

California Water Supply Outlook Report

March 2023



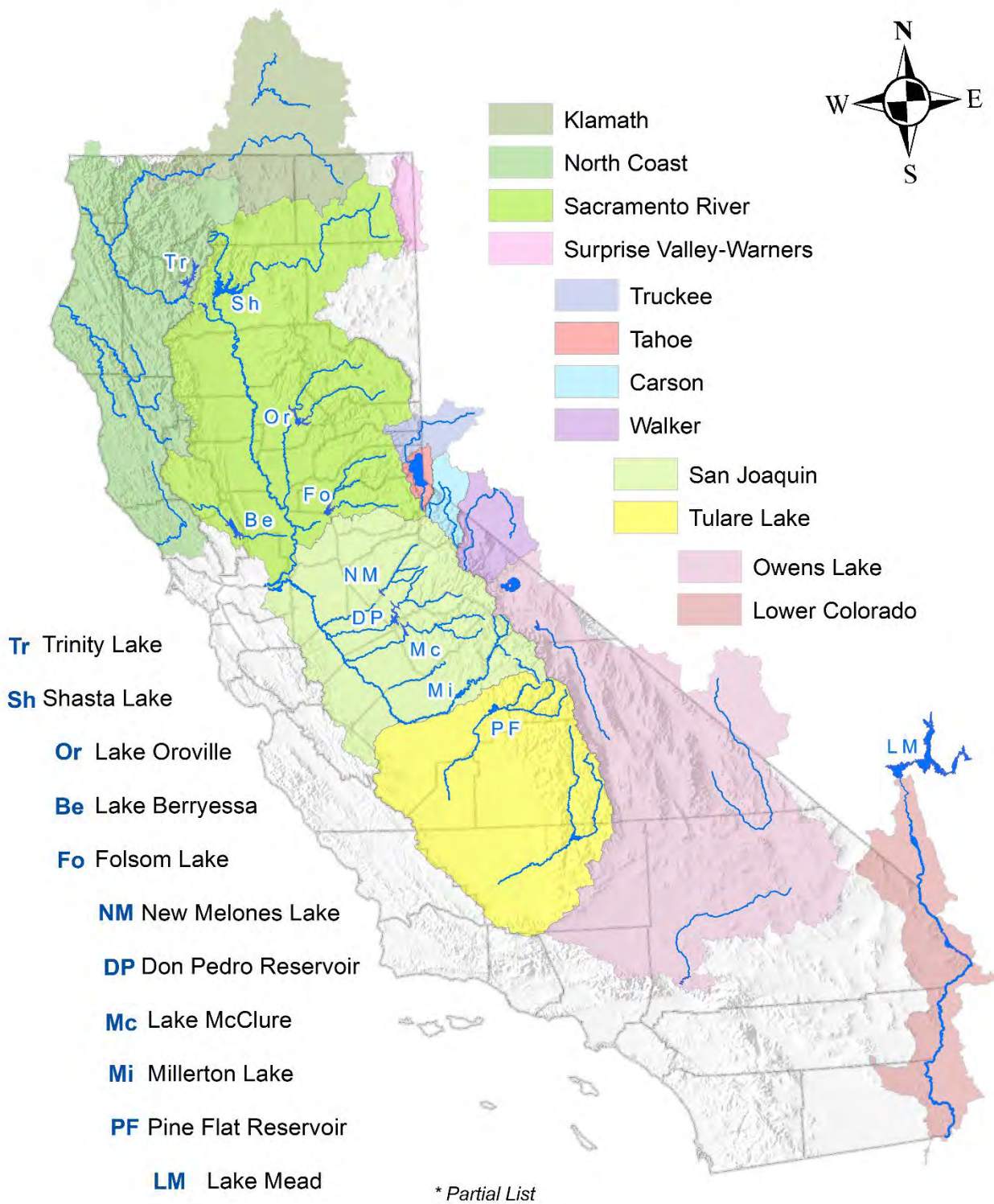
The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers. If you believe you experienced discrimination when obtaining services from USDA, participating in a USDA program, or participating in a program that receives financial assistance from USDA, you may file a complaint with USDA. Information about how to file a discrimination complaint is available from the Office of the Assistant Secretary for Civil Rights. USDA prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) To file a complaint of discrimination, complete, sign, and mail a program discrimination complaint form, available at any USDA office location or online at www.ascr.usda.gov, or write to: USDA Office of the Assistant Secretary for Civil Rights 1400 Independence Avenue, SW, Washington, DC 20250-9410 Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of lender. Persons with disabilities who require alternative means for communication of program information (e.g., Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

Contents

California Forecast Basins, Major Rivers, and Large Reservoirs (Map).....	3
State of California General Outlook	4
Streamflow Forecasts:	
Sacramento River Basin	5
San Joaquin River Basin	6
Tulare Lake Basin	7
North Coastal Area Basin	8
Klamath Basin	9
Lake Tahoe Basin	11
Truckee River Basin	13
Carson River Basin	15
Walker River Basin	17
Surprise Valley-Warner Mtns	19
Lower Colorado River Basin	20
How Forecasts are Made	21

Cover: NRCS CA Feb Snow Survey Crew: Valerie Bullard, Evan Smith, & Jeff Anderson (NV). Feb 22, 2023 Snow Course Site Conditions: Palisades #2 (top and bottom left); Mt. Rubicon #1 (middle); and Richardson #2 (right). For more information, visit the NRCS National Water and Climate Center's [Manual Snow Survey webpage](#) and the [California Cooperative Snow Survey website](#)

California Forecast Basins, Major Rivers, and Large Reservoirs*



STATE OF CALIFORNIA GENERAL OUTLOOK

March 2023

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

Snowpack between January 31st and the end of February decreased from 170- to 147 percent of normal for the dates in the northern Sierras; from 209- to 191 percent in the central Sierras; and from 255- to 224 percent in the southern Sierras. More information is available online at <http://cdec.water.ca.gov/snow/current/snow/index2.html>.

PRECIPITATION

In February, the Northern Sierra-, San Joaquin-, and Tulare Basin Index stations received 67-, 126-, and 169 percent of average. As of March 17th, the basins have received between 136- and 211 percent of normal rainfall. February's drier weather patterns dropped seasonal rainfall percentages, which have recovered with the early March rains. More information is available online at http://cdec.water.ca.gov/snow_rain.html

RESERVOIRS

Total intrastate reservoir storage on February 28, 2023 was 96 percent of average, compared to 98 percent of average at the end of January. Storage at Lake Mead was 45 percent of average, the same as at the end of January. As of March 17th, storage at Shasta Reservoir was 94 percent of average (71 percent of capacity), up from 87 percent of average at the end of January. Oroville Reservoir was 125 percent of average (83 percent of capacity), up from 112 percent of average at the end of January. Don Pedro Reservoir was 118 percent of average (88 percent of capacity), up from 105 percent at the end of January. More information is available online at <https://cdec.water.ca.gov/reservoir.html>.

