

Natural Resources Conservation Service

Nevada Water Supply Outlook Report

January 1, 2017



Photo Credit: Jason Bean, Reno Gazette Journal

Truckee River in downtown Reno – December 10, 2016

Wet Start and More on the Way

It's been a wet start to the water year, putting Nevada's water supply in good shape as the heart of winter arrives. Statewide, water year to date precipitation is about 140% above average as of January 1. Heavy rain in mid-December sent the Truckee River in Reno to its highest flows since January 2006. The next large atmospheric river storm is forecast for January 7-9, this will bring more high flows to northwest Nevada and flooding is expected. Despite living in a desert, floods do occur in Nevada. This month marks the twentieth anniversary of the 1997 New Year's flood. See the attached video, produced by the National Weather Service, as you take in current news reports.

<https://www.youtube.com/watch?v=0bisSuBAvaQ>

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 at various points. The report is best read in digital format which allows readers to click on the blue internet links. Email jeff.anderson@nv.usda.gov to join a digital subscription list.

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 March 1 to July 31.**

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.

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.

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 of adjustments in this report follows:

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

Little Truckee River above Boca Reservoir (2) = Little Truckee R above Boca Reservoir, observed + Sierra Valley Diversion + Independence Lake storage change + Stampede Reservoir storage change

Truckee River at Farad (2) (externally adjusted by US Water Master) = Truckee River at Farad, obs – Lake Tahoe outflow + Sierra Valley Diversion + Donner Lake storage change + Martis Lake storage change + Prosser Reservoir storage change + Independence Lake storage change + Stampede Reservoir storage change + Boca Reservoir storage change

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)

“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 2006-2016.

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 1981-2016; for soil moisture the period is 2006-2016.

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>.

Nevada Water Supply Outlook Report

January 1, 2017

SUMMARY

Precipitation has been abundant since October, and lots more is on the way through early January. Significant gains have already been made this water year towards recovering from the 2012-2015 drought deficits. A complete recovery is unlikely this winter, but the [drought monitor comparison tool](#) shows that Nevada's status has improved from a year ago. Last year more than 30% of the state was in the extreme or exceptional drought categories; this year, eastern Nevada is out of drought status and the rest of the state has seen significant improvement. Rain storms set precipitation records for the month of October. More heavy rain in mid-December boosted Lake Tahoe above its natural rim and sent the Truckee River in Reno to its highest flows since January 2006. It was also the first year since 2011 that the Humboldt River near Imlay didn't dry up in late summer. As of January 1, all of northern Nevada is well above average for water year precipitation. January 1 snowpacks were below median values in the Sierra basins, but as of publication on January 6, those basins are now also above average. The rest of northern Nevada also has an above normal snowpack. Stormy weather during the first part of January boosted snow and precipitation percentages and lots more precipitation is forecast through the second week of the month. Near term forecasts are for a shift from snow to high elevation rain. This poses a flooding concern in northwestern Nevada. Lakes and reservoirs are storing more water than last year, although there is still lots of room to catch mid-winter runoff from the impending storm. January 1 streamflow forecasts range from 90-130% of average. These forecasts do not take into account any precipitation since the first of the year, so leaning toward the wetter forecasts (30% exceedance) may be appropriate.

SNOWPACK

January 1 snowpacks ranged from 62-91% of median in the Sierra, to 107-143% of median for the rest of the state. In the Sierra, January 1 snowpack percentages were highly dependent on elevation. Snow above 8,000 feet elevation was near to above median, while snow below 8,000 feet was only 50% of the median. This was due to more rain than snow below 8,000 feet. Storms through January 5, boosted snow below 8,000ft, but the incoming warm atmospheric river may melt much of this snow. Snow for the rest of Nevada, outside the Sierra has been consistently near to above median at all elevations based on SNOTEL measurements. Snow and precipitation percentages are changing rapidly in early January, check the most current [update report](#) for current conditions. Additionally, clicking on any of the graphs in the online .pdf version of this report will link you to an updated copy on the internet.

PRECIPITATION

As of January 1, water year to date precipitation was well above normal across northern Nevada ranging from 163% of average in the Lake Tahoe Basin to 111% in eastern Nevada. Most basins have had 130% of average amounts or more. October was a month for the record books, particularly in the Sierra basins, with three to five times the normal October precipitation. Other parts of Nevada, including the Humboldt, Snake and Owyhee basins, saw more than twice normal October amounts. October is not generally very wet compared to winter months, however this year most SNOTELs in the Sierra received

7-8 inches and Ward Creek #3 on the west side of Lake Tahoe, collected nearly 20 inches of water. These amounts outpace January's monthly averages. Moisture-wise, these basins scored the equivalent of an extra month of winter in October. Even though November precipitation was below normal, December was again above average. Precipitation from October through January 1 totaled 40-55% of average annual totals in most basins, while the storms through January 5 bumped that range to 45-70%. Based on climate averages, we still have the three wettest months of the year ahead of us. This puts Nevada in good shape to possibly have a much wetter than average water year in 2017.

SOIL MOISTURE

Soil moisture has improved substantially from summer lows. December rains increased soil saturation to new maximums for December in many basins based on the [basin soil moisture graphs](#).

RESERVOIRS

Reservoir storage is much better than last January in northern Nevada, however room exists to store a lot more water. Lake Tahoe's water surface elevation reached its natural rim on December 10, last year this mark wasn't achieved until April 9. From this point forward Tahoe can continue to fill its six feet of useable storage. In the Truckee basin, combined storage is 49% of capacity, 84% of average; last January 1 storage was 19% of capacity, 33% of average. Lahontan Reservoir is 24% of capacity, 56% of average, last January storage was only 4% of capacity, 10% of average. In the Walker basin, combined storage is 46% of capacity, 129% of average; last January 1 storage was 15% of capacity, 43% of average. Rye Patch Reservoir is 8% of capacity, 21% of average, last January storage was only 5% of capacity, 15% of average. It's looking like summer reservoir storage will be significantly better than last year up north, how much better will be determined by our weather in the coming months. Down south Lake Mohave and Lake Mead are currently storing less water than last year.

STREAMFLOW FORECASTS

Streamflow forecasts for January 1 range from 90-120% of average for most of the region. The Owyhee River near Gold Creek is slightly higher at 132%. These 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, and assumes average precipitation in the future. There is however, a 50% chance of more streamflow occurring if future conditions are wet, and conversing, a 50% chance of less streamflow occurring if the future weather is dry. In January, forecast skill is lower than in later months. This is demonstrated by a large range in streamflow water volumes between the 10%, 30%, 50%, 70%, and 90% exceedances. Forecast skill increases as the winter progresses, primarily because a greater portion of the future weather conditions become known. This increase in skill is reflected by a narrowing of the range around the 50% exceedance forecast.

It's wise to consider the entire range of exceedances when looking at a forecast. This is true even when April 1 forecasts become available. Last summer's streamflow provides a good example to learn from. Dry spring weather, combined with persistent drought effects, resulted in actual streamflow falling short of the 50% exceedance forecasts issued on April 1. A [forecast review](#) on our website, illustrates that over half the forecasted streams (19 out of 37) experienced actual flows between the 70% and 90% exceedance levels, while another six streams had actual flows less than the 90% exceedance level. This

kind of year causes water users frustration, as allotment numbers are often reduced as the season goes on. In addition to below normal precipitation between April and July, lingering drought effects, like reduced base flow and depleted streambank storage, likely also played a part reducing runoff efficiency. Forecast statistics dictate that there is a one in ten chance that actual flows will not meet that 90% exceedance level under extreme conditions. Considering this year's forecasts, water users that depend on the Sierra should keep an eye on the elevational gradient of the snowpack percentages. Having a good snowpack all the way up our mountains is critical to maintaining streamflow throughout the summer, especially for streams without the benefit of reservoir storage to supplement flows.

UPCOMING EVENTS

Northern Nevada Streamflow, Weather and Reservoir Forecast Meeting

The public is invited to attend presentations by the NRCS, NWS, USBOR regarding the 2017 streamflow, precipitation and reservoir forecasts for the Truckee, Carson, Walker, and Humboldt rivers.

When: TBD - Contact Reed Cozens rcozens@water.nv.gov or 775-684-2816 for more information

Where: Nevada Division of Water Resources; 901 S. Stewart Street Suite 2002, Carson City, NV

Humboldt River Basin Water Authority (HRBWA) Meeting

NRCS will provide a snowpack update and water supply information.

When: Friday, February 17, 2017

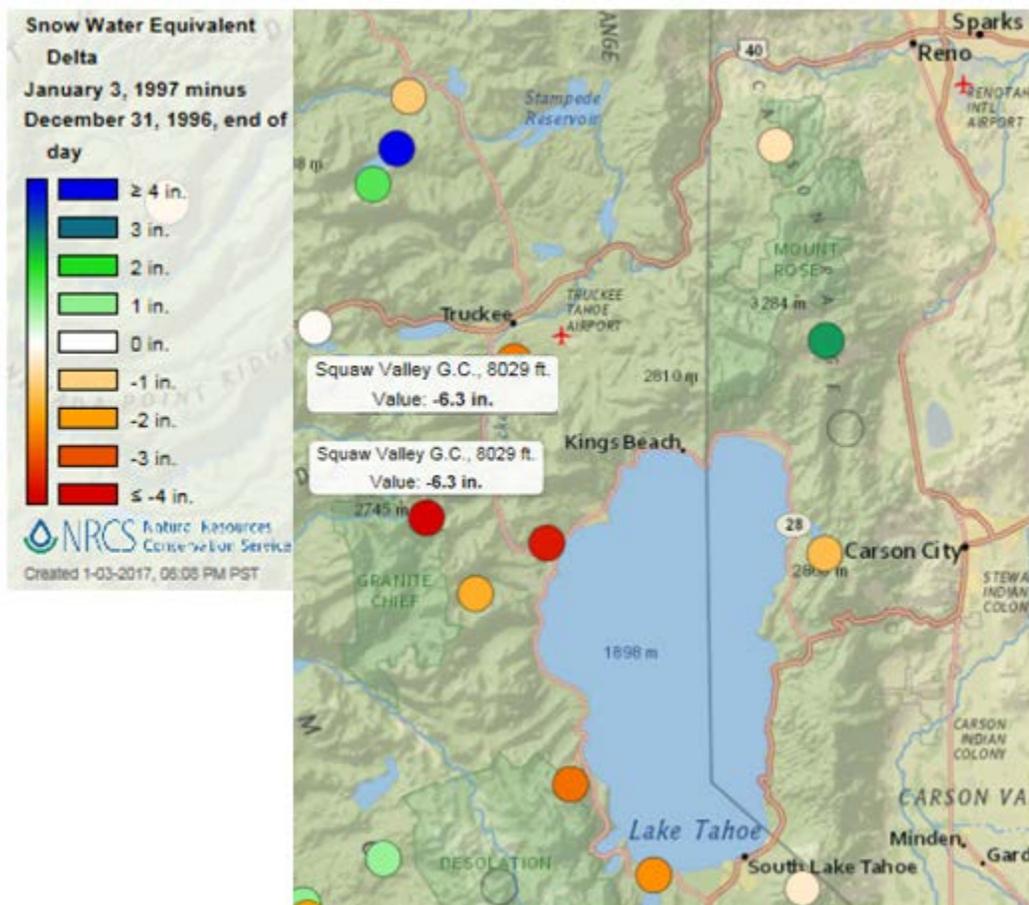
Where: Winnemucca Inn, 741 W Winnemucca Blvd, Winnemucca, NV 89445

Western Snow Conference, April 17-20, 2017, Boise, ID <http://www.westernsnowconference.org>

This year is a joint meeting with the Weather Modification Association.

NEW SNOW SURVEY PRODUCTS

[Interactive Map 3.0 Beta Version](#): The NRCS National Water and Climate center released a new beta version of the interactive conditions map in December. During the beta testing phase, users are encouraged to evaluate, and provide feedback, on the new features and capabilities of the release. There are new elements, a "Basin View" mode, new data display options, and the ability to create links that will always display "current" conditions. New elements include: snow density; a delta function for snow water equivalent, snow depth, and reservoir storage; water year peak data for snow water equivalent, snow depth and date of water year peak; and streamflow volume forecasts for any publication date and target period. For assistance using this new product please contact the Nevada Snow Survey. The previous version of the interactive map also continues to be available, as well as, the Nevada specific [Conditions Links](#) page created last year.

