

Natural Resources Conservation Service

Nevada Water Supply Outlook Report

March 1, 2021



February Powder in the Ruby Mountains

Photo courtesy of Ruby Mountains Heli-Experience

February storms brought much needed snow to the Ruby Mountains and other parts of northeastern Nevada. SNOTEL sites in the Ruby Mountains added an average of 4.4 inches of water content between February 12 and March 1. The Upper Humboldt Basin snowpack increased from 56% of median on February 1 to 80% on March 1. The Owyhee Basin saw the largest month-to-month snowpack increase, going from 54% of median on February 1 to 89% on March 1. Unfortunately, these storms mostly bypassed the eastern Sierra basins where March 1 snowpacks are now 64-73% of median.

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

March 1, 2021

SUMMARY

January brought significant snow to the Sierra, but left the eastern side of Nevada dry. February results were opposite with less than normal snow falling in the Sierra and big snowpack gains across the rest of northern Nevada. March 1 snowpacks are 64-73% of median for the Lake Tahoe, Truckee, Carson and Walker basins, and 69% in Eastern Nevada. Snowpack percentages are higher at 76-106% of median across the rest of northern Nevada. The lack of rain last fall continues to affect water year precipitation percentages which are lower than snowpack percentages. Water year precipitation ranges from 58-63% of average in the Sierra basins to 75-95% for other basins in northern Nevada. The lack of rain last fall has resulted in very dry soils under the snow. Soil moisture is significantly less than data for any other year for Eastern Nevada, Clover Valley and Franklin River Basin, as well as in the Upper Colorado and Virgin River basins. Soil moisture is near previous record dry conditions in the Lake Tahoe, Carson, Upper Humboldt basins and in the Spring Mountains. Dry soils are a wildcard this season for predicting streamflow. Gus Goodbody, the NRCS forecaster for the Colorado basin, summarized the implication of these conditions saying, "significant soil moisture and groundwater deficits remain an important part of the story, meaning snowmelt runoff is expected to be lower than the snowpack conditions alone might suggest." This month's 50% exceedance forecasts are 26-89% of average for the April-July period. Soil moisture deficits could result in observed runoff falling short of these levels. Consider using the 70% and 90% exceedance forecasts especially if spring months continue to be dry.

SNOWPACK

February storms increased snowpack percentages across northern Nevada, but left other areas wanting more. March 1 snowpacks are 80-106% of median for the Northern Great Basin, Owyhee, Snake and Humboldt basins, representing an increase of between 14 to 35 percentage points since February 1. Less than normal amounts of snow fell in the eastern Sierra causing March 1 percentages to decrease from last month. March 1 snowpacks in the Lake Tahoe, Truckee, Carson and Walker basins are 64-73% of median, down 5 to 11 percentage points from February 1. In southern Nevada, snow courses in the Spring Mountains are 33% of median. Las Vegas depends on the Upper Colorado Basin for much of its water supply. Based on measurements at 134 SNOTEL sites in the Colorado basin, the snowpack increased from 74% of median on February 1 to 83% of median on March 1.

PRECIPITATION

Monthly precipitation in February was 165-197% of average for the Upper Humboldt, Owyhee, Snake and Clover Valley basins and 99-140% for Northern Great Basin, Lower Humboldt Basin and Eastern Nevada. Precipitation missed the Sierra with the Lake Tahoe, Truckee, Carson and Walker basins only recording 33-44% of average precipitation for the month. Based on data back to 1981, monthly amounts ranked in the [top five Februarys](#) at 10 out of 13 SNOTEL sites in the Snake, Owyhee, North Fork Humboldt and Marys River basins. Water year precipitation continues to lag in most basins. October 1 through March 1 precipitation is 58-63% of average in the Lake Tahoe, Truckee, Carson and Walker basins and 75-95% of average across other basins in northern Nevada. Another month of below average precipitation in Sierra adds to the precipitation deficits which stretch back through water year 2020. In the Sierra, precipitation for the past [17 months](#) ranks lowest five at most sites based on SNOTEL data

back to ~1981. Despite well-above average precipitation in February, SNOTELs in the Ruby Mountains have record dry precipitation over the past 17 months. The same is true for the four long-term SNOTEL sites between Austin and Ely. These precipitation deficits are a significant contributor factor to Nevada's [drought status](#) which, as of March 2, classified 92% of the state in severe to exceptional drought.

SOIL MOISTURE

The lack of fall rain before snow accumulation continues to result in soil moisture well below average in all basins. Soil moisture is significantly less than the driest conditions previously recorded in Eastern Nevada, Clover Valley and Franklin River Basin, as well as in the Upper Colorado and Virgin River basins. Soil moisture is matching previous record dry conditions in the Lake Tahoe, Carson, Upper Humboldt Basin and Spring Mountains. Dry soils are likely to result in reduced runoff efficiency this spring as snowmelt will need to saturate the soil profile. Soil moisture graphs found 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 are based on data since 2006.

RESERVOIRS

Reservoir storage is significantly lower than a year ago. See basin summaries later in the report for storage volumes. Reduced reservoir storage emphasizes the importance of spring precipitation to delay irrigation demand and stretch the stored water until later into the summer.

STREAMFLOW FORECASTS

March 1 streamflow forecasts range from 26-89% for the April-July period. Forecasts in the Sierra basins decreased and forecasts in basins with above average February precipitation increased. Unless otherwise noted, forecast percentages in this report are based on the 50% exceedance level. Keep in mind, every forecast has five exceedance levels reported in the basin summaries later in this report. The 50% exceedance is the middle of the road forecast, 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 observed volumes could be close to, or less than, the drier forecasts (70% and 90% exceedances). The dry soils under the snow across the region are an important consideration. Soil moisture data are not used in the NRCS streamflow forecasting due to a period of record that is too short for statistical regression techniques. That said, the data are helpful when evaluating exceedance volumes. Dry soils soak up snow melt reducing runoff efficiency which, in turn, reduces observed streamflow. In this case, drier exceedance forecasts may be more likely to match observed runoff, especially if precipitation is also less than normal during the forecast period.

UPCOMING EVENTS

Northern Nevada Streamflow, Reservoir, and Weather Forecast Meeting for Water Planning

Thursday, April 15, from 3pm - 5 pm (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.

If interested in attending, contact Bunny Bishop (bbishop@water.nv.gov) to be added to notification list.

Western Snow Conference, April 12-15, 2021, Virtual Meeting

Topic: Bridging the Gap between Research and Operations

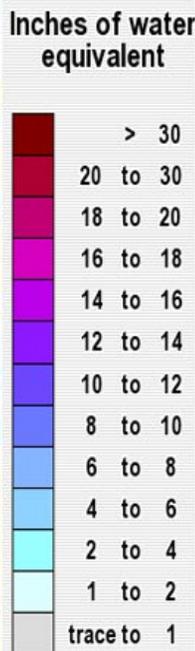
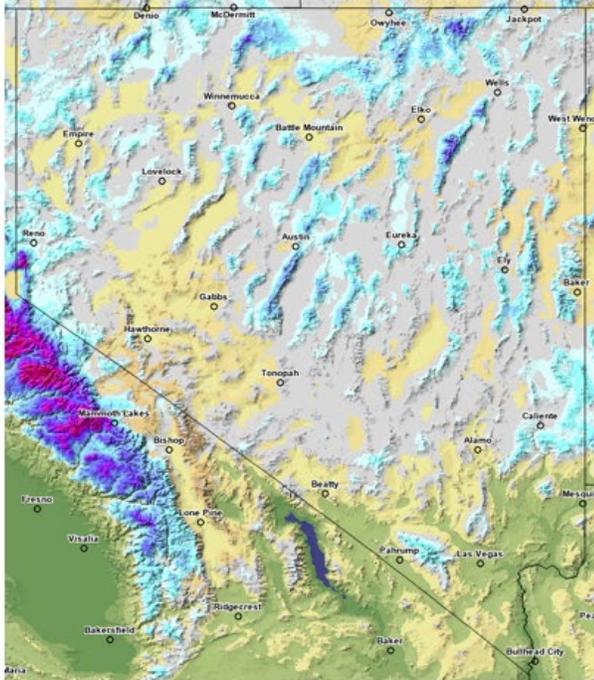
<https://westernsnowconference.org/meeting/2021>

RANGELAND CONDITIONS

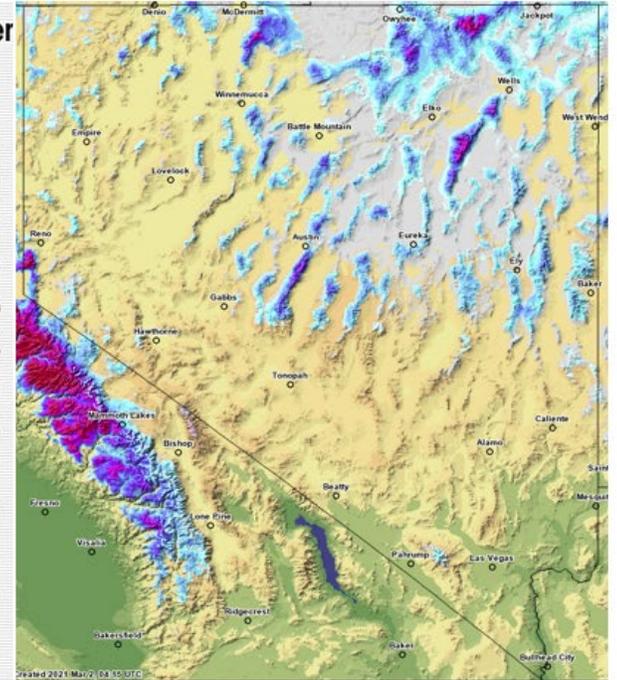
The NRCS mission is to provide resources to farmers and ranchers to aid them with conservation. Most NRCS SNOTEL stations are located in the mountains above 6,500 feet. There are a lot of rangeland acres below the SNOTEL network. This section takes a closer look at data from lower elevation rangeland 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 [February 1, 2021](#) map (left) shows modeled snow water equivalent across Nevada one month ago. Comparing to March 1, 2021 (right), snowpacks have improved in eastern Nevada especially at higher elevations. The low elevation snow in western Nevada from storms at the end of January has melted.

Modeled Snow Water Equivalent for 2021 February 1

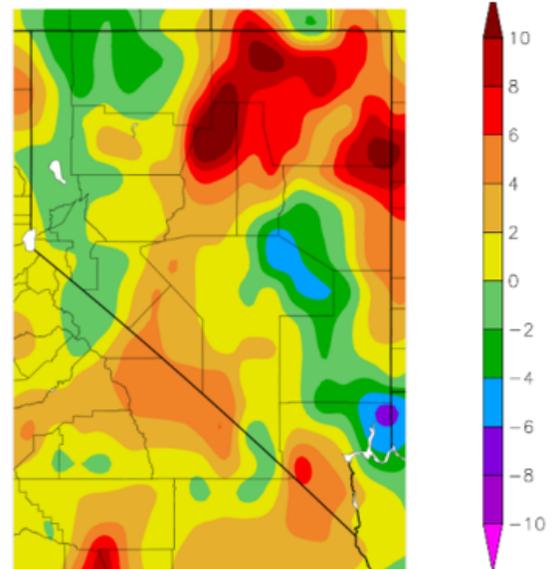


Modeled Snow Water Equivalent for 2021 March 1



Plant Growth: Plant growth is progressing slowly with nearly the entire state in severe drought, limiting available plant moisture. Temperatures in Northeastern Nevada are 3 to 5 degrees warmer than normal for February (see map to right). Wildflowers are blooming in Death Valley and southern Nevada and the lower hills in western Nevada are turning green with cheatgrass growth (*Bromus tectorum*) and annual forbs. The Great Basin and Mojave Desert have a winter-spring dominated precipitation pattern, so plant growth starts early, usually in late January and early February while temperatures are cool and soil moisture is high. By mid-to-late June, most upland range species have produced and dispersed their seed, thus completing their life cycle. With the hot summer temperatures, the plants enter dormancy and leaves drop off or die back. Some of the shrubs in the Aster family produce flowers and seeds later in the summer (sagebrush- *Artemisia spp.*, rabbitbrush – *Ericameria spp.*), but most of their stem and leaf growth occurs earlier in the year. Some shrubs and grasses have the ability to break dormancy with late summer rains and even flower again. Snow cover in northern

Departure from Normal Temperature (F)
2/1/2021 – 2/28/2021



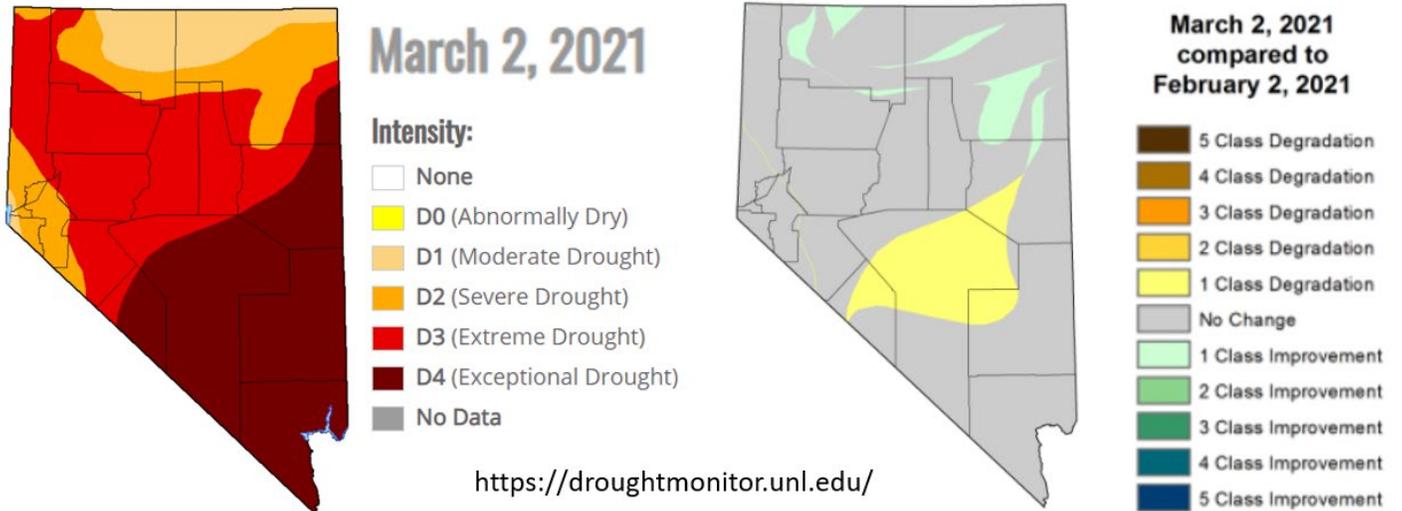
Generated 3/2/2021 at HPRCC using provisional data.
NOAA Regional Climate Centers

Nevada is important for the shrubs because they typically have long, deep tap roots and shallow lateral roots. The slow melting of snow provides moisture deep in the soil profile, and as the surface soils dry out, the roots start drawing moisture deeper in the profile allowing shrubs like sagebrush and rabbitbrush to complete their growth cycle.

Drought Status: The US drought monitor map from March 2, 2021 indicates that 40% of the state is currently in exceptional drought with the remainder experiencing moderate to extreme drought. The area highlighted in yellow on the right-hand map received one drought class degradation compared to last month's map.

U.S. Drought Monitor - Nevada

U.S. Drought Monitor Class Change - Nevada



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 February. Most stations had near normal to above average temperatures. February precipitation was mixed with generally better-than-average precipitation to the north and east and less than average amounts to the south and west. The maximum February temperature recorded at Reno airport was 61°F. Battle Mountain had a February high of 65°F which is 4°F cooler than last year; however, the overall departure from normal was nearly 7 degrees higher for the month of February. The highest temperature in February was 74°F at the Las Vegas airport climate station and coldest temperature of -22°F was recorded at Wildhorse Reservoir station.