STREAMFLOW

Forecasts in the Sacramento, San Joaquin, and Tulare basins range between 64- and 190 percent of the 1991-2020 medians between April and July. NRCS forecasts in the Tahoe, Truckee, Carson, and Walker River basins are all above 150% of the 1999-2020 median. NRCS forecasts for stations in the Klamath Basin and North Coast are also at or above the median. Summaries are provided below.

Sacramento River Streamflow Forecasts - March 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	1080		1570	92%		2590	1710
MF American R nr Auburn (NWS)	APR-JUL	520		685	151%		985	453
Inflow to Shasta Lk (DWR)	OCT-SEP	4190		5310	94%		7840	5643
	APR-JUL	1200		1740	98%		2960	1767
Silver Ck bl Camino Div. Dam (DWR)	APR-JUL			210	134%			157
McCloud R ab Shasta (DWR)	APR-JUL			400	102%			393
Sacramento R nr Red Bluff (NWS)	APR-JUL	1520		2200	91%		3760	2410
NF Feather R at Pulga (DWR)	APR-JUL			980	116%			842
Inflow Jackson Mdws & Bowman Res (DWR)	APR-JUL			120	117%			103
Feather R at Lk Almanor (DWR)	APR-JUL			280	116%			241
Inflow to Folsom Res (DWR)	OCT-SEP	3040		3920	146%		5540	2689
	APR-JUL	1120		1710	137%		2800	1247
Pit R at Shasta Lk (NWS)	APR-JUL	495		680	64%		1100	1070
Pit R at Shasta Lk (DWR)	APR-JUL			900	91%			992
Inflow to Oroville Res (NWS)	APR-JUL	1230		1880	125%		3360	1510
Inflow to Folsom Res (NWS)	APR-JUL	1250		1690	143%		2540	1180
Yuba R at Smartville (DWR)	OCT-SEP	2220		2880	127%		4230	2273
	APR-JUL	820		1250	126%		2150	993
N Yuba R bl Goodyears Bar (DWR)	APR-JUL			350	129%			271
Yuba R at Smartville (NWS)	APR-JUL	815		1160	124%		1970	934
Inflow to Union Valley Res (NWS)	APR-JUL	106		138	144%		192	95.9
N Yuba R bl Goodyears Bar (NWS)	APR-JUL	245		355	132%		550	268
Sacramento R at Shasta (NWS)	APR-JUL	240		375	128%		610	292
Sacramento R nr Red Bluff (DWR)	OCT-SEP	6270		8140	97%		12200	8351
	APR-JUL	1500		2350	95%		4200	2474
S Yuba R nr Langs Crossing (DWR)	APR-JUL			290	122%			237
Cosumnes R at Michigan Bar (NWS)	APR-JUL	112		171	144%		335	119
McCloud R ab Shasta (NWS)	APR-JUL	255		365	99%		530	370
NF American R at N FK Dam (DWR)	APR-JUL			330	138%			240
Sacramento R at Shasta (DWR)	APR-JUL			360	117%			309
NF Feather R nr Prattville (NWS)	APR-JUL	225		315	113%		430	280
Inflow to Oroville Res (DWR)	OCT-SEP	3860		5100	117%		8240	4341
	APR-JUL	1230		1960	115%		4120	1710

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 March 1, 2023	# of Sites	% Median	Last Year % Median
Sacramento River	76	176%	110%

SanJoaquin Streamflow Forecasts - March 1, 2023

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

SanJoaquin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
MF Stanislaus R bl Beardsley (DWR)	APR-JUL			475	160%			297
Tuolumne R nr Hetch Hetchy (NWS)	APR-JUL	760		905	152%		1120	596
Big Ck bl Huntington Lk (DWR)	APR-JUL			175	180%			97
Inflow to New Melones Res (NWS)	APR-JUL	790		1040	157%		1490	661
Inflow to Millerton Lk (NWS)	APR-JUL	1730		2220	182%		2710	1220
Inflow to New Don Pedro Res (NWS)	APR-JUL	1560		2030	171%		2620	1190
Inflow to Millerton Lk (DWR)	OCT-SEP	2580		3260	184%		4340	1775
	APR-JUL	1560		2090	170%		2930	1229
Cherry & Eleanor CKs, Hetch Hetchy (DWR)	APR-JUL			500	158%			317
Inflow to New Don Pedro Res (DWR)	OCT-SEP	2680		3260	167%		4470	1954
	APR-JUL	1500		1900	155%		2820	1222
Merced R at Pohono Bridge Yosemite (DWR)	APR-JUL			590	160%			369
Cosumnes R at Michigan Bar (DWR)	OCT-SEP	725		875	224%		1480	390
	APR-JUL	115		185	139%		465	133
SF San Joaquin R nr Florence Lk (DWR)	APR-JUL			330	176%			188
Inflow to New Melones Res (DWR)	OCT-SEP	1560		1960	166%		2790	1181
	APR-JUL	800		1100	157%		1720	699
Inflow to Pardee Res (DWR)	OCT-SEP	960		1240	162%		1700	764
	APR-JUL	490		700	149%		1040	469
Merced R at Pohono Bridge Yosemite (NWS)	APR-JUL	560		665	176%		835	377
Inflow to Lake McClure (NWS)	APR-JUL	815		1020	170%		1360	601
Inflow to Pardee Res (NWS)	APR-JUL	520		690	158%		970	436
Tuolumne R nr Hetch Hetchy (DWR)	APR-JUL			940	160%			587

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 March 1, 2023	# of Sites	% Median	Last Year % Median
SanJoaquin	80	208%	99%

Tulare Lake Streamflow Forecasts - March 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)	OCT-SEP	575		745	175%		1040	426
	APR-JUL	320		450	163%		675	276
Kaweah R at Terminus Res (NWS)	APR-JUL	410		520	188%		710	277
	APR-JUL	1900		2220	185%		2660	1200
Inflow to Pine Flat Res (DWR)	OCT-SEP	870		1140	170%		1730	672
	APR-JUL	585		800	187%		1260	427
Inflow to Pine Flat Res (DWR)	OCT-SEP	2350		2890	173%		4000	1671
	APR-JUL	1580		2020	168%		2920	1204
Tule R at Success Res (DWR)	OCT-SEP	180		250	189%		390	132
	APR-JUL	55		95	170%		175	56
Tule R at Success Res (NWS)	APR-JUL	71		107	182%		193	58.9
	APR-JUL	575		800	179%		1090	447
Kern R nr Kernville (DWR)	APR-JUL			720	190%			379

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 March 1, 2023	# of Sites	% Median	Last Year % Median
Tulare Lake	43	276%	106%