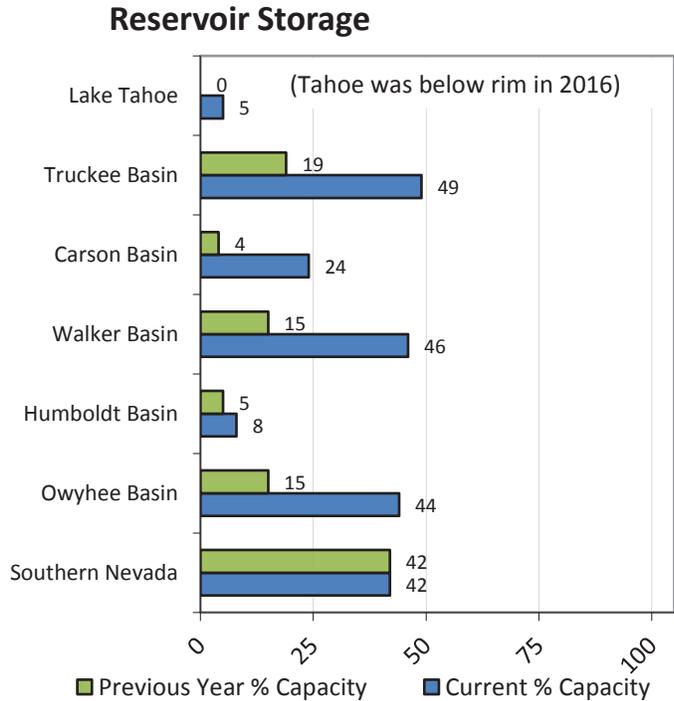
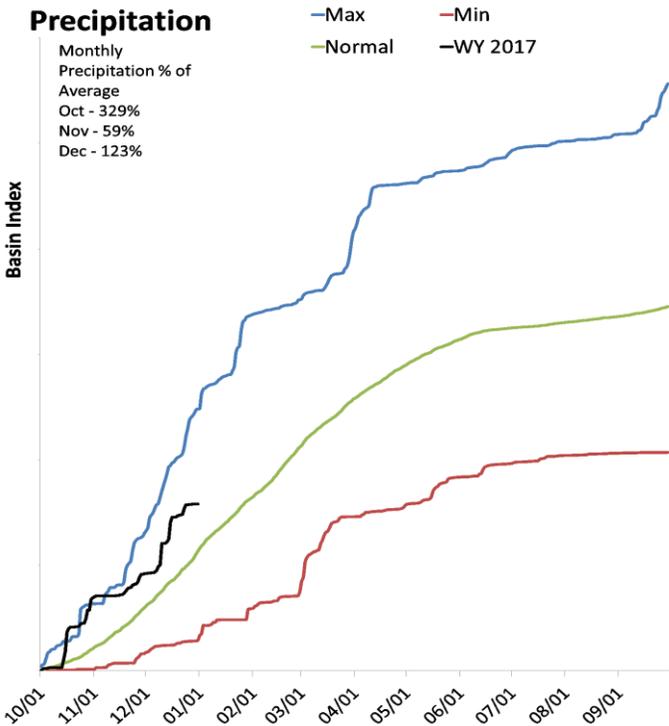
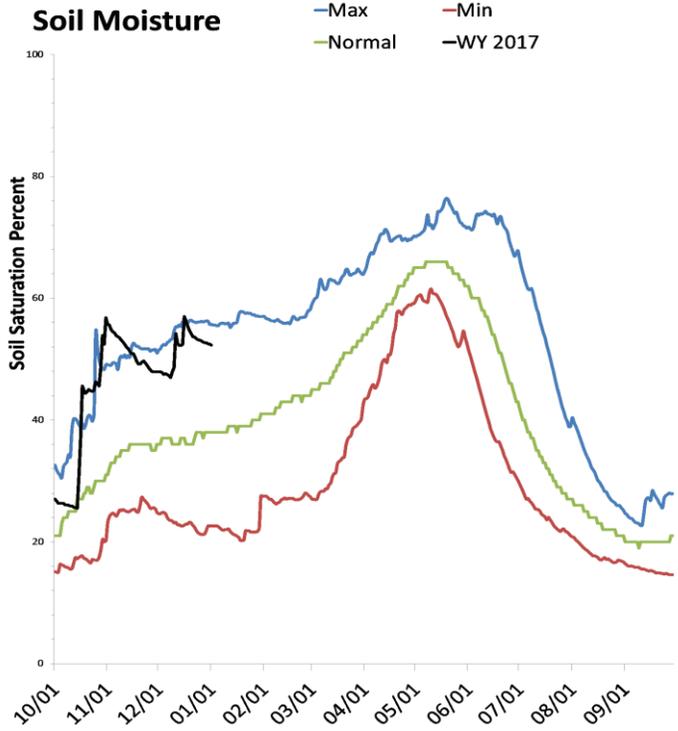
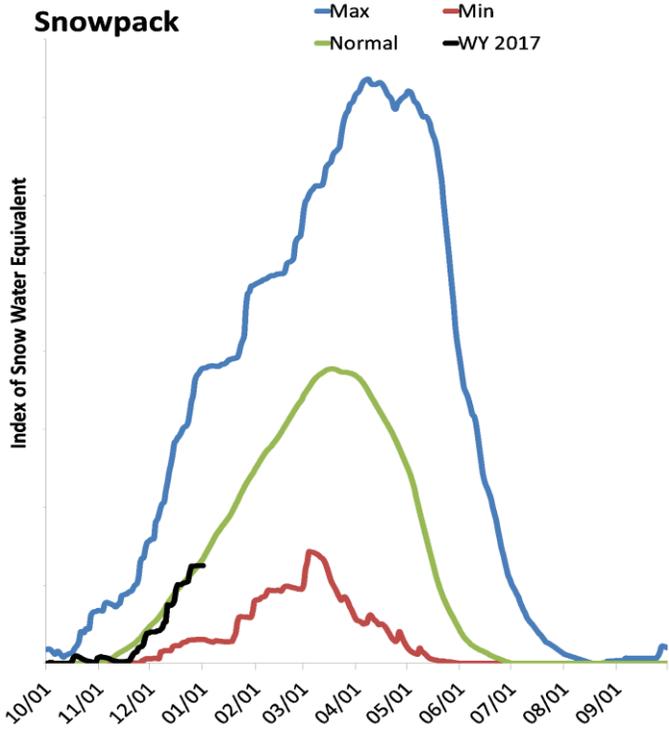


Above is an [example](#) of the new snow water equivalent delta function from Interactive Map 3.0 for the New Year's 1997 flood event. During that event Squaw Valley GC SNOTEL had 6.3 inches of snow water melt. This combined with 13.2 inches of rain over the same three day period, produced a total of 19.5 inches of runoff in 3 days!

State of Nevada & Eastern Sierra

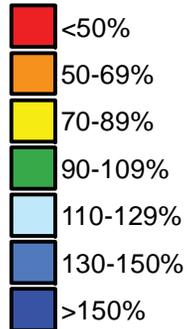
January 1, 2017

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is near normal at 95% of median, compared to 154% last year. Precipitation in December was above average, which brings the seasonal accumulation (Oct-Dec) to 142% of average. Soil moisture is at 52% saturation, compared to 48% last year. Reservoir storage ranges from 5% of capacity in Lake Tahoe to 49% of capacity in the Truckee Basin.

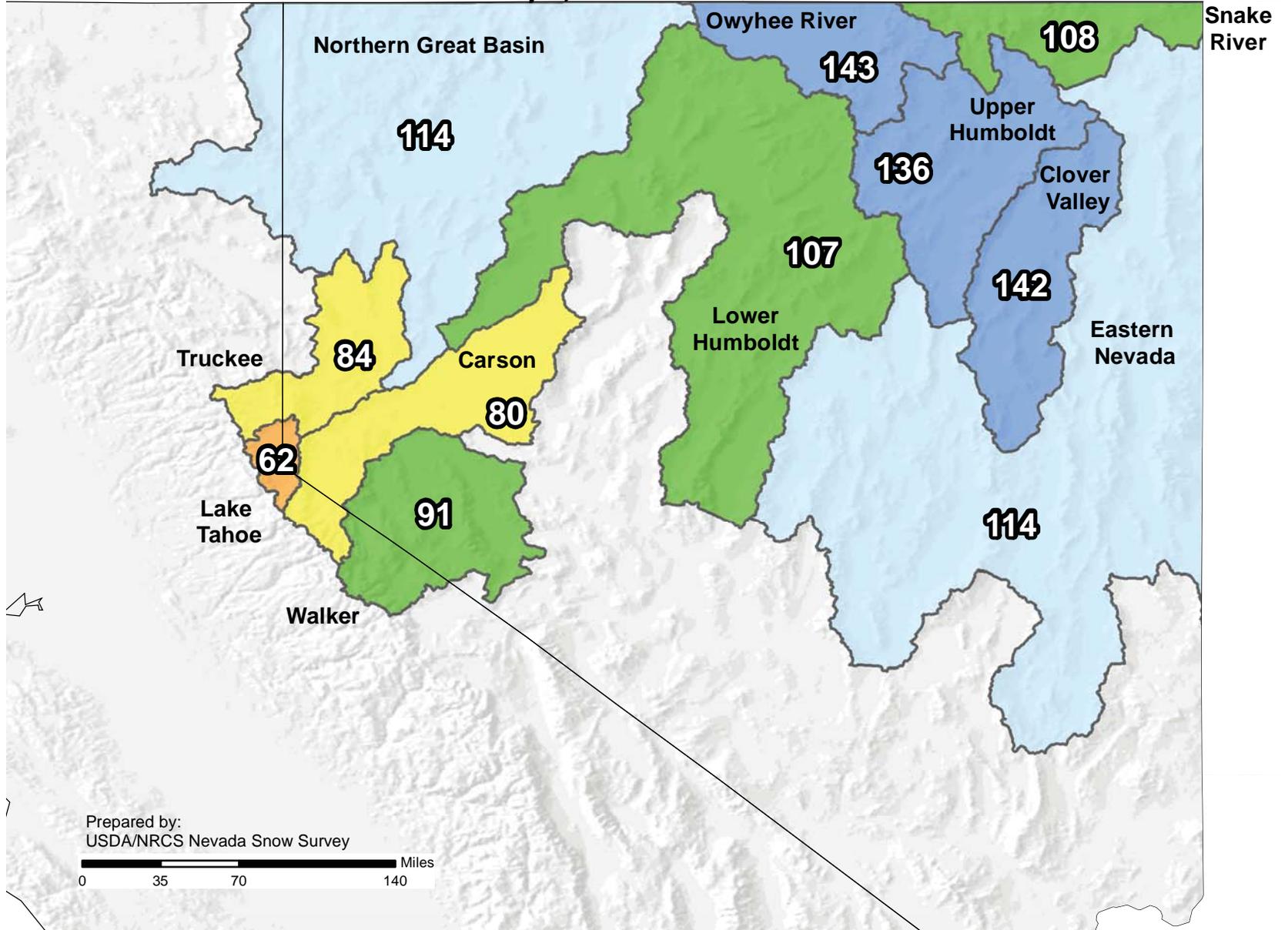


Nevada & Eastern Sierra Percent of Median Snowpack January 1, 2017

1st of Month Snow
Water Equivalent
Basin-wide Percent
of 1981-2010 Median



*Provisional data
subject to revision*



Prepared by:
USDA/NRCS Nevada Snow Survey

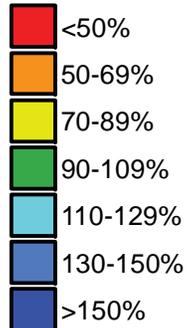


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Map data based on the first of month snow water equivalent found at selected SNOTEL and snow course sites in or near the basin compared to the median value for those sites. SNOTEL data based on the first reading of the day (typically midnight). Snow course data based on measurements taken within the last 5 days of preceding month. A table based, station-by-station, report of the underlying data can be found by selecting "Nevada" and report type "Snowpack" for the date listed above on the following webpage: <http://www.wcc.nrcs.usda.gov/basin.html>.

Nevada & Eastern Sierra Water Year to Date Precipitation October 1, 2016 through January 1, 2017

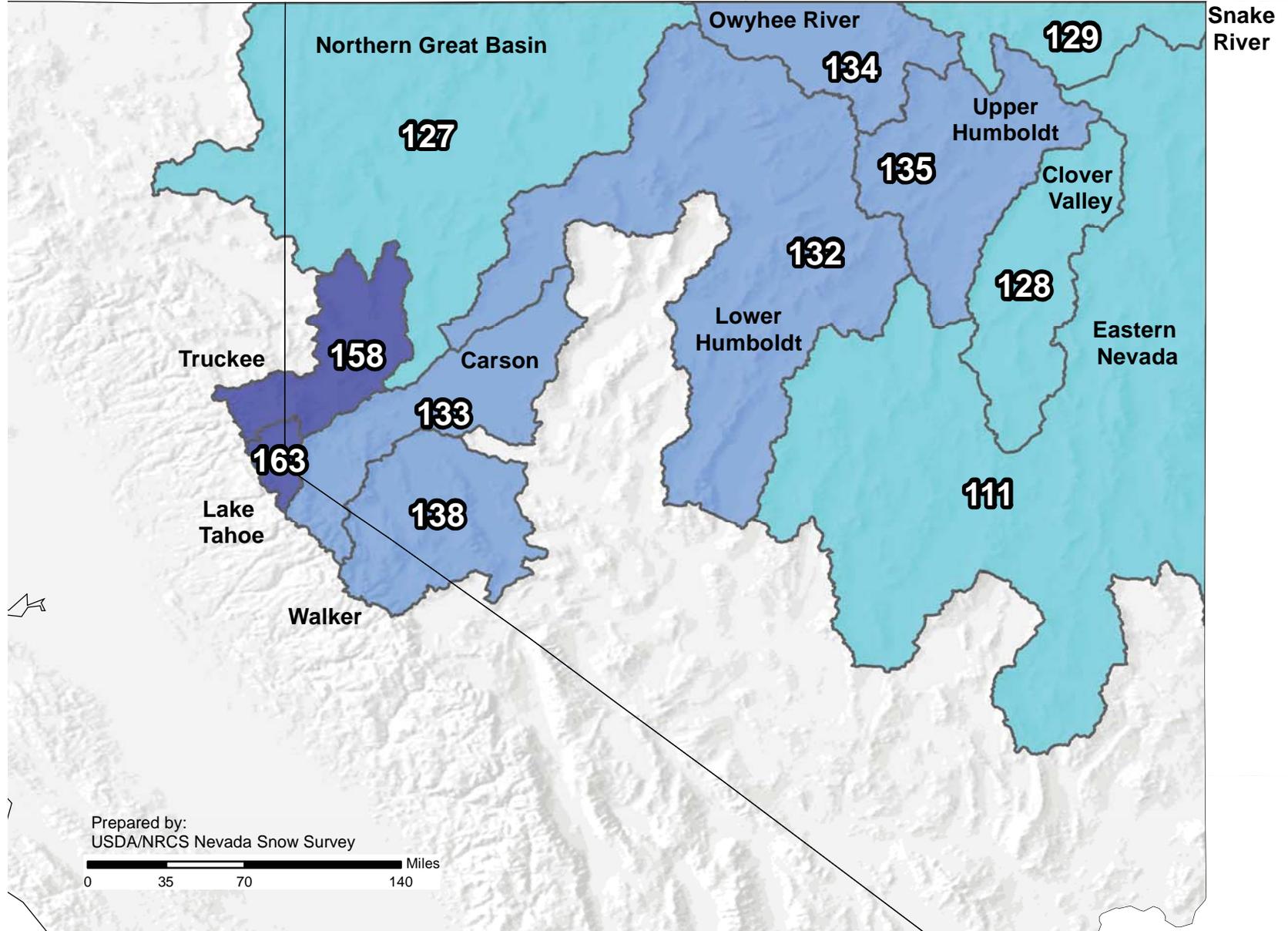
Basin-wide
Water Year
Precipitation to Date
as a Percent of
the 1981-2010 Average



