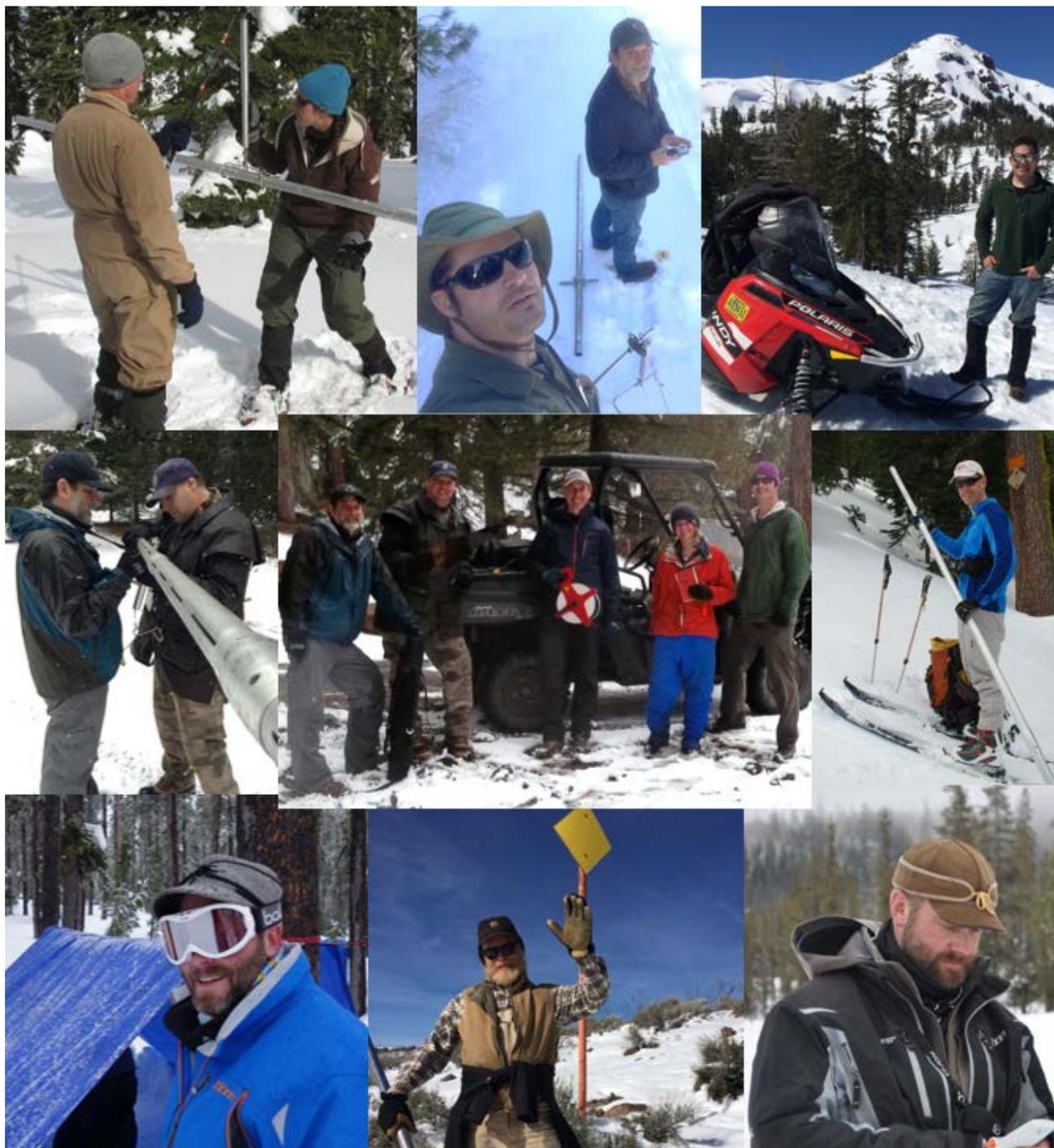


*Natural Resources Conservation Service*

# Nevada Water Supply Outlook Report

May 1, 2016



## **It's tough work, but somebody has to do it**

Snow surveying is a team effort. This month we recognize the work of snow surveyors across Nevada and the Eastern Sierra. In 2016, our team of 18 people made 88 measurements at 42 snow courses. These manual snow tube measurements supplement automated SNOTEL measurements, and help the NRCS forecast streamflow. A list of surveyors is provided on the back cover of this report.

## 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](mailto: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](http://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 2006-2015.