**North Coast
Streamflow Forecasts - March 1, 2023**

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

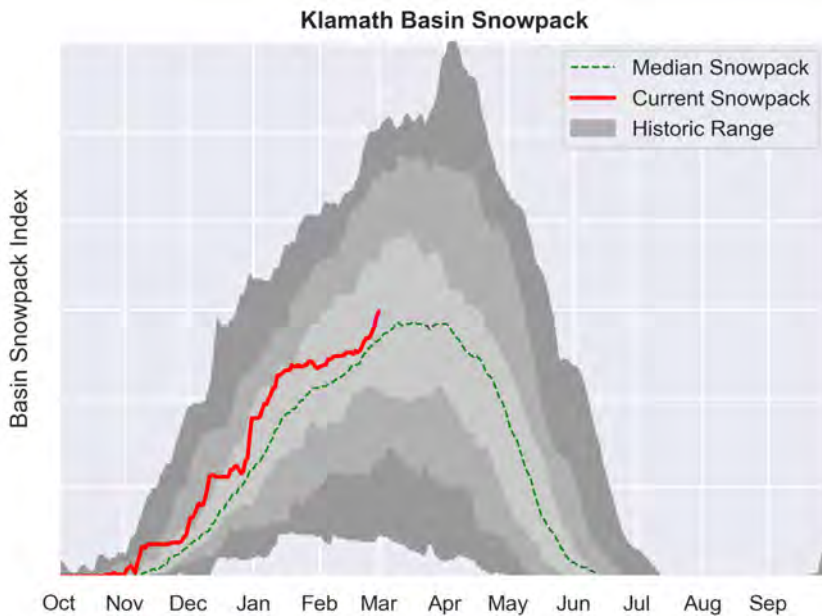
North Coast	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Trinity R at Lewiston (DWR)	APR-JUL	435		720	111%		1240	648
Inflow to Clair Engle Lk (NWS)	APR-JUL	495		700	122%		1100	574
Scott R nr Fort Jones (NWS)	APR-JUL	99		160	98%		255	164

- 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 March 1, 2023	# of Sites	% Median	Last Year % Median
North Coast	12	158%	58%

Klamath Basin Summary

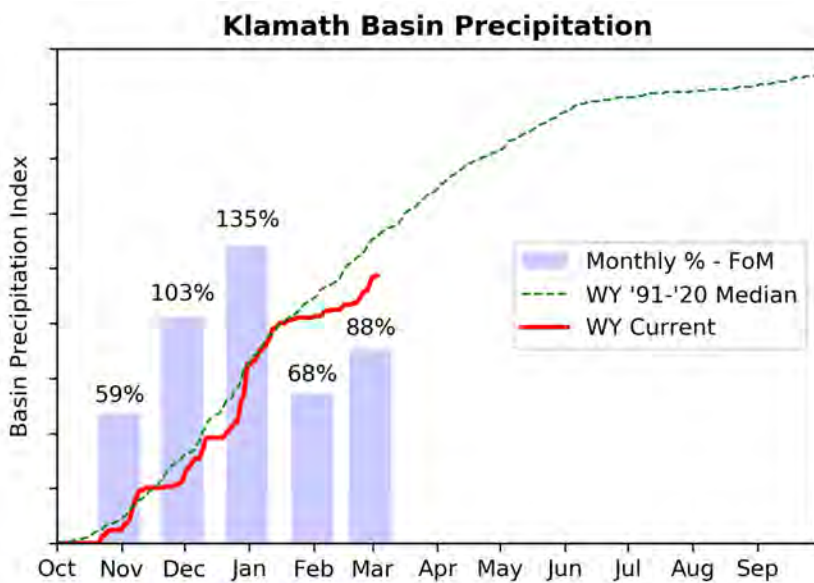
SNOWPACK



► View snowpack for individual sites by accessing the basin data report [here](#).

As of March 1, the basin snowpack is 109% of median, slightly higher than last month when the basin snowpack was 105% of median. Snow accumulation in the basin has already exceeded the normal peak, nearly 2 weeks before normal peak snow accumulation.

PRECIPITATION



► View precipitation for individual sites by accessing the basin data report [here](#).

FoM = First of Month

February precipitation is below normal at 88% of median. Precipitation since the beginning of the water year (October 1 - March 1) is 87% of median.

Provided by:
NRCS OR

Klamath Streamflow Forecasts - March 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	FEB-SEP	173	230	275	115%	325	405	240
	MAR-SEP	144	198	240	112%	285	360	215
Upper Klamath Lake Inflow ¹²	FEB-SEP	425	595	680	109%	770	990	625
	MAR-SEP	335	480	555	107%	635	830	520
Gerber Reservoir Inflow ²	FEB-JUN	23	34	41	158%	49	60	26
Clear Lake Inflow ²	FEB-JUN	-1.49	27	46	253%	65	93	18.2
Williamson R bl Sprague R nr Chiloquin	FEB-SEP	305	395	455	108%	515	600	420
	MAR-SEP	260	340	395	110%	450	530	360

