USDA United States Department of Agriculture

Natural Resources Conservation Service

Nevada Water Supply Outlook Report
February 1, 2021

Looking across the Carson Valley from Route 50, January 29, 2021

Storms during the last week of January brought snow to valley floors in western Nevada. Snowfall in the mountains increased basin snowpack percentages in the Eastern Sierra from 36-53% of median before the storm to 75-82% on February 1. Other basins in western Nevada saw smaller snowpack increases. Unfortunately, the storm mostly bypassed the Upper Humboldt and other basins in northeast Nevada.

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 in lake level 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" (Averages and Medians): Throughout this report conditions are expressed as a "percent of normal". In this context "normal" is meant to be a catch-all word that refers to the statistical **average** for the 1981-2010 period when related to streamflow, precipitation and reservoir storage, and the statistical **median** for the 1981-2010 period when related to snowpack. For an explanation of why snowpack uses median visit: www.wcc.nrcs.usda.gov/normals/median_average.htm. Soil moisture has only been measured at SNOTEL sites since ~2006. Due to the short record the soil moisture normal is based on the short-term average for water years 2006-2020.

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 1981-2020; for soil moisture the period is 2006-2020.

Watershed Snowpack Analysis: These tables summarize the snowpack percent of median for each main basin, and its sub-basins. Percentages are based on SNOTEL and snow course measurements. By selecting "Nevada" and report type "Snow" a full report with station-by-station data can be found here: http://www.wcc.nrcs.usda.gov/basin.html.

This publication can be found online at:
https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/

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Nevada Water Supply Outlook
February 1, 2021

SUMMARY

The La Nina storm track, which had been focused to our north, finally took aim at California and Nevada the last week of January. This strong atmospheric river storm produced February 1 snowpack percentages ranging from 74-87% of median in the Truckee, Tahoe, Carson, Walker, and Lower Humboldt basins, as well as Eastern Nevada and the Northern Great Basin. It will take another two or three storms of similar size to produce a normal April 1 snowpack in the Sierra basins. Unfortunately, the end of January storm bypassed northeastern Nevada where February 1 snow percentages are 54-60% of median. Statistically, there is a 10% chance for snowpacks in northeast Nevada to reach normal April 1 amounts. Water year precipitation is 59-84% of average across the state's main basins. With both snow and precipitation totals below normal, streamflow forecasts are following suit. Most February 1 streamflow forecasts range from 31-81% for the April-July period. The US Drought Monitor published February 2nd ranks 93% of Nevada in severe to exceptional drought. This is due to below normal snowpacks, significant precipitation deficits that stretch back to last winter, low soil moisture and reservoir storage that is less than last year. More storms are needed to reverse these drought conditions and improve Nevada's water supply outlook for the rest of 2021.

SNOWPACK

Despite recent storms, February 1 snowpacks continue to be below normal across the region. Snowpack percentages are 75-82% of median in the Truckee, Tahoe, Carson and Walker basins. Percentages are similar at 74-87% for the Northern Great Basin, Lower Humboldt Basin and Eastern Nevada. Percentages are lowest for the Upper Humboldt, Owyhee, Snake and Clover Valley and Franklin River basins at just 54-60%. The first three weeks of January brought little new snow causing percentages to fall off from those reported last month. On January 25th basin snowpack percentages were just 36-76% of median across the state. An intense atmospheric river storm the last week of January provided a dramatic boost to snowpacks in the Sierra, Eastern Nevada and Spring Mountains. The Walker Basin benefited the most, seeing its snowpack double from 36% before the storm to 75% of median on February 1. The water content of the snowpack increased by between 3 and 10 inches at SNOTEL sites in the eastern Sierra the last week of January. Nine SNOTEL sites recorded an increase in snow water which was the highest ever recorded during the last week of January. The storm overlapped with the end of month manual snow surveys that the NRCS and other agencies accomplish. Some surveys were done prior to the storm and some afterwards. Due to the large differences pre- and post-storm, those data collected before the storm have been omitted from basin calculations and were not used in streamflow forecasts in this report. In northeastern Nevada, the storm mostly bypassed the Upper Humboldt, Owyhee, Snake, and Clover Valley basins. February 1 snow amounts rank in the lowest 10 years on record across much of northeast Nevada. Statistically there is only a 10% chance snowpacks in northeast Nevada, including the Upper Humboldt, will recover to normal April 1 peak amounts.

PRECIPITATION

So far this water year, precipitation from October 1 through February 1 stands at 59-84% of average. January monthly precipitation was near to above average in the Northern Great Basin, as well as the Walker, Carson, and Lower Humboldt basins. Monthly precipitation amounts in other basins were below

average, adding to the precipitation deficits discussed in last month's report. These precipitation deficits represent a significant contributing factor to Nevada's drought status, which as of February 2nd classified 93% of the state in severe to exceptional drought.

SOIL MOISTURE

Precipitation deficits and the lack of fall rain before snow started accumulating has left soil moisture well below average in all basins. Record soil dryness exists in the Upper Humboldt Basin, Eastern Nevada, Clover Valley and Franklin River Basin, the Spring Mountains, as well as in the Upper Colorado and Virgin River basins. Dry soils could produce reduced runoff efficiency this spring due to the need to fill the soil profile. Soil moisture graphs found later in this report average data from sensors located at soil depths of 2, 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

Reservoir storage is significantly lower than a year ago. See individual basin information later in the report for storage volumes. Reservoir space means there is room to mitigate flood concerns, but it also emphasizes the importance of accumulating additional precipitation to fill reservoirs for next summer.

STREAMFLOW FORECASTS

Most February 1 streamflow forecasts range from 31-81% for the April-July period. Forecasts generally increased since last month. The biggest increases are for streams coming out of the Sierra. Forecasts for the main stem of the Humboldt River saw modest increases of a few percent thanks to better precipitation for tributaries to the north. Streams originating in the Ruby Mountains, such as Lamoille Creek and the Southfork Humboldt, had forecasts decrease since last month. Key forecasts include: Lake Tahoe Rise 69%, Truckee River at Farad 67%, Carson River near Fort Churchill 54%, East Walker River near Bridgeport 79%, West Walker River near Coleville 80%, Humboldt River near Elko 53%, Humboldt River near Imlay 31% and Colorado River Lake Powell Inflow 42%. All of these forecast percentages are based on the 50% exceedance level. Keep in mind every forecast has five exceedance levels. The 50% exceedance is the middle of the road forecast, and it assumes average precipitation in the future. There is, however, a 50% chance of more streamflow occurring if future conditions are wetter than average, and conversely, a 50% chance of less streamflow occurring if the future weather is drier than average. If drier than normal conditions persist in 2021, the actual volumes could be closer to the drier forecasts (70% and 90% exceedances) which are provided in the basin summaries.

UPCOMING EVENTS

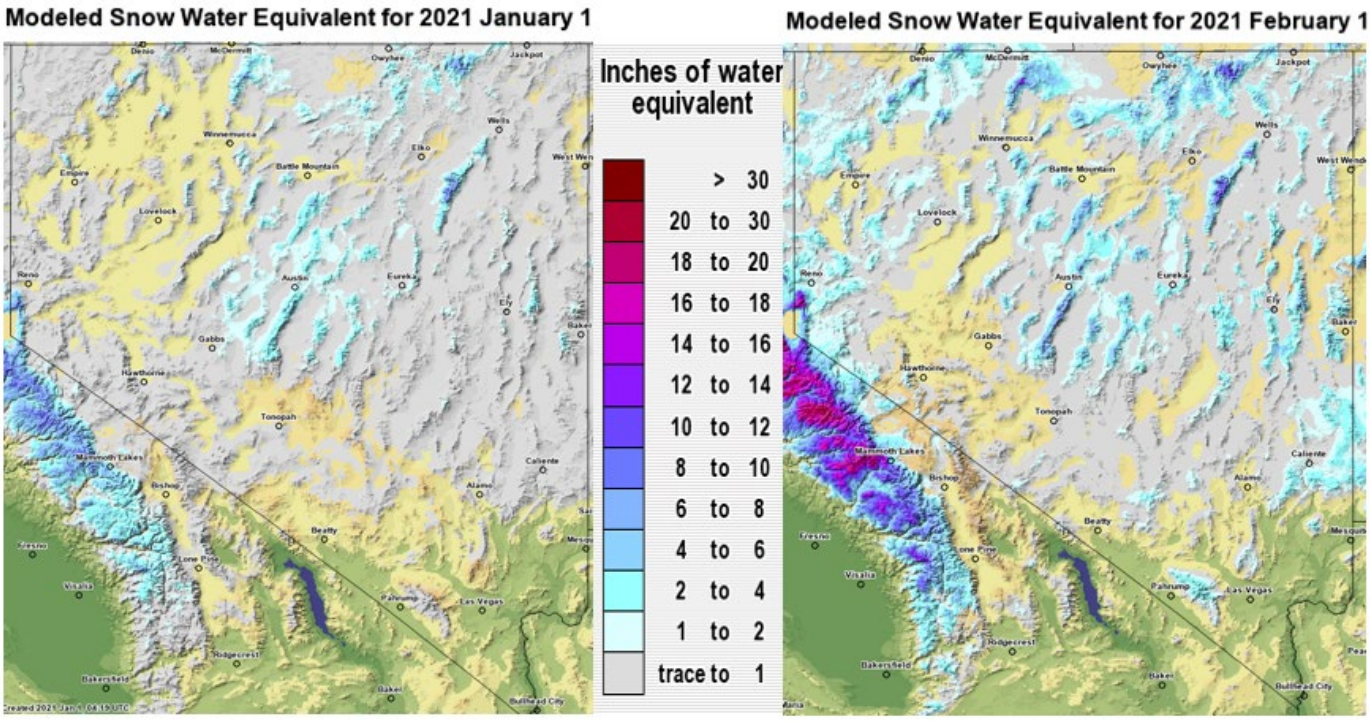
Northern Nevada Streamflow, Reservoir, and Weather Forecast Meeting for Water Planning
Thursday, Feb. 11 from 2 pm – 4 pm on Lifesize (virtual format).
The public is invited to presentations by the NRCS, NWS, USBR, USGS regarding the 2021 snowpack, streamflow, precipitation and reservoir conditions for the Truckee, Carson, Walker, and Humboldt rivers.
Join the meeting online: https://call.lifesizecloud.com/7185156
Call in by phone (audio only) +1 (877) 422-8614 Meeting extension: 7185156#

Western Snow Conference, April 12-15, 2021, Virtual Meeting
Topic: Bridging the Gap between Research and Operations
https://westernsnowconference.org/meeting/2021

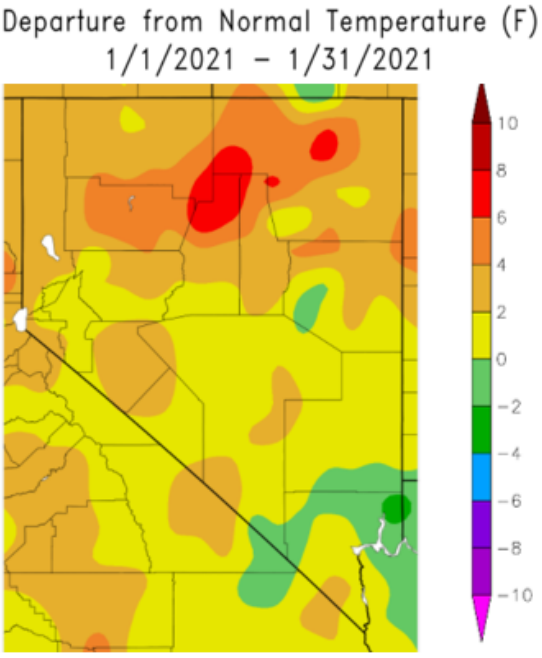
RANGELAND CONDITIONS

The NRCS mission is to provide resources to farmers and ranchers to aid them with conservation. Most NRCS SNOTEL stations are located in the mountains above 6,500 feet. There are a lot of rangeland acres below the SNOTEL network. This section takes a closer look at data from lower elevation rangeland and valley locations which may be more meaningful to the rangeland communities.

Snow Cover: Seasonal snow cover replenishes soil moisture and provides water for plant growth. A useful tool to track the lower elevation snowpack is NOAA's Modeled Snow Water Equivalent Map. The January 1, 2021 map (left) shows modeled snow water equivalent across Nevada one month ago. Comparing to February 1, 2021 (right), some low elevation snow accumulated. Snowpacks at slightly higher elevations have increased across northeastern Nevada as compared to January 1.

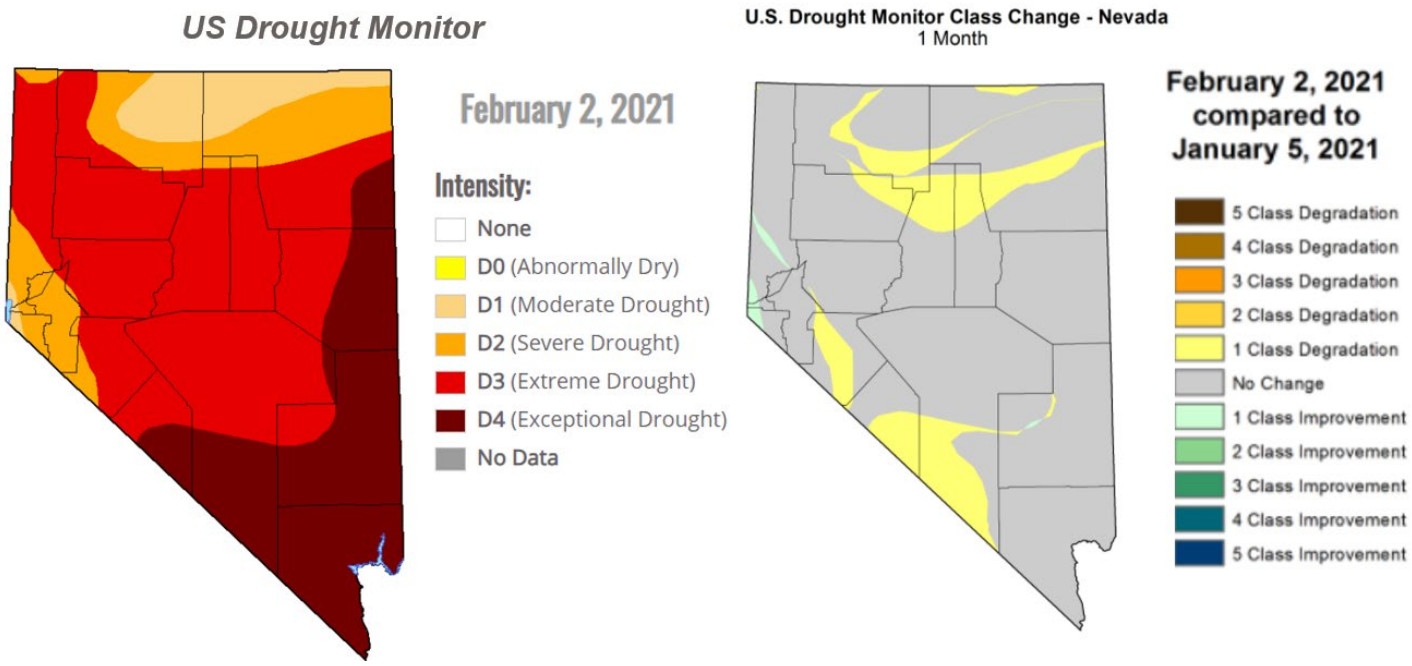


Plant Growth: Warmer than normal temperatures in January, illustrated on the map to the right, have initiated plant growth across the state at low to mid-elevations (~5500 feet). Germination is behind on several annual non-native plants, including cheatgrass (Bromus tectorum), Arabian schismus (Schismus arabicus), bur buttercup (Ceratocephala testiculata), red-stem filaree (Erodium cicutarium) and annual mustards due to dry conditions. Long-term forecasts developed by the USA Phenology Network predicted that spring leaf out would arrive earlier than normal (https://www.usanpn.org/home). Spring leaf out has already occurred in southern Nevada and wildflowers and shrubs are beginning to bloom in the deserts of southern California and Arizona. Spring is days-to-weeks early in parts of California, Nevada, and Arizona, with some areas east of Santa Barbara being 49 days early.



Generated 2/3/2021 at HPRCC using provisional data.
NOAA Regional Climate Centers

Drought Status: The US drought monitor map from February 2, 2021 indicates that 93% of the state is currently in severe to exceptional drought. The area highlighted in yellow on the right-hand map received a one drought class degradation compared to the map issued January 5, 2021.



Valley Temperature and Precipitation: Table 1 provides a summary of temperature and precipitation data from selected valley climate stations across the state for the month of January. January was a very warm and average to dry month, with all stations recording above normal temperatures and half recording below normal precipitation. On January 31, the maximum temperature for the month at Reno was 63°F, the same high as in 2020. Elko had a January high of 58°F which is 8°F higher than last year. The highest temperature in January was 71°F at the Las Vegas airport climate station compared to the record high of 77°F in 1975.

