

California Water Supply Outlook Report

April 2023

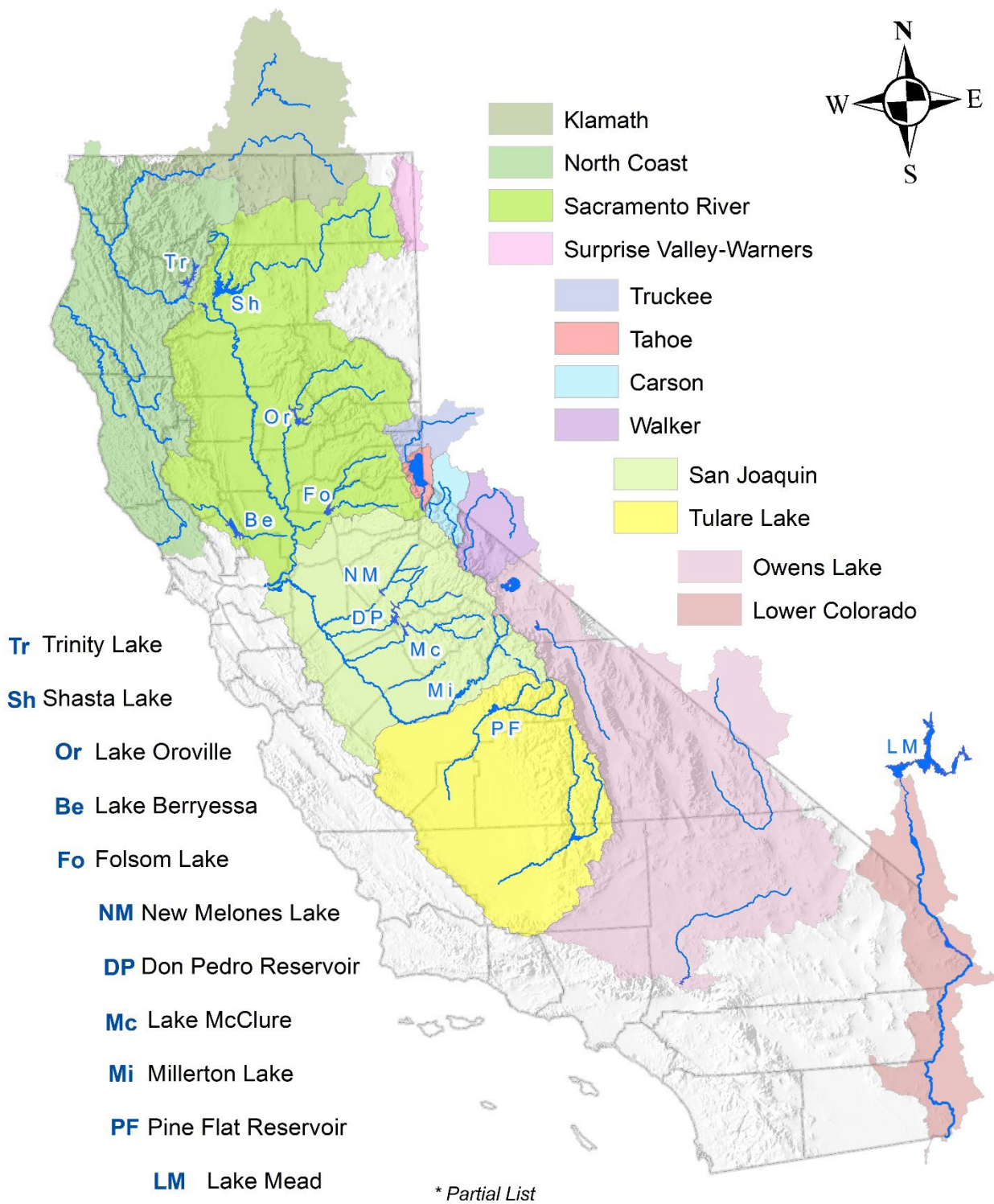


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*Cover: Top: View of Lake Tahoe from Rubicon #2 Snow Course on March 20, 2023.
Bottom Left: CA Snow Survey Crew including new support from the US District
Court Water Master office. Bottom Right: Rubicon SnowTel Site.*

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 snow water equivalents (SWE) between March 1 and April 17 increased from 153- to 207 percent of normal for the dates in the northern Sierras; from 199- to 240 percent in the central Sierras; and from 232- to 319 percent in the southern Sierras. More information is available online at <http://cdec.water.ca.gov/snow/current/snow/index2.html>.

PRECIPITATION

In March, the Northern Sierra-, San Joaquin-, and Tulare Basin Index stations received 196-, 281-, and 380 percent of average. As of March 17th, the basins have received between 130- and 205 percent of normal rainfall. March's series of storm systems kept seasonal rainfall averages above significantly normal. More information is available online at http://cdec.water.ca.gov/snow_rain.html

RESERVOIRS

Total intrastate reservoir storage on March 31, 2023 was 105 percent of average, compared to 96 percent of average at the end of February. Storage at Lake Mead was 46 percent of average, up from 45 percent of average at the end of February. As of April 16th, storage at Shasta Reservoir was 113 percent of average (92 percent of capacity), up from 84 percent of average at the end of February. Oroville Reservoir was 125 percent of average (83 percent of capacity), up from 116 percent of average at the end of February. Don Pedro Reservoir was 106 percent of average (80 percent of capacity), up from 105 percent at the end of February. 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 93- and 446 percent of the 1991-2020 medians between April and July. NRCS forecasts in the Tahoe, Truckee, Carson, and Walker River basins are all above 200% 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 - April 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	1910		2290	134%		2870	1710
MF American R nr Auburn (NWS)	APR-JUL	910		1010	223%		1140	453
Inflow to Shasta Lk (DWR)	OCT-SEP	5590		6040	107%		6880	5643
	APR-JUL	2030		2400	136%		3160	1767
Silver Ck bl Camino Div. Dam (DWR)	APR-JUL			290	185%			157
McCloud R ab Shasta (DWR)	APR-JUL			540	137%			393
Sacramento R nr Red Bluff (NWS)	APR-JUL	2740		3300	137%		4200	2410
NF Feather R at Pulga (DWR)	APR-JUL			1610	191%			842
Inflow Jackson Mdws & Bowman Res (DWR)	APR-JUL			185	180%			103
Feather R at Lk Almanor (DWR)	APR-JUL			460	191%			241
Inflow to Folsom Res (DWR)	OCT-SEP	4490		4900	182%		5520	2689
	APR-JUL	1910		2300	184%		2900	1247
Pit R at Shasta Lk (NWS)	APR-JUL	885		1000	93%		1250	1070
Pit R at Shasta Lk (DWR)	APR-JUL			1270	128%			992
Inflow to Oroville Res (NWS)	APR-JUL	2670		3030	201%		3750	1510
Inflow to Folsom Res (NWS)	APR-JUL	2160		2410	204%		2780	1180
Yuba R at Smartville (DWR)	OCT-SEP	3500		3760	165%		4280	2273
	APR-JUL	1510		1760	177%		2260	993
N Yuba R bl Goodyears Bar (DWR)	APR-JUL			480	177%			271
Yuba R at Smartville (NWS)	APR-JUL	1500		1680	180%		2000	934
Inflow to Union Valley Res (NWS)	APR-JUL	176		193	201%		215	95.9
N Yuba R bl Goodyears Bar (NWS)	APR-JUL	430		470	175%		550	268
Sacramento R at Shasta (NWS)	APR-JUL	465		530	182%		680	292
Sacramento R nr Red Bluff (DWR)	OCT-SEP	8680		9360	112%		10800	8351
	APR-JUL	2650		3220	130%		4490	2474
S Yuba R nr Langs Crossing (DWR)	APR-JUL			420	177%			237
Cosumnes R at Michigan Bar (NWS)	APR-JUL	215		250	210%		335	119
McCloud R ab Shasta (NWS)	APR-JUL	375		430	116%		530	370
NF American R at N FK Dam (DWR)	APR-JUL			450	188%			240
Sacramento R at Shasta (DWR)	APR-JUL			510	165%			309
NF Feather R nr Prattville (NWS)	APR-JUL	370		405	143%		455	283.6
Inflow to Oroville Res (DWR)	OCT-SEP	6360		6830	157%		7930	4341
	APR-JUL	2650		3200	187%		4490	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 April 1, 2023	# of Sites	% Median	Last Year % Median
Sacramento River	80	193%	41%

