

California Water Supply Outlook Report

January 2025



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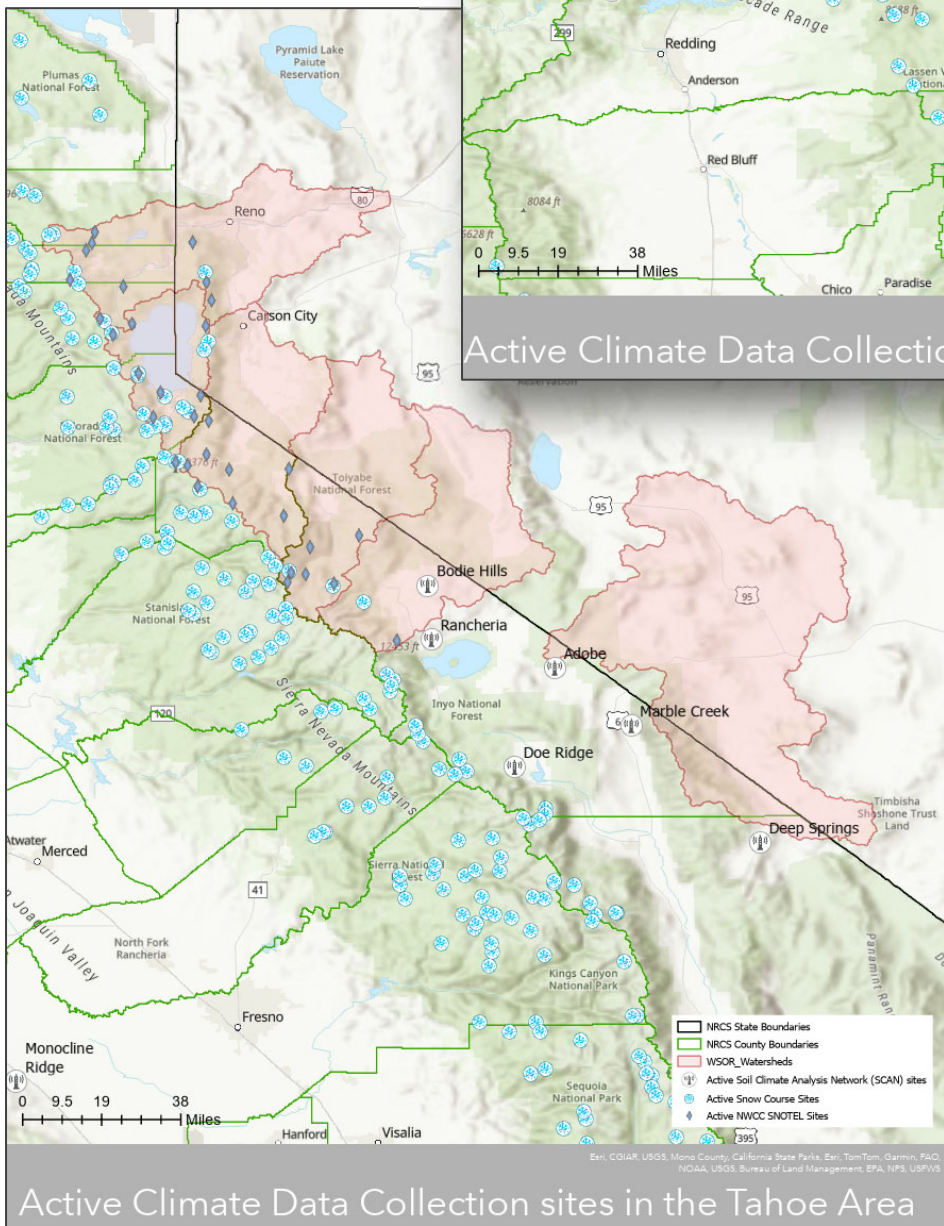
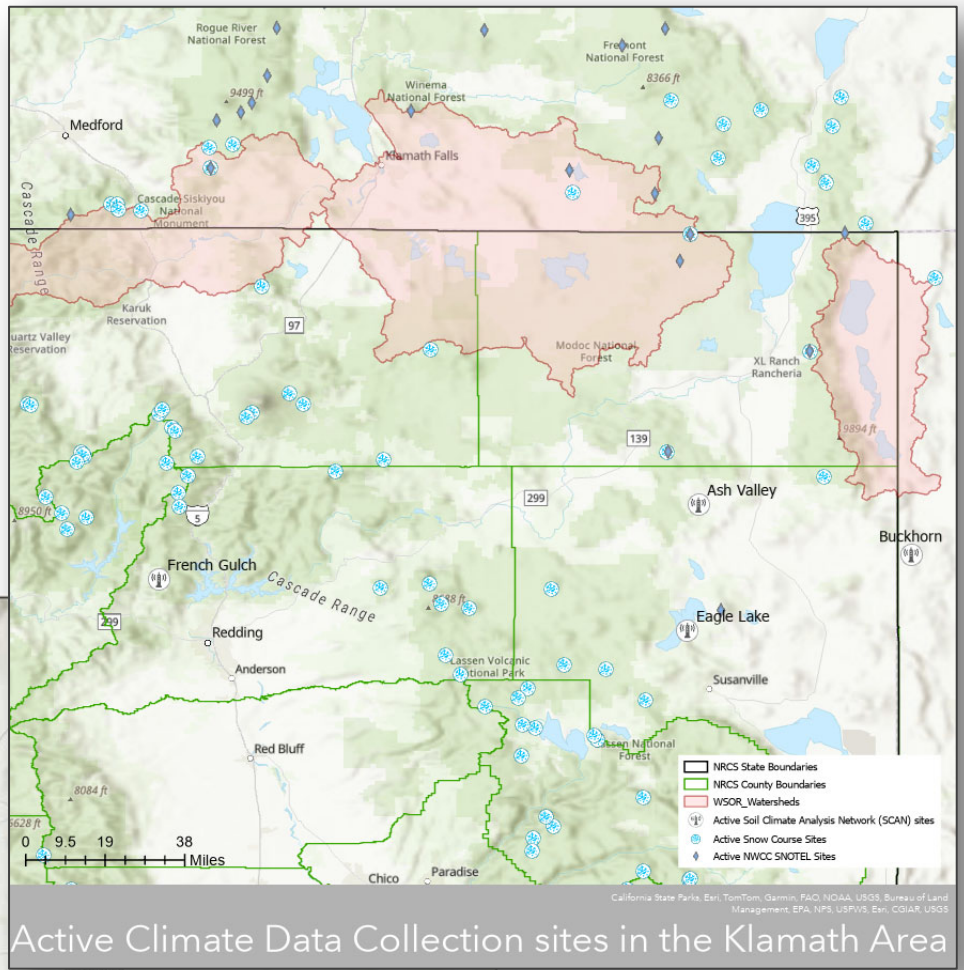
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Map Updated 4/18/2024



*Maps only show forecasted basins that are partially or completely contained in CA. Maps Updated 4/18/2024

STATE OF CALIFORNIA GENERAL OUTLOOK

January 2025

2024 RECAP:

Water Supply Outlook Report Format Updates

Historically, NRCS CA has displayed data from 2 other agencies: California Department of Water Resources (DWR) and the National Weather Service (NWS) for the western Sierra streamflow predictions. Together with NRCS's forecasting data, the major irrigation watersheds are covered for the whole state. NRCS CA is transitioning to providing links to the most up to date data as opposed to providing a snapshot of the data collected and provided by these Partner agencies. *NRCS CA is interested in your feedback on the new format. If you have any comments, please email them to: NRCS.CA.Engineering@usda.gov.*

NRCS Water Supply Forecast System for the American West

This year, the NRCS begins using a new water supply forecast (WSF) system, the Multi-Model Machine-Learning Metasystem, or M4. In comparison to the historic singular WSF model, the new system creates a mean value from six different forecast models. Using the mean of the ensemble of models harnesses the strengths of each technique while insulating against potential individual model vulnerabilities. The original NRCS WSF model remains as part of the suite of ensemble models. Testing shows that the ensemble mean generally equals or exceeds the performance of any individual model member. Application of NRCS water supply probabilistic forecasts remains unchanged.

Contact:

Angus Goodbody, angus.goodbody@usda.gov, Lead Forecast Hydrologist, USDA NRCS Snow Survey and Water Supply Forecasting Program

Additional reading:

- [Assessing the new NRCS water supply forecast model for the American West](#)
- [A Machine Learning Metasystem for Robust Probabilistic Nonlinear Regression-Based Forecasting](#)

2025 UPDATES:

Snow Survey

NRCS CA maintains 4 snow courses in the Lake Tahoe region: Richardson #2, Palisades Tahoe #2, Rubicon #1, and Mount Rose. NRCS CA will start measuring snow depth around February 1 for the 2025 Water Year. Snow Course Locations and Data can be found at <https://nwcc-apps.sc.egov.usda.gov/> under "Interactive Map."

DWR cooperator partners maintain other snow courses around CA. That data can be found in the DWR B120 links below.

Snowpack

As of January 16th, snowpack is 121 percent of normal for the dates in the northern Sierras (down from 165 percent on December 31st); 75 percent of normal in the central Sierras (down from 95 percent on December 31st); and 57 percent of normal in the southern Sierras (down from 76 percent on December 31st). The DWR Daily Statewide Summary of Snow Water Content map is attached at the end of the General Outlook. More information is available online at:

<http://cdec.water.ca.gov/snow/current/snow/index2.html>.

Precipitation

As of January 17th, the Northern Sierra-, San Joaquin-, and Tulare Basin Index stations received 114, 58, and 57 percent of average for this date. To date, January is significantly drier than November and December 2024. More information is available online at: http://cdec.water.ca.gov/snow_rain.html

Reservoirs

As of December 31, 2024, total reservoir storage in intrastate California was 122 percent of average. Total interstate reservoir storage, including Lake Powell, Lake Mead and the North Coast watershed was 83 percent of average. As of January 16, 2025, storage at Shasta Reservoir was 123 percent of average, up from 114 percent of average in April 2024. Oroville Reservoir was 129 percent of average, up from 126 percent of average in April 2024. Don Pedro Reservoir was 99 percent of average, down from 113 percent of average in April 2024. The DWR Selected Reservoirs Daily Graph – Water Supply summary chart is attached at the end of the General Outlook. More information is available online at: <https://cdec.water.ca.gov/reservoir.html>.

Lake Oroville, along with 16 other reservoirs, is managed by [DWR](#) through the [State Water Project](#). Shasta Dam, along with 5 other storage reservoirs, is managed by the US Bureau of Reclamation as part of the [Central Valley Project](#). Don Pedro Dam and Reservoir is jointly owned by [Turlock and Modesto Irrigation Districts](#). These three reservoirs are just three examples of why the [CA Cooperative Snow Survey Partnership](#) is so critical to understanding where and how water is stored and eventually distributed.

Streamflow

NRCS forecasts in the Tahoe, Truckee, Carson, and Walker River basins are approximately 92 - 129 percent of the 1991-2020 median. NRCS forecasts for stations in the Klamath Basin are 95 - 189 percent of the 1991-2020 medians between April and September. NRCS Forecast summaries are attached after the General Outlook Report.

For the Sacramento, San Joaquin, Tulare, North Coast, and Owens Lake forecasts, please refer to the most up to date information on the DWR and NWS webpages. Links with instructions on how to access the data are provided below.

Links to Data for Sacramento, San Joaquin and Tulare Lake Basins data:

Please note that DWR and NWS use percent of average while NRCS uses percent of median to display forecasted stream flows.

- California Department of Water Resources (DWR):
 - [B120 \(ca.gov\)](#) This version of DWR’s Bulletin 120 links to the seasonal (April – July) forecasting summary for 18 points in the three watersheds and also provides DWR staff contact information.

B-120 WATER SUPPLY FORECAST SUMMARY

UNIMPAIRED FLOW FOR - February 2024
(Provisional data, subject to change)

Report generated: February 8, 2024 17:48

APRIL - JULY FORECAST SUMMARY (IN THOUSANDS OF ACRE-FEET)			
HYDROLOGIC REGION WATERSHED	APRIL - JULY FORECAST	PERCENT OF AVERAGE	80% PROBABILITY RANGE 90% 10%

- [B120DIST \(ca.gov\)](#) This version of DWR’s Bulletin 120 links to the monthly stream forecasts (Feb – Sept) for 16 points in CA and also provides DWR staff contact information.


