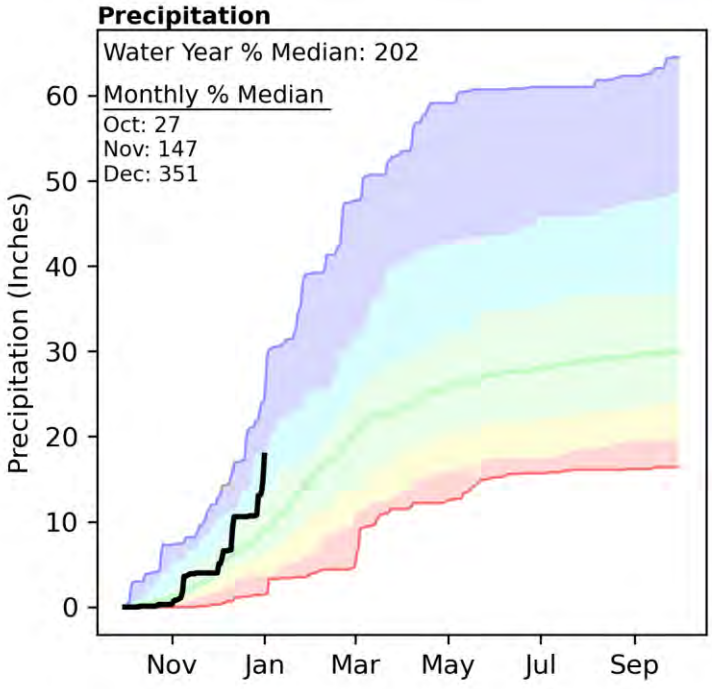
Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Carson	13	238%	200%

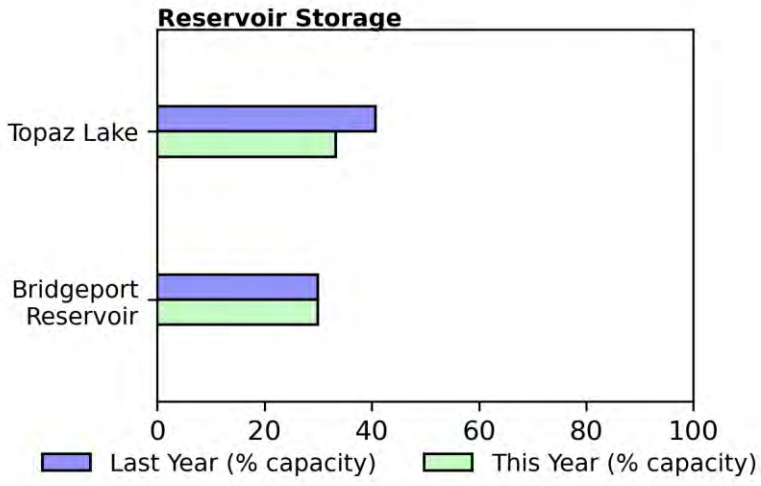
Walker River Basin | January 1, 2023

Snowpack in the Walker River Basin is well above normal at 269% of median, compared to 228% at this time last year. Precipitation in December was well above normal at 351%, which brings the seasonal accumulation (October-December) to 202% of median. Soil moisture is at 39% saturation compared to 48% saturation last year. Reservoir storage is 32% of capacity, compared to 36% last year.









Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: 30 year normal calculation description

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Walker

Streamflow Forecasts - January 1, 2023

Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Walker	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
E Walker R nr Bridgeport[2]								
	MAR-AUG	40	82	110	216%	138	180	51
	APR-AUG	34	73	99	225%	125	164	44
W Walker R nr Coleville								
	MAR-JUL	136	196	235	153%	280	340	154
	APR-JUL	128	186	225	153%	265	320	147
W Walker R bl L Walker R nr Coleville								
	MAR-JUL	137	198	240	151%	280	345	159
	APR-JUL	129	188	230	150%	270	330	153

1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Bridgeport Reservoir	12.7	12.7	12.6	42.5

Basin Index
# of reservoirs

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Walker	7	269%	228%

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Surprise Valley-Warners - January 1, 2023

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Surprise Valley-Warners	2	176%	140%

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Colorado
Streamflow Forecasts - January 1, 2023

Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Colorado	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Lake Powell Inflow[2]								
	APR-JUL	3620	5420	6860	112%	8460	11100	6130

1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of December, 2022	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Powell	5530.5	6713.1	13921.0	24322.0

Basin Index
# of reservoirs

Watershed Snowpack Analysis January 1, 2023	# of Sites	% Median	Last Year % Median
Colorado	167	126%	136%

