United States Department of Agriculture

Natural Resources Conservation Service

Nevada Water Supply Outlook Report
April 1, 2024

NRCS Snow Surveyors Evan Smith and Valerie Bullard measure Mount Rose Snow Course on March 26, 2024
Credit: Jeff Anderson

112th Snowpack Measurement at Mount Rose Snow Course

Mount Rose snow course has the longest snow water measurement record in the country and most likely the world. Dr. James E. Church from the University of Nevada Reno is considered the father of snow surveying. In the early 1900's Dr. Church developed the snow tubes design still used today by snow surveyors to core and weigh the snow water content of the snowpack. The first Mount Rose measurement was made in 1910. This year's measurement at Mount Rose averaged 99 inches of snow depth and 37.8 inches of water content which was 111% of normal. To learn more about Dr. Church listen to KUNR's recent story highlighting his impact on water management for more than 100 years.

Background information about this report:

This report provides an analysis of water supply conditions across Nevada and a part of the eastern Sierra in California. It is published monthly from January to May. First of month data are summarized and used to forecast summer streamflow. The report is best read in digital format which allows readers to click on the blue internet links.

Streamflow Forecasts: Most of the annual streamflow in the western United States originates as snowfall that accumulates in the mountains during the winter. As the snowpack accumulates, hydrologists can estimate the runoff that will occur when the snow melts. Measurements of snow water equivalent (SWE) at snow courses and SNOTEL sites, along with precipitation, antecedent streamflow, and El Niño / Southern Oscillation indices are used in computerized statistical models to produce streamflow runoff forecasts. **Forecasts in this report give the total volume of water expected to flow past a location during a specified period, such as April 1 to July 31.**

Most **streamflow forecast volumes** in this report are expressed in KAF (thousand-acre-feet). Some smaller streams are forecast in acre-feet and noted as such in parentheses after the forecast name, such as "Marlette Lake Inflow (acre-feet)". Forecasts for Lake Tahoe, Pyramid Lake and Walker Lake are expressed in feet of water surface elevation change during the forecast period. A rise in lake level is indicated by a positive value, while a drop caused by evaporation is indicated by a negative number. The East Fork Carson River has two recession forecasts that provide the dates when spring river flows are expected to recede to 500 cfs and 200 cfs levels as the snowmelt decreases in late spring.

Interpreting Streamflow Forecasts: Forecasts of any kind are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast. There is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. **Unless otherwise stated the 50% exceedance forecast is the one referred to in the text of this report.** To quantify the range around this 50% value, four other forecasts are provided in the forecast tables, two smaller values (90% and 70% exceedances) and two larger values (30% and 10% exceedances). There is a 90% chance that the actual flow will be more than the minimum forecast (90% exceedance forecast). Likewise there is a 10% chance the actual flow will be more than the maximum forecast (10% exceedance forecast). Other forecasts can be interpreted similarly. The wider the spread between these values, the more forecast uncertainty.

As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Water users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water perhaps due to a dry climate outlook for the coming months, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water, for example if there is a threat of flooding, they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose, they should be prepared to deal with either more or less water.

Streamflow Adjustments: Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream lakes, reservoirs and diversions. Certain forecasts are adjusted for these structures; these are footnoted with a (2) in the report. A summary list of all streamflow adjustments is provided on the back cover of this report.

"Normal" = Median: Starting in water year 2022 the NRCS selected the statistical median for the 1991-2020 period as the default central tendency for all parameters including snowpack, precipitation, soil moisture, streamflow and reservoir storage. Unless otherwise stated all percentages in this report are based on median. For more information about the 1991-2020 normals and how they impact our region visit the Nevada Normals Dashboard.

Soil moisture has been measured at SNOTEL sites since ~2006. Due to the short record the soil moisture normal is based on water years 2006-2020. Soil moisture data are depth averaged from sensors located at soil depths of 8 and 20 inches.

Maximums and Minimums: Graphs in this report display "Max" and "Min" lines for snowpack, precipitation and soil moisture. For snow and precipitation these are basin-wide, daily maximums and minimums for water years 1981-2021; for soil moisture the period is 2006-2021.

Watershed Snowpack Analysis: These tables summarize the snowpack percent of median for each basin and its sub-basins. Percentages are based on SNOTEL and snow course measurements. Basin snowpack files are available here. Select "Nevada" and report type "Snow" a full report with station-by-station data. Basin order is alphabetical by main bain, followed by its sub-basins, then the next main basin.

For questions contact:

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Nevada Water Supply Outlook
April 1, 2024

SUMMARY

March roared like a lion from beginning to end and made up for the slow start to this winter. April 1 snowpacks are 108-244% of median and all basins across Nevada, the Eastern Sierra and the Upper Colorado have peaked above normal for the second year in a row. The last time back-to-back winters had above normal snowpacks was 2016 and 2017. Water year precipitation since October 1 ranges from 99-141% of median for the region. Soil moisture is near normal to above normal for this time of year, setting the stage for an efficient runoff once the snowmelt begins. The NRCS April 1 streamflow forecasts predict normal to well above normal April-July runoff across the state based on the 50% exceedance volumes. Based on streamflow forecasts and current reservoir storage, all reservoirs across northern Nevada and the Eastern Sierra have a good chance of filling this season. When considering streamflow forecasts keep in mind that each one has five exceedances which provide a range of volumes that are most probable. The 50% exceedance volume is most likely if near normal precipitation follows through July. The 30% and 10% exceedances are more likely if we see wetter than normal conditions and the 70% and 90% exceedances are more likely if the weather turns drier than normal. The Humboldt, Owyhee, and Snake basins are lining up for another excellent runoff season with forecast volumes ranking above the 85th percentile of historic flows. The Snowpack and Streamflow Forecasts sections below outline conditions that may result in better runoff volumes than last year particularly for the lower Humboldt River thanks to solid back-to-back water years.

SNOWPACK

Snowpacks across the state have peaked above normal for the second year in a row. April 1 snowpack percentages are 108-117% of median in the Eastern Sierra basins, 115% in the Upper Colorado basin, 147% in Eastern Nevada, 164-227% across other parts of northern Nevada and 244% in the Spring Mountains in southern Nevada.

Getting to an above normal snowpack didn't follow a linear path in the Truckee, Tahoe, Carson and Walker basins. The January 1 snowpack was only 44% of median, ranking sixth lowest for the date back to 1981. Based on historic data there was only 30% chance the Eastern Sierra snowpack would reach its median peak by April 1. This type of comeback has only happened a handful of times. Of the 17 years with the lowest January 1 snow water amounts only 2024, 2008, 2000 and 1996 recovered to a normal peak. Additionally, a "normal" snowpack in the Eastern Sierra is not that normal. In the last 44 years only 13 years have had peak snow water contents between 80% of 120% of normal. This means that 70% of the time snowpacks are either well below normal or well above normal.

The Humboldt Basin hasn't seen back-to-back winters with this much snow since 1982 and 1983 (Figure 1, next page). The April 1 snow water amount in the Upper Humboldt Basin ranks seventh highest when compared to peak snow amounts since 1981. For comparison 2023's peak SWE ranked second highest behind 1984, while peak amounts in 1982 and 1983 ranked third and fifth highest respectively. In the Ruby Mountains after a relatively slow start to snow accumulation this winter, the change in snow water between January 1 and April 1 ranked second highest just behind 2023. Nearly all SNOTELs across the northern Nevada measured January

through March accumulation in the top five years and eight SNOTELs had the highest or second highest January through March amount on record.

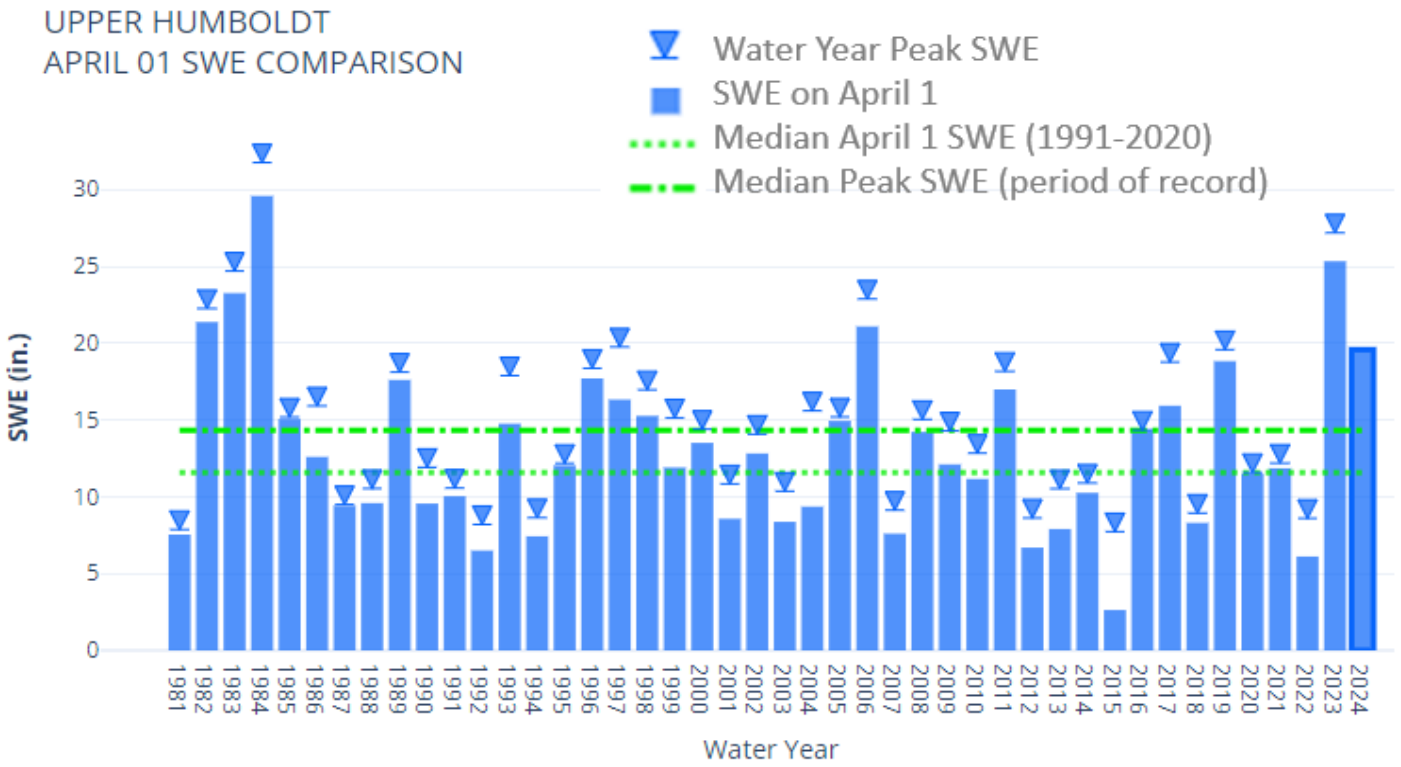


Figure 1: Upper Humboldt Basin comparison of April 1 snow water equivalent (blue bars) with each year's peak snow water equivalent (triangles). Compared to 2023 and 2024, the last time back-to-back winters had similar snow amounts was in 1982 and 1983. Peak SWE typically occurs after April 1 in the Upper Humboldt Basin so the 2024 peak SWE could end up a bit higher than the April 1 amount displayed.

PRECIPITATION

Monthly precipitation in March was well above normal statewide ranging from 140% in the Lower Humboldt Basin to 245% in the Spring Mountains. Water year precipitation percentages on April 1 are 99-103% of median in the Eastern Sierra basins, 107% in the Upper Colorado, 119% in the Spring Mountains, 121-141% across the rest of northern Nevada.

SOIL MOISTURE

Soil moisture is near normal or above normal for this time of year across northern Nevada and the Eastern Sierra. Some basins have seen increases in soil moisture as snow began melting at lower elevation SNOTEL sites. Colder temperatures and additional snowfall at the end of the month slowed snowmelt but expect soil moisture to increase once melt resumes and higher elevation SNOTELs also start melting. Above normal snow combined with good soil moisture will help produce an efficient runoff this spring as less snowmelt will be soaked up by the soil. Soil moisture graphs found later in this report average data from sensors located at soil depths of 8 and 20 inches for all the SNOTEL sites in a basin. SNOTEL soil moisture data has a short period of record. Soil moisture graphs in this report are based on data since October 2005.

RESERVOIRS

The volume of streamflow produced from last winter's record snowpack has allowed reservoir managers to carry over excellent storage amounts into 2024. Table 1 shows April 1 storage amounts. Based on streamflow forecasts and current storage amounts all reservoirs across northern Nevada and the Eastern Sierra will hopefully fill this season.

Table 1: Reservoir storage for April 1, 2024.

Reservoir	Apr 1, 2024 Storage (KAF)	Median Apr 1 Storage (KAF)	Reservoir Capacity (KAF)	Current Storage % Capacity	Current Storage % Median
Lake Tahoe	625.3	289.3	744.5	84%	216%
Marlette Lake	12.0	11.9	11.8	102%	101%
Boca Reservoir	8.3	19.0	40.9	20%	44%
Donner Lake	4.0	4.3	9.5	42%	93%
Independence Lake	14.9	14.8	17.3	86%	100%
Prosser Reservoir	7.8	9.7	29.8	26%	80%
Stampede Reservoir	202.3	164.2	226.5	89%	123%
Lahontan Reservoir	272.5	198.4	313.0	87%	137%
Bridgeport Reservoir	40.8	25.1	42.5	96%	162%
Topaz Lk nr Topaz	58.7	24.2	59.4	99%	242%
Chimney Ck Reservoir	17.8	8.4	35.0	51%	211%
Rye Patch Reservoir	105.3	53.5	194.3	54%	197%
Wild Horse Reservoir	62.5	33.3	71.5	87%	188%
Lake Powell	7,717.5	12880.0	24,322.0	32%	60%
Lake Mead	9,629.0	15296.0	26,159.0	37%	63%
Lake Mohave	1,682.0	1684.0	1,810.0	93%	100%

STREAMFLOW FORECASTS

The NRCS April 1 streamflow forecasts predict normal to well above normal April-July runoff across Nevada based on the 50% exceedance volumes. Keep in mind the range of possible outcomes is dependent on future weather. Karl Wetlaufer, the NRCS forecast hydrologist for the Colorado basin, provided the following thoughts on evaluating forecasts.

> *"As always, we encourage you to zoom into the granularity of the individual streamflow points that are of interest to you and consider the forecasts as the full suite of exceedance probabilities. As has been observed many times over the past 10 years, future weather beyond April 1st can cause observed streamflows to end up on both ends of the range of probable outcomes issued in our forecasts. While longer lead Climate Outlooks have a great deal of uncertainly involved in them currently the CPC has much of the Upper Colorado Basin* [and the Great Basin] *predicted for equal chances of above or below normal precipitation and above normal chances of higher temperatures. All that said, even though we are near peak snowpack accumulation it remains important to keep an eye on changing weather and hydrologic conditions to help anticipate where observed streamflows are likely to end up within the range of forecasted exceedance probabilities."*

The Humboldt, Owyhee and Snake basins could be poised for one of the best snowmelt runoff seasons in a number of years. The April first 50% exceedance forecasts in these basins range from 154-639% of median (138-271% of average), and most rank above the 85th percentile when compared to historic volumes. The mainstem of the Humboldt River is one to pay particular attention to. It generally has higher runoff volumes when the system is primed by back-to-back above normal snowpacks. Compare peak snowpacks in Figure 1 to April-July streamflow volumes for the Humboldt River near Imlay in Figure 2. Three period stand out: 1982-1984, 1996-1998 and 2005-2006. Each of these periods saw greater seasonal streamflow volumes during the second and third years with above normal snow. Last year the basin saw its second greatest snowpack since 1981. The April-July observed flow at Imlay was 233KAF in 2023. The 50% exceedance forecast this month calls for 275KAF. A wetter than normal spring could deliver the larger volumes predicted by the 30% and 10% exceedance forecasts which are 325KAF and 405KAF respectively. As of early April, the Imlay gage has already surpassed 800cfs which is a threshold that was not reached until early May last year.

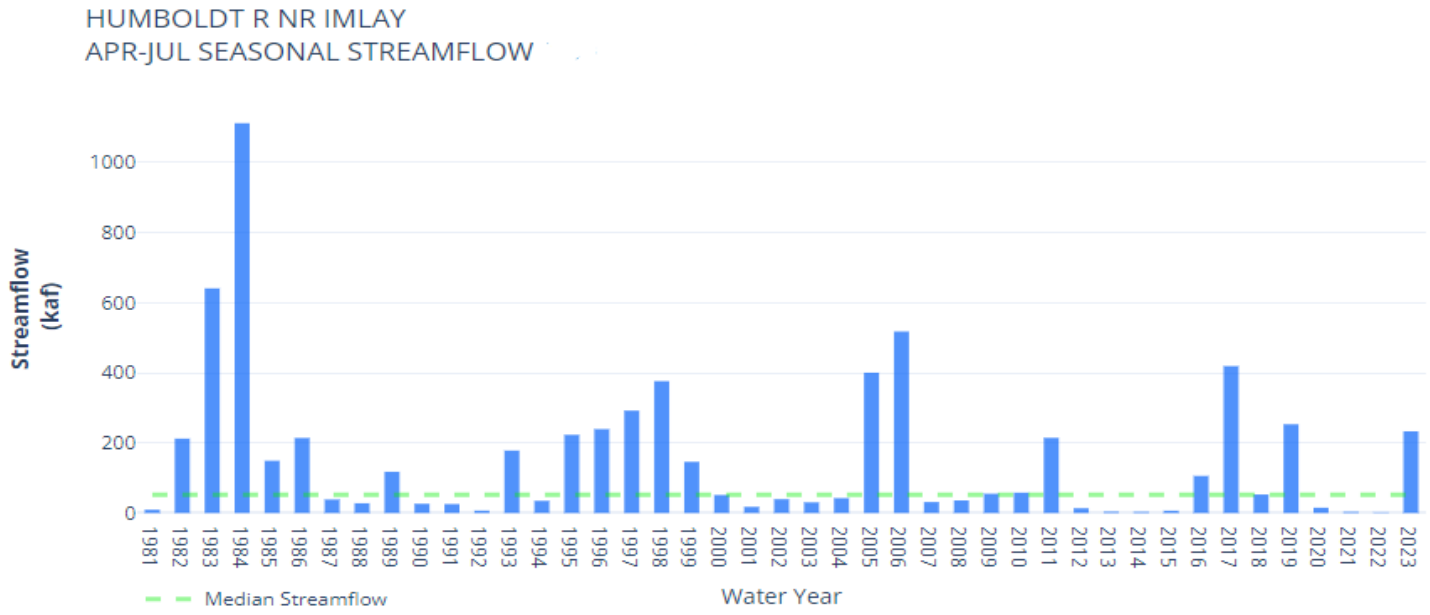


Figure 2: Humboldt River near Imlay April-July streamflow volumes 1981-2023.

To track snow levels compared to river flow as the spring runoff progresses use the interactive NRCS Snow-to-Flow charts. These plots allow users to compare this year's snowpack and streamflow to other historic years for each forecast point. Figure 3 provides an example snow-to-flow plot for the Humboldt River near Imlay. This chart shows that current snow amounts and streamflow is similar to 2006. April-July observed streamflow in 2006 was 518KAF, which is more than this month's 10% exceedance forecast.