B-120 WATER SUPPLY FORECAST SUMMARY

UNIMPAIRED FLOW FOR - February 1, 2024
(Provisional data, subject to change)

Report generated: February 08, 2024 13:31

WATER YEAR FORECAST SUMMARY AND MONTHLY DISTRIBUTION (IN THOUSANDS OF ACRE-FEET)												
WATERSHED	OCT THRU JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	WATER YEAR TOTAL	80% PROBABILITY RANGE 90% 10%	WY % AVERAGE

- National Weather Service (NWS): [CNRFC - Water Resources - Daily Water Resources Update \(noaa.gov\)](#) The California Nevada Forecast Center provides Daily Water updates. The report that is closest to the NRCS forecasting report is the “Seasonal %Avg” product in the “Forecast Flow” data type.

Daily Water Resources Update Web content below courtesy of:  [Other Resources](#)

1 Select data type below:

Precipitation	Snow	Observed Flow	Reservoir Storage	Forecast Flow	Point Forecasts
---------------	------	---------------	-------------------	----------------------	-----------------

2 Select product below:

Water Year %Avg	Seasonal %Avg	Spring Peak Flow Dates	Seasonal Volumes (text)	Seasonal Tracker (text)
Water Year Tracker (text)	Seasonal Breakdown (text)	Water Year Breakdown (text)	Next 12 Months (text)	Spring Peaks (text)

Forecast Seasonal Volume (WY2024)
 Click for more options
 Data Mode:

Percent of Normal

Extreme Below	Much Below	Below	Near Normal	Above	Much Above	Extreme Above
50%	70%	90%	110%	130%	150%	

Marker size scaled by average seasonal flow.

Created: Thu Feb 08 2024 at 10:15 AM PST

Seasonal Forecast Volumes (as percentages) can be provided by clicking the “show data table” button on the top right of the interactive map. This value is for the whole water year and is not broken down by month. In order to get monthly forecasting data, text reports are available. The “ESP Water Supply Seasonal Forecast” product is the one NRCS used to report data in its previous products.

Change Map Background

Note 1 About Product: This product is updated daily with current water year forecasts plotted.

Note 2 About Product: Most recent Official or Raw ESP Water Supply Forecast during the current water year.

Alternate Text Products: [Official Water Supply Text Forecast](#) | [ESP Water Supply Seasonal Forecast](#)
[Current and Archived Point Data](#)

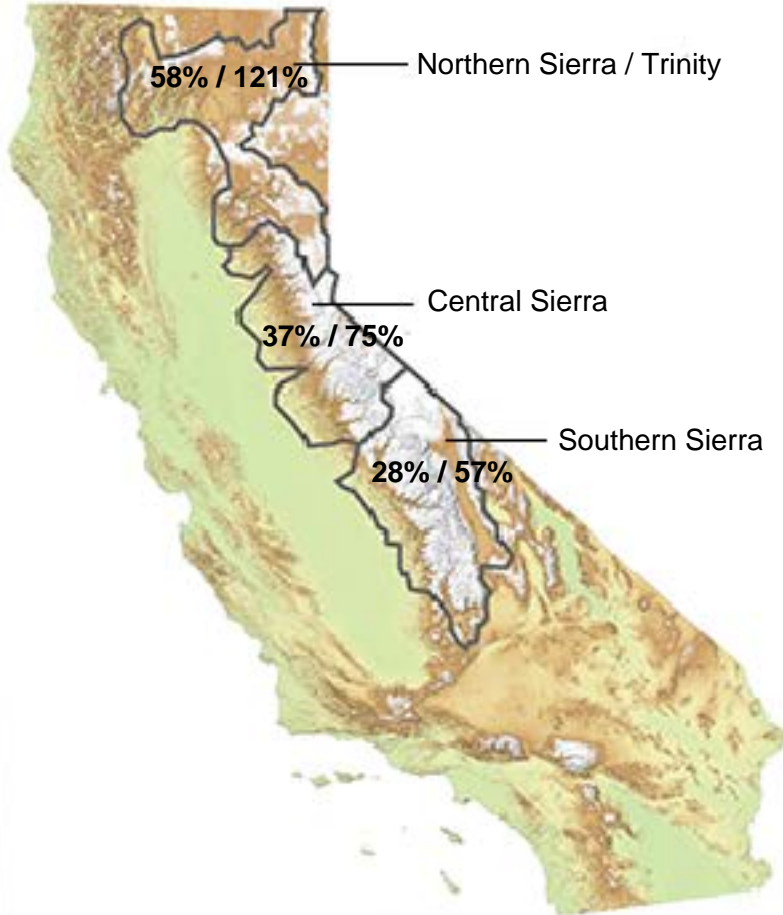


STATEWIDE SNOW WATER CONTENT

CURRENT REGIONAL SNOWPACK FROM AUTOMATED SNOW SENSORS

% of April 1 Average / % of Normal for This Date

Data as of January 16, 2025



NORTH	
Data as of January 16, 2025	
Number of Stations Reporting	27
Average snow water equivalent (Inches)	15.4
Percent of April 1 Average (%)	58
Percent of normal for this date (%)	121

CENTRAL	
Data as of January 16, 2025	
Number of Stations Reporting	53
Average snow water equivalent (Inches)	10.3
Percent of April 1 Average (%)	37
Percent of normal for this date (%)	75

SOUTH	
Data as of January 16, 2025	
Number of Stations Reporting	22
Average snow water equivalent (Inches)	6.6
Percent of April 1 Average (%)	28
Percent of normal for this date (%)	57

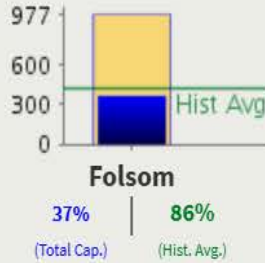
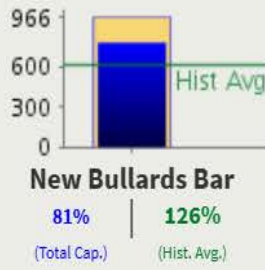
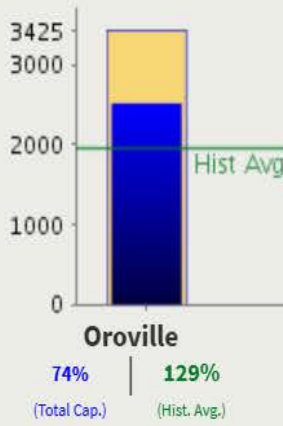
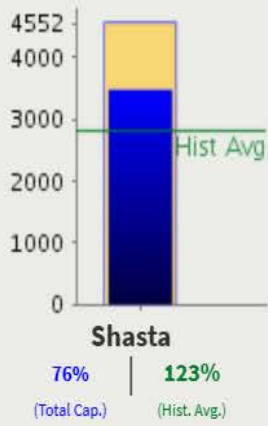
STATE	
Data as of January 16, 2025	
Number of Stations Reporting	102
Average snow water equivalent (Inches)	10.8
Percent of April 1 Average (%)	41
Percent of normal for this date (%)	85

Statewide Average: 41% / 85%

CURRENT CONDITIONS: MAJOR WATER SUPPLY RESERVOIRS:16-JAN-2025

Data as of Midnight: 16-Jan-2025

Change Date: 16-Jan-2025

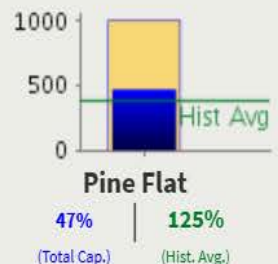
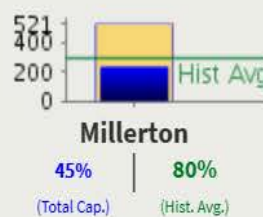
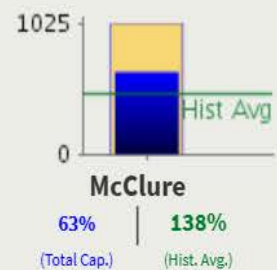
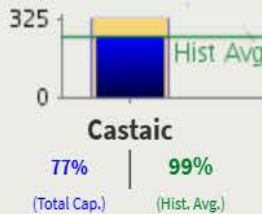
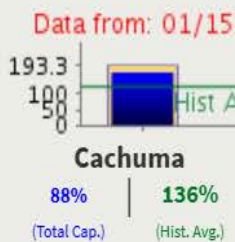
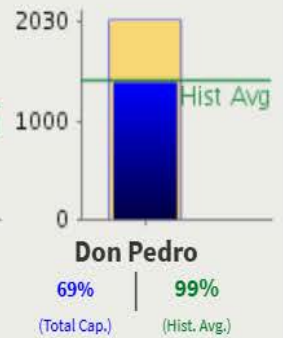
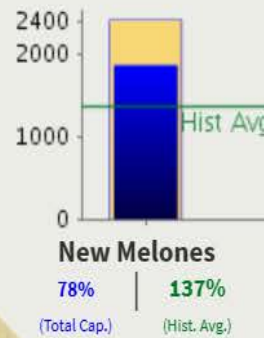
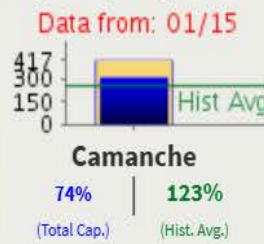
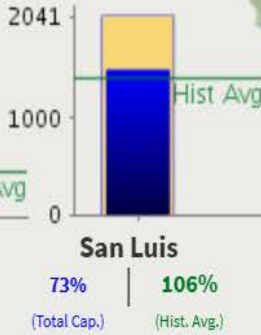
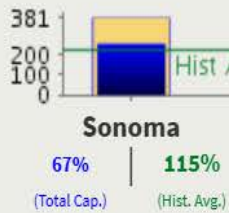
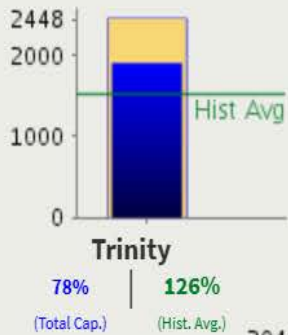


LEGEND

- Blue Bar:** Storage level for date
- Gold Bar:** Total reservoir capacity
- Green Line:** Historic level for date.

Capacity (TAF) | Historical Avg Mark

% of Capacity | % Hist. Avg.
(Click res. 3 char. code for details)



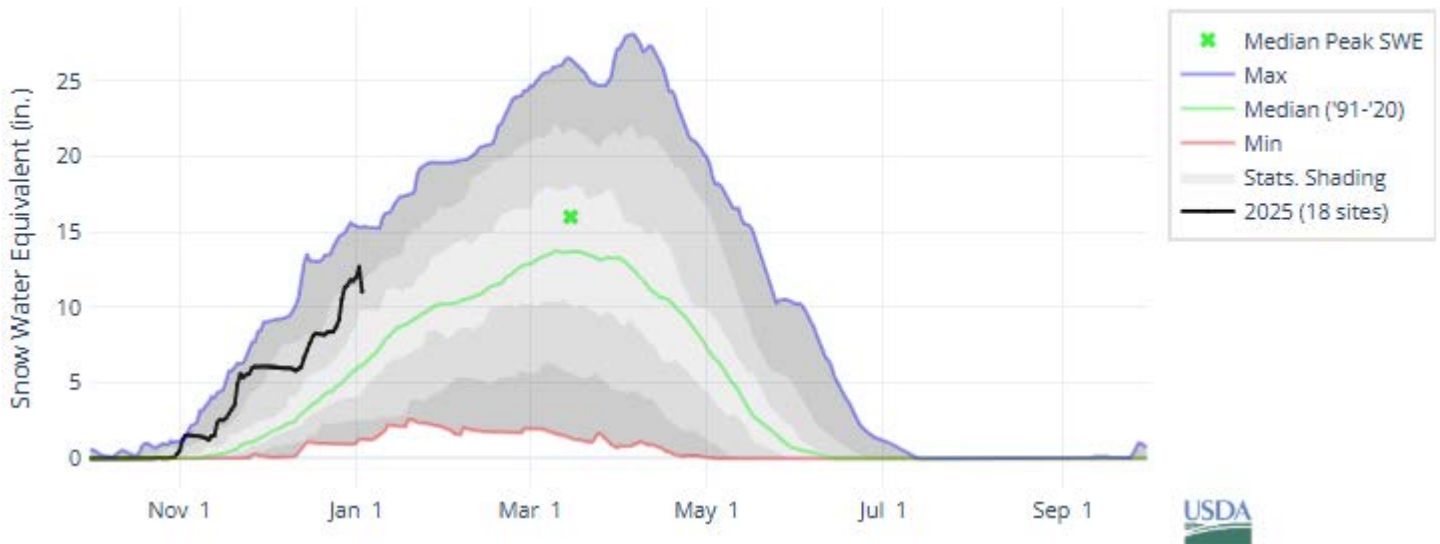
[Click for printable version of current data.](#)

Report Generated: 17-Jan-2025 8:54 AM

The CSI link has been disabled to zoom in, for the lack of historical data.