**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 1981-2015; for soil moisture the period is 2006-2015.

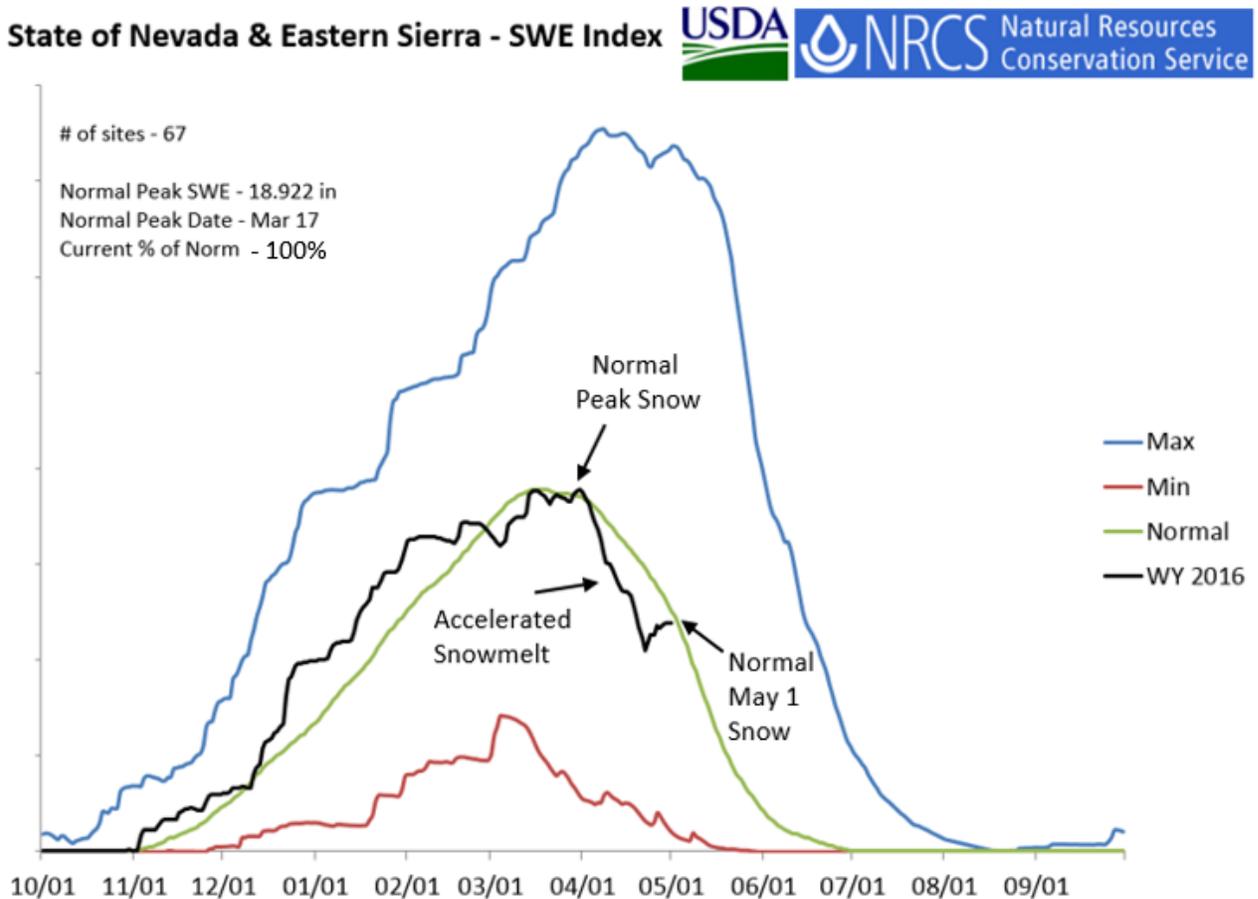
**Watershed Snowpack Analysis:** These tables summarize the snowpack percent of median for each main basin, and its sub-basins. Percentages are based on SNOTEL and snow course measurements. By selecting “Nevada” and report type “Snow” a full report with station-by-station data can be found here: <http://www.wcc.nrcs.usda.gov/basin.html>.

# Nevada Water Supply Outlook Report

## May 1, 2016

### SUMMARY

The graph below, showing statewide snow water equivalent, illustrates that our snowpack peaked at normal or better amounts in late March. Much of April brought accelerated snow melt. This resulted in the loss of about half of the snowpack. Cool temperatures, and new snow, at the end of April helped bring snow amounts back in line with the long term median by May 1. The new snow, and better than average precipitation in April, will add to streamflow volumes for the season. Across Northern Nevada and the Eastern Sierra streamflow forecasts range from 81-136% for the May through July period. Nevada's surface water supply is expected to be better than in recent years, but irrigation shortages are still likely for many agricultural areas. More rain is expected in early May, which will delay irrigation demand and help stretch water supplies.



### SNOWPACK

May 1 snow ranges from 66% of median in the Owyhee basin to 127% in Eastern Nevada. Snowmelt progressed at a fast pace during the first three weeks of April. The increasing sun angle, combined with average temperatures 5 to 10 degrees above normal, fueled snowmelt rates in excess of 1 inch of snow water per day at many SNOTEL stations. Out of 71 SNOTEL sites, 21 are now snow-free compared to 60 at this time last year. Most basins lost one-third to one-half of the snow measured on April 1 during the

first three weeks of the month. If melt had continued at that pace without relief, this winter's snowpack might have melted out on a date similar to recent drought years, such as 2013 or 2014. The loss of snow was most dramatic in the [Upper Humboldt Basin](#), which lost two-thirds of its snow by April 23. Fortunately, cool temperatures arrived and slowed melt during the last week of the month. Storms during this period added snow at higher elevations, and helped snowpack percentages rebound. May 1 snowpacks in the Sierra and the Upper Humboldt basins are near normal for this time of year, while snow is above normal in the Lower Humboldt, Snake and Clover Valley basins, as well as in eastern Nevada. Even Mt. Charleston, just north of Las Vegas, got a late season snowfall at the end of April. SNOTEL stations in Lee Canyon reported 15-17 inches of new snow on April 30. The snow surprised our electronics technician, who was in the area doing "summer" maintenance work.