Table 1. Summary of monthly temperature and precipitation data from valley stations across Nevada

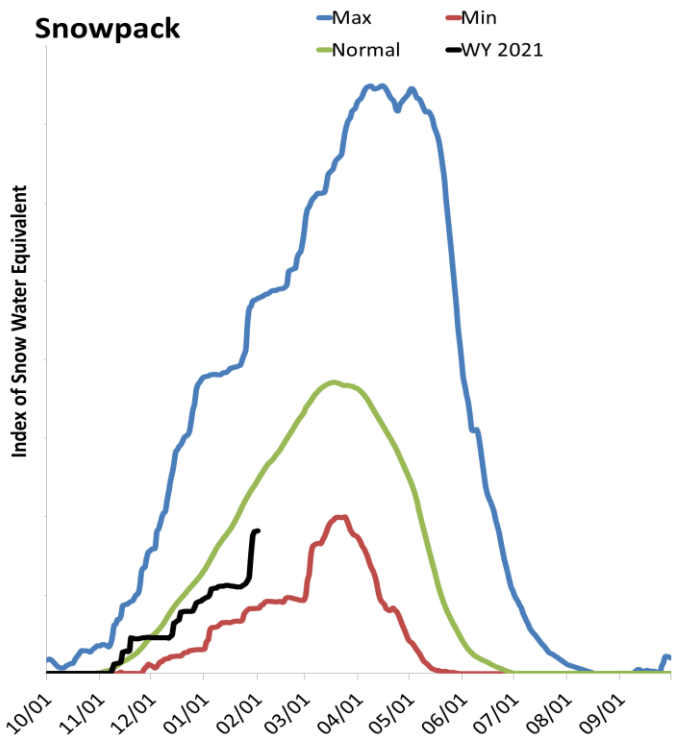
Climate Station	January Temperature Ave °F	Departure from Normal °F	January Monthly Precipitation (inches)	Departure from Normal (inches)
Reno airport	37.79	+4.06	1.3	0.15
Lovelock airport	33.24	+2.77	0.76	0.22
Orovada	31.82	+2.35	1.2	0.14
Winnemucca	34.94	+4.77	0.99	0.11
Battle Mountain	37.68	+8.21	0.42	-0.33
Elko airport	31.23	+7.04	0.57	-0.57
Wildhorse Reservoir	20.64	+1.95	1.11	-0.49
Ely	28.27	+3.20	0.43	-0.36
Eureka	29.27	+1.59	1.11	0.08
Tonopah	33.4	+1.26	0.48	0.09
Caliente	35.06	+2.70	0.18	-0.66
Las Vegas airport	49.37	+2.85	0.2	-0.34

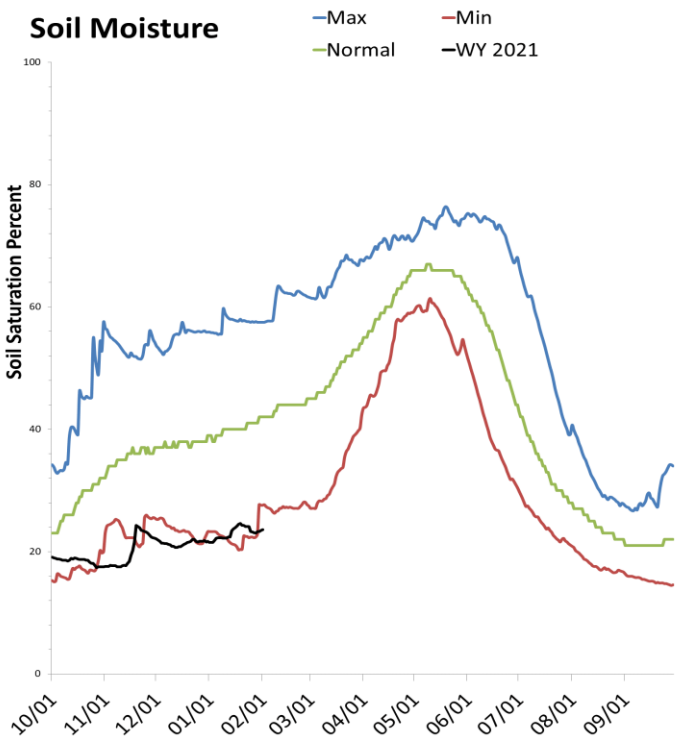
Source: https://wrcc.dri.edu/Climate/summaries.php

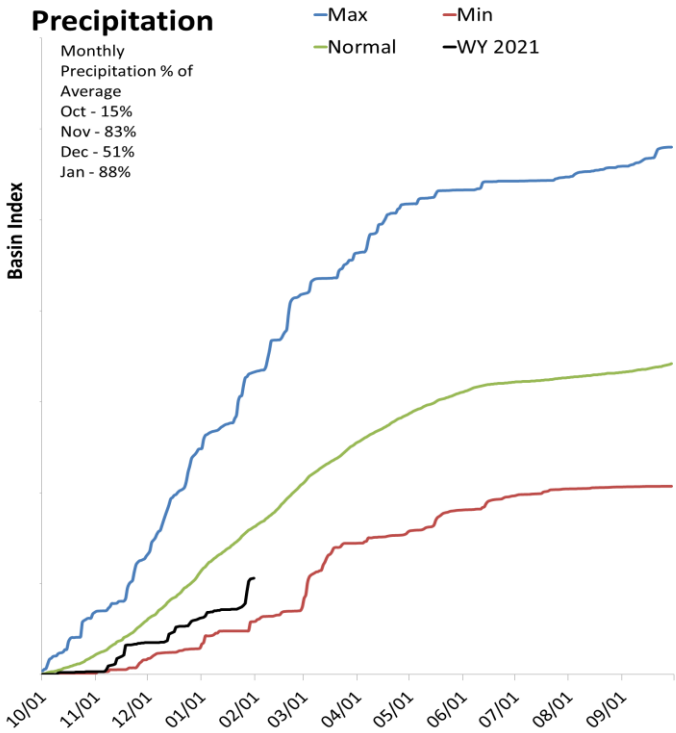
State of Nevada & Eastern Sierra

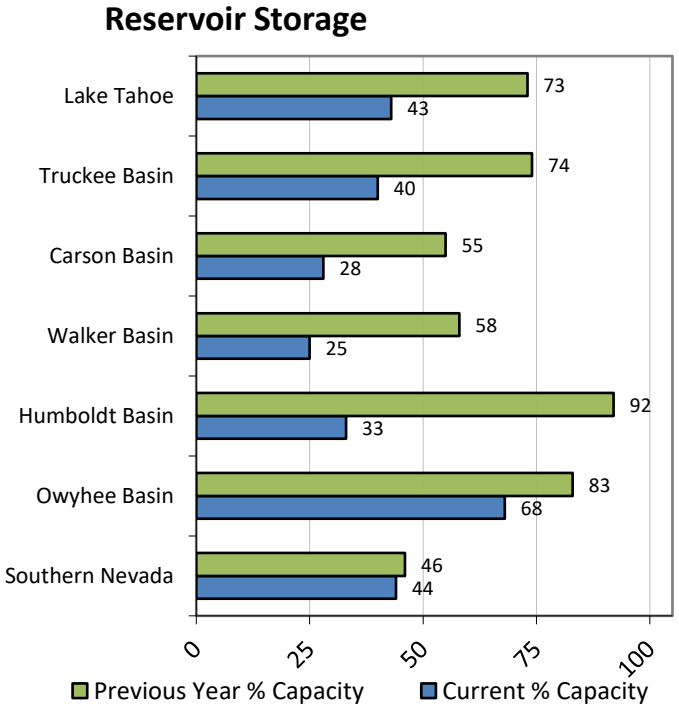
February 1, 2021

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is below normal at 74% of median, compared to 91% last year. Precipitation in January was below average, which brings the seasonal accumulation (Oct-Jan) to 66% of average. Soil moisture is at 24% saturation, compared to 37% last year. Reservoir storage ranges from 25% of capacity in the Walker Basin to 68% of capacity in the Owyhee Basin.

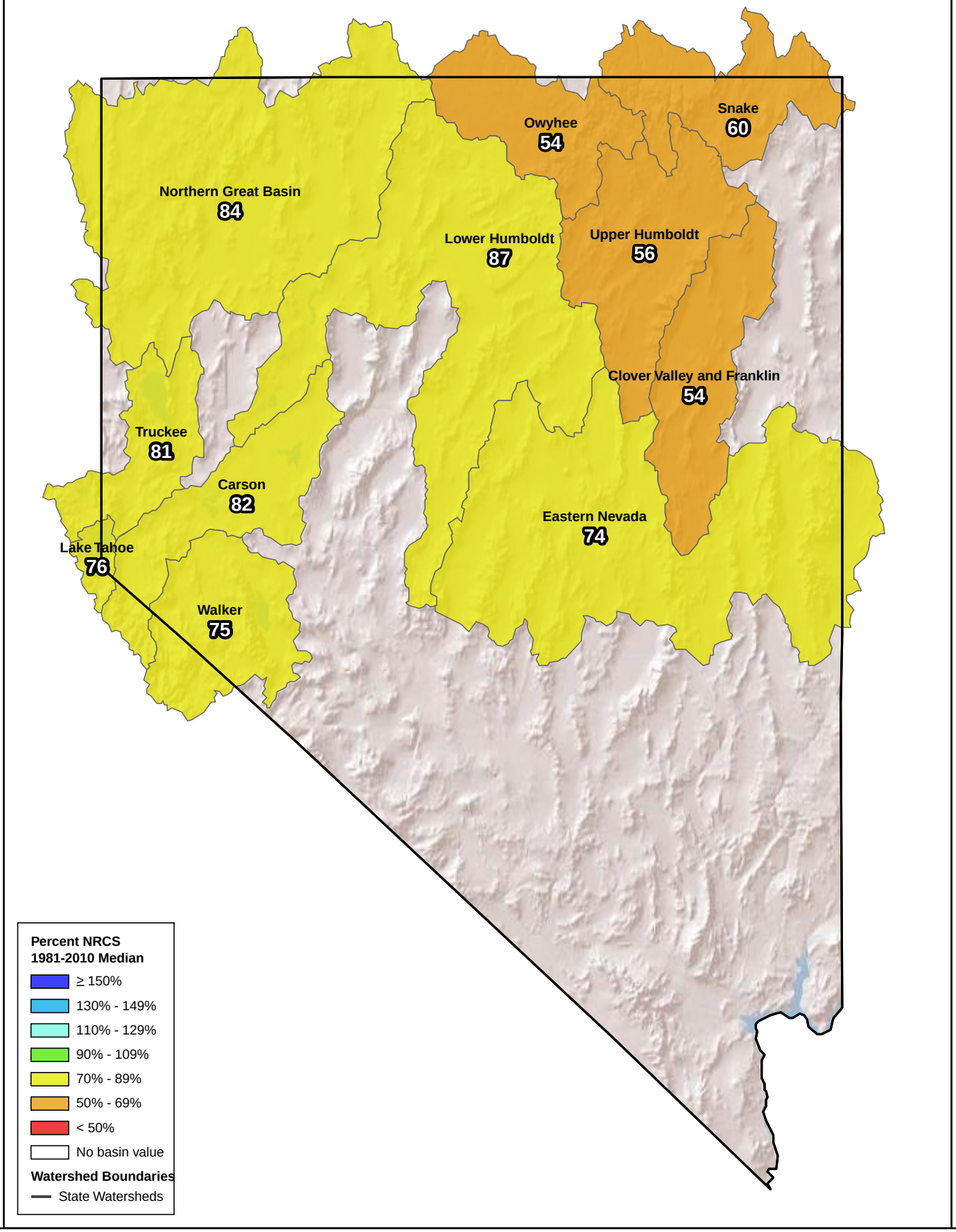








Snow Water Equivalent	Percent NRCS 1981-2010 Median	February 1st, 2021



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N
0 20 40 80 120 160 200 Miles

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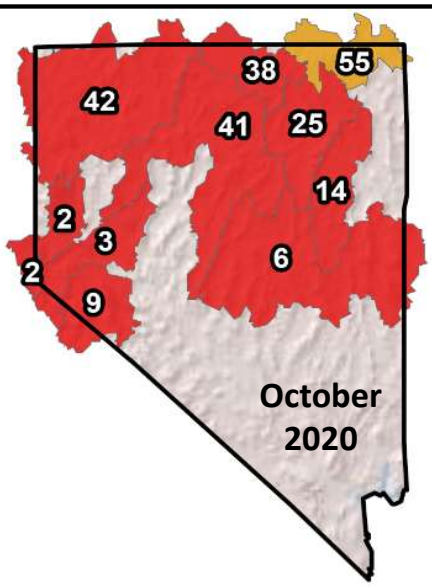
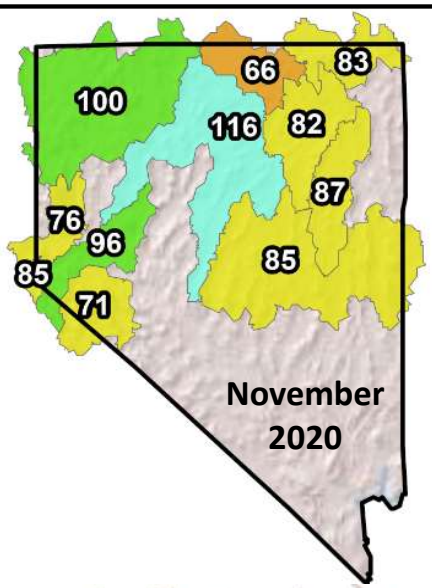
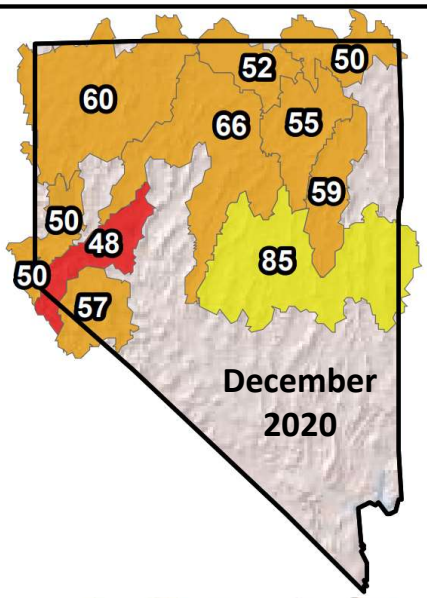
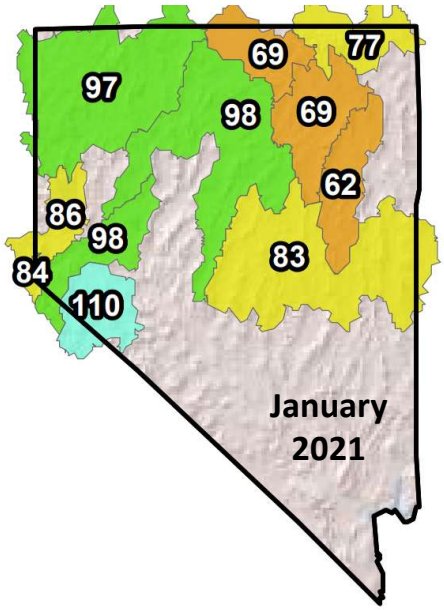
Monthly Precipitation as Percent of Average – Water Year 2021









Monthly Precipitation as a Percent of Average

Based on NRCS SNOTEL data compared to 1981-2010 average

- ≥ 150%
- 130% - 149%
- 110% - 129%
- 90% - 109%
- 70% - 89%
- 50% - 69%
- < 50%
- No basin value

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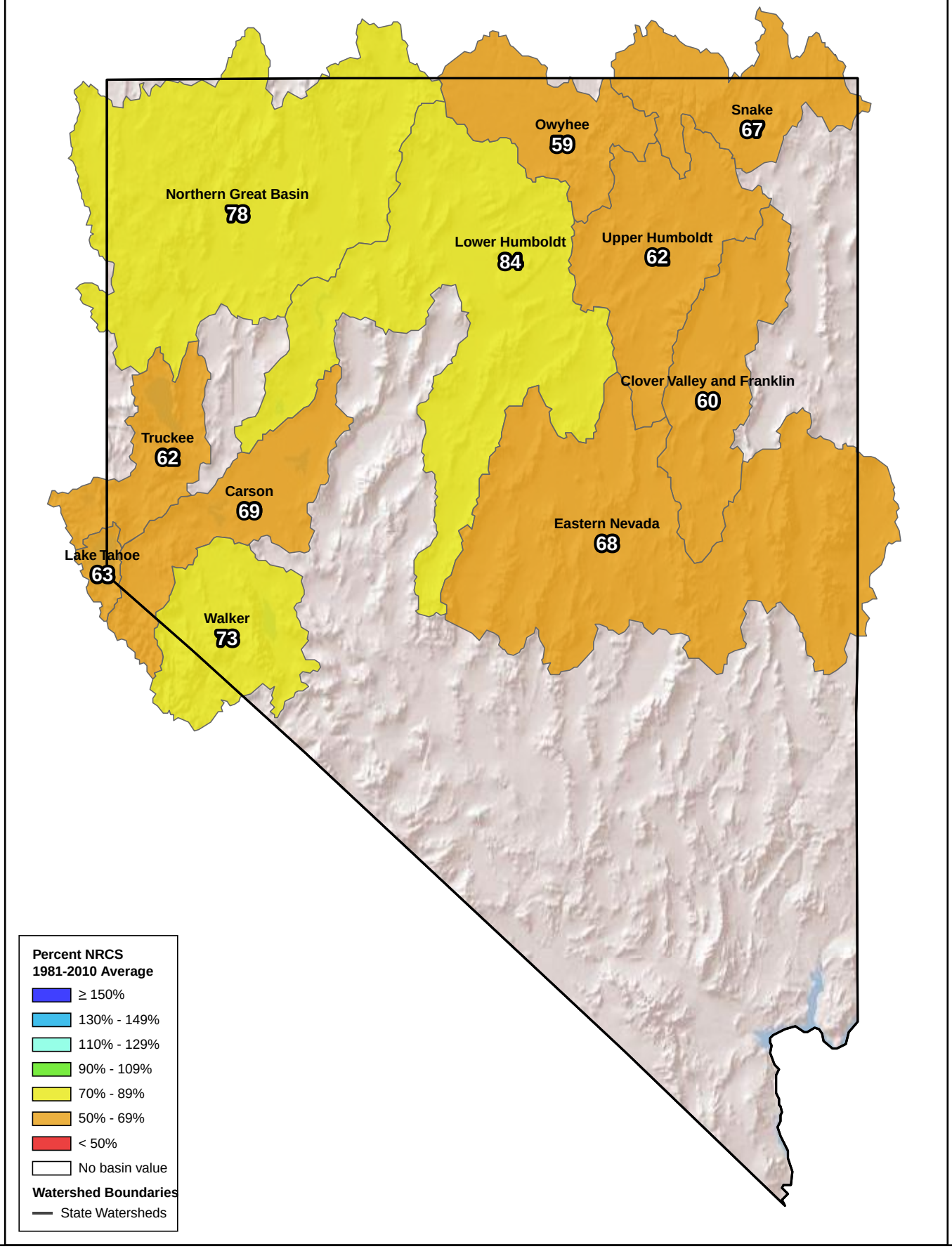
Water Year to Date Precipitation	Percent NRCS 1981-2010 Average	October 1, 2020 - January 31, 2021