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

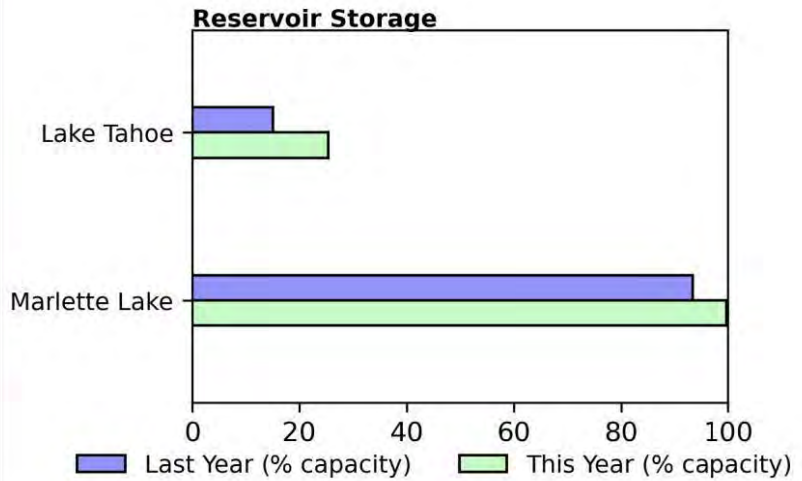
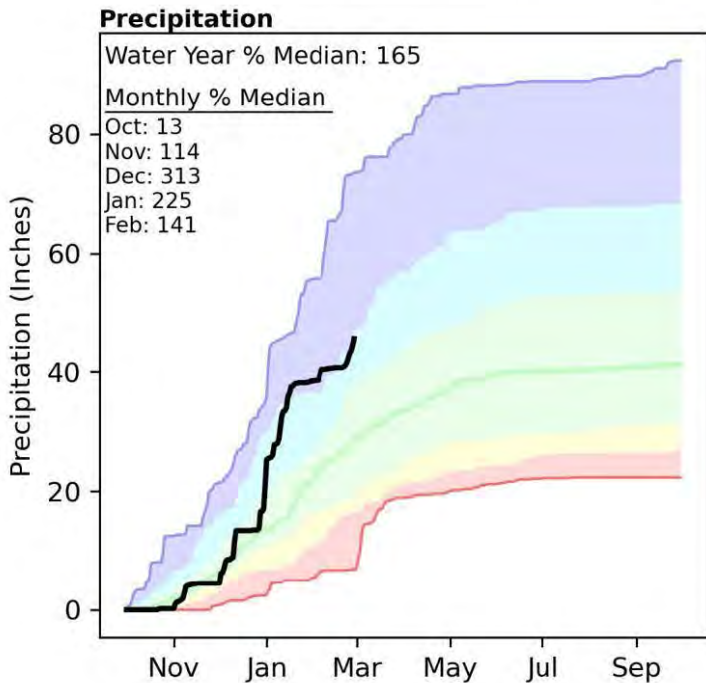
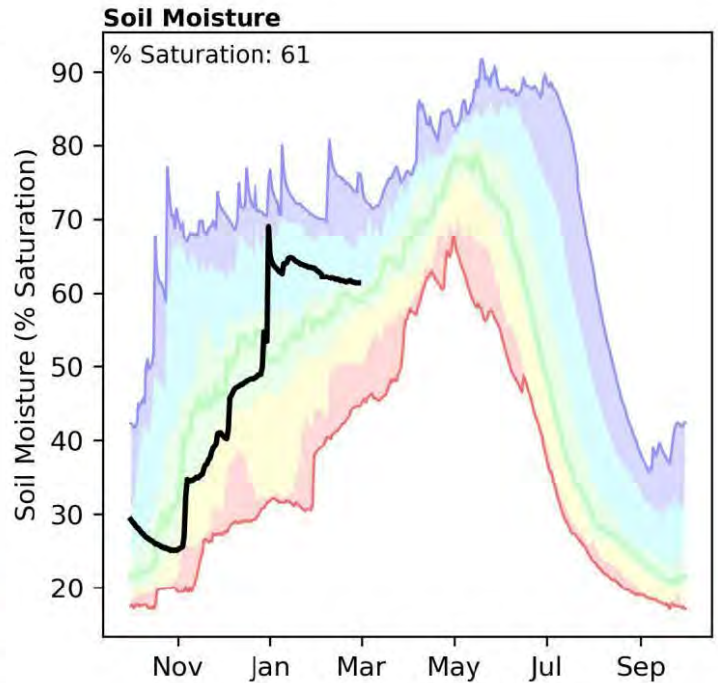
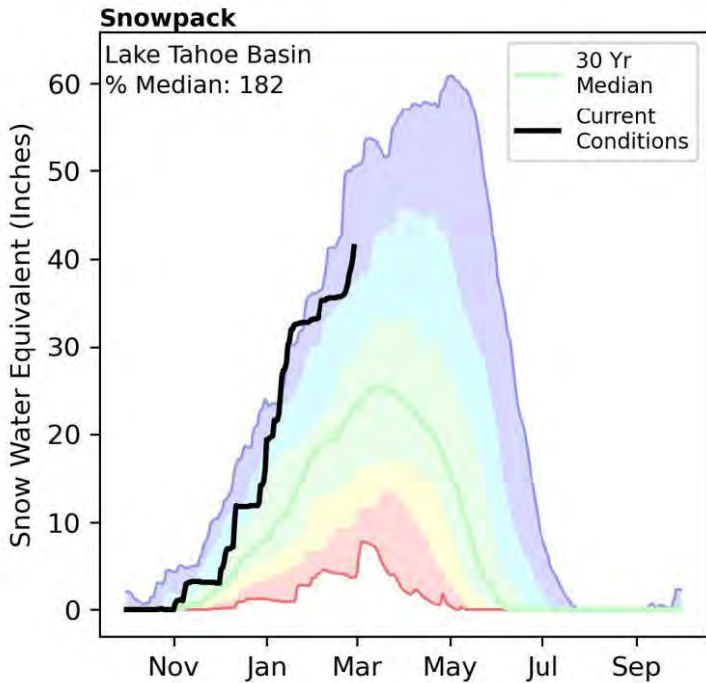
Reservoir Storage End of February, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Upper Klamath Lake	328.3	301.1	330.6	523.7

Basin Index
of reservoirs

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Klamath	31	104%	86%

Lake Tahoe Basin | March 1, 2023

Snowpack in the Lake Tahoe Basin is well above normal at 182% of median, compared to 82% at this time last year. Precipitation in February was well above normal at 141%, which brings the seasonal accumulation (October-February) to 165% of median. Soil moisture is at 61% saturation compared to 62% saturation last year. Reservoir storage is 27% of capacity, compared to 16% last year.



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

Provided 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.

Tahoe Streamflow Forecasts - March 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	290	370	425	306%	475	555	139
	APR-JUL	200	260	300	297%	340	400	101
Lake Tahoe Rise Gates Closed ¹	OCT-HIGH	2.8	4	4.5	283%	5.1	6.3	1.59
	MAR-HIGH	0.95	2	2.5	179%	3	4.1	1.4
	APR-HIGH	1	1.7	2.1	181%	2.5	3.2	1.16