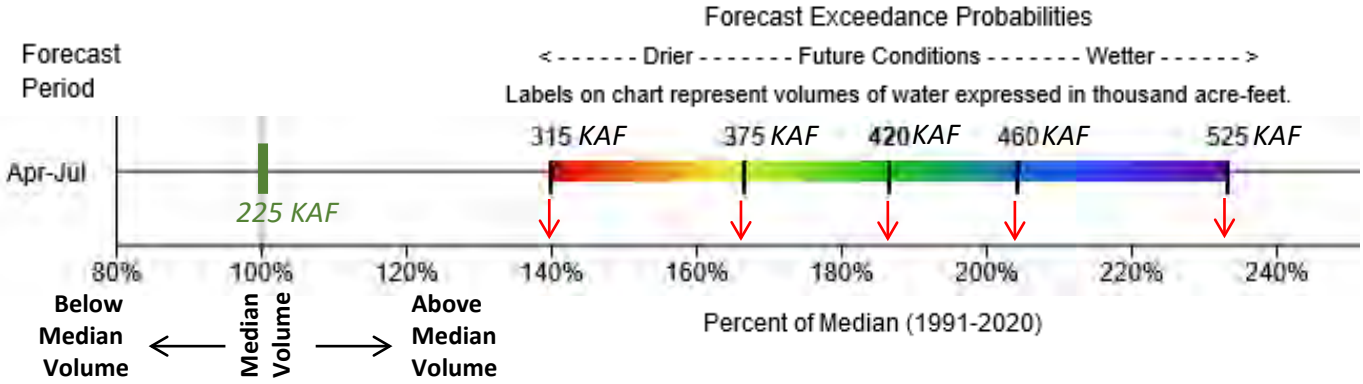
Appendix: Interpreting the Streamflow Forecast Chart

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
APR-JUL	315	375	420	187%	460	525	225

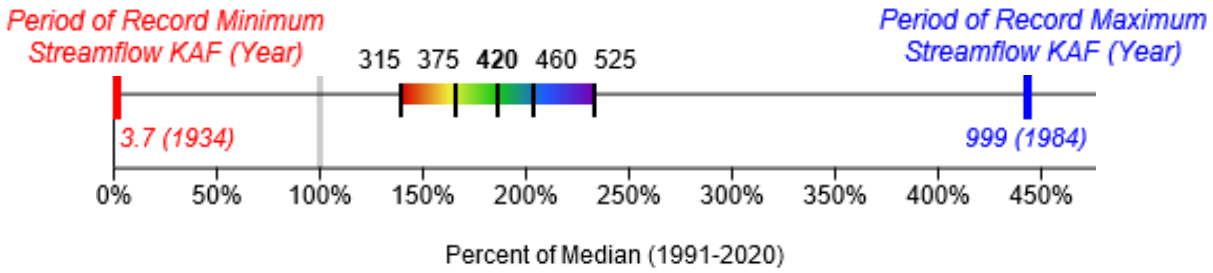
The Forecast Chart (below) provides an alternative to the tables (above) used in the basin summaries. The chart displays the forecast exceedance range as a colored bar. The vertical lines on the bar signify the five forecast exceedances.

The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of median can be estimated by looking at the horizontal axis. The green line and number centered above 100% on the horizontal axis represents the 1981-2010 historical median streamflow for the forecast period in KAF.



In the example above, the entire forecast bar is shifted right of the green bar indicating a forecast for above the median Apr-Jul streamflow of 225KAF. The 50% exceedance is represented by the black line in the green portion of the colored bar. This represents a forecast volume of 420KAF which is ~185% of median. If drier than normal future conditions occur the 70% exceedance forecast may be more likely (375KAF or ~165% of median). If future conditions turn wetter than normal, the 30% exceedance forecast may be more likely (460KAF or ~205% of median). Water users are encouraged to consider the range of forecast exceedances instead of relying solely only on the 50% forecast.

In very wet or dry years forecasts may approach historical records. In these cases the period of record minimum or maximum may be displayed. The minimum is represented by a heavy red line, while the maximum is represented by a heavy blue line. The numbers below the red and blue lines represent the volume in KAF and the year it occurred in parentheses.