*Provisional data
subject to revision*



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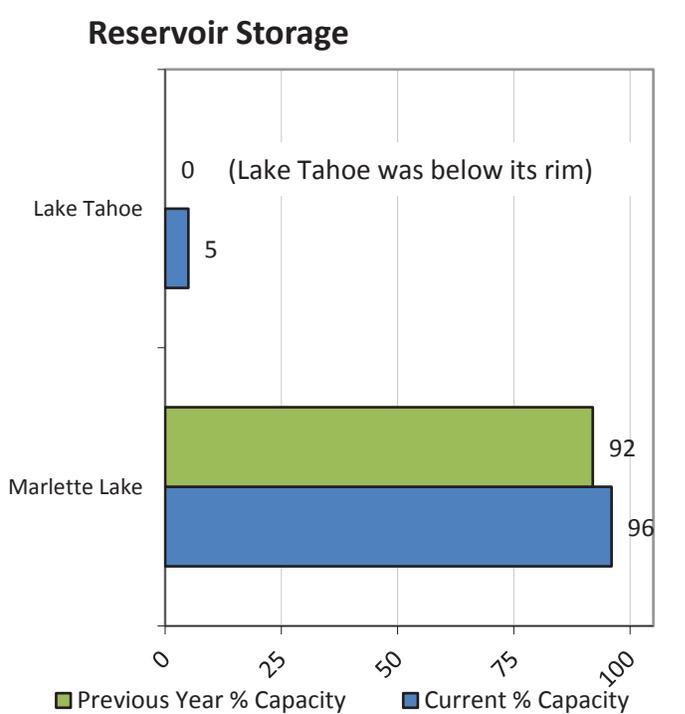
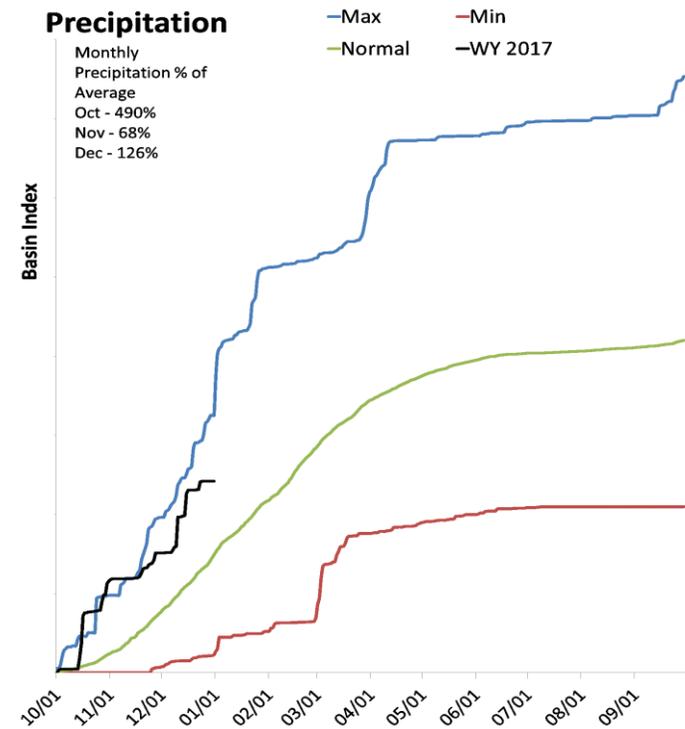
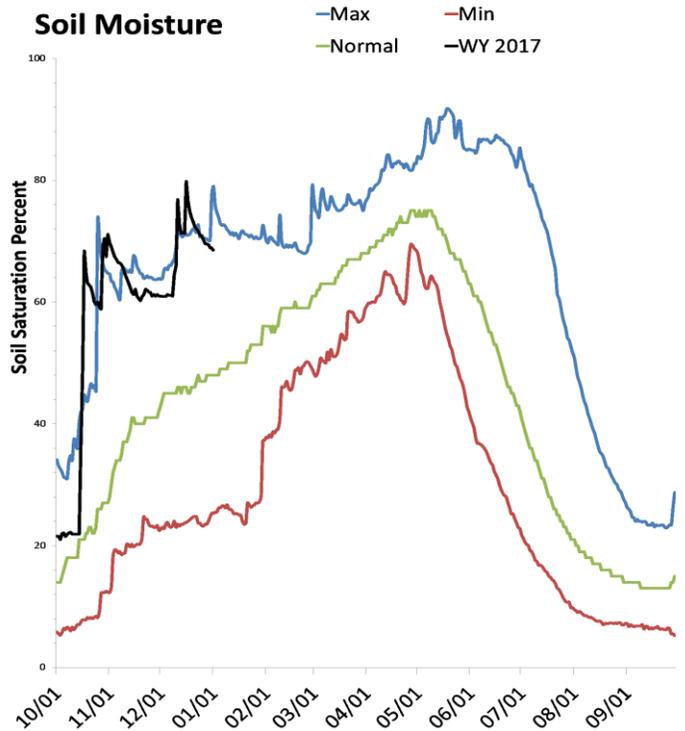
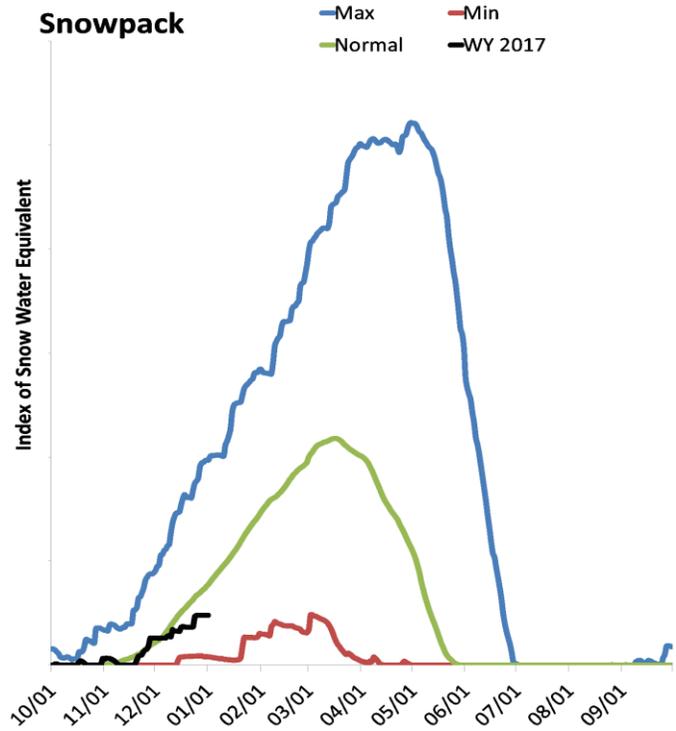
Prepared by:
USDA/NRCS Nevada Snow Survey

Map data based water year to date precipitation for the first of the month at selected SNOTEL sites in or near the basin compared to the average value for those sites. SNOTEL data based on the first reading of the day (typically midnight). A table based, station-by-station, report of the underlying data can be found by selecting "Nevada" and report type "Precipitation" for the date listed above on the following webpage: <http://www.wcc.nrcs.usda.gov/basin.html>.

Lake Tahoe Basin

January 1, 2017

Snowpack in the Lake Tahoe Basin is much below normal at 62% of median, compared to 155% last year. Precipitation in December was above average, which brings the seasonal accumulation (Oct-Dec) to 163% of average. Soil moisture is at 68% saturation, compared to 57% last year. Lake Tahoe's water elevation is 6223.32 ft, which is 0.32 ft above the lake's natural rim and equals a storage of 39 thousand acre-feet. Last year its elevation was 6221.61 ft which equaled a storage deficit of 168 thousand acre-feet. Lake Tahoe is forecast to rise 2.5 feet from October 1 to its highest elevation.



**Lake Tahoe Basin
Streamflow Forecasts - January 1, 2017**

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

| Lake Tahoe Basin | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|---|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Marlette Lake Inflow ² | MAR-JUL | -90 | 620 | 1110 | 100% | 1600 | 2300 | 1110 |
| | APR-JUL | -230 | 410 | 840 | 101% | 1270 | 1900 | 830 |
| Lake Tahoe Rise Gates Closed ¹ | OCT-HIGH | 0.157 | 1.69 | 2.5 | 112% | 3.3 | 5.1 | 2.24 |
| | MAR-HIGH | 0.66 | 1.45 | 1.8 | 104% | 2.2 | 2.9 | 1.73 |
| | APR-HIGH | 0.5 | 1.1 | 1.3 | 99% | 1.5 | 2.1 | 1.31 |

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

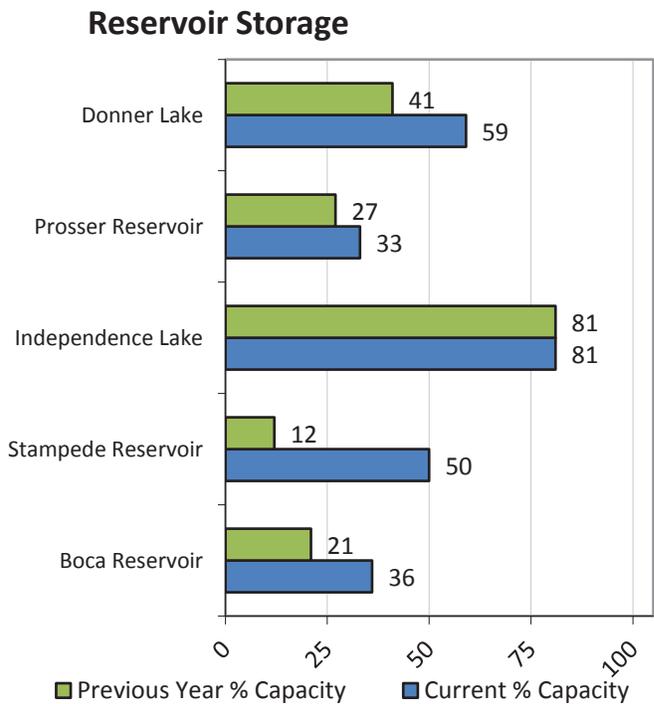
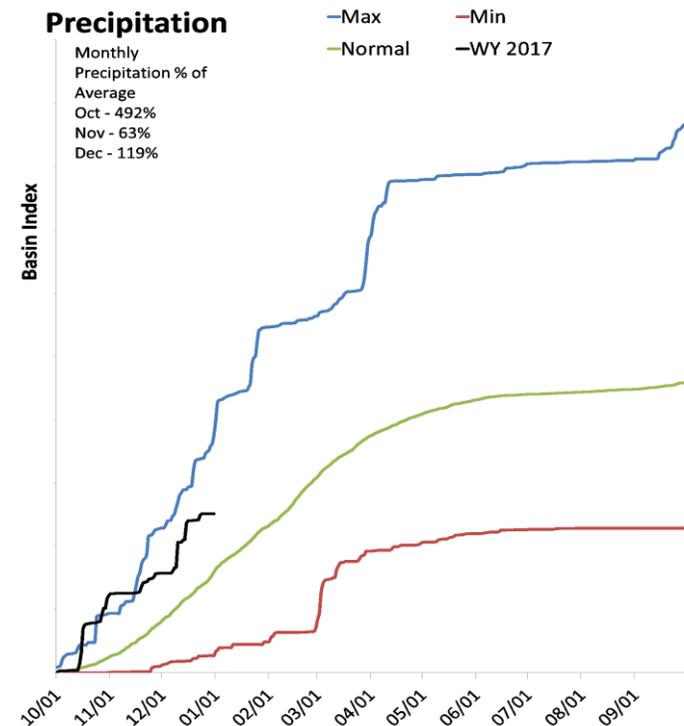
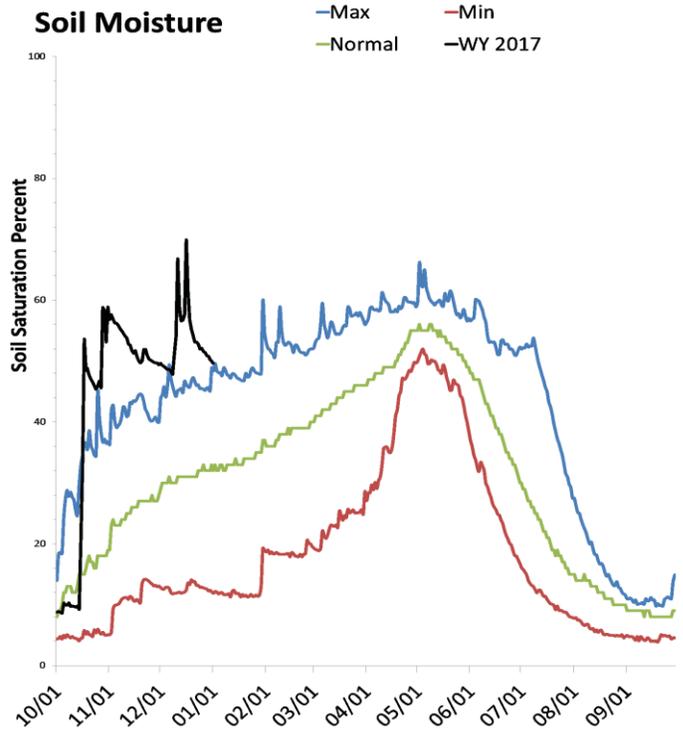
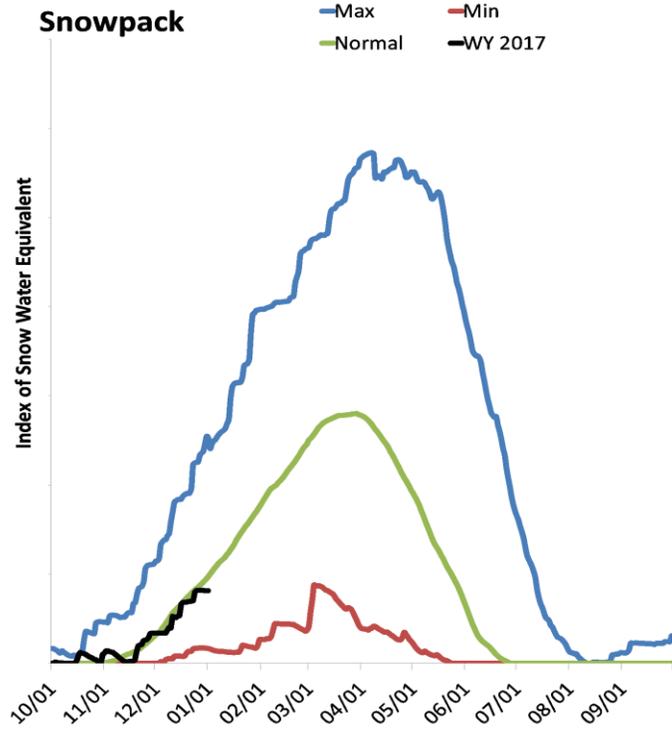
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Lake Tahoe | 38.8 | 0.0 | 262.1 | 744.6 |
| Marlette Lk nr Carson City, NV | 11.3 | 10.9 | 11.7 | 11.8 |
| Basin-wide Total | 50.1 | 10.9 | 273.8 | 756.4 |
| # of reservoirs | 2 | 2 | 2 | 2 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Lake Tahoe Basin | 9 | 62% | 155% |

Truckee River Basin

January 1, 2017

Snowpack in the Truckee River Basin is below normal at 84% of median, compared to 118% last year. Precipitation in December was above average, which brings the seasonal accumulation (Oct-Dec) to 158% of average. Soil moisture is at 50% saturation, compared to 45% last year. Combined reservoir storage is 49% of capacity, compared to 19% last year. Forecast streamflow volumes range from 91% to 124% of average.