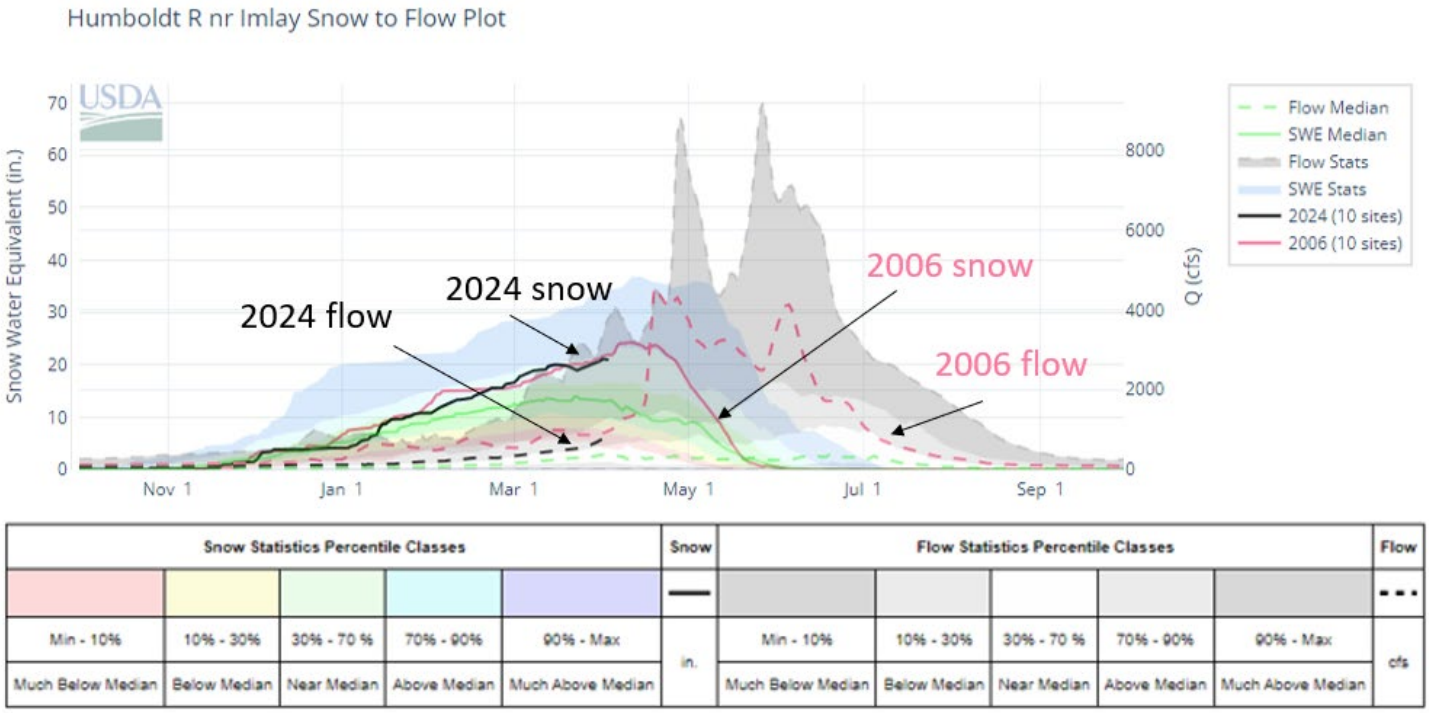


Figure 3: Humboldt River near Imlay snow-to-flow graph comparing snow water equivalent for SNOTELs used in the NRCS forecasts to streamflow discharge (Q in cfs on secondary axis) for water years 2024 and 2006.

A note about streamflow medians and averages in Nevada. Starting in 2022 forecast percentages in NRCS Water Supply Outlook Reports have been based on medians, not averages. The Normals Dashboard has 15-minute YouTube presentation that goes into details about how this impacts Nevada. The boom or bust nature of runoff in the Great Basin creates large difference between median and average streamflow. The Humboldt River at Imlay is an extreme example. Its April-July median streamflow volume is 52 kaf, while the average is 130 kaf, two and a half time more. Due to this it is possible for a streamflow forecast for Imlay to be far above 100% of median, while also being far below 100% of average. While the Humboldt River at Imlay is the most extreme example, many other streams in the Great Basin have large differences between median and average streamflow. Click the links that follow to compare this month's forecasts as a percent of median and a percent of average. Water users should always focus on the forecasted volumes, and not only the percent of normal, when assessing forecasts.

VALLEY AND RANGELAND CONDITIONS

Most the data presented in this report comes from NRCS SNOTEL stations located in the mountains above 6,000 feet. This section summarizes data from valley locations to provide a look at conditions at lower elevations.

Seasonal snow cover replenishes soil moisture and provides water for plant growth on rangelands. A useful tool to track the lower elevation snowpack is NOAA's Modeled Snow Water Equivalent Map. The April 1 map (right) shows much of Nevada's lower elevations received modest snow amounts the last weekend of March. Comparing maps snow water increased during March across Nevada's mountain ranges.

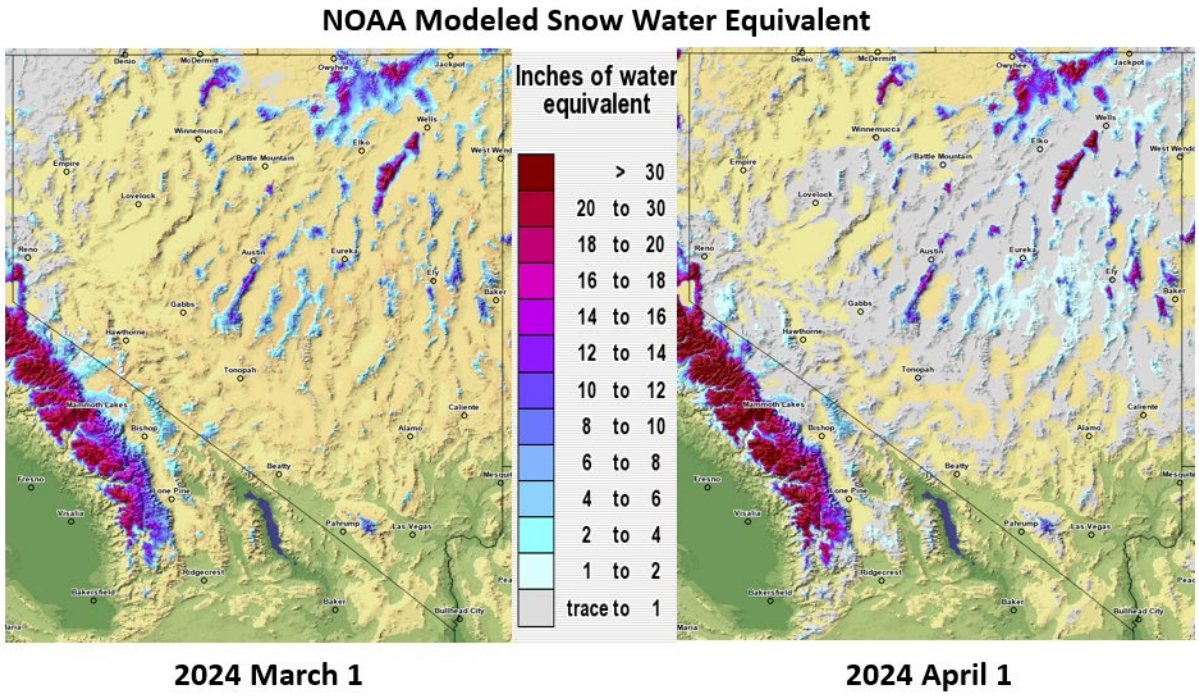


Figure 4: Modeled snow water content across Nevada. Source: NOAA

Valley Temperature and Precipitation: Table 2 provides precipitation and temperature data for valley climate stations across the state for the month of March. Most stations were wetter and colder than normal.

Table 2. March summary of valley climate stations. Source: http://www.rcc-acis.org/

Climate Station	Precipitation March Total (inches)	Precipitation March Departure from Normal (inches)	March Temperature Average (deg F)	March Temperature Departure from Normal (deg F)
Reno Airport	2.20	+1.40	44.1	-2.5
Yerington*	0.75	+0.26	44.1	-1.4
Fallon NAS	0.46	-0.03	44.3	-1.5
Lovelock Airport	1.02	+0.60	41.4	-1.9
Winnemucca Airport	1.43	+0.56	41.3	-1.3
Elko Airport	2.19	+1.22	38.6	-1.3
Eureka	1.00	-0.34	36.1	-0.3
Ely Airport	1.90	+0.92	35.3	-2.4
Tonopah	0.08	-0.64	40.2	-1.2
Las Vegas Airport	0.74	+0.32	57.5	-3.3

**Data do not represent a complete month. 8 days of data were missing.*

DROUGHT STATUS:

Nevada's drought status remains unchanged since last month. Most of Nevada is currently classified as drought free although a portion of southern Nevada has moderate drought due the multi-decade declines in storage in the lower Colorado reservoirs. The water level in Lake Mead has improved since July 2022, but storage is currently only 37% of capacity.

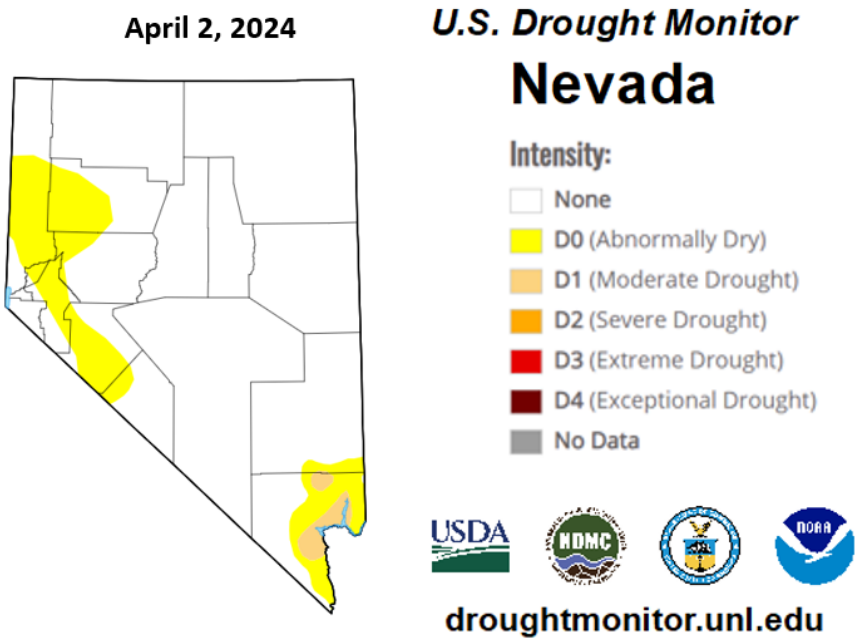


Figure 5: Drought status for April 2, 2024 Source: [U.S. Drought Monitor]

UPCOMING EVENTS

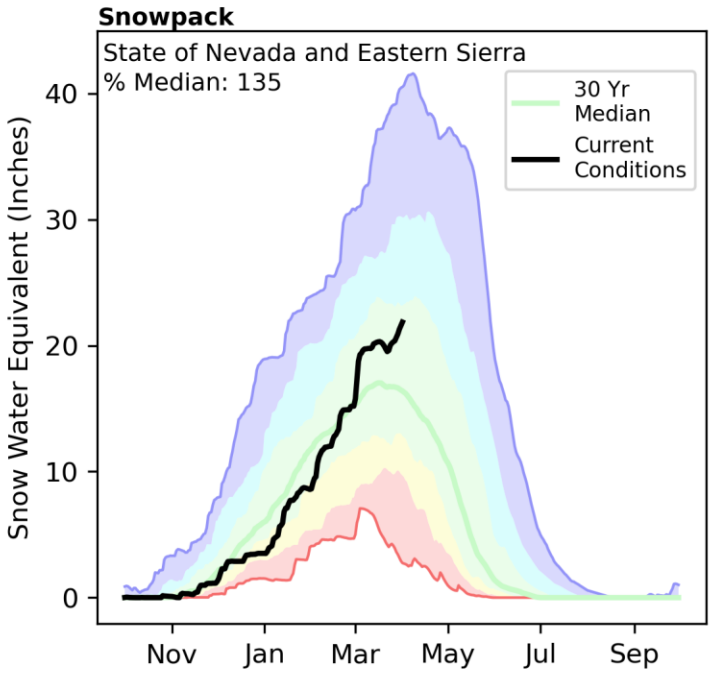
Northern Nevada Streamflow, Reservoir and Weather Forecast Meeting
The public is invited to attend presentations by the NRCS, NWS, USBR, USGS.
April 11, 2024 from 1:30 to 3pm
Nevada Division of Water Resources; 901 S. Stewart St. Suite 2002, Carson City, Nevada
Contact: Nicole Goehring ngoehring@water.nv.gov for more information

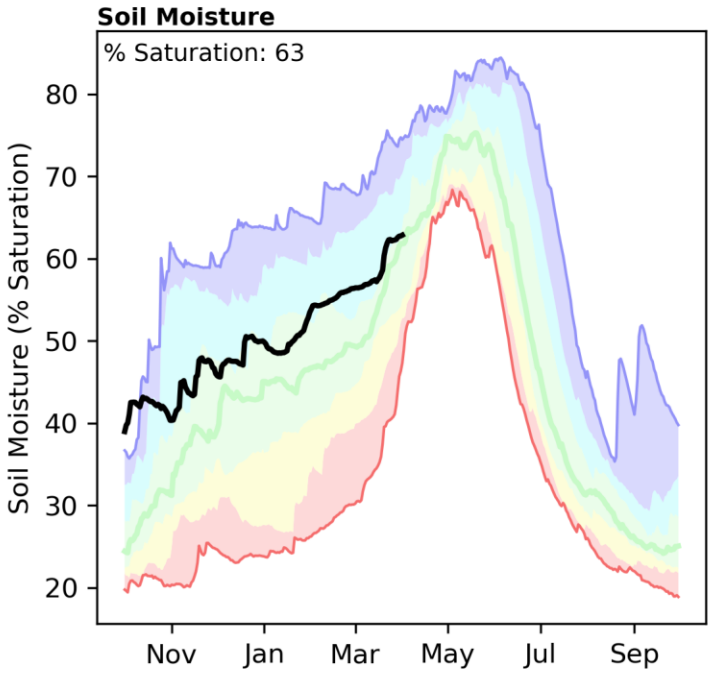
Western Snow Conference - link
April 22 - 25, 2024
Corvallis, Oregon
This Year's Theme: Watersheds to Estuaries
Short Course on April 22: Rivers Running: Dam Removal Methods, Developments, and Results in the Pacific Northwest."

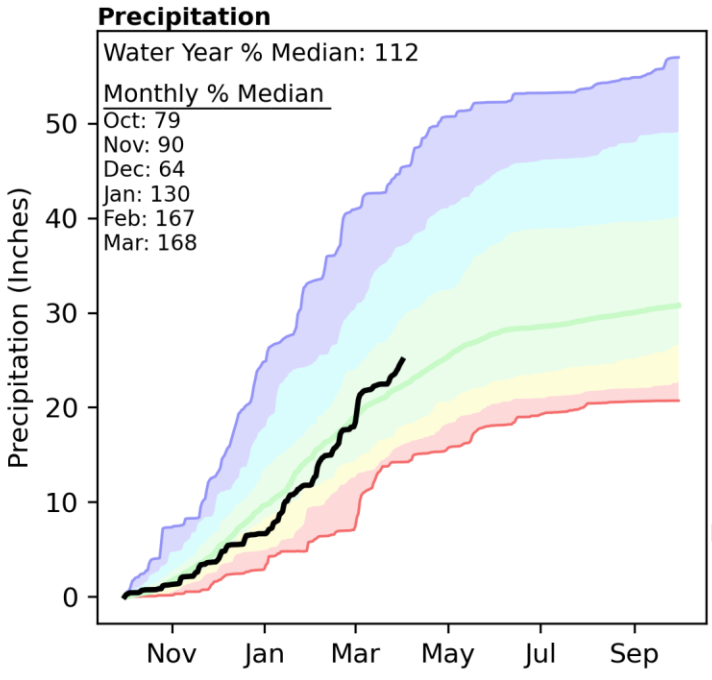
Smart About Water Day
May 4, 2024 from 10am – 2pm
McKinley Arts Center, Reno, Nevada
The purpose of this annual event is to provide the community with an opportunity to understand more about water management and watershed stewardship in our region. This free public event will once again host activities for all ages. The NRCS Snow Survey will participate along with many other organizations.

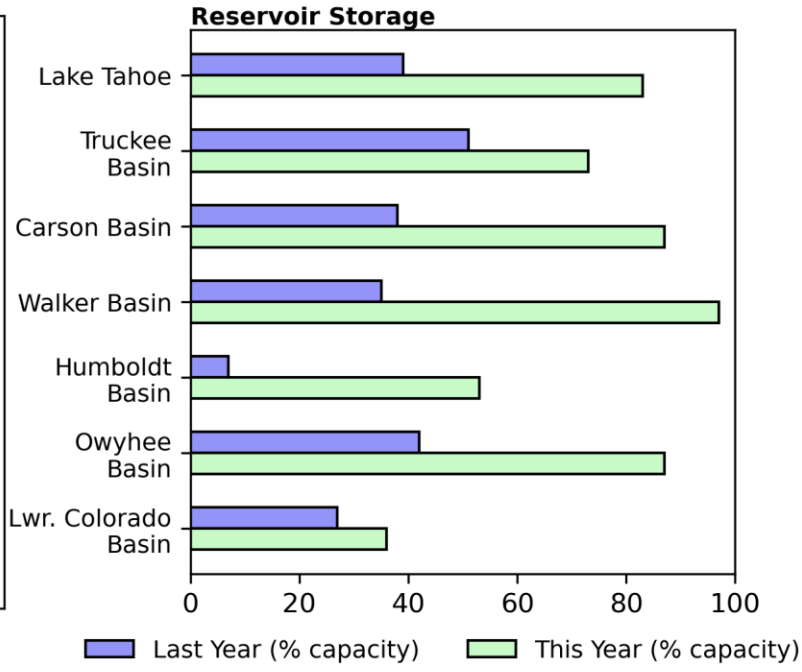
State of Nevada and Eastern Sierra | April 1, 2024

Snowpack in the State of Nevada and Eastern Sierra is well above normal at 135% of median, compared to 249% at this time last year. Precipitation in March was well above normal at 168%, which brings the seasonal accumulation (October-March) to 112% of median. Soil moisture is at 63% saturation compared to 55% saturation last year.