SNOWPACK

SNOW WATER EQUIVALENT IN KLAMATH

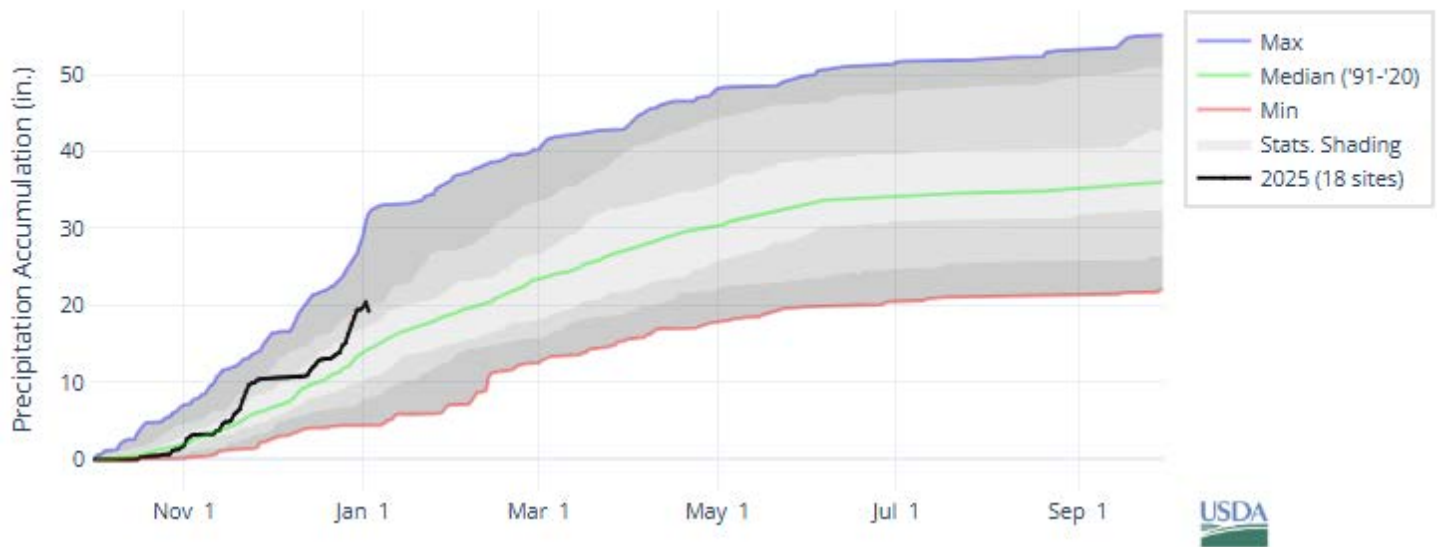


As of January 1, the basin snowpack is above normal at 200% of median. This is lower than December 1 when the basin snowpack was 395% of median.

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

PRECIPITATION

PRECIPITATION ACCUMULATION IN KLAMATH



December precipitation is above normal at 159% of median. Precipitation since the beginning of the water year (October 1 - January 1) is 148% of median.

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

Statistical shading percentiles are calculated from period of record (POR) data, excluding the current water year. Percentile categories range from: minimum to 10th percentile, 10th-30th, 30th-70th, 70th-90th, 90th-maximum.

RESERVOIR STORAGE

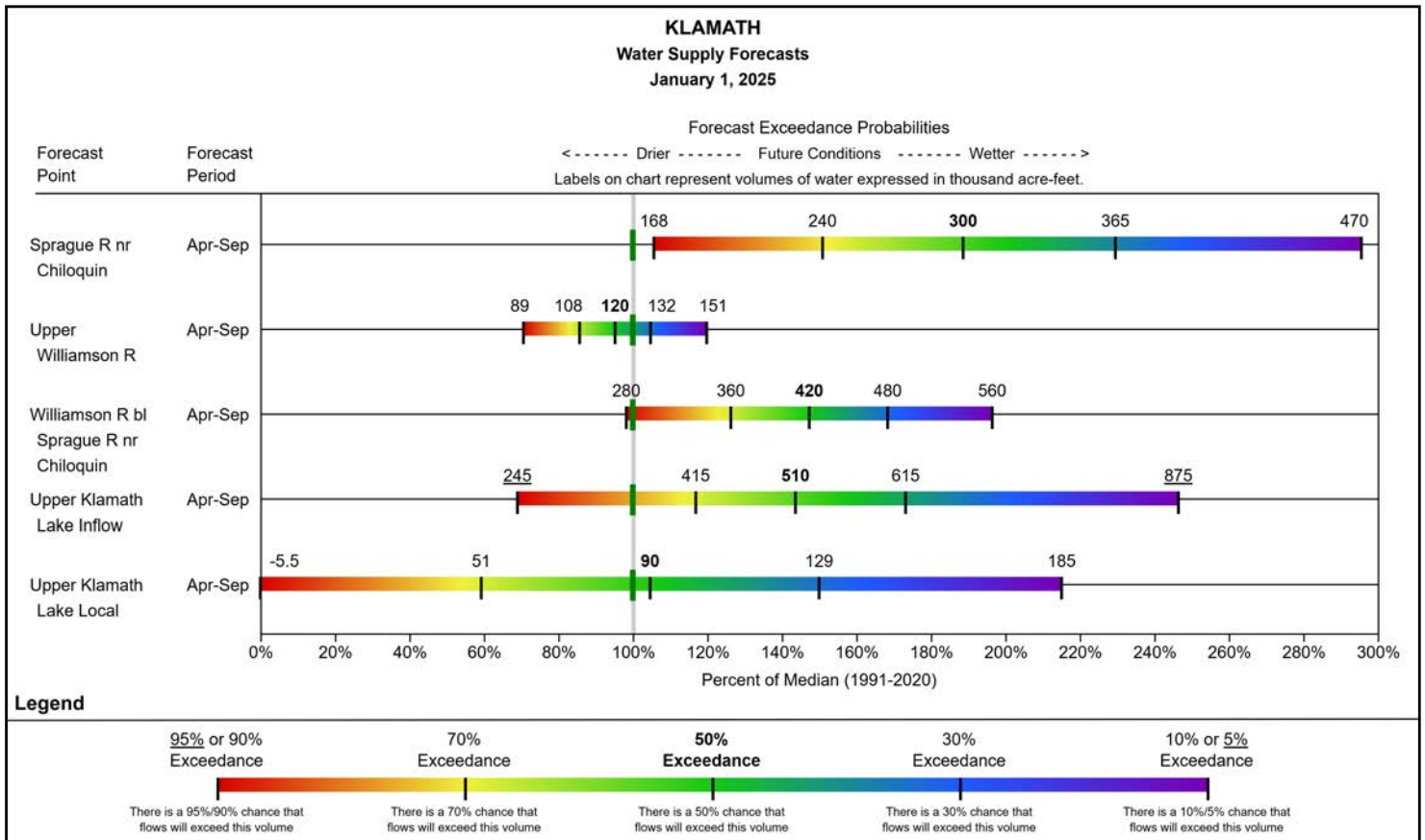
As of January 1, storage at major reservoirs in the basin ranges from 55% of median at Gerber Reservoir to 137% of median at Upper Klamath Lake.

Klamath	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)	Current % Capacity	Last Year % Capacity	Median % Capacity	Current % Median	Last Year % Median
Clear Lake	70.9	72.8	104.6	513.3	14%	14%	20%	68%	70%
Hyatt Prairie	7.4	7.0	9.9	16.2	46%	43%	61%	75%	71%
Fourmile Lake	3.6	2.6	5.2	15.6	23%	16%	33%	69%	49%
Upper Klamath Lake	355.1	259.0	259.7	523.7	68%	49%	50%	137%	100%
Howard Prairie	28.3	21.6	36.0	62.1	46%	35%	58%	79%	60%
Gerber	20.4	15.4	36.9	94.3	22%	16%	39%	55%	42%
Basin Index					40%	31%	37%	107%	84%
# of reservoirs					6	6	6	6	6

STREAMFLOW FORECAST

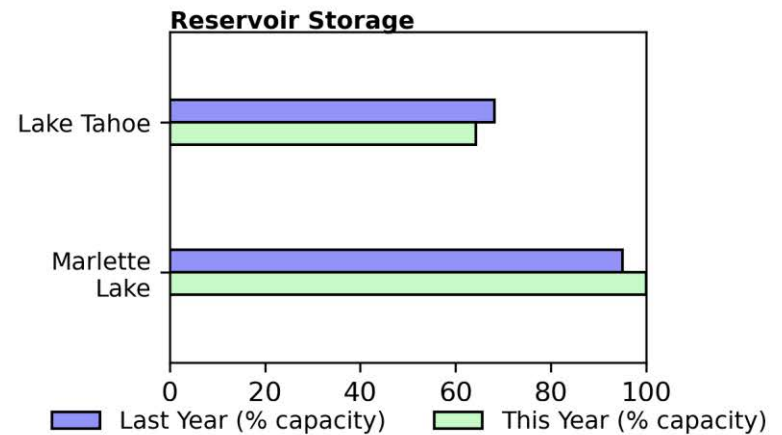
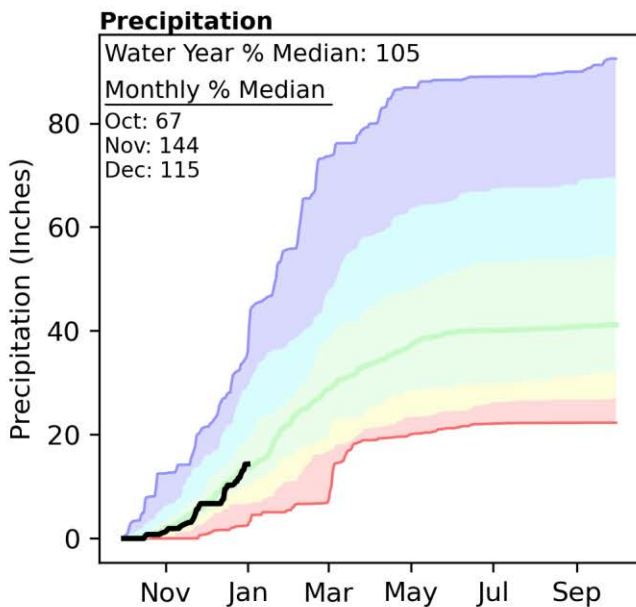
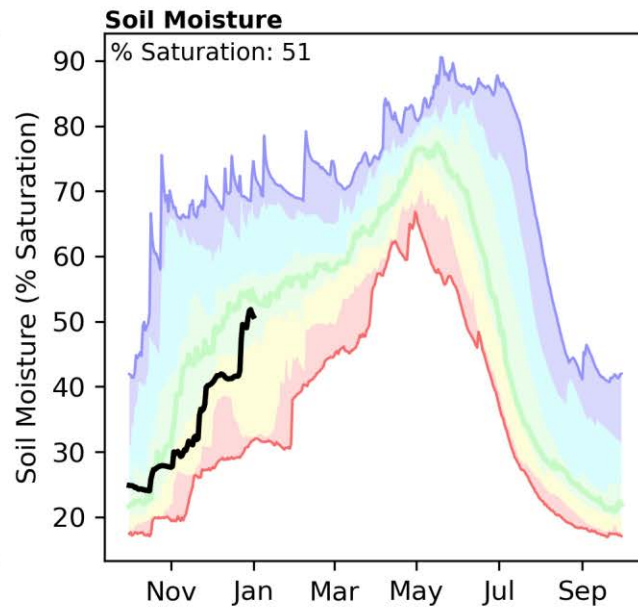
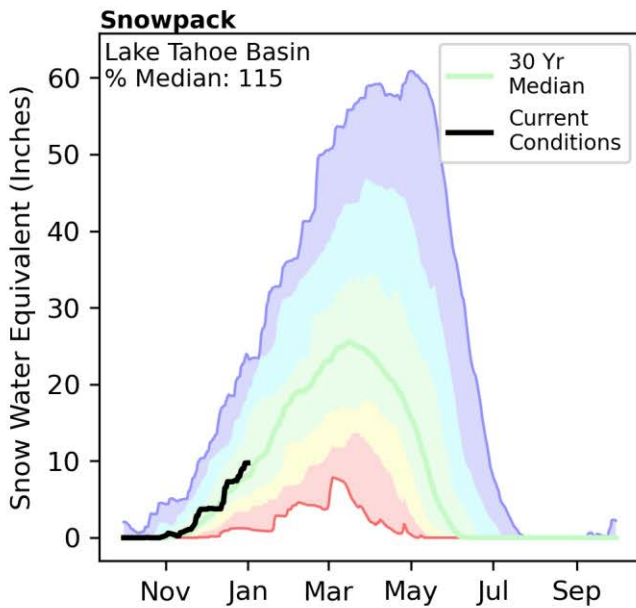
The streamflow forecasts for the primary period in the basin range from 95% to 189% of median.