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Miles
0 10 20 40 60 80 100

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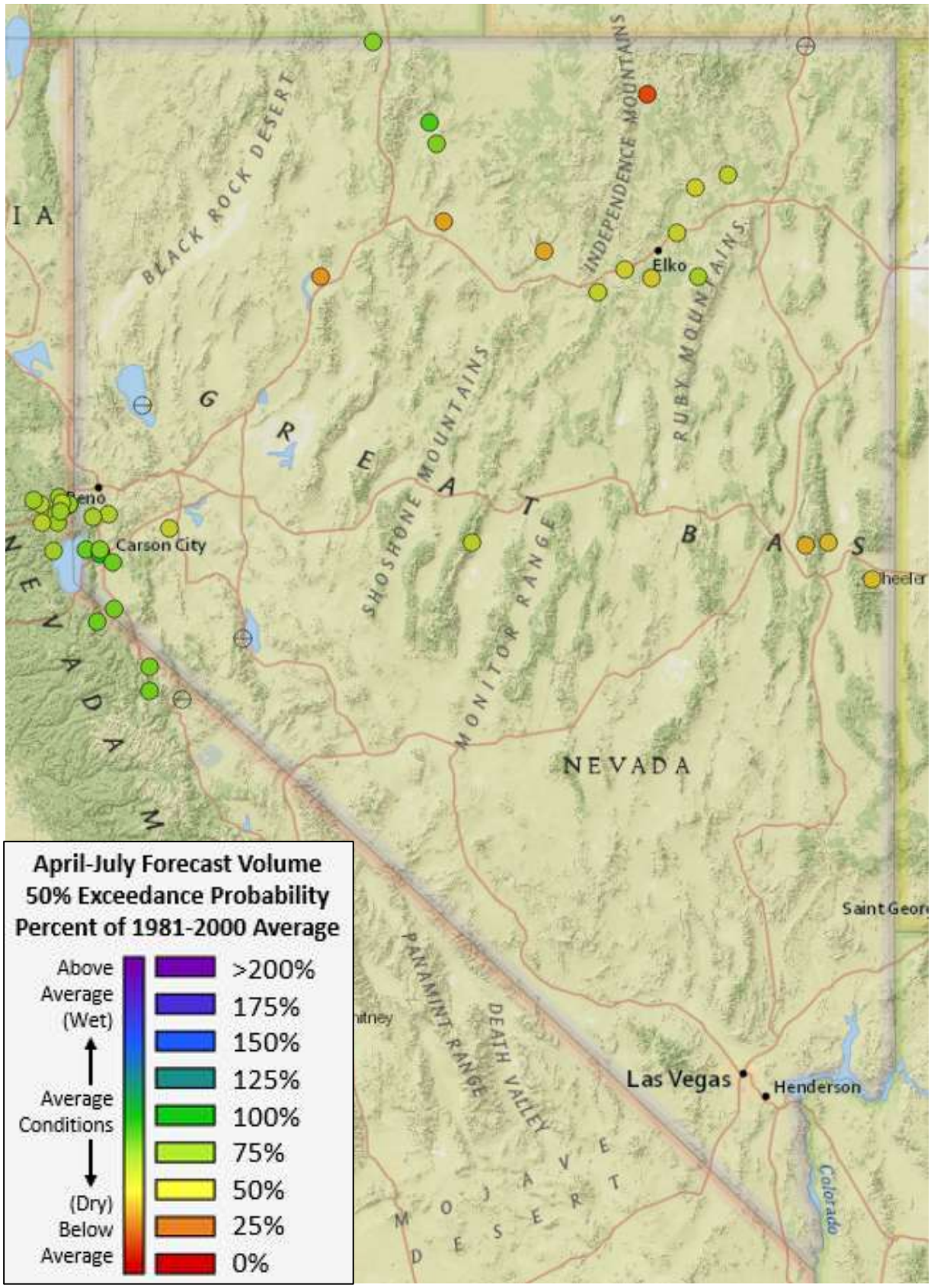
February 1, 2021 - Streamflow Forecasts - Nevada & Eastern Sierra

Forecasted April - July streamflow as a percentage of the 1981 - 2010 Average



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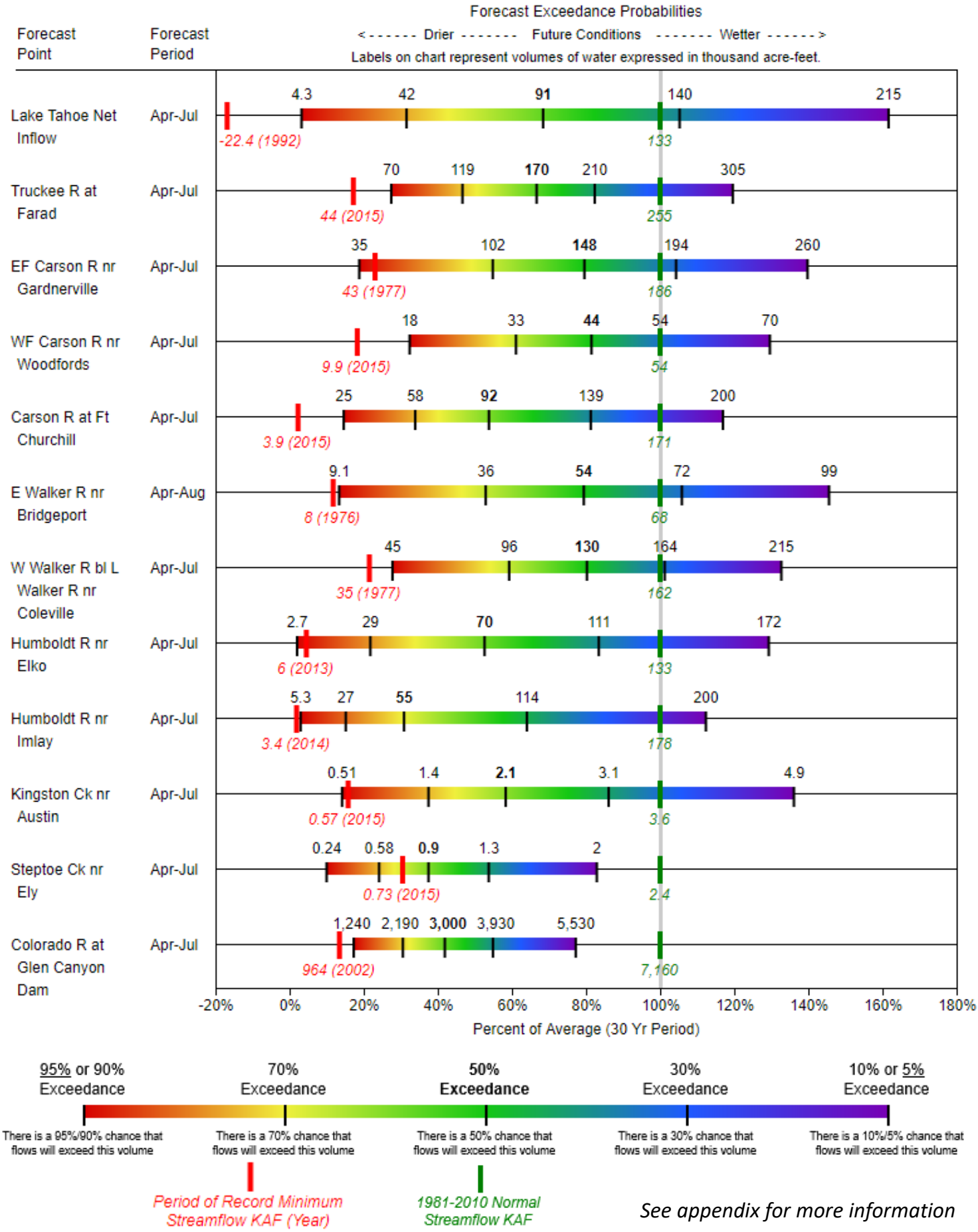
⊖ Apr-Jul forecast not issued

Streamflow Forecasts - State of Nevada Summary

February 1, 2021

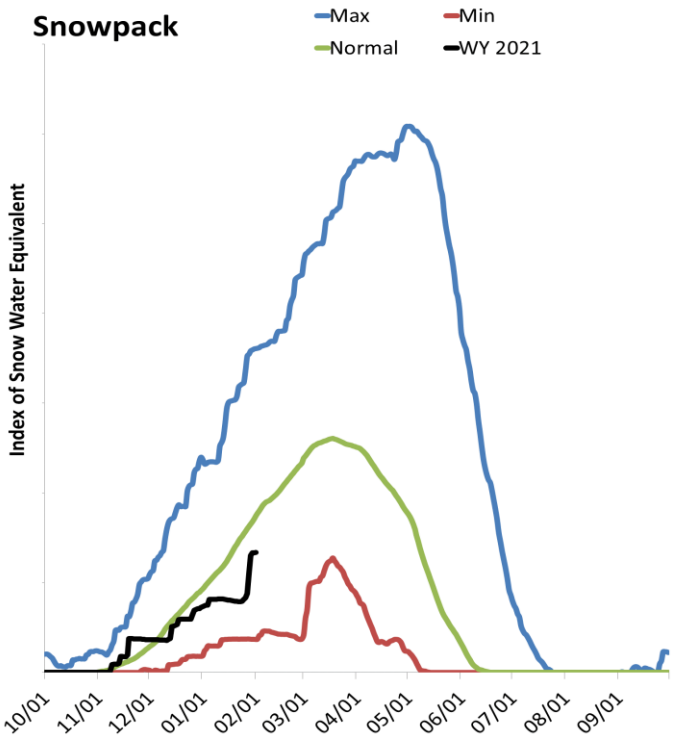


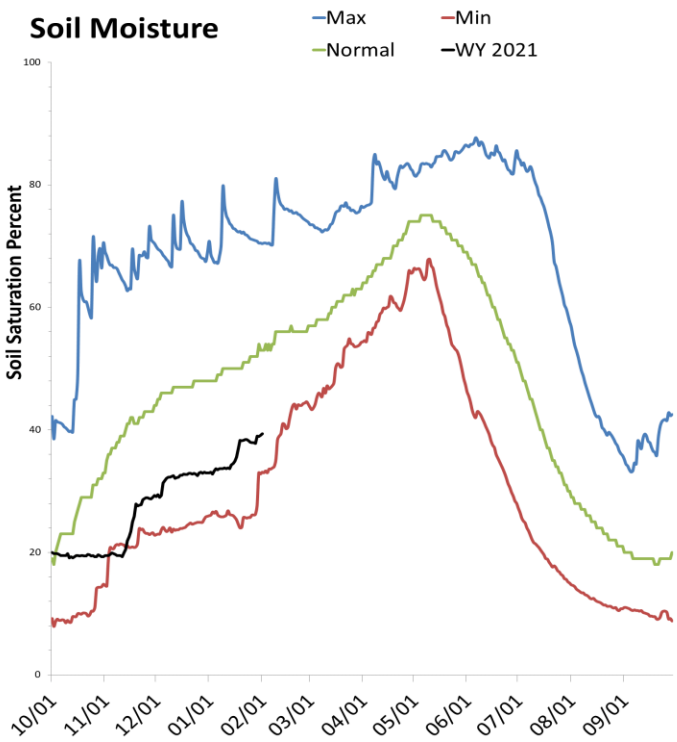
See appendix for more information

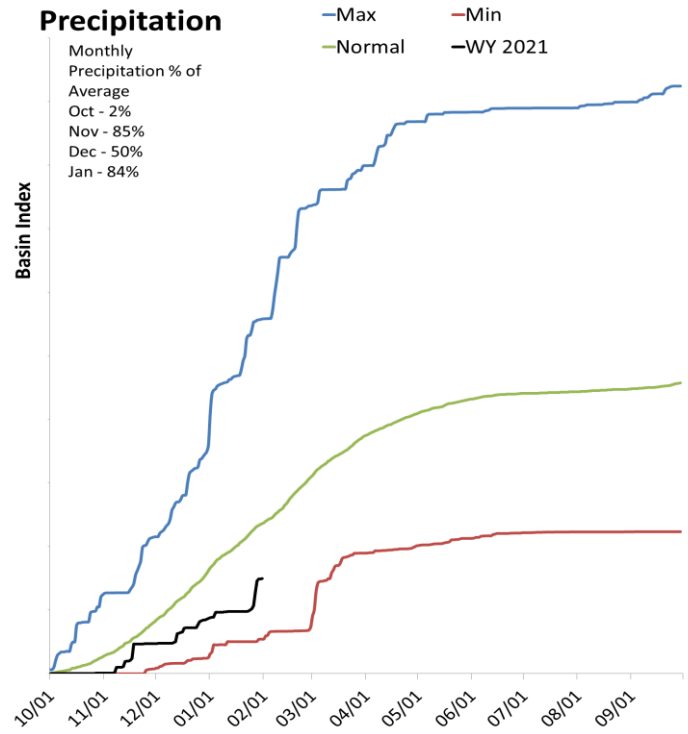
Lake Tahoe Basin

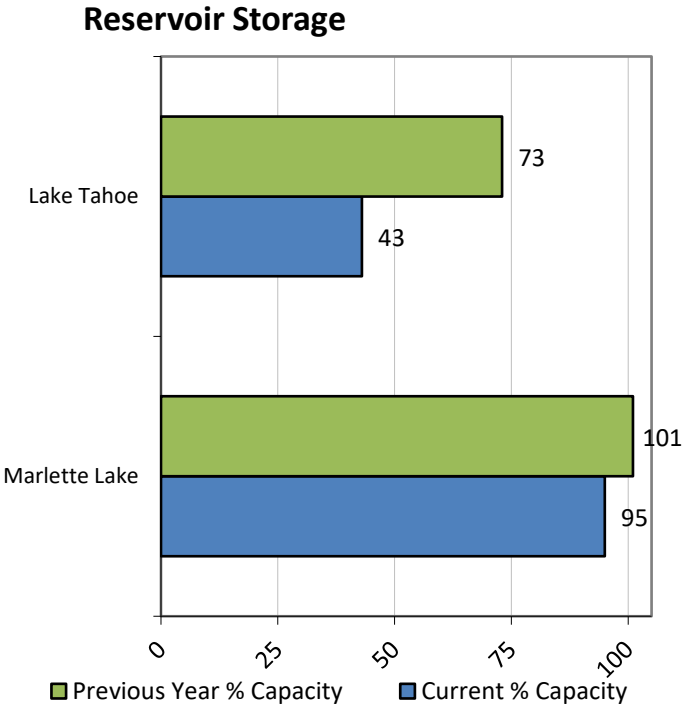
February 1, 2021

Snowpack in the Lake Tahoe Basin is below normal at 77% of median, compared to 76% last year. Precipitation in January was below average, which brings the seasonal accumulation (Oct-Jan) to 63% of average. Soil moisture is at 39% saturation, compared to 50% last year. Lake Tahoe's water elevation is 6225.65 ft, which is 2.65 ft above the lake's natural rim and equals a storage of 322.2 thousand acre-feet. Last year its elevation was 6227.44 ft which equaled a storage of 540.7 thousand acre-feet. Lake Tahoe is forecast to rise 1.3 feet from March 1 to its highest elevation, which means it is unlikely to completely fill this year.