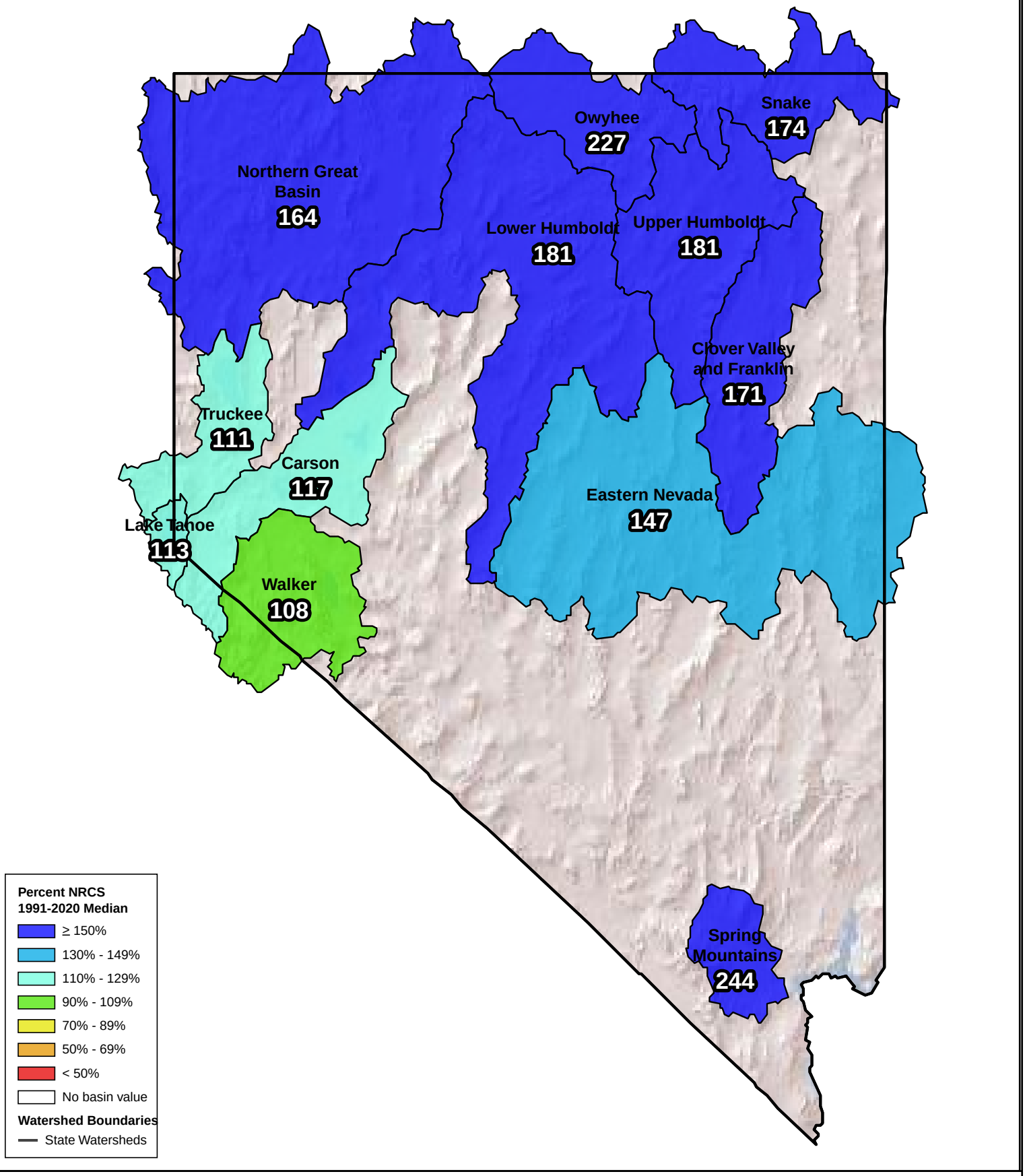






Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: 30 year normal calculation description

Snow Water Equivalent	Percent NRCS 1991-2020 Median	April 1st, 2024



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0 20 40 80 120 160 200 Miles

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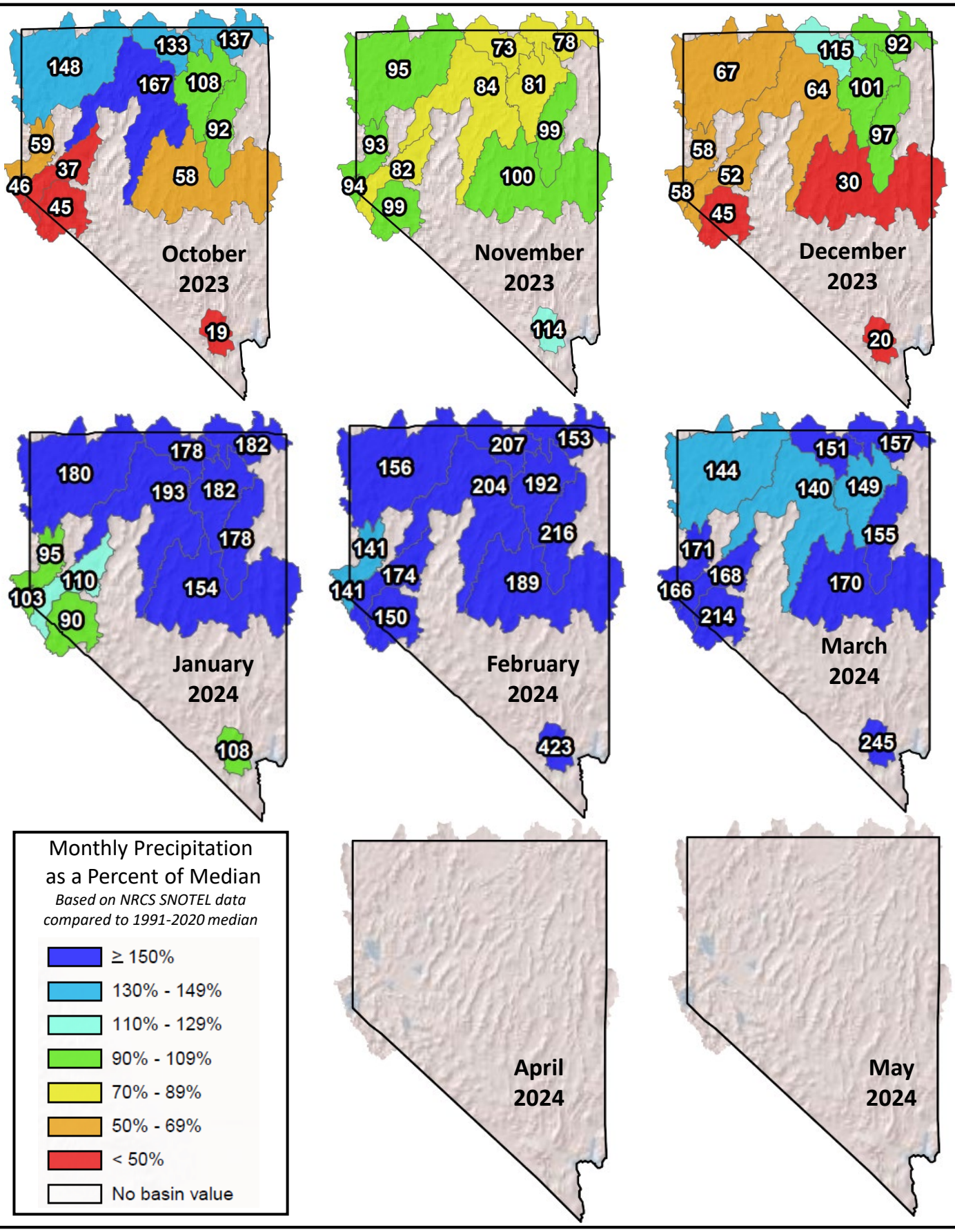
Monthly Precipitation as Percent of Median – Water Year 2024



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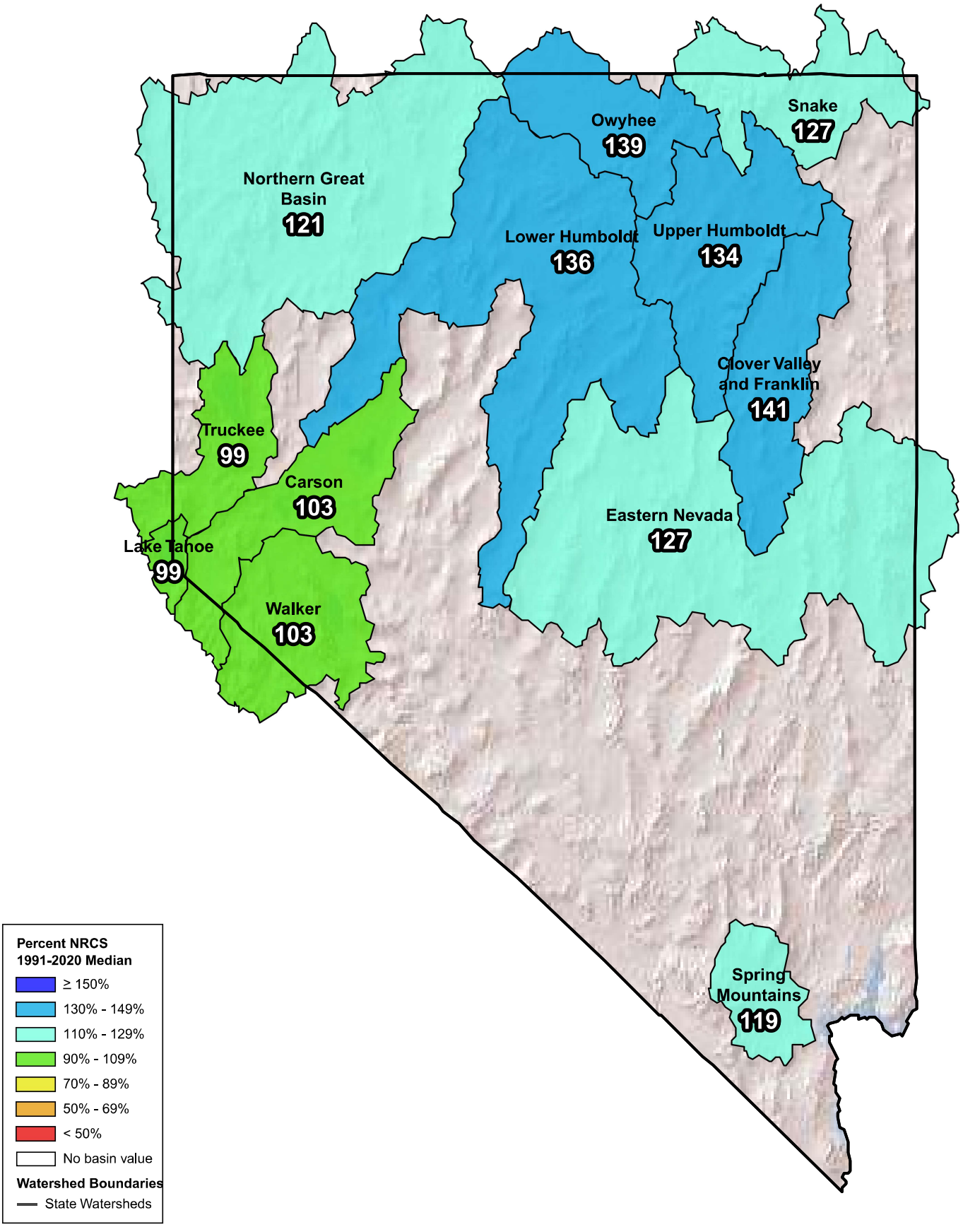
United States Department of Agriculture

Water Year to Date Precipitation	Percent NRCS 1991-2020 Median	October 1, 2023 - March 31, 2024



USDA Natural Resources Conservation Service
United States Department of Agriculture

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0 20 40 80 120 160 200 Miles

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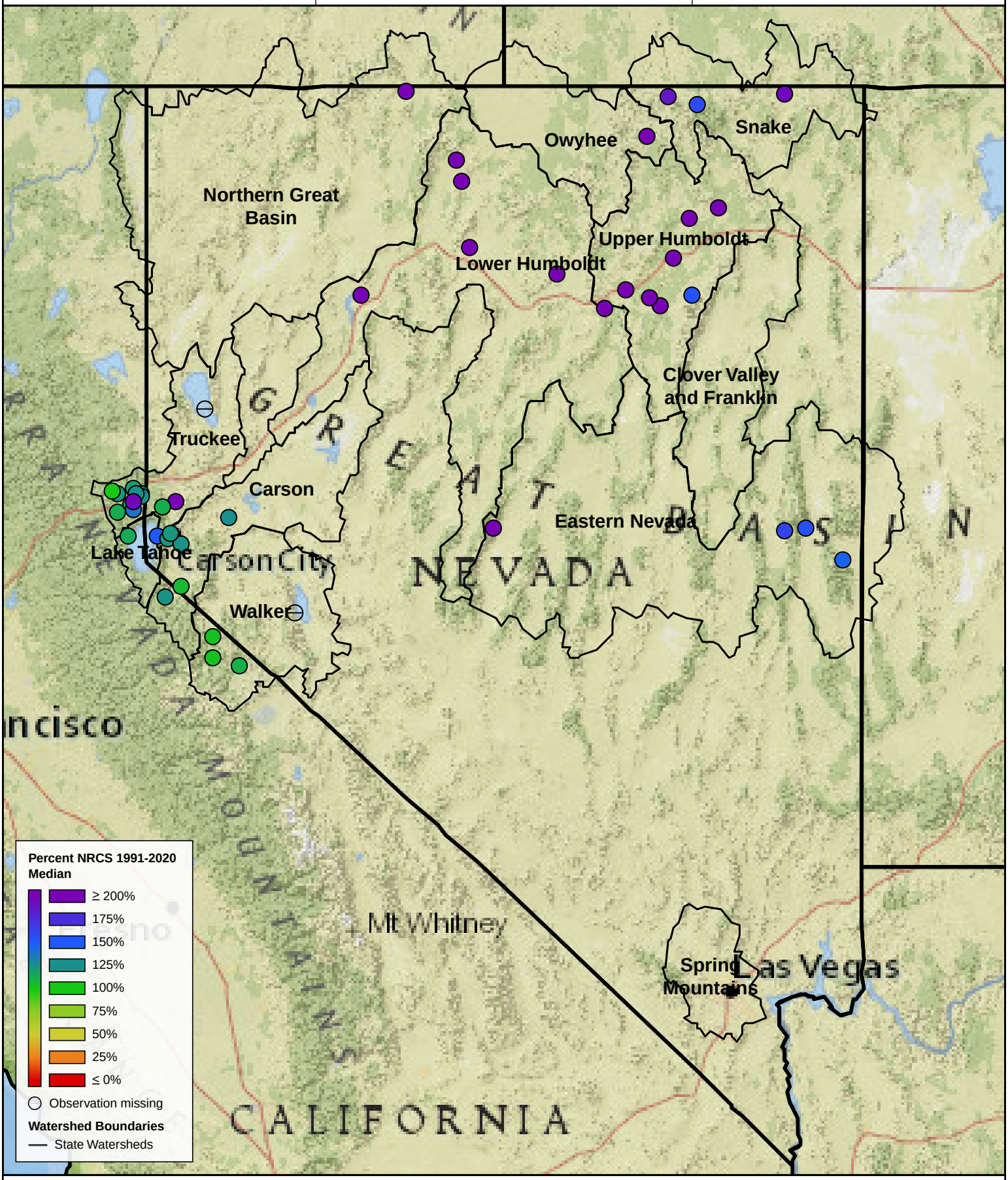
Streamflow Forecast Volume 50% Exceedance Probability	Percent NRCS 1991-2020 Median	April 1, 2024 Primary Forecast Period *(April-July in most cases)*



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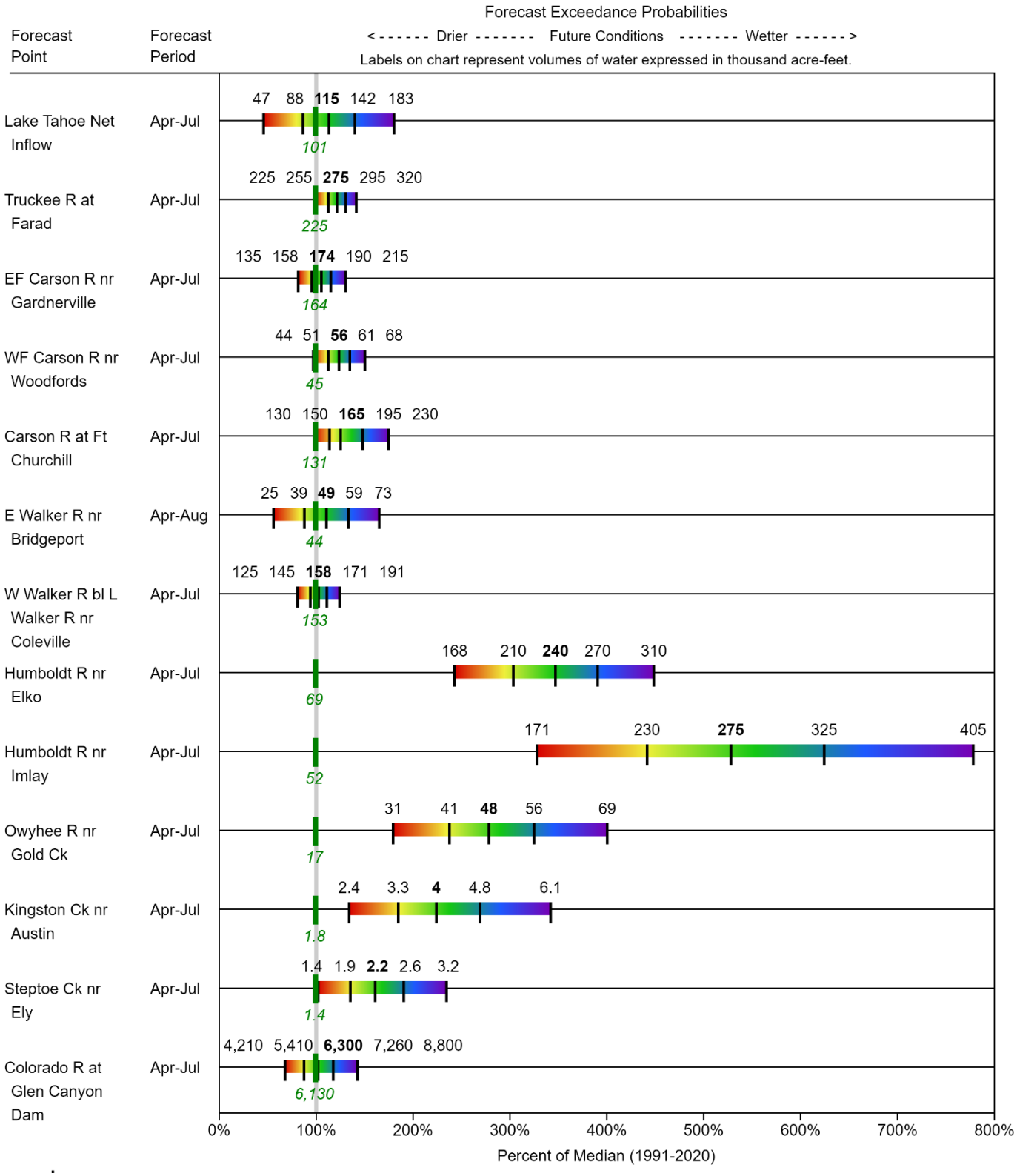
Streamflow Forecasts - State of Nevada Overview