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

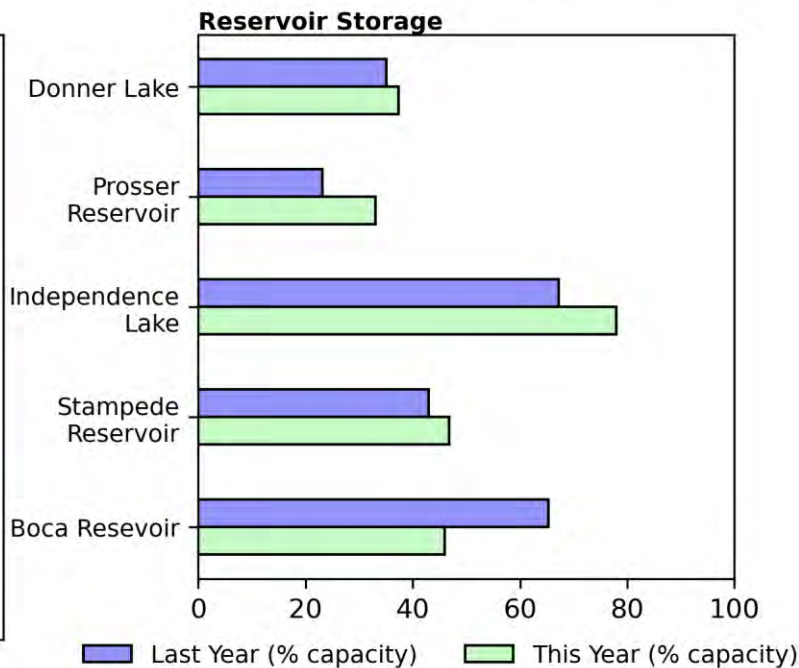
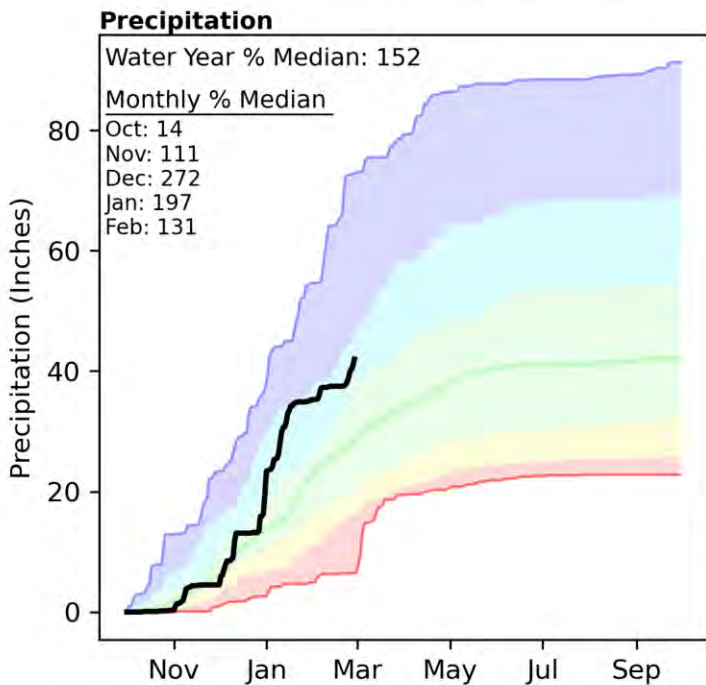
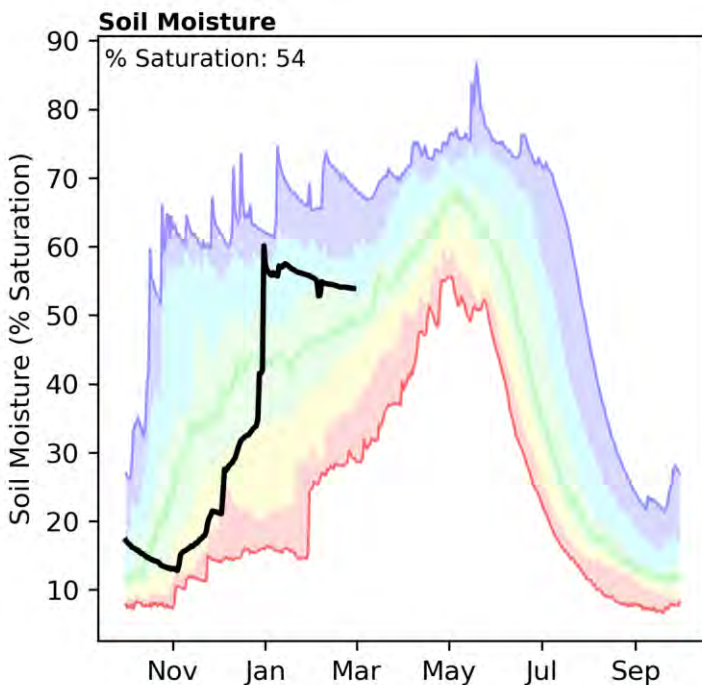
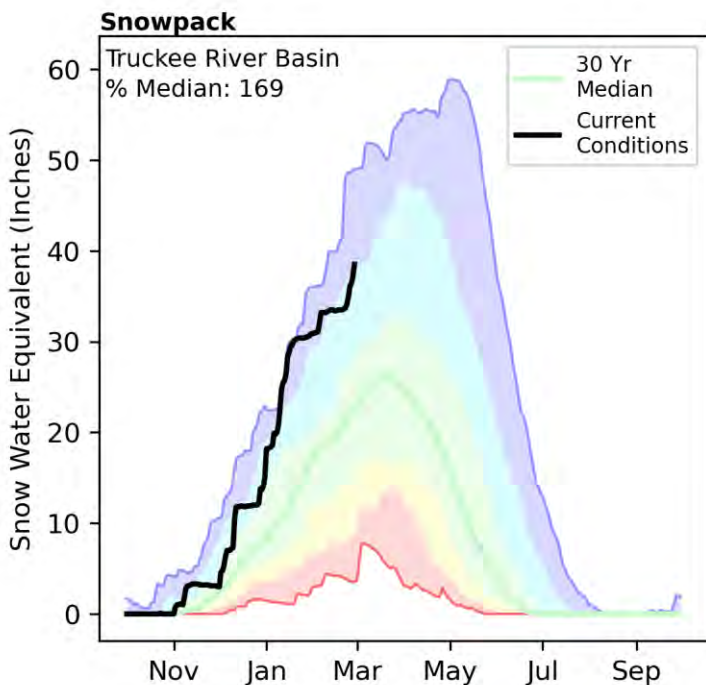
Reservoir Storage End of February, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Tahoe	165.2	125.1	221.8	744.5

Basin Index
of reservoirs

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Tahoe	23	192%	106%

Truckee River Basin | March 1, 2023

Snowpack in the Truckee River Basin is well above normal at 169% of median, compared to 85% at this time last year. Precipitation in February was well above normal at 131%, which brings the seasonal accumulation (October-February) to 152% of median. Soil moisture is at 54% saturation compared to 58% saturation last year. Reservoir storage is 47% of capacity, compared to 45% last year.



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

Provided by:
NRCS NV

Truckee Streamflow Forecasts - March 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	117	154	180	209%	205	245	86
	APR-JUL	86	120	145	201%	170	210	72
Independence Lk Inflow ²	MAR-JUL	16.1	19.2	21	184%	24	27	11.4
	APR-JUL	13.1	16	18	171%	20	23	10.5
Donner Lake Inflow ²	MAR-JUL	20	27	31	161%	35	42	19.2
	APR-JUL	15.2	20	24	160%	28	33	15
Truckee R ab Farad Sidewater ²	MAR-JUL	142	181	205	193%	235	270	106
	APR-JUL	119	155	179	199%	205	240	90
Boca Res Local Inflow ²	MAR-JUL	13	17.6	21	477%	24	28	4.4
	APR-JUL	5.2	8.6	11	724%	13.4	16.8	1.52
Stampede Res Local Inflow ²	MAR-JUL	109	140	161	233%	182	215	69
	APR-JUL	77	106	125	212%	144	173	59
Martis Ck Res Inflow ²	MAR-JUL	14.7	20	24	270%	28	33	8.9
	APR-JUL	7.2	11.8	15	263%	18.2	23	5.7
Sagehen Ck nr Truckee	MAR-JUL	6.7	9.2	11	229%	12.7	15.2	4.8
	APR-JUL	5	7.4	9	220%	10.6	13	4.1
Prosser Ck Res Inflow ²	MAR-JUL	56	70	79	188%	88	102	42
	APR-JUL	41	54	62	177%	70	83	35
Truckee R at Farad ²	MAR-JUL	310	410	480	181%	550	650	265
	APR-JUL	270	340	400	178%	475	565	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