Data Current as of: 2/4/2021 1:52:37 PM

Lake Tahoe Basin
Streamflow Forecasts - February 1, 2021

Lake Tahoe Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Marlette Lake Inflow[2]								
	MAR-JUL	90	550	920	83%	1340	1930	1110
	APR-JUL	60	360	680	82%	1040	1540	830
Lake Tahoe Rise Gates Closed[1]								
	MAR-HIGH	0.07	0.72	1.3	75%	1.88	3.2	1.73
	OCT-HIGH	0.157	0.93	1.6	71%	2.3	3.7	2.24
	APR-HIGH	0.27	0.59	0.9	69%	1.24	1.68	1.31
Lk Tahoe Net Inflow[2]								
	MAR-JUL	11.4	57	123	65%	189	285	189.3
	APR-JUL	4.3	42	91	63%	140	215	144.6

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
3) Median value used in place of average

Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Tahoe	322.2	540.7	276.2	744.5
Marlette Lk nr Carson City	11.2	11.9	11.8	11.8
Basin-wide Total	333.4	552.6	288.0	756.3
# of reservoirs	2	2	2	2

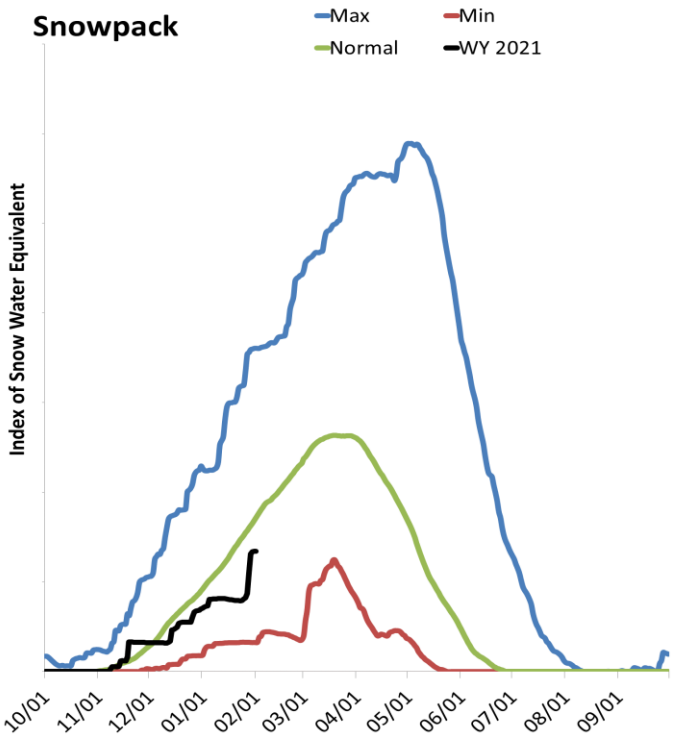
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Lake Tahoe Basin	17	77%	76%

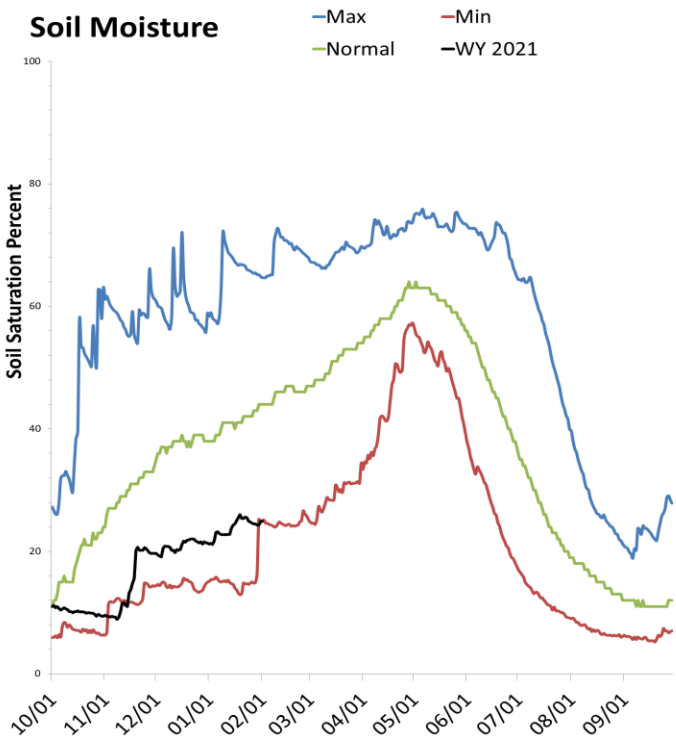
Important Information about Forecast Coordination: Hydrologists with the NRCS and National Weather Service California Nevada River Forecast Center (CNRFC) coordinate Lake Tahoe Rise, Truckee River at Farad, Little Truckee River near Boca, and the Carson River at Ft. Churchill using output of their respective 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.

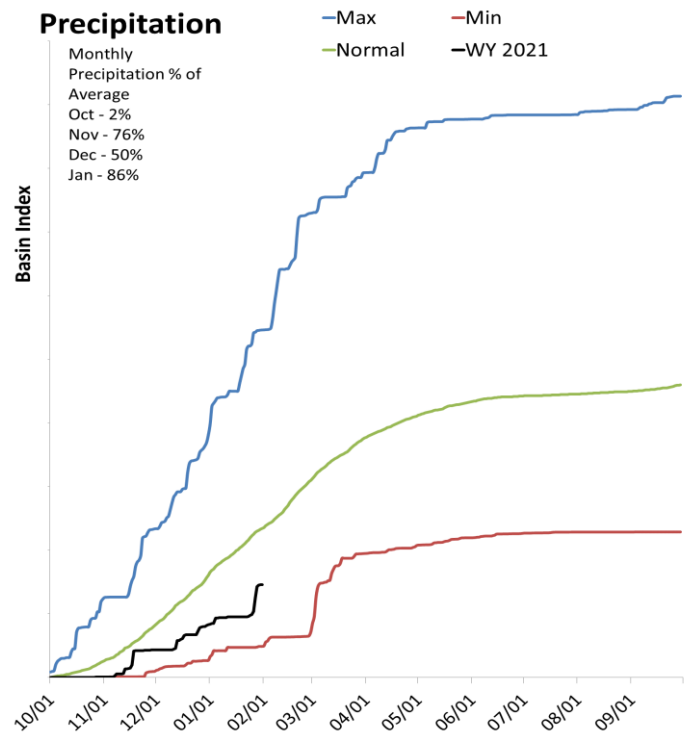
Truckee River Basin

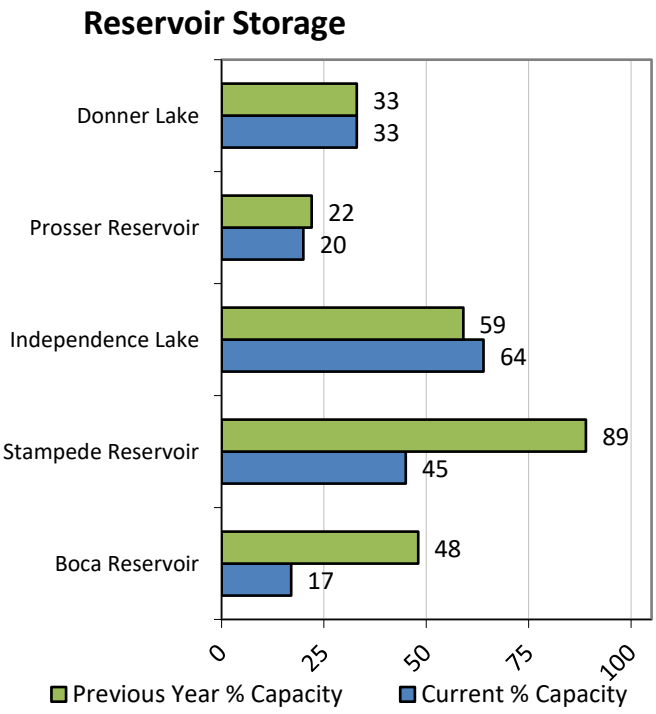
February 1, 2021

Snowpack in the Truckee River Basin is below normal at 81% of median, compared to 78% last year. Precipitation in January was below average, which brings the seasonal accumulation (Oct-Jan) to 62% of average. Soil moisture is at 25% saturation, compared to 42% last year. Combined reservoir storage is 40% of capacity , compared to 74% last year. Forecast streamflow volumes range from 58% to 70% of average for the March-July period.









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Truckee River Basin
Streamflow Forecasts - February 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Truckee River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Donner Lake Inflow[2]								
	MAR-JUL	3.1	8.8	12.6	58%	16.4	22	21.74
	APR-JUL	1.6	6.5	9.8	55%	13.1	18	17.84
Martis Ck Res Inflow[2]								
	MAR-JUL	0.15	5.4	9	70%	12.6	17.8	12.91
	APR-JUL	0.38	3	6	64%	9	13.4	9.39
Prosser Ck Res Inflow[2]								
	MAR-JUL	14.6	26	34	67%	42	53	50.71
	APR-JUL	11	21	28	65%	35	45	42.84
Independence Lk Inflow[2]								
	MAR-JUL	2.9	6.5	9	67%	11.5	15.1	13.5
	APR-JUL	2.7	5.8	8	66%	10.2	13.3	12.1
Sagehen Ck nr Truckee								
	MAR-JUL	2.1	3	3.8	59%	4.9	7	6.4
	APR-JUL	1.68	2.5	3.3	59%	4.3	6.5	5.6
Stampede Res Local Inflow[2]								
	MAR-JUL	9.4	41	62	69%	84	115	90.25
	APR-JUL	3.3	32	51	67%	71	100	76.5
L Truckee R ab Boca Reservoir[2]								
	MAR-JUL	15.4	46	67	63%	88	119	107
	APR-JUL	10	34	52	59%	70	100	88
Boca Res Local Inflow[2]								
	MAR-JUL	0.28	3.3	6	64%	8.7	12.8	9.42
	APR-JUL	0.33	1.43	3.5	64%	5.6	8.6	5.5
Truckee R at Farad[2]								
	MAR-JUL	70	156	215	70%	275	360	307
	APR-JUL	70	119	170	67%	210	305	255
Truckee R ab Farad Sidewater[2]								
	MAR-JUL	26	62	87	69%	112	148	126.1
	APR-JUL	16.6	50	73	68%	96	129	108.09
Galena Ck at Galena Ck State Pk								
	MAR-JUL	1.48	2.6	3.3	68%	4	5.1	4.85
	APR-JUL	1	2.1	2.8	64%	3.5	4.6	4.37
Steamboat Ck at Steamboat								
	MAR-JUL	1.2	3.6	6.4	65%	10.3	18.6	9.8
	APR-JUL	0.63	2.5	4.8	62%	8.3	16	7.7
Pyramid Lake Elevation Change[1]								
	LOW-HIGH	-2.1	-0.11	0.8	47%	1.71	3.7	1.7

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
3) Median value used in place of average

Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Boca Reservoir	7.0	19.8	15.1	40.9
Donner Lake	3.1	3.1	3.5	9.5
Independence Lake	11.0	10.3	13.4	17.3
Prosser Reservoir	5.9	6.6	9.5	29.8
Stampede Reservoir	101.5	201.5	144.6	226.5
Basin-wide Total	128.6	241.3	186.1	324.0
# of reservoirs	5	5	5	5

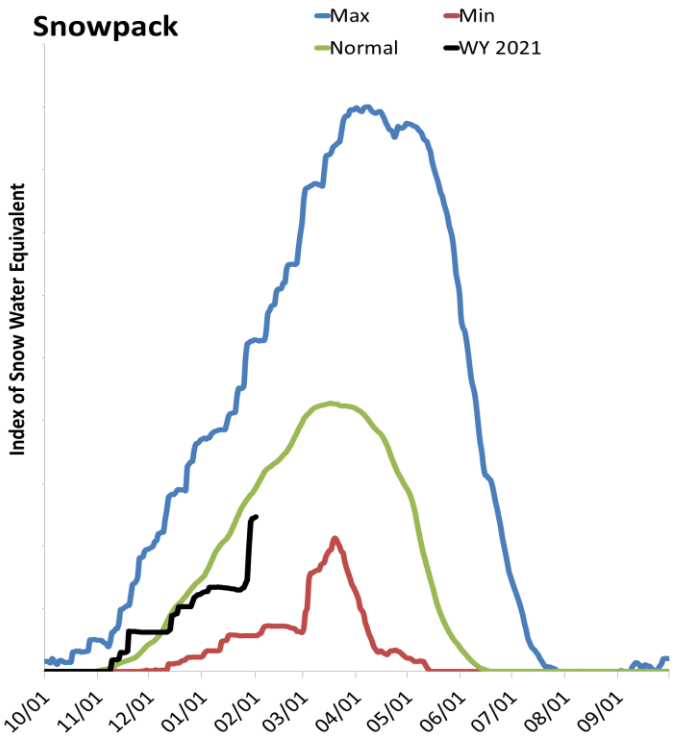
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Truckee River Basin	15	81%	78%
Little Truckee River	3	82%	75%
Sagehen & Independence Creeks	3	82%	75%
Galena Creek	1	78%	80%
Steamboat Creek	2	82%	76%
Truckee River above Pyramid Lake	26	81%	77%

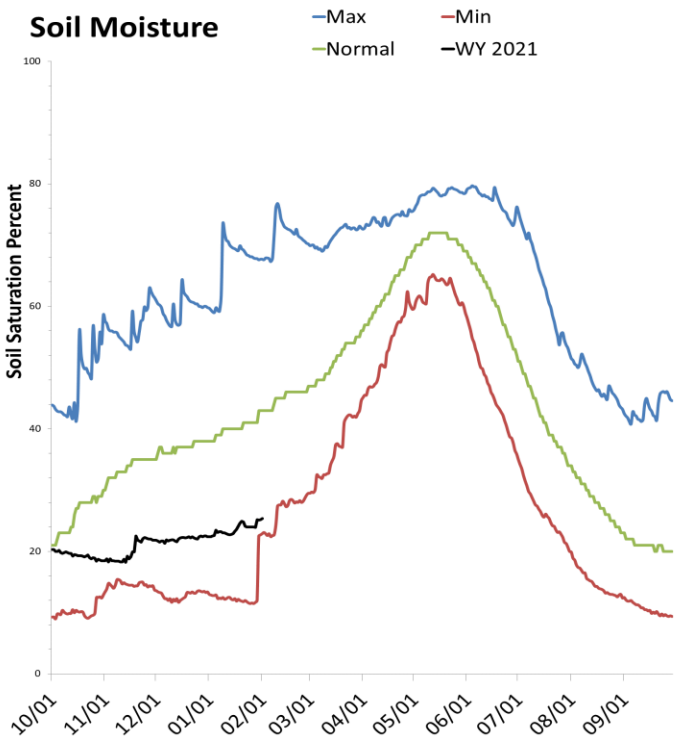
Important Information about Forecast Coordination: Hydrologists with the NRCS and National Weather Service California Nevada River Forecast Center (CNRFC) coordinate Lake Tahoe Rise, Truckee River at Farad, Little Truckee River near Boca, and the Carson River at Ft. Churchill using output of their respective 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.

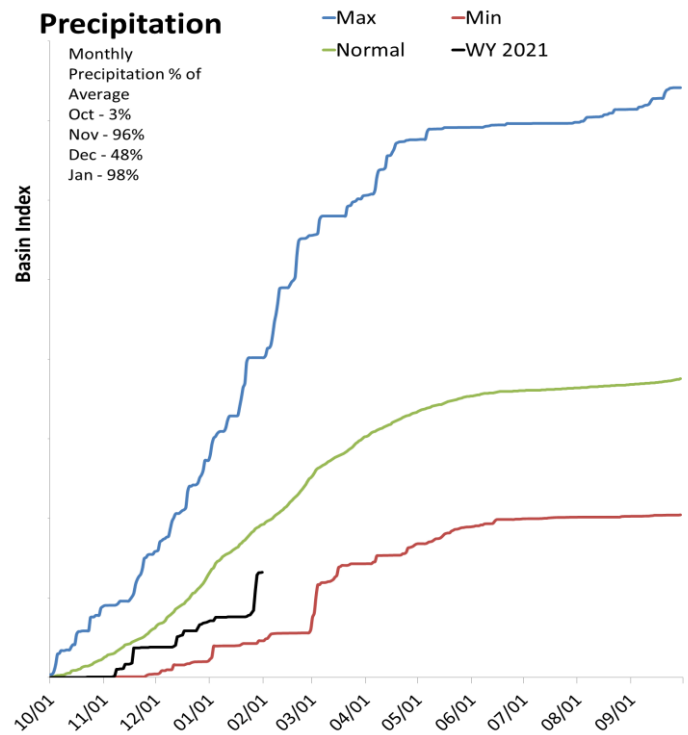
Carson River Basin

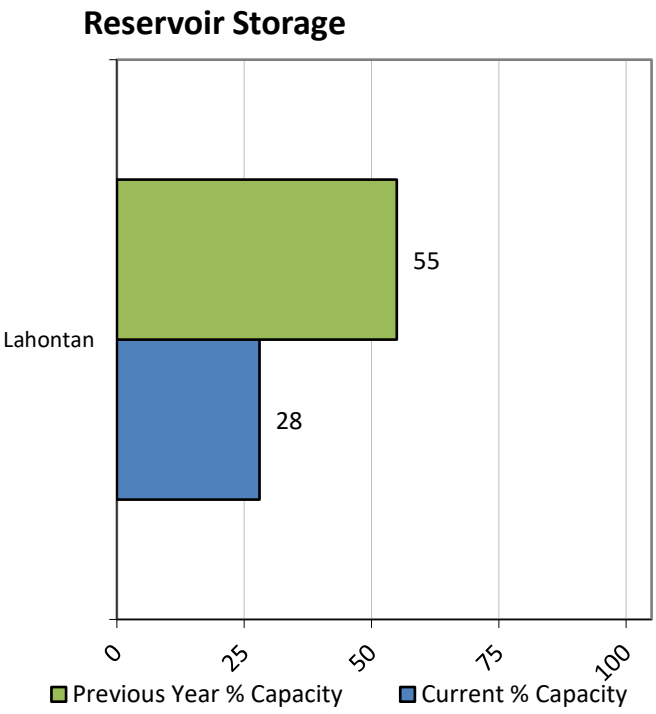
February 1, 2021

Snowpack in the Carson River Basin is below normal at 82% of median, the same as last year at this time. Precipitation in January was near average, which brings the seasonal accumulation (Oct-Jan) to 69% of average. Soil moisture is at 25% saturation, compared to 42% last year. Storage in Lahontan Reservoir is 28% of capacity , compared to 55% last year. Forecast streamflow volumes range from 55% to 85% of average for the March-July period.