## **PRECIPITATION**

Water year precipitation since October 1 is 106-137% of average across the region, with percentages increasing from west to east across the state. The storms during the last week of April pushed monthly precipitation to average, or better, amounts in most areas. The best precipitation was in Eastern Nevada, which received 161% of its average April moisture. In the Sierra, the Walker Basin had 149% of its average monthly amount. The Truckee and Carson basins were close to average. The Upper Humboldt Basin measured 141%, while the Lower Humboldt had an average amount. Across the region, many SNOTEL sites recorded more than 3 inches of precipitation in April. A few exceeded 5 inches, and those were mostly in the Upper Humboldt and Eastern Nevada. The largest amount was measured at Bear Creek SNOTEL, near Jarbidge, where 8.1 inches fell. Another round of moisture is headed Nevada's way. If weather forecasts prove correct, it is likely May will also have above average precipitation.

## **SOIL MOISTURE**

May 1 soil moisture measurements at SNOTEL sites are near, to above, average in all basins. These data are based on sensors placed at depths of 2, 8 and 20 inches that have been collecting data since 2006.

## **RESERVOIRS**

Water storage continues to increase in most reservoirs. Lake Tahoe rose another half foot in April (0.54 feet). This pushed the lake level above its rim and allowed water to spill into the Truckee River at Tahoe City. Flows at Tahoe City are currently around 20 cubic feet per second. This is less than the May 1 median flow of 55 cubic feet per second. Lake Tahoe is forecast to rise another 0.76 feet this spring. Reservoir storage along the Truckee River continues to climb and is now 46% of capacity, up from 36% last month. Independence Lake and Marlette Lake are near full capacity. In the Walker basin, combined storage in Topaz and Bridgeport reservoirs is 29% of capacity, down a couple percent from last month. Lahontan Reservoir storage continues to increase and contains 96,100 acre-feet, 33% of capacity. Rye Patch Reservoir contains 39,700 acre-feet, 20% of capacity. The last time Rye Patch contained this much water was in September 2012. A wet weather forecast for early May should help delay irrigation demand and keep water in storage until later in the season.

## **STREAMFLOW FORECASTS**

For the northern part of the state, streamflow forecasts for the May-July period range from 81% for Sagehen Creek, in the Truckee Basin, to 136% for Lehman Creek, in Great Basin National Park. The majority of the forecasts in the Sierra basins are 90-110% of average. The Carson River near Fort Churchill is forecast slightly lower, at 86%. Forecast percentages are higher in the Humboldt Basin, ranging from 96-136% of average. Forecasts are lower for points important to Southern Nevada. Lake Powell Inflow is forecast at 77% of average, and the Virgin River at Littlefield at 68%.

## **2016-2017 CLIMATE OUTLOOK**

This is the last Nevada Water Supply Report for the 2015-2016 season. You can continue to track snowmelt, precipitation and soil moisture at SNOTEL sites using data and graphs linked from the [Nevada Snow Survey webpage](#). The National Weather Service's [Climate Prediction Center Outlook](#) is a good source to gain insight into what to expect next winter. The most recent advisory published on April 14<sup>th</sup> stated: "Nearly all models predict further weakening of El Niño, with a transition to ENSO-neutral likely during late spring or early summer 2016. Then, the chance of La Niña increases during the late summer or early fall. The official forecast is consistent with the model forecasts, also supported by a historical tendency for La Niña to follow strong El Niño events. A transition to ENSO-neutral is likely during late Northern Hemisphere spring or early summer 2016, with an increasing chance of La Niña during the second half of the year." La Niña tends to favor the Pacific Northwest with wet and cold winters, while the Southwest is often left dry. Our region straddles the divide between wet and dry and either outcome is possible based on historical data. Stay tuned, the next Nevada Water Supply Outlook Report will be published in January 2017. Let's hope next winter starts and finishes similar to, or better than, this year.

## **UPCOMING EVENTS**

### ***Humboldt River Basin Water Authority (HRBWA) Meeting***

When: Friday, May 13, 2016, 10am-4pm

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

The NRCS will provide two presentations:

10:30 – 11:15am Overview of NRCS Programs Including Those which May Assist with Watershed Restoration Planning and Implementation Projects; Irrigation Efficiency Projects and/or Planning and Implementation of Cloud Seeding Projects within the Humboldt River Basin. Gary Roeder, Asst. State Conservationist, Programs

11:15 – 12:00pm Humboldt River Basin Weather, Climate and Streamflow Forecast. Jeff Anderson, Hydrologist, Snow Survey Program

## SNOW SURVEY PRODUCT HIGHLIGHT

This section highlights products that are linked from the [Nevada Snow Survey Program website](#). This month the [Historic Monthly Streamflow Data](#) webpage is the focus. Water users commonly request streamflow data from past years. This new webpage provides pre-built links to the NRCS database for periods of record, monthly streamflow data. The dropdown menu on that page is arranged by the main basins used in the Water Supply Outlook Report. Data can be copied and pasted into a spreadsheet for more detailed comparison. Below is a sample of output options for the East Walker River near Bridgeport.