Truckee River Basin Streamflow Forecasts - January 1, 2017

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) |
|--|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Sagehen Ck nr Truckee | MAR-JUL | 2.8 | 4.3 | 5.8 | 91% | 7.8 | 11.9 | 6.4 |
| | APR-JUL | 2.4 | 3.7 | 5 | 89% | 6.8 | 10.6 | 5.6 |
| L Truckee R ab Boca Reservoir ² | MAR-JUL | 50 | 92 | 120 | 121% | 148 | 190 | 99 |
| | APR-JUL | 60 | 80 | 100 | 119% | 145 | 180 | 84 |
| Truckee R at Farad ² | MAR-JUL | 153 | 280 | 365 | 119% | 450 | 575 | 307 |
| | APR-JUL | 210 | 260 | 310 | 122% | 420 | 495 | 255 |
| Galena Ck at Galena Ck State Pk | MAR-JUL | 2.3 | 3.8 | 4.8 | 99% | 5.8 | 7.3 | 4.85 |
| | APR-JUL | 2.1 | 3.5 | 4.5 | 103% | 5.5 | 6.9 | 4.37 |
| Steamboat Ck at Steamboat | APR-JUL | 0.83 | 3.9 | 8 | 104% | 14.3 | 29 | 7.7 |
| Pyramid Lake Elevation Change ¹ | LOW-HIGH | -2.1 | 0.78 | 2.1 | 124% | 3.4 | 6.3 | 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

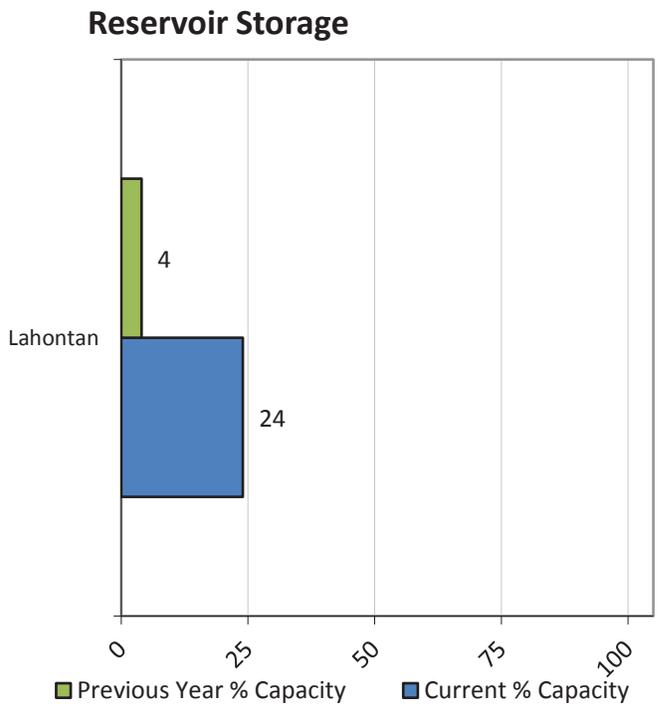
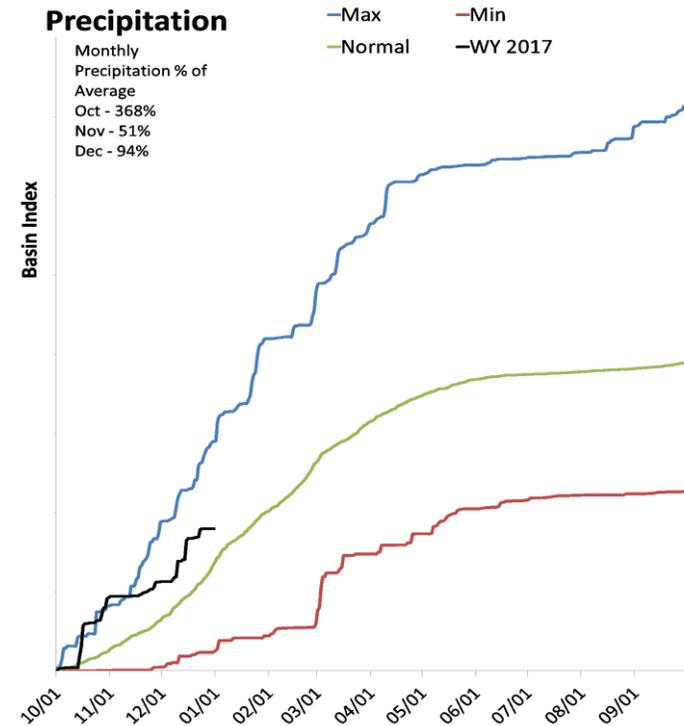
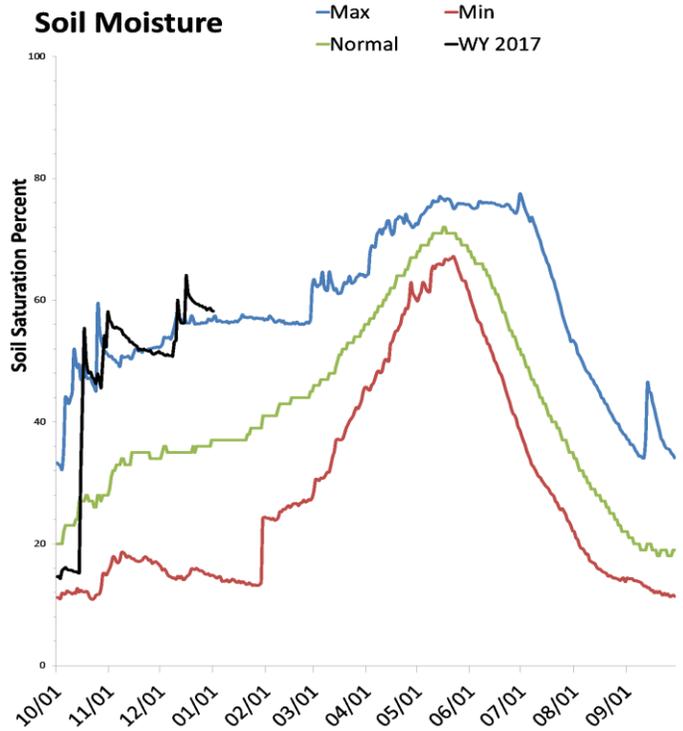
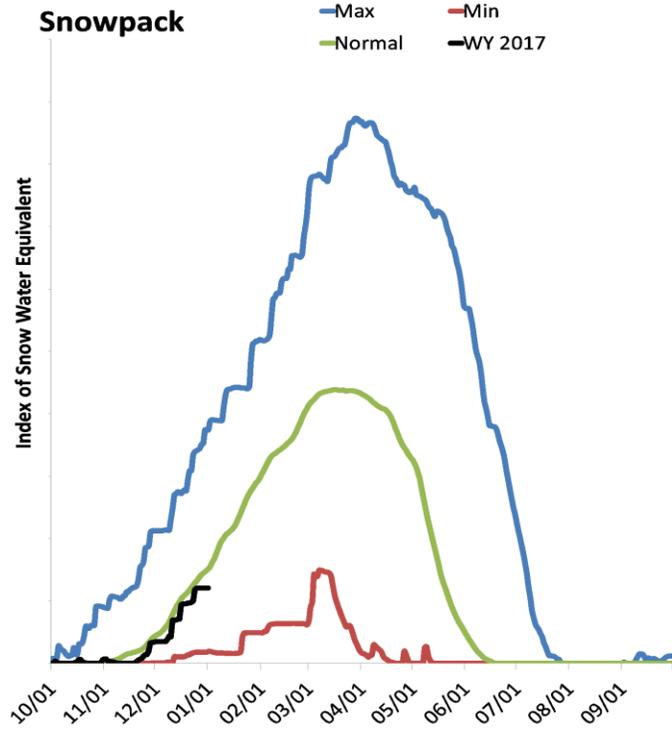
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Boca Reservoir | 14.6 | 8.6 | 14.7 | 40.9 |
| Donner Lake | 5.7 | 3.9 | 3.7 | 9.5 |
| Independence Lake | 14.0 | 14.0 | 13.4 | 17.3 |
| Prosser Reservoir | 9.4 | 7.8 | 9.7 | 28.6 |
| Stampede Reservoir | 113.4 | 27.2 | 144.6 | 226.5 |
| Basin-wide Total | 157.0 | 61.5 | 186.1 | 322.8 |
| # of reservoirs | 5 | 5 | 5 | 5 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Truckee River Basin | 8 | 84% | 118% |
| Little Truckee River | 3 | 65% | 116% |
| Sagehen & Independence Creeks | 3 | 65% | 116% |
| Galena Creek | 1 | 114% | 115% |
| Steamboat Creek | 1 | 114% | 115% |
| Truckee River above Pyramid Lake | 17 | 73% | 136% |

Carson River Basin

January 1, 2017

Snowpack in the Carson River Basin is below normal at 80% of median, compared to 146% last year. Precipitation in December was near average, which brings the seasonal accumulation (Oct-Dec) to 133% of average. Soil moisture is at 58% saturation, compared to 42% last year. Storage in Lahontan Reservoir is 24% of capacity, compared to 4% last year. Forecast streamflow volumes range from 100% to 113% of average.



Carson River Basin Streamflow Forecasts - January 1, 2017

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 | 76 | 156 | 210 | 102% | 265 | 345 | 205 |
| | APR-JUL | 135 | 162 | 180 | 97% | 198 | 225 | 186 |
| | 200 cfs | 22 Jun | 13 Jul | 27 Jul | | 10 Aug | 31 Aug | 24 Jul |
| | 500 cfs | 02 Jun | 21 Jun | 04 Jul | | 17 Jul | 05 Aug | 30 Jun |
| WF Carson R nr Woodfords | MAR-JUL | 22 | 47 | 65 | 110% | 83 | 108 | 59 |
| | APR-JUL | 19 | 43 | 60 | 111% | 77 | 101 | 54 |
| Carson R nr Carson City | MAR-JUL | 34 | 148 | 225 | 107% | 300 | 415 | 210 |
| | APR-JUL | 28 | 124 | 190 | 106% | 255 | 350 | 179 |
| King Canyon Ck nr Carson City | MAR-JUL | 0.01 | 0.2 | 0.4 | 105% | 0.6 | 0.89 | 0.38 |
| | APR-JUL | 0.02 | 0.21 | 0.38 | 100% | 0.55 | 0.81 | 0.38 |
| Ash Canyon Ck nr Carson City | MAR-JUL | 0.59 | 1.11 | 1.47 | 104% | 1.83 | 2.4 | 1.41 |
| | APR-JUL | 0.33 | 0.79 | 1.1 | 98% | 1.41 | 1.87 | 1.12 |
| Carson R at Ft Churchill | MAR-JUL | 68 | 147 | 225 | 113% | 325 | 525 | 200 |
| | APR-JUL | 110 | 165 | 190 | 111% | 250 | 375 | 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

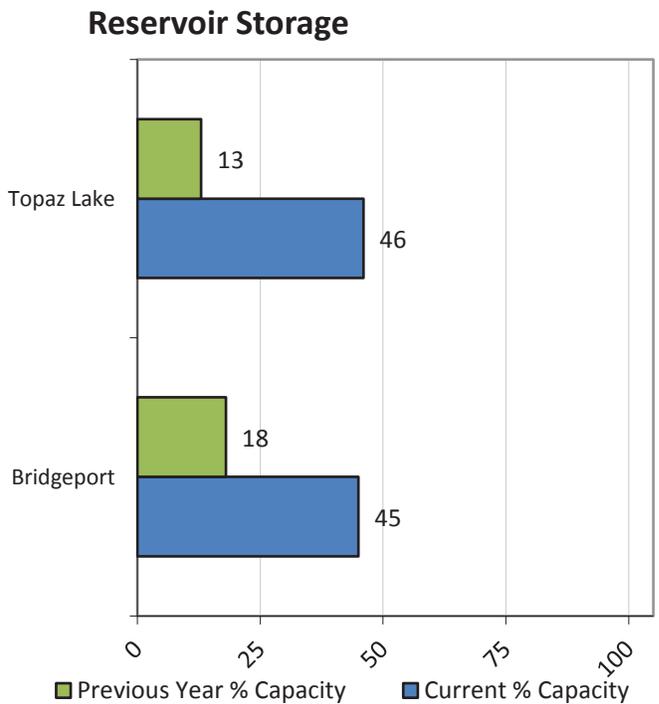
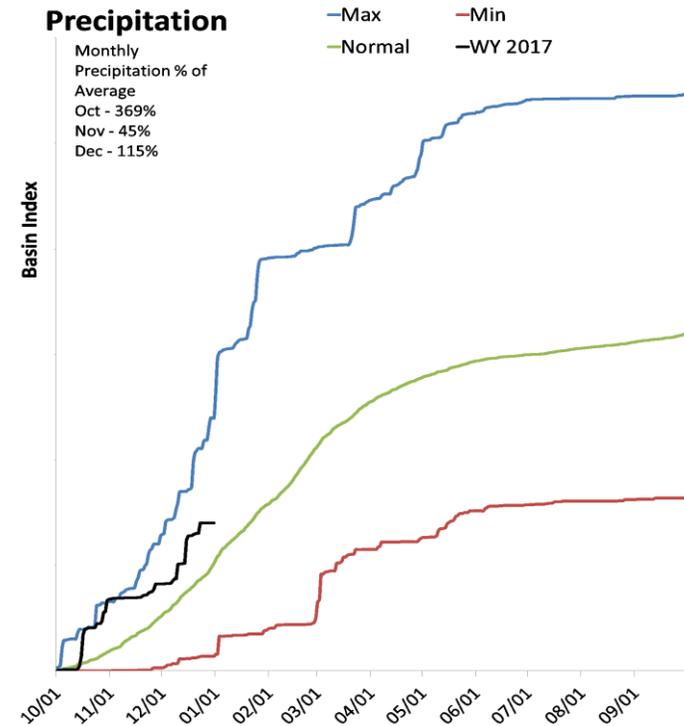
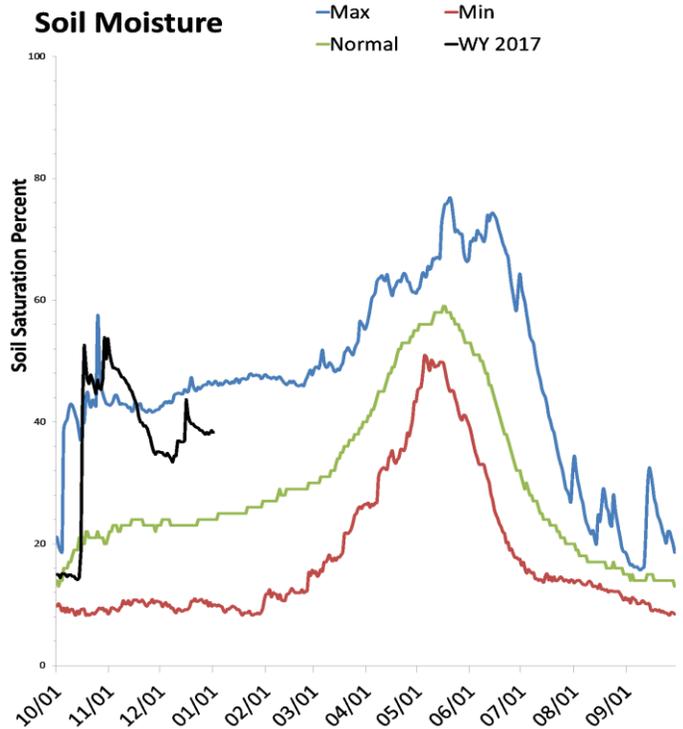
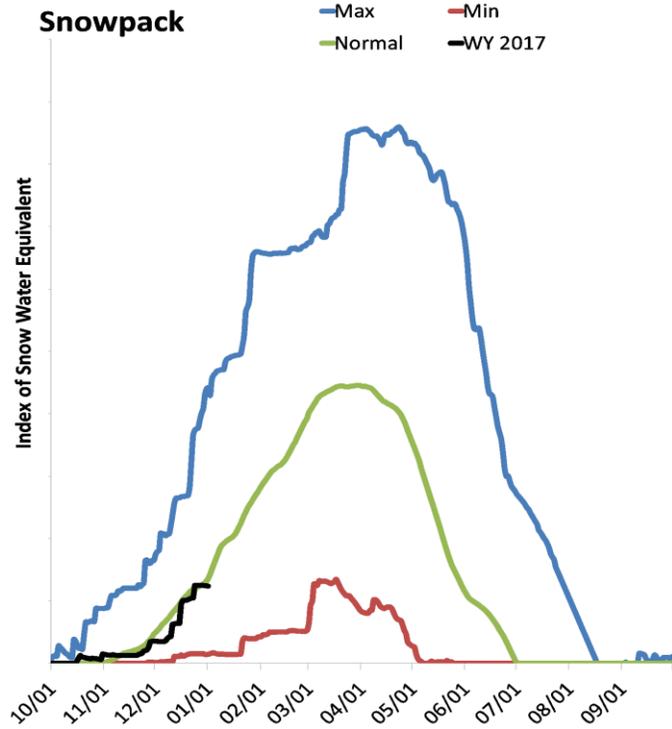
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Lahontan Reservoir, NV | 69.5 | 12.0 | 123.3 | 295.5 |
| Basin-wide Total | 69.5 | 12.0 | 123.3 | 295.5 |
| # of reservoirs | 1 | 1 | 1 | 1 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Carson River Basin | 9 | 80% | 146% |
| East Fork Carson River | 6 | 79% | 141% |
| West Fork Carson River | 6 | 77% | 156% |

Walker River Basin

January 1, 2017

Snowpack in the Walker River Basin is near normal at 91% of median, compared to 140% last year. Precipitation in December was above average, which brings the seasonal accumulation (Oct-Dec) to 138% of average. Soil moisture is at 39% saturation, compared to 32% last year. Combined reservoir storage is 46% of capacity, compared to 15% last year. Forecast streamflow volumes range from 85% to 99% of average.