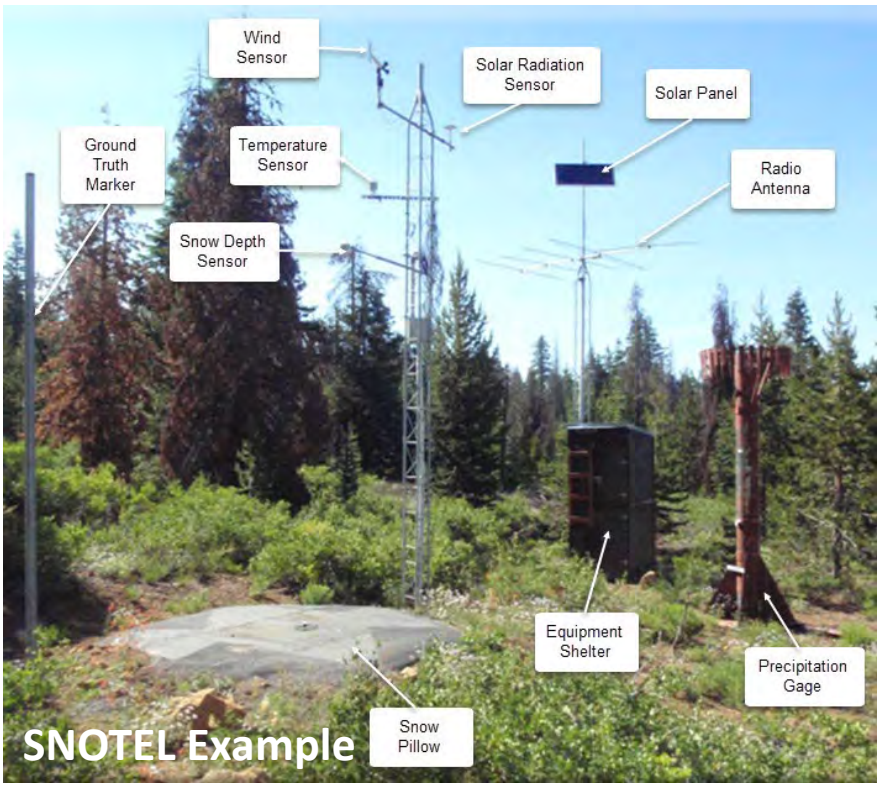


Click here for an online version which allows users to see averages instead of medians, as well as historic forecasts.

Appendix - SNOTEL and Snow Course Overview

SNOTEL

The NRCS operates an extensive, automated data collection network called SNOTEL (short for Snow Telemetry). SNOTEL sites are designed to operate unattended in remote mountain locations. Data are collected and transmitted hourly and available on the internet. Daily data (midnight values) are quality checked by NRCS hydrologists on at least a weekly basis. SNOTEL sites provide snowpack water content data via a pressure-sensing snow pillow. Other data include snow depth, water year precipitation accumulation, air temperature with daily maximums, minimums, and averages, soil moisture and soil temperature at depths of 2, 8 and 20 inches. The earliest NRCS SNOTEL sites have data back to 1981 or a bit earlier.



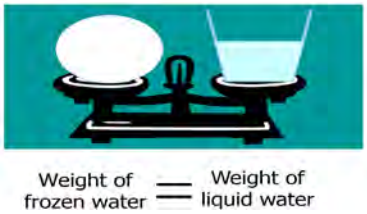
Snow Course

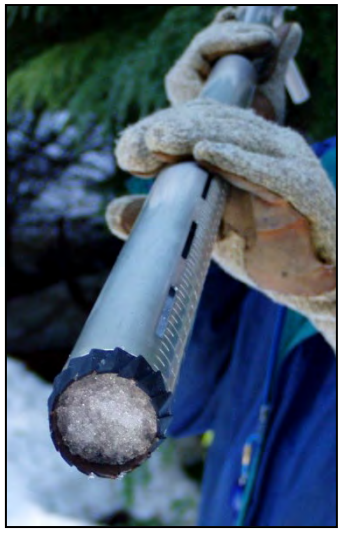
Snow courses are measurement transects where snow tubes are used by snow surveyors during the winter season to determine the depth and water content of the snowpack. Hollow snow tubes are used to vertically core the snowpack. The tubes are then weighed to determine the water content of the snow. Generally, snow courses are situated in meadows or forest openings protected from the wind. A snow course measurement is the average of a number of sample points, typically 5 to 10. Snow courses are measured on a monthly basis typically between February 1 and April 1. Snow courses provide a longer record than SNOTEL. The earliest snow courses in the Lake Tahoe and Truckee basins have data back to 1910.

Snow Water Equivalent (SWE):

Sometimes also called snow water content, this is the amount of water contained within the snowpack. It can be thought of as the depth of water (in inches) that would result if you melted the snowpack. For example, if the snowpack was contained 12 inches of SWE, then when melted there would a puddle of water 12 inches deep on the ground.

SWE measurements made by snow pillows or snow tubes rely on the fact that water weighs the same whether it is liquid or frozen.





Snow core inside snow tubes

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California Water Supply Outlook