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

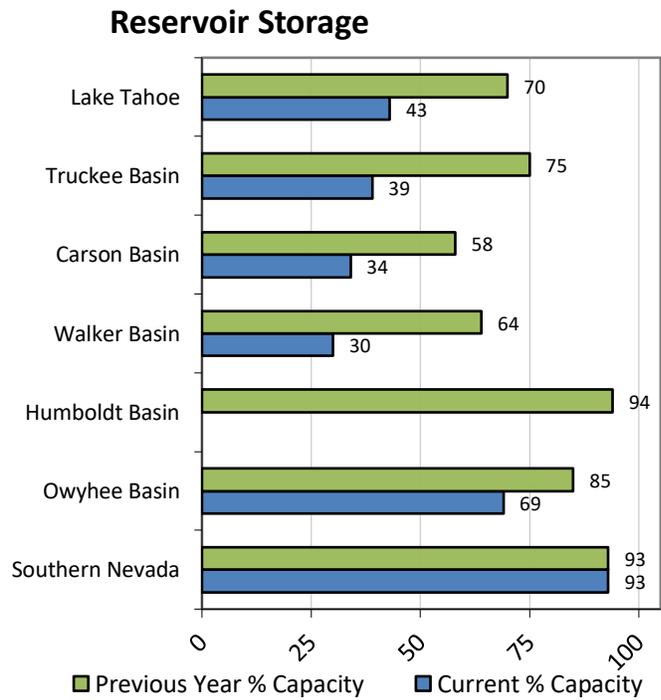
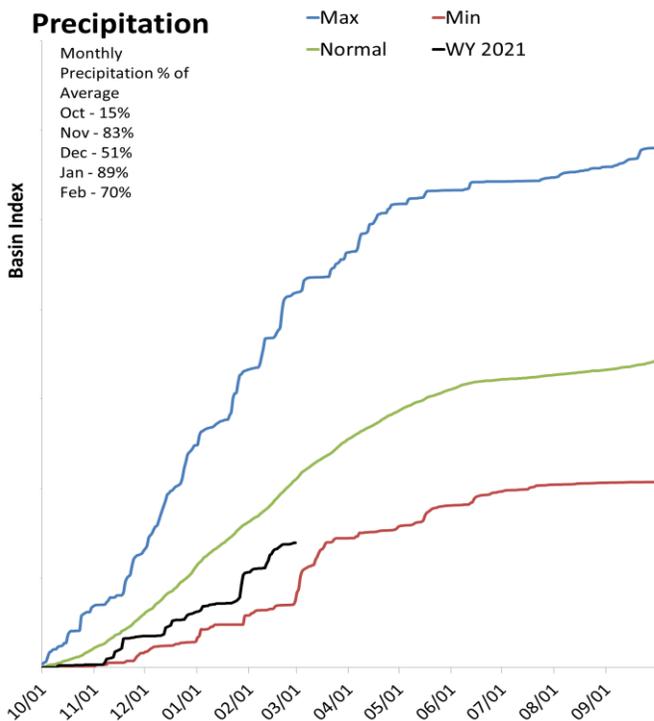
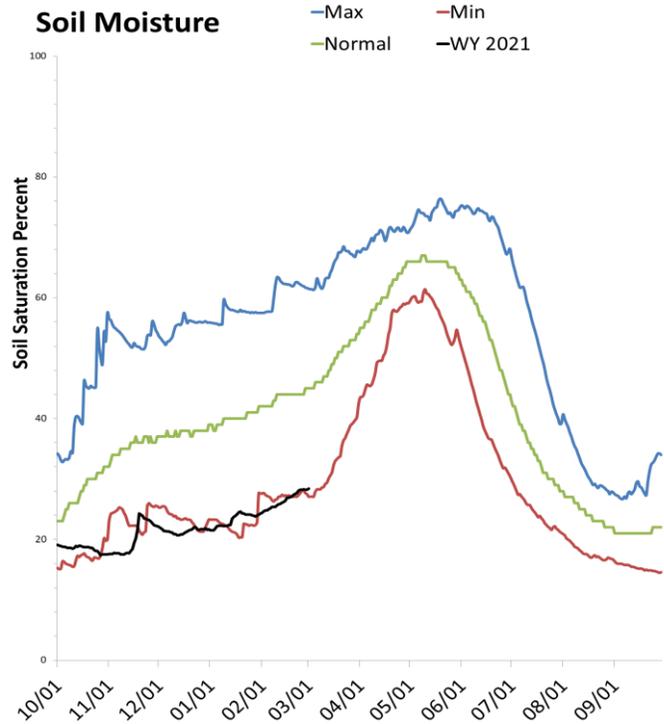
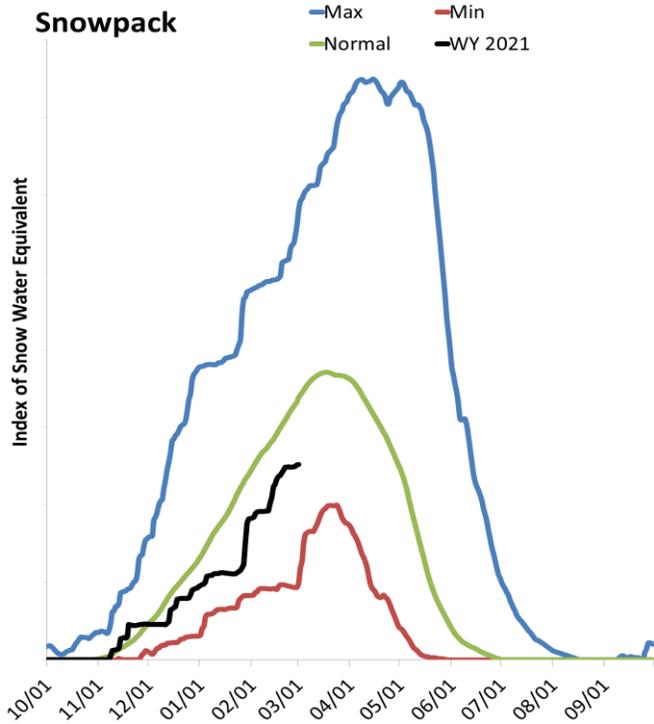
Climate Station	February Temperature Ave °F	Departure from Normal °F	February Monthly Precipitation (inches)	Departure from Normal (inches)
Reno airport	40.18	2.09	0.12	-0.87
Lovelock airport	36.7	0.31	0.37	-0.06
Orovada	33.44	-1.4	1.24	0.3
Winnemucca	35.73	0.32	1.34	0.66
Battle Mountain	42.11	6.88	0.89	0.24
Elko airport	33.32	3.38	1.01	0.09
Wildhorse Reservoir	23.64	1.86	1.71	0.55
Ely	28.91	0.26	0.72	-0.06
Eureka	28.38	-1.87	1.07	0.01
Tonopah	37.61	1.11	0.04	-0.42
Caliente	37.76	0.07	1.2	0.25
Las Vegas airport	54.46	3.06	0.01	-0.55

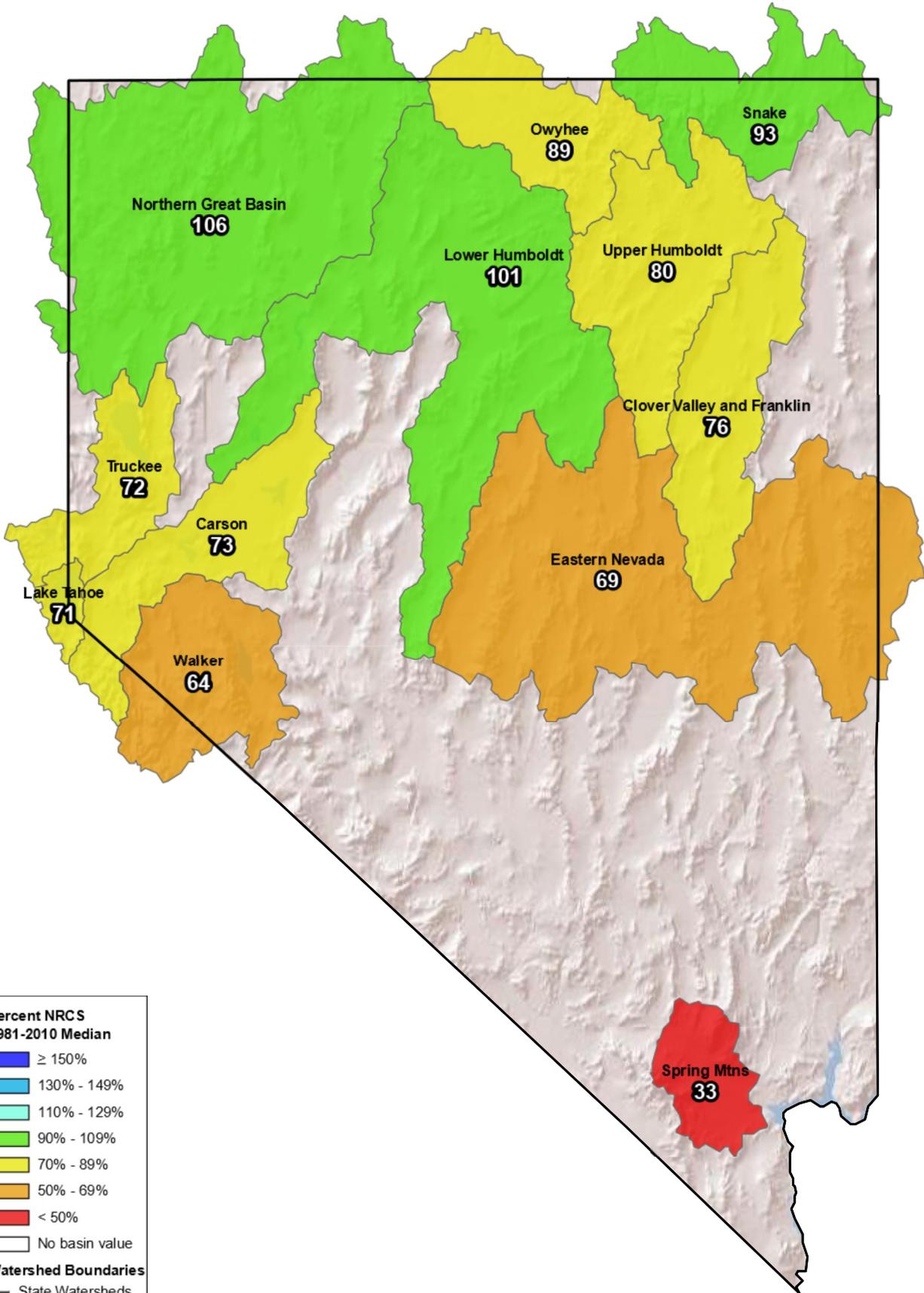
Source: <https://wrcc.dri.edu/Climate/summaries.php>

State of Nevada & Eastern Sierra

March 1, 2021

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is below normal at 76% of median, compared to 67% last year. Precipitation in February was below average, which brings the seasonal accumulation (Oct-Feb) to 68% of average. Soil moisture is at 28% saturation, compared to 39% last year. Reservoir storage ranges from 30% of capacity in the Walker Basin to 93% of capacity in Southern Nevada.





**Percent NRCS
1981-2010 Median**

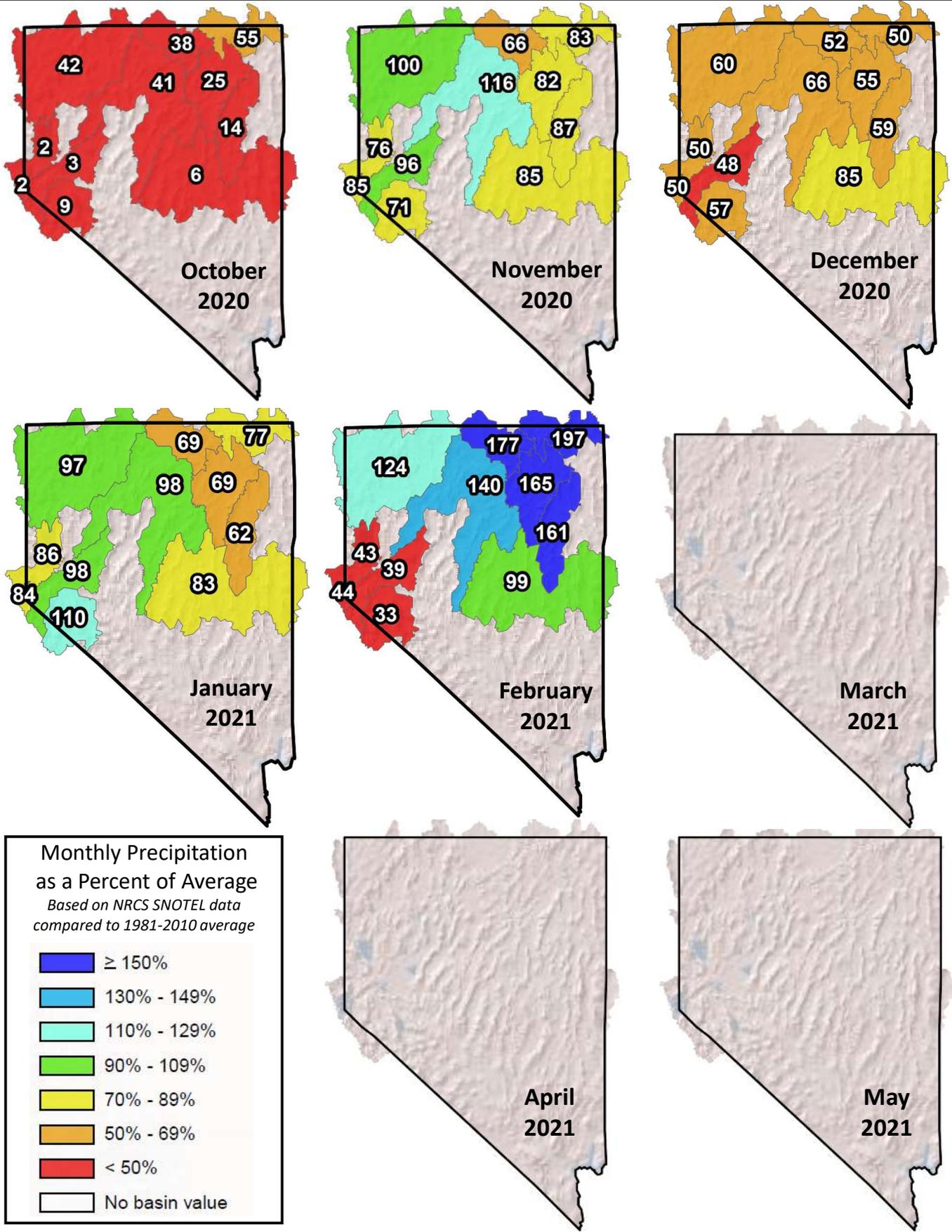
- ≥ 150%
- 130% - 149%
- 110% - 129%
- 90% - 109%
- 70% - 89%
- 50% - 69%
- < 50%
- No basin value