Walker River Basin Streamflow Forecasts - January 1, 2017

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 | 14.1 | 49 | 73 | 94% | 97 | 132 | 78 |
| | APR-AUG | 11.3 | 42 | 63 | 93% | 84 | 115 | 68 |
| W Walker R bl L Walker nr Coleville | MAR-JUL | 58 | 122 | 165 | 97% | 210 | 270 | 170 |
| | APR-JUL | 51 | 113 | 155 | 96% | 197 | 260 | 162 |
| W Walker R nr Coleville | MAR-JUL | 63 | 127 | 170 | 99% | 215 | 275 | 172 |
| | APR-JUL | 54 | 116 | 158 | 97% | 200 | 260 | 163 |
| Walker Lake Elevation Change ¹ | LOW-HIGH | -1.69 | -0.44 | 1.2 | 85% | 2.2 | 4.1 | 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

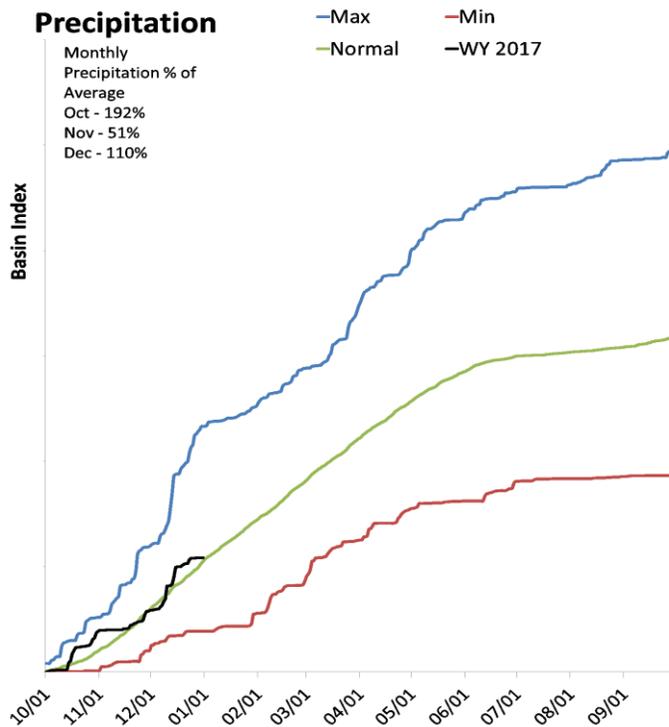
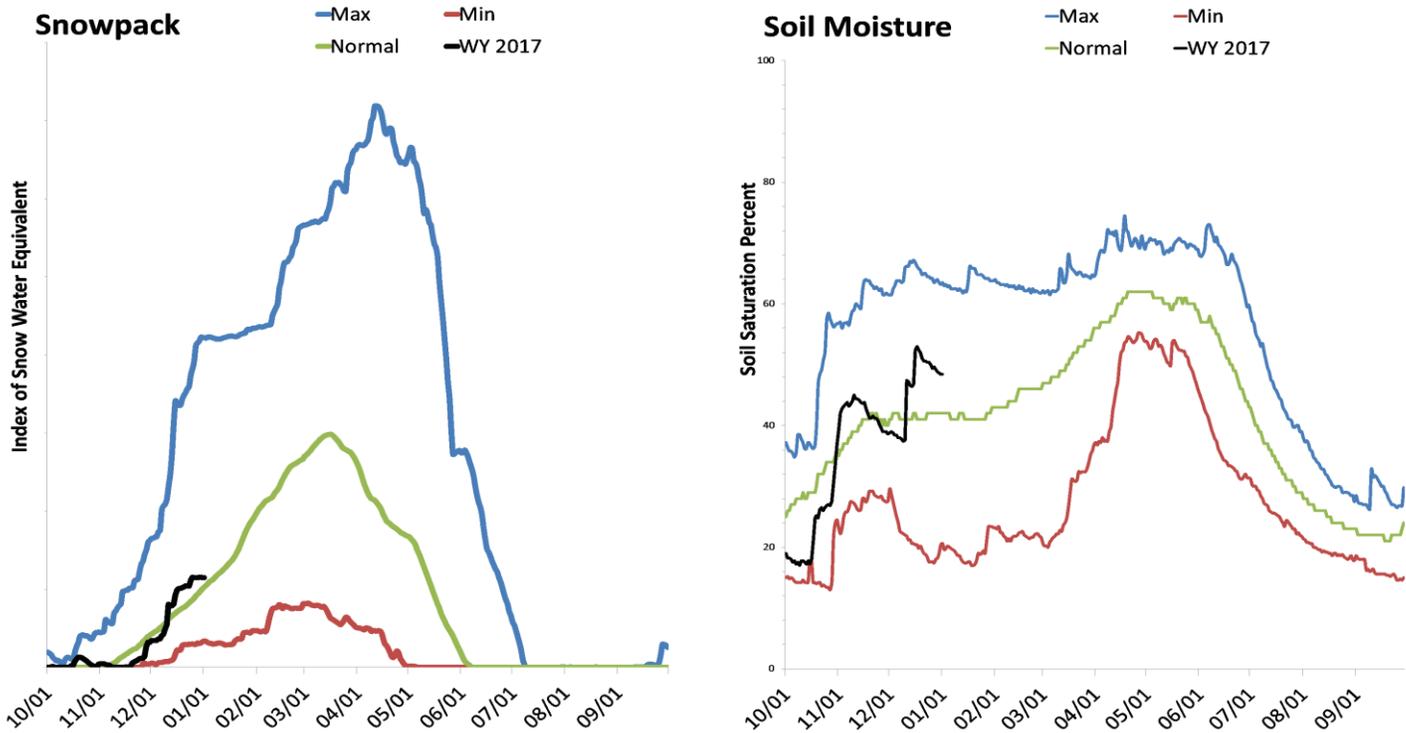
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Bridgeport Reservoir | 19.2 | 7.8 | 17.3 | 42.5 |
| Topaz Lk nr Topaz, CA | 27.6 | 7.9 | 18.9 | 59.4 |
| Basin-wide Total | 46.8 | 15.7 | 36.2 | 101.9 |
| # of reservoirs | 2 | 2 | 2 | 2 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Walker River Basin | 7 | 91% | 140% |
| East Walker River above Bridgeport | 2 | 75% | 147% |
| West Walker River above Coleville | 5 | 94% | 136% |

Northern Great Basin

January 1, 2017

Snowpack in the Northern Great Basin is above normal at 114% of median, compared to 193% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 127% of average. Soil moisture is at 44% saturation, compared to 45% last year. Forecast streamflow volumes range from 80% to 92% of average.



Northern Great Basin Streamflow Forecasts - January 1, 2017

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) |
|----------------------------|-----------------|-----------|-----------|-----------|-------|-----------|-----------|----------------|
| Davis Ck | APR-JUL | 2500 | 4100 | 5800 | 80% | 8100 | 13400 | 7233 |
| | APR-SEP | 3000 | 4700 | 6500 | 81% | 8900 | 14200 | 7991 |
| Bidwell Ck nr Fort Bidwell | APR-JUL | 4.9 | 7.8 | 9.8 | 82% | 11.8 | 14.7 | 12 |
| Eagle Ck nr Eagleville | APR-JUL | 0.3 | 2 | 3.8 | 88% | 5.6 | 8.1 | 4.3 |
| McDermitt Ck nr McDermitt | MAR-JUN | 0.45 | 9.8 | 16.1 | 92% | 22 | 32 | 17.5 |
| | APR-JUL | 0.17 | 7 | 11.7 | 90% | 16.4 | 23 | 13 |

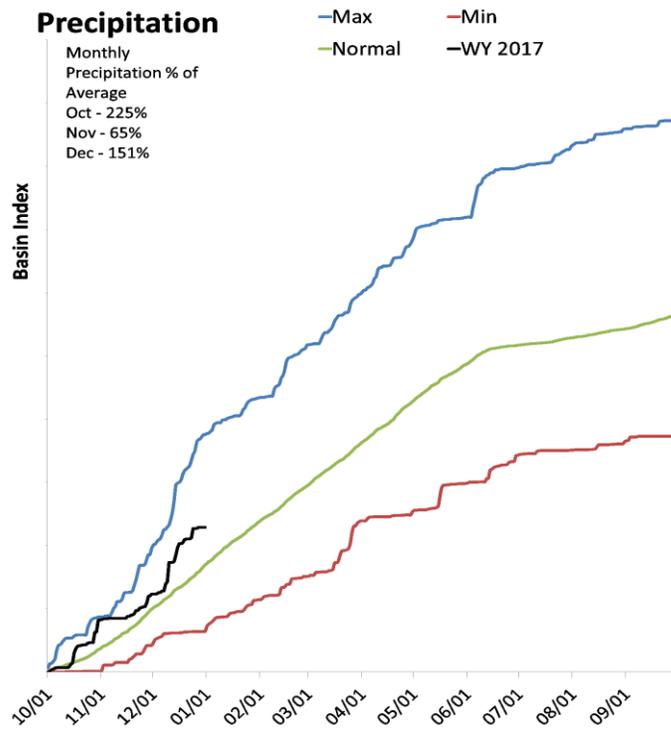
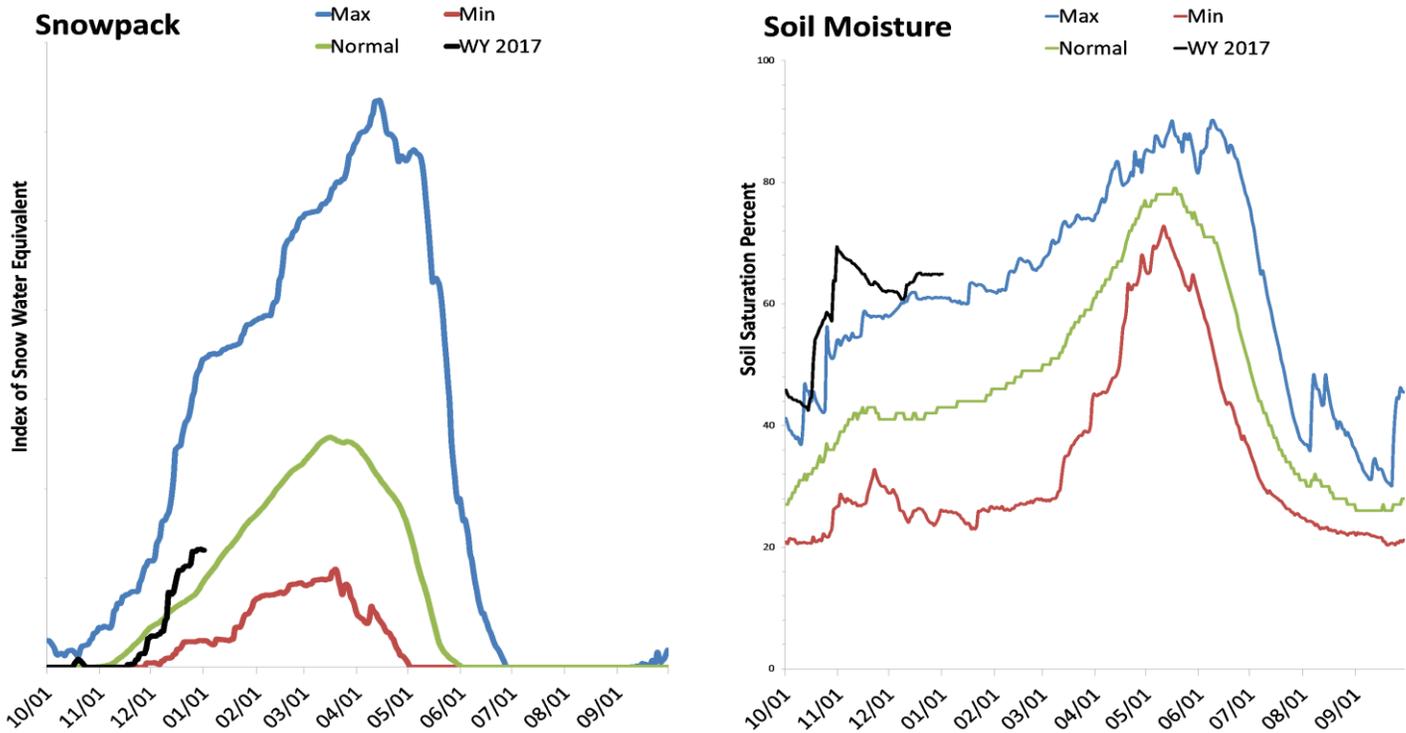
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Northern Great Basin | 7 | 114% | 193% |
| Surprise Valley - Warner Mtns | 2 | 114% | 189% |
| McDermitt Creek | 1 | 92% | 219% |
| Quinn River | 4 | 113% | 192% |

Upper Humboldt River Basin

January 1, 2017

Snowpack in the Upper Humboldt River Basin is much above normal at 136% of median, compared to 192% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 135% of average. Soil moisture is at 62% saturation, compared to 58% last year. Forecast streamflow volumes range from 107% to 121% of average.