For data in tabular format and to view other forecasts please view the basin data reports [here](#).



Lake Tahoe Basin | January 1, 2025

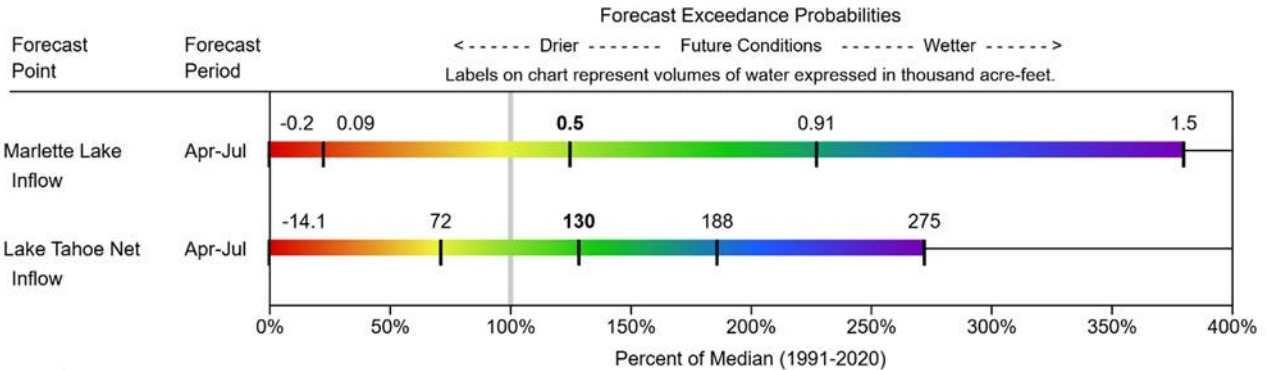
Snowpack in the Lake Tahoe Basin is above normal at 115% of median, compared to 44% at this time last year. Precipitation in December was above normal at 115%, which brings the seasonal accumulation (October-December) to 105% of median. Soil moisture is at 51% saturation compared to 58% saturation last year. Reservoir storage is 65% of capacity, compared to 69% last year.



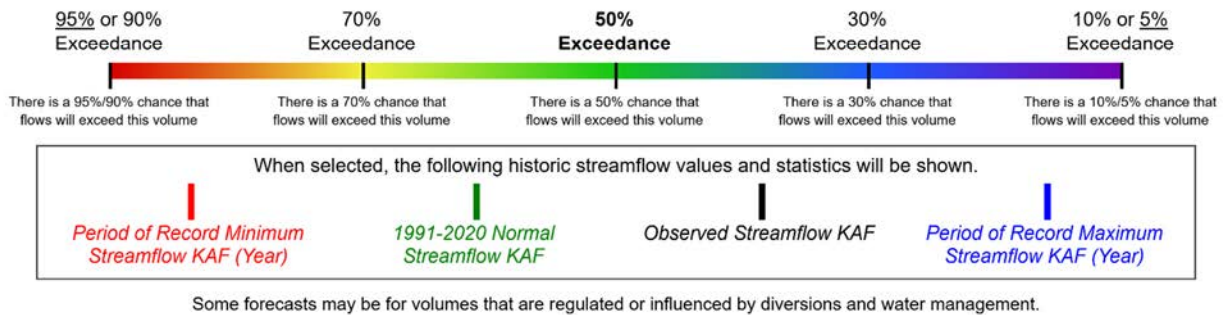
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

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.

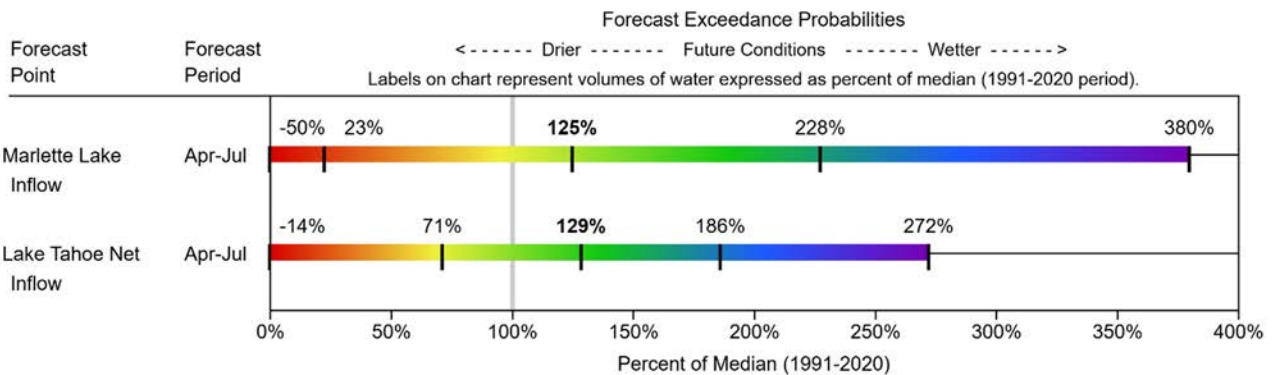
TAHOE
Water Supply Forecasts
January 1, 2025



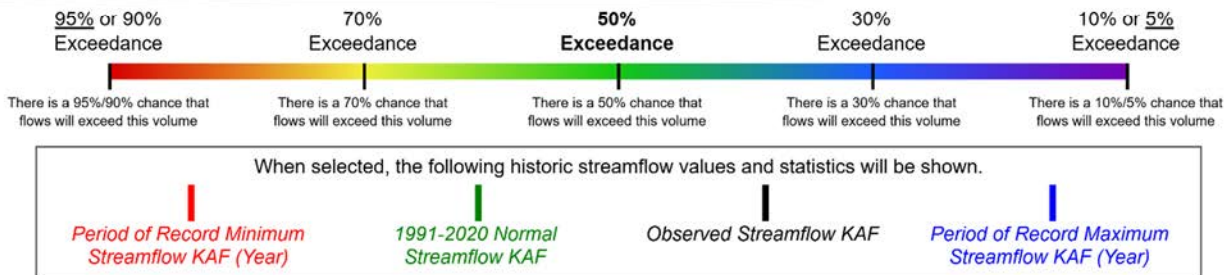
Legend



TAHOE
Water Supply Forecasts
January 1, 2025

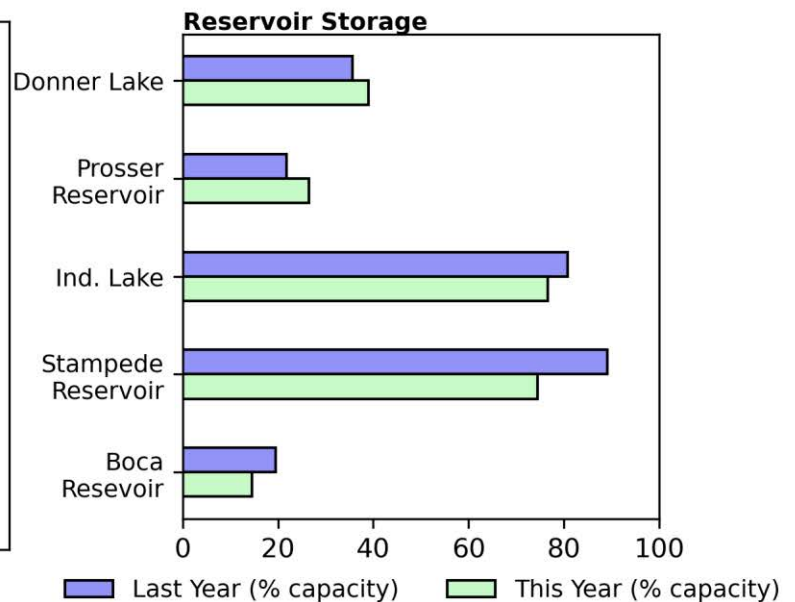
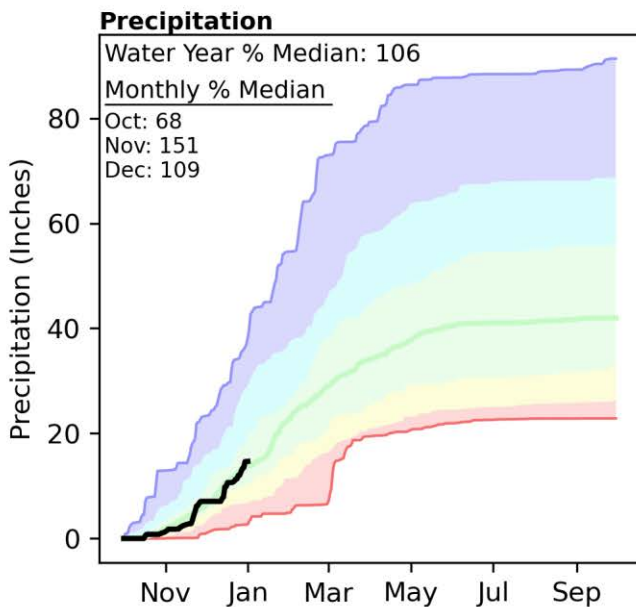
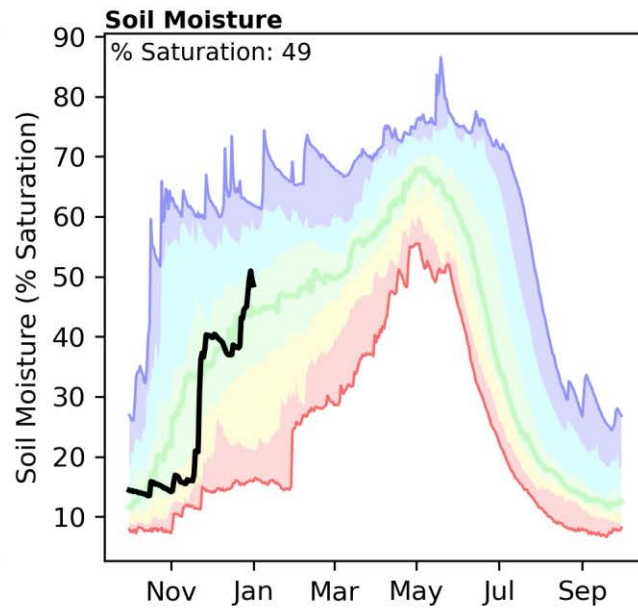
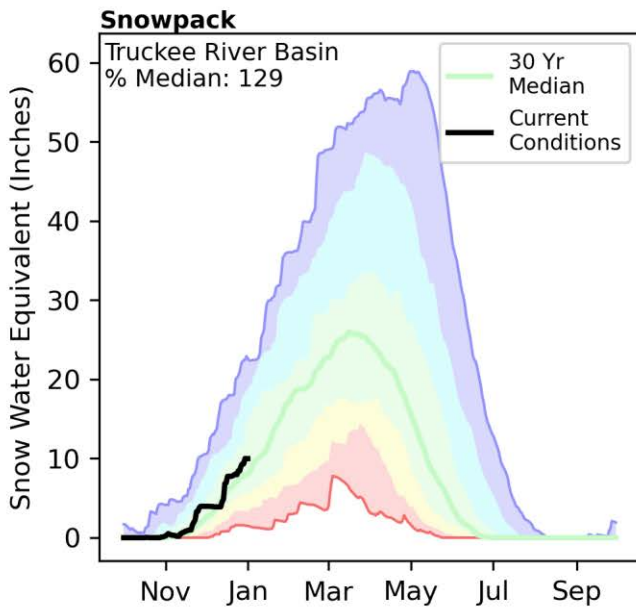