Output Format ▾ Layout ▾ Units ▾ Time Period ▾ Fit Table To Screen

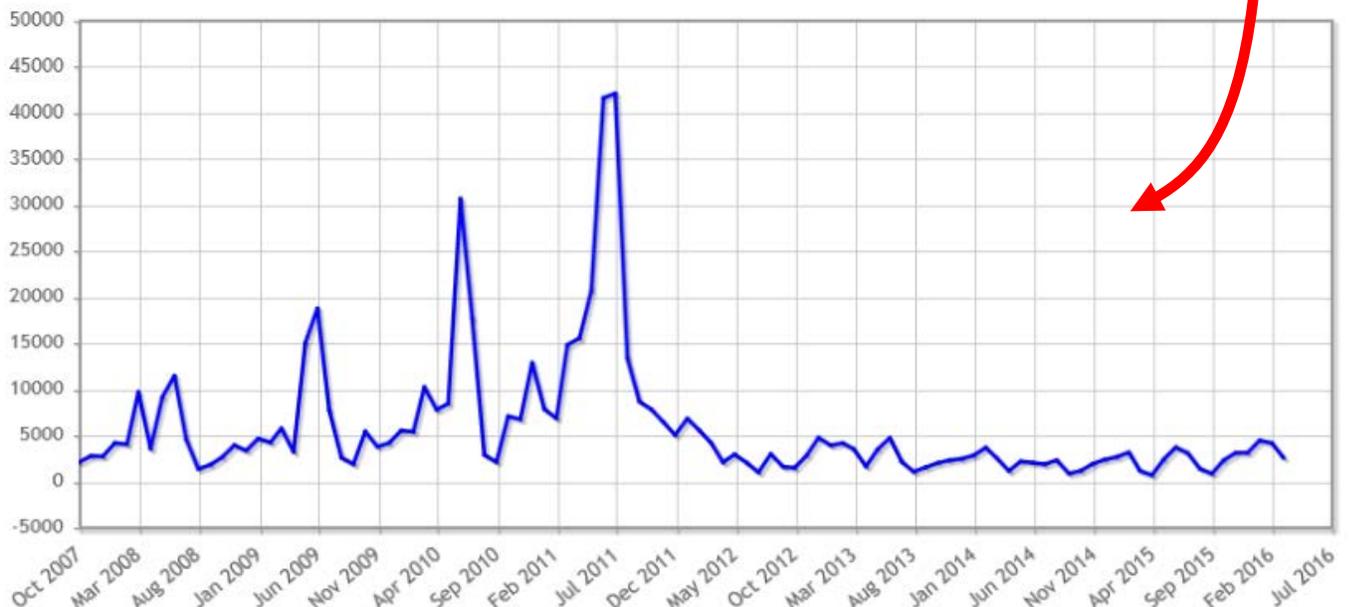
### E Walker R Nr Bridgeport (10293000) California STREAMFLOW Site - 6400 ft Monthly Data for Oct 1921 to Apr 2016

(As of: Tue Apr 19 12:46:47 GMT-08:00 2016)  
\*\*Provisional data, subject to revision\*\*

Water Year	Oct	Nov	Dec	Jan	Feb
	Stream Volume, Adjusted (ac_ft)				
2008	2074	2767	2709	4173	4033
2009	2631	3922	3340	4644	4233
2010	5411	3764	4168	5515	5378
2011	7061	6738	12845	7829	6842
2012	7816	6423	5029	6808	5520

Change the "Layout" to "Chart" to graph the data.