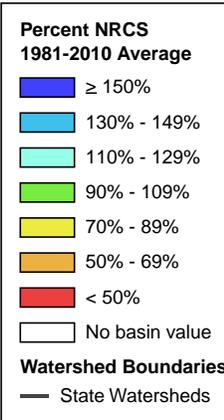
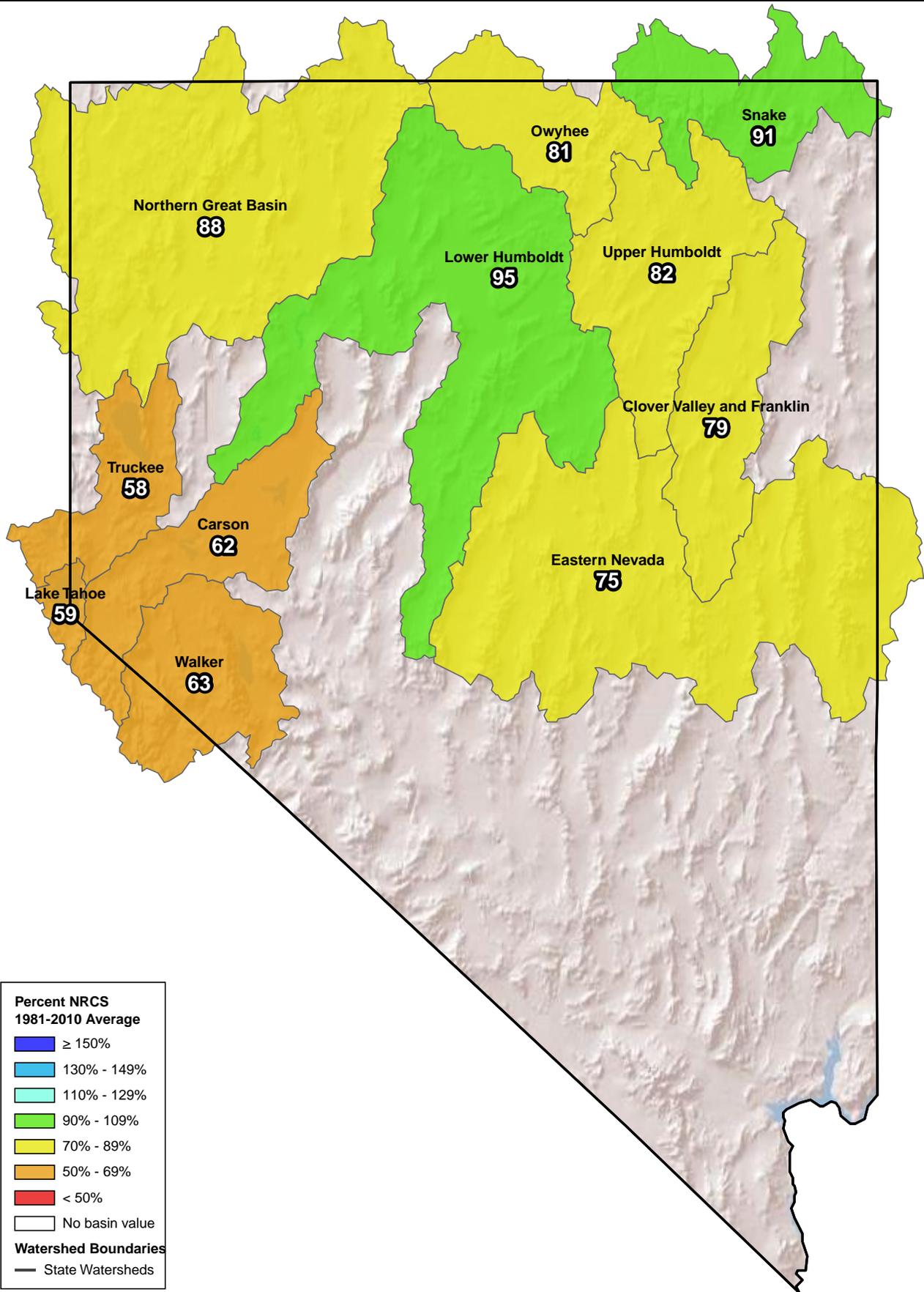
Watershed Boundaries

- State Watersheds



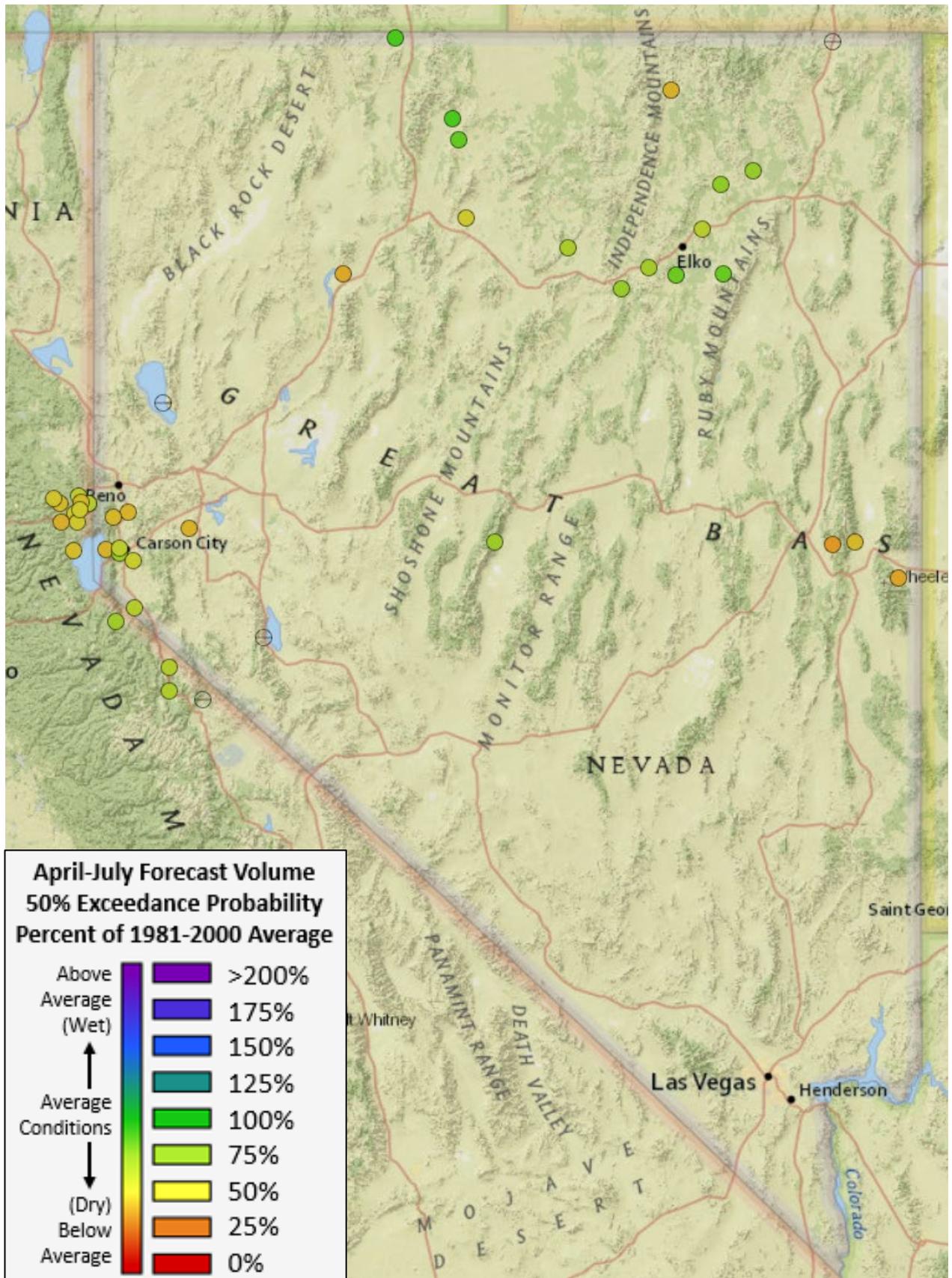
Monthly Precipitation as Percent of Average – Water Year 2021





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

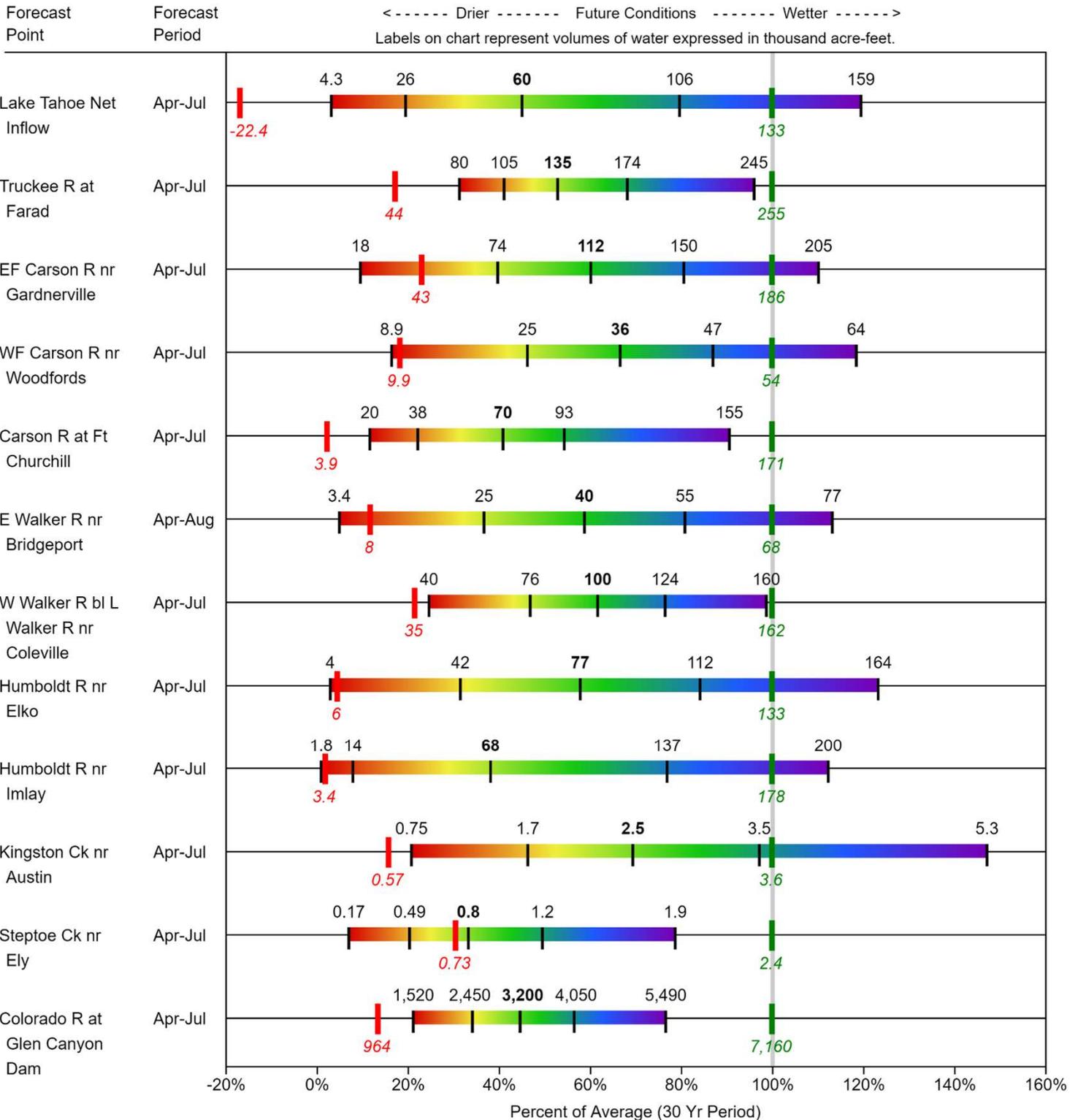
Forecasted April - July streamflow as a percentage of the 1981 - 2010 Average



Streamflow Forecasts - State of Nevada Summary

March 1, 2021

Forecast Exceedance Probabilities



Period of Record Minimum Streamflow KAF (Year)

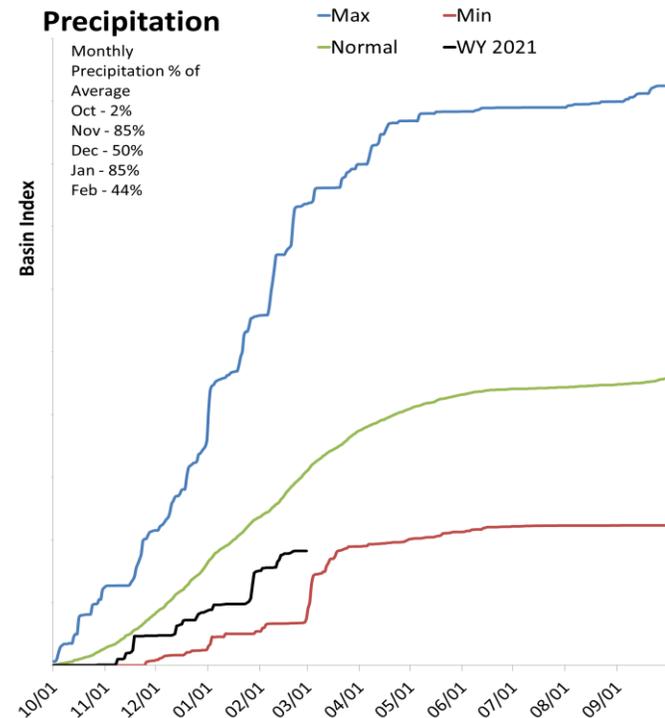
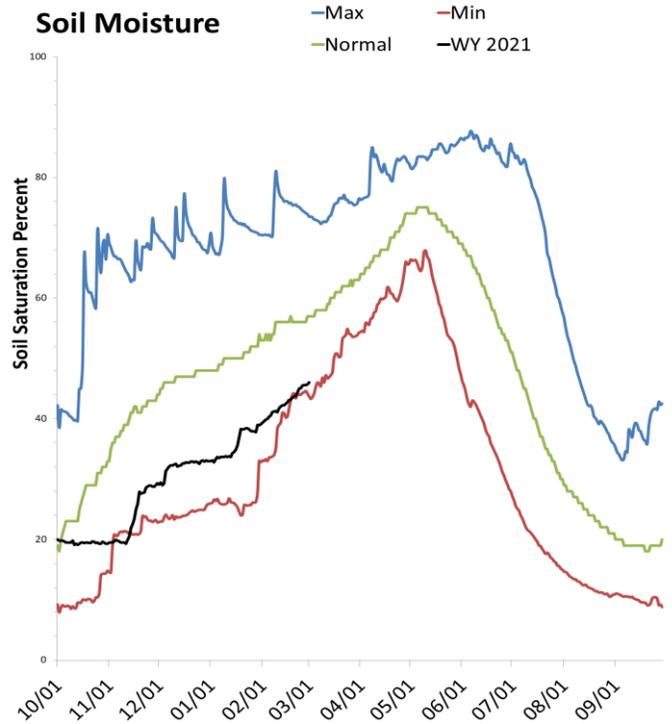
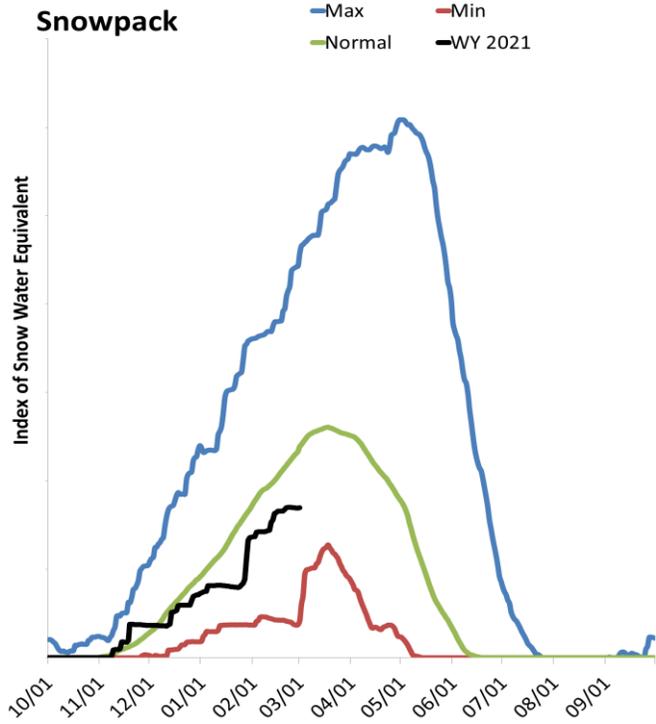
1981-2010 Normal Streamflow KAF

See appendix for more information

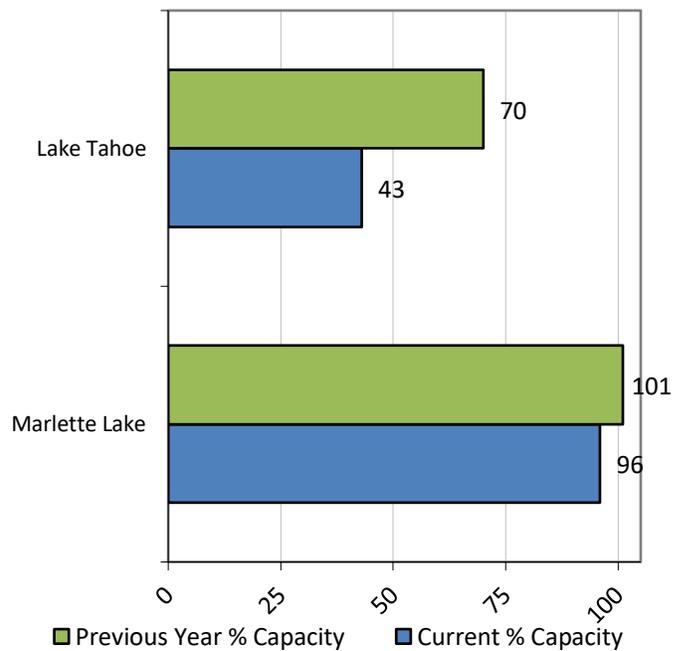
Lake Tahoe Basin

March 1, 2021

Snowpack in the Lake Tahoe Basin is below normal at 71% of median, compared to 51% last year. Precipitation in February was much below average, which brings the seasonal accumulation (Oct-Feb) to 59% of average. Soil moisture is at 46% saturation, compared to 52% last year. Lake Tahoe's water elevation is 6225.62 ft, which is 2.62 ft above the lake's natural rim and equals a storage of 318.5 thousand acre-feet. Last year its elevation was 6227.3 ft which equaled a storage of 523.6 thousand acre-feet. Lake Tahoe is forecast to rise 0.9 feet from March 1 to its highest elevation, which means it is unlikely to completely fill this year.