Sanjoaquin Streamflow Forecasts - April 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			730	246%			297
Tuolumne R nr Hetch Hetchy (NWS)	APR-JUL	1190		1260	211%		1340	596
Big Ck bl Huntington Lk (DWR)	APR-JUL			270	278%			97
Inflow to New Melones Res (NWS)	APR-JUL	1560		1670	253%		1820	661
Inflow to Millerton Lk (NWS)	APR-JUL	2830		3050	250%		3220	1220
Inflow to New Don Pedro Res (NWS)	APR-JUL	2660		2860	240%		3050	1190
Inflow to Millerton Lk (DWR)	OCT-SEP	4360		4720	266%		5130	1775
	APR-JUL	2870		3200	260%		3580	1229
Cherry & Eleanor CKs, Hetch Hetchy (DWR)	APR-JUL			730	230%			317
Inflow to New Don Pedro Res (DWR)	OCT-SEP	4140		4410	226%		4840	1954
	APR-JUL	2550		2800	229%		3210	1222
Merced R at Pohono Bridge Yosemite (DWR)	APR-JUL			960	260%			369
Cosumnes R at Michigan Bar (DWR)	OCT-SEP	1040		1100	282%		1280	390
	APR-JUL	230		290	218%		460	133
SF San Joaquin R nr Florence Lk (DWR)	APR-JUL			500	266%			188
Inflow to New Melones Res (DWR)	OCT-SEP	2440		2700	229%		3000	1181
	APR-JUL	1430		1680	240%		1960	699
Inflow to Pardee Res (DWR)	OCT-SEP	1460		1590	208%		1800	764
	APR-JUL	860		990	211%		1190	469
Merced R at Pohono Bridge Yosemite (NWS)	APR-JUL	935		985	261%		1030	377
Inflow to Lake McClure (NWS)	APR-JUL	1510		1590	265%		1680	601
Inflow to Pardee Res (NWS)	APR-JUL	880		950	218%		1050	436
Tuolumne R nr Hetch Hetchy (DWR)	APR-JUL			1400	239%			587

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Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
SanJoaquin	72	252%	48%

Tulare Lake Streamflow Forecasts - April 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	1260		1360	319%		1500	426
	APR-JUL	730		810	293%		940	276
Kaweah R at Terminus Res (NWS)	APR-JUL	800		855	309%		905	277
	APR-JUL	2950		3190	266%		3340	1200
Inflow to Pine Flat Res (DWR)	OCT-SEP	2260		2500	372%		2840	672
	APR-JUL	1610		1830	429%		2150	427
Inflow to Pine Flat Res (DWR)	OCT-SEP	4190		4480	268%		4920	1671
	APR-JUL	2970		3240	269%		3650	1204
Tule R at Success Res (DWR)	OCT-SEP	495		570	432%		635	132
	APR-JUL	180		250	446%		310	56
Tule R at Success Res (NWS)	APR-JUL	230		245	416%		265	58.9
	APR-JUL	1460		1590	356%		1680	447
Kern R nr Kernville (DWR)	APR-JUL			1630	430%			379

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Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Tulare Lake	46	314%	46%

Owens Lake Streamflow Forecasts - April 1, 2023

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

Owens Lake	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Owens R (DWR)	APR-JUL			370	160%			231

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Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Owens Lake	19	312%	55%

North Coast Streamflow Forecasts - April 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	840		1030	159%		1310	648
Inflow to Clair Engle Lk (NWS)	APR-JUL	925		1030	179%		1200	574
Scott R nr Fort Jones (NWS)	APR-JUL	170		200	122%		250	164

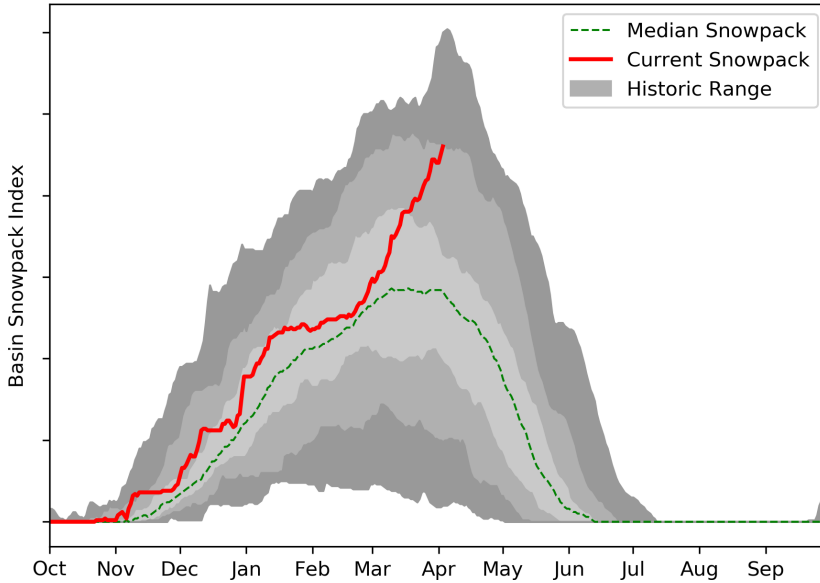
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Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
North Coast	18	178%	14%