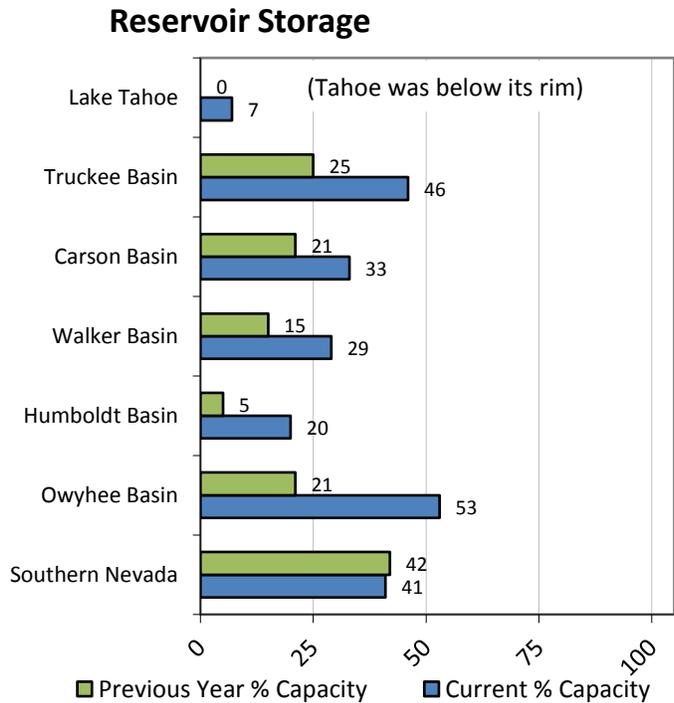
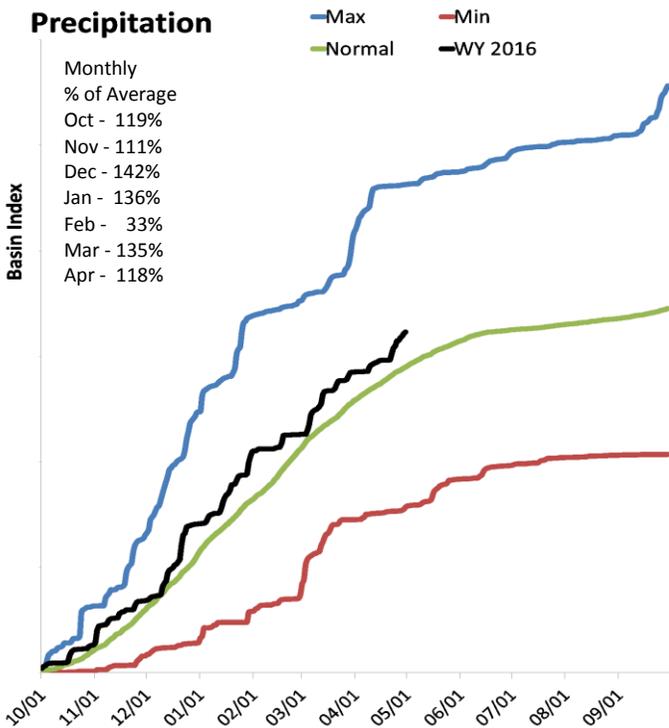
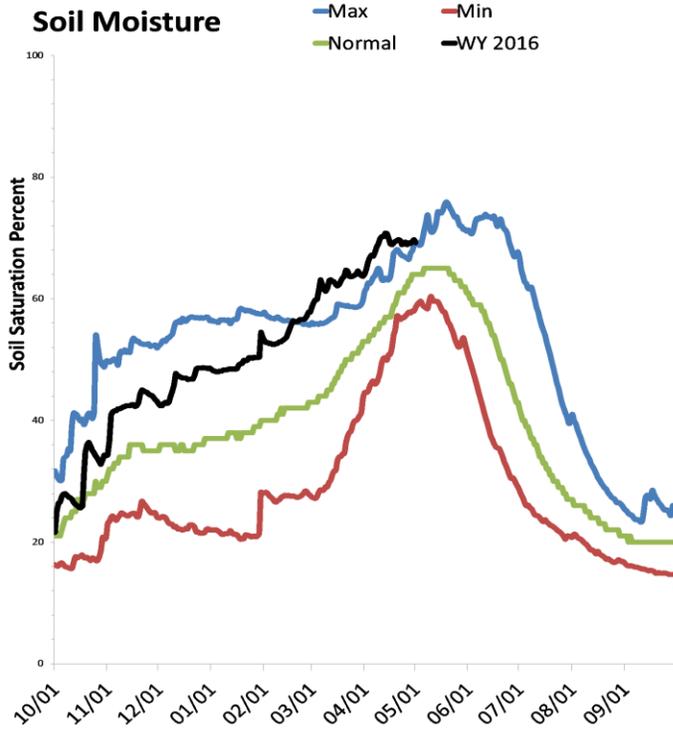
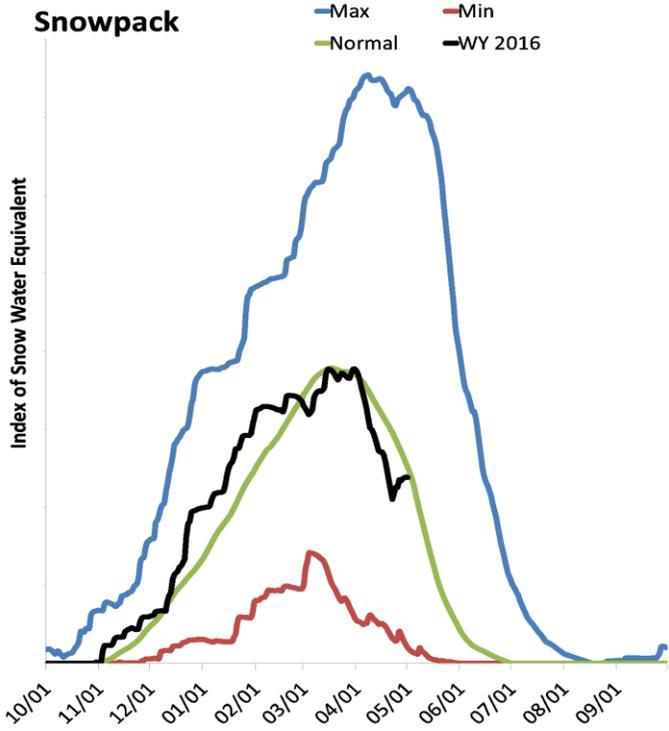
### E Walker R Nr Bridgeport (10293000) California STREAMFLOW Site - 6400 ft