Reservoir Storage



**Lake Tahoe Basin
Streamflow Forecasts - March 1, 2021**

Lake Tahoe Basin	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Marlette Lake Inflow ²	MAR-JUL	30	200	560	50%	880	1250	1110
	APR-JUL	20	120	340	41%	660	1120	830
Lake Tahoe Rise Gates Closed ¹	MAR-HIGH	0.052	0.32	0.9	52%	1.48	2.8	1.73
	APR-HIGH	0.14	0.59	0.65	50%	0.92	1.4	1.31
Lk Tahoe Net Inflow ²	MAR-JUL	1.89	18.1	80	42%	142	235	189.3
	APR-JUL	4.3	26	60	41%	106	159	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Tahoe	318.5	523.6	296.7	744.5
Marlette Lk nr Carson City	11.3	11.9	11.8	11.8
Basin-wide Total	329.8	535.5	308.5	756.3
# of reservoirs	2	2	2	2

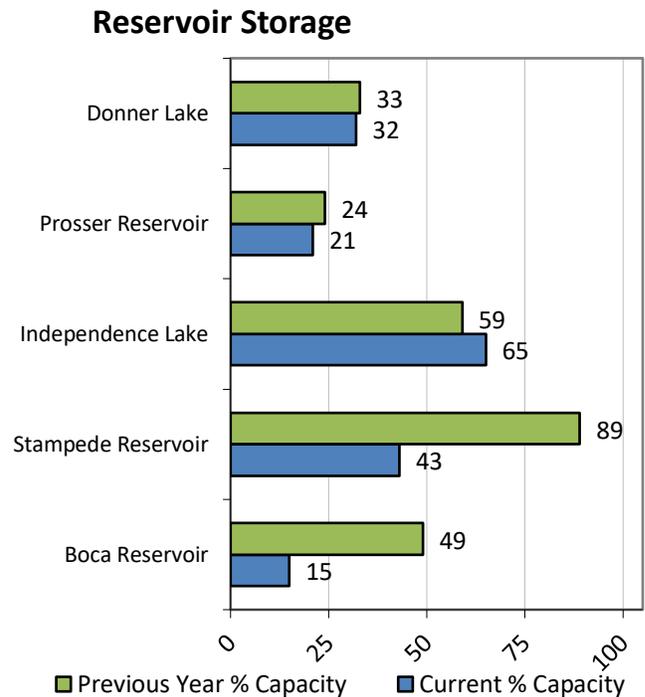
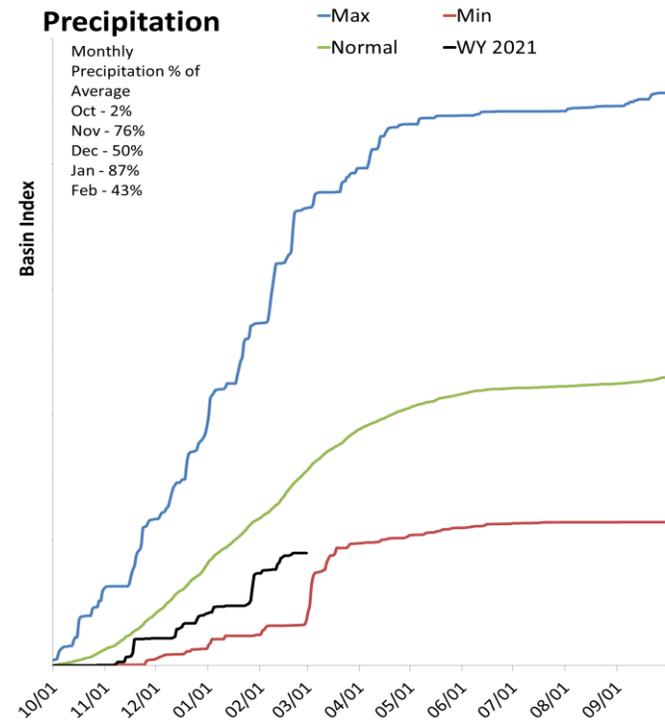
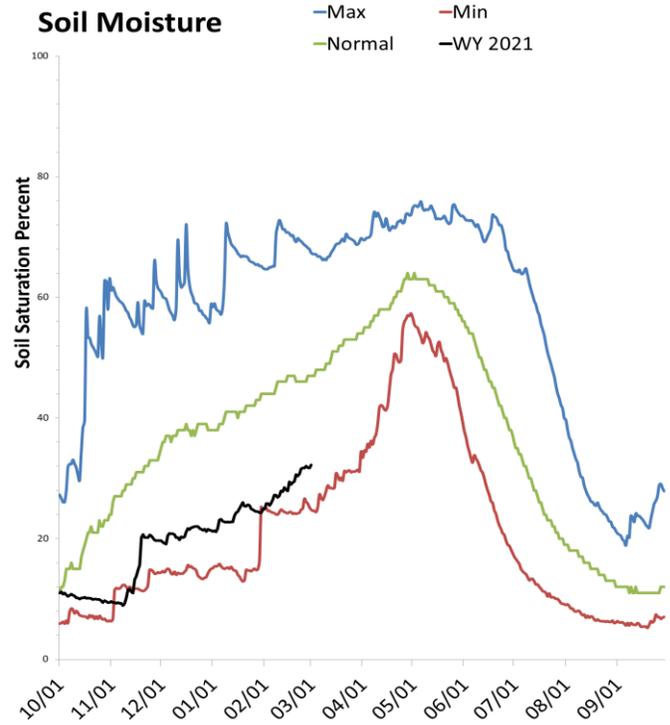
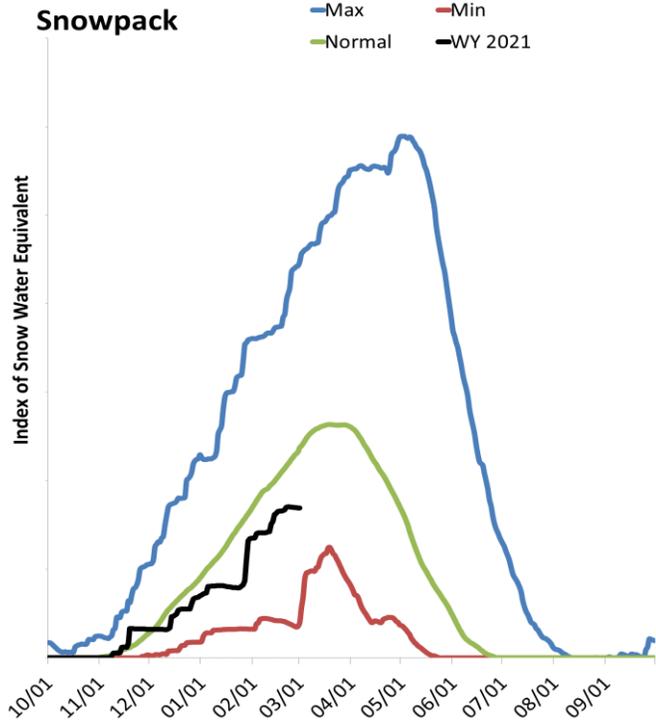
Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Lake Tahoe Basin	23	71%	51%

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

March 1, 2021

Snowpack in the Truckee River Basin is below normal at 72% of median, compared to 51% last year. Precipitation in February was much below average, which brings the seasonal accumulation (Oct-Feb) to 58% of average. Soil moisture is at 32% saturation, compared to 42% last year. Combined reservoir storage is 39% of capacity, compared to 75% last year. Forecast streamflow volumes range from 40% to 57% of average for the March-July period.



Truckee River Basin Streamflow Forecasts - March 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	0.03	5.2	8.8	40%	12.3	17.5	21.74
	APR-JUL	0.89	3.6	6.8	38%	10	14.6	17.84
Martis Ck Res Inflow ²	MAR-JUL	0.52	3.1	6.1	47%	9.1	13.6	12.91
	APR-JUL	0.47	1.55	4.2	45%	6.9	10.8	9.39
Prosser Ck Res Inflow ²	MAR-JUL	8	18.1	25	49%	32	42	50.71
	APR-JUL	4.3	13.6	20	47%	26	36	42.84
Independence Lk Inflow ²	MAR-JUL	0.84	4	6.2	46%	8.3	11.5	13.5
	APR-JUL	0.67	3.6	5.5	45%	7.5	10.3	12.1
Sagehen Ck nr Truckee	MAR-JUL	1.69	2.3	2.9	45%	3.5	4.8	6.4
	APR-JUL	1.33	1.89	2.4	43%	3	4.3	5.6
Stampede Res Local Inflow ²	MAR-JUL	4.1	31	49	54%	67	94	90.25
	APR-JUL	2.3	23	40	52%	58	83	76.5
L Truckee R ab Boca Reservoir ²	MAR-JUL	2.1	29	47	44%	65	92	107
	APR-JUL	15	22	38	43%	52	73	88
Boca Res Local Inflow ²	MAR-JUL	0.28	1.74	4.1	44%	6.5	9.9	9.42
	APR-JUL	0.11	0.54	2.4	44%	4.3	7	5.5
Truckee R at Farad ²	MAR-JUL	39	117	170	55%	225	300	307
	APR-JUL	80	105	135	53%	174	245	255
Truckee R ab Farad Sidewater ²	MAR-JUL	17.5	50	72	57%	94	126	126.1
	APR-JUL	8.1	39	60	56%	81	111	108.09
Galena Ck at Galena Ck State Pk	MAR-JUL	0.45	1.52	2.3	47%	3	4.1	4.85
	APR-JUL	0.12	1.18	1.9	43%	2.6	3.7	4.37
Steamboat Ck at Steamboat	APR-JUL	0.71	1.9	3.2	42%	5	8.7	7.7
Pyramid Lake Elevation Change ¹	LOW-HIGH	-0.78	0.051	0.37	22%	1.24	2.3	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Boca Reservoir	6.3	20.0	16.7	40.9
Donner Lake	3.0	3.1	3.7	9.5
Independence Lake	11.2	10.2	13.7	17.3
Prosser Reservoir	6.4	7.1	9.7	29.8
Stampede Reservoir	98.0	201.0	146.7	226.5
Basin-wide Total	125.0	241.4	190.5	324.0
# of reservoirs	5	5	5	5

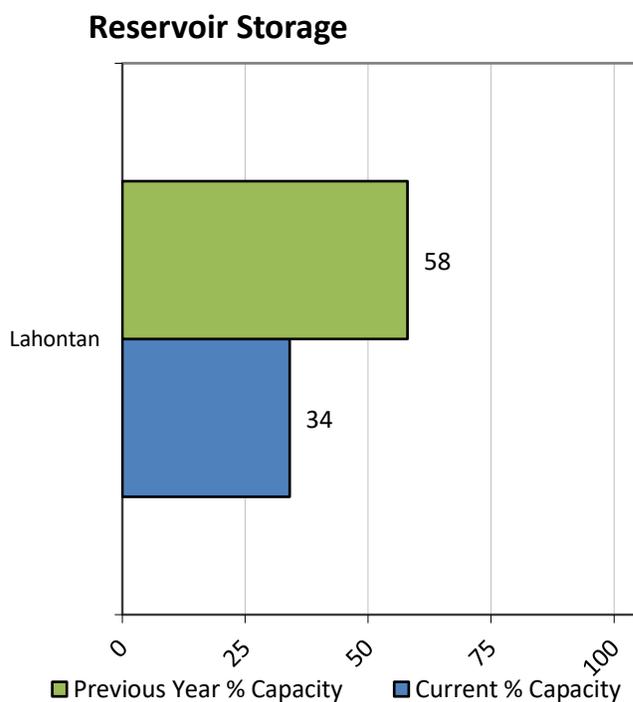
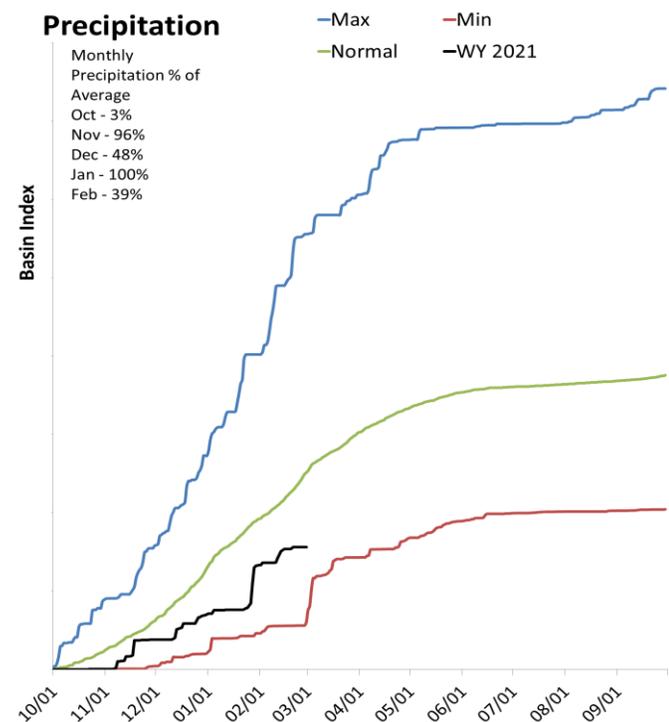
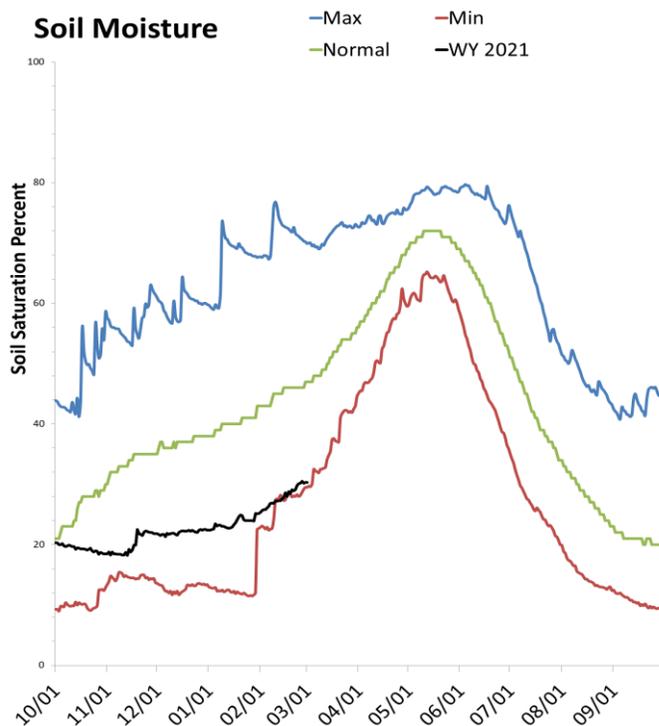
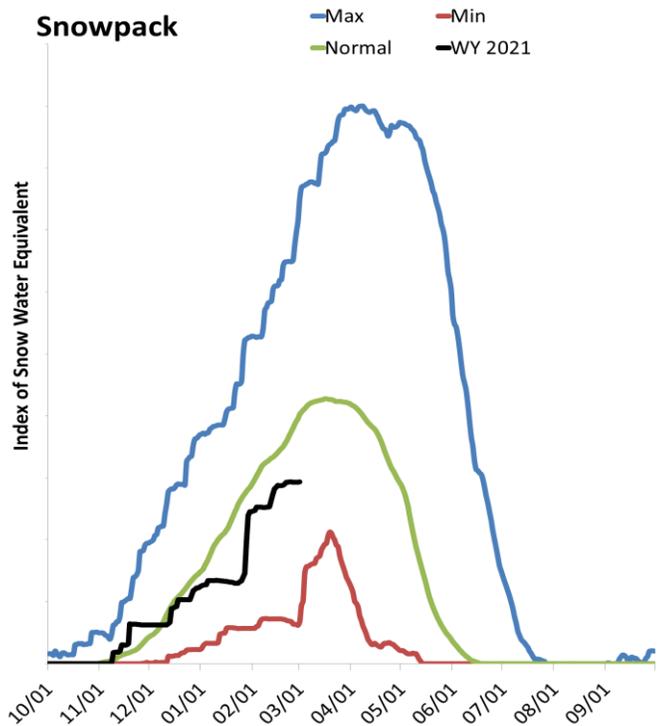
Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Truckee River Basin	17	72%	51%
Little Truckee River	5	72%	51%
Sagehen & Independence Creeks	3	70%	48%
Galena Creek	1	65%	57%
Steamboat Creek	1	65%	57%
Truckee River above Pyramid Lake	33	72%	51%

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

March 1, 2021

Snowpack in the Carson River Basin is below normal at 73% of median, compared to 55% last year. Precipitation in February was much below average, which brings the seasonal accumulation (Oct-Feb) to 62% of average. Soil moisture is at 31% saturation, compared to 44% last year. Storage in Lahontan Reservoir is 34% of capacity, compared to 58% last year. Forecast streamflow volumes range from 45% to 68% of average for the March-July period.