Upper Humboldt River Basin Streamflow Forecasts - January 1, 2017

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 | 24 | 38 | 47 | 115% | 56 | 70 | 41 |
| | APR-JUL | 17.3 | 31 | 40 | 111% | 49 | 63 | 36 |
| Lamoille Ck nr Lamoille | MAR-JUL | 16.7 | 26 | 32 | 107% | 38 | 47 | 30 |
| | APR-JUL | 14.8 | 24 | 30 | 103% | 36 | 45 | 29 |
| NF Humboldt R at Devils Gate | MAR-JUL | 16 | 32 | 43 | 110% | 54 | 70 | 39 |
| | APR-JUL | 7.2 | 24 | 35 | 109% | 46 | 63 | 32 |
| Humboldt R nr Elko | MAR-JUL | 85 | 148 | 190 | 119% | 230 | 295 | 159 |
| | APR-JUL | 59 | 118 | 158 | 119% | 198 | 255 | 133 |
| SF Humboldt R at Dixie | MAR-JUL | 31 | 64 | 87 | 121% | 110 | 143 | 72 |
| | APR-JUL | 29 | 59 | 79 | 120% | 99 | 129 | 66 |
| Humboldt R nr Carlin | MAR-JUL | 176 | 235 | 275 | 114% | 315 | 375 | 242 |
| | APR-JUL | 131 | 190 | 230 | 112% | 270 | 330 | 206 |
| Humboldt R at Palisade | MAR-JUL | 210 | 270 | 310 | 115% | 350 | 410 | 270 |
| | APR-JUL | 150 | 215 | 255 | 113% | 295 | 360 | 225 |

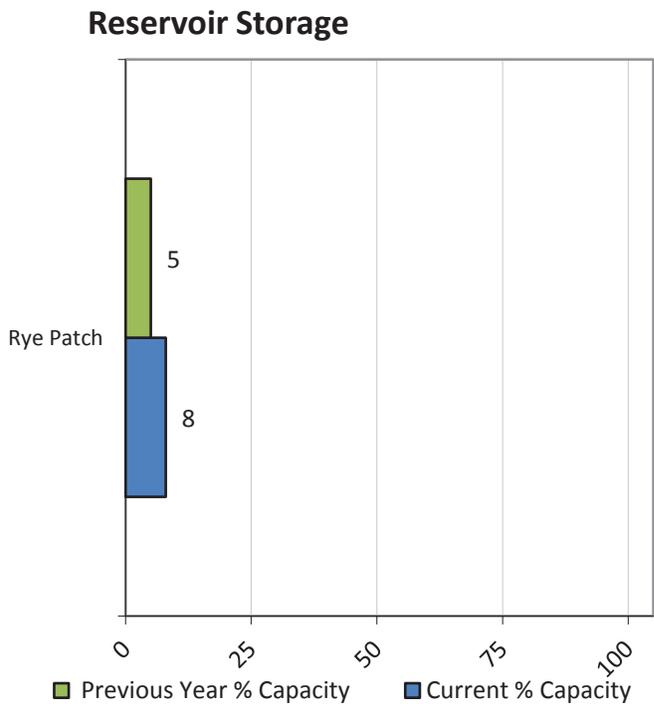
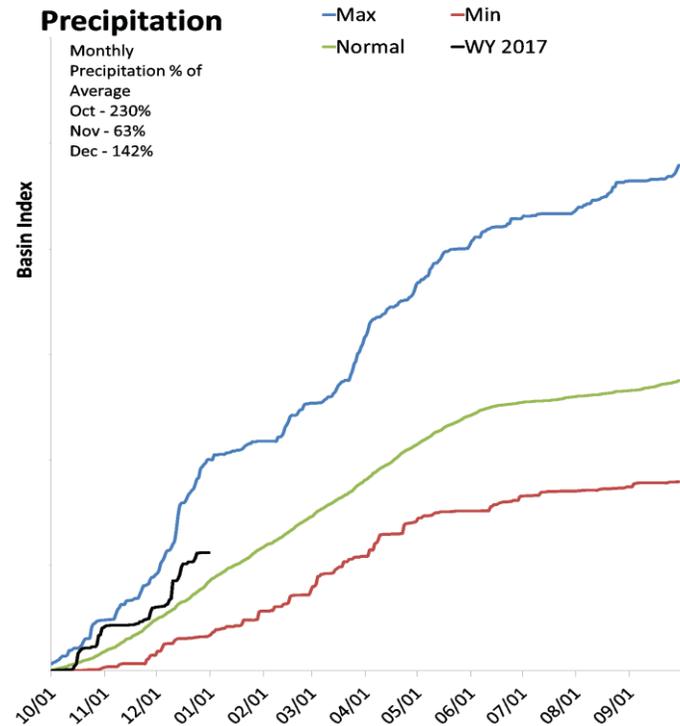
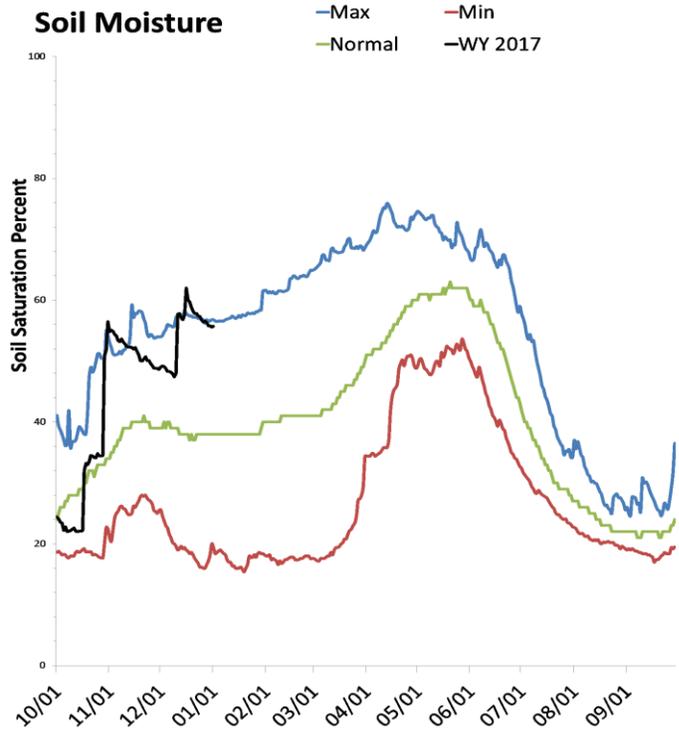
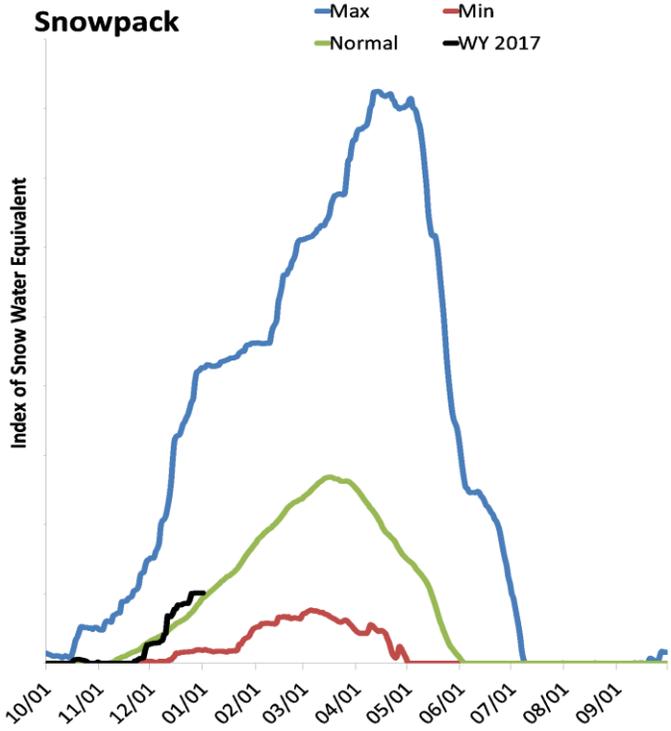
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Upper Humboldt River Basin | 9 | 136% | 192% |
| Mary's River | 3 | 128% | 172% |
| Lamoille Creek | 1 | 113% | 159% |
| North Fork Humboldt River | 2 | 164% | 216% |
| South Fork Humboldt River | 2 | 137% | 222% |

Lower Humboldt River Basin

January 1, 2017

Snowpack in the Lower Humboldt River Basin is near normal at 107% of median, compared to 190% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 132% of average. Soil moisture is at 56% saturation, compared to 55% last year. Storage in Rye Patch Reservoir is 8% of capacity, compared to 5% last year. Forecast streamflow volumes range from 95% to 98% of average.



Lower Humboldt River Basin Streamflow Forecasts - January 1, 2017

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 Mtn | MAR-JUL | 16.2 | 23 | 26 | 96% | 33 | 40 | 27 |
| | APR-JUL | 10.6 | 14.4 | 17 | 93% | 19.6 | 23 | 18.2 |
| Humboldt R at Comus | MAR-JUL | 125 | 200 | 250 | 98% | 300 | 375 | 255 |
| | APR-JUL | 76 | 150 | 200 | 94% | 250 | 325 | 213 |
| L Humboldt R nr Paradise | MAR-JUL | 1.78 | 6.7 | 10 | 95% | 13.3 | 18.2 | 10.5 |
| | APR-JUL | 0.95 | 5.7 | 9 | 93% | 12.3 | 17.1 | 9.7 |
| Martin Ck nr Paradise | MAR-JUL | 1.76 | 13.2 | 21 | 95% | 29 | 40 | 22 |
| | APR-JUL | 0.53 | 9.3 | 16 | 91% | 23 | 33 | 17.5 |
| Humboldt R nr Imlay | MAR-JUL | 62 | 144 | 200 | 96% | 255 | 340 | 209 |
| | APR-JUL | 14.6 | 101 | 160 | 90% | 220 | 305 | 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

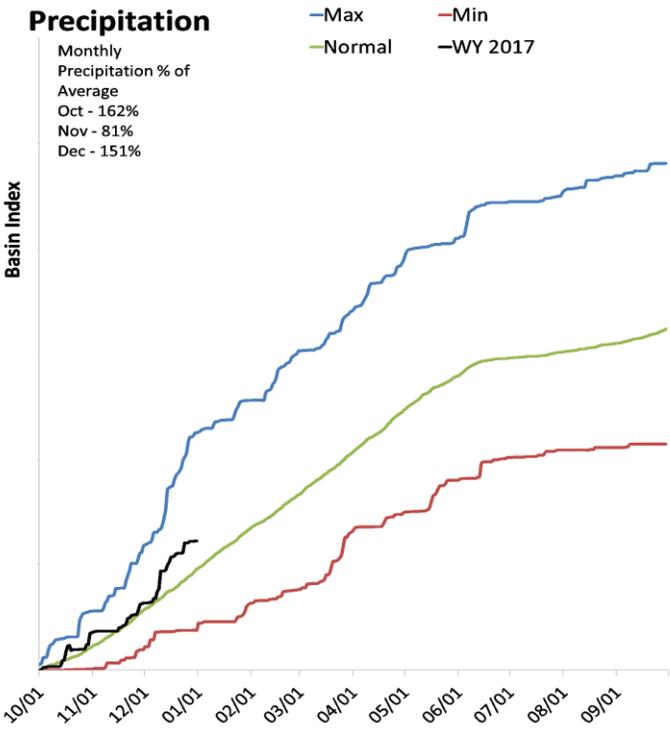
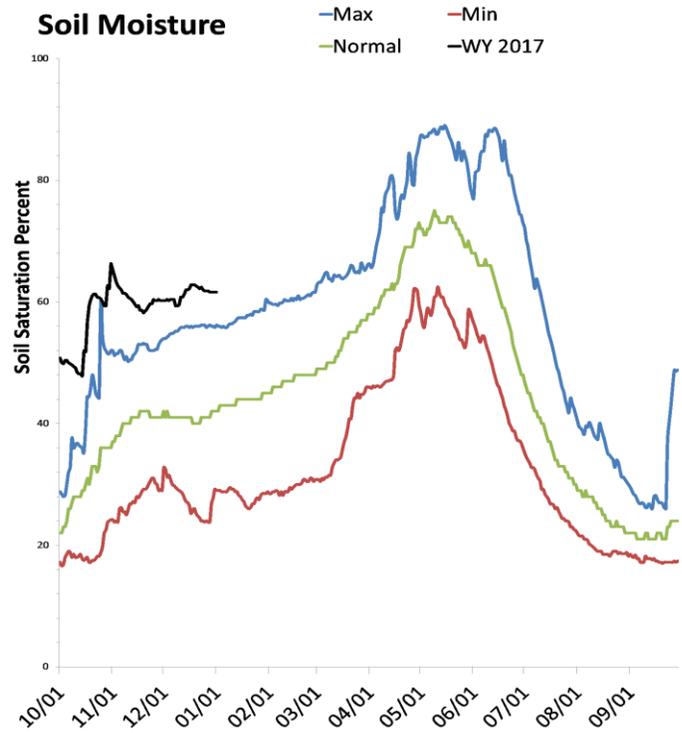
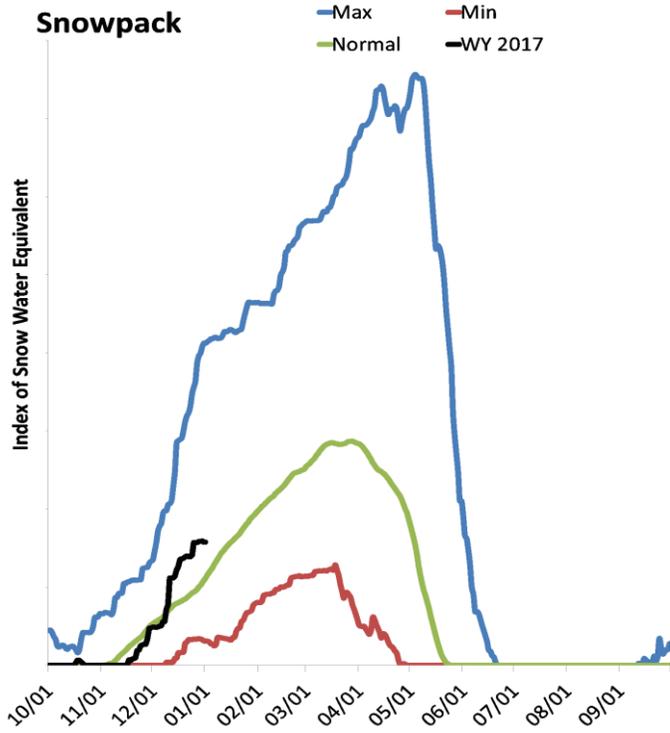
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Rye Patch Re nr Rye Patch, NV | 14.8 | 10.4 | 69.2 | 194.3 |
| Basin-wide Total | 14.8 | 10.4 | 69.2 | 194.3 |
| # of reservoirs | 1 | 1 | 1 | 1 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Lower Humboldt River Basin | 5 | 107% | 190% |
| Rock Creek | 0 | | |
| Reese River | 2 | 93% | 195% |
| Martin Creek | 3 | 117% | 187% |
| Little Humboldt River | 3 | 117% | 187% |
| Humboldt River above Imlay | 14 | 126% | 191% |

Clover Valley & Franklin River Basin

January 1, 2017

Snowpack in the Clover Valley and Franklin River Basin is much above normal at 142% of median, compared to 184% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 128% of average. Soil moisture is at 61% saturation, compared to 60% last year. The forecast streamflow volume for the Franklin River is 116% of average. Snow tube measurements made January 4th at Hole in Mountain SNOTEL recorded 15.8in of snow water at the new snow pillow location, while the original location (destroyed last year by the avalanche) had 11 in.