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Carson River Basin
Streamflow Forecasts - February 1, 2021

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

Carson River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
EF Carson R nr Gardnerville								
	MAR-JUL	38	113	164	80%	215	290	205
	APR-JUL	35	102	148	80%	194	260	186
	200 cfs	28 May	20 Jun	06 Jul		22 Jul	14 Aug	24 Jul
	500 cfs	14 May	02 Jun	15 Jun		28 Jun	17 Jul	30 Jun
WF Carson R nr Woodfords								
	MAR-JUL	17.2	37	50	85%	63	83	59
	APR-JUL	17.5	33	44	81%	54	70	54
Carson R nr Carson City								
	MAR-JUL	10.5	103	172	82%	240	345	210
	APR-JUL	11.8	91	145	81%	199	280	179
Marlette Lake Inflow[2]								
	MAR-JUL	90	550	920	83%	1340	1930	1110
	APR-JUL	60	360	680	82%	1040	1540	830
Kings Canyon Ck nr Carson City								
	MAR-JUL	0.02	0.1	0.32	84%	0.51	0.73	0.38
	APR-JUL	0.01	0.11	0.3	79%	0.49	0.7	0.38
Ash Canyon Ck nr Carson City								
	MAR-JUL	0.41	0.88	1.2	85%	1.52	1.99	1.41
	APR-JUL	0.22	0.62	0.9	80%	1.18	1.58	1.12
Carson R at Ft Churchill								
	MAR-JUL	44	79	110	55%	149	220	200
	APR-JUL	25	58	92	54%	139	200	171

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
3) Median value used in place of average

Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lahontan Reservoir	88.9	171.3	146.9	313.0
Basin-wide Total	88.9	171.3	146.9	313.0
# of reservoirs	1	1	1	1

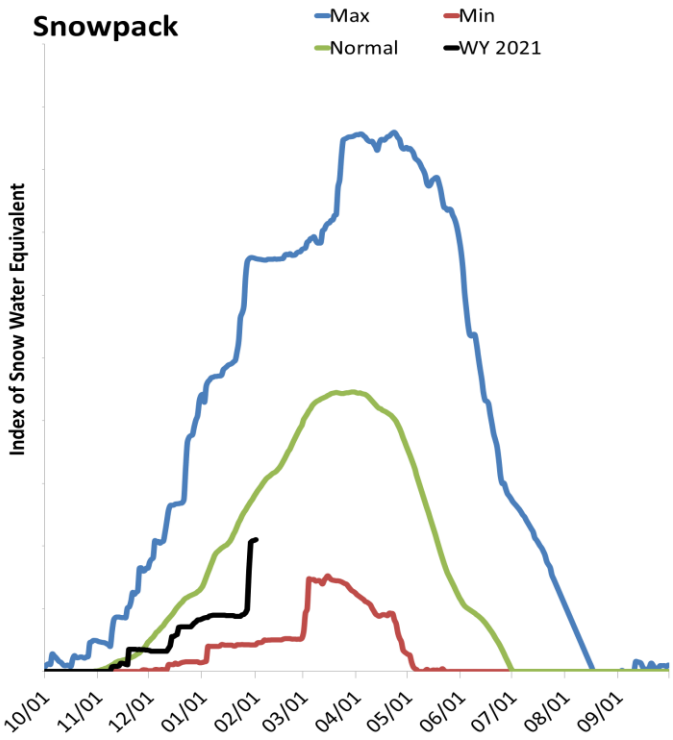
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Carson River Basin	15	82%	82%
East Fork Carson River	6	89%	85%
West Fork Carson River	9	78%	81%

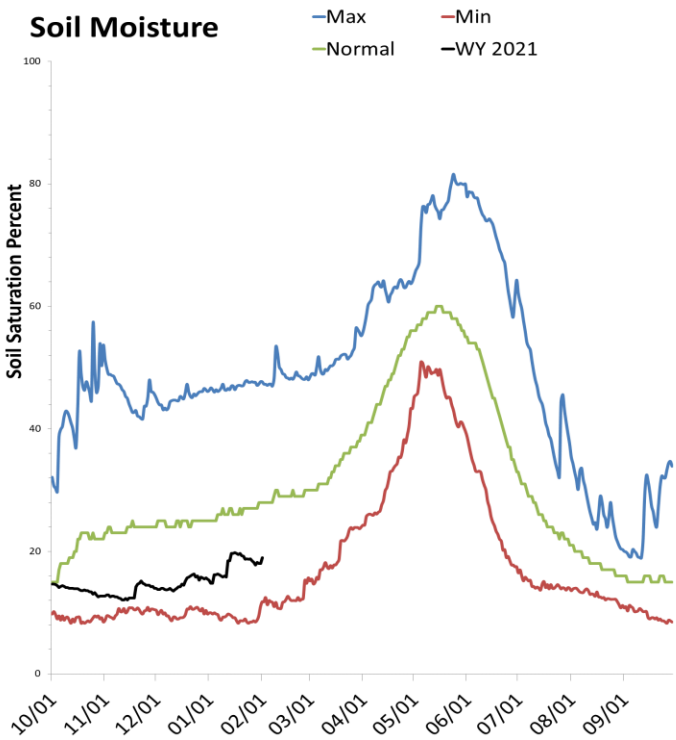
Important Information about Forecast Coordination: Hydrologists with the NRCS and National Weather Service California Nevada River Forecast Center (CNRFC) coordinate Lake Tahoe Rise, Truckee River at Farad, Little Truckee River near Boca, and the Carson River at Ft. Churchill using output of their respective 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.

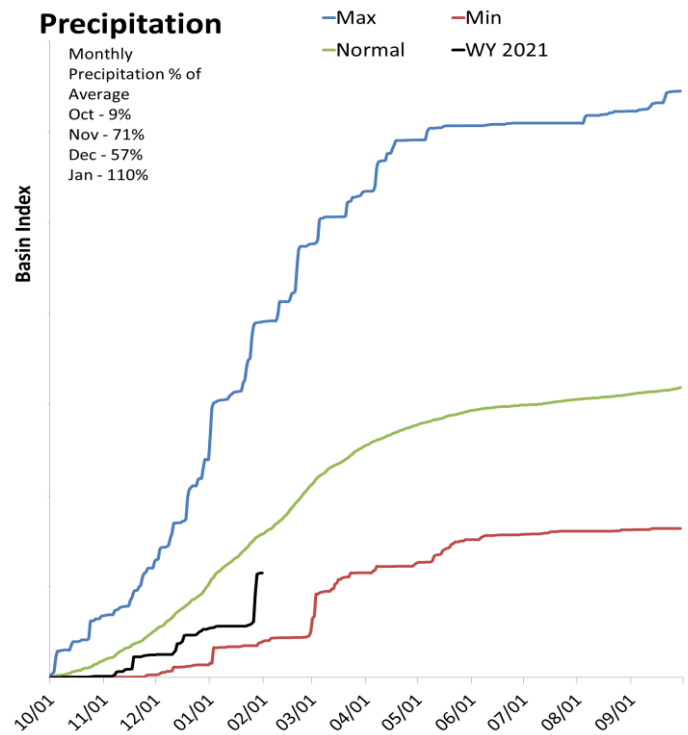
Walker River Basin

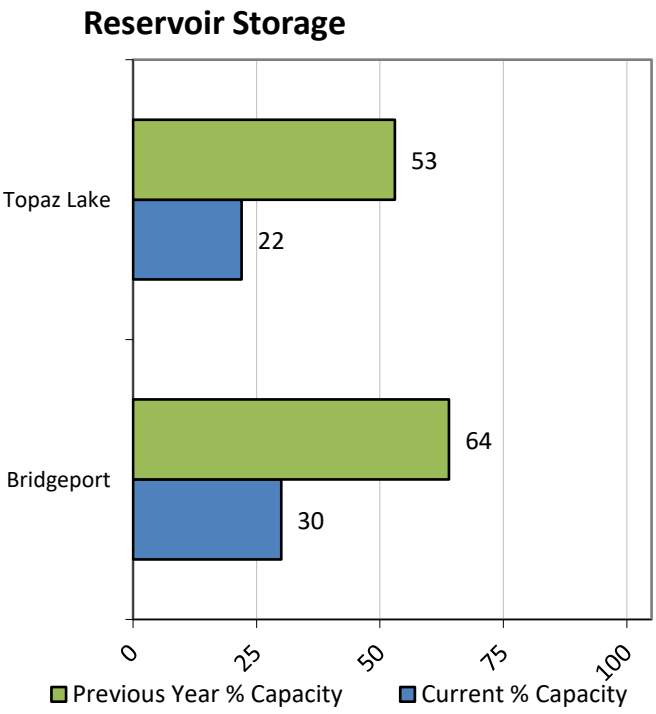
February 1, 2021

Snowpack in the Walker River Basin is below normal at 75% of median, compared to 62% last year. Precipitation in January was above average, which brings the seasonal accumulation (Oct-Jan) to 73% of average. Soil moisture is at 16% saturation, compared to 20% last year. Combined reservoir storage is 25% of capacity , compared to 58% last year. Forecast streamflow volumes range from 81% to 82% of average for the period starting in March through either July or August.









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Walker River Basin
Streamflow Forecasts - February 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Walker River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
E Walker R nr Bridgeport[2]								
	MAR-AUG	11	43	64	82%	85	117	78
	APR-AUG	9.1	36	54	79%	72	99	68
W Walker R bl L Walker nr Coleville								
	MAR-JUL	54	104	138	81%	172	220	170
	APR-JUL	45	96	130	80%	164	215	162
W Walker R nr Coleville								
	MAR-JUL	56	106	140	81%	174	225	172
	APR-JUL	39	93	130	80%	167	220	163
Walker Lake Elevation Change[1]								
	LOW-HIGH	-1.69	-0.43	0.8	57%	1.72	3.3	1.41

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
3) Median value used in place of average

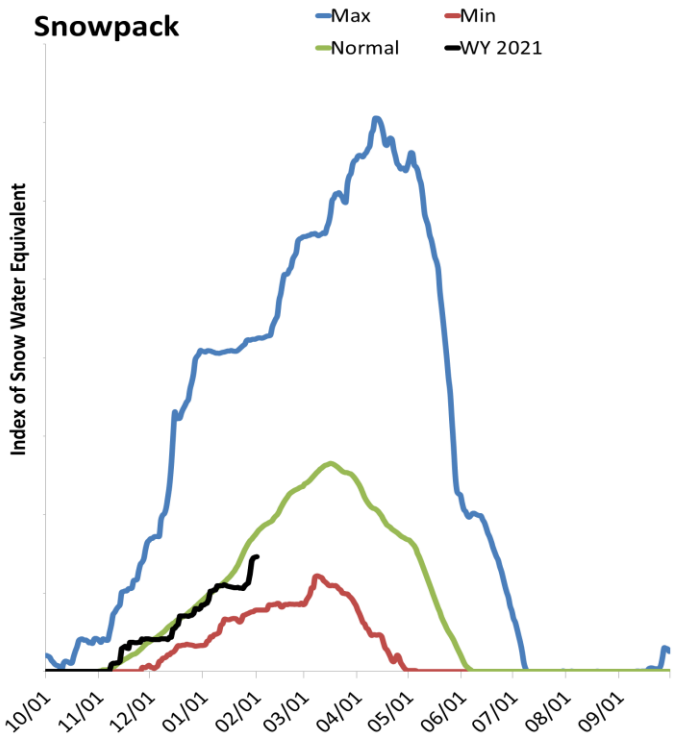
Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	12.8	27.2	20.8	42.5
Topaz Lk nr Topaz	12.8	31.5	23.6	59.4
Basin-wide Total	25.6	58.7	44.4	101.9
# of reservoirs	2	2	2	2

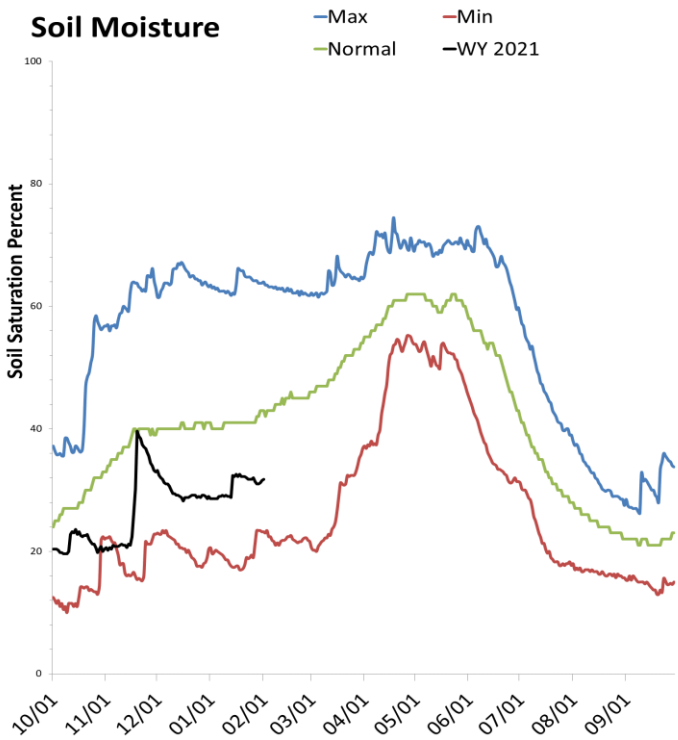
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Walker River Basin	10	75%	62%
East Walker River above Bridgeport	4	85%	57%
West Walker River above Coleville	8	74%	63%

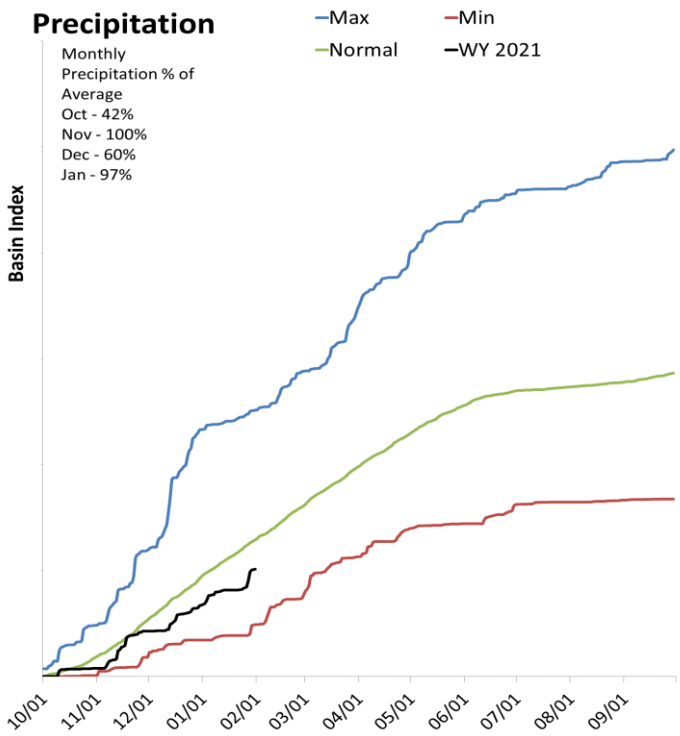
Northern Great Basin

February 1, 2021

Snowpack in the Northern Great Basin is below normal at 84% of median, compared to 129% last year. Precipitation in January was near average, which brings the seasonal accumulation (Oct-Jan) to 79% of average. Soil moisture is at 30% saturation, compared to 47% last year. The forecast streamflow volumes for McDerrmitt Creek is 10% of average for the March-June period. Streamflow forecasts for Davis Creek, Bidwell Creek and Eagle Creek have been permanantly discontinued until stream gaging can be re-established.