Klamath Basin Summary

SNOWPACK

Klamath Basin Snowpack

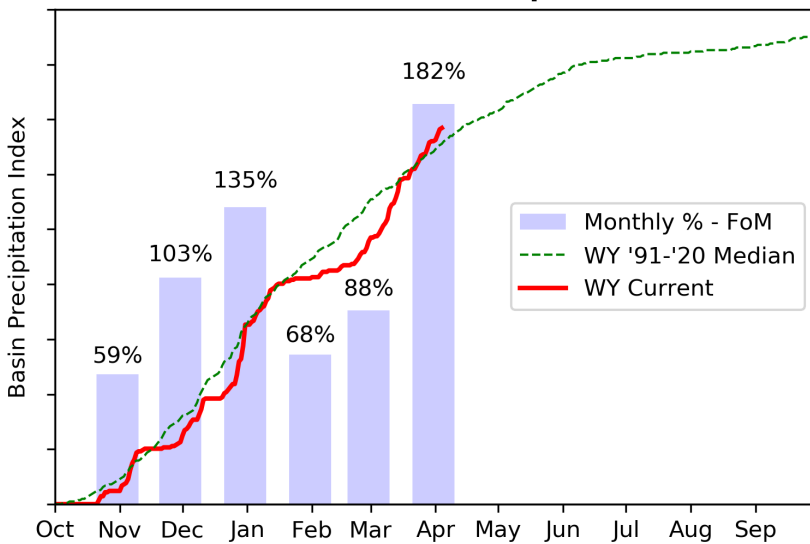


► View snowpack for individual sites by accessing the basin data report [here](#).

As of April 1, the basin snowpack is 165% of median, higher than last month when the basin snowpack was 109% of median.

PRECIPITATION

Klamath Basin Precipitation



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

FoM = First of Month

March precipitation is above normal at 182% of median. Precipitation since the beginning of the water year (October 1 - April 1) is 102% of median.

Provided by:
NRCS OR

Klamath Streamflow Forecasts - April 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	APR-SEP	220	250	275	173%	295	330	159
Upper Klamath Lake Inflow ¹²	APR-SEP	465	550	595	163%	640	740	365
Gerber Reservoir Inflow								
Clear Lake Inflow ²	APR-JUN	50	62	71	-1140%	79	92	-6.23
Williamson R bl Sprague R nr Chiloquin	APR-SEP	370	410	430	151%	455	490	285

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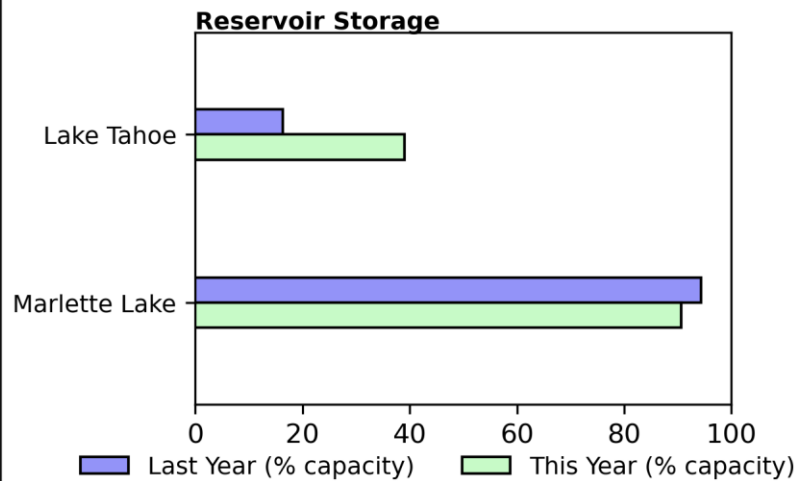
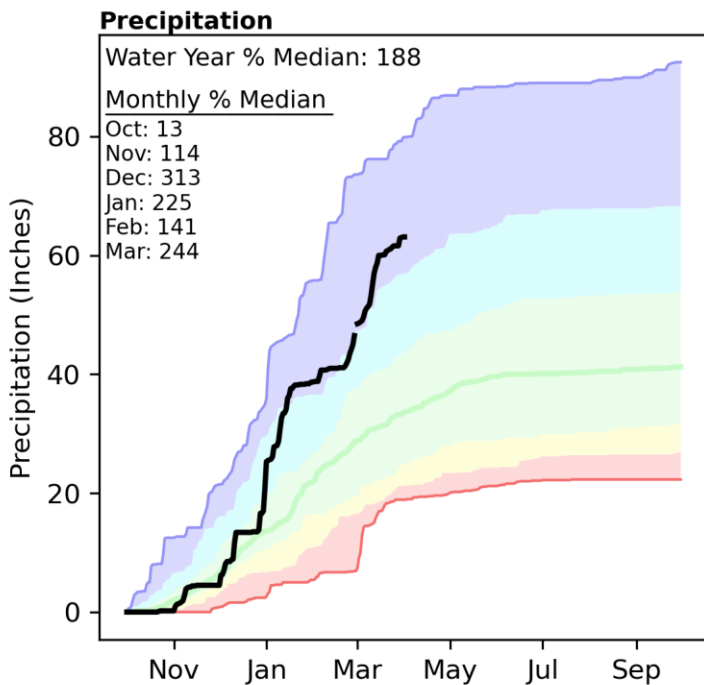
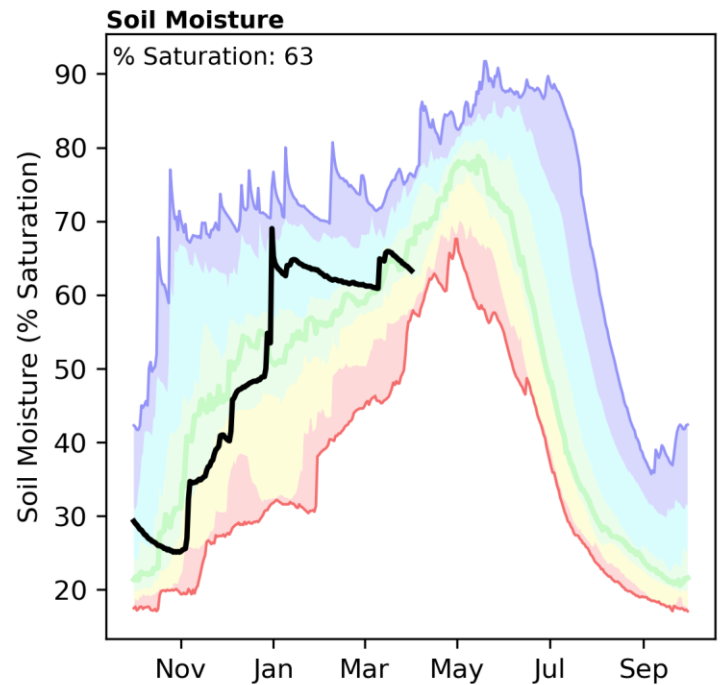
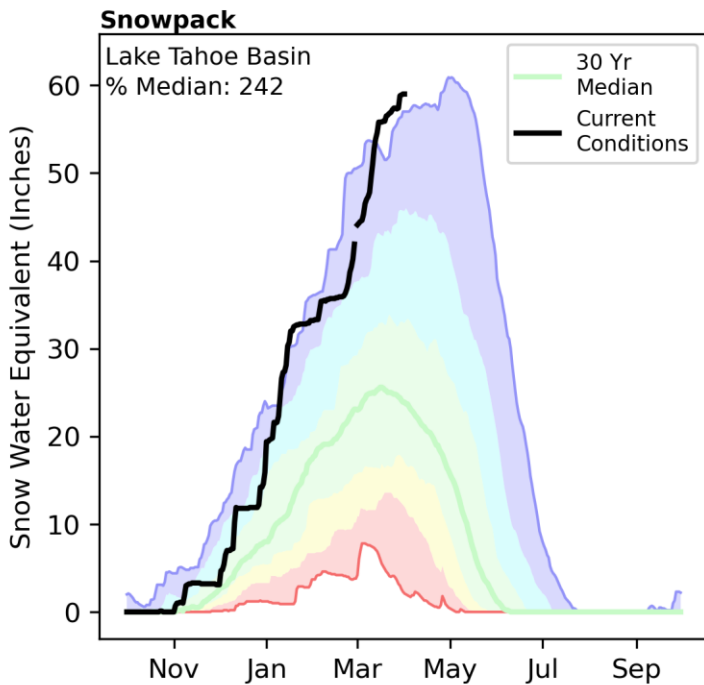
Reservoir Storage End of March, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Upper Klamath Lake	437.7	346.5	441.9	523.7