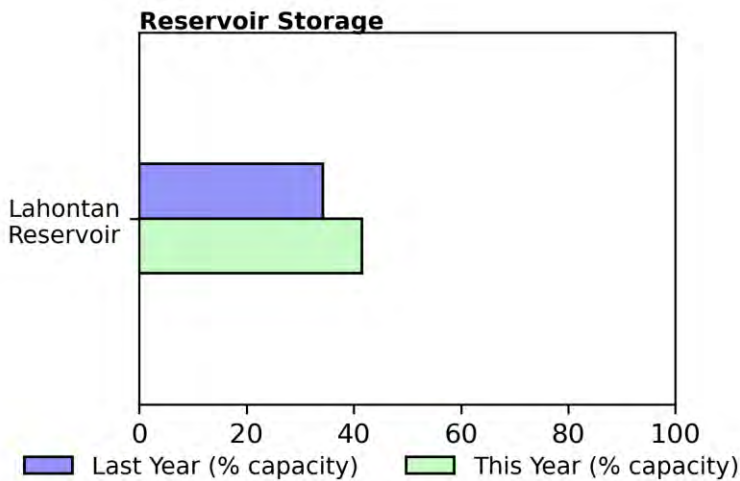
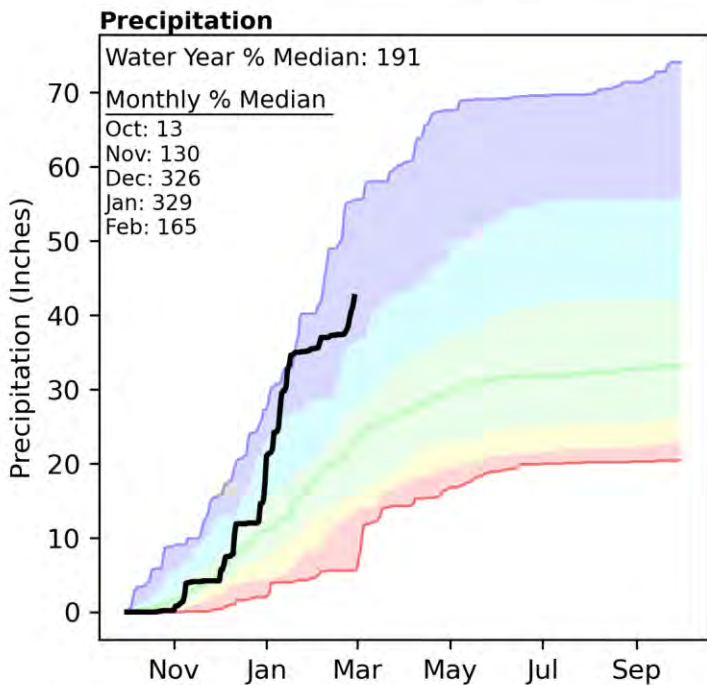
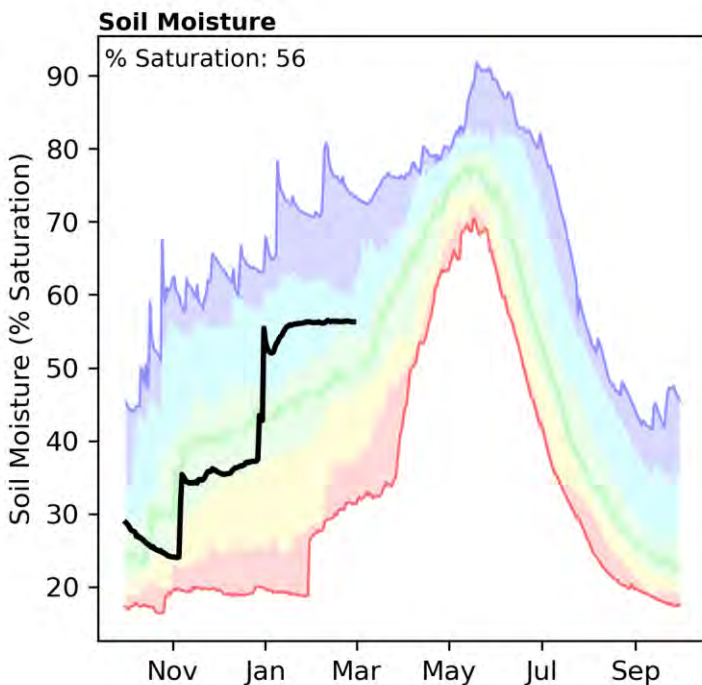
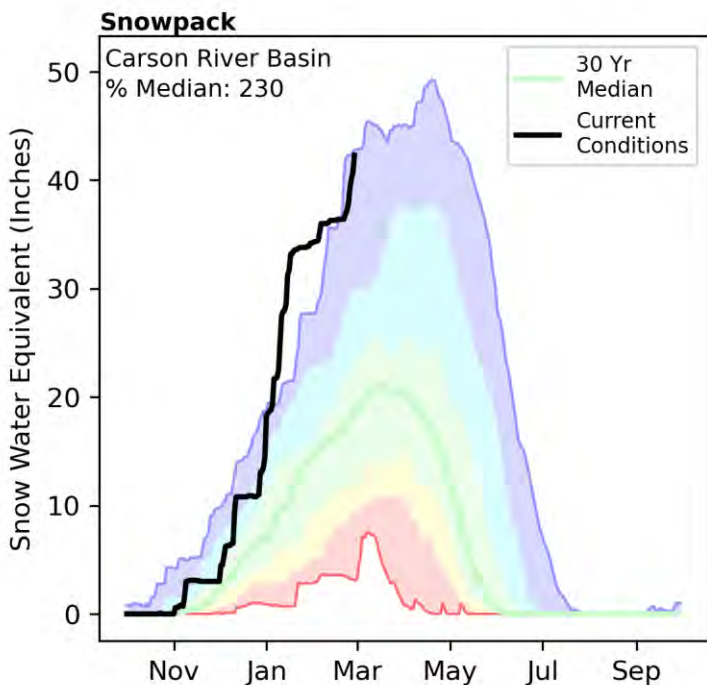
Reservoir Storage End of February, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Independence Lake	13.3	12.6	14.1	17.3
Martis Reservoir		0.9	0.8	35.8
Stampede Reservoir	103.4	93.8	151.4	226.5
Donner Lake	3.4	3.3	3.7	9.5
Boca Reservoir	16.9	26.1	10.7	40.9
Prosser Reservoir	9.8	7.5	9.7	29.8

Basin Index
of reservoirs

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Truckee	17	173%	112%

Carson River Basin | March 1, 2023

Snowpack in the Carson River Basin is well above normal at 230% of median, compared to 77% at this time last year. Precipitation in February was well above normal at 165%, which brings the seasonal accumulation (October-February) to 191% of median. Soil moisture is at 56% saturation compared to 60% saturation last year. Reservoir storage is 42% of capacity, compared to 34% last year.



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

Provided 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.