ATTENTION: In December 2015, Hole-in-Mountain SNOTEL was destroyed by an avalanche. The site was rebuilt in October 2016 at a similar elevation, but 450 feet south of the original location. The new location is outside the avalanche slide path to protect the equipment in the future. Moving the site has implications when comparing this year's data to historic data. Snow surveyors are making snow tube measurements this winter, at both the new and original locations to evaluate how similar the sites are. A news release with more information is on our homepage: www.nv.nrcs.usda.gov/snow/

The graphs on this page are based on data from five SNOTELs, including Hole in Mountain's new location. The Min, Max and Normal lines are based on historic data from the same sites, including data from Hole in Mountain's original location. Please keep this in mind when evaluating your water supply.

Contact Jeff Anderson with your questions:
jeff.anderson@nv.usda or 775-857-8500 ext. 152

Clover Valley & Franklin River Basin Streamflow Forecasts - January 1, 2017

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

| Clover Valley & Franklin River Basin | Forecast Period | 90% (KAF) | 70% (KAF) | 50% (KAF) | % Avg | 30% (KAF) | 10% (KAF) | 30yr Avg (KAF) |
|--------------------------------------|--------------------|--------------|--------------|--------------|-------|--------------|--------------|-------------------|
| Franklin Ck nr Arthur | APR-JUL | 5.2 | 6.9 | 8 | 116% | 9.1 | 10.8 | 6.9 |

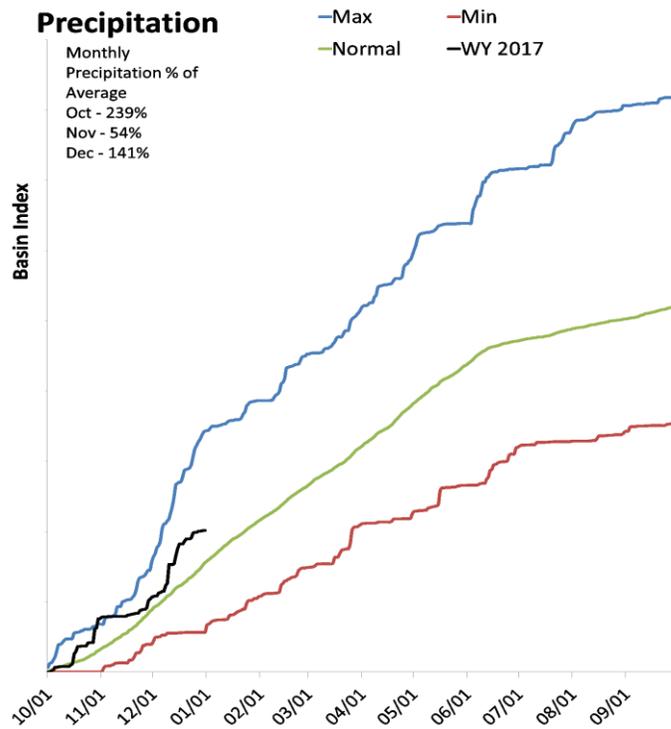
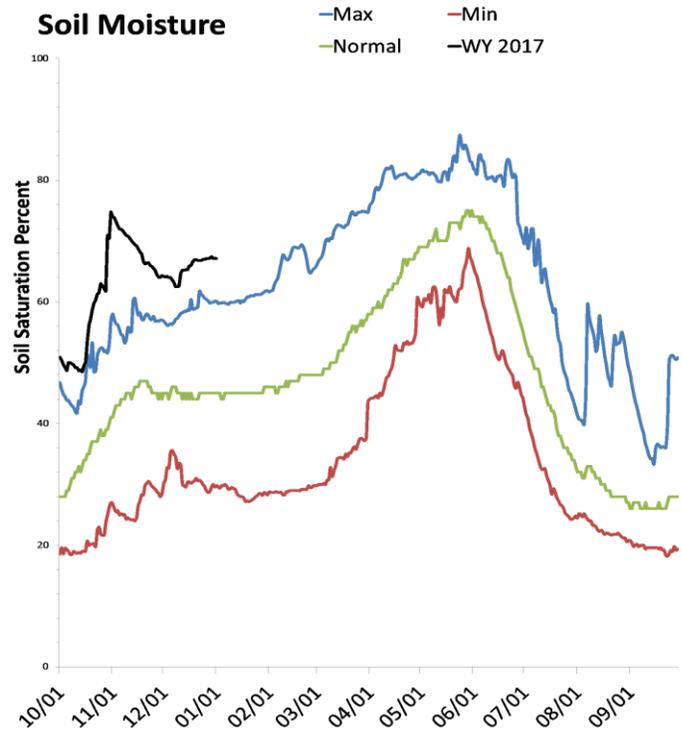
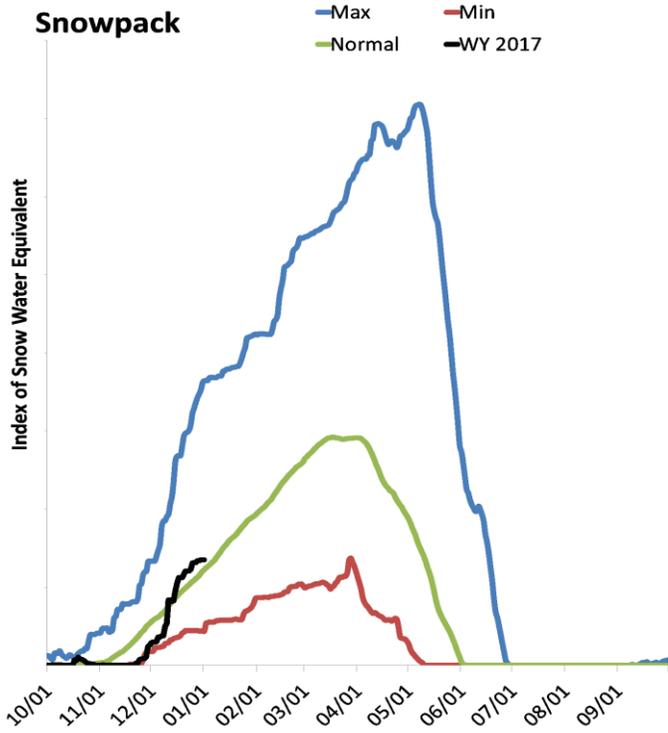
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Clover Valley & Franklin River Basin | 5 | 142% | 184% |
| Clover Valley | 2 | 162% | 159% |
| Franklin River | 4 | 132% | 197% |

Snake River Basin

January 1, 2017

Snowpack in the Snake River Basin is near normal at 108% of median, compared to 183% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 129% of average. Soil moisture is at 61% saturation, compared to 57% last year. The forecast streamflow volume for Salmon Falls Creek is 109% of average.



Snake River Basin Streamflow Forecasts - January 1, 2017

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 | 53 | 73 | 88 | 109% | 105 | 132 | 81 |
| | MAR-SEP | 56 | 76 | 92 | 108% | 109 | 137 | 85 |

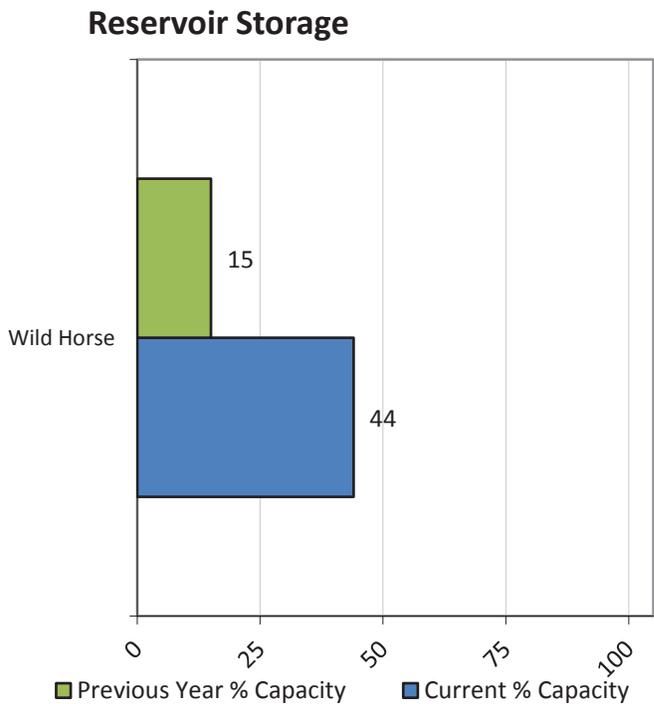
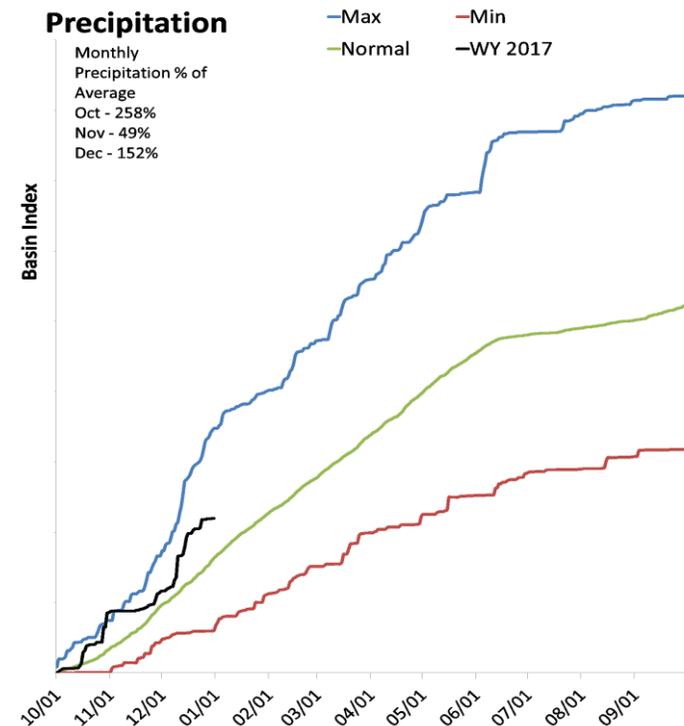
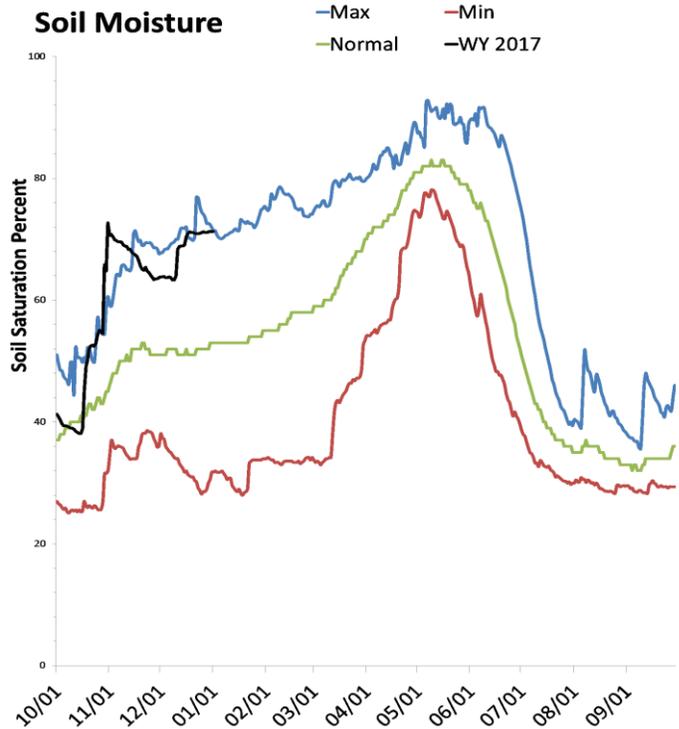
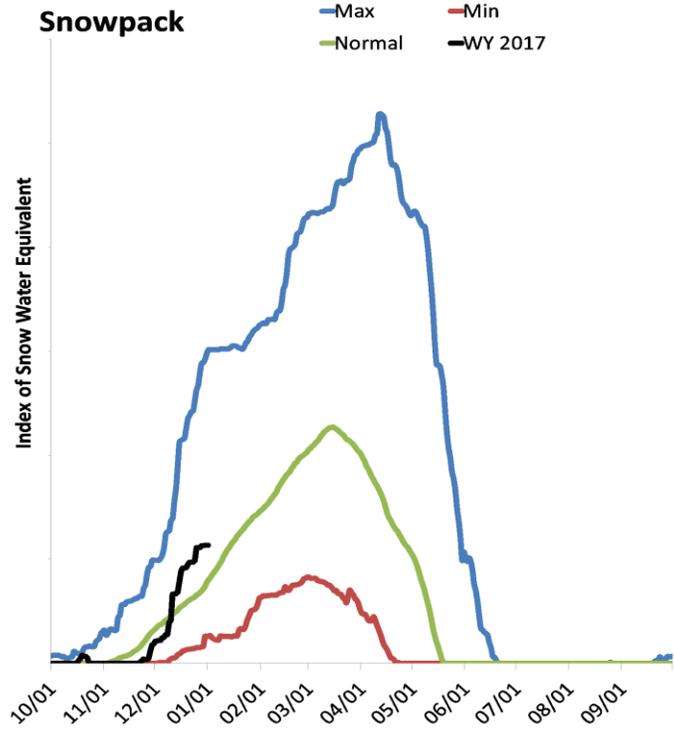
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Snake River Basin | 8 | 108% | 183% |
| Bruneau River | 5 | 111% | 190% |
| Jarbidge River | 3 | 102% | 174% |
| Salmon Falls Creek | 6 | 97% | 179% |

Owyhee River Basin

January 1, 2017

Snowpack in the Owyhee River Basin is much above normal at 143% of median, compared to 203% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 134% of average. Soil moisture is at 70% saturation, compared to 65% last year. Storage in Wildhorse Reservoir is 44% of capacity, compared to 15% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 132% of average.