April 1, 2024



95% or 90% Exceedance — There is a 95%/90% chance that flows will exceed this volume

70% Exceedance — There is a 70% chance that flows will exceed this volume

50% Exceedance — There is a 50% chance that flows will exceed this volume

30% Exceedance — There is a 30% chance that flows will exceed this volume

10% or 5% Exceedance — There is a 10%/5% chance that flows will exceed this volume

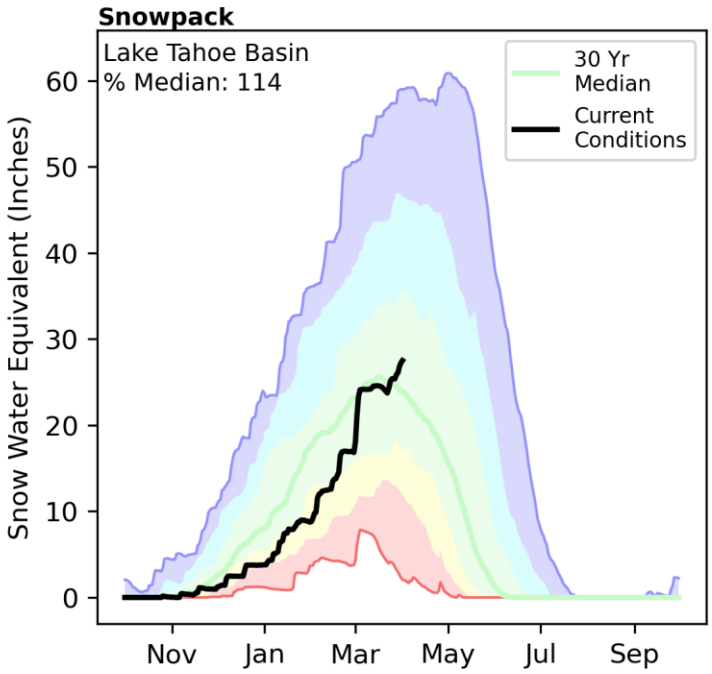
[Click Here for Basin Forecast Charts](#)

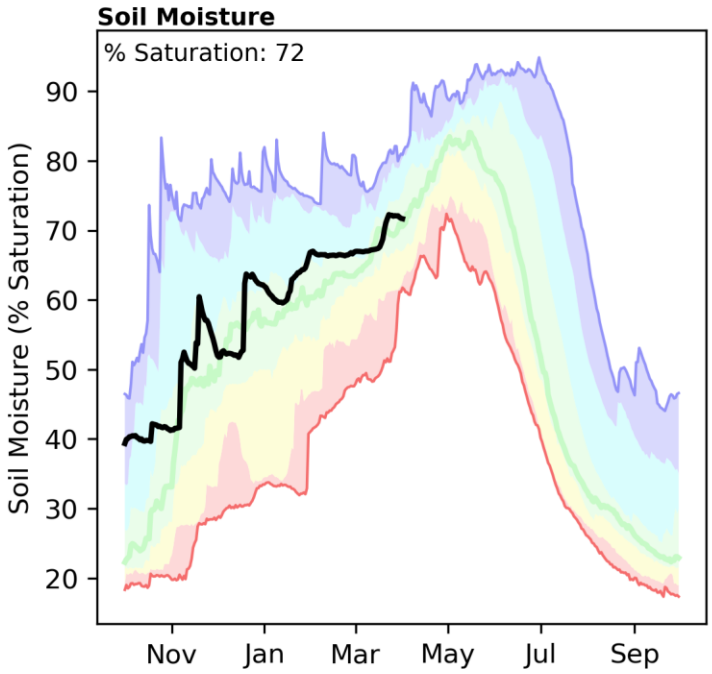
1981-2010 Normal Streamflow KAF

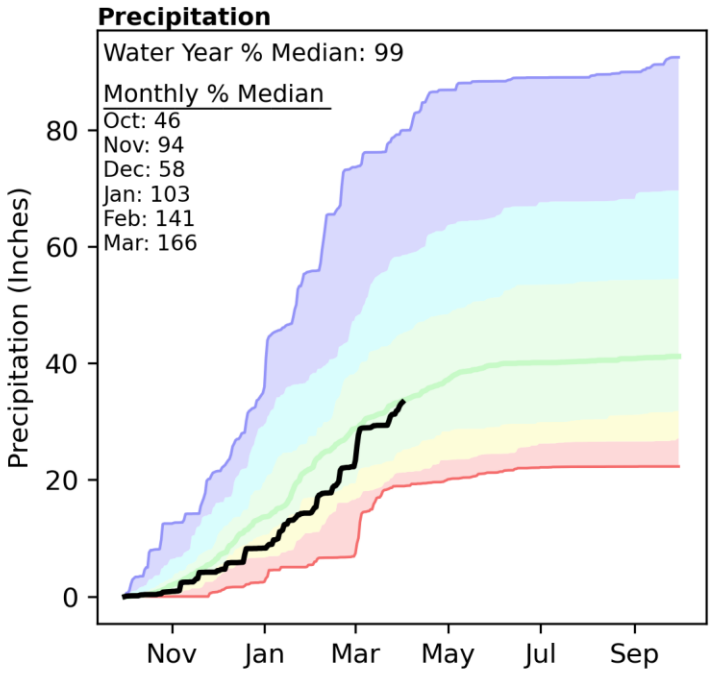
See appendix for more information

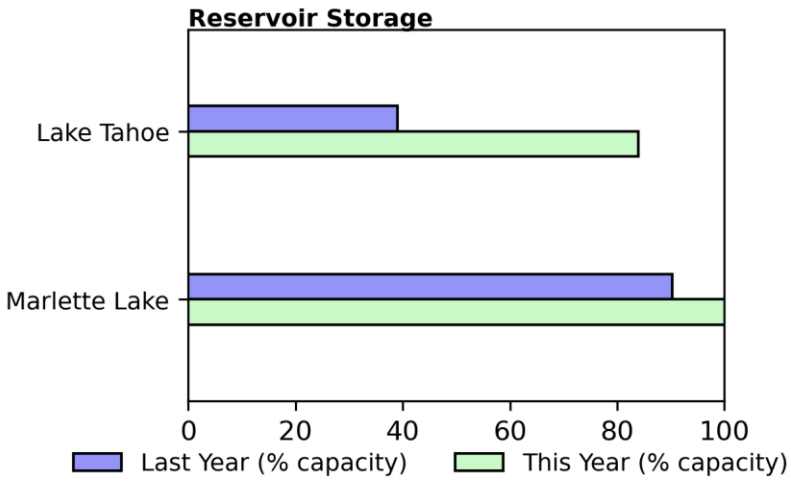
Lake Tahoe Basin | April 1, 2024

Snowpack in the Lake Tahoe Basin is above normal at 114% of median, compared to 238% at this time last year. Precipitation in March was well above normal at 166%, which brings the seasonal accumulation (October-March) to 99% of median. Soil moisture is at 72% saturation compared to 69% saturation last year. Reservoir storage is 84% of capacity, compared to 40% 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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Lake Tahoe
Streamflow Forecasts - April 1, 2024

Lake Tahoe	Forecast Period	Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Marlette Lake Inflow								
	APR-JUL	0.14	0.42	0.6	150%	0.78	1.06	0.4
Lake Tahoe Rise Gates Closed[2]								
	APR-HIGH	1	1.2	1.4	121%	1.65	1.87	1.16
Lake Tahoe Net Inflow								
	APR-JUL	47	88	115	114%	142	183	101

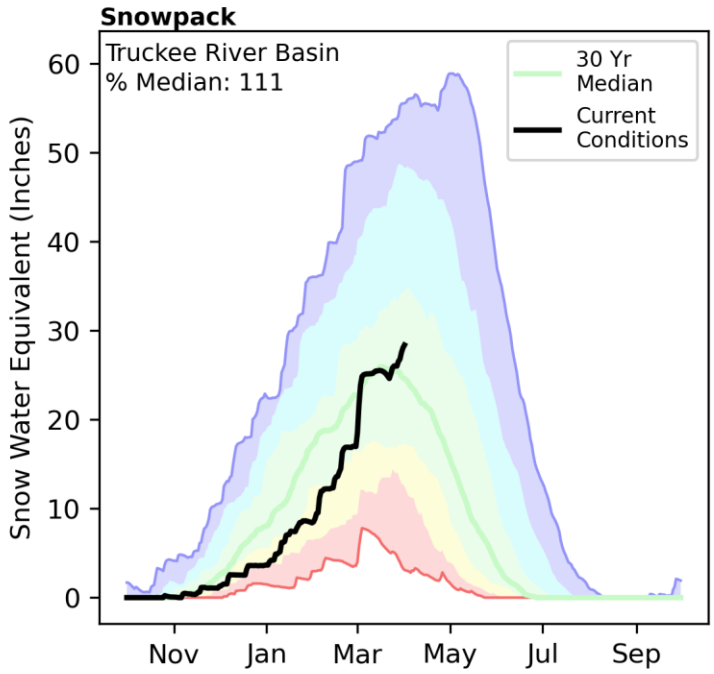
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

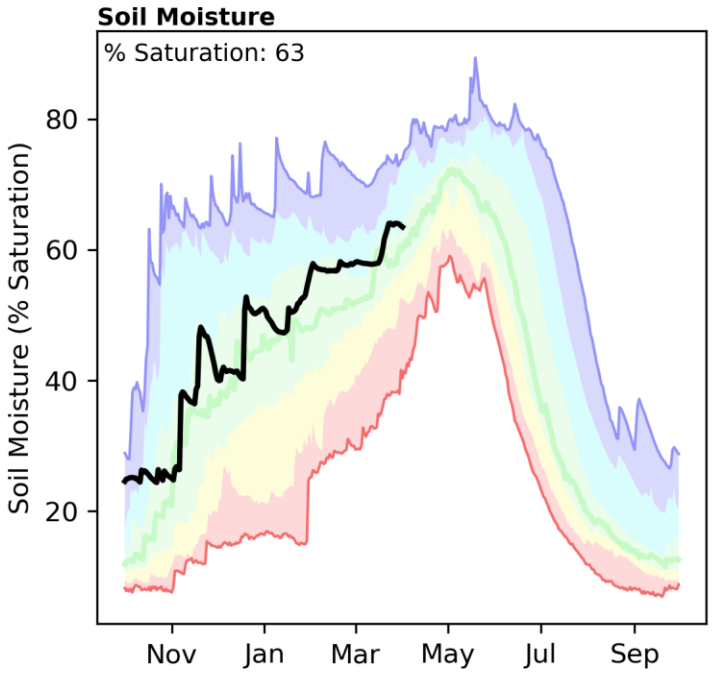
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Tahoe	625.3	290.5	289.3	744.5
Marlette Lk nr Carson City	12.0	10.6	11.9	11.8

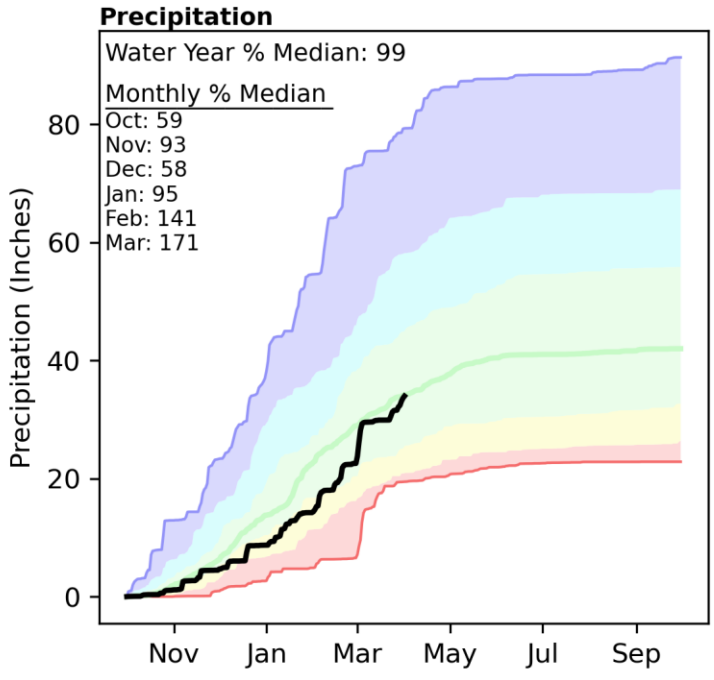
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Lake Tahoe	24	114%	238%

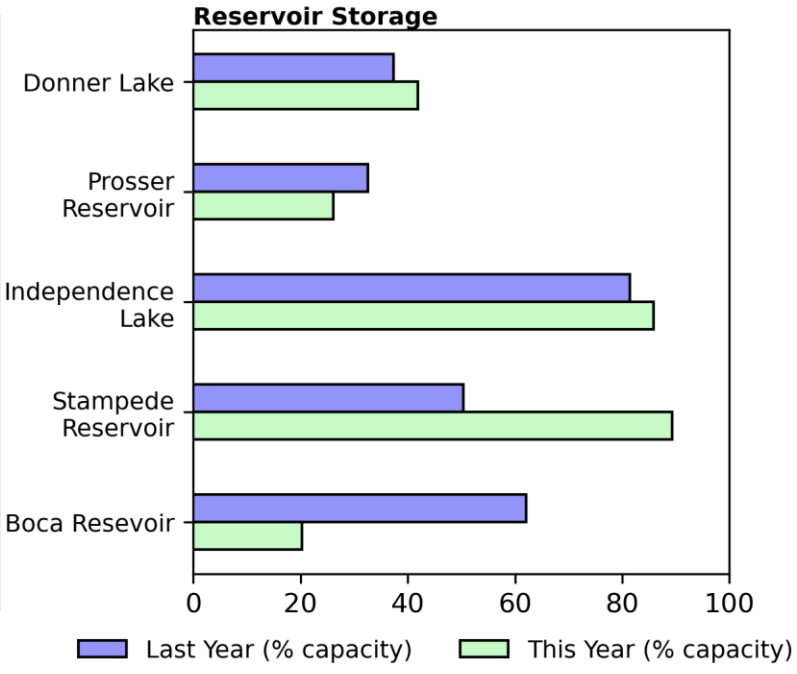
Truckee River Basin | April 1, 2024

Snowpack in the Truckee River Basin is above normal at 111% of median, compared to 218% at this time last year. Precipitation in March was well above normal at 171%, which brings the seasonal accumulation (October-March) to 99% of median. Soil moisture is at 63% saturation compared to 61% saturation last year. Reservoir storage is 73% of capacity, compared to 51% last year.









Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
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Truckee
Streamflow Forecasts - April 1, 2024

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)
Donner Lake Inflow[2]	APR-JUL	12.4	15.1	17	113%	18.9	22	15
Martis Ck Res Inflow[2]	APR-JUL	4.4	6.5	7.9	139%	9.3	11.4	5.7
Prosser Ck Res Inflow[2]	APR-JUL	34	39	42	120%	45	50	35
Independence Lk Inflow[2]	APR-JUL	8.3	9.6	10.4	99%	11.2	12.5	10.5
Sagehen Ck nr Truckee	APR-JUL	3.4	4.4	5	122%	5.6	6.6	4.1
Stampede Res Local Inflow[2]	APR-JUL	51	62	70	119%	78	89	59
L Truckee R ab Boca Reservoir[2]	APR-JUL	72	83	90	125%	99	110	72
Boca Res Local Inflow[2]	APR-JUL	1.2	1.59	3	197%	4.4	6.5	1.52
Truckee R at Farad[2]	APR-JUL	225	255	275	122%	295	320	225
Truckee R ab Farad Sidewater[2]	APR-JUL	88	103	113	126%	123	138	90
Galena Ck at Galena Ck State Pk	APR-JUL	3.2	4	4.5	113%	5	5.8	4
Steamboat Ck at Steamboat	APR-JUL	1.25	2.9	4.5	214%	6.4	9.8	2.1
Pyramid Lake Elevation Change	LOW-HIGH	-0.49	0.49	1.15		1.81	2.8	

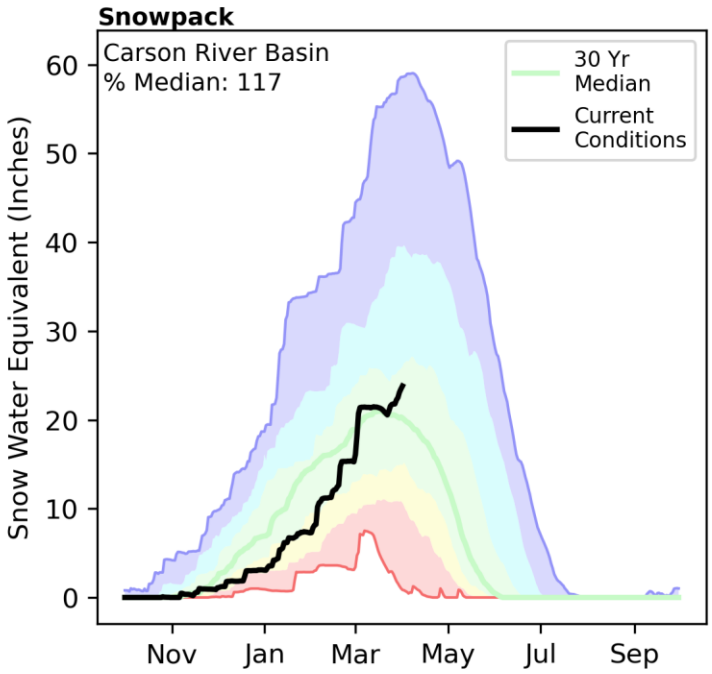
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

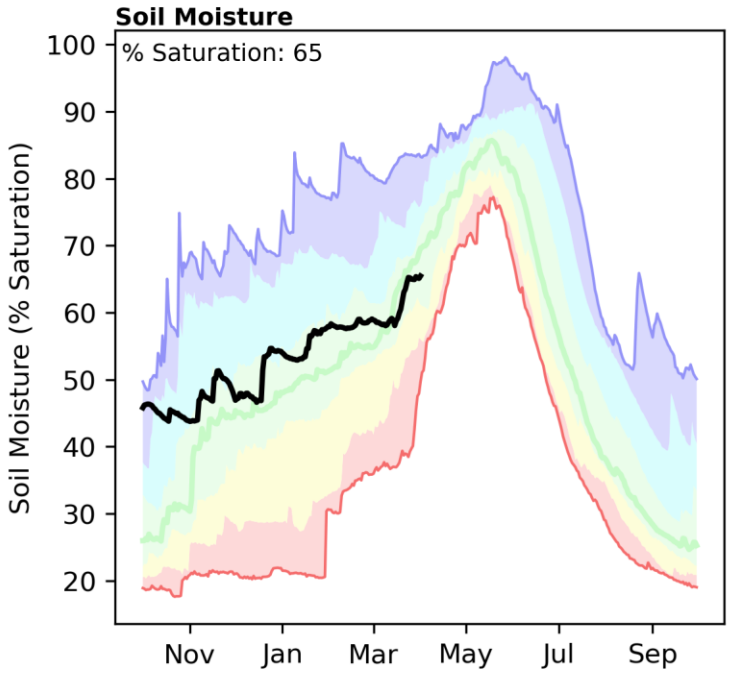
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Boca Reservoir	8.3	25.4	19.0	40.9
Donner Lake	4.0	3.5	4.3	9.5
Independence Lake	14.9	14.1	14.8	17.3
Prosser Reservoir	7.8	9.7	9.7	29.8
Stampede Reservoir	202.3	114.0	164.2	226.5