Basin Index
of reservoirs

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Klamath	31	159%	35%

Lake Tahoe Basin | April 1, 2023

Snowpack in the Lake Tahoe Basin is well above normal at 242% of median, compared to 52% at this time last year. Precipitation in March was well above normal at 244%, which brings the seasonal accumulation (October-March) to 188% of median. Soil moisture is at 63% saturation compared to 74% saturation last year. Reservoir storage is 40% of capacity, compared to 18% 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.

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Tahoe Streamflow Forecasts - April 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	APR-JUL	280	325	350	347%	375	420	101
	MAY-JUL	205	245	270	574%	300	340	47
Lake Tahoe Rise Gates Closed ¹	APR-HIGH	2.2	2.6	2.9	250%	3.2	3.9	1.16
	MAY-HIGH	1	1.48	1.7	239%	1.92	2.4	0.71

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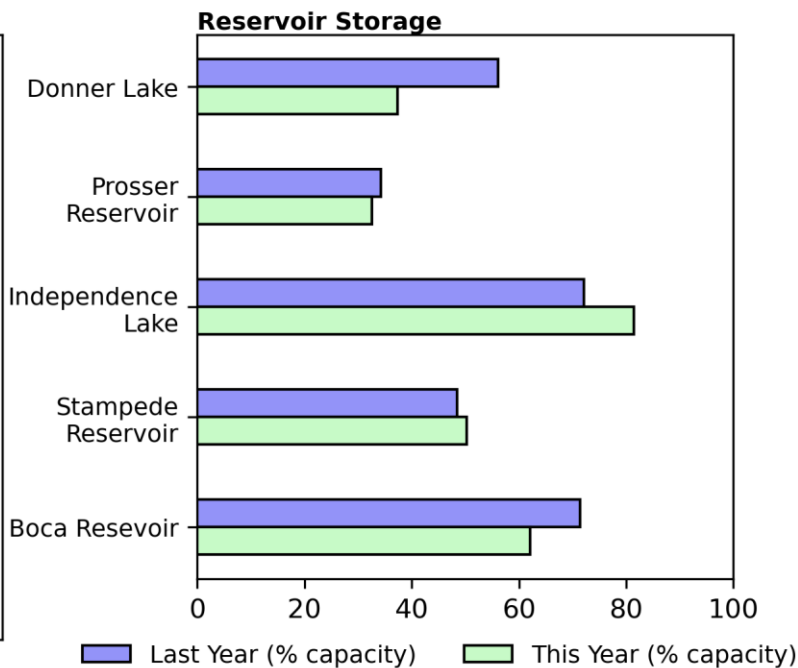
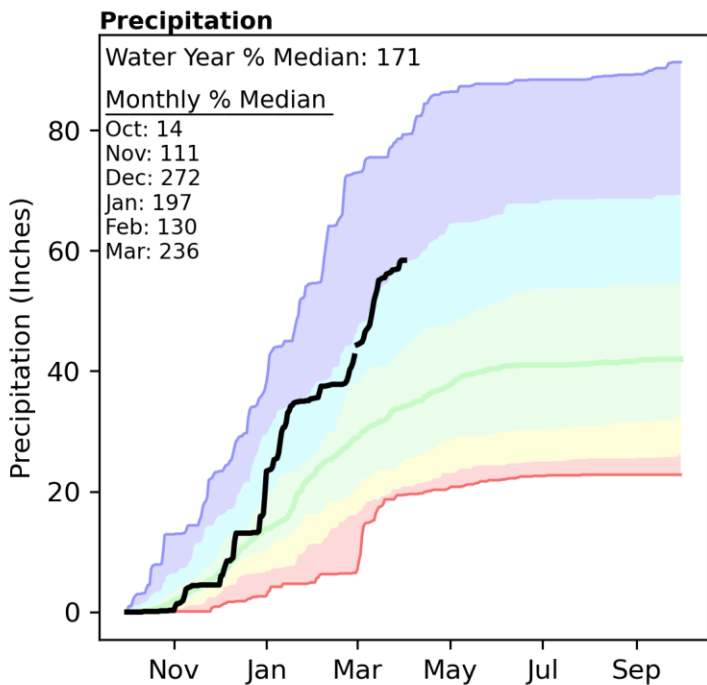
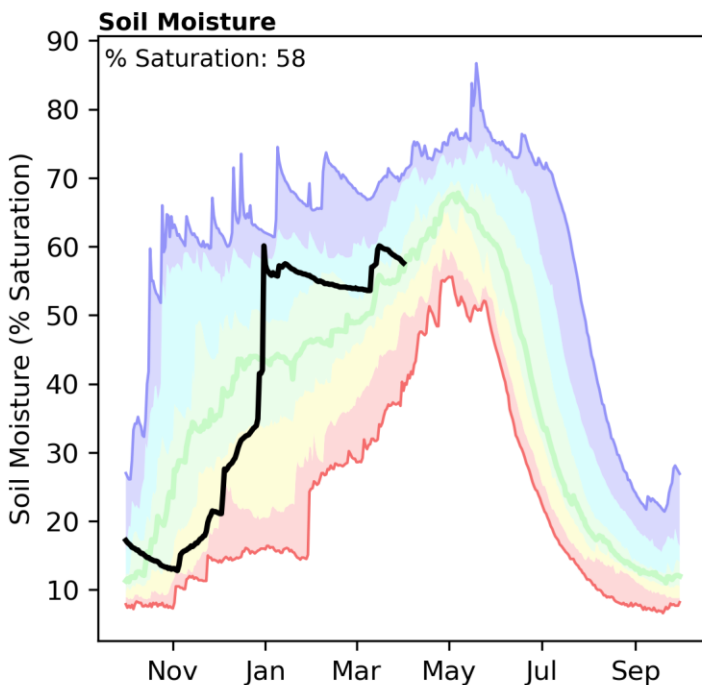
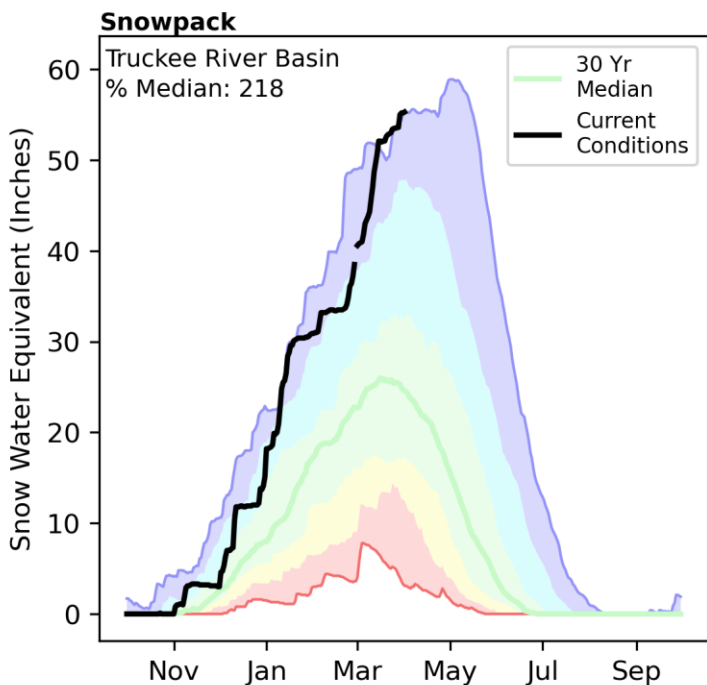
Reservoir Storage End of March, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Tahoe	290.5	121.4	289.3	744.5