Carson River Basin Streamflow Forecasts - March 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	34	90	128	62%	166	220	205
	APR-JUL	17.9	74	112	60%	150	205	186
	200 cfs	01 Jun	18 Jun	30 Jun		12 Jul	29 Jul	24 Jul
	500 cfs	16 May	01 Jun	11 Jun		21 Jun	07 Jul	30 Jun
WF Carson R nr Woodfords	MAR-JUL	12.6	29	40	68%	50	66	59
	APR-JUL	8.9	25	36	67%	47	64	54
Carson R nr Carson City	MAR-JUL	38	76	108	51%	147	215	210
	APR-JUL	28	62	93	52%	131	198	179
Marlette Lake Inflow ²	MAR-JUL	30	200	560	50%	880	1250	1110
	APR-JUL	20	120	340	41%	660	1120	830
Kings Canyon Ck nr Carson City	MAR-JUL	0.01	0.06	0.22	58%	0.34	0.59	0.38
	APR-JUL	0.01	0.05	0.2	53%	0.33	0.54	0.38
Ash Canyon Ck nr Carson City	MAR-JUL	0.31	0.63	0.85	60%	1.07	1.39	1.41
	APR-JUL	0.17	0.46	0.65	58%	0.85	1.13	1.12
Carson R at Ft Churchill	MAR-JUL	38	66	90	45%	120	175	200
	APR-JUL	20	38	70	41%	93	155	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 February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lahontan Reservoir	106.9	180.6	170.8	313.0
Basin-wide Total	106.9	180.6	170.8	313.0
# of reservoirs	1	1	1	1

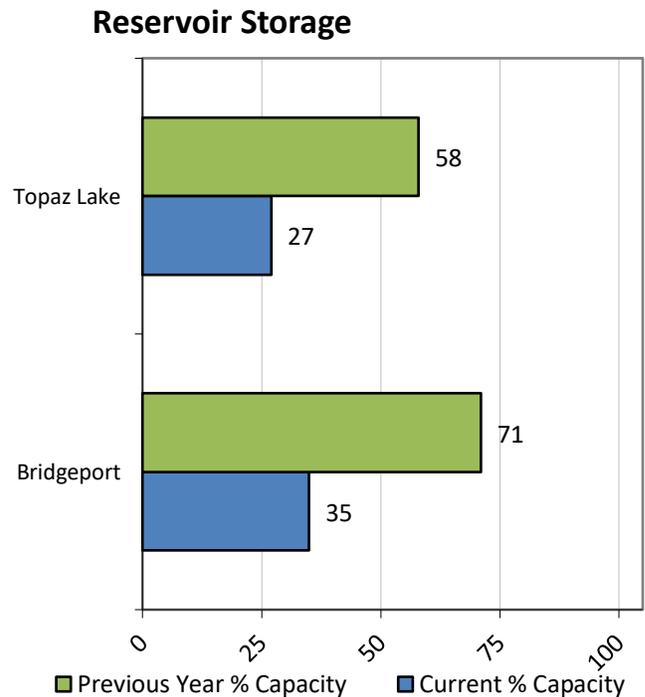
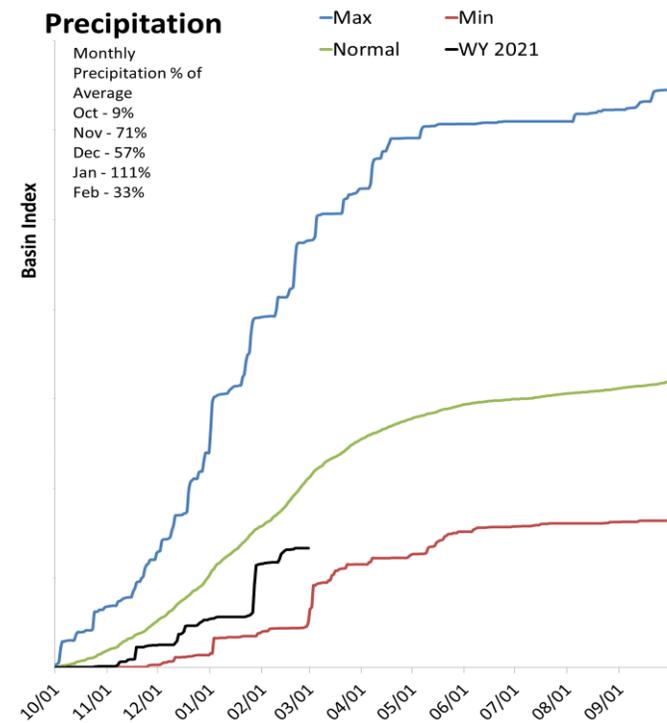
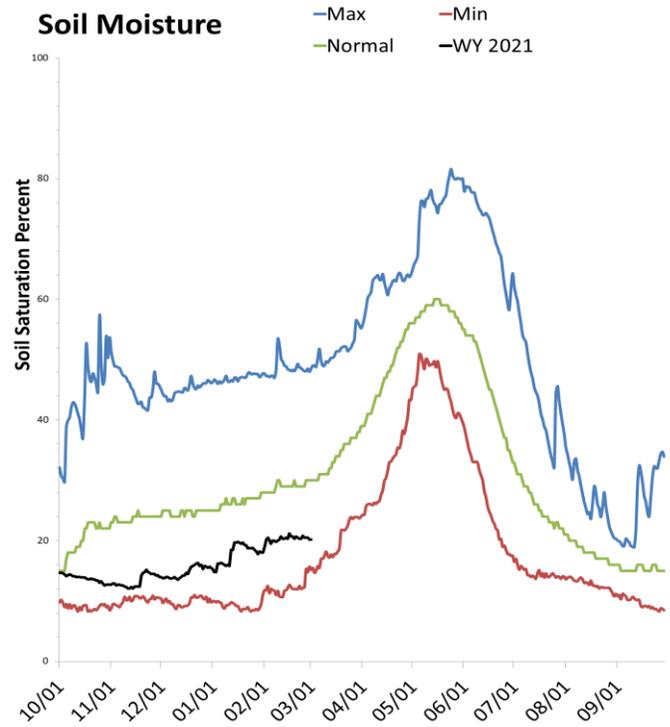
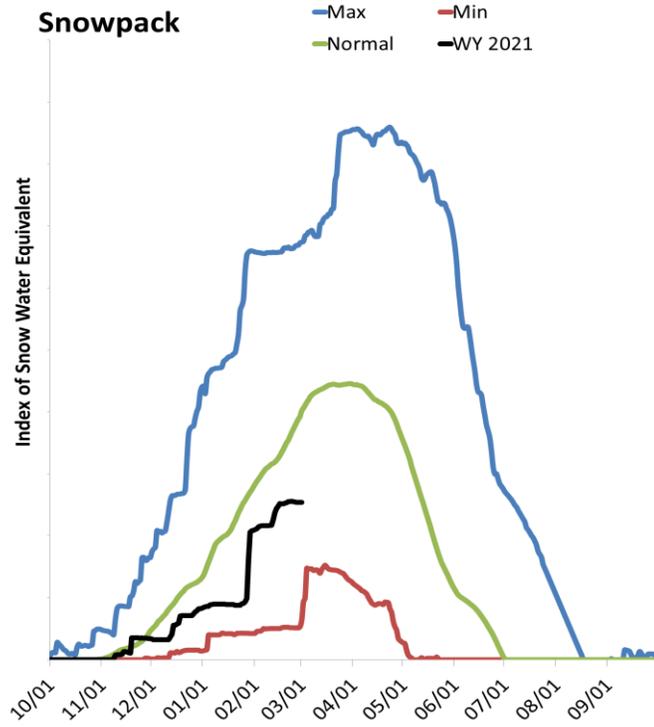
Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Carson River Basin	16	73%	55%
East Fork Carson River	7	73%	58%
West Fork Carson River	9	71%	55%

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

March 1, 2021

Snowpack in the Walker River Basin is much below normal at 64% of median, compared to 42% last year. Precipitation in February was much below average, which brings the seasonal accumulation (Oct-Feb) to 63% of average. Soil moisture is at 18% saturation, compared to 19% last year. Combined reservoir storage is 30% of capacity, compared to 64% last year. Forecast streamflow volumes range from 62% to 63% of average for the period starting in March through either July or August.



Walker River Basin Streamflow Forecasts - March 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	6.7	32	49	63%	67	92	78
	APR-AUG	3.4	25	40	59%	55	77	68
W Walker R bl L Walker nr Coleville	MAR-JUL	46	82	107	63%	132	168	170
	APR-JUL	40	76	100	62%	124	160	162
W Walker R nr Coleville	MAR-JUL	33	77	107	62%	137	181	172
	APR-JUL	37	74	99	61%	124	161	163
Walker Lake Elevation Change ¹	LOW-HIGH	-0.31	0.23	0.3	21%	1.11	1.92	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
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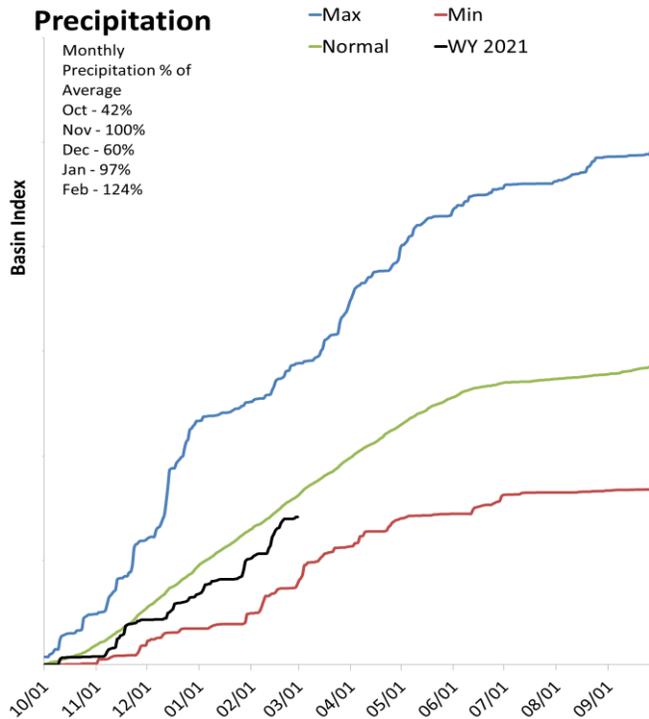
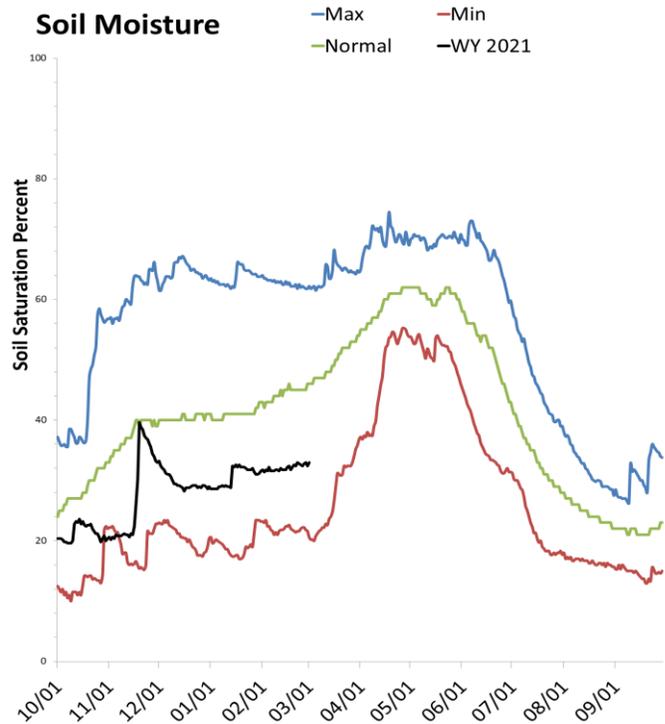
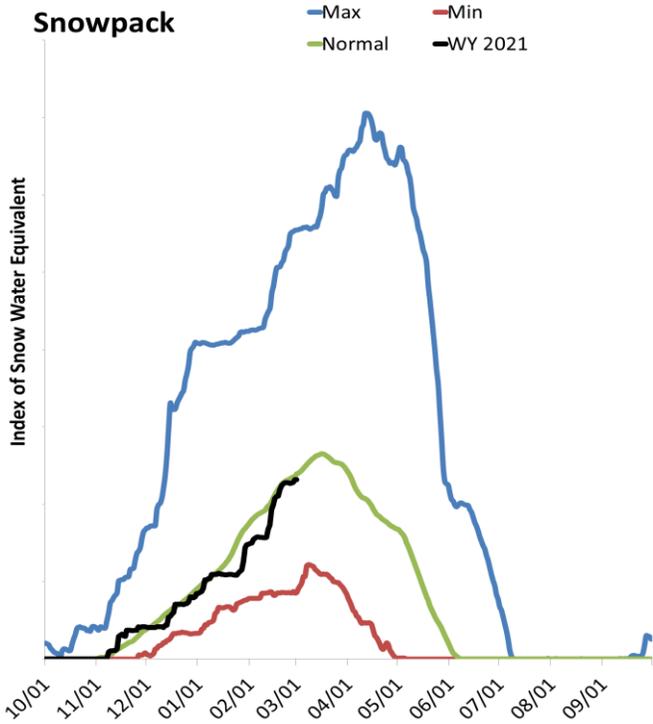
Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	14.7	30.2	24.4	42.5
Topaz Lk nr Topaz	16.3	34.5	28.6	59.4
Basin-wide Total	31.0	64.7	53.0	101.9
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Walker River Basin	8	64%	42%
East Walker River above Bridgeport	2	61%	36%
West Walker River above Coleville	7	64%	42%

Northern Great Basin

March 1, 2021

Snowpack in the Northern Great Basin is near normal at 106% of median, compared to 105% last year. Precipitation in February was above average, which brings the seasonal accumulation (Oct-Feb) to 87% of average. Soil moisture is at 31% saturation, compared to 46% last year. The forecast streamflow volumes for McDerrmitt Creek is 89% of average for the March-June period. Streamflow forecasts for Davis Creek, Bidwell Creek and Eagle Creek have been permanently discontinued until stream gaging can be re-established.