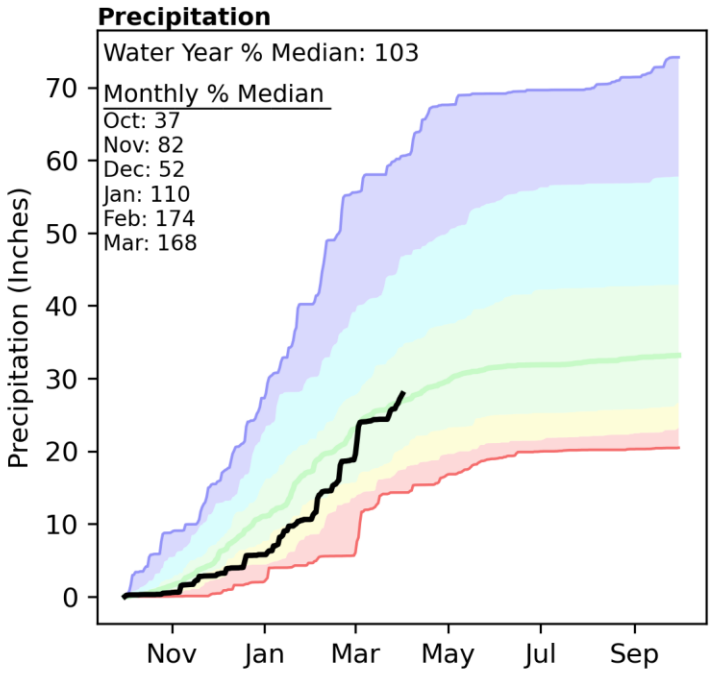
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Truckee	18	111%	218%
Little Truckee ab Stampede	5	105%	218%
Sagehen-Independence	3	118%	230%
Galena	2	108%	212%
Steamboat	2	108%	212%
Truckee above Pyramid Lake	34	113%	233%

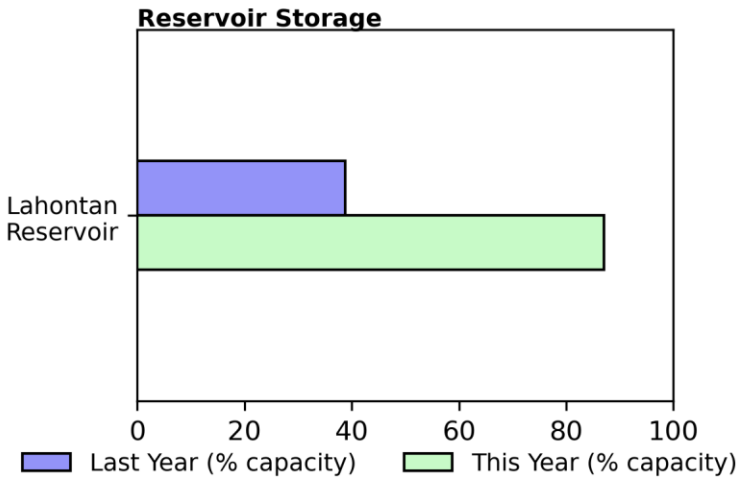
Carson River Basin | April 1, 2024

Snowpack in the Carson River Basin is above normal at 117% of median, compared to 290% at this time last year. Precipitation in March was well above normal at 168%, which brings the seasonal accumulation (October-March) to 103% of median. Soil moisture is at 65% saturation, same as last year at this time. Reservoir storage is 87% of capacity, compared to 39% last year.









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Carson
Streamflow Forecasts - April 1, 2024

		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	135	158	174	106%	190	215	164
WF Carson R nr Woodfords	APR-JUL	44	51	56	124%	61	68	45
Carson R nr Carson City	APR-JUL	111	143	165	124%	187	220	133
Kings Canyon Ck nr Carson City	APR-JUL	0.06	0.11	0.16	123%	0.22	0.31	0.13
Ash Canyon Ck nr Carson City	APR-JUL	0.71	0.88	1	122%	1.13	1.34	0.82
Carson R at Ft Churchill	APR-JUL	130	150	165	126%	195	230	131

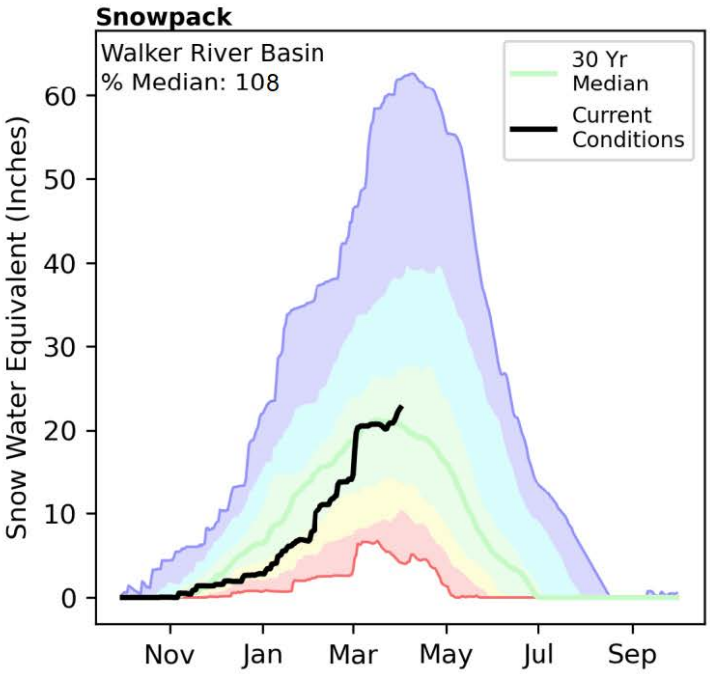
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

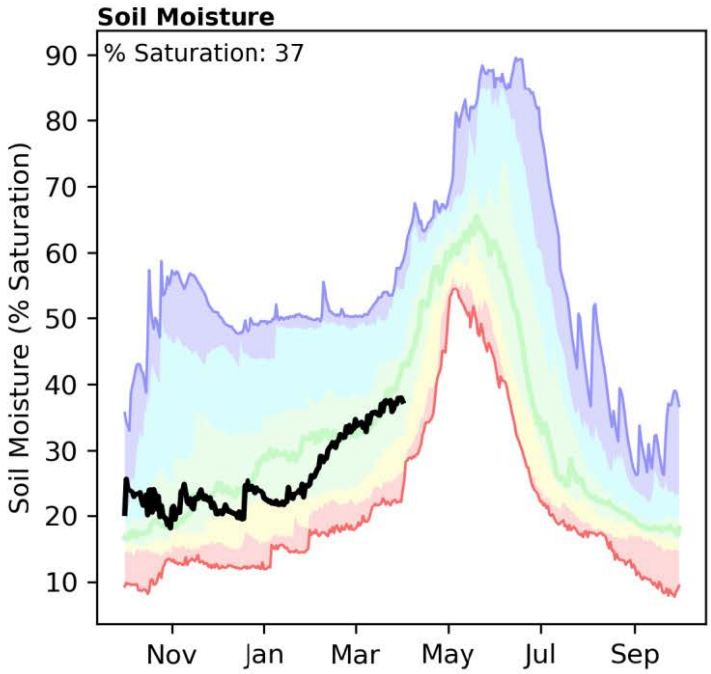
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lahontan Reservoir	272.5	121.3	198.4	313.0

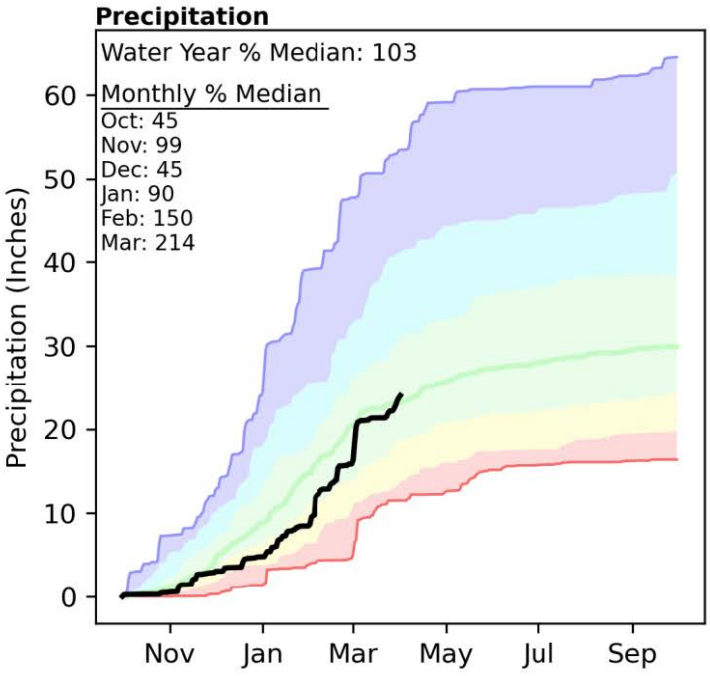
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Carson	16	117%	290%
East Fork Carson	7	111%	300%
West Fork Carson	9	117%	269%

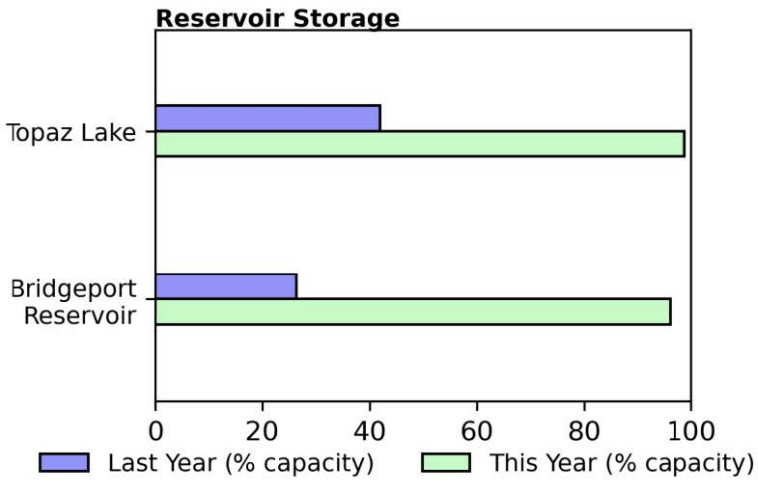
Walker River Basin | April 1, 2024

Snowpack in the Walker River Basin is about normal at 108% of median, compared to 308% at this time last year. Precipitation in March was well above normal at 214%, which brings the seasonal accumulation (October-March) to 103% of median. Soil moisture is at 37% saturation compared to 45% saturation last year. Reservoir storage is 98% of capacity, compared to 35% last year.









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

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Walker
Streamflow Forecasts - April 1, 2024

		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	25	39	49	111%	59	73	44
W Walker R bl L Walker R nr Coleville								
	APR-JUL	125	145	158	103%	171	191	153
W Walker R nr Coleville								
	APR-JUL	121	139	151	103%	163	181	147
Walker Lake Elevation Change								
	LOW-HIGH	-0.44	1.07	2.1		3.1	4.6	

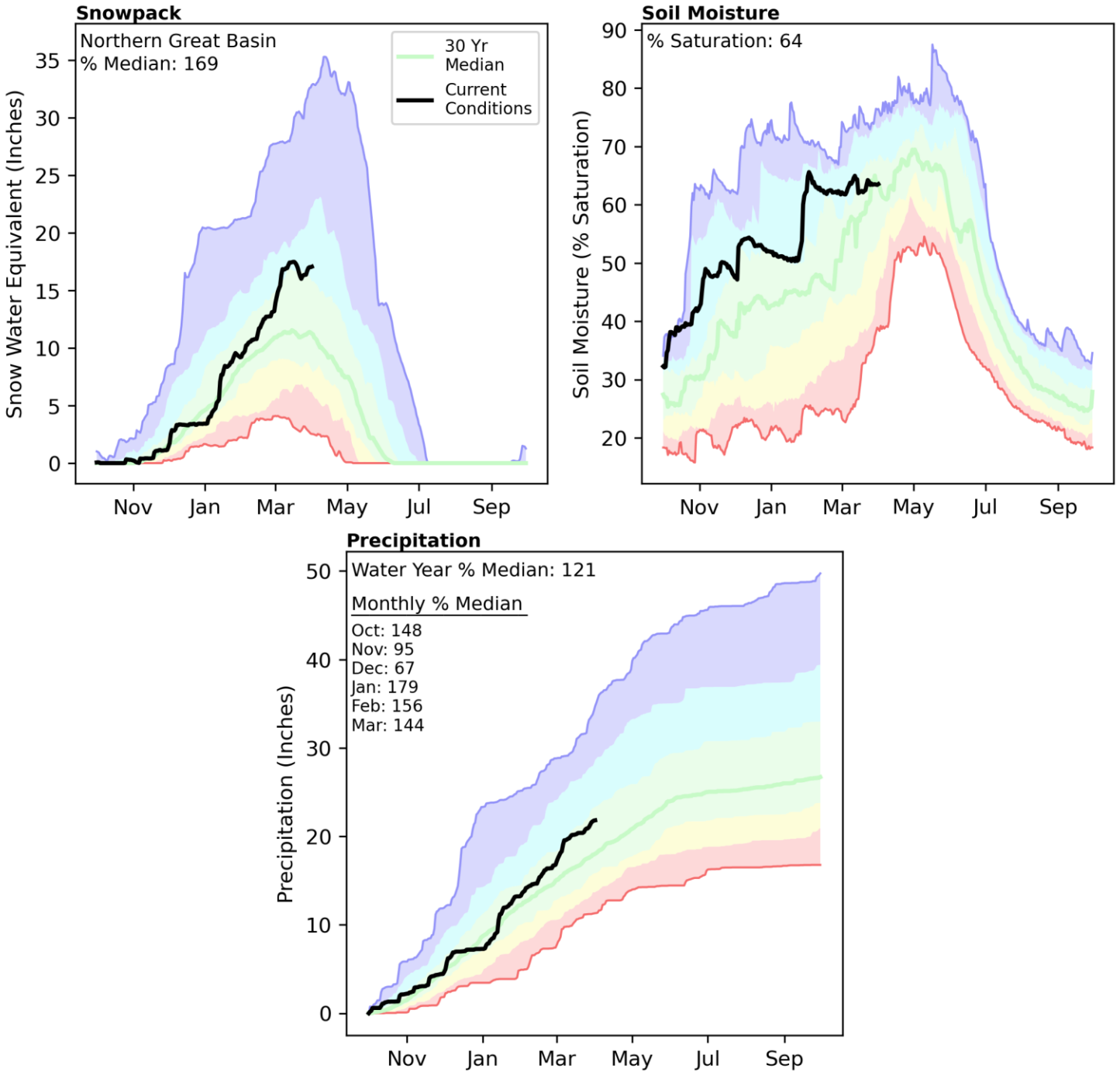
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Bridgeport Reservoir	40.8	11.2	25.1	42.5
Topaz Lk nr Topaz	58.7	24.9	24.2	59.4

Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Walker	10	108%	308%
East Walker ab Bridgeport	4	103%	361%
West Walker ab Coleville	8	109%	304%

Northern Great Basin | April 1, 2024

Snowpack in the Northern Great Basin is well above normal at 169% of median, compared to 224% at this time last year. Precipitation in March was well above normal at 144%, which brings the seasonal accumulation (October-March) to 121% of median. Soil moisture is at 64% saturation compared to 48% saturation last year.



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Data Current As of: 4/4/2024 9:58:41 AM

Northern Great Basin
Streamflow Forecasts - April 1, 2024

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

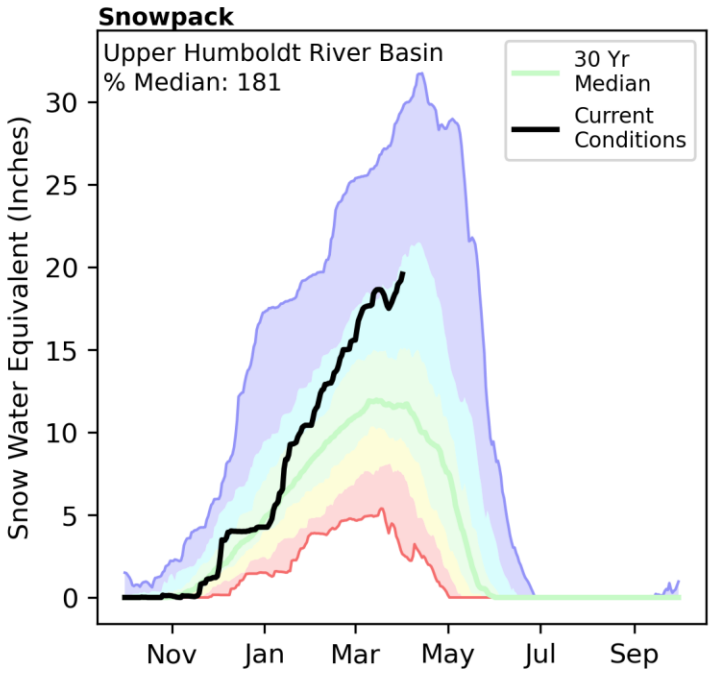
Northern Great Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
McDermitt Ck nr McDermitt								
	APR-JUL	10	12.9	15	205%	17.3	21	7.3

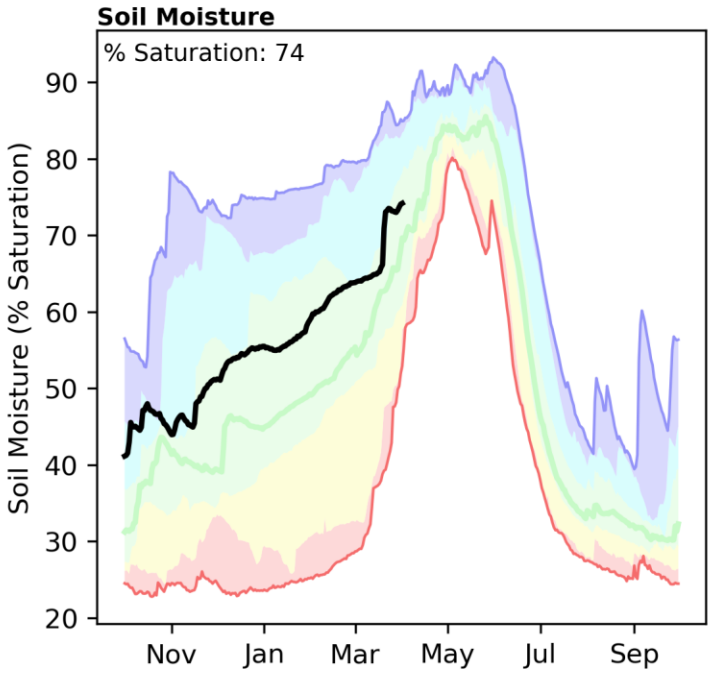
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

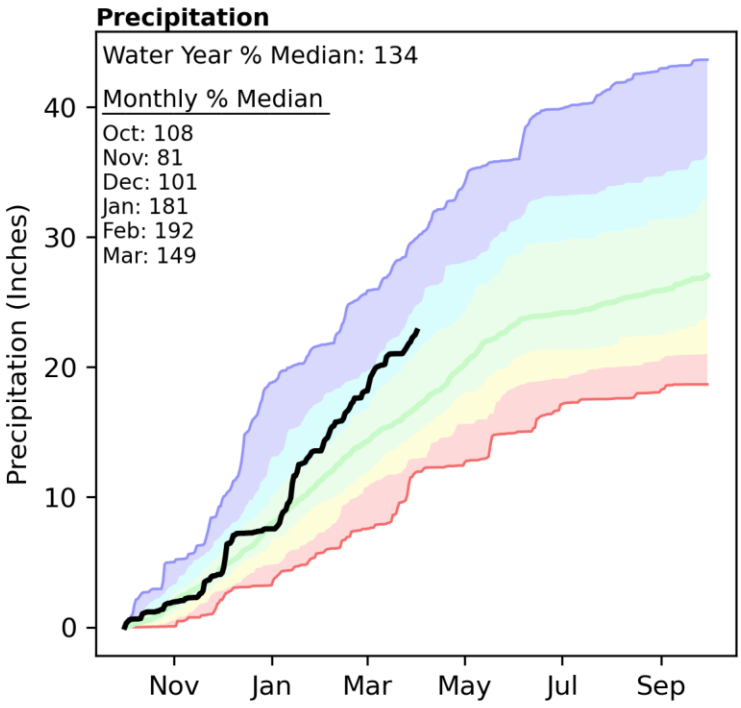
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Northern Great Basin	15	169%	224%
Surprise Valley-Warner Mtns	4	157%	189%
McDermitt	4	150%	227%
Quinn	8	171%	233%

Upper Humboldt River Basin | April 1, 2024

Snowpack in the Upper Humboldt River Basin is well above normal at 181% of median, compared to 228% at this time last year. Precipitation in March was well above normal at 149%, which brings the seasonal accumulation (October-March) to 134% of median. Soil moisture is at 74% saturation compared to 58% saturation last year.