Legend



Truckee River Basin | January 1, 2025

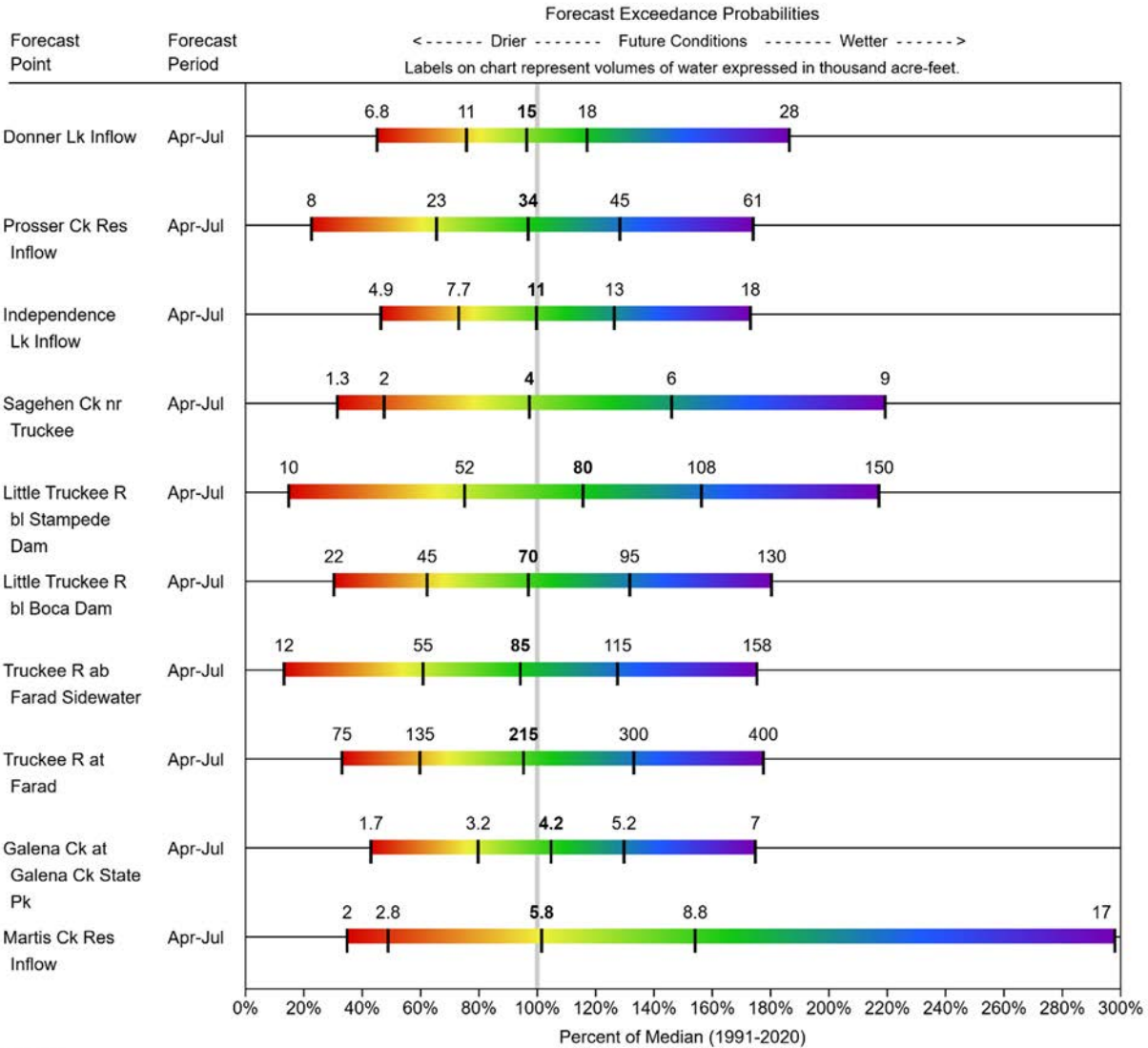
Snowpack in the Truckee River Basin is above normal at 129% of median, compared to 46% at this time last year. Precipitation in December was about normal at 109%, which brings the seasonal accumulation (October-December) to 106% of median. Soil moisture is at 49% saturation compared to 48% saturation last year. Reservoir storage is 62% of capacity, compared to 72% last year.



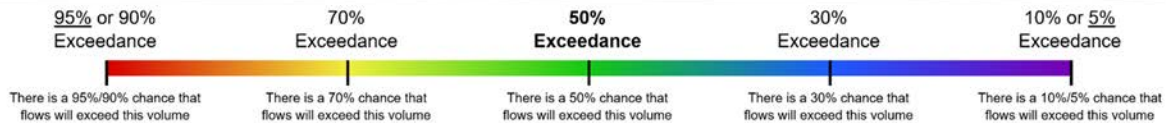
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
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TRUCKEE
Water Supply Forecasts
January 1, 2025



Legend

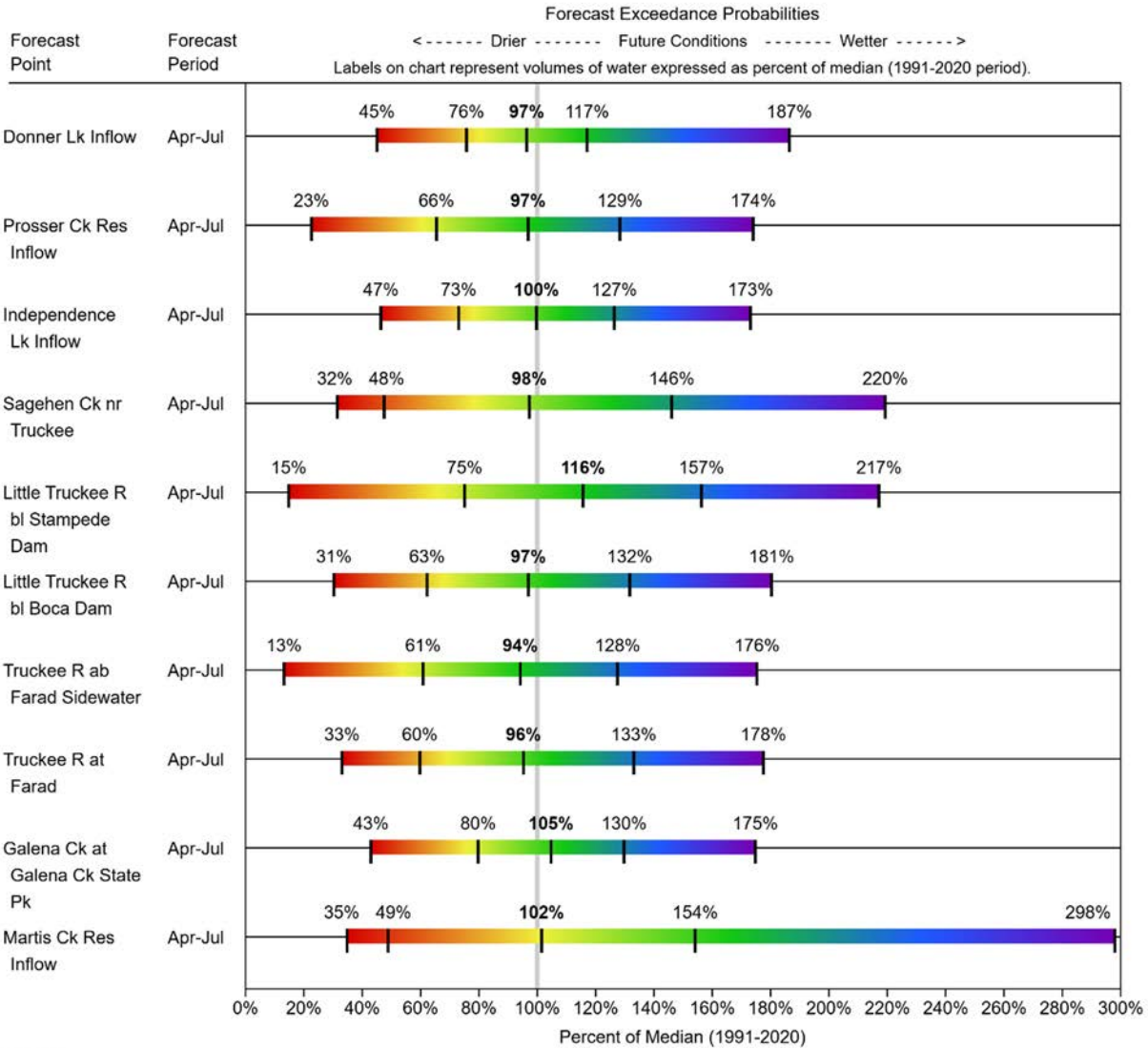


When selected, the following historic streamflow values and statistics will be shown.

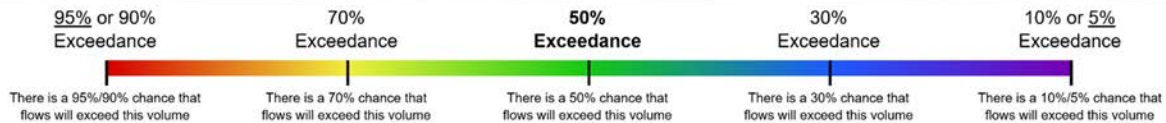
<i>Period of Record Minimum Streamflow KAF (Year)</i>	<i>1991-2020 Normal Streamflow KAF</i>	<i>Observed Streamflow KAF</i>	<i>Period of Record Maximum Streamflow KAF (Year)</i>