# State of Nevada & Eastern Sierra

5/1/2016

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is near normal at 100% of median, compared to 8% last year. Precipitation in April was above average at 118%, which brings the seasonal accumulation (Oct-Apr) to 114% of average. Soil moisture is 68% compared to 61% last year. Reservoir storage ranges from 7% of useable capacity in Lake Tahoe to 53% of capacity in the Owyhee Basin.

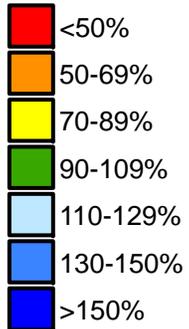


# Nevada & Eastern Sierra

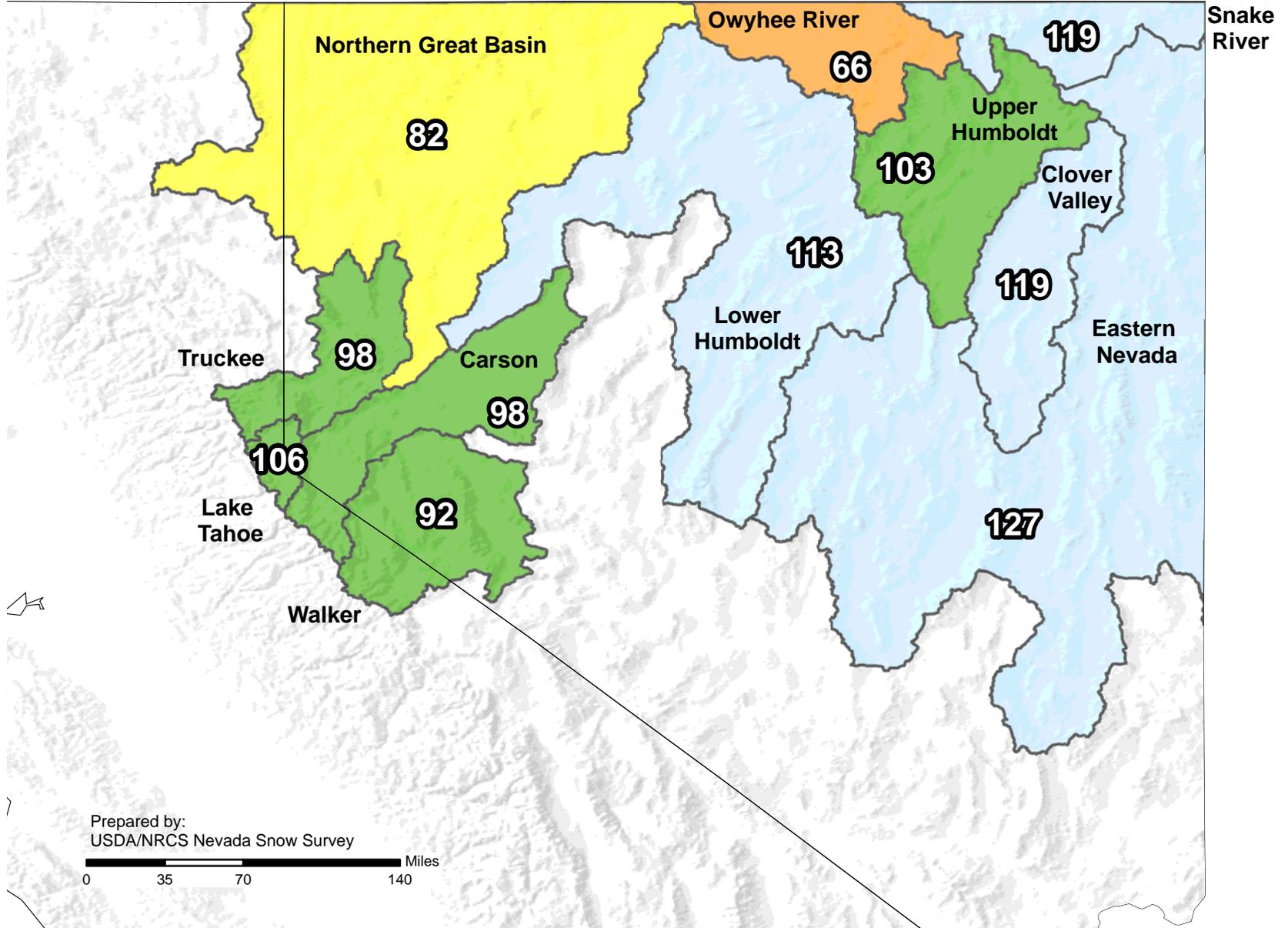
## Percent of Median Snowpack

### May 1, 2016

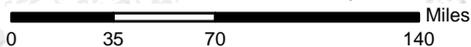
1st of Month Snow  
Water Equivalent  
Basin-wide Percent  
of 1981-2010 Median