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Northern Great Basin
Streamflow Forecasts - February 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Northern Great Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
McDermitt Ck nr McDermitt								
	MAR-JUN	4.4	8.1	13.2	75%	15.1	22	17.5
	APR-JUL	2.5	5.5	9.6	74%	11.6	17.5	13

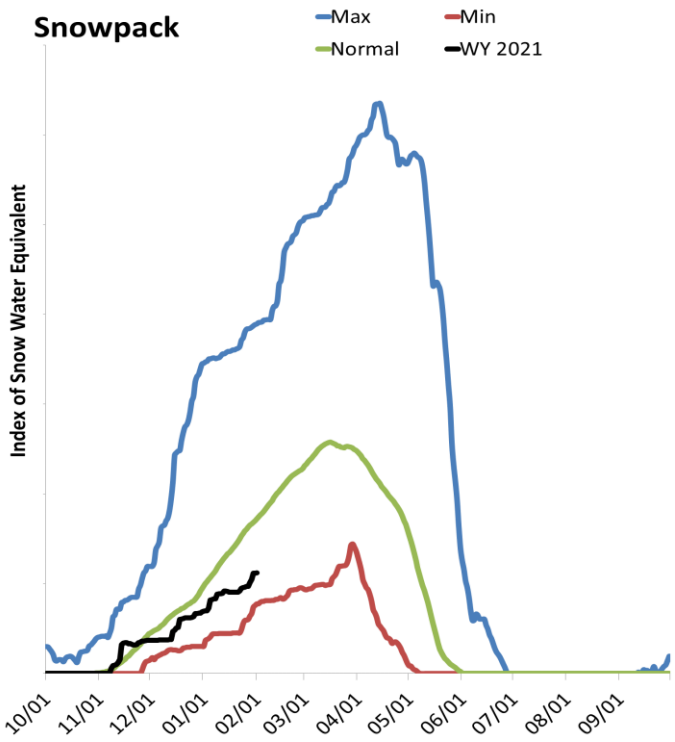
1) 90% and 10% exceedance probabilities are actually 95% and 5%
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

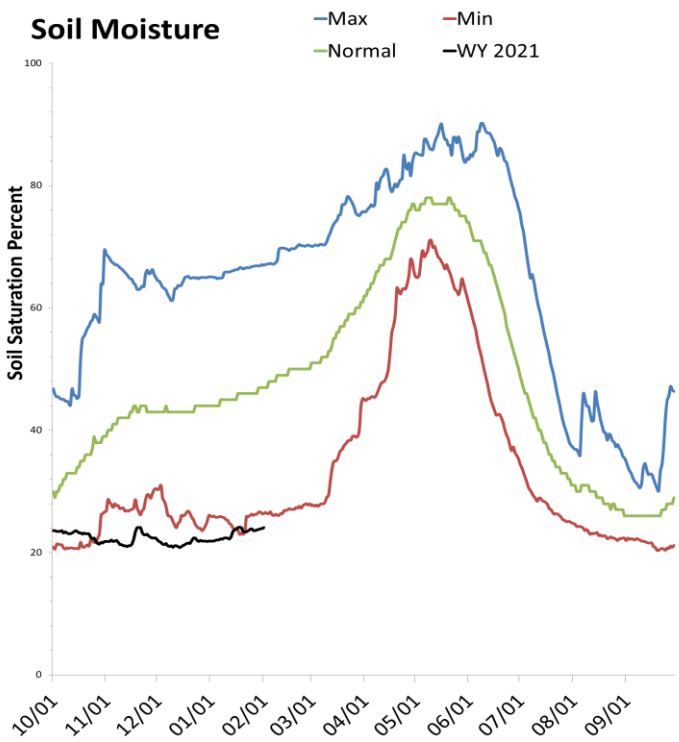
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Northern Great Basin	13	84%	129%
Surprise Valley - Warner Mtns	4	70%	132%
McDermitt Creek	3	110%	115%
Quinn River	8	95%	128%

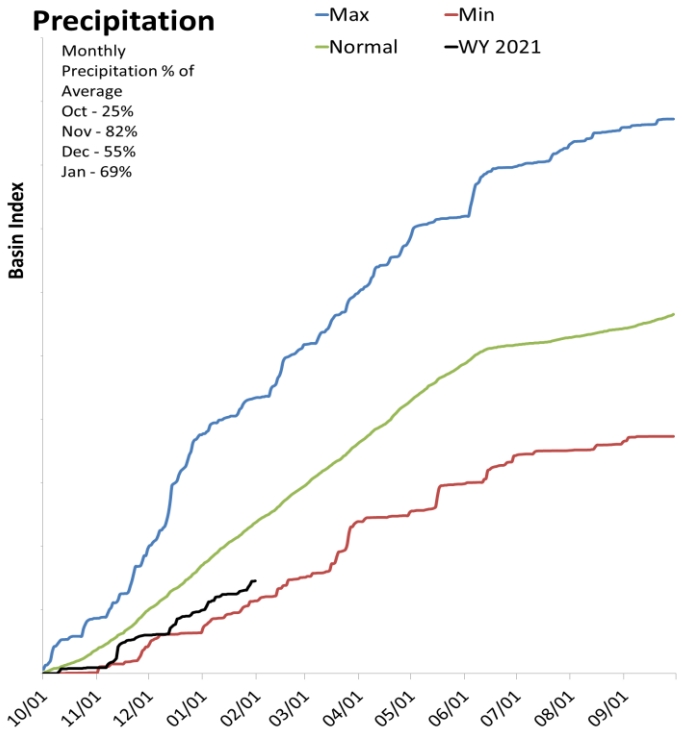
Upper Humboldt River Basin

February 1, 2021

Snowpack in the Upper Humboldt River Basin is much below normal at 56% of median, compared to 103% last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 61% of average. Soil moisture is at 24% saturation, compared to 39% last year. Forecast streamflow volumes range from 49% to 65% of average for the March-July period.







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Upper Humboldt River Basin
Streamflow Forecasts - February 1, 2021

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

Upper Humboldt River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Marys R nr Deeth								
	MAR-JUL	0.46	14.5	24	59%	34	48	41
	APR-JUL	1.08	9.8	20	56%	28	42	36
Lamoille Ck nr Lamoille								
	MAR-JUL	8.7	15.1	19.5	65%	24	30	30
	APR-JUL	8.2	14.6	19	66%	23	30	29
NF Humboldt R at Devils Gate								
	MAR-JUL	1.95	10.7	21	54%	31	46	39
	APR-JUL	0.96	6.8	16	50%	25	39	32
Humboldt R nr Elko								
	MAR-JUL	8	59	103	65%	147	210	159
	APR-JUL	2.7	29	70	53%	111	172	133
SF Humboldt R ab Dixie Ck								
	MAR-JUL	2.2	15.4	35	49%	55	83	72
	APR-JUL	2.6	12.7	32	48%	51	80	66
Humboldt R nr Carlin								
	MAR-JUL	51	110	150	62%	190	250	242
	APR-JUL	9.8	65	103	50%	141	196	206
Humboldt R at Palisade								
	MAR-JUL	42	102	174	64%	184	245	270
	APR-JUL	19.1	82	124	55%	166	230	225

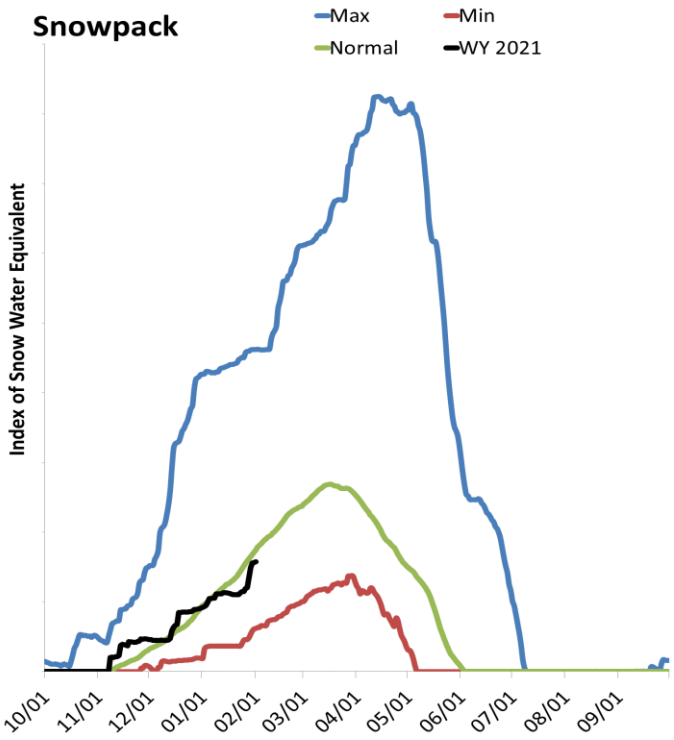
1) 90% and 10% exceedance probabilities are actually 95% and 5%
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

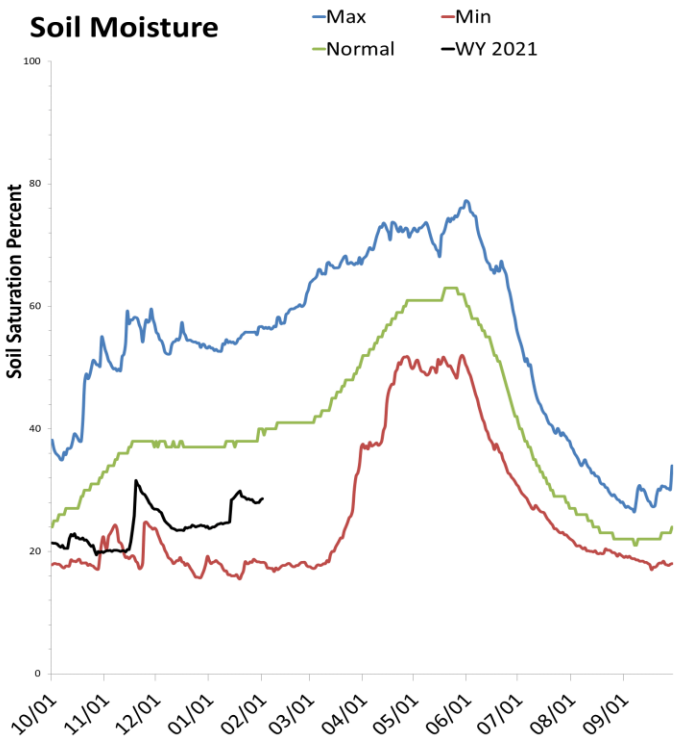
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Upper Humboldt River Basin	22	56%	103%
Mary's River	5	61%	124%
Lamoille Creek	3	63%	101%
North Fork Humboldt River	5	43%	124%
South Fork Humboldt River	7	63%	96%

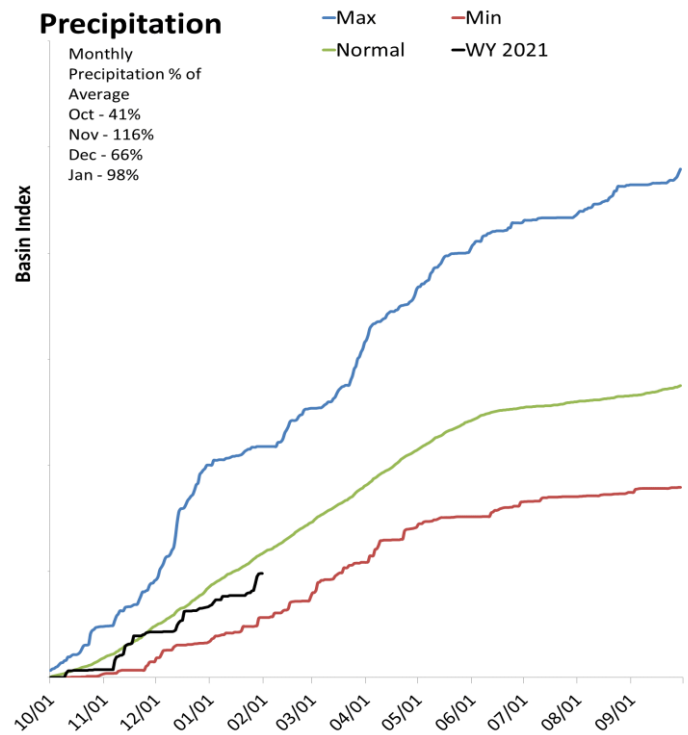
Lower Humboldt River Basin

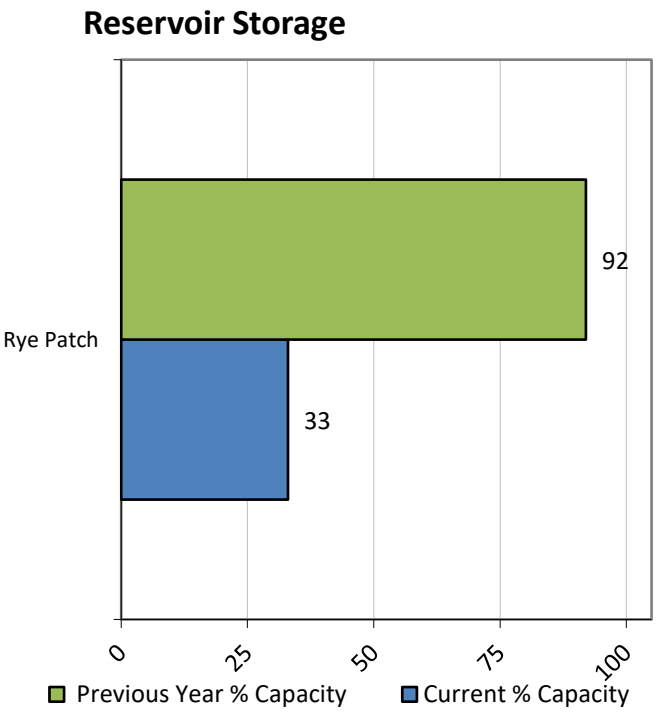
February 1, 2021

Snowpack in the Lower Humboldt River Basin is below normal at 87% of median, compared to 117% last year. Precipitation in January was near average, which brings the seasonal accumulation (Oct-Jan) to 84% of average. Soil moisture is at 31% saturation, compared to 37% last year. Storage in Rye Patch Reservoir is 33% of capacity , compared to 92% last year. Forecast streamflow volumes range from 40% to 85% of average for the March-July period.









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Lower Humboldt River Basin
Streamflow Forecasts - February 1, 2021

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

Lower Humboldt River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Rock Ck nr Battle Mountain								
	MAR-JUL	3.8	8.7	12	44%	15.3	20	27
	APR-JUL	2.1	4.9	6.8	37%	8.7	11.5	18.2
Humboldt R at Comus								
	MAR-JUL	10.2	36	124	49%	137	210	255
	APR-JUL	6.4	23	77	36%	111	185	213
L Humboldt R nr Paradise Valley								
	MAR-JUL	0.53	4.5	8.3	79%	12	17.5	10.5
	APR-JUL	0.29	4	7.6	78%	11.2	16.6	9.7
Martin Ck nr Paradise Valley								
	MAR-JUL	0.66	9.4	18.8	85%	23	33	22
	APR-JUL	0.88	7.3	15.4	88%	19.4	28	17.5
Humboldt R nr Imlay								
	MAR-JUL	6.3	29	84	40%	105	187	209
	APR-JUL	5.3	27	55	31%	114	200	178

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
3) Median value used in place of average

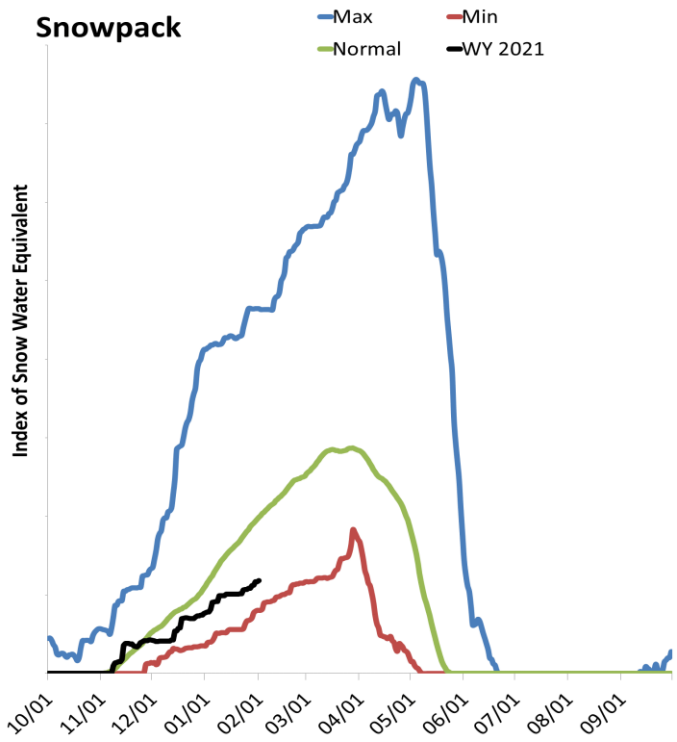
Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Rye Patch Re nr Rye Patch, NV	63.3	179.5	72.1	194.3
Basin-wide Total	63.3	179.5	72.1	194.3
# of reservoirs	1	1	1	1

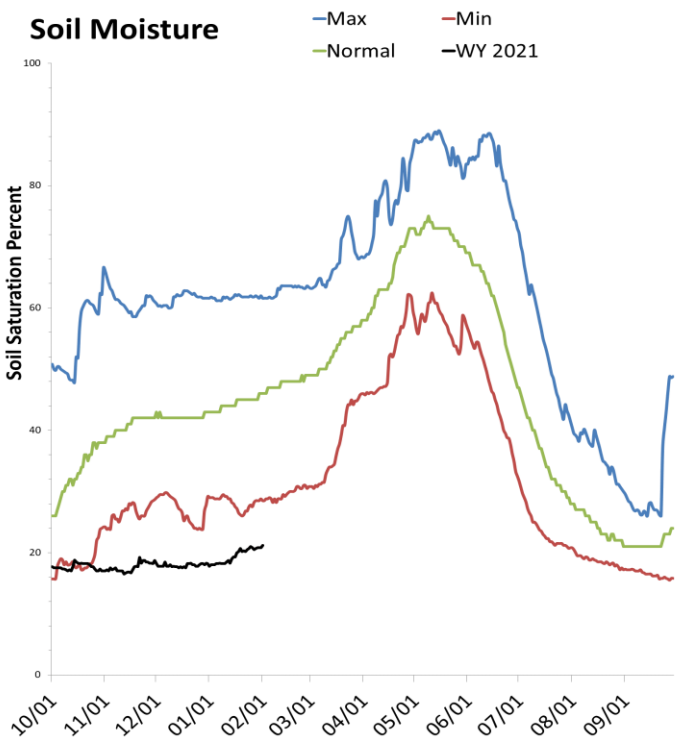
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Lower Humboldt River Basin	7	87%	117%
Rock Creek	1	96%	192%
Reese River	2	91%	103%
Martin Creek	3	90%	123%
Little Humboldt River	5	85%	124%
Humboldt River above Imlay	29	63%	106%

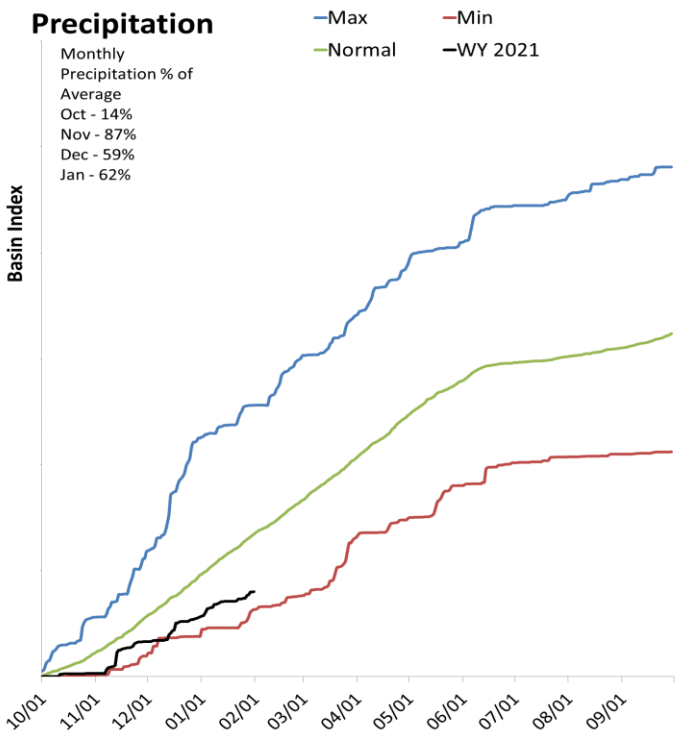
Clover Valley & Franklin River Basin

February 1, 2021

Snowpack in the Clover Valley & Franklin River Basin is much below normal at 54% of median. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 60% of average. Soil moisture is at 21% saturation, compared to 38% last year. The Franklin River streamflow forecast has been permanently discontinued until stream gaging can be re-established.