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

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Upper Humboldt
Streamflow Forecasts - April 1, 2024

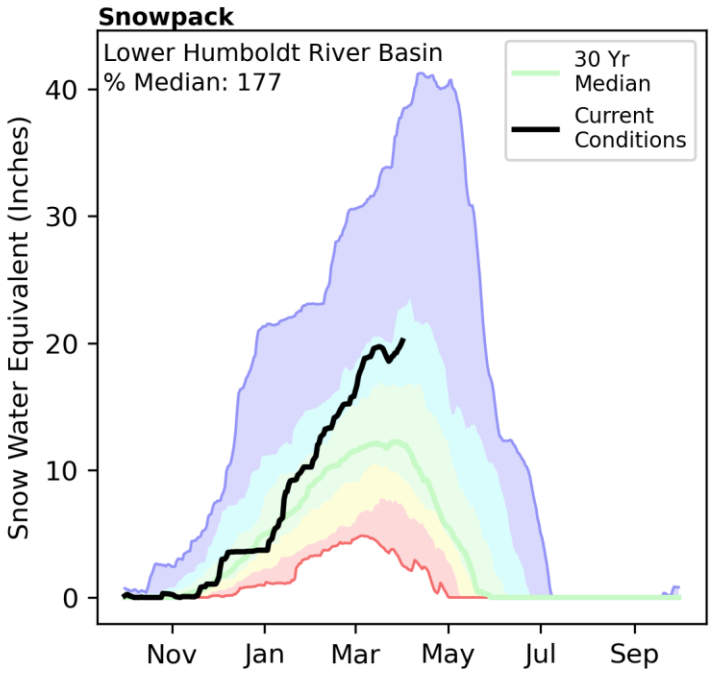
		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Upper Humboldt	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Marys R nr Deeth								
	APR-JUL	39	47	52	200%	57	65	26
Lamoille Ck nr Lamoille								
	APR-JUL	30	36	40	154%	44	50	26
NF Humboldt R at Devils Gate								
	APR-JUL	48	60	68	378%	76	88	18
Humboldt R nr Elko								
	APR-JUL	168	210	240	348%	270	310	69
SF Humboldt R abv Tenmile Ck								
	APR-JUL	102	121	135	260%	149	168	52
SF Humboldt R ab Dixie Ck								
	APR-JUL	93	115	130	255%	145	167	51
Humboldt R nr Carlin								
	APR-JUL	255	320	370	370%	420	505	100
Humboldt R at Palisade								
	APR-JUL	295	365	420	385%	475	570	109

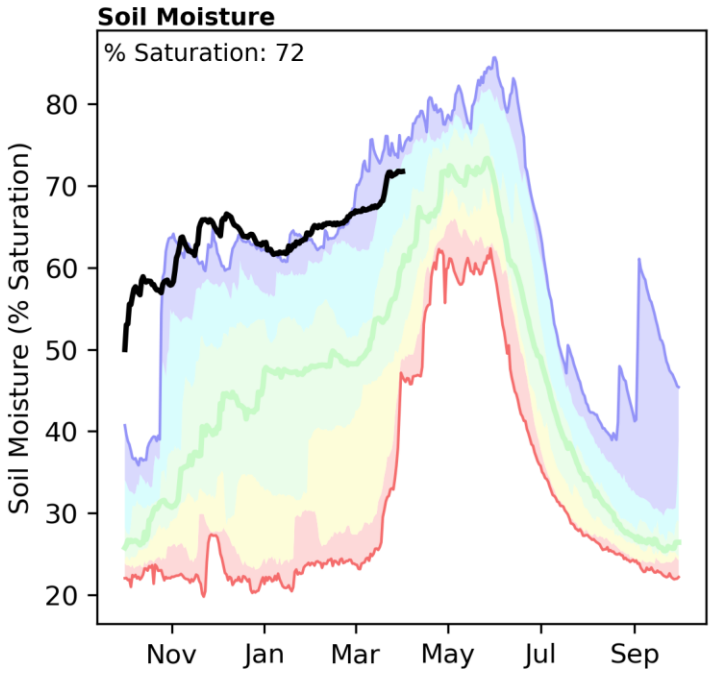
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

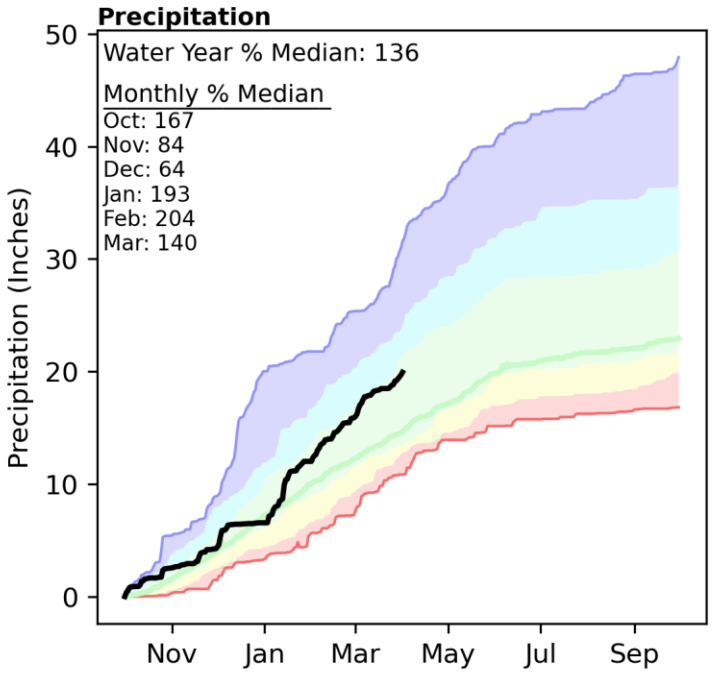
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Upper Humboldt	26	181%	228%
Mary's	5	178%	208%
Lamoille	3	156%	209%
North Fork Humboldt	6	257%	323%
South Fork Humboldt	8	168%	235%

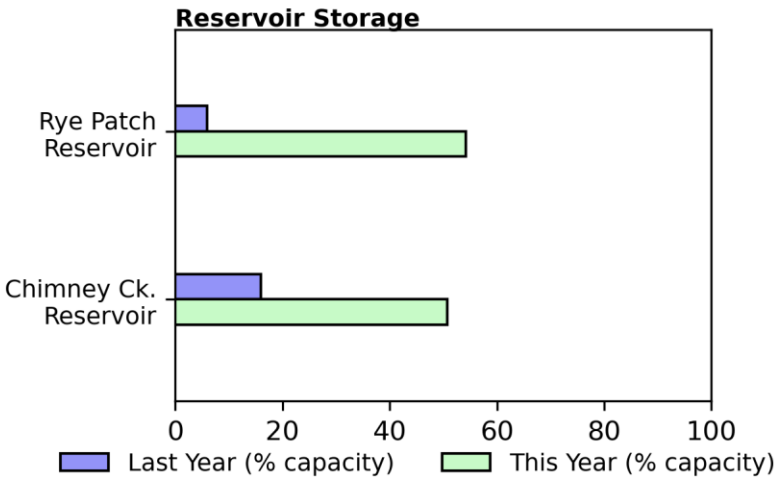
Lower Humboldt River Basin | April 1, 2024

Snowpack in the Lower Humboldt River Basin is well above normal at 177% of median, compared to 230% at this time last year. Precipitation in March was well above normal at 140%, which brings the seasonal accumulation (October-March) to 136% of median. Soil moisture is at 72% saturation compared to 49% saturation last year. Reservoir storage is 51% of capacity, compared to 8% last year.









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For more information visit: 30 year normal calculation description

Data Current As of: 4/4/2024 9:58:43 AM

Lower Humboldt
Streamflow Forecasts - April 1, 2024

		Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast						
Lower Humboldt	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Rock Ck nr Battle Mountain	APR-JUL	21	31	39	639%	48	63	6.1
Humboldt R at Comus	APR-JUL	245	310	360	456%	410	495	79
L Humboldt R nr Paradise Valley[2]	APR-JUL	8	11.6	14	241%	16.4	20	5.8
Martin Ck nr Paradise Valley	APR-JUL	17.7	23	26	241%	29	34	10.8
Humboldt R nr Imlay	APR-JUL	171	230	275	529%	325	405	52

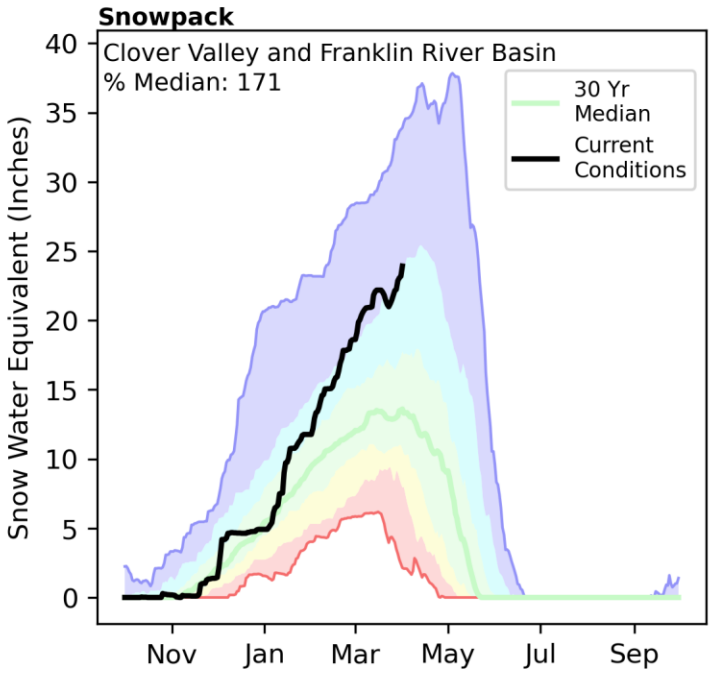
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

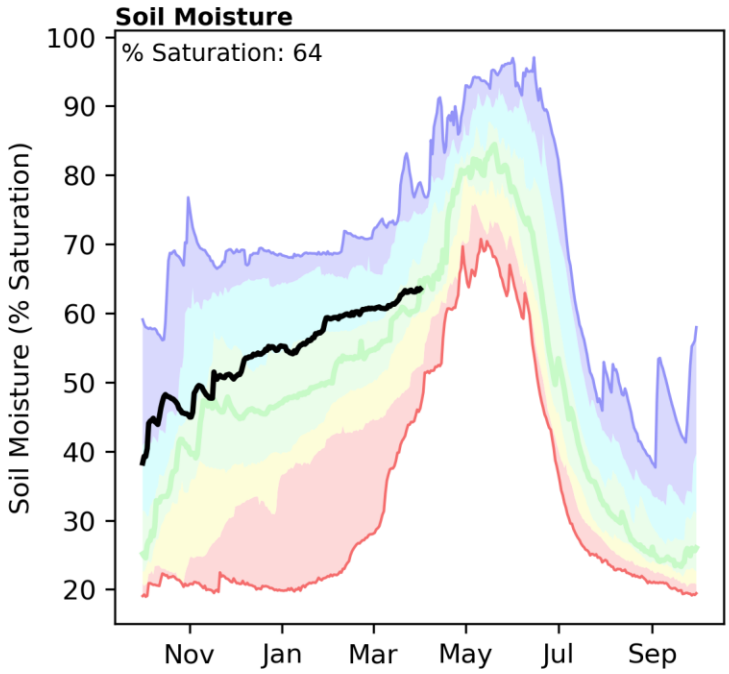
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Chimney Creek Reservoir	17.8	5.6	8.4	35.0
Rye Patch Re nr Rye Patch, NV	105.3	11.6	53.5	194.3

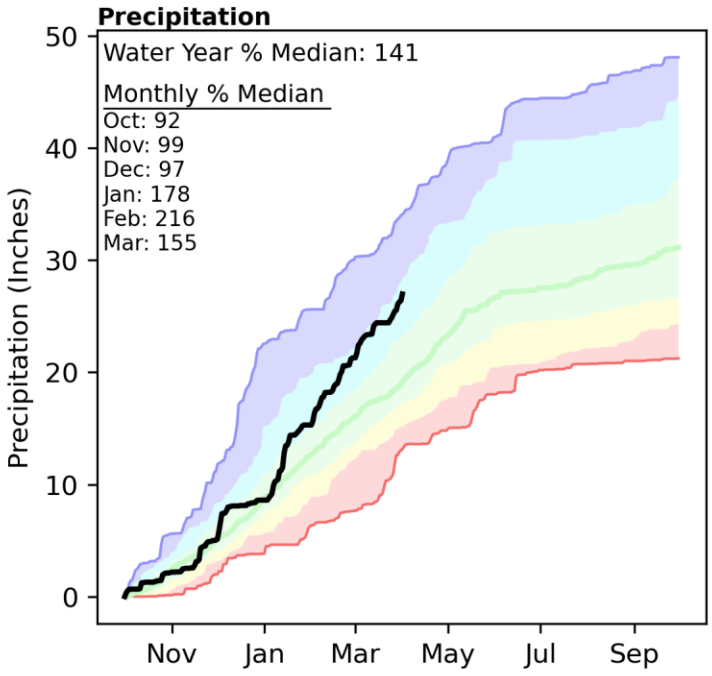
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Lower Humboldt	9	177%	230%
Rock	2	244%	276%
Reese	3	155%	254%
Martin	2	143%	192%
Little Humboldt	5	183%	234%
Humboldt above Imlay	35	180%	228%

Clover Valley and Franklin River Basin | April 1, 2024

Snowpack in the Clover Valley and Franklin River Basin is well above normal at 171% of median, compared to 233% at this time last year. Precipitation in March was well above normal at 155%, which brings the seasonal accumulation (October-March) to 141% of median. Soil moisture is at 64% saturation compared to 56% saturation last year.







Hole-in-Mountain SNOTEL - Status
Starting in water year 2020, automated snow water and snow depth measurements have been moved back to the original Hole-in-Mountain SNOTEL location used from 1981-2015. This move allows daily snow water percent of median to be calculated using historic data. The SNOTEL was re-located outside an avalanche zone in 2016 following an avalanche that damaged the site. Unfortunately, the new location while protected from future slides, was subject to drifting and snow data proved unrepresentative. Snow data from 2016-2020 have been removed from the public database and will appear as missing in NRCS products. Other SNOTEL parameters collected at the newer location are representative and were not moved. These include air temperature, precipitation and soil moisture.