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

TRUCKEE
Water Supply Forecasts
January 1, 2025



Legend



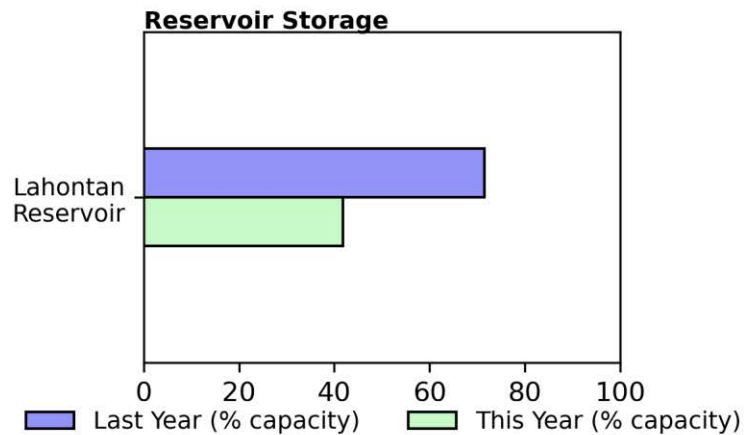
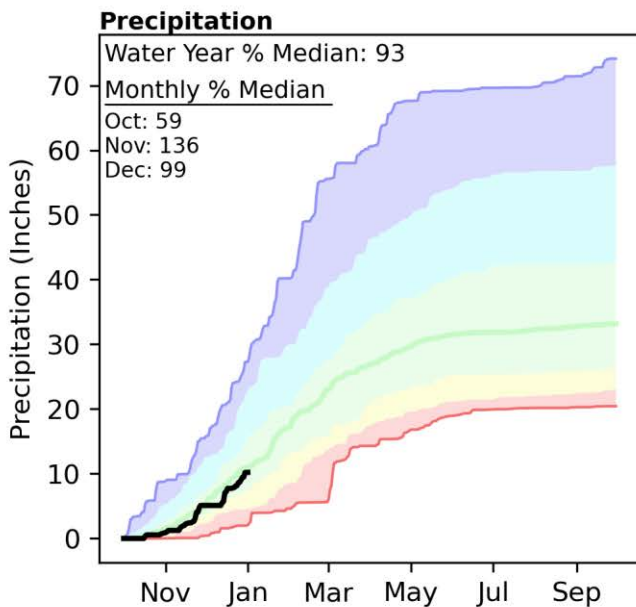
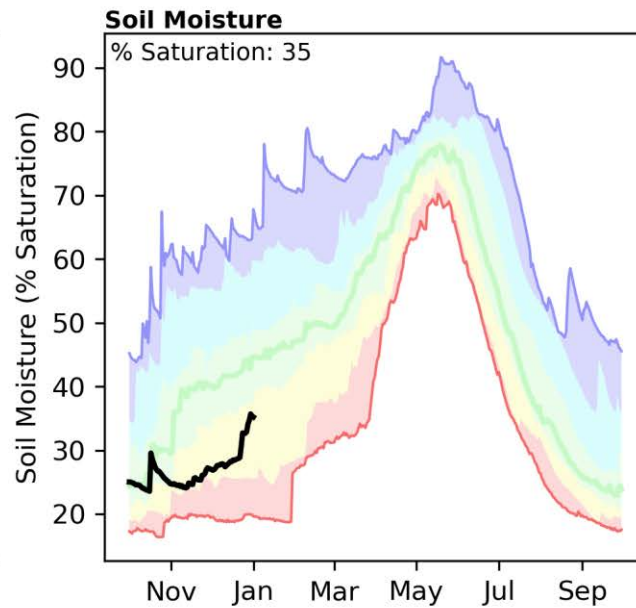
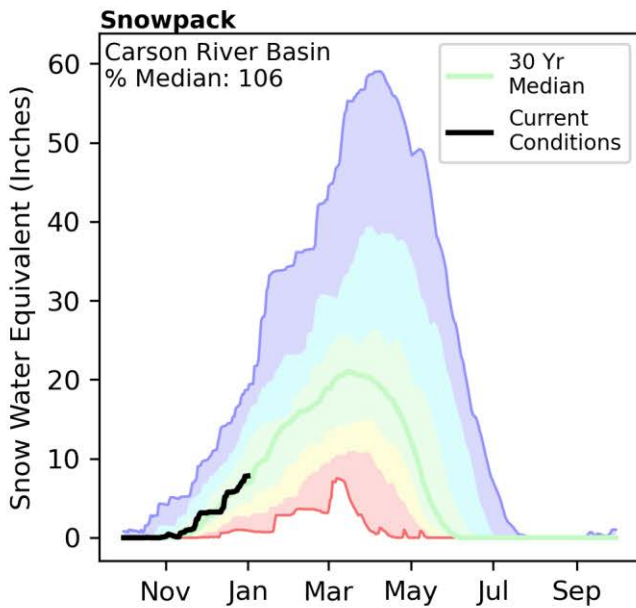
When selected, the following historic streamflow values and statistics will be shown.

<i>Period of Record Minimum Streamflow KAF (Year)</i>	<i>1991-2020 Normal Streamflow KAF</i>	<i>Observed Streamflow KAF</i>	<i>Period of Record Maximum Streamflow KAF (Year)</i>

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

Carson River Basin | January 1, 2025

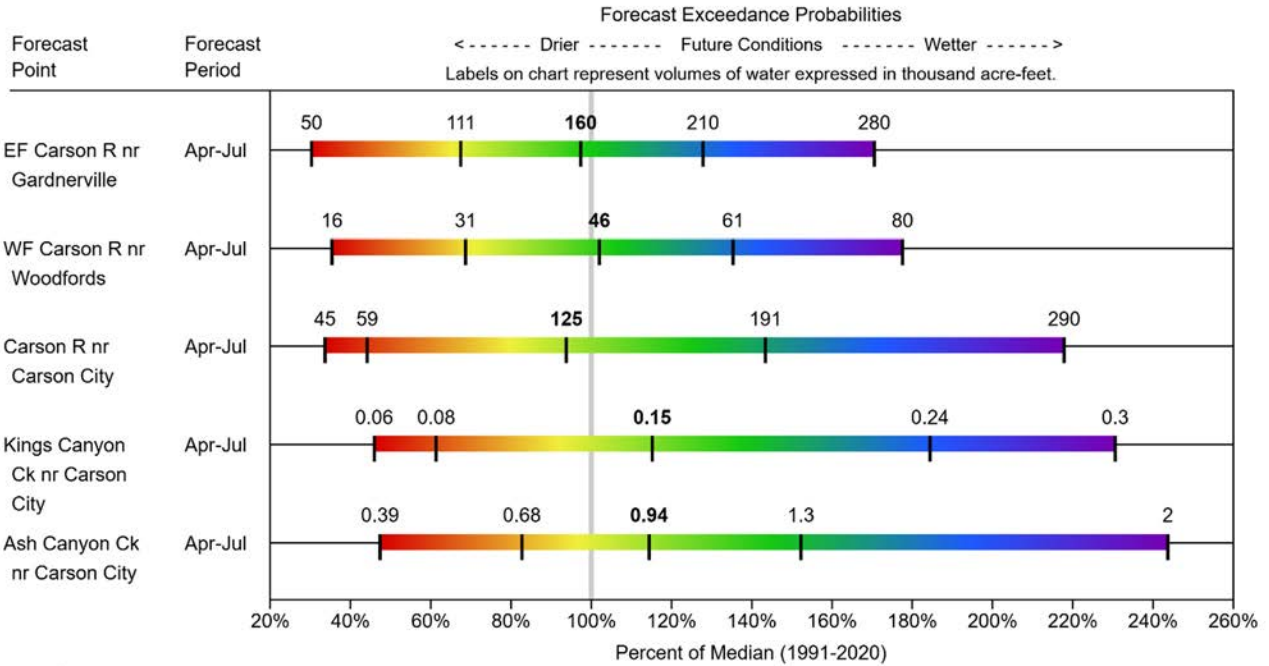
Snowpack in the Carson River Basin is about normal at 106% of median, compared to 41% at this time last year. Precipitation in December was about normal at 99%, which brings the seasonal accumulation (October-December) to 93% of median. Soil moisture is at 35% saturation compared to 49% saturation last year. Reservoir storage is 42% of capacity, compared to 71% 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
Water Supply Forecasts
January 1, 2025



Legend

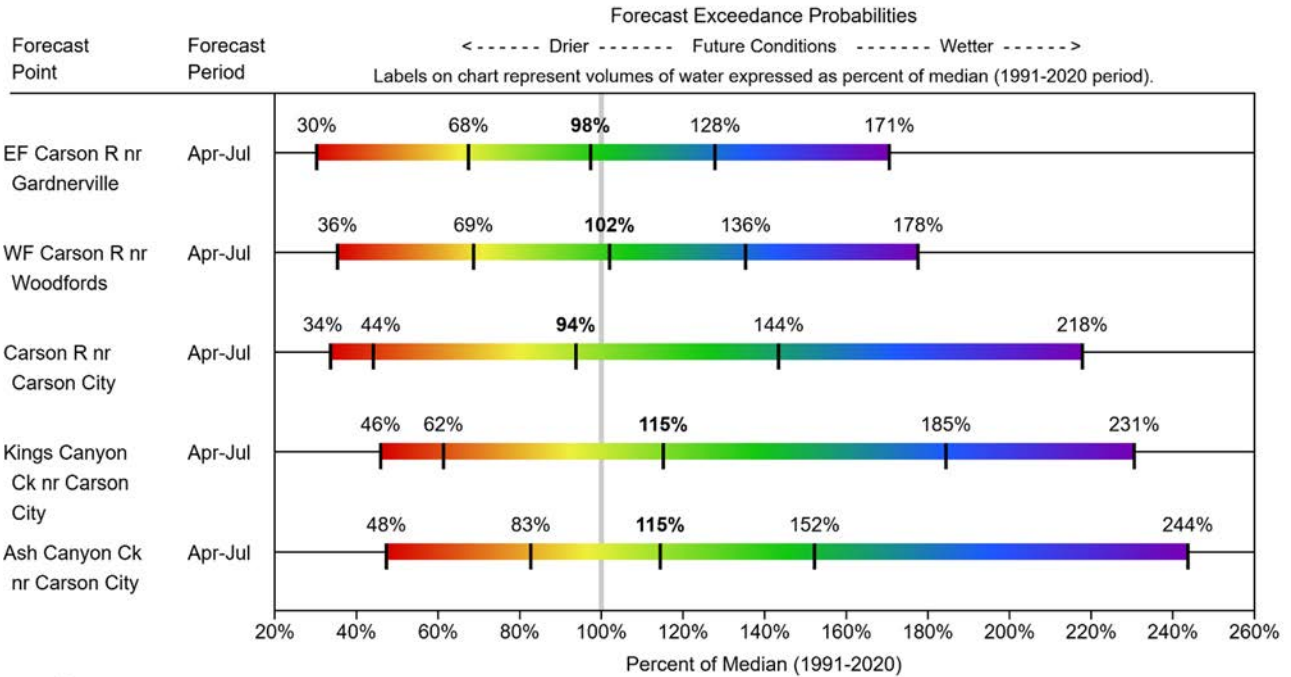


When selected, the following historic streamflow values and statistics will be shown.

<i>Period of Record Minimum Streamflow KAF (Year)</i>	<i>1991-2020 Normal Streamflow KAF</i>	<i>Observed Streamflow KAF</i>	<i>Period of Record Maximum Streamflow KAF (Year)</i>
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Some forecasts may be for volumes that are regulated or influenced by diversions and water management.





CARSON
Water Supply Forecasts
January 1, 2025



Legend



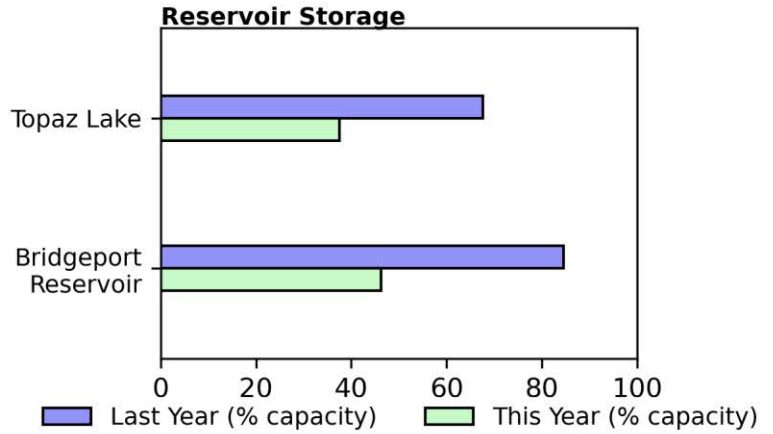
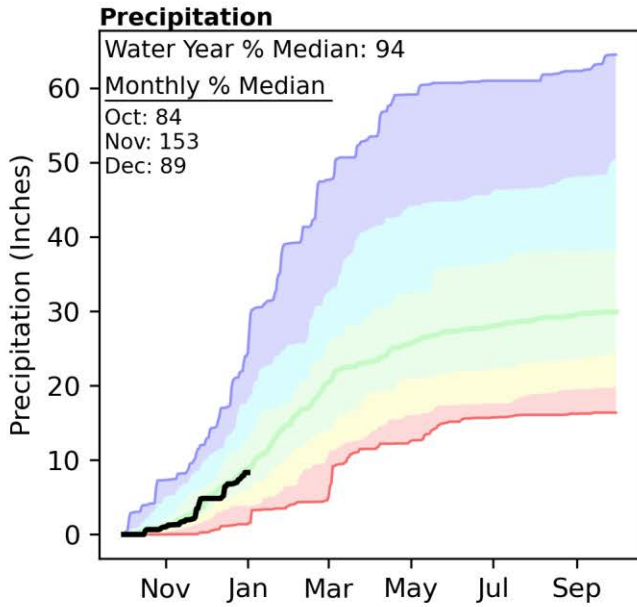
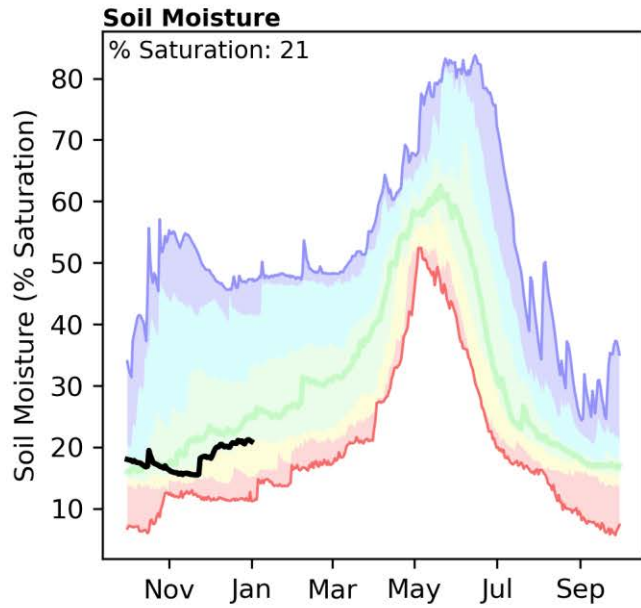
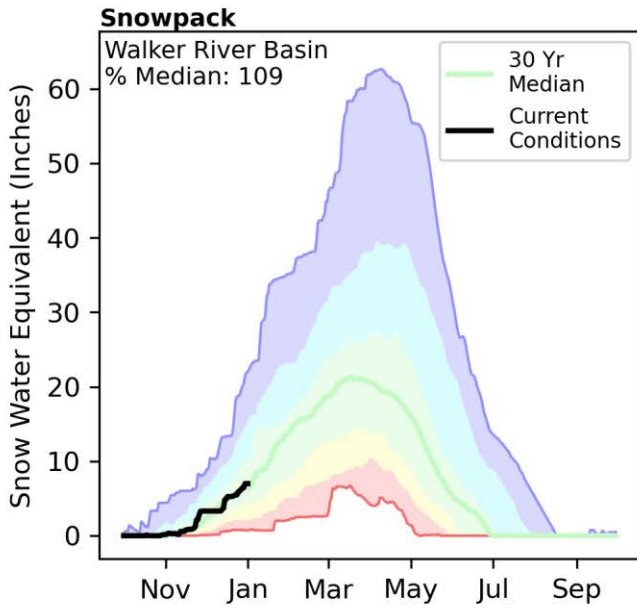
When selected, the following historic streamflow values and statistics will be shown.