Basin Index
of reservoirs

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Tahoe	23	242%	52%

Truckee River Basin | April 1, 2023

Snowpack in the Truckee River Basin is well above normal at 218% of median, compared to 61% at this time last year. Precipitation in March was well above normal at 236%, which brings the seasonal accumulation (October-March) to 171% of median. Soil moisture is at 58% saturation compared to 69% saturation last year. Reservoir storage is 51% of capacity, compared to 52% last year.



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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Truckee Streamflow Forecasts - April 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	APR-JUL	165	190	200	278%	210	240	72
	MAY-JUL	128	144	155	352%	166	182	44
Independence Lk Inflow ²	APR-JUL	21	22	23	219%	24	25	10.5
	MAY-JUL	17.4	18.8	19.9	249%	21	22	8
Donner Lake Inflow ²	APR-JUL	26	29	31	207%	33	36	15
	MAY-JUL	12.3	15.2	17.2	210%	19.1	22	8.2
Truckee R ab Farad Sidewater ²	APR-JUL	205	220	230	256%	240	255	90
	MAY-JUL	156	170	180	286%	190	205	63
Boca Res Local Inflow ²	APR-JUL	12.9	14.9	16.4	1079%	17.8	19.8	1.52
	MAY-JUL	3.8	5	5.8	1381%	6.6	7.8	0.42
Stampede Res Local Inflow ²	APR-JUL	159	171	179	303%	187	198	59
	MAY-JUL	110	124	133	369%	143	157	36
Martis Ck Res Inflow ²	APR-JUL	20	22	24	421%	25	27	5.7
	MAY-JUL	11.2	13.2	14.7	565%	16.1	18.2	2.6
Sagehen Ck nr Truckee	APR-JUL	11.8	12.7	13.3	324%	14	14.9	4.1
	MAY-JUL	8.7	9.8	10.5	477%	11.3	12.3	2.2
Prosser Ck Res Inflow ²	APR-JUL	76	81	84	240%	87	92	35
	MAY-JUL	53	59	62	282%	66	72	22
Truckee R at Farad ²	APR-JUL	490	530	560	249%	600	660	225
	MAY-JUL	365	400	425	306%	450	485	139