*Provisional data  
subject to revision*



Prepared by:  
USDA/NRCS Nevada Snow Survey

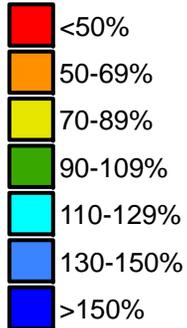


Map data based on the first of month snow water equivalent found at selected SNOTEL and snow course sites in or near the basin compared to the median value for those sites. SNOTEL data based on the first reading of the day (typically midnight). Snow course data based on measurements taken within the 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>.

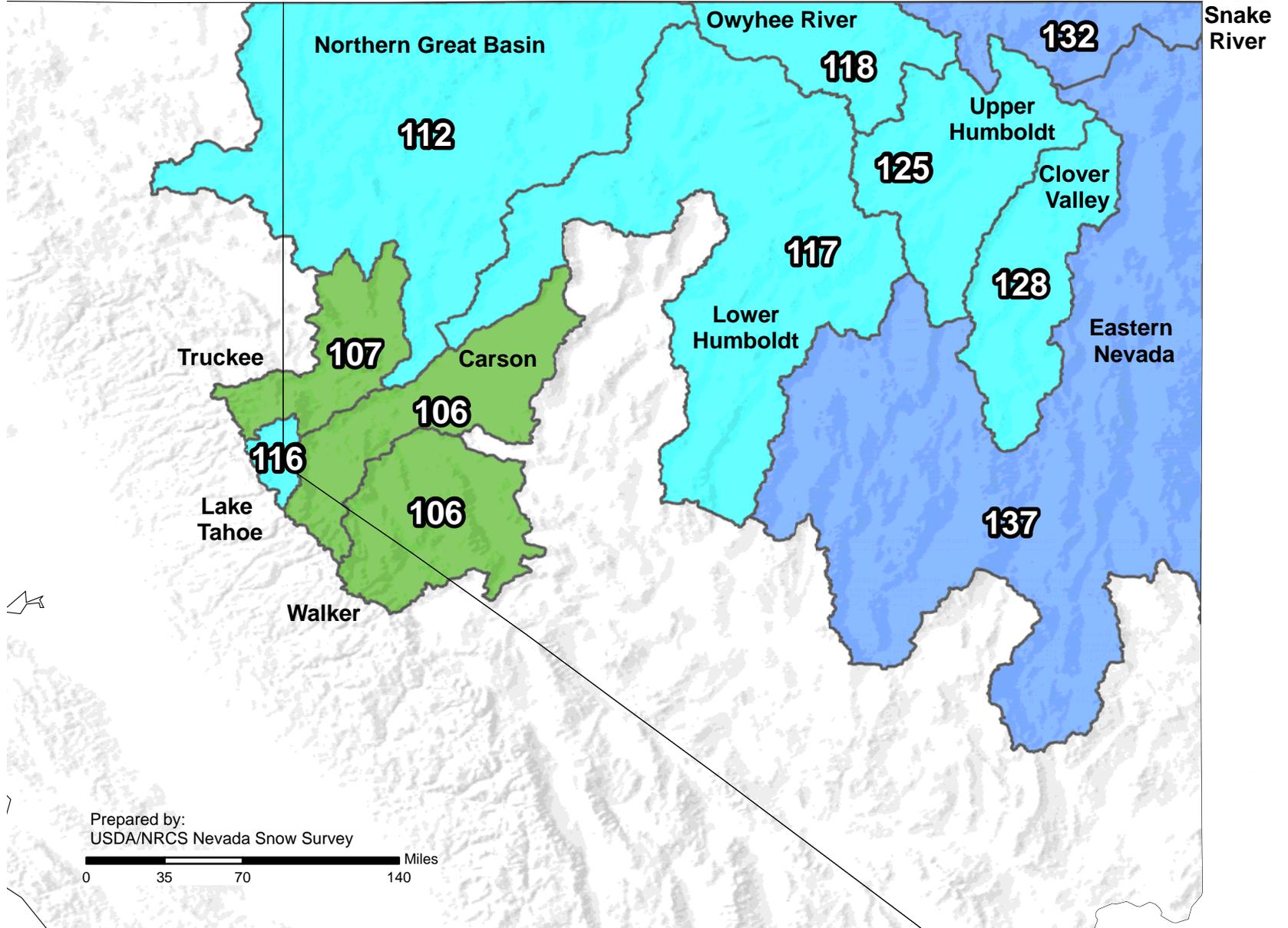


# Nevada & Eastern Sierra Water Year to Date Precipitation May 1, 2016

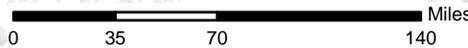
Basin-wide  
Water Year  
Precipitation to date  
as a Percent of  
the 1981-2010 Average