Hole-in-Mountain SNOTEL - October 2020 Update

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 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

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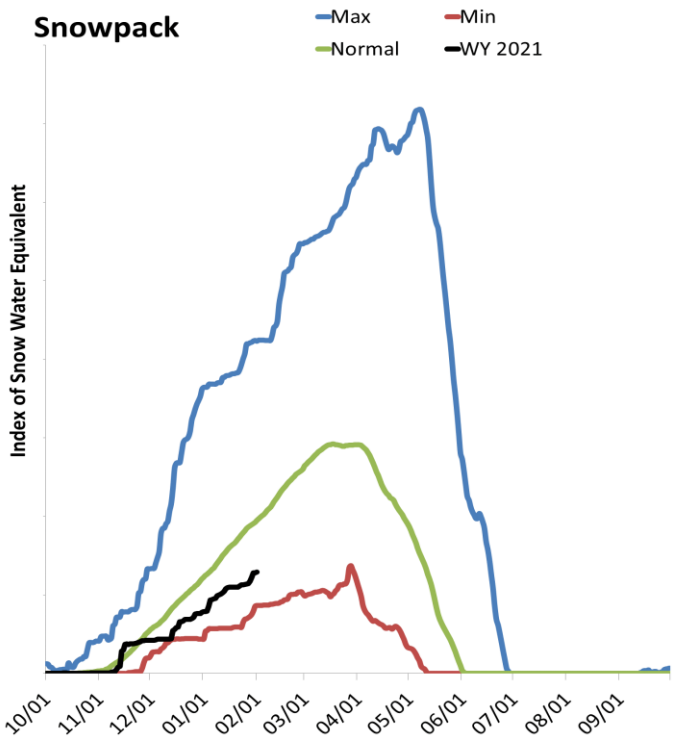
Clover Valley & Franklin River Basin - February 1, 2021

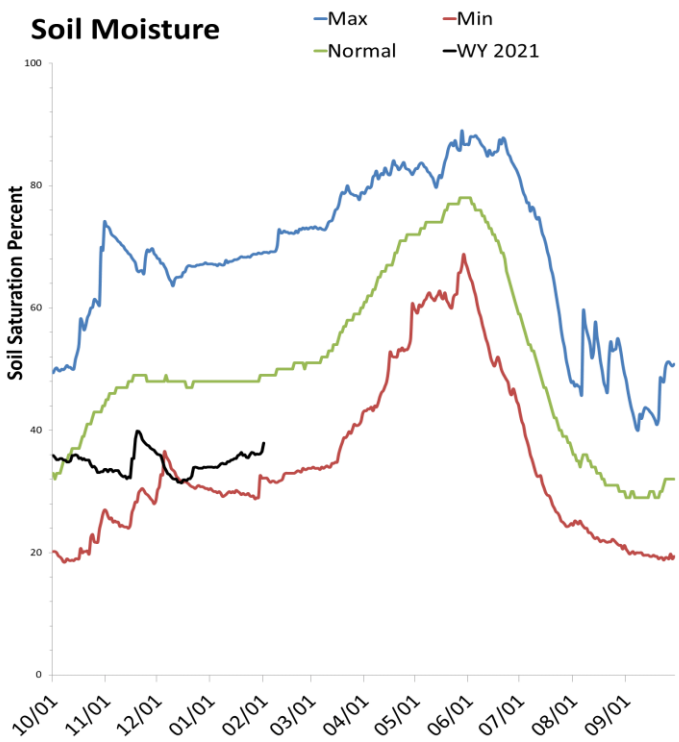
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Clover Valley & Franklin River Basin	8	54%	103%
Clover Valley	3	52%	108%
Franklin River	6	57%	101%

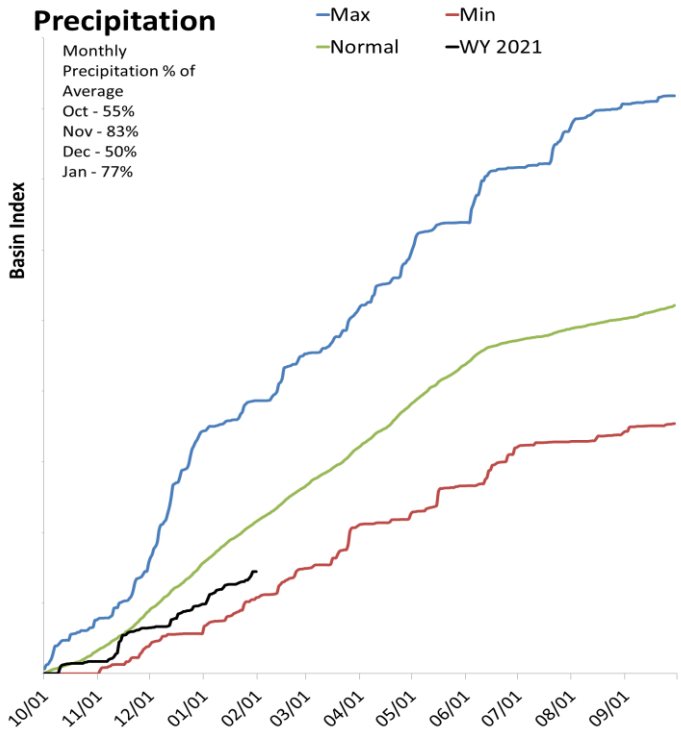
Snake River Basin

February 1, 2021

Snowpack in the Snake River Basin is much below normal at 60% of median, compared to 121% last year. Precipitation in January was below average, which brings the seasonal accumulation (Oct-Jan) to 67% of average. Soil moisture is at 28% saturation, compared to 41% last year. The forecast streamflow volume for Salmon Falls Creek is 44% of average for the March-July period.







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Snake River Basin
Streamflow Forecasts - February 1, 2021

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

Snake River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Salmon Falls Ck nr San Jacinto								
	MAR-JUL	14.7	26	36	44%	47	65	81
	MAR-SEP	16.3	28	38	45%	50	69	85

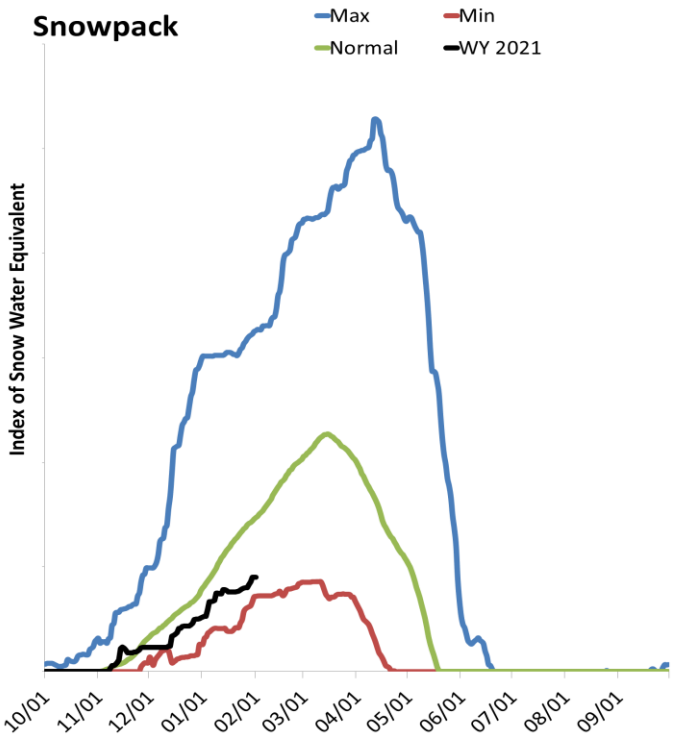
1) 90% and 10% exceedance probabilities are actually 95% and 5%
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

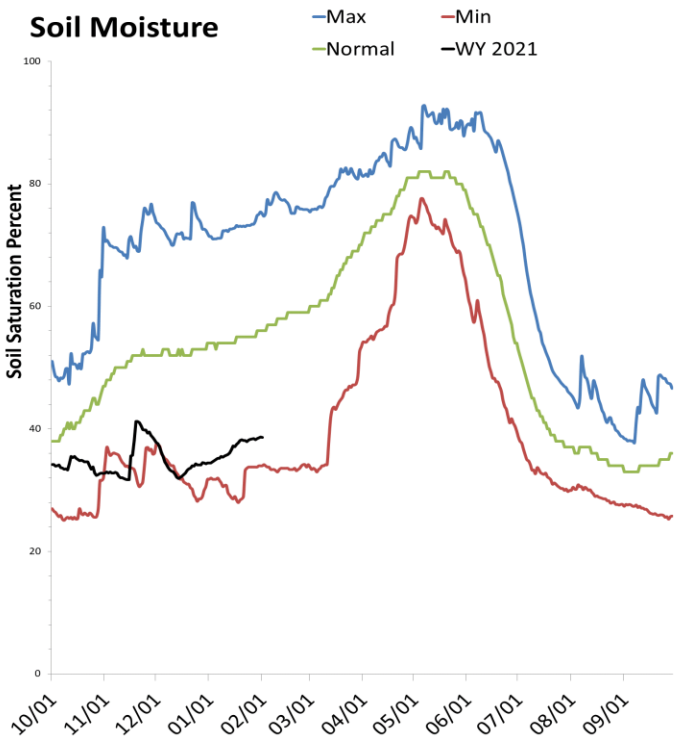
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Snake River Basin	12	60%	121%
Bruneau River	8	58%	117%
Bruneau Headwaters	6	57%	128%
Jarbidge River	3	64%	104%
Salmon Falls Creek	7	64%	114%

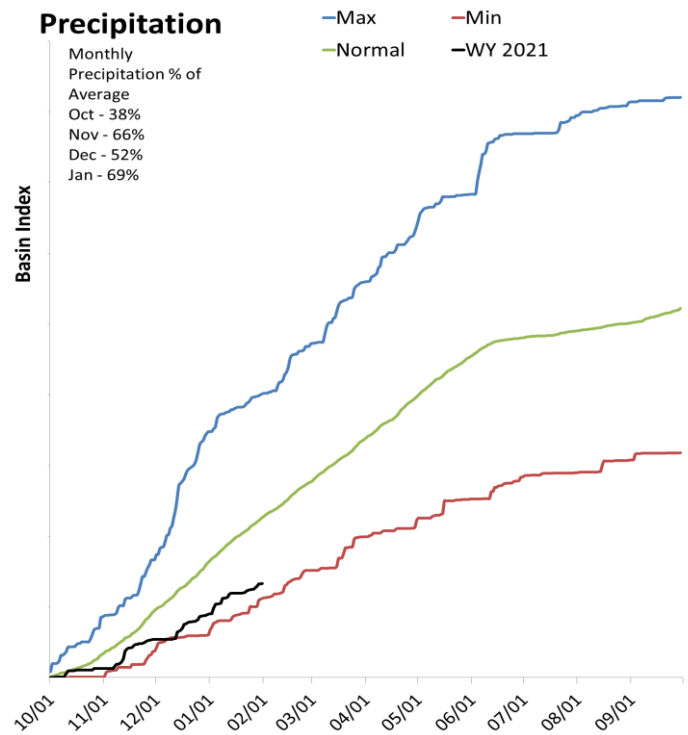
Owyhee River Basin

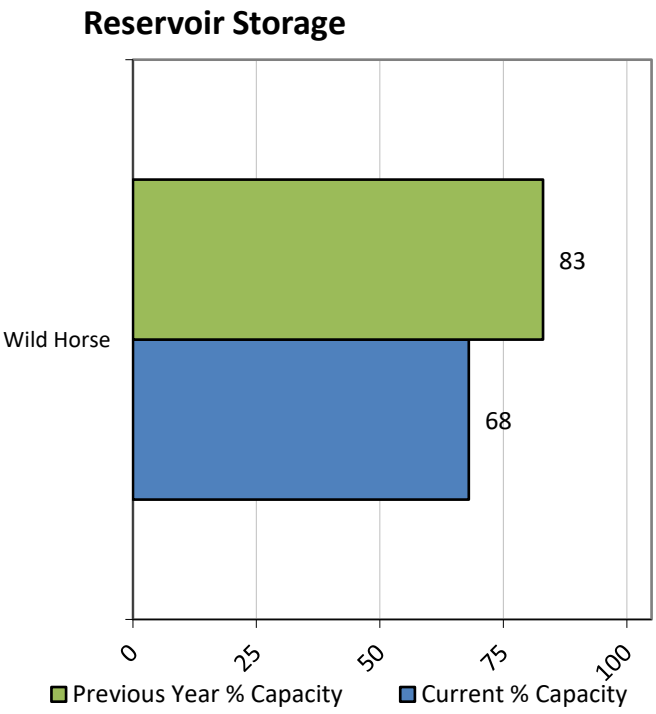
February 1, 2021

Snowpack in the Owyhee River Basin is much below normal at 54% of median, compared to 139% last year. Precipitation in January was much below average, which brings the seasonal accumulation (Oct-Jan) to 59% of average. Soil moisture is at 34% saturation, compared to 43% last year. Storage in Wildhorse Reservoir is 68% of capacity , compared to 83% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 19% of average for the March-July period.









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Owyhee River Basin
Streamflow Forecasts - February 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Owyhee River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Owyhee R nr Gold Ck[2]								
	MAR-JUL	0.32	2.6	5.3	19%	9	16.3	28
	APR-JUL	0.3	0.87	3	14%	6.4	13.8	22

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
3) Median value used in place of average

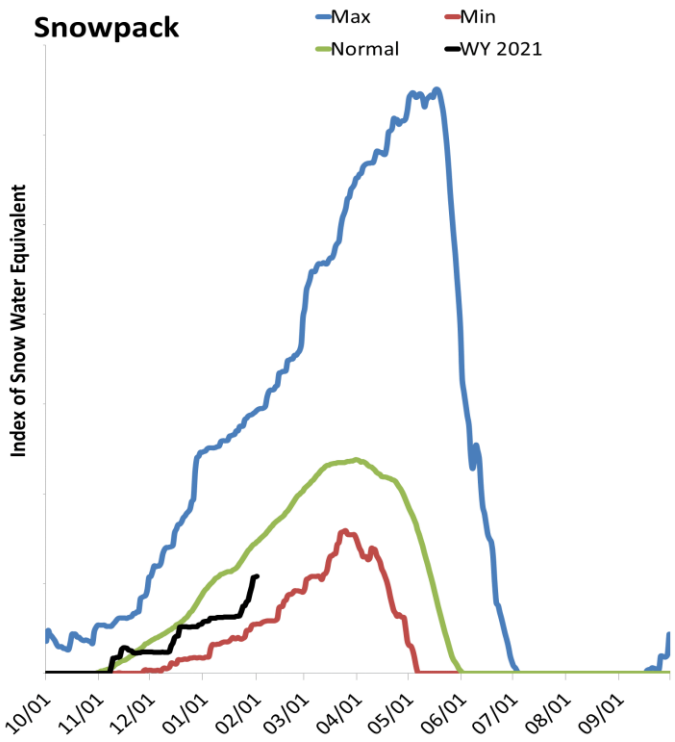
Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Wild Horse Reservoir	48.3	59.5	33.2	71.5
Basin-wide Total	48.3	59.5	33.2	71.5
# of reservoirs	1	1	1	1

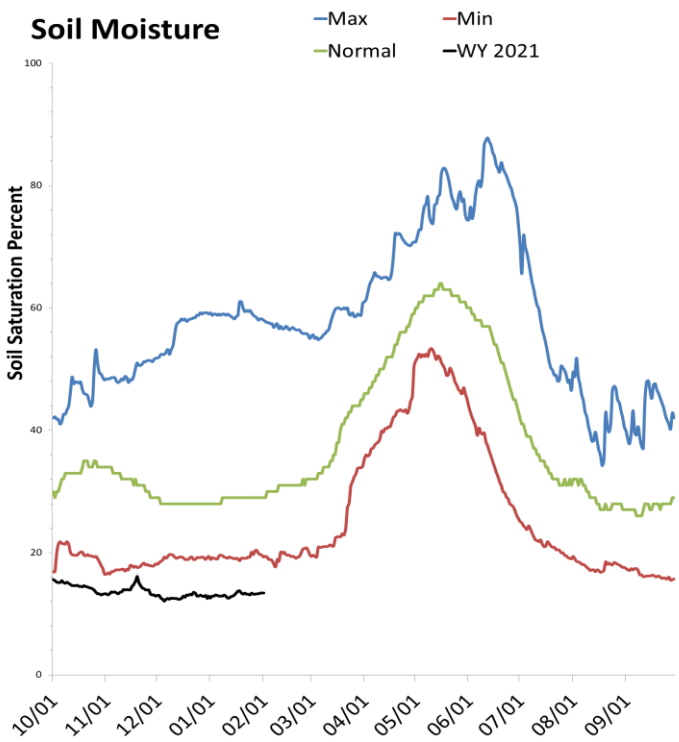
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Owyhee River Basin	11	54%	139%
Owyhee River above Owyhee	8	55%	137%
Owyhee River above Gold Creek	4	56%	139%
South Fork Owyhee River	6	56%	133%