Owyhee River Basin Streamflow Forecasts - January 1, 2017

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 | 14.8 | 28 | 37 | 132% | 45 | 58 | 28 |
| | MAR-SEP | 14 | 27 | 35 | 130% | 44 | 56 | 27 |
| | APR-JUL | 8 | 21 | 30 | 136% | 39 | 52 | 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

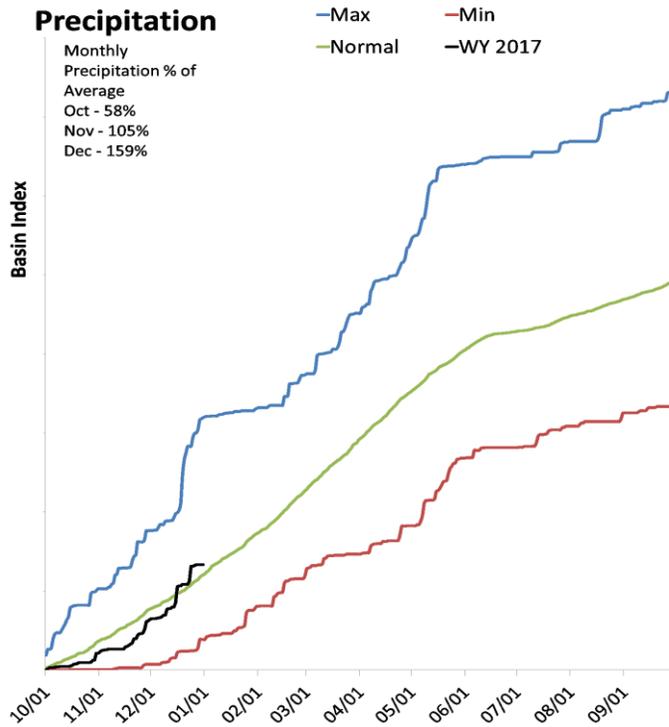
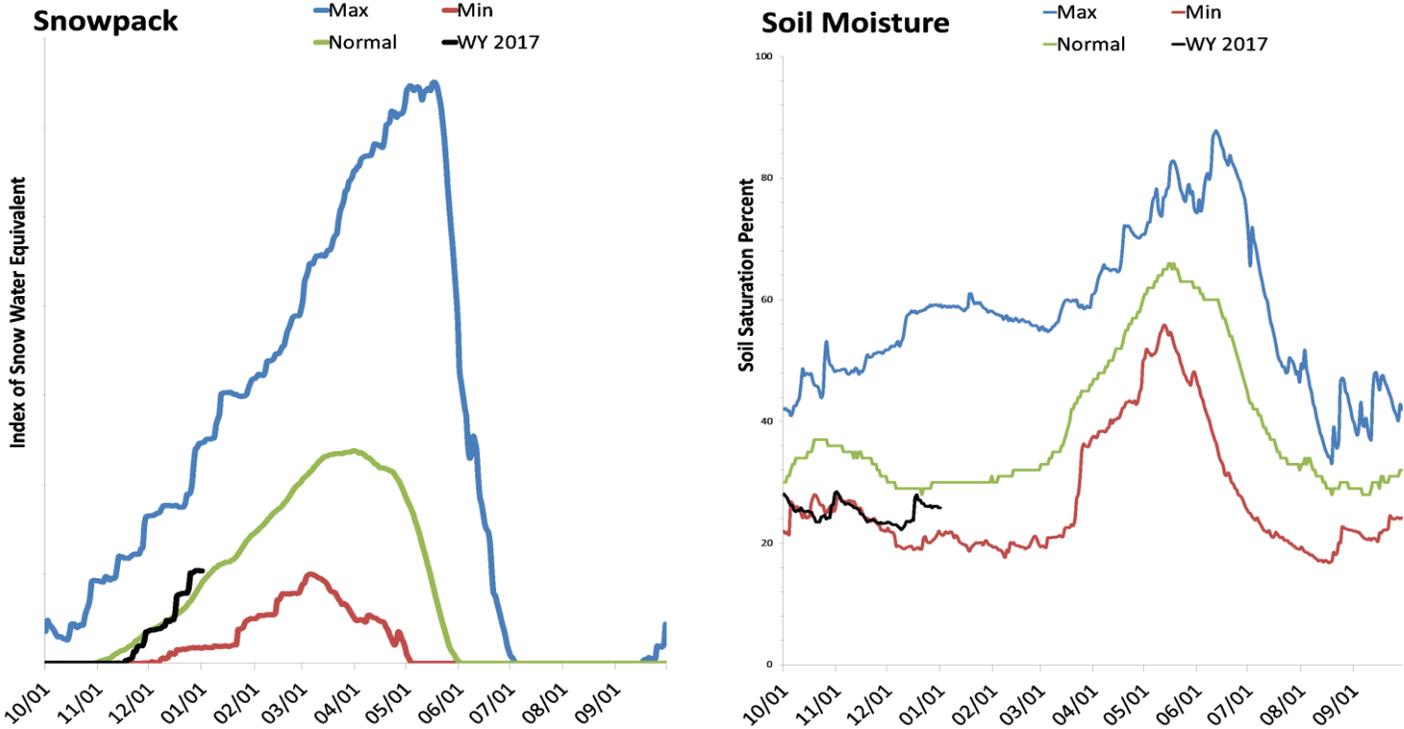
| Reservoir Storage End of December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|------------------|--------------------|------------------|-------------------|
| Wild Horse Reservoir | 31.7 | 10.5 | 32.4 | 71.5 |
| Basin-wide Total | 31.7 | 10.5 | 32.4 | 71.5 |
| # of reservoirs | 1 | 1 | 1 | 1 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Owyhee River Basin | 5 | 143% | 203% |
| Owyhee River above Owyhee | 4 | 135% | 198% |
| Owyhee River above Gold Creek | 2 | 160% | 227% |
| South Fork Owyhee River | 2 | 164% | 216% |

Eastern Nevada

January 1, 2017

Snowpack in the Eastern Nevada is above normal at 114% of median, compared to 164% last year. Precipitation in December was much above average, which brings the seasonal accumulation (Oct-Dec) to 111% of average. Soil moisture is at 25% saturation, compared to 40% last year. Forecast streamflow volumes range from 100% to 103% of average.



Eastern Nevada Streamflow Forecasts - January 1, 2017

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 | 0.14 | 1.57 | 3.6 | 100% | 5.6 | 8.6 | 3.6 |
| Step toe Ck nr Ely | APR-JUL | 0.78 | 1.76 | 2.4 | 100% | 3.1 | 4.1 | 2.4 |
| Cleve Ck nr Ely | APR-JUL | 1.25 | 3.1 | 4.4 | 100% | 5.7 | 7.6 | 4.41 |
| Lehman Ck nr Baker | APR-JUL | 0.87 | 2 | 2.8 | 103% | 3.6 | 4.7 | 2.72 |

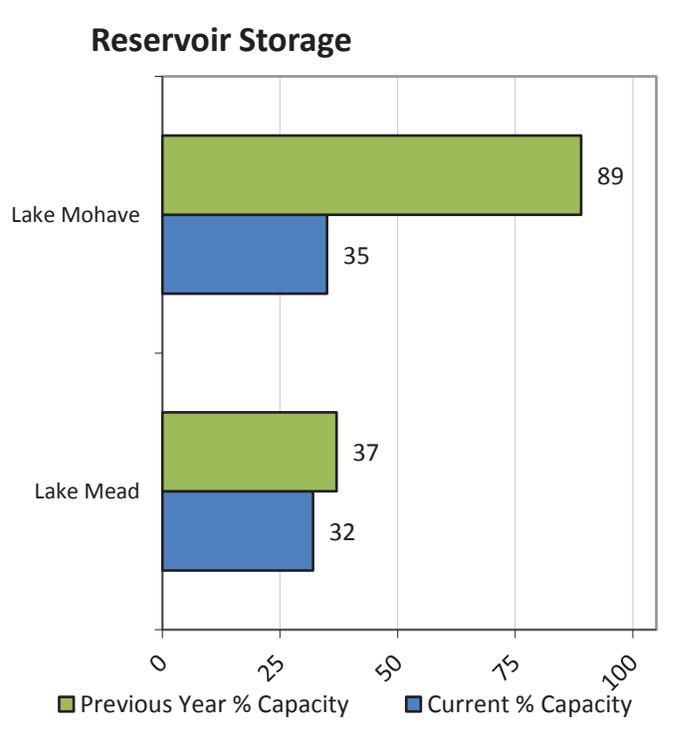
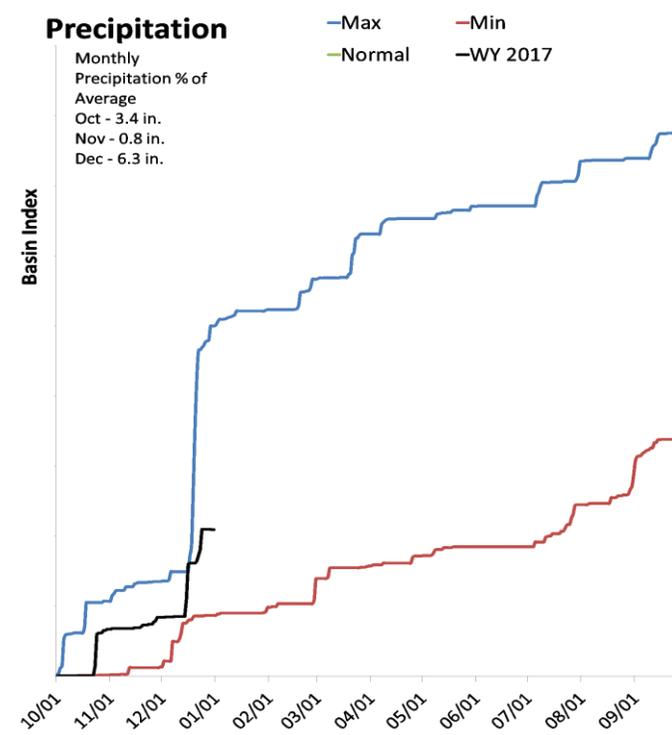
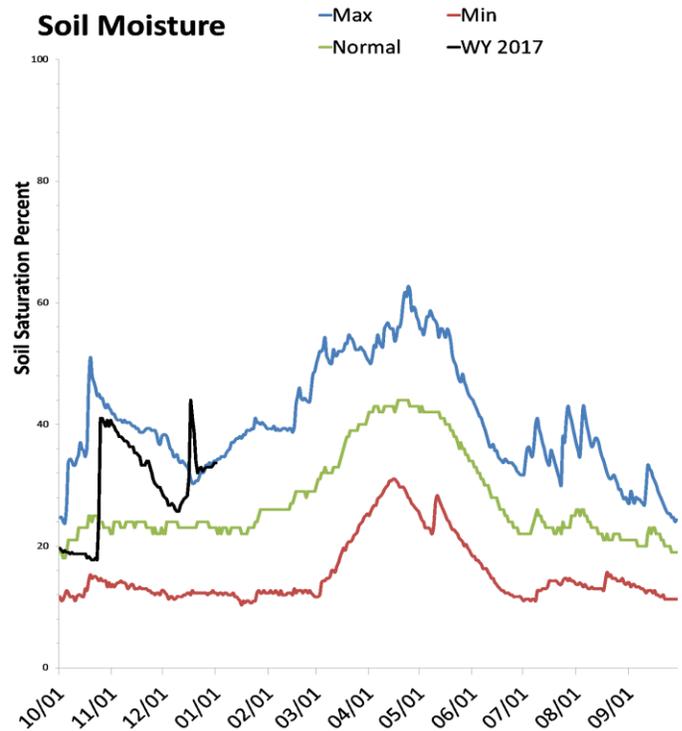
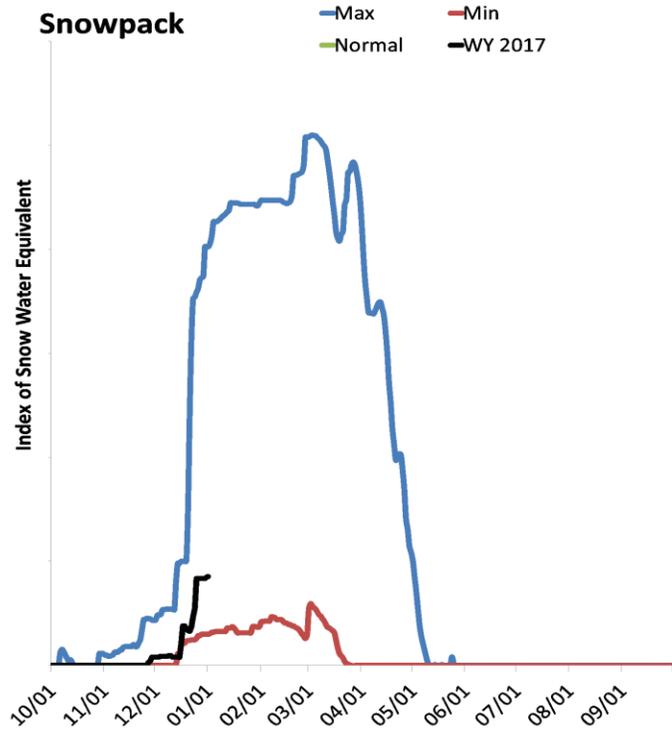
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|-----------------------|
| Eastern Nevada | 4 | 114% | 164% |
| Kingston Creek | 1 | 79% | 186% |
| Step toe Valley | 2 | 124% | 139% |
| Baker & Lehman Creeks | 0 | | |

Spring Mountains & Southern Nevada

January 1, 2017

The average snow water content at SNOTEL sites in the Spring Mountains is 4.2 inches. Precipitation in December averaged 6.3 inches, which brings the average seasonal accumulation (Oct-Dec) to 10.5 inches. Soil moisture is at 34% saturation, compared to 27% last year. Storage in Lake Mead is 32% of capacity, compared to 37% last year. Lake Mohave storage is 35% of capacity, compared to 89% last year. Forecast streamflow volumes range from 97% to 126% of average.



**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--1, same goes for the soil moisture normal line.

Spring Mountains & Southern Nevada Streamflow Forecasts - January 1, 2017

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 | 22 | 50 | 76 | 121% | 107 | 163 | 63 |
| Virgin R at Littlefield | APR-JUL | 11.4 | 53 | 82 | 126% | 111 | 153 | 65 |
| Lake Powell Inflow ² | APR-JUL | 3530 | 5430 | 6950 | 97% | 8660 | 11500 | 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 December, 2016 | Current (KAF) | Last Year (KAF) | Average (KAF) | Capacity (KAF) |
|--|---------------|-----------------|---------------|----------------|
| Lake Mead | 10093.0 | 10095.0 | 20297.0 | 26159.0 |
| Lake Mohave | 1650.0 | 1581.0 | 1602.0 | 1810.0 |
| Basin-wide Total | 11743.0 | 11676.0 | 21899.0 | 27969.0 |
| # of reservoirs | 2 | 2 | 2 | 2 |

| Watershed Snowpack Analysis January 1, 2017 | # of Sites | % Median | Last Year % Median |
|--|------------|----------|--------------------|
| Spring Mountains | 0 | | |
| White River | 1 | 146% | 120% |
| Virgin River | 8 | 159% | 133% |
| Colorado R above Glen Canyon Dam | 106 | 121% | 113% |



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