Northern Great Basin Streamflow Forecasts - March 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	8.2	12.3	15.6	89%	19.2	25	17.5
	APR-JUL	4.8	8.3	11.2	86%	14.5	20	13

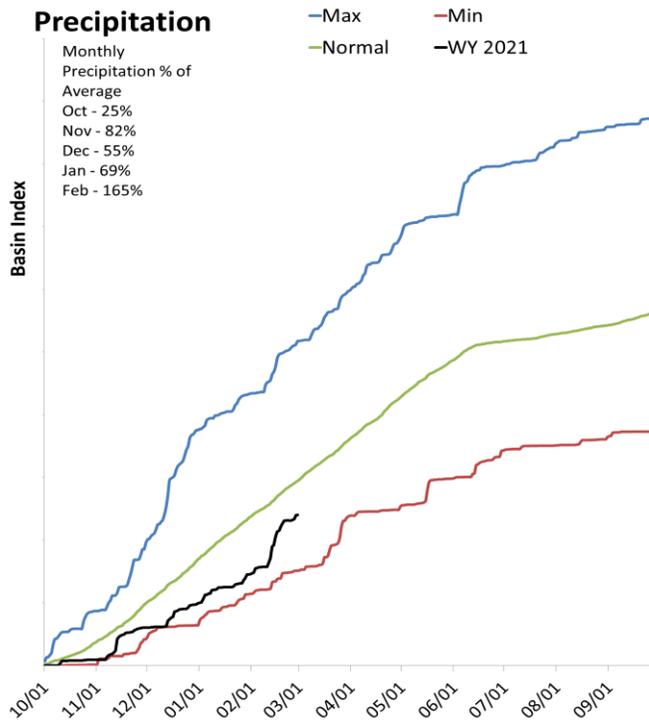
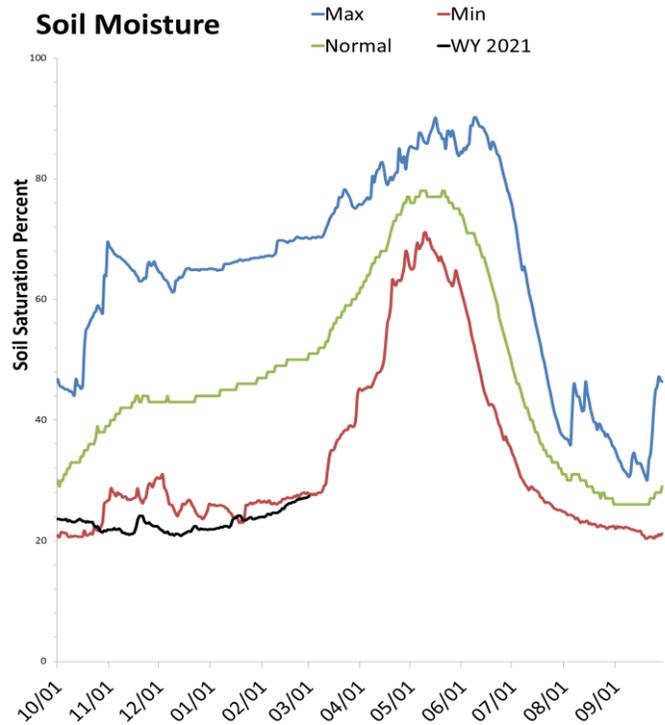
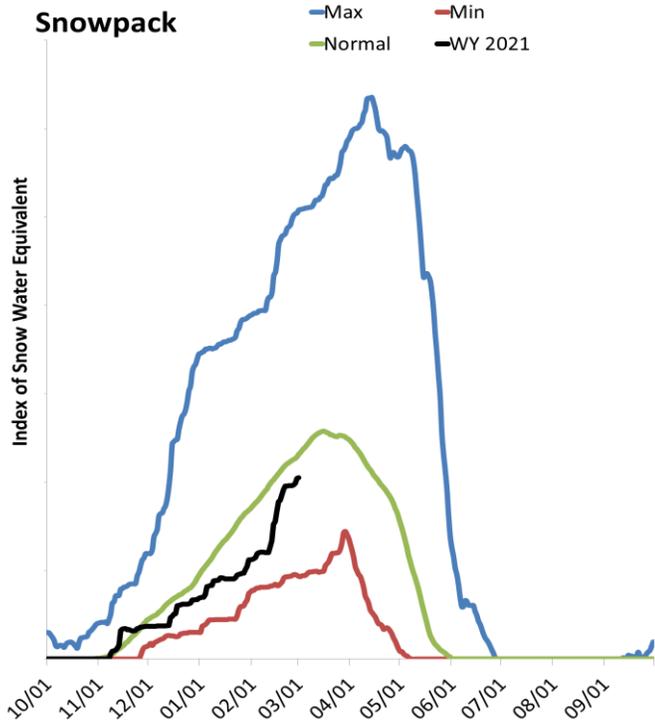
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Northern Great Basin	15	106%	105%
Surprise Valley - Warner Mtns	4	101%	109%
McDermitt Creek	3	98%	80%
Quinn River	8	107%	101%

Upper Humboldt River Basin

March 1, 2021

Snowpack in the Upper Humboldt River Basin is below normal at 80% of median, compared to 94% last year. Precipitation in February was much above average, which brings the seasonal accumulation (Oct-Feb) to 82% of average. Soil moisture is at 27% saturation, compared to 43% last year. Forecast streamflow volumes range from 59% to 83% of average for the March-July period.



Upper Humboldt River Basin Streamflow Forecasts - March 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	11.3	22	30	73%	38	49	41
	APR-JUL	7.2	18.4	26	72%	34	45	36
Lamoille Ck nr Lamoille	MAR-JUL	14.5	21	25	83%	29	36	30
	APR-JUL	13.5	19.7	24	83%	28	35	29
NF Humboldt R at Devils Gate	MAR-JUL	3.8	18.8	29	74%	39	54	39
	APR-JUL	2.5	15.3	24	75%	33	46	32
Humboldt R nr Elko	MAR-JUL	6.7	59	94	59%	129	181	159
	APR-JUL	4	42	77	58%	112	164	133
SF Humboldt R ab Dixie Ck	MAR-JUL	15.4	42	60	83%	78	105	72
	APR-JUL	9.4	36	54	82%	72	99	66
Humboldt R nr Carlin	MAR-JUL	71	125	162	67%	199	255	242
	APR-JUL	40	97	136	66%	175	230	206
Humboldt R at Palisade	MAR-JUL	88	152	195	72%	240	300	270
	APR-JUL	52	116	159	71%	200	265	225

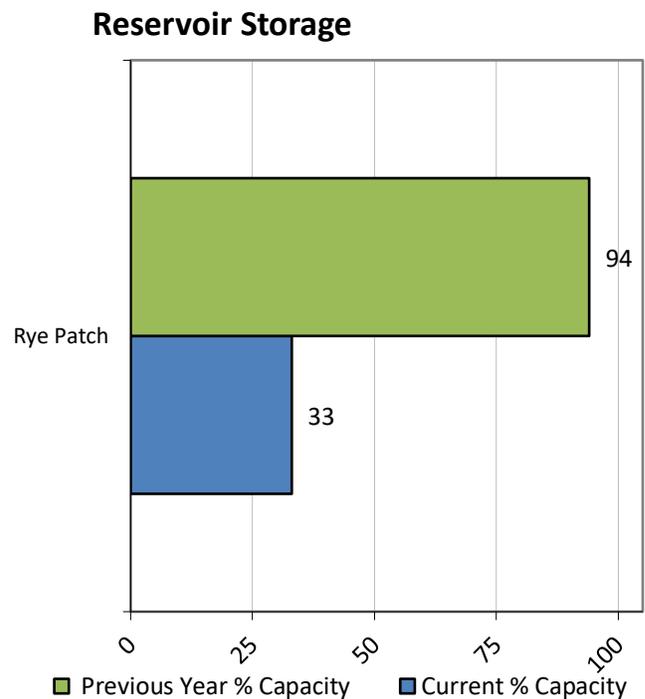
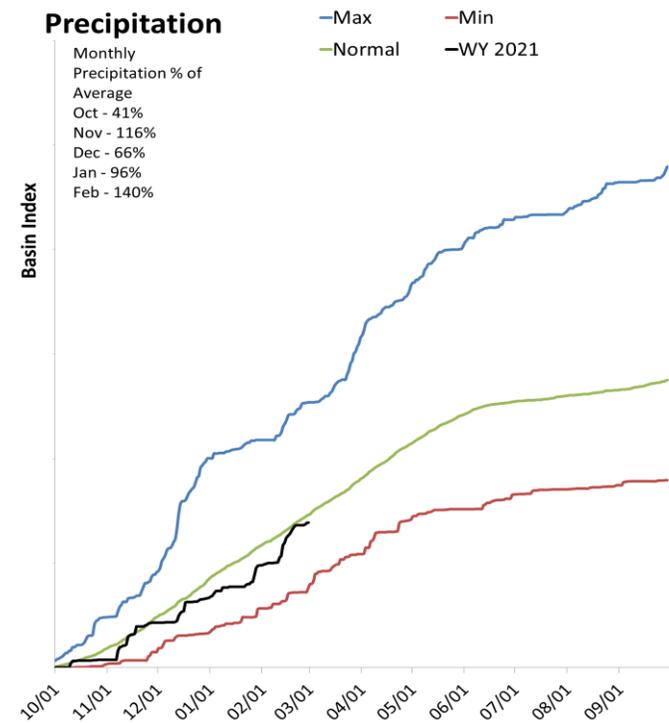
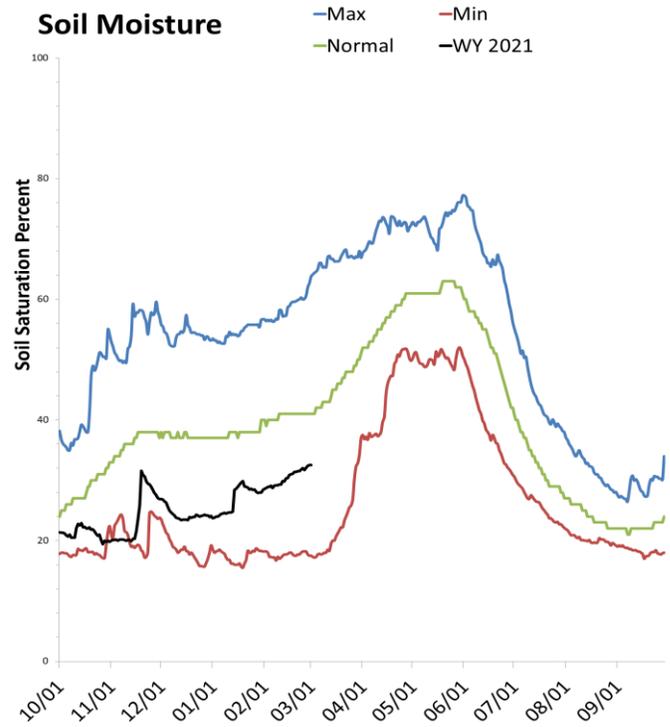
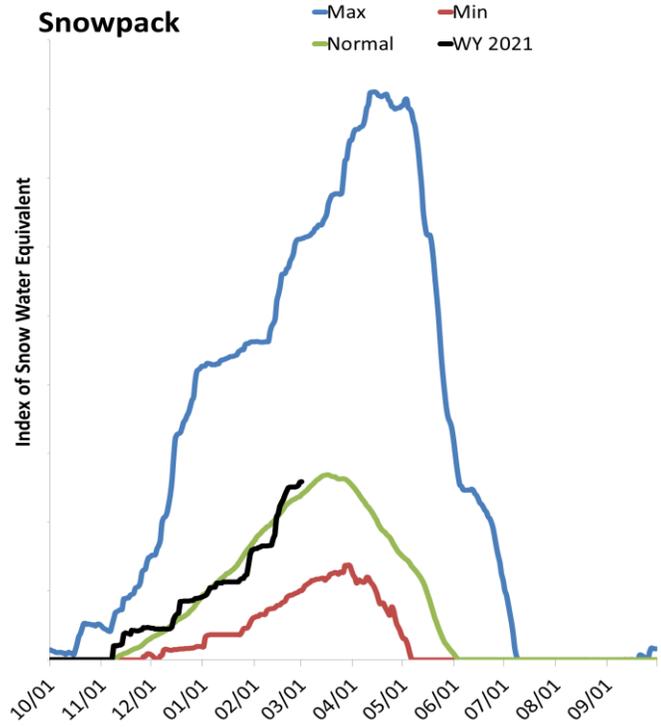
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
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- 3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Upper Humboldt River Basin	24	80%	94%
Mary's River	5	81%	101%
Lamoille Creek	3	83%	95%
North Fork Humboldt River	5	74%	101%
South Fork Humboldt River	8	88%	94%

Lower Humboldt River Basin

March 1, 2021

Snowpack in the Lower Humboldt River Basin is near normal at 101% of median, compared to 91% last year. Precipitation in February was much above average, which brings the seasonal accumulation (Oct-Feb) to 95% of average. Soil moisture is at 34% saturation, compared to 38% last year. Storage in Rye Patch Reservoir is 33% of capacity, compared to 94% last year. Forecast streamflow volumes range from 42% to 91% of average for the March-July period.



Lower Humboldt River Basin Streamflow Forecasts - March 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	8.8	14.5	18.4	68%	22	28	27
	APR-JUL	5.1	8.9	11.5	63%	14.1	17.9	18.2
Humboldt R at Comus	MAR-JUL	5.5	87	143	56%	199	280	255
	APR-JUL	6.4	58	106	50%	154	225	213
L Humboldt R nr Paradise Valley	MAR-JUL	0.63	4.4	8.8	84%	13.2	19.7	10.5
	APR-JUL	0.58	3.9	8.1	84%	12.3	18.6	9.7
Martin Ck nr Paradise Valley	MAR-JUL	5	13.9	20	91%	26	35	22
	APR-JUL	0.83	9.6	15.5	89%	21	30	17.5
Humboldt R nr Imlay	MAR-JUL	4.2	14.5	88	42%	162	270	209
	APR-JUL	1.78	14.2	68	38%	137	200	178

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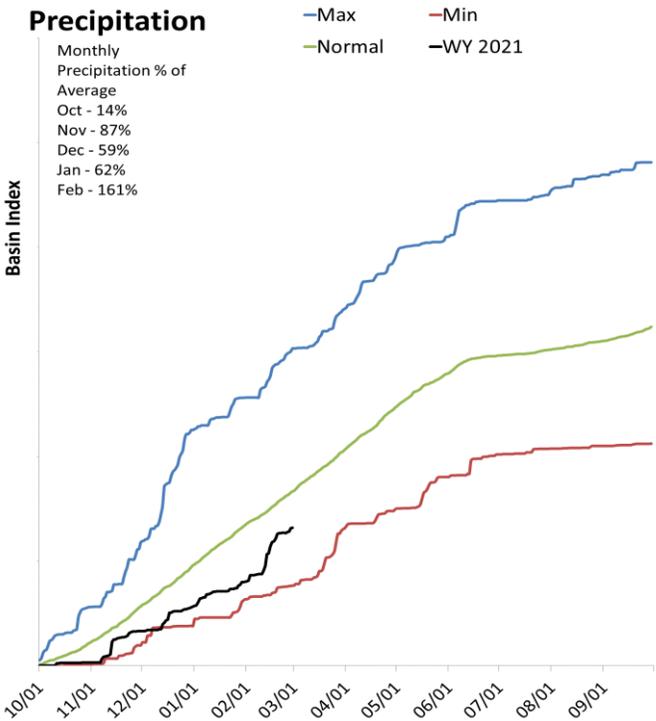
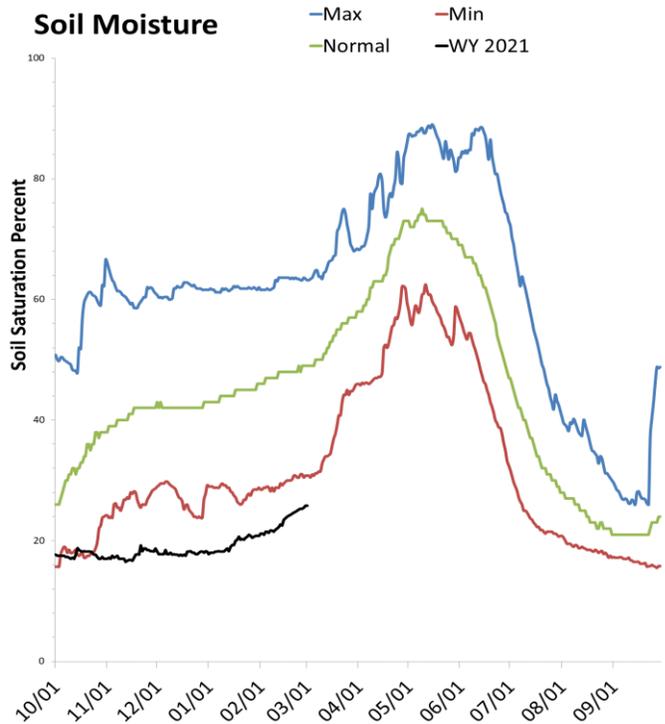
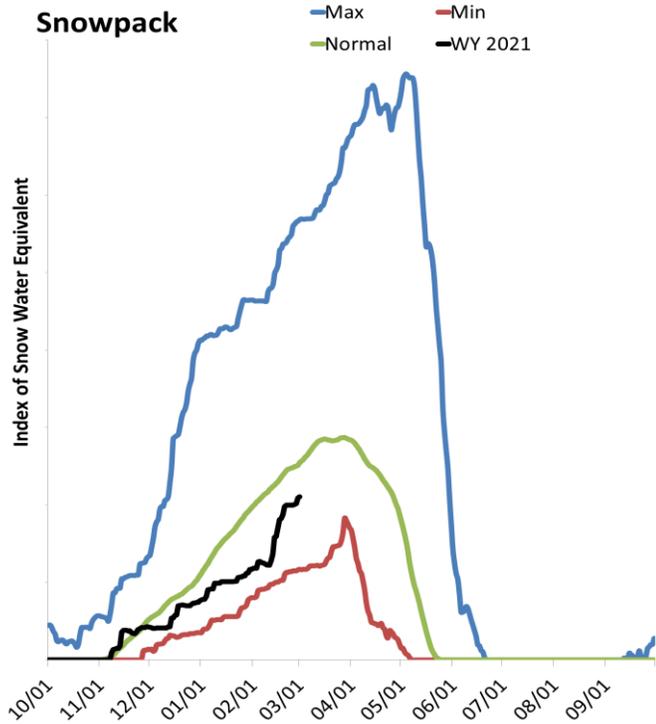
Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Rye Patch Re nr Rye Patch, NV	65.0	183.6	76.7	194.3
Basin-wide Total	65.0	183.6	76.7	194.3
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Lower Humboldt River Basin	7	101%	91%
Rock Creek	1	80%	103%
Reese River	2	112%	91%
Martin Creek	3	105%	94%
Little Humboldt River	5	96%	91%
Humboldt River above Imlay	31	85%	93%