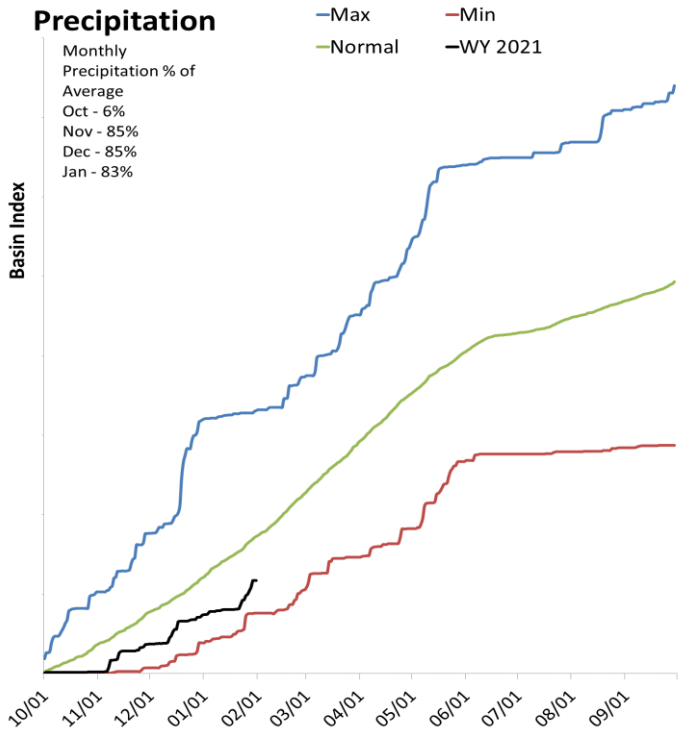
Eastern Nevada

February 1, 2021

Snowpack in the Eastern Nevada is below normal at 74% of median, compared to 90% last year. Precipitation in January was below average, which brings the seasonal accumulation (Oct-Jan) to 68% of average. Soil moisture is at 13% saturation, compared to 21% last year. Forecast streamflow volumes range from 38% to 58% of average for the April-July period.







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Eastern Nevada
Streamflow Forecasts - February 1, 2021

		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
Eastern Nevada	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kingston Ck nr Austin	APR-JUL	0.51	1.35	2.1	58%	3.1	4.9	3.6
Steptoe Ck nr Ely	APR-JUL	0.24	0.58	0.9	38%	1.29	1.99	2.4
Cleve Ck nr Ely	APR-JUL	0.58	1.27	1.9	43%	2.7	4	4.41
Lehman Ck nr Baker	APR-JUL	0.08	0.51	1.2	44%	1.89	2.9	2.72

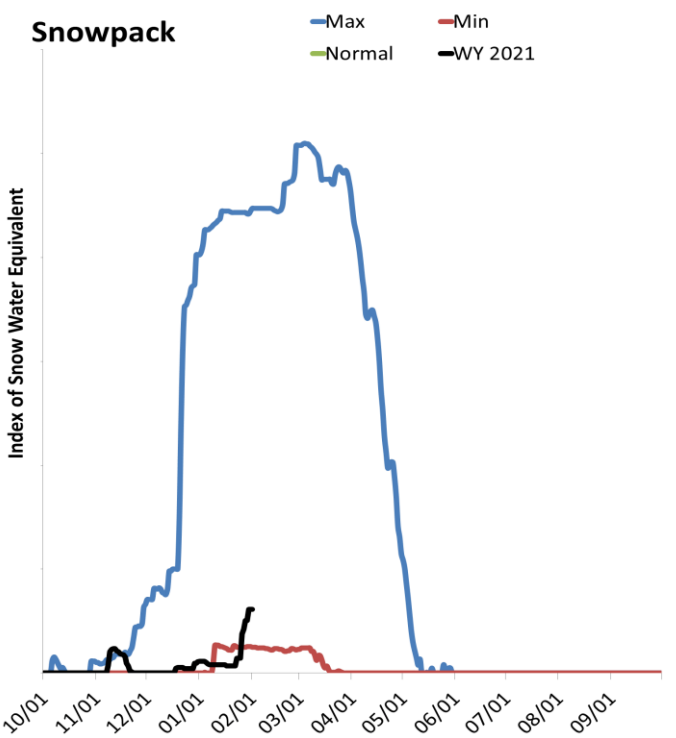
1) 90% and 10% exceedance probabilities are actually 95% and 5%
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

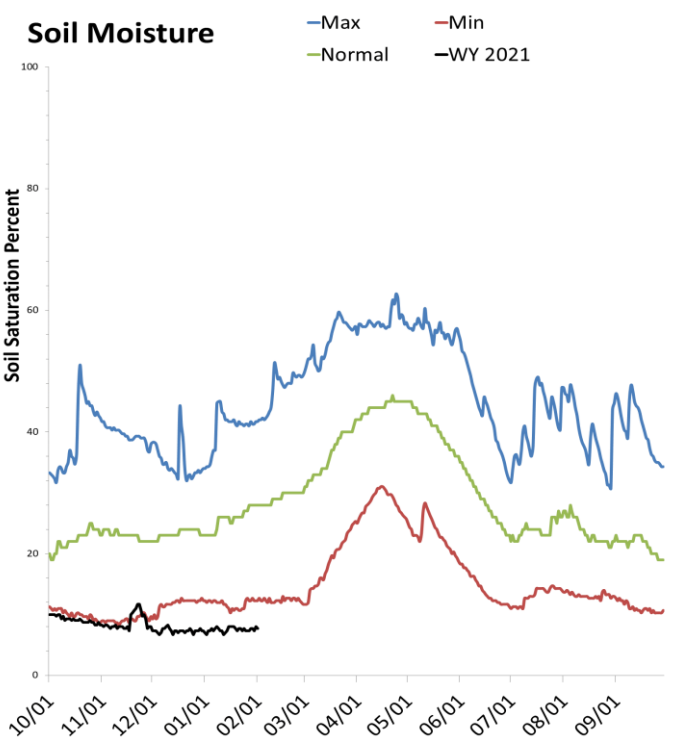
Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Eastern Nevada	4	74%	90%
Kingston Creek	1	89%	94%
Steptoe Valley	2	55%	91%
Baker & Lehman Creeks	0		

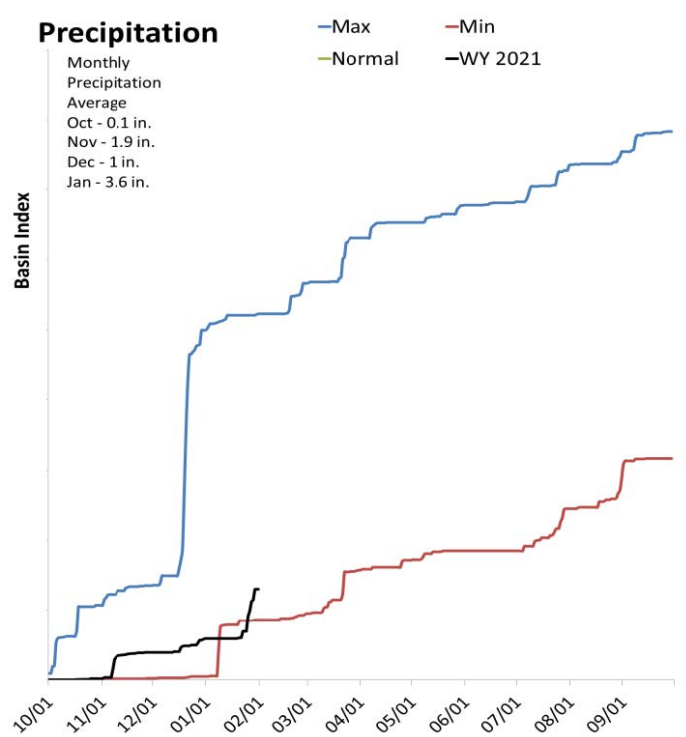
Spring Mountains & Southern Nevada

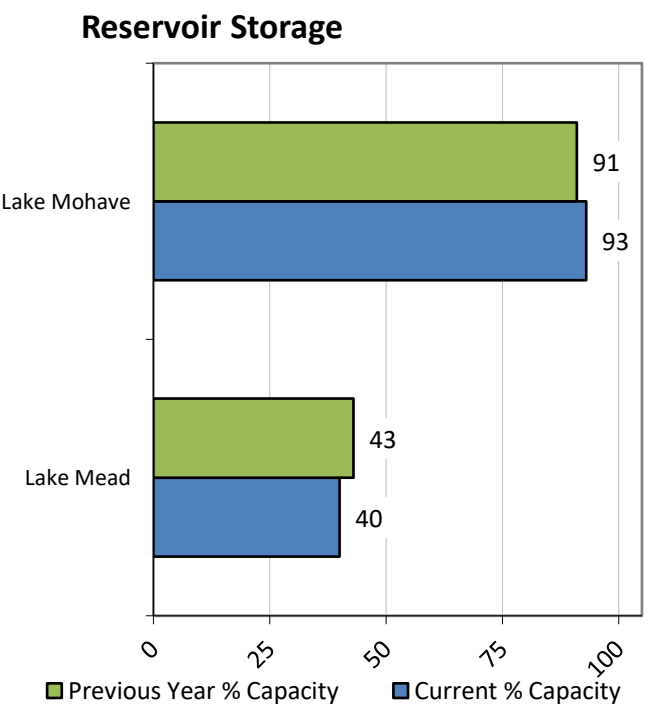
February 1, 2021

The average snow water content at SNOTEL sites in the Spring Mountains is 3.1 inch. Precipitation in January averaged 3.1 inches, which brings the average seasonal accumulation (Oct-Jan) to 6.5 inches. Soil moisture is at 8% saturation, compared to 25% last year. Storage in Lake Mead is 40% of capacity, compared to 43% last year. Lake Mohave storage is 93% of capacity, compared to 91% last year. The forecast streamflow volume for Lake Powell Inflow is 42% of average for the April-July period.









**SNOTEL sites in the Spring Mtns were installed in June 2008. Due to the short record snowpack and precipitation normals are not presented. Max and Min lines are based on water years 2009-2020, same goes for the soil moisture normal line.

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Spring Mountains & Southern Nevada
Streamflow Forecasts - February 1, 2021

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

Spring Mountains & Southern Nevada	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Virgin R nr Hurricane	APR-JUL	0.63	8.2	26	41%	47	78	63
Virgin R at Littlefield	APR-JUL	1.3	4.5	28	43%	51	86	65
Lake Powell Inflow [2]	APR-JUL	1240	2190	3000	42%	3930	5530	7160

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
3) Median value used in place of average

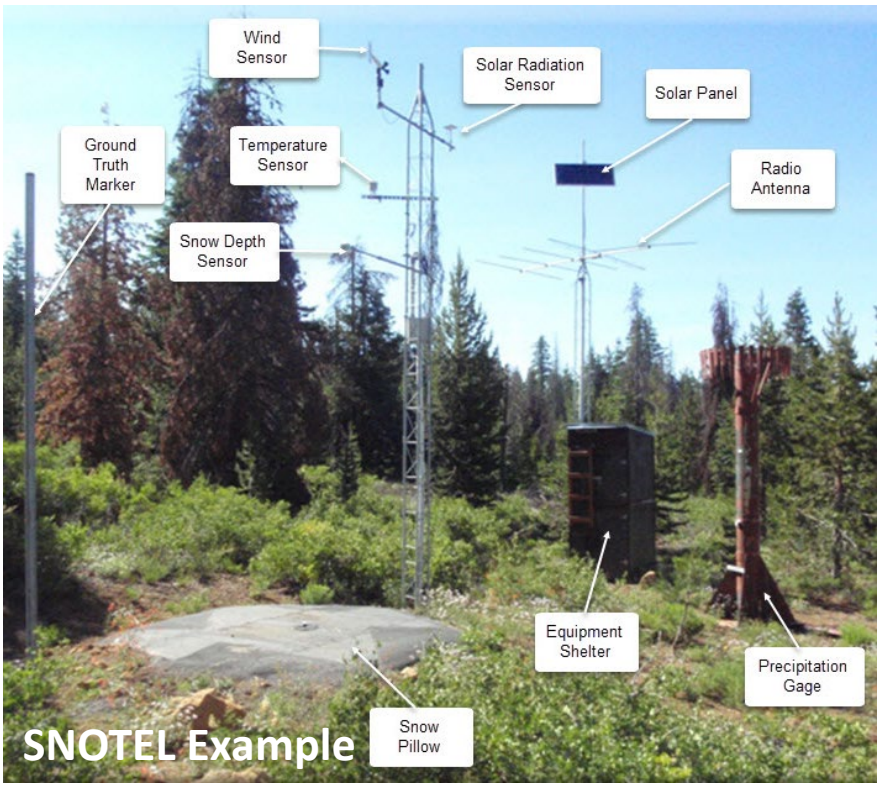
Reservoir Storage End of January, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	10524.0	11265.0	20452.0	26159.0
Lake Mohave	1690.0	1653.0	1676.0	1810.0
Basin-wide Total	12214.0	12918.0	22128.0	27969.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2021	# of Sites	% Median	Last Year % Median
Spring Mountains	0		
White River	1	37%	76%
Virgin River	9	78%	147%
Colorado R above Glen Canyon Dam	105	74%	111%

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.



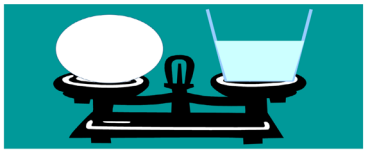
Snow Course

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

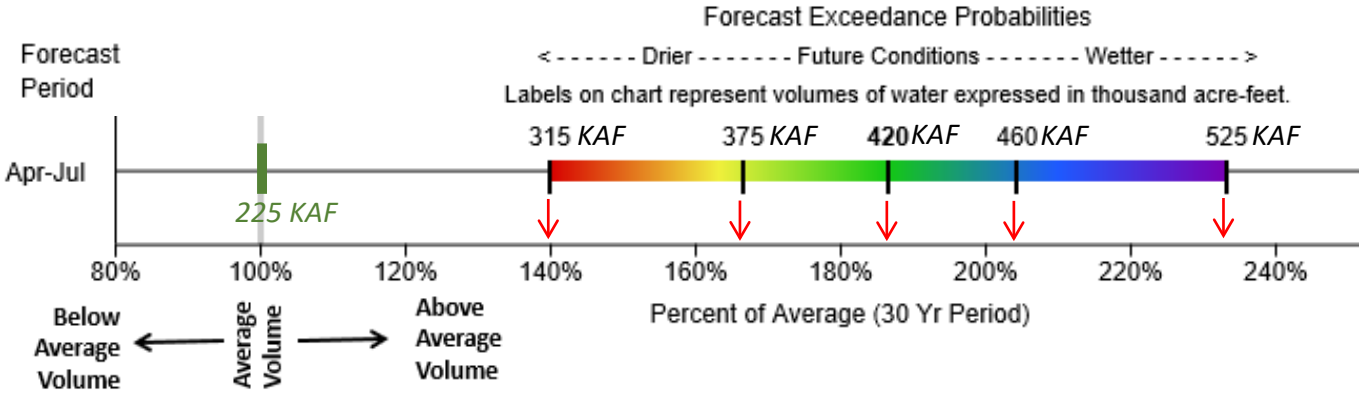
Appendix: Interpreting the Streamflow Forecast Chart

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

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

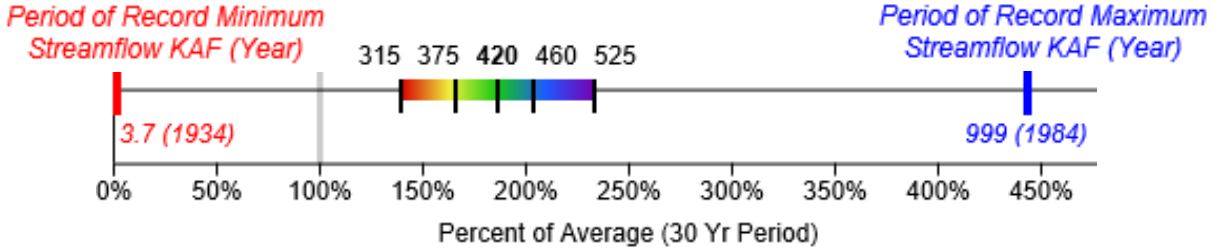
The Forecast Chart (below) provides an alternative to the tables (above) used in the basin summaries. The chart displays the forecast exceedance range as a colored bar. The vertical lines on the bar signify the five forecast exceedances.

The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of average 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 average 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 average 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 average. If drier than normal future conditions occur the 70% exceedance forecast may be more likely (375KAF or ~165% of average). If future conditions turn wetter than normal, the 30% exceedance forecast may be more likely (460KAF or ~205% of average). 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.



Users can use additional online features to compare historic forecasts with observed flow here: *https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nv/snow/waterproducts/?cid=nrcs144p2_037513*

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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

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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