*Provisional data  
subject to revision*



Prepared by:  
USDA/NRCS Nevada Snow Survey



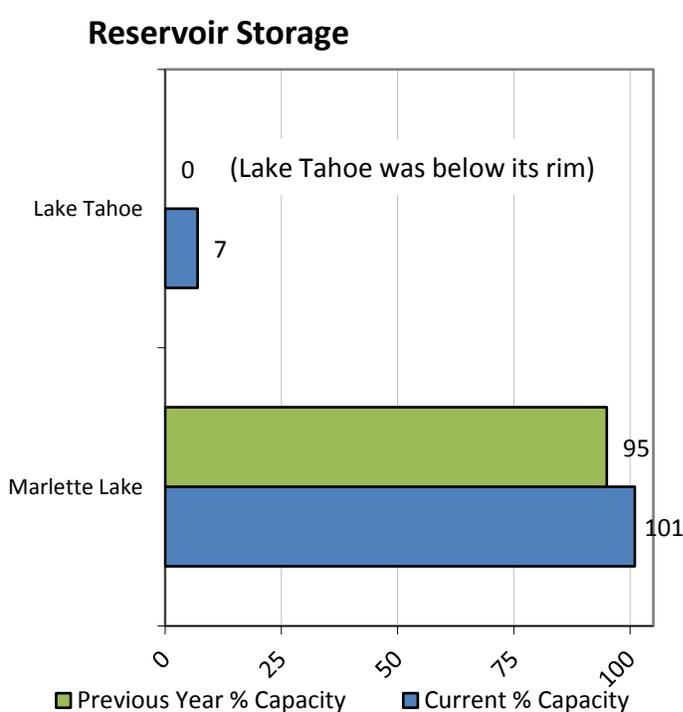
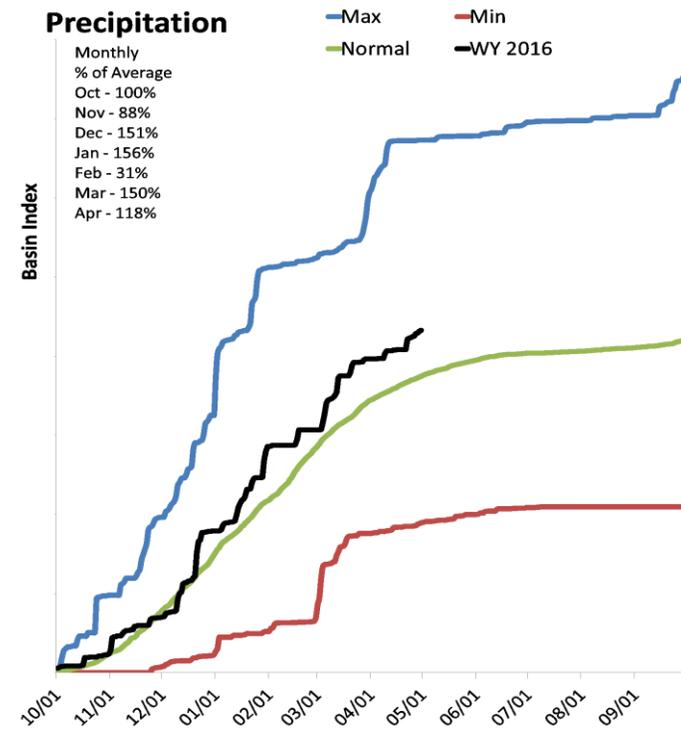
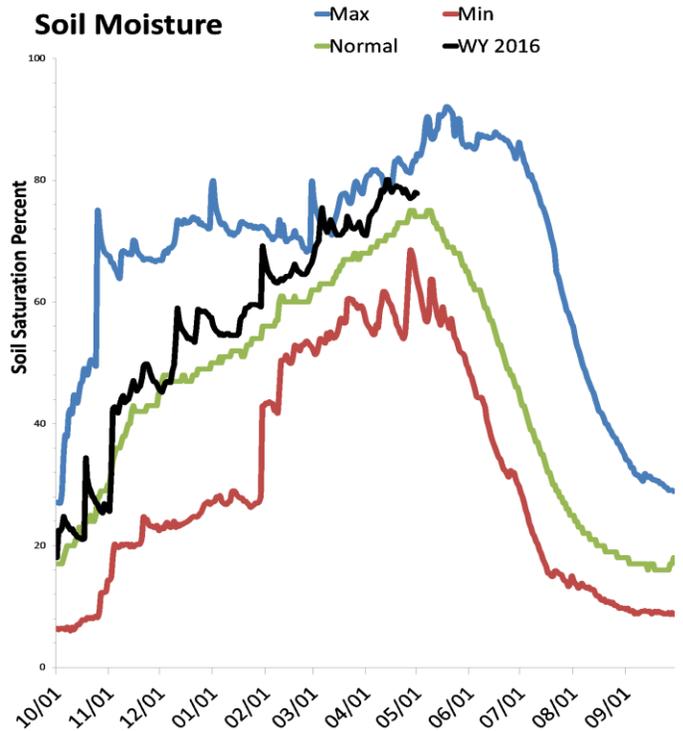