Carson
Streamflow Forecasts - March 1, 2023

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

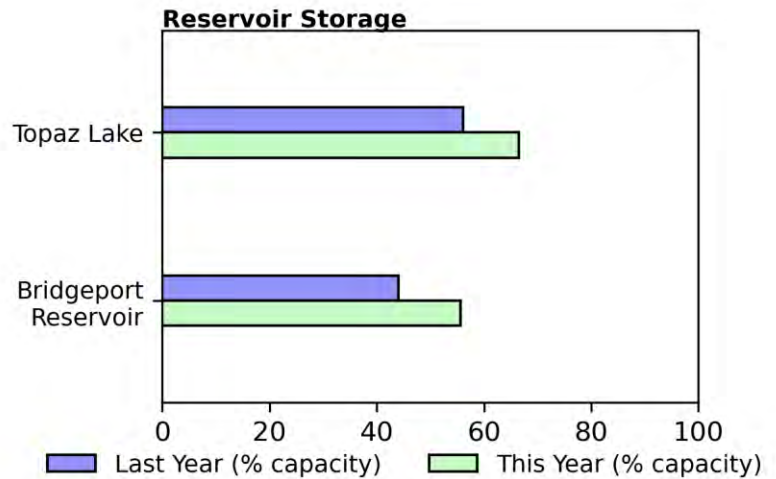
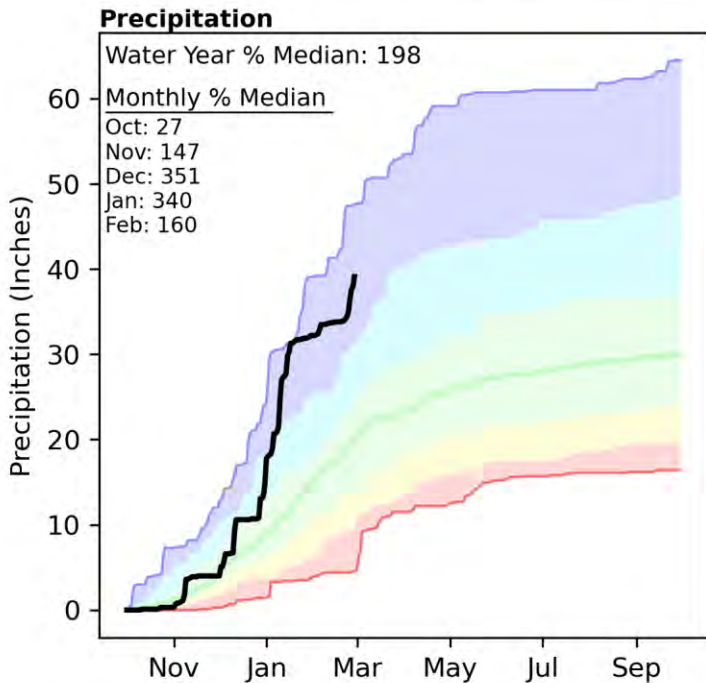
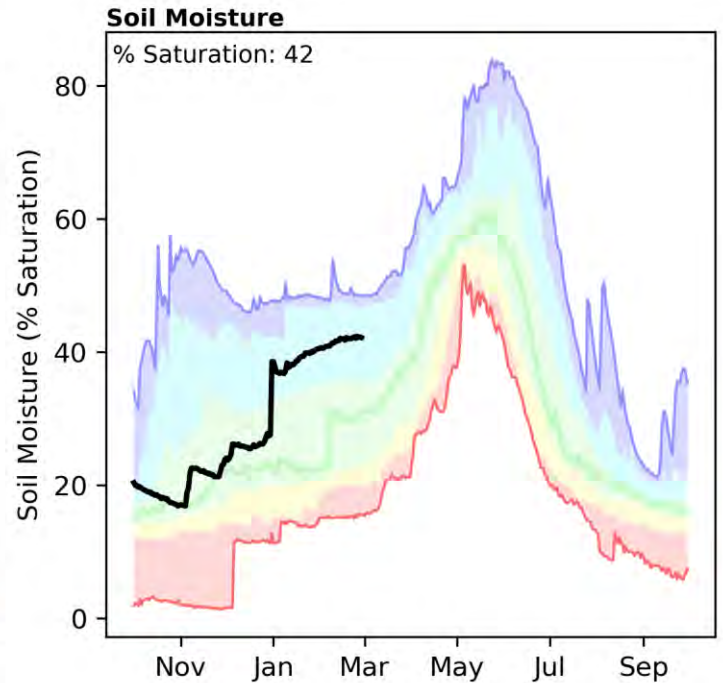
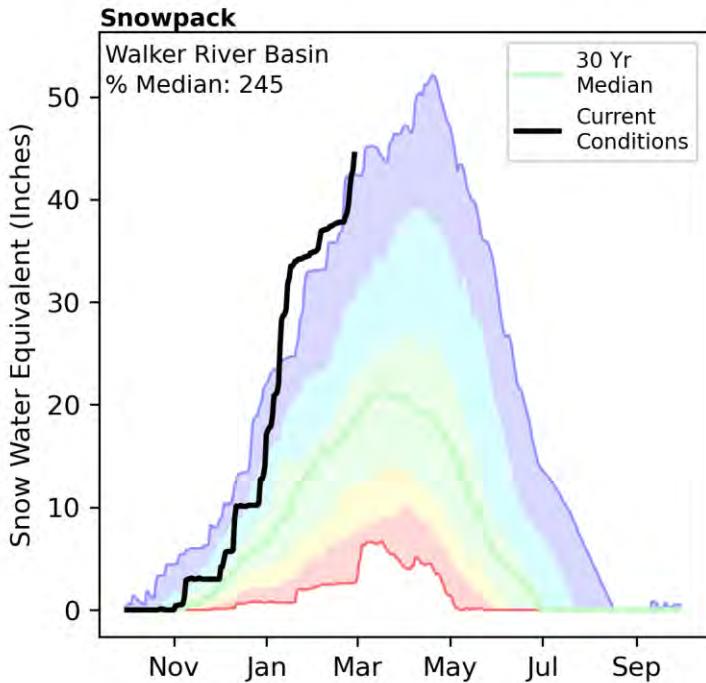
Carson	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
EF Carson R nr Gardnerville	MAR-JUL	300	365	410	223%	455	520	184
	APR-JUL	310	370	370	226%	455	515	164
	200 cfs	13 Aug	30 Aug	10 Sep		21 Sep	08 Oct	14 Jul
	500 cfs	20 Jul	06 Aug	17 Aug		28 Aug	14 Sep	20 Jun
WF Carson R nr Woodfords	MAR-JUL	77	96	110	220%	124	143	50
	APR-JUL	67	87	100	222%	113	133	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 March 1, 2023	# of Sites	% Median	Last Year % Median
Carson	16	226%	102%

Walker River Basin | March 1, 2023

Snowpack in the Walker River Basin is well above normal at 245% of median, compared to 78% at this time last year. Precipitation in February was well above normal at 160%, which brings the seasonal accumulation (October-February) to 198% of median. Soil moisture is at 42% saturation compared to 48% saturation last year. Reservoir storage is 62% of capacity, compared to 51% last year.