Contact Jeff Anderson for more information:
jeff.anderson@usda.gov or 775-834-0913

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

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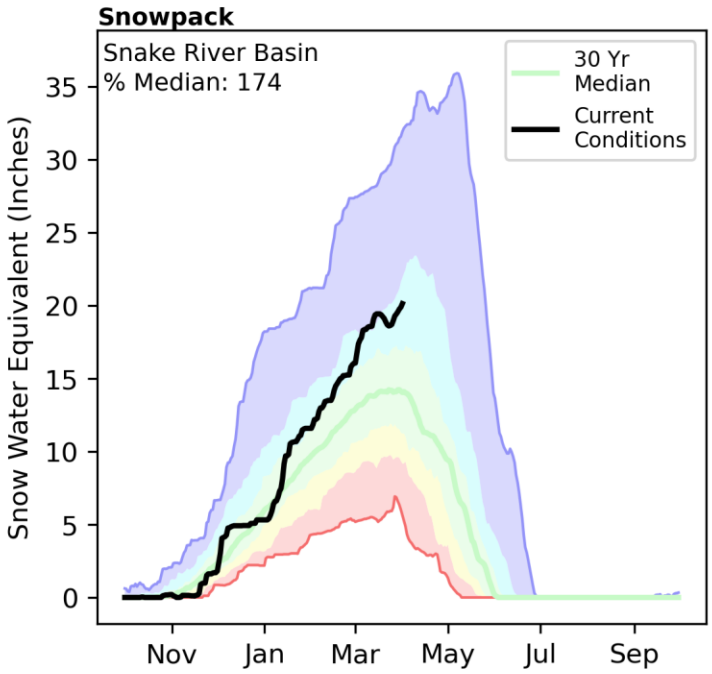
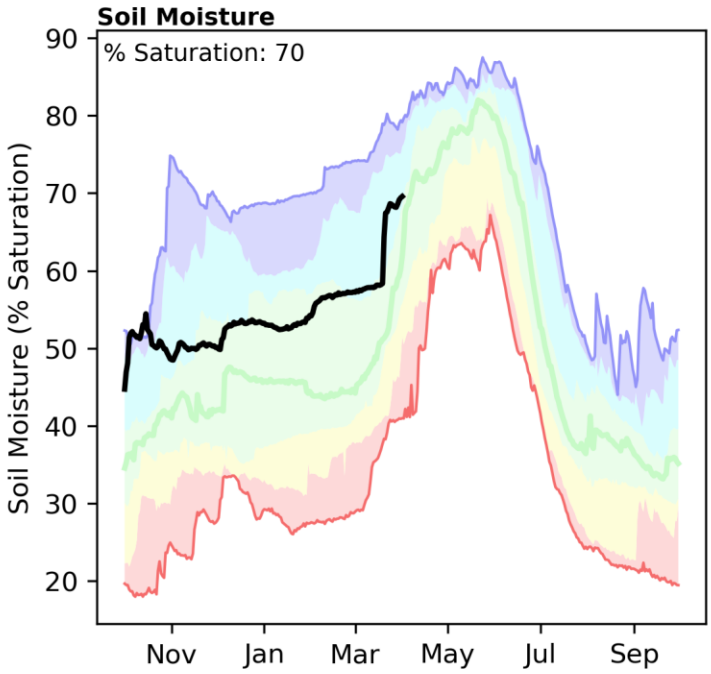
Clover Valley And Franklin - April 1, 2024

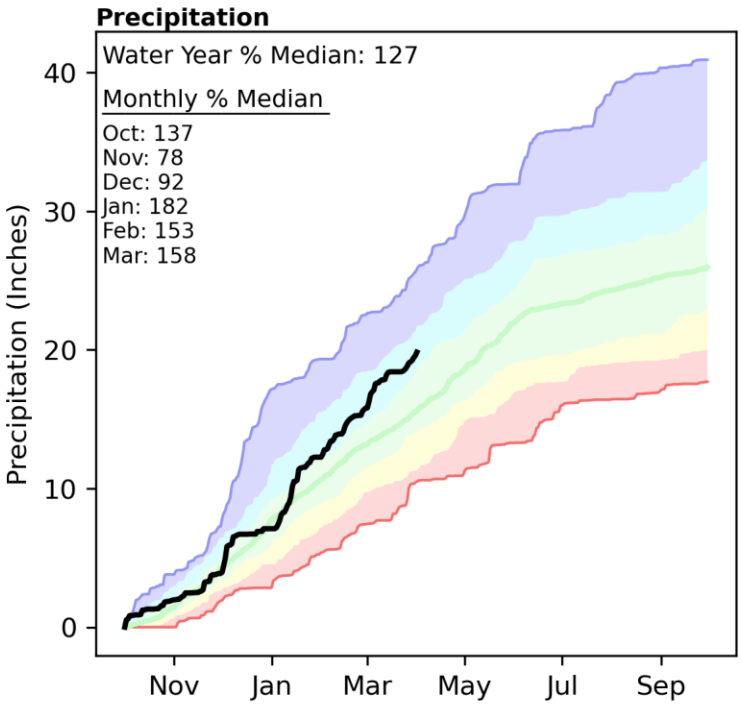
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Clover Valley and Franklin	11	171%	233%
Clover Valley	5	198%	253%
Franklin	7	165%	218%

Snake River Basin | April 1, 2024

Snowpack in the Snake River Basin is well above normal at 174% of median, compared to 202% at this time last year. Precipitation in March was well above normal at 158%, which brings the seasonal accumulation (October-March) to 127% of median. Soil moisture is at 70% saturation compared to 41% saturation last year.







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

Data Current As of: 4/4/2024 9:58:45 AM

Snake
Streamflow Forecasts - April 1, 2024

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

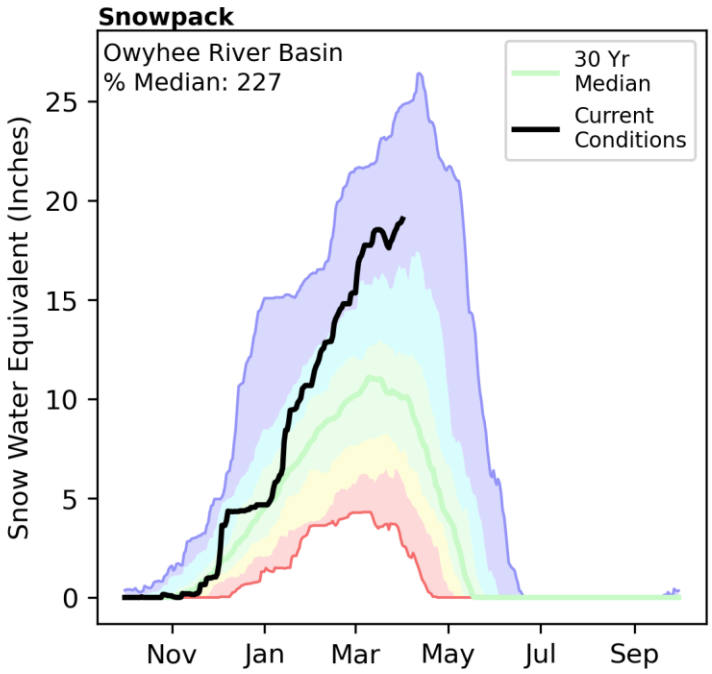
Snake	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Bruneau R at Rowland								
	APR-JUL	67	81	90	188%	99	113	48
	APR-SEP	69	83	92	188%	101	115	49
Jarbidge River Below Jarbidge								
	APR-JUL	25	29	31	158%	33	37	19.6
	APR-SEP	25	29	31	155%	33	37	20
Salmon Falls Ck nr San Jacinto								
	APR-JUL	78	97	110	196%	125	148	56
	APR-SEP	81	100	114	197%	129	152	58

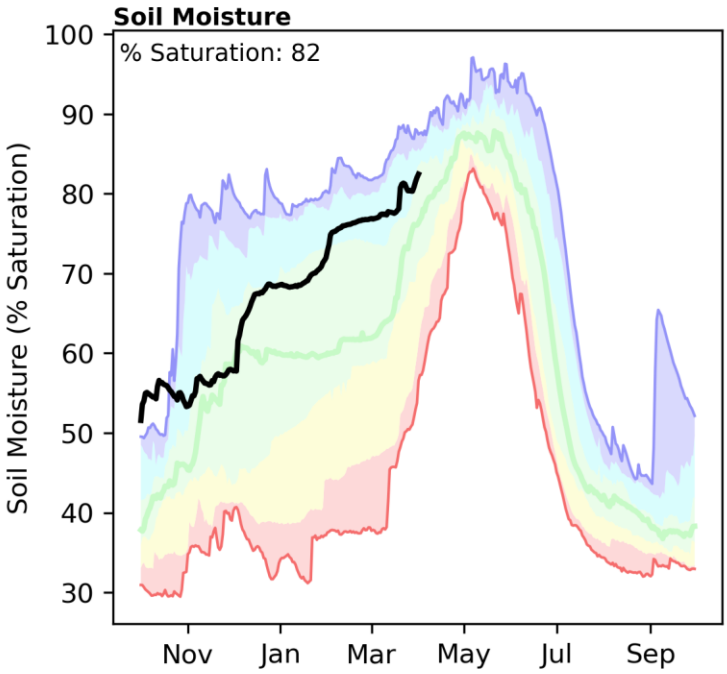
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

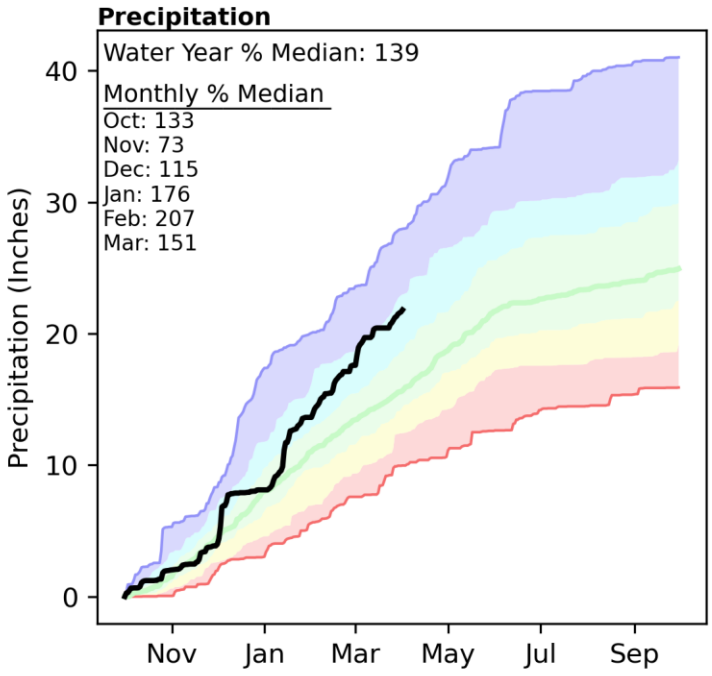
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Snake	14	174%	202%
Bruneau Headwaters	6	197%	213%
Jarbidge	3	133%	147%
Salmon Falls	7	163%	199%

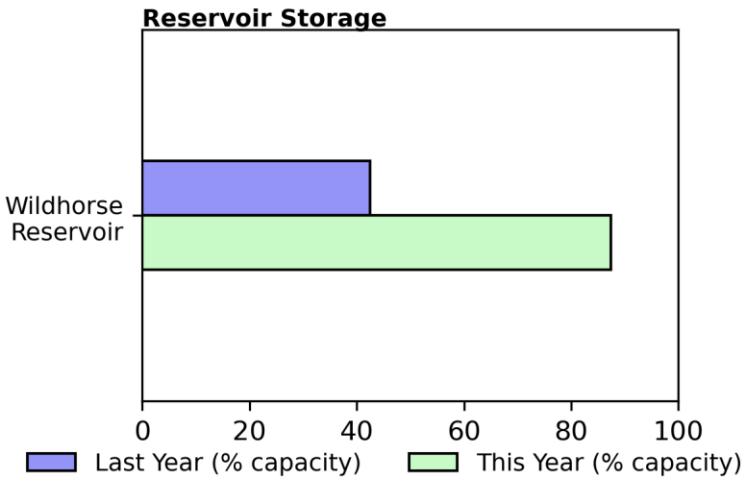
Owyhee River Basin | April 1, 2024

Snowpack in the Owyhee River Basin is well below normal at 227% of median, which is the same as this time last year. Precipitation in March was well above normal at 151%, which brings the seasonal accumulation (October-March) to 139% of median. Soil moisture is at 82% saturation compared to 67% saturation last year. Reservoir storage is 87% of capacity, compared to 42% last year.









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

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Owyhee

Streamflow Forecasts - April 1, 2024

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

Owyhee	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Owyhee R nr Gold Ck[2]								
	APR-JUL	31	41	48	279%	56	69	17.2

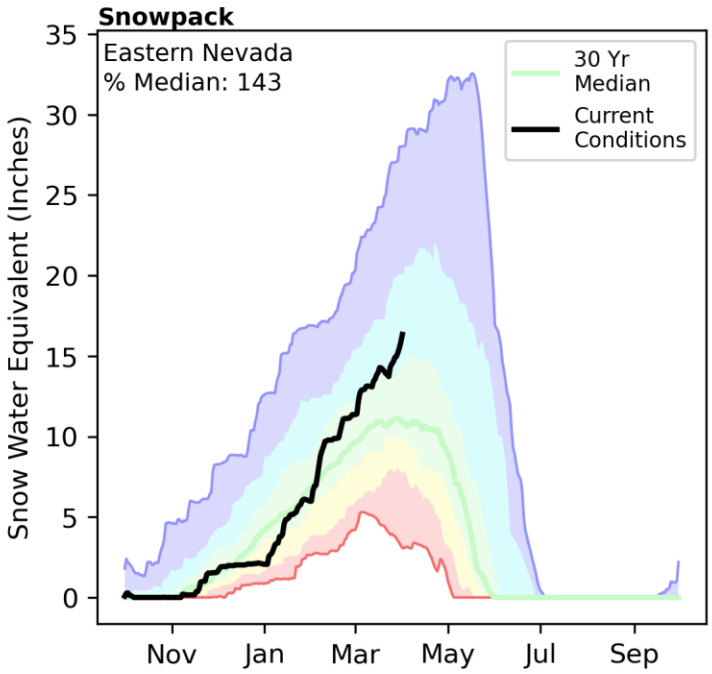
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

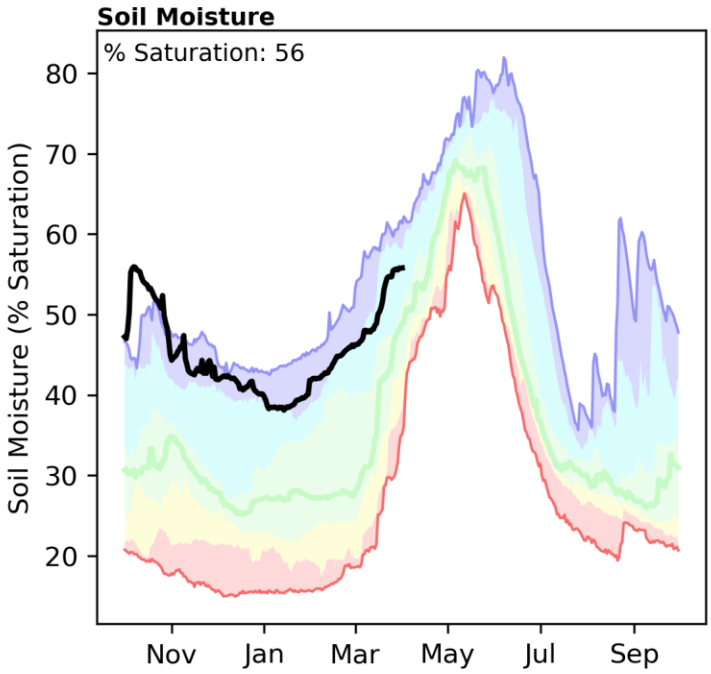
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Wild Horse Reservoir	62.5	30.4	33.3	71.5

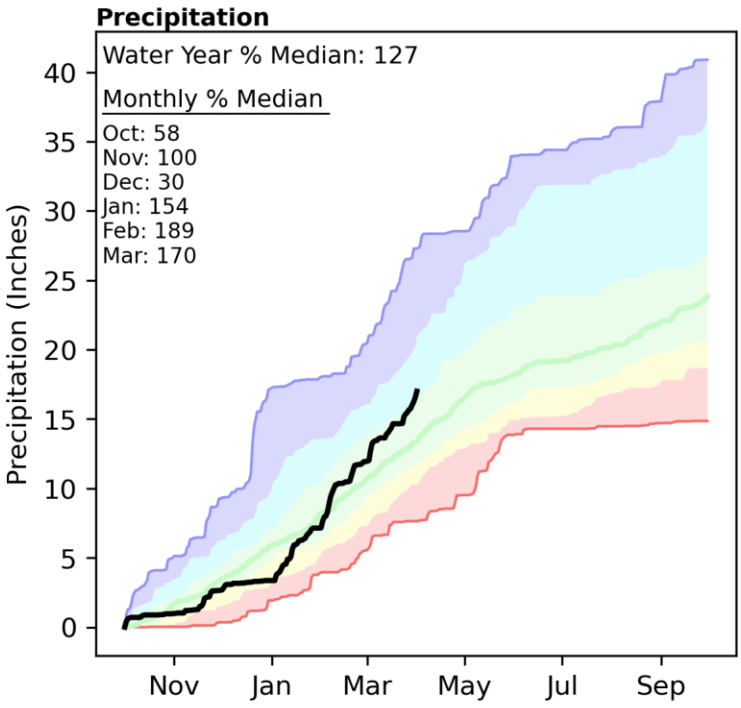
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Owyhee	12	227%	227%
Owyhee ab Owhyee	8	213%	204%
Owhyee ab Gold Creek	4	203%	195%
South Fork Owyhee	7	207%	212%

Eastern Nevada | April 1, 2024

Snowpack in Eastern Nevada is well above normal at 143% of median, compared to 293% at this time last year. Precipitation in March was well above normal at 170%, which brings the seasonal accumulation (October-March) to 127% of median. Soil moisture is at 56% saturation compared to 49% saturation last year.







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

Data Current As of: 4/4/2024 9:58:47 AM

Eastern Nevada
Streamflow Forecasts - April 1, 2024

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

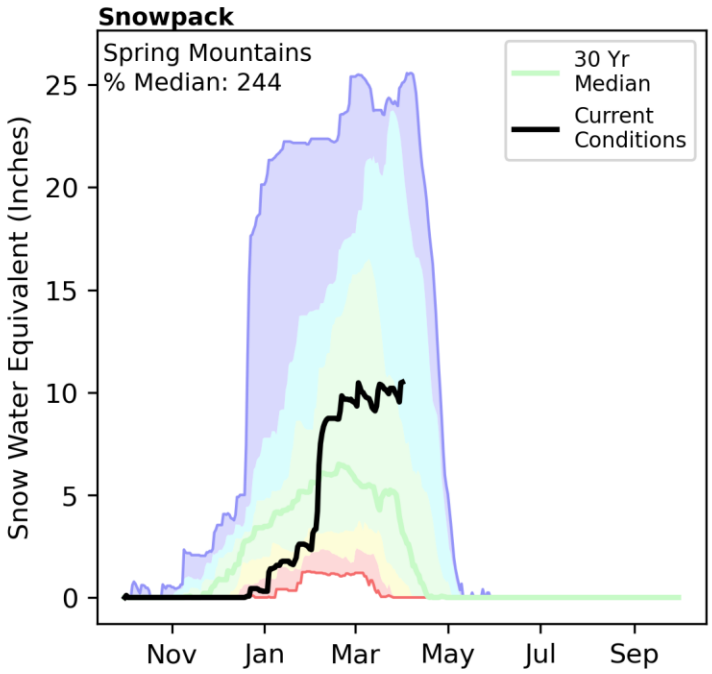
Eastern Nevada	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Kingston Ck nr Austin	APR-JUL	2.4	3.3	4	225%	4.8	6.1	1.78
Steptoe Ck nr Ely	APR-JUL	1.4	1.85	2.2	162%	2.6	3.2	1.36
Cleve Ck nr Ely	APR-JUL	2.6	3.5	4.2	156%	5	6.2	2.7
Lehman Ck nr Baker	APR-JUL	1.58	2.4	2.9	146%	3.4	4.2	1.99

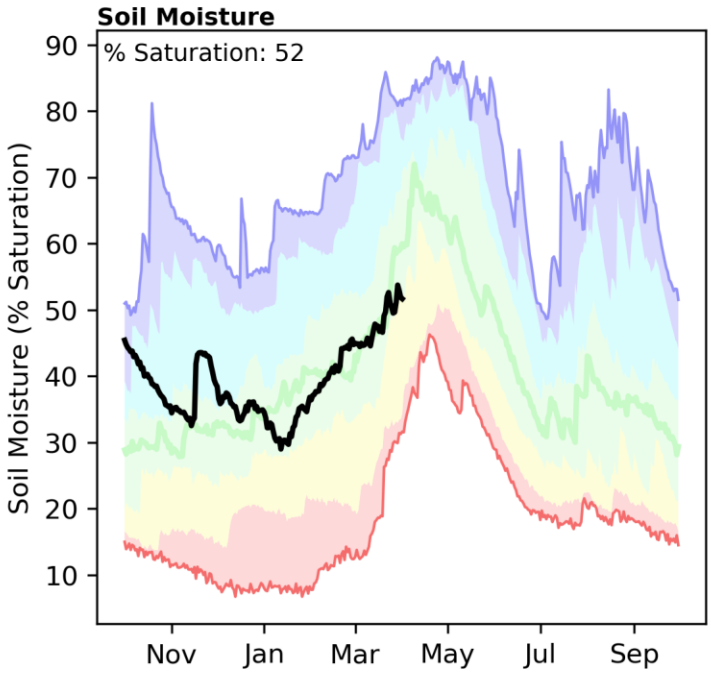
1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

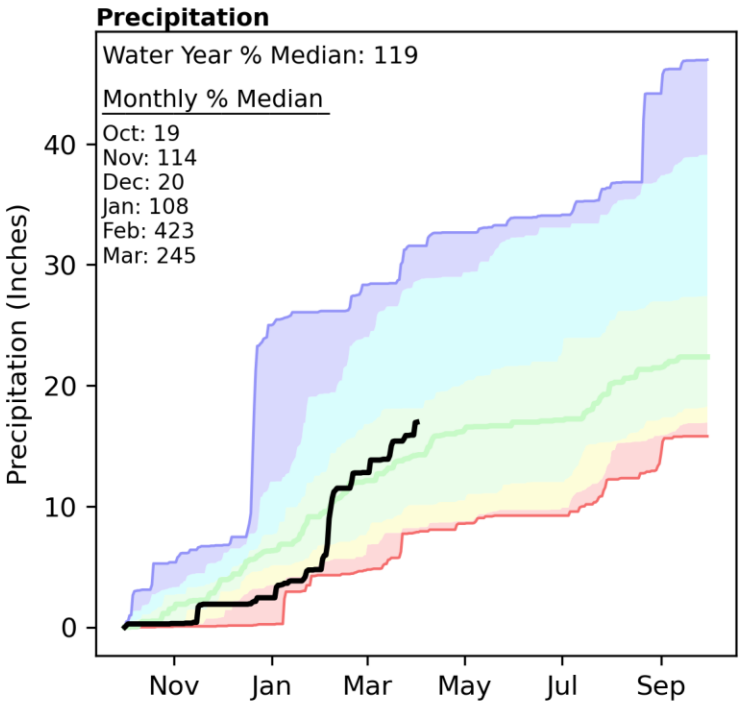
Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Eastern Nevada	15	143%	293%
Kingston	2	125%	238%
Steptoe Valley	5	128%	275%

Spring Mountains | April 1, 2024

Snowpack in the Spring Mountains is well above normal at 244% of median, compared to 531% at this time last year. Precipitation in March was well above normal at 245%, which brings the seasonal accumulation (October-March) to 119% of median. Soil moisture is at 52% saturation compared to 59% saturation last year.