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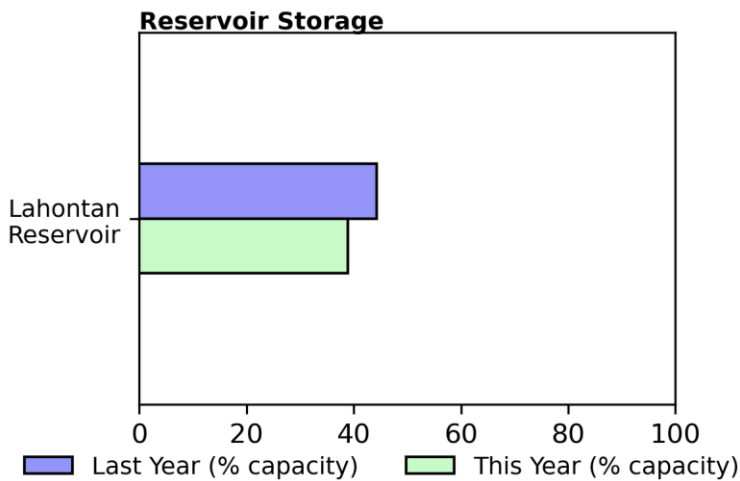
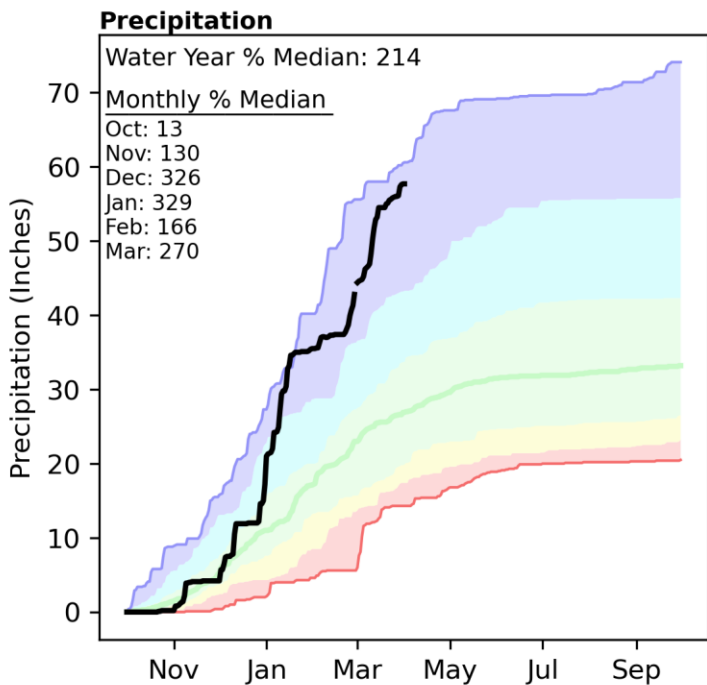
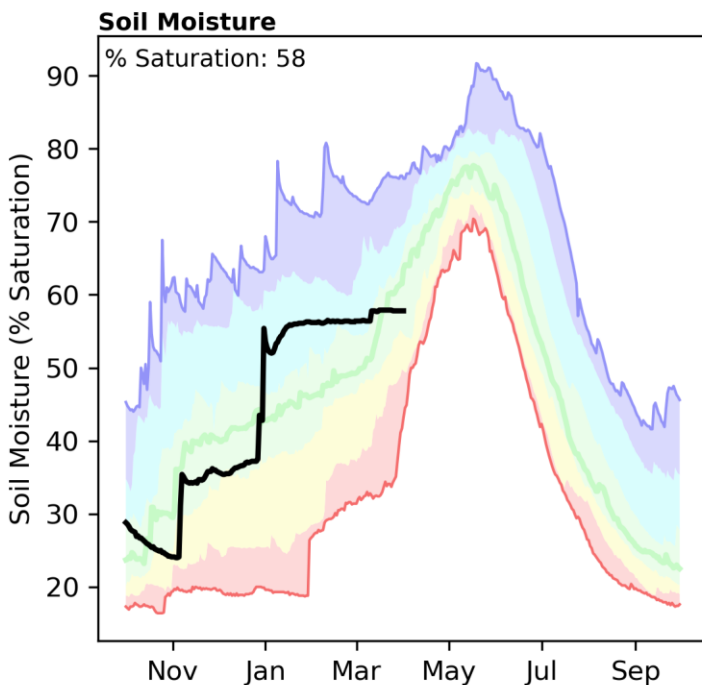
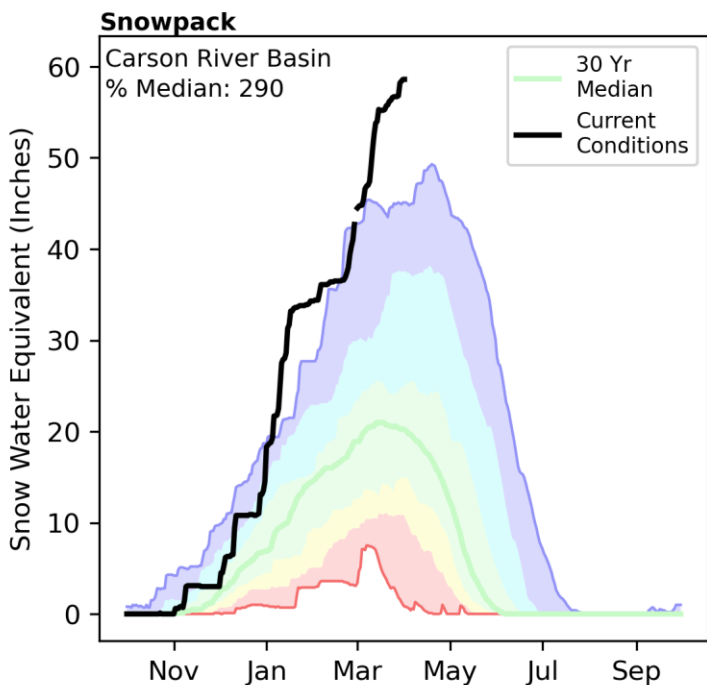
Reservoir Storage End of March, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Independence Lake	14.1	12.5	14.8	17.3
Martis Reservoir			0.9	35.8
Stampede Reservoir	113.9	109.9	164.2	226.5
Donner Lake	3.5	5.3	4.3	9.5
Boca Reservoir	25.4	29.2	19.0	40.9
Prosser Reservoir	9.7	10.2	9.7	29.8

Basin Index
of reservoirs

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Truckee	18	217%	60%

Carson River Basin | April 1, 2023

Snowpack in the Carson River Basin is well above normal at 290% of median, compared to 51% at this time last year. Precipitation in March was well above normal at 270%, which brings the seasonal accumulation (October-March) to 214% of median. Soil moisture is at 58% saturation compared to 70% saturation last year. Reservoir storage is 39% of capacity, compared to 44% last year.



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.

Carson Streamflow Forecasts - April 1, 2023

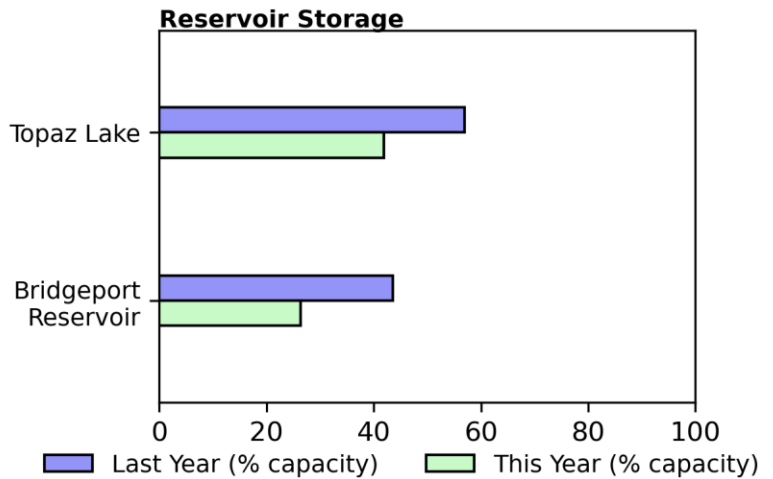
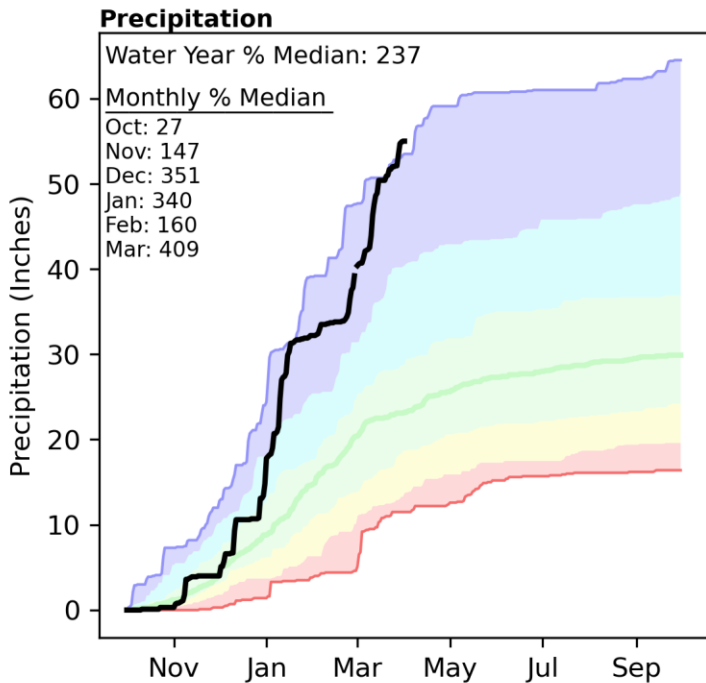
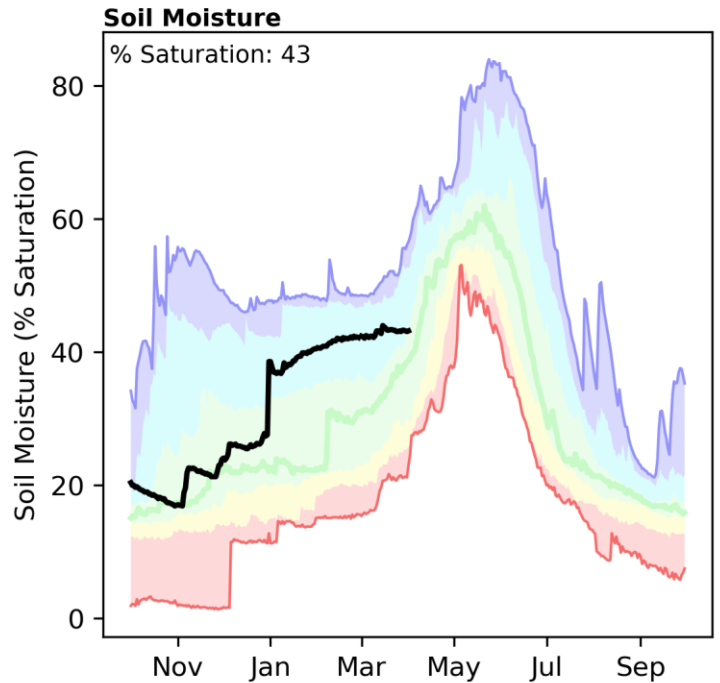
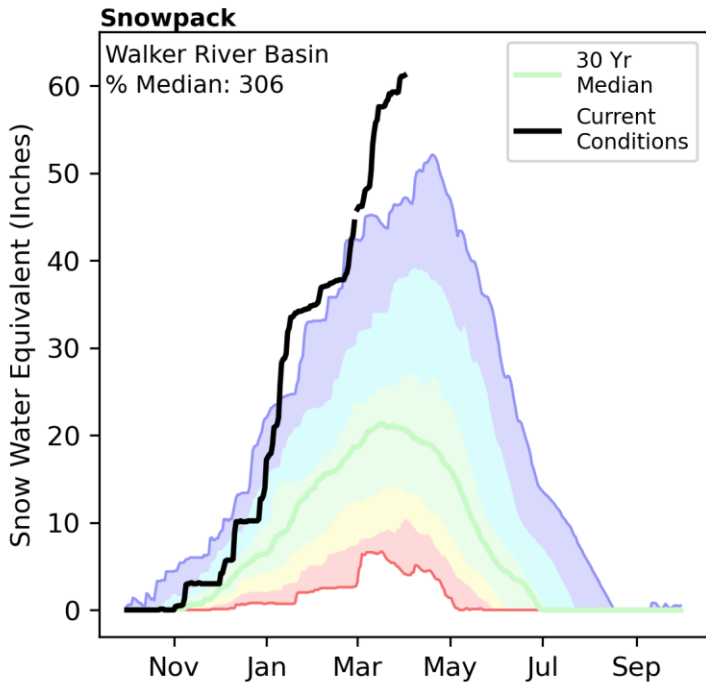
Forecast Exceedance Probabilities For Risk Assessment
Chance that actual volume will exceed forecast