 <i>Period of Record Minimum Streamflow KAF (Year)</i>	 <i>1991-2020 Normal Streamflow KAF</i>	 <i>Observed Streamflow KAF</i>	 <i>Period of Record Maximum Streamflow KAF (Year)</i>
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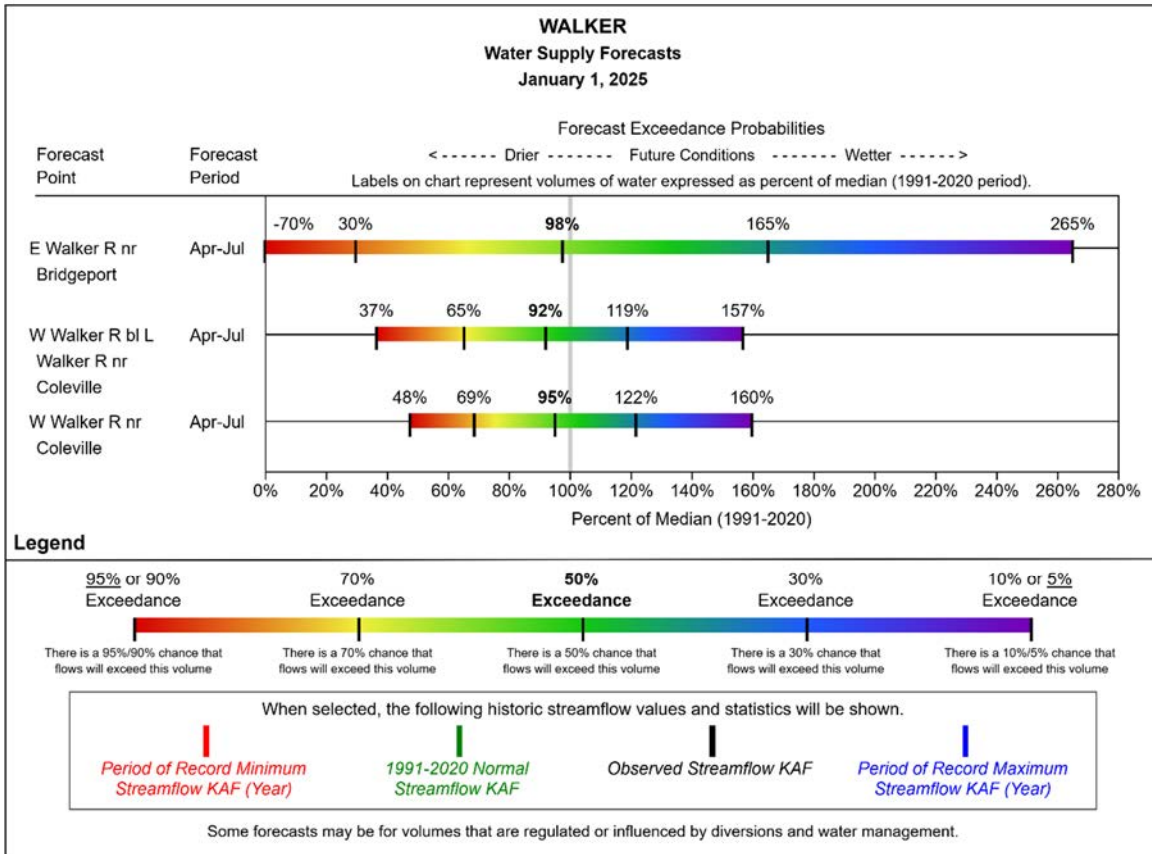
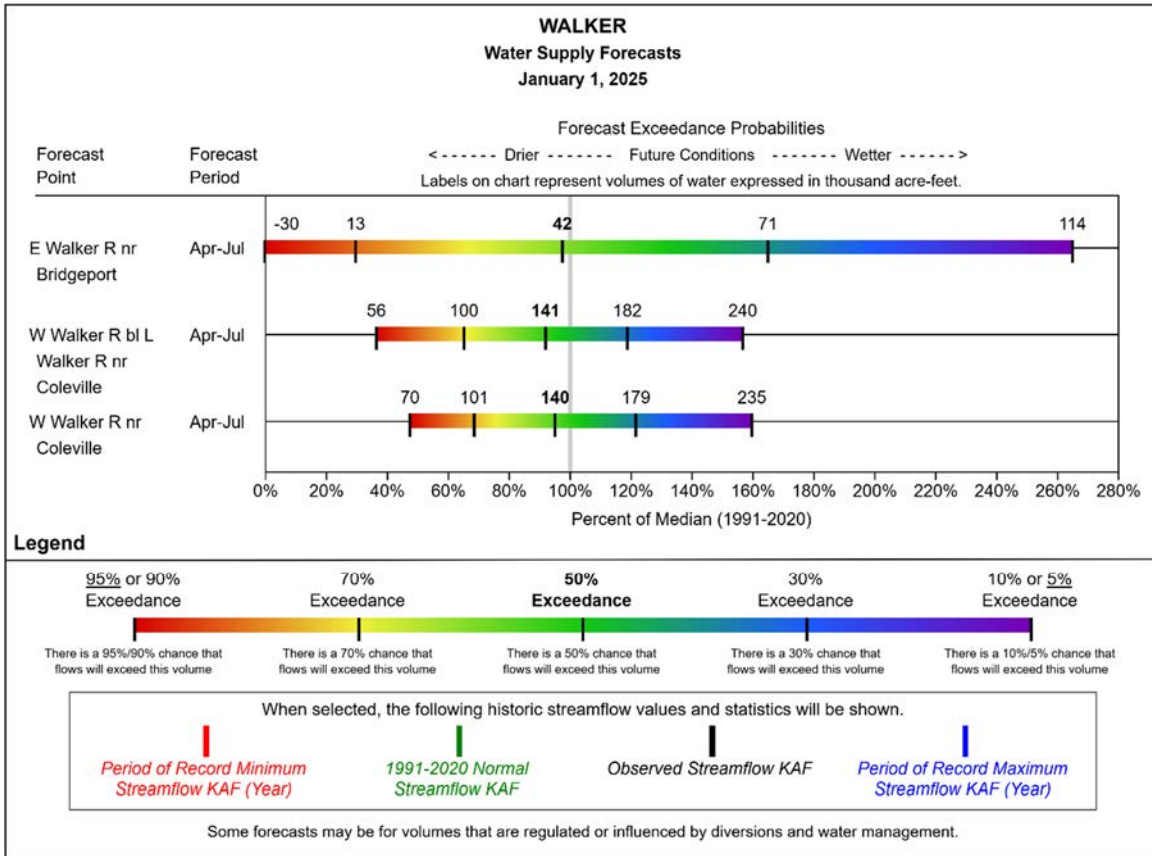
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

Walker River Basin | January 1, 2025

Snowpack in the Walker River Basin is about normal at 109% of median, compared to 44% at this time last year. Precipitation in December was below normal at 89%, which brings the seasonal accumulation (October-December) to 94% of median. Soil moisture is at 21% saturation, the same as last year at this time. Reservoir storage is 41% of capacity, compared to 75% last year.

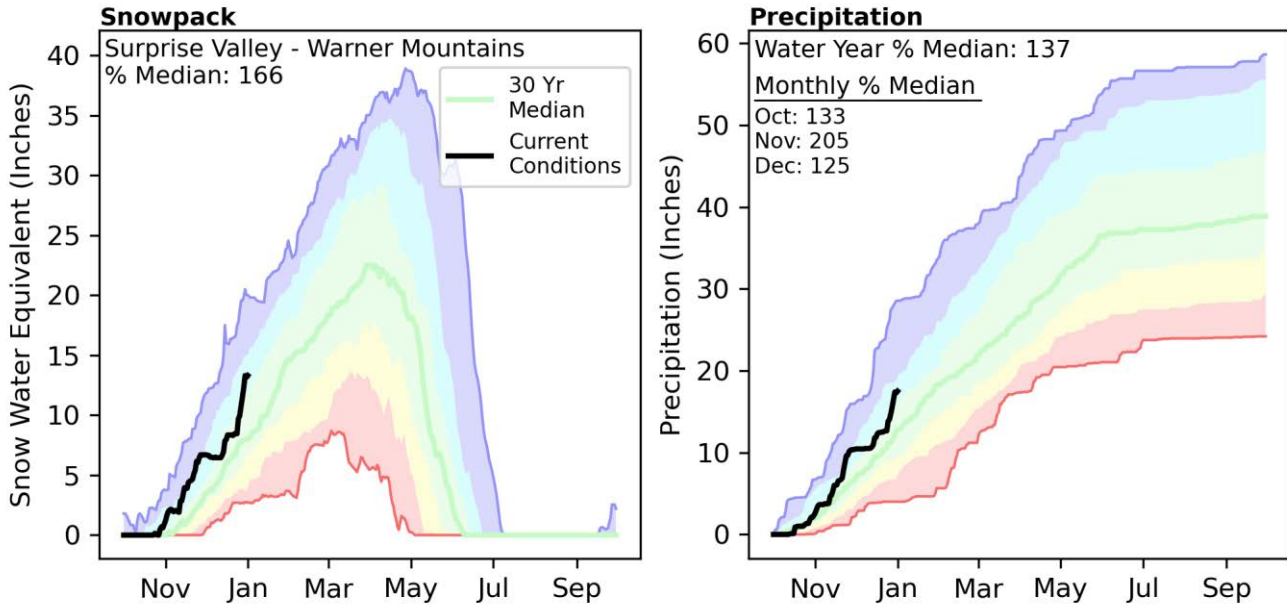


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles. For more information visit: [30 year normal calculation description](#)