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

Provided by:
NRCS NV

Walker Streamflow Forecasts - March 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	123	157	180	353%	205	235	51
	APR-AUG	101	132	154	350%	176	205	44
W Walker R nr Coleville	MAR-JUL	265	315	345	224%	380	425	154
	APR-JUL	250	295	330	224%	360	405	147
W Walker R bl L Walker R nr Coleville	MAR-JUL	250	295	330	208%	365	410	159
	APR-JUL	230	280	310	203%	340	390	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 February, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Bridgeport Reservoir	19.6	15.6	15.6	42.5

Basin Index
of reservoirs

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Walker	9	239%	101%

Surprise Valley-Warners - March 1, 2023

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Surprise Valley-Warners	6	143%	87%

Colorado Streamflow Forecasts - March 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	5000	6760	8110	132%	9580	12000	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 February, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Powell	5456.1	6335.2	13471.0	24322.0

Basin Index
of reservoirs

Watershed Snowpack Analysis March 1, 2023	# of Sites	% Median	Last Year % Median
Colorado	205	149%	106%

Appendix: Interpreting the Streamflow Forecast Chart

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

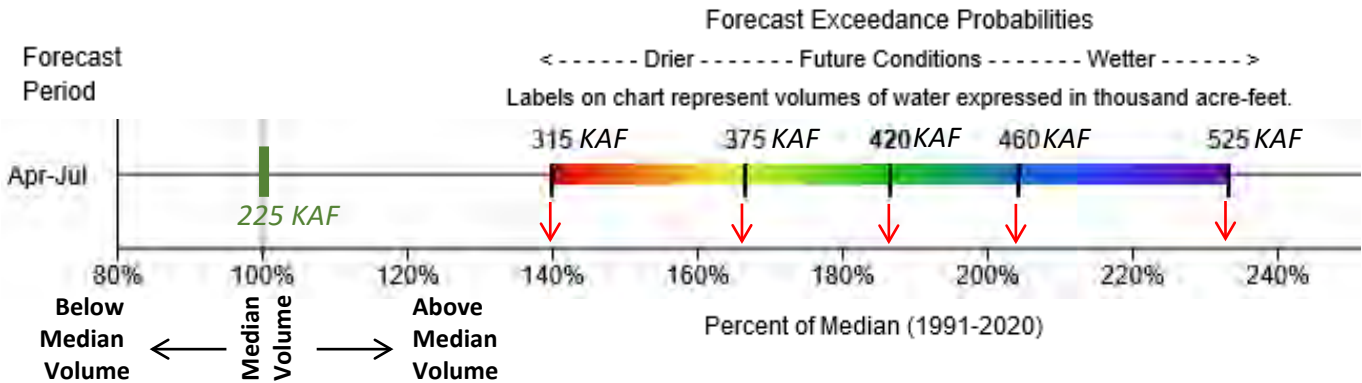
Provided by:
NRCS NV

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.

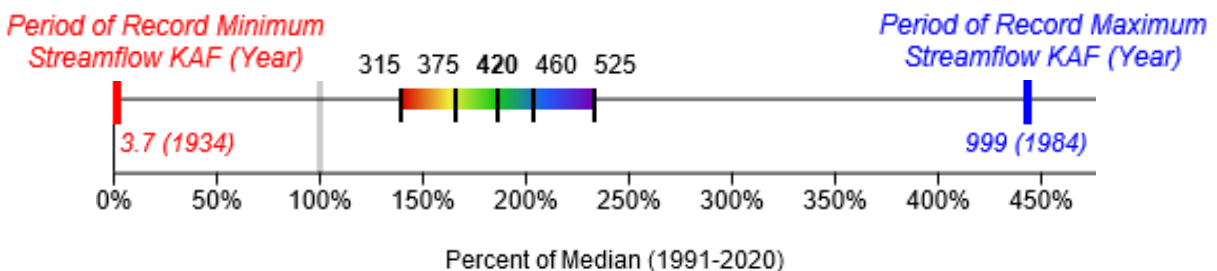


The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of median can be estimated by looking at the horizontal axis. The green line and number centered above 100% on the horizontal axis represents the 1981-2010 historical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

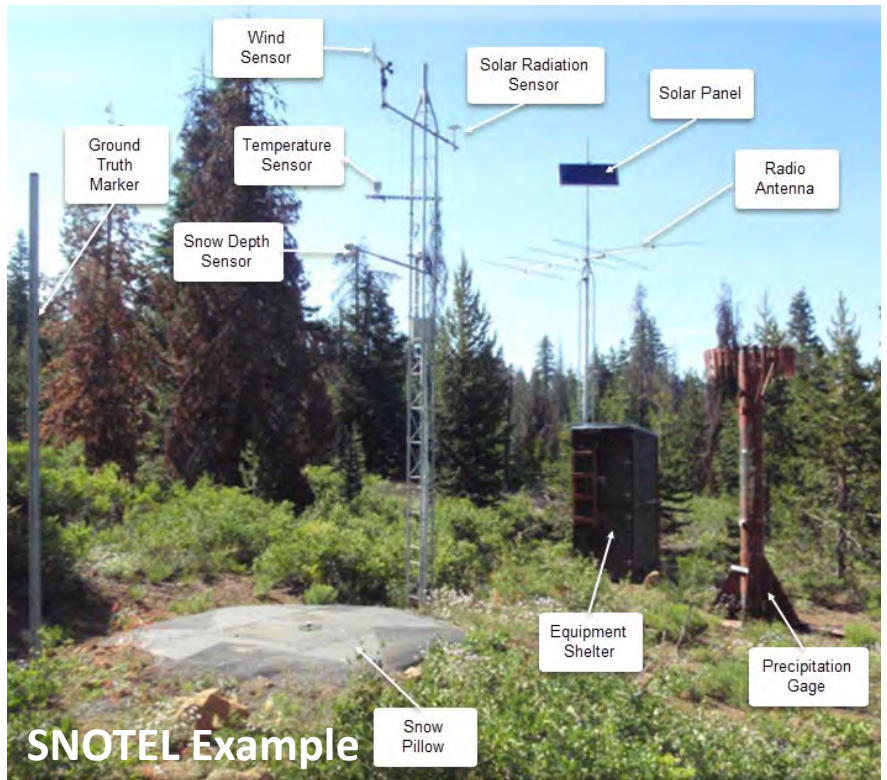


[Click here](#) for an online version which allows users to see averages instead of medians, as well as historic forecasts.

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.



SNOTEL Example

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 Course Example

Provided by:
NRCS NV

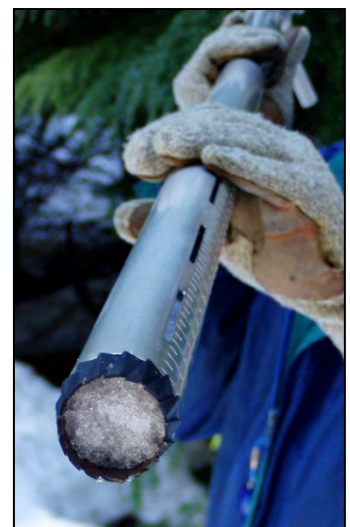
Snow Water Equivalent (SWE):

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.



Weight of frozen water = Weight of liquid water



Snow core inside snow tubes

Issued by
Terry Cosby, Chief
Natural Resources Conservation Service
U.S. Department of Agriculture
Washington, D.C.



Released by
Carlos Suarez, State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
Davis, CA

For questions, please contact Greg Norris, California
NRCS State Conservation Engineer at
Greg.Norris@usda.gov

YOU MAY OBTAIN THIS PRODUCT AS WELL AS
CURRENT SNOW, PRECIPITATION, TEMPERATURE
AND SOIL MOISTURE, RESERVOIR, SURFACE
WATER SUPPLY INDEX, AND OTHER DATA BY
VISITING OUR WEB SITE:

<https://www.nrcs.usda.gov/resources/data-and-reports/california-snow-survey>



California Water Supply Outlook