Carson	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
EF Carson R nr Gardnerville								
	APR-JUL	490	515	530	323%	545	570	164
	MAY-JUL	410	435	450	388%	470	495	116
	200 cfs	23 Sep	02 Oct	08 Oct		14 Oct	23 Oct	14 Jul
	500 cfs	21 Aug	03 Sep	11 Sep		19 Sep	02 Oct	20 Jun
WF Carson R nr Woodfords								
	APR-JUL	130	137	142	316%	147	154	45
	MAY-JUL	104	113	120	400%	126	136	30

- 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 April 1, 2023	# of Sites	% Median	Last Year % Median
Carson	16	290%	51%

Snowpack in the Walker River Basin is well above normal at 306% of median, compared to 61% at this time last year. Precipitation in March was well above normal at 409%, which brings the seasonal accumulation (October-March) to 237% of median. Soil moisture is at 43% saturation compared to 57% saturation last year. Reservoir storage is 35% 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 - April 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	APR-AUG	205	220	230	523%	240	255	44
	MAY-AUG	194	205	215	524%	225	240	41
W Walker R nr Coleville	APR-JUL	385	405	415	282%	430	445	147
	MAY-JUL	350	370	380	311%	395	415	122
W Walker R bl L Walker R nr Coleville	APR-JUL	380	400	415	271%	430	450	153
	MAY-JUL	365	385	400	317%	410	430	126

- 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

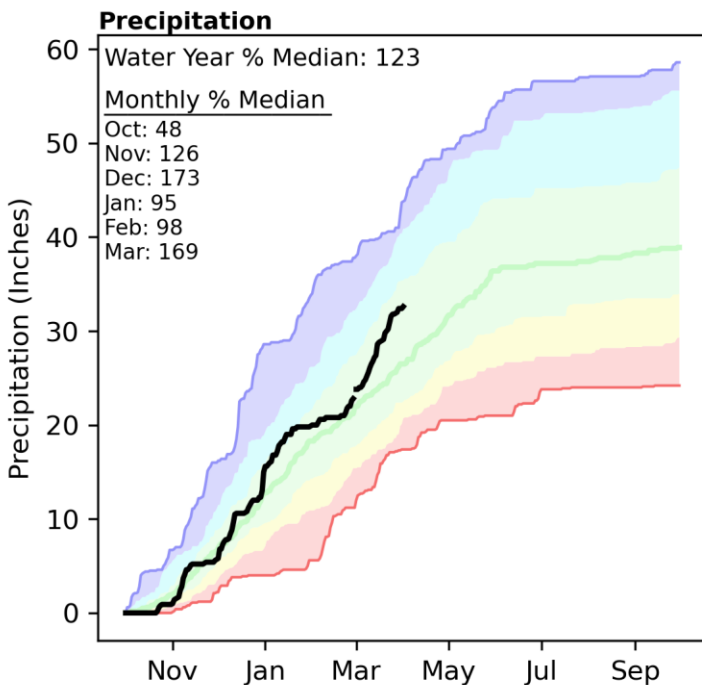
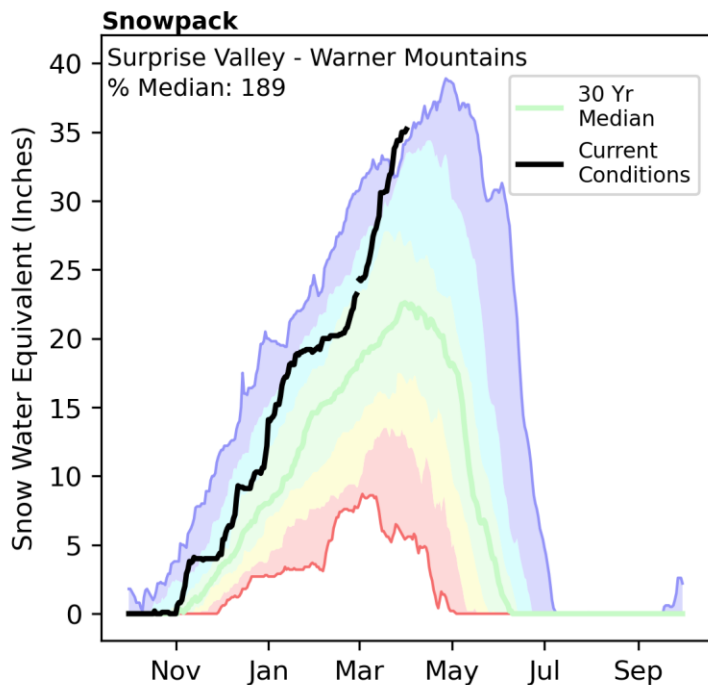
Reservoir Storage End of March, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Bridgeport Reservoir	11.2	18.5	25.1	42.5