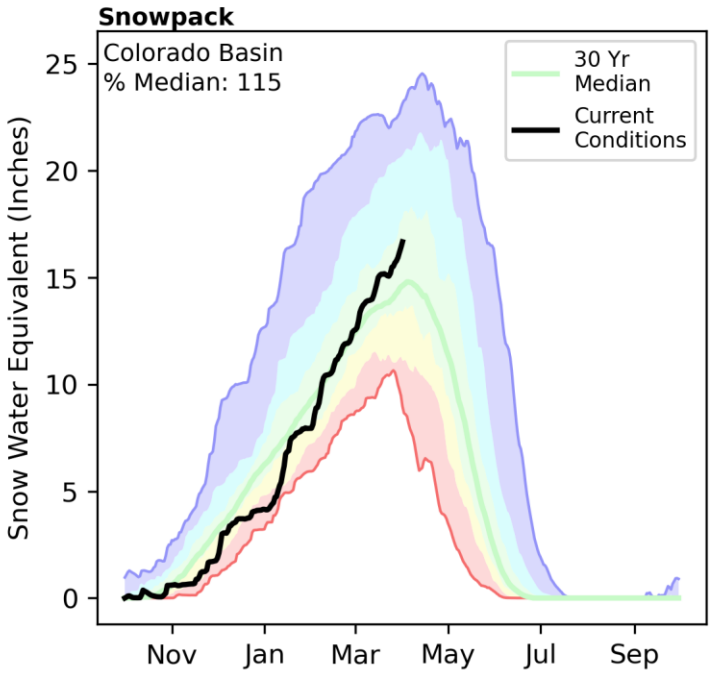


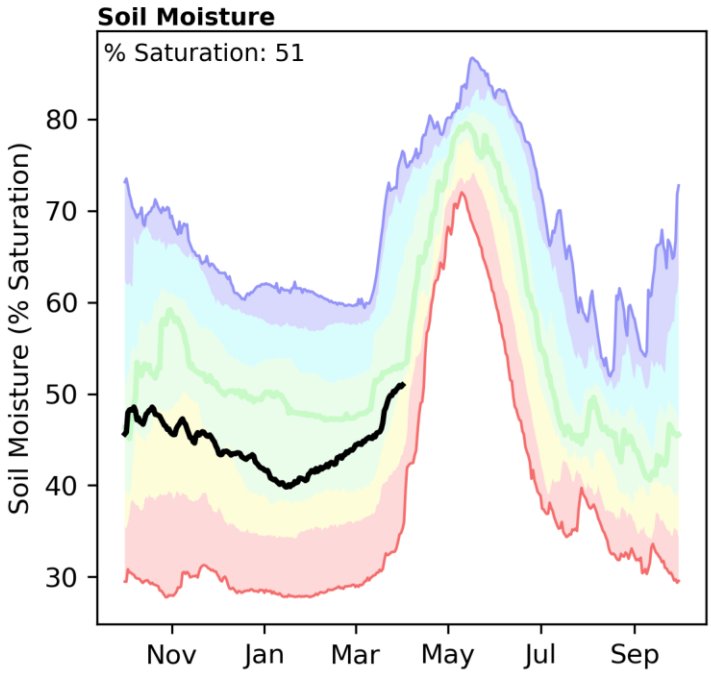
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: 30 year normal calculation description

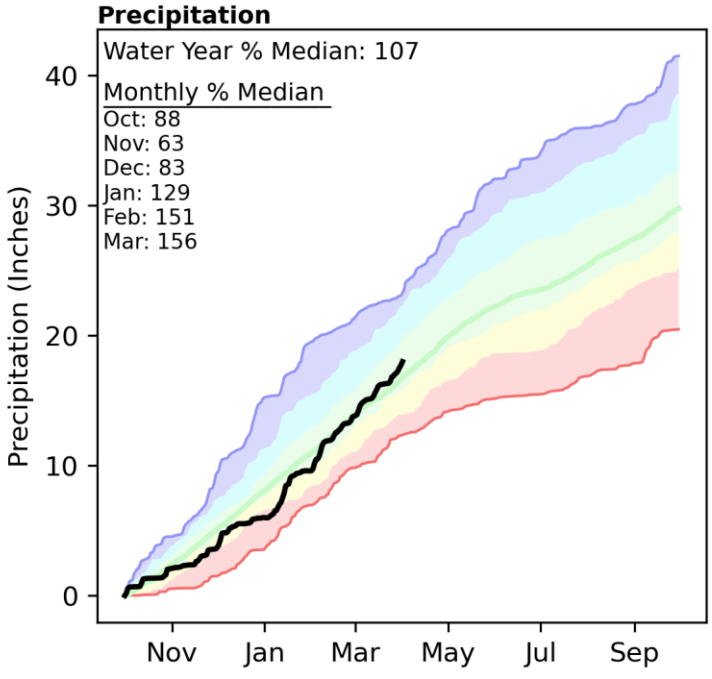
SNOTEL sites in the Spring Mountains were installed in 2008. Reported percentages are based on SNOTEL medians calculated using data from water years 2009-2020, not the full 30-year period. Snowpack percentages in the March and April reports include snow course measurements from long term data collection transects.

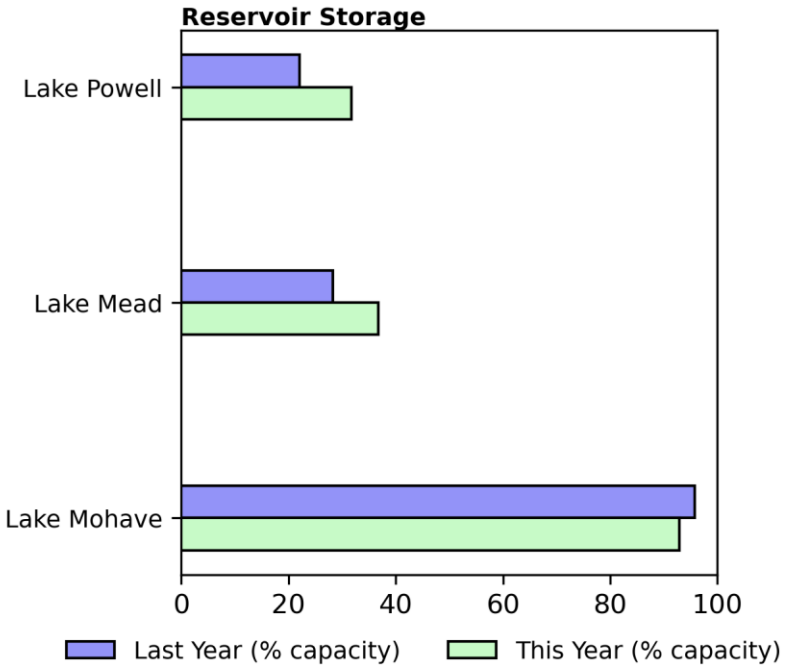
Colorado Basin | April 1, 2024

Snowpack in the Colorado Basin above Lake Powell is above normal at 115% of median, compared to 158% at this time last year. Precipitation in March was well above normal at 156%, which brings the seasonal accumulation (October-March) to 107% of median. Soil moisture is at 51% saturation compared to 53% saturation last year. Reservoir storage in the Lower Colorado Basin is 36% of capacity, compared to 27% last year.









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

Data Current As of: 4/4/2024 9:58:49 AM

Colorado
Streamflow Forecasts - April 1, 2024

		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	4210	5410	6300	103%	7260	8800	6130
Virgin R at Littlefield[2]	APR-JUL	19	28	36	109%	46	59	33
Virgin R nr Hurricane[2]	APR-JUL	17.7	26	34	110%	43	56	31

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

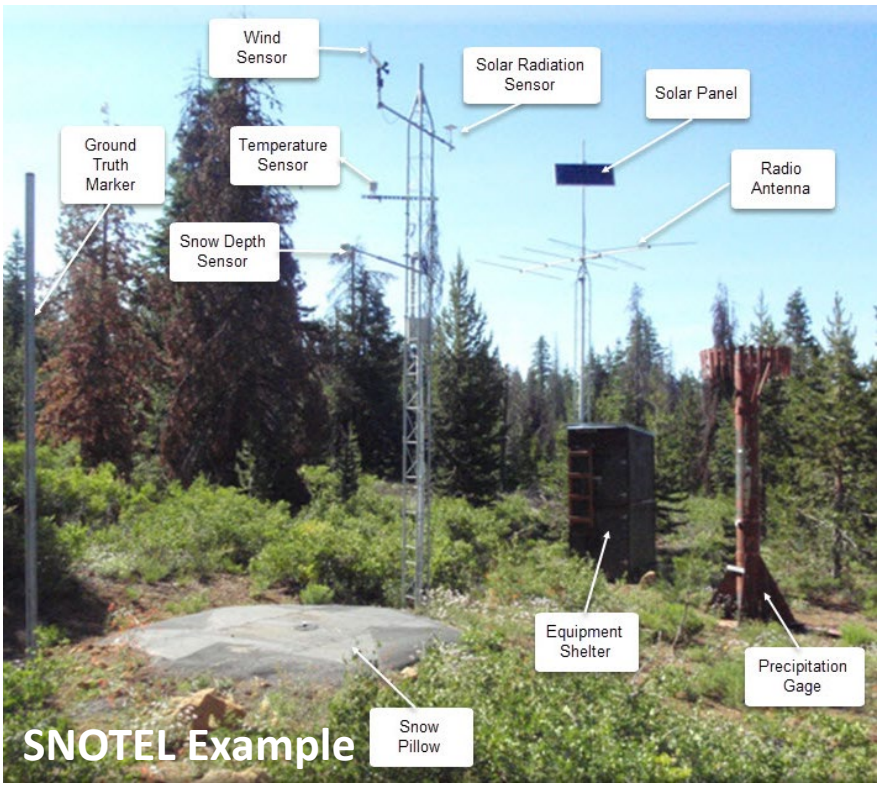
Reservoir Storage End of March, 2024	Current (KAF)	Last Year (KAF)	Median (KAF)	Capacity (KAF)
Lake Powell	7717.5	5375.0	12880.0	24322.0
Lake Mead	9629.0	7401.7	15296.0	26159.0
Lake Mohave	1682.0	1734.0	1684.0	1810.0

Watershed Snowpack Analysis April 1, 2024	# of Sites	% Median	Last Year % Median
Virgin	9	123%	339%
Upper Colorado	131	114%	158%

Appendix - SNOTEL and Snow Course Overview

SNOTEL

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



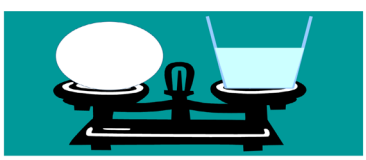
Snow Course

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

Snow Water Equivalent (SWE):

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

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



Weight of frozen water = Weight of liquid water

Snow core inside snow tubes

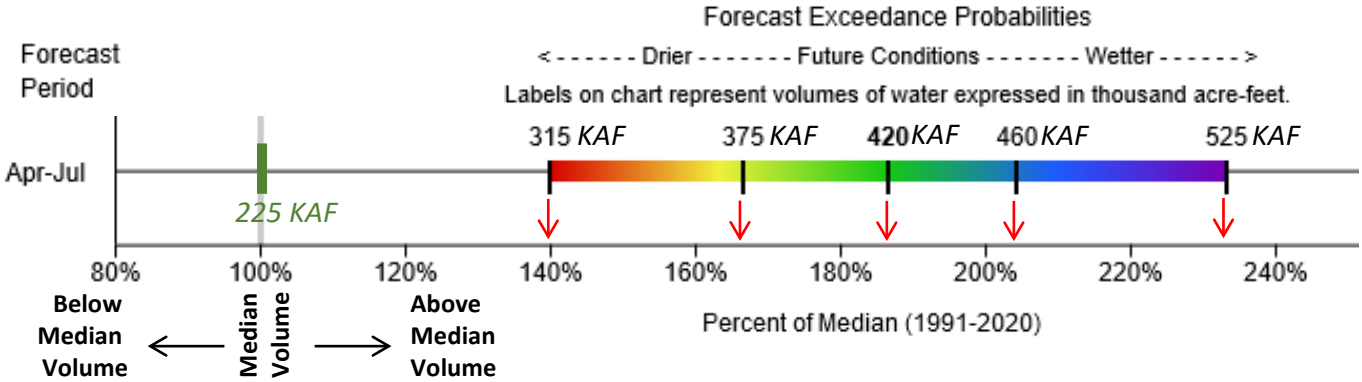
Appendix: Interpreting the Streamflow Forecast Chart

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

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

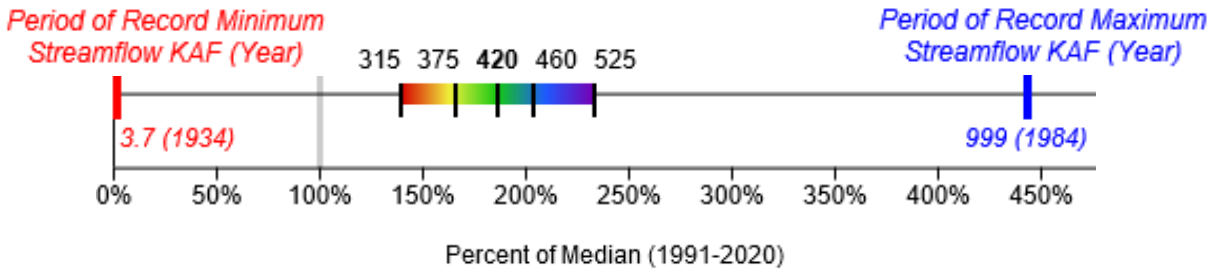
The Forecast Chart (below) provides an alternative to the tables (above) used in the basin summaries. The chart displays the forecast exceedance range as a colored bar. The vertical lines on the bar signify the five forecast exceedances.

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



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

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



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

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A number of NRCS field offices and outside agencies provide assistance with snow course measurements. This cooperation is greatly appreciated.

List of Streamflow Adjustments:

Lake Tahoe Net Inflow (2) (externally adjusted by US Water Master*) = Lake Tahoe storage change + Lake Tahoe Release. Net inflow used due to complexities with estimating Lake Tahoe evaporation and precipitation.

Marlette Lake Inflow (2) = Marlette Lake Inflow, observed + Marlette Lake storage change

Donner Lake inflow (2) (externally adjusted by US Water Master*) **=** Donner Lake storage change + Donner Lake Release + Lake Evaporation – Lake Precipitation

Martis Creek Reservoir inflow (2) (externally adjusted by US Water Master*) = Martis Creek Reservoir storage change + Martis Creek Reservoir Release + Lake Evaporation – Lake Precipitation

Prosser Creek Reservoir Inflow (2) (externally adjusted by US Water Master*) = Prosser Creek Reservoir storage change + Prosser Creek Reservoir Release + Lake Evaporation – Lake Precipitation

Independence Lake Inflow (2) (externally adjusted by US Water Master*) = Independence Lake storage change + Independence Lake Release + Lake Evaporation – Lake Precipitation

Stampede Reservoir Local Inflow (2) (externally adjusted by US Water Master*) = Stampede Reservoir storage change + Stampede Reservoir Release + Lake Evaporation – Lake Precipitation – Independence Lake Release + Sierra Valley Diversion

Boca Reservoir Local Inflow (2) (externally adjusted by US Water Master*) = Boca Reservoir storage change + Boca Reservoir Release + Lake Evaporation – Lake Precipitation – Stampede Reservoir Release

Little Truckee River above Boca Reservoir (2) (externally adjusted by US Water Master*) **=** Independence Lake Inflow (2) + Stampede Reservoir Local Inflow (2) + Boca Reservoir Local Inflow (2)

Truckee R above Farad Sidewater (2) (externally adjusted by US Water Master*) **=** Truckee River at Farad, observed – Boca Creek Reservoir Release – Prosser Creek Reservoir Release – Donner Lake Release – Martis Creek Reservoir Release – Lake Tahoe Release

Truckee River at Farad (2) (externally adjusted by US Water Master*) = Donner Lake inflow (2) + Martis Creek Reservoir inflow (2) + Prosser Creek Reservoir Inflow (2) + Independence Lake Inflow (2) + Stampede Reservoir Local Inflow (2) + Boca Reservoir Local Inflow (2) + Truckee R above Farad Sidewater (2)

East Walker River near Bridgeport (2) = East Walker River near Bridgeport, observed + Bridgeport Reservoir storage change

L Humboldt R nr Paradise Valley (2) = L Humboldt R nr Paradise Valley + Chimney Creek Reservoir storage change

Owyhee River near Gold Creek (2) = Owyhee River near Gold Creek + Wildhorse Reservoir storage change

Lake Powell Inflow (2) (externally adjusted by Bureau of Reclamation for major upstream reservoirs, but not trans-basin diversions to Missouri or Rio Grande)

*Externally adjusted US Water Master data comes from Hydrologic Flow Report which accounts for precipitation and evaporation from each reservoir: http://www.troa.net/reports/wm_hydrologicflow/

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