Clover Valley & Franklin River Basin

March 1, 2021

Snowpack in the Clover Valley & Franklin River Basin is below normal at 76% of median. Precipitation in February was much above average, which brings the seasonal accumulation (Oct-Feb) to 79% of average. Soil moisture is at 26% saturation, compared to 43% 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

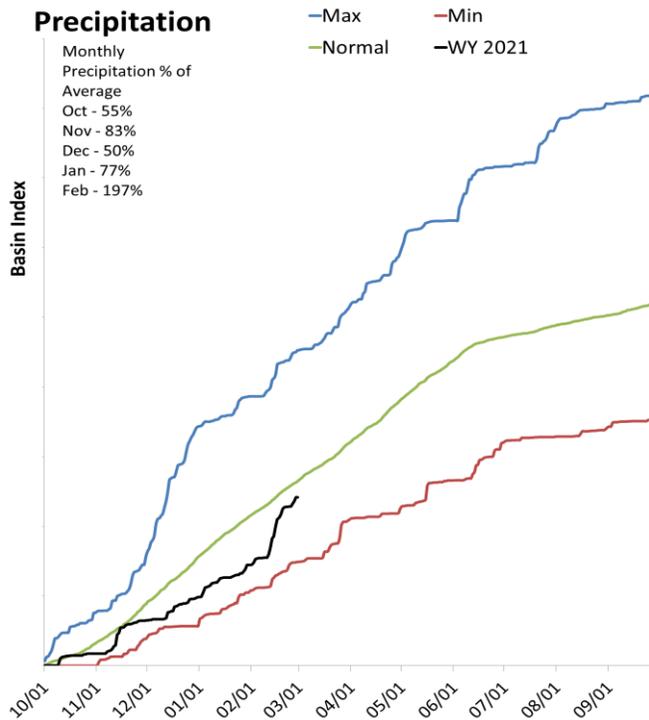
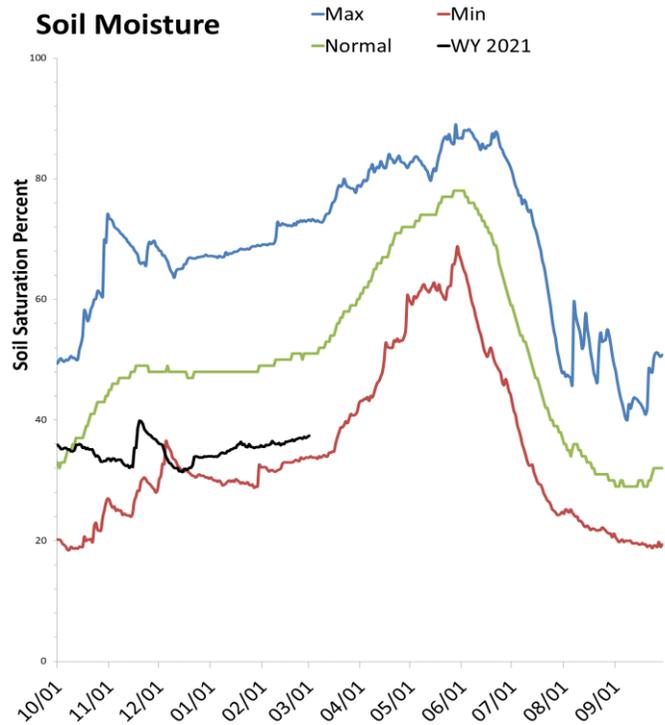
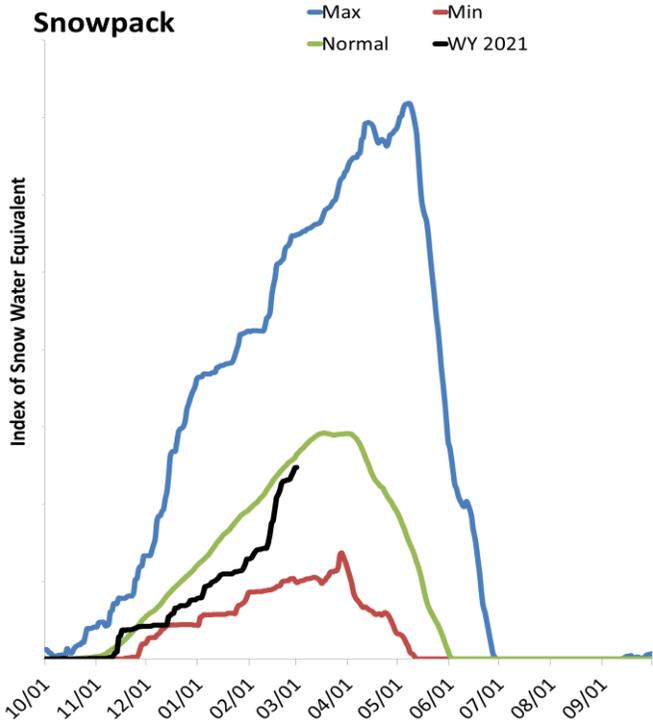
Clover Valley & Franklin River Basin - March 1, 2021

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Clover Valley & Franklin River Basin	10	76%	93%
Clover Valley	4	71%	109%
Franklin River	6	80%	89%

Snake River Basin

March 1, 2021

Snowpack in the Snake River Basin is near normal at 93% of median, compared to 113% last year. Precipitation in February was much above average, which brings the seasonal accumulation (Oct-Feb) to 91% of average. Soil moisture is at 30% saturation, compared to 42% last year. The forecast streamflow volume for Salmon Falls Creek is 74% of average for the March-July period.



Snake River Basin Streamflow Forecasts - March 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	34	49	60	74%	73	93	81
	MAR-SEP	36	51	63	74%	76	97	85

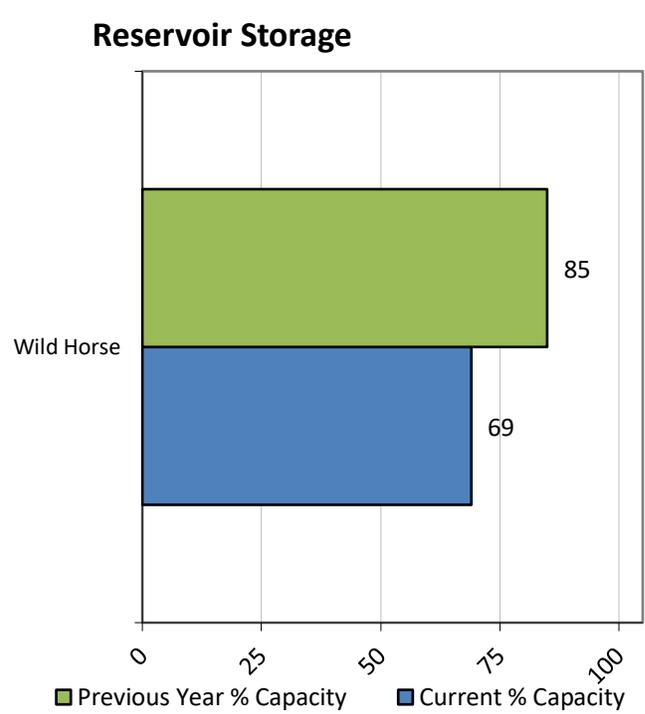
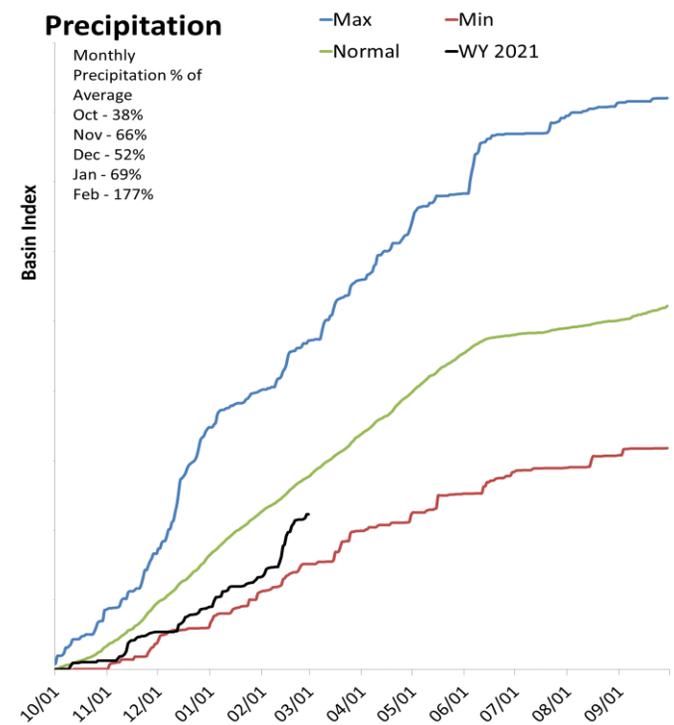
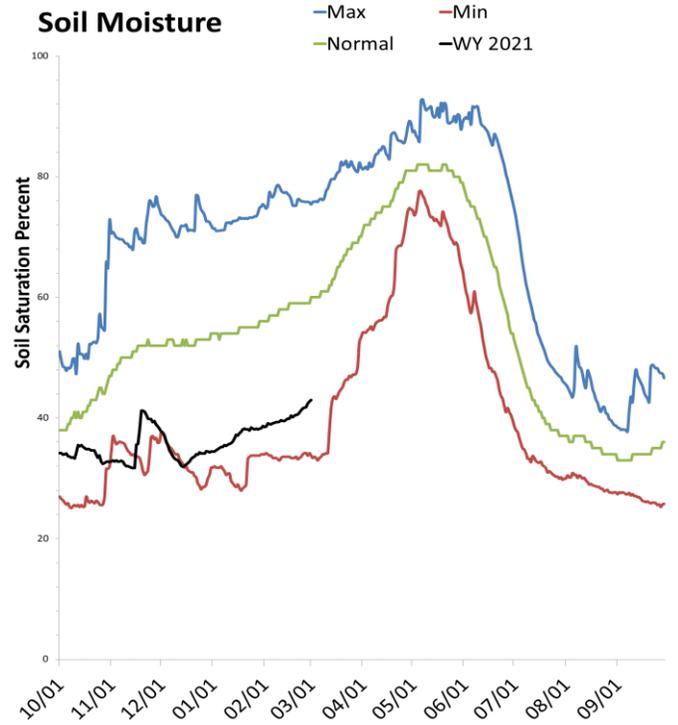
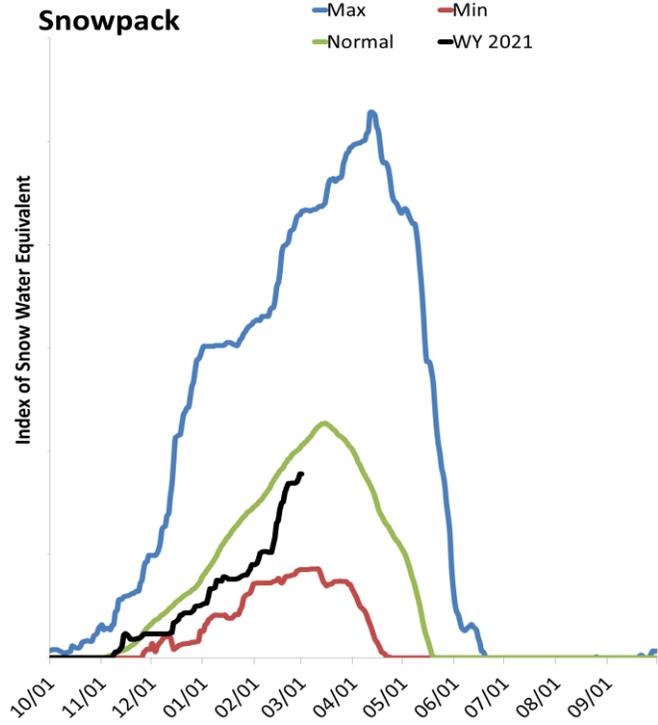
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- 3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Snake River Basin	14	93%	113%
Bruneau River	9	89%	106%
Bruneau Headwaters	6	83%	105%
Jarbidge River	3	94%	100%
Salmon Falls Creek	8	96%	112%

Owyhee River Basin

March 1, 2021

Snowpack in the Owyhee River Basin is below normal at 89% of median, compared to 118% last year. Precipitation in February was much above average, which brings the seasonal accumulation (Oct-Feb) to 81% of average. Soil moisture is at 38% saturation, compared to 48% last year. Storage in Wildhorse Reservoir is 69% of capacity, compared to 85% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 49% of average for the March-July period.