Basin Index
of reservoirs

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Walker	10	306%	61%

Surprise Valley - Warner Mountains | April 1, 2023

Snowpack in the Surprise Valley - Warner Mountains is well above normal at 189% of median, compared to 60% at this time last year. Precipitation in March was well above normal at 169%, which brings the seasonal accumulation (October-March) to 123% of median.



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

Provided by:
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Data Current As of: 4/12/2023 6:45:42 PM

Surprise Valley-Warners - April 1, 2023

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Surprise Valley-Warners	4	189%	60%

Colorado Streamflow Forecasts - April 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	8000	9620	10800	176%	12000	14000	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 March, 2023	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Powell	5375.0	5812.4	12880.0	24322.0

Basin Index
of reservoirs

Watershed Snowpack Analysis April 1, 2023	# of Sites	% Median	Last Year % Median
Colorado	227	176%	88%

Appendix: Interpreting the Streamflow Forecast Chart

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

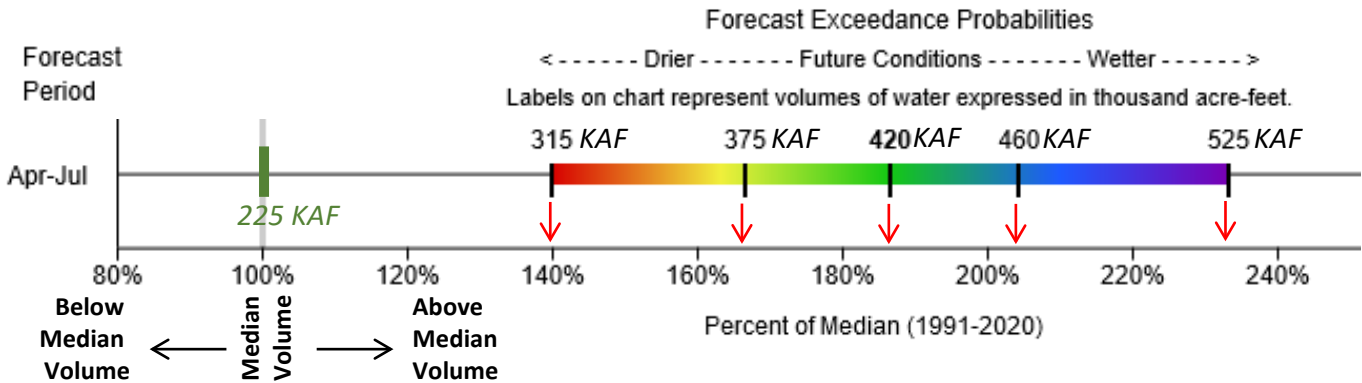
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Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
APR-JUL	315	375	420	187%	460	525	225

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.

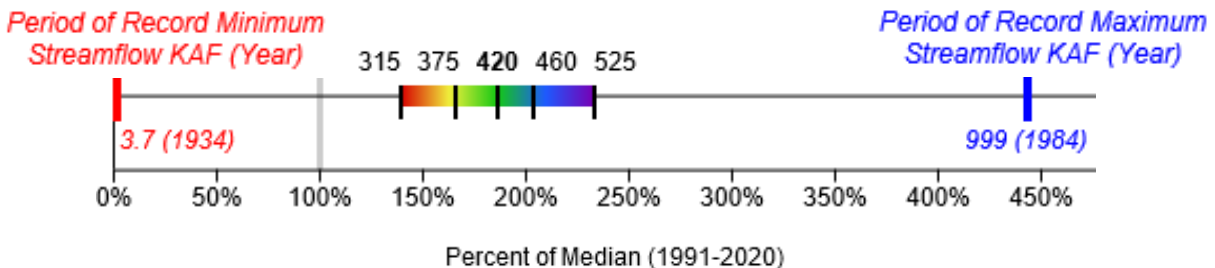


The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of median can be estimated by looking at the horizontal axis. The green line and number centered above 100% on the horizontal axis represents the 1981-2010 historical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

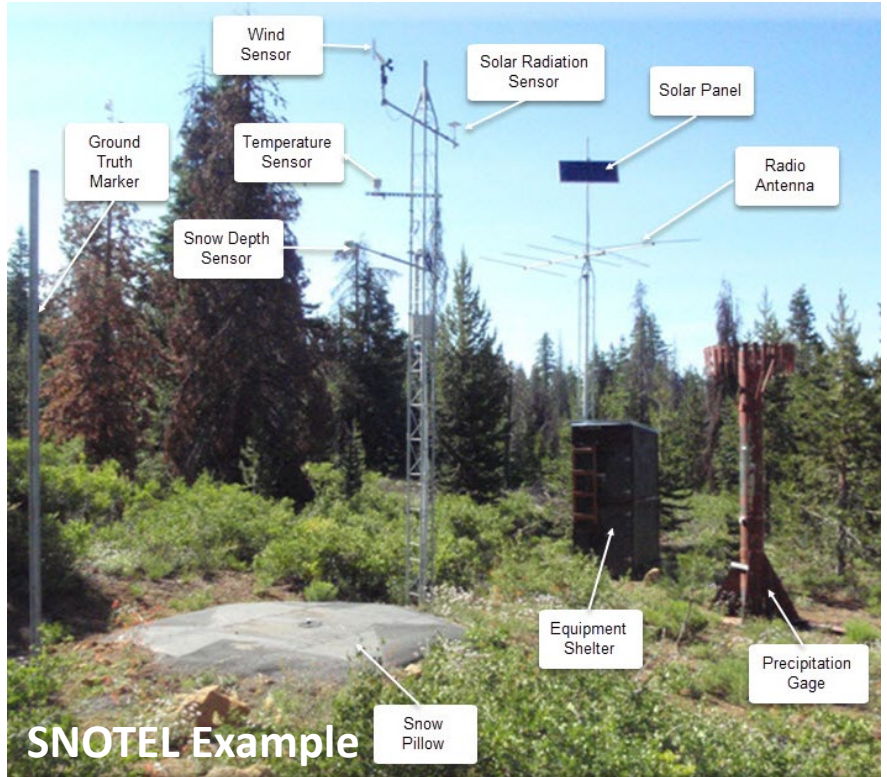


[Click here](#) for an online version which allows users to see averages instead of medians, as well as historic forecasts.

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

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

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California Water Supply Outlook