Surprise Valley - Warner Mountains | January 1, 2025

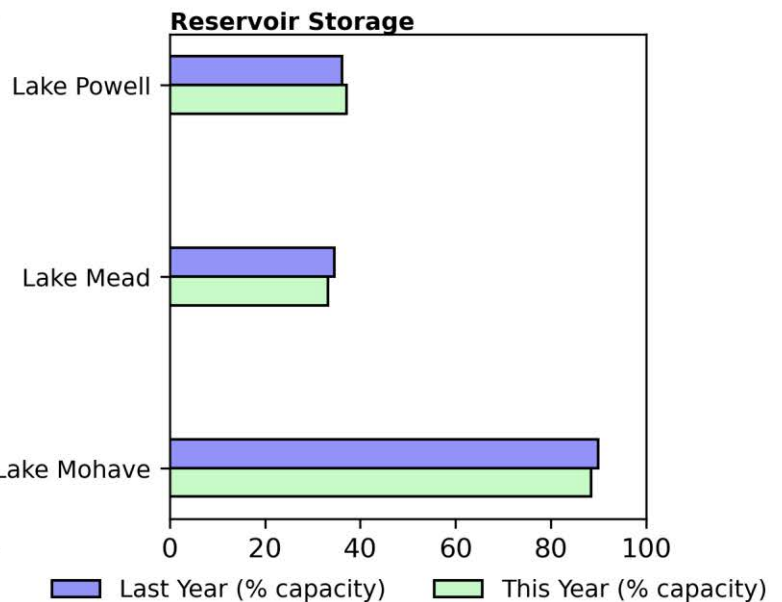
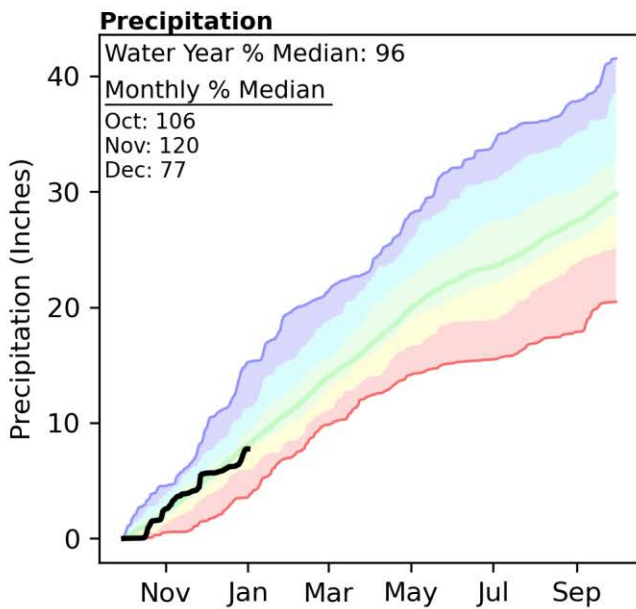
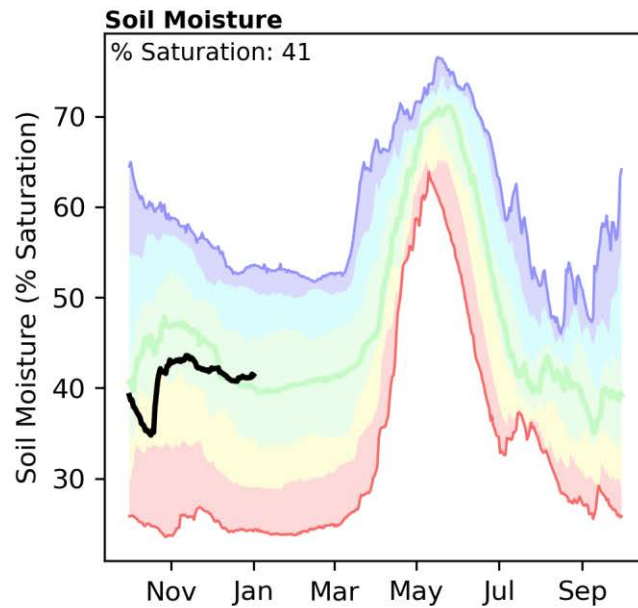
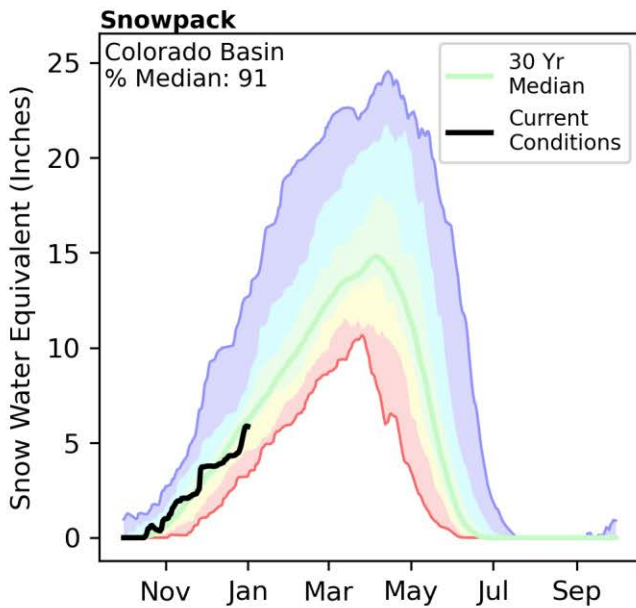
Snowpack in the Surprise Valley - Warner Mountains is well above normal at 166% of median, compared to 79% at this time last year. Precipitation in December was above normal at 125%, which brings the seasonal accumulation (October-December) to 137% of median.



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

Colorado Basin | January 1, 2025

Snowpack in the Colorado Basin above Lake Powell is about normal at 91% of median, compared to 67% at this time last year. Precipitation in December was below normal at 77%, which brings the seasonal accumulation (October-December) to 96% of median. Soil moisture is at 41% saturation compared to 37% saturation last year. Reservoir storage in the Lower Colorado Basin is 36% of capacity, compared to 37% last year.



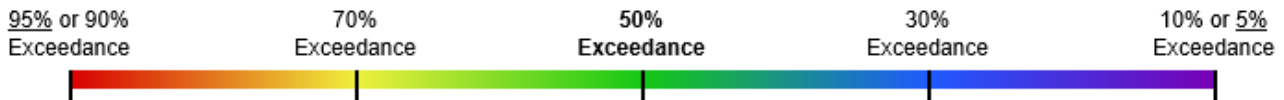
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Appendix: Interpreting the Streamflow Forecast Chart

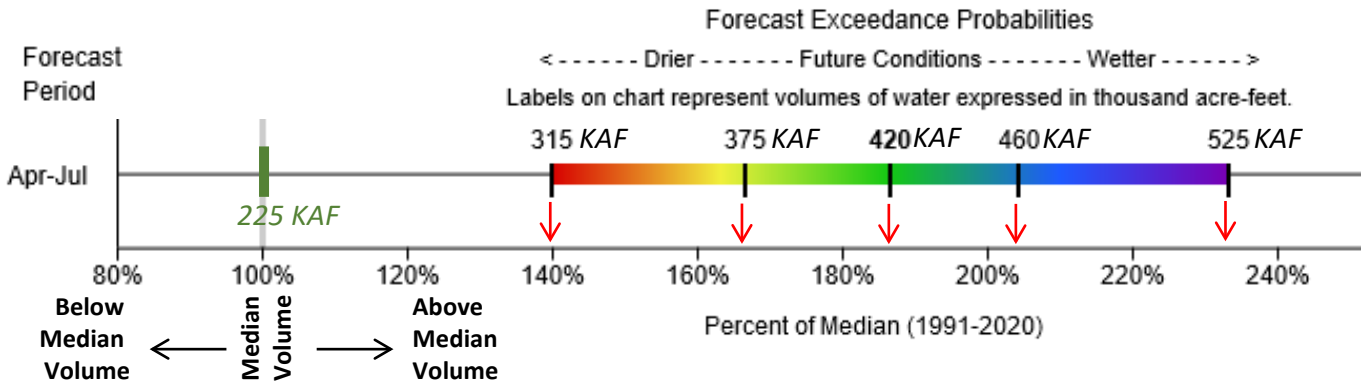
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

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.

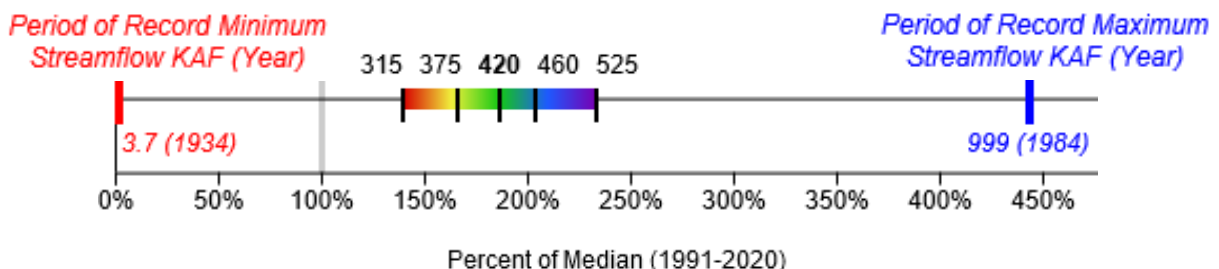


The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of median can be estimated by looking at the horizontal axis. The green line and number centered above 100% on the horizontal axis represents the 1981-2010 historical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

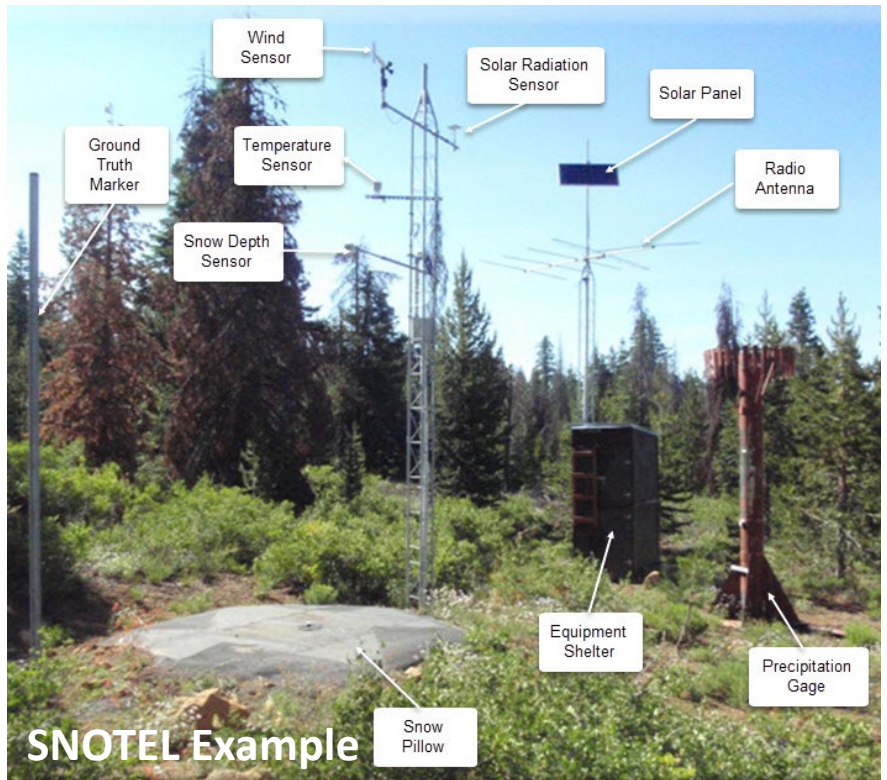


[Click here](#) for an online version which allows users to see averages instead of medians, as well as historic forecasts.

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

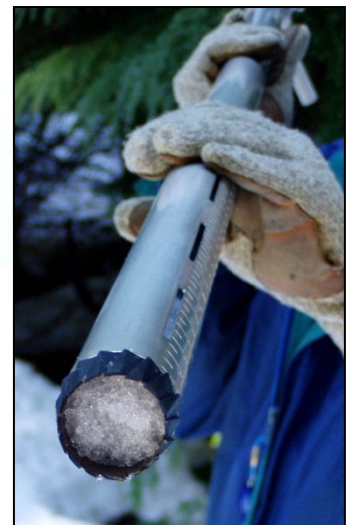
Snow Water Equivalent (SWE):

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

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WATER SUPPLY INDEX, AND OTHER DATA BY
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<https://www.nrcs.usda.gov/resources/data-and-reports/california-snow-survey>



California Water Supply Outlook