Owyhee River Basin Streamflow Forecasts - March 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	4.6	9.4	13.7	49%	18.7	28	28
	APR-JUL	1.16	4.9	9	41%	14.3	24	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

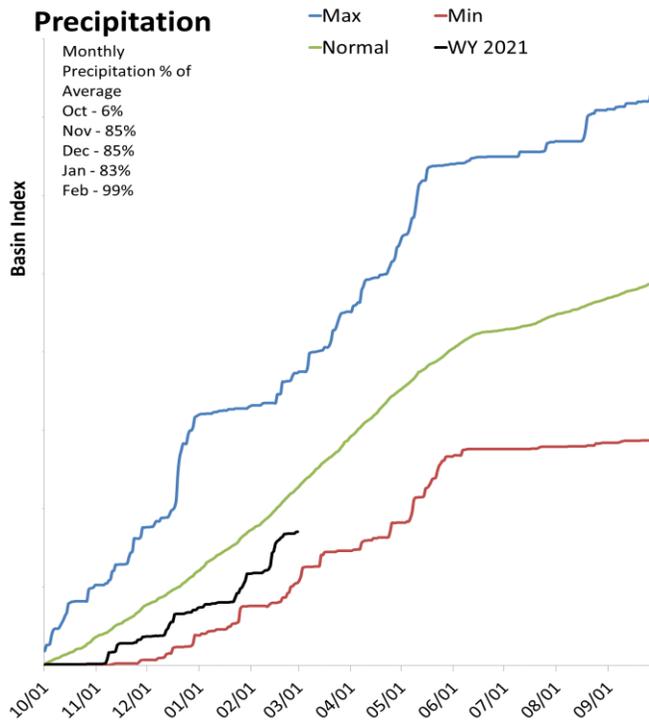
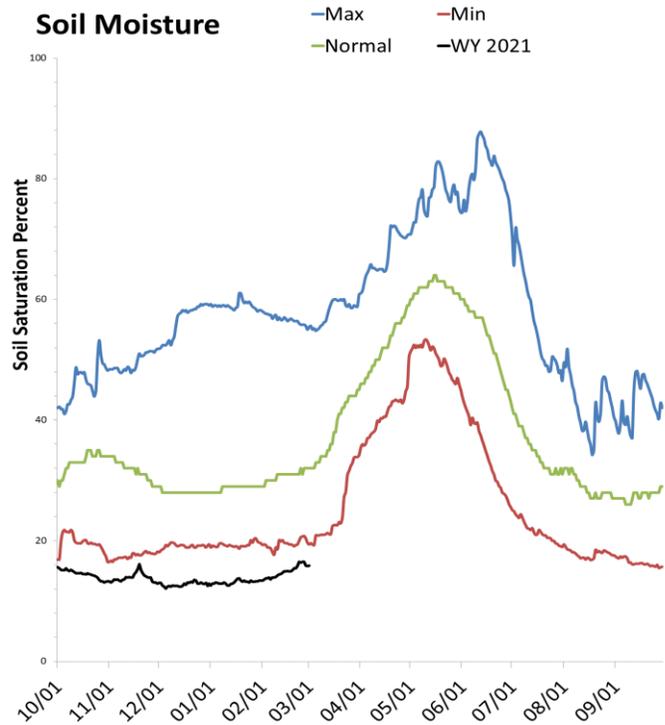
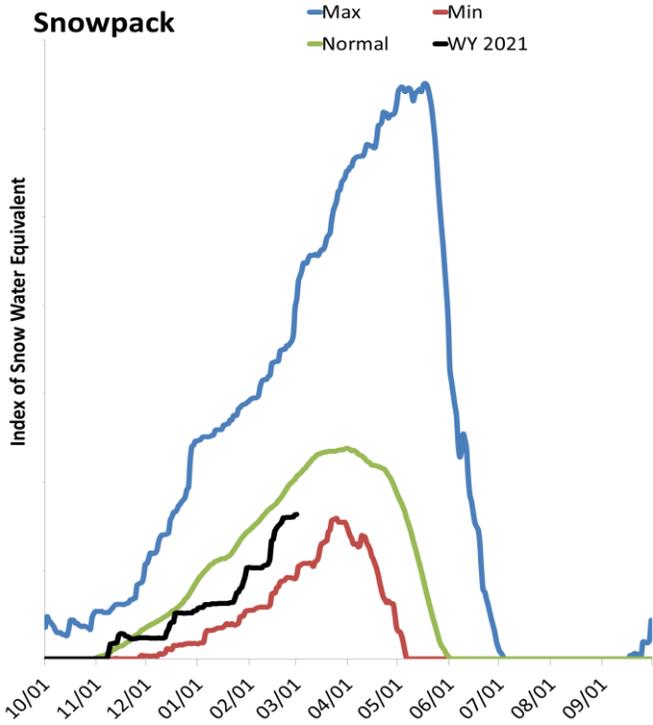
Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Wild Horse Reservoir	49.0	60.5	34.5	71.5
Basin-wide Total	49.0	60.5	34.5	71.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Owyhee River Basin	11	89%	118%
Owyhee River above Owyhee	8	89%	114%
Owyhee River above Gold Creek	4	87%	108%
South Fork Owyhee River	6	89%	113%

Eastern Nevada

March 1, 2021

Snowpack in the Eastern Nevada is much below normal at 69% of median, compared to 65% last year. Precipitation in February was near average, which brings the seasonal accumulation (Oct-Feb) to 75% of average. Soil moisture is at 17% saturation, compared to 24% last year. Forecast streamflow volumes range from 33% to 69% of average for the April-July period.



Eastern Nevada Streamflow Forecasts - March 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	0.75	1.67	2.5	69%	3.5	5.3	3.6
Step toe Ck nr Ely	APR-JUL	0.17	0.49	0.8	33%	1.19	1.89	2.4
Cleve Ck nr Ely	APR-JUL	0.59	1.28	1.9	43%	2.6	4	4.41
Lehman Ck nr Baker	APR-JUL	0.08	0.33	1	37%	1.67	2.7	2.72

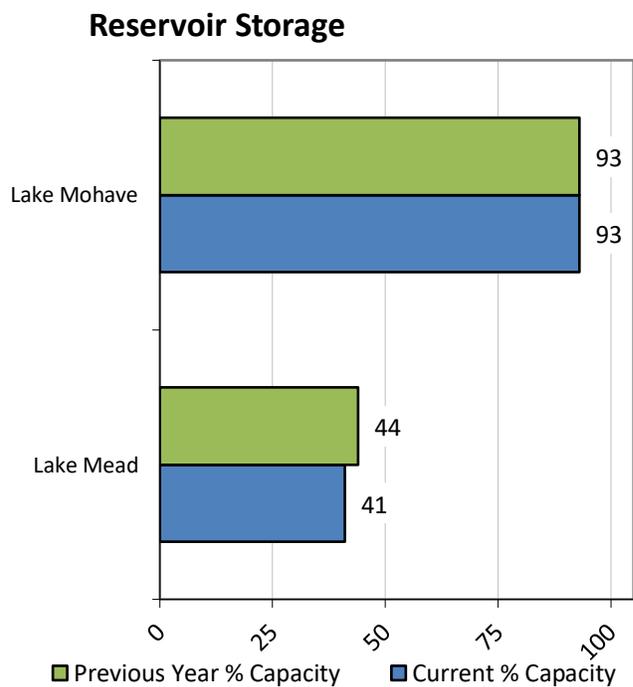
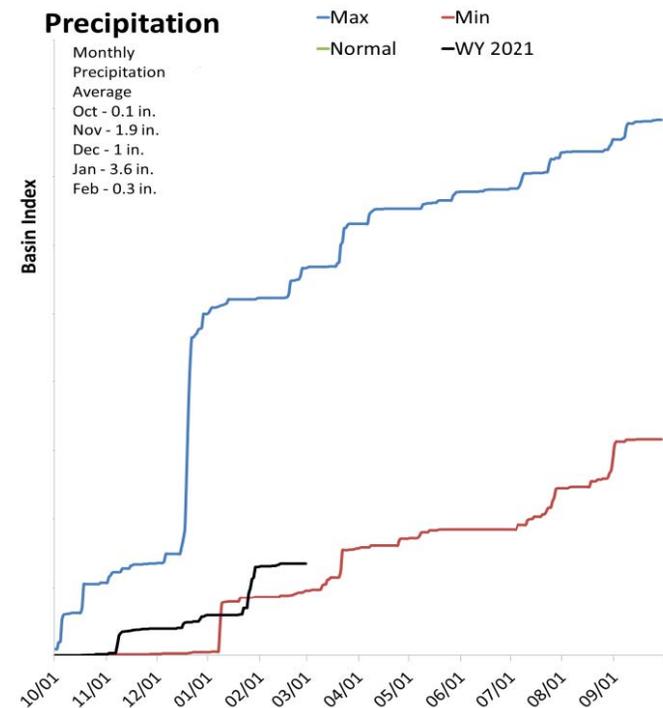
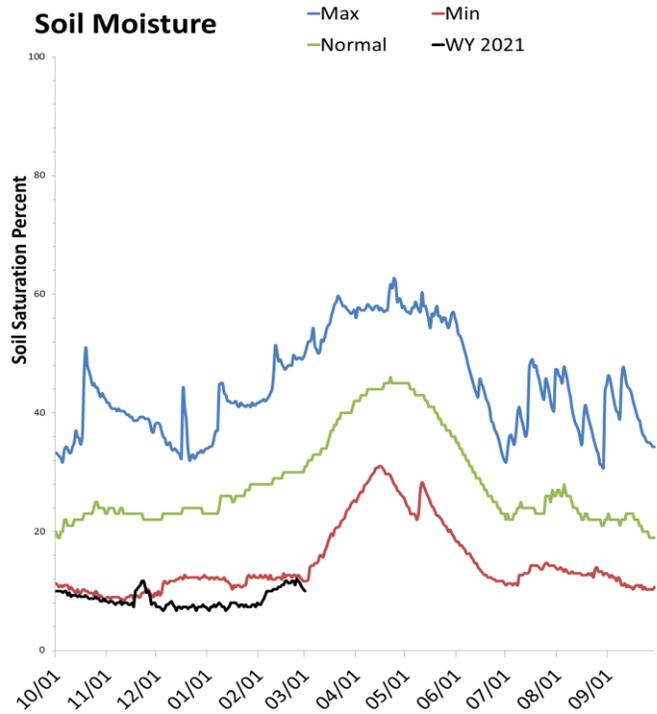
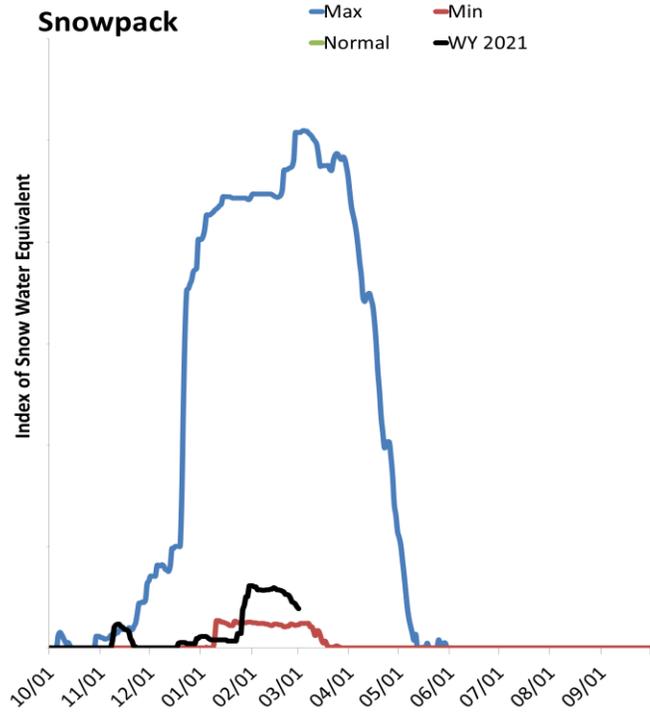
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Eastern Nevada	13	69%	65%
Kingston Creek	1	105%	84%
Step toe Valley	5	59%	68%
Baker & Lehman Creeks	3	65%	57%

Spring Mountains & Southern Nevada

March 1, 2021

Snowpack in the Spring Mountains is much below normal at 33% of median, compared to 48% last year based on snow course measurements. The average snow water content at SNOTEL sites in the Spring Mountains is 1.9 inch. Precipitation in February averaged 0.3 inches, which brings the average seasonal accumulation (Oct-Feb) to 6.8 inches. Soil moisture is at 10% saturation, compared to 26% last year. Storage in Lake Mead is 41% of capacity, compared to 44% last year. Lake Mohave storage is 93% of capacity, the same as last year at this time. The forecast streamflow volume for Lake Powell Inflow is 45% 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.

Spring Mountains & Southern Nevada Streamflow Forecasts - March 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	1.89	5.7	16.4	26%	35	62	63
Virgin R at Littlefield	APR-JUL	5.8	12.2	18.5	28%	27	42	65
Lake Powell Inflow ²	APR-JUL	1520	2450	3200	45%	4050	5490	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

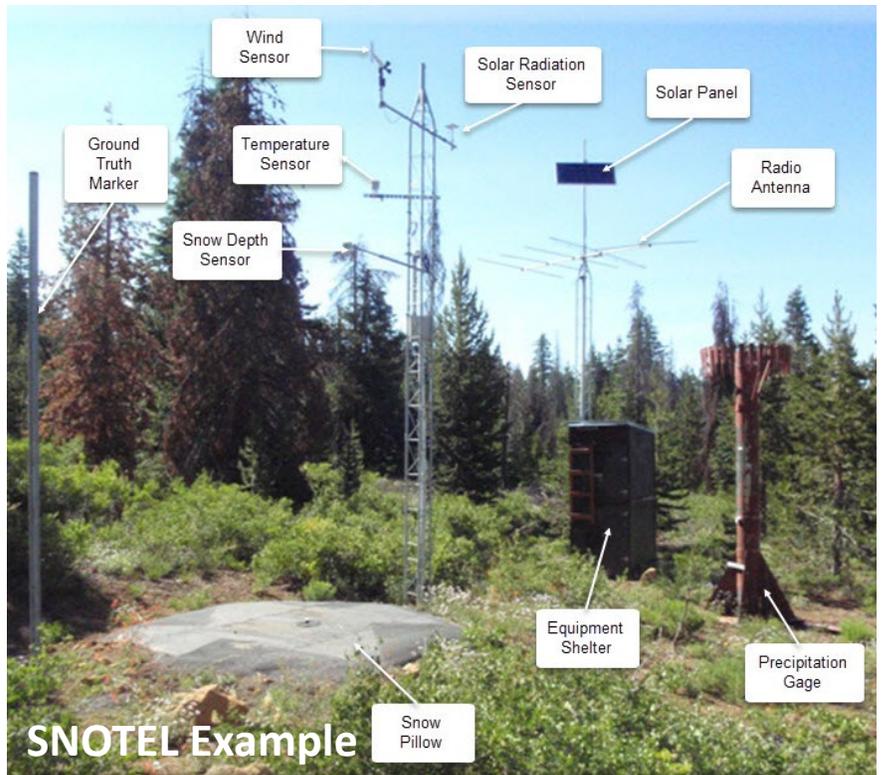
Reservoir Storage End of February, 2021	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	10622.0	11405.0	20575.0	26159.0
Lake Mohave	1689.0	1675.0	1673.0	1810.0
Basin-wide Total	1689.0	1675.0	1673.0	1810.0
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis March 1, 2021	# of Sites	% Median	Last Year % Median
Spring Mountains	3	33%	48%
White River	6	55%	59%
Virgin River	9	61%	104%
Colorado R above Glen Canyon Dam	105	83%	106%

Appendix - SNOTEL and Snow Course Overview

SNOTEL

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



SNOTEL Example

Snow Course

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



Snow Course Example

Sample points

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

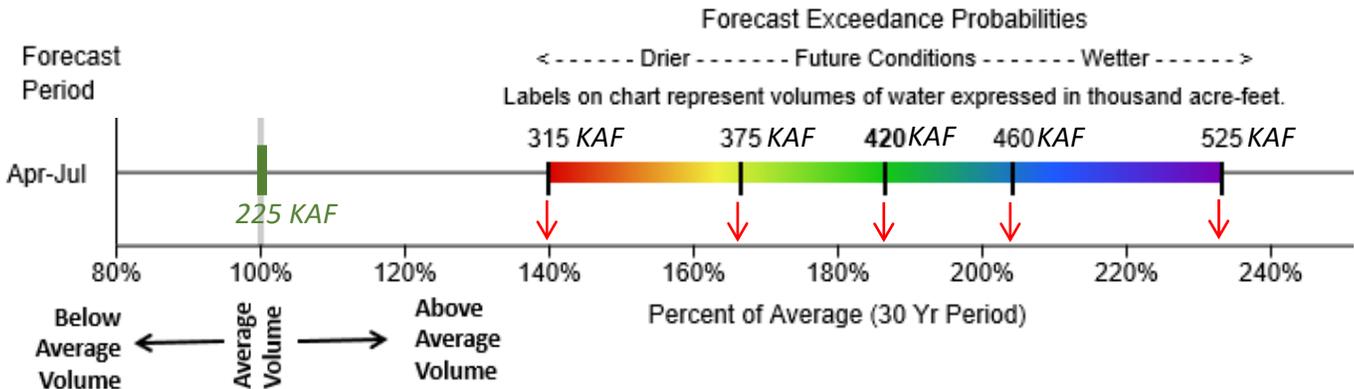
Appendix: Interpreting the Streamflow Forecast Chart

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.

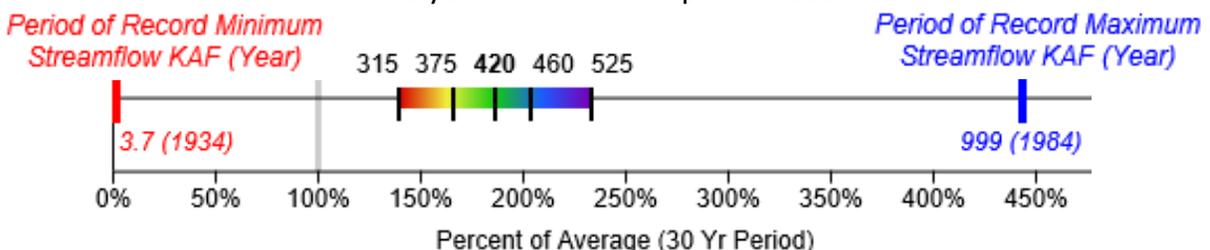


The numbers above the forecast bar are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of average can be estimated by looking at the horizontal axis. The green line and number centered above 100% on the horizontal axis represents the 1981-2010 historical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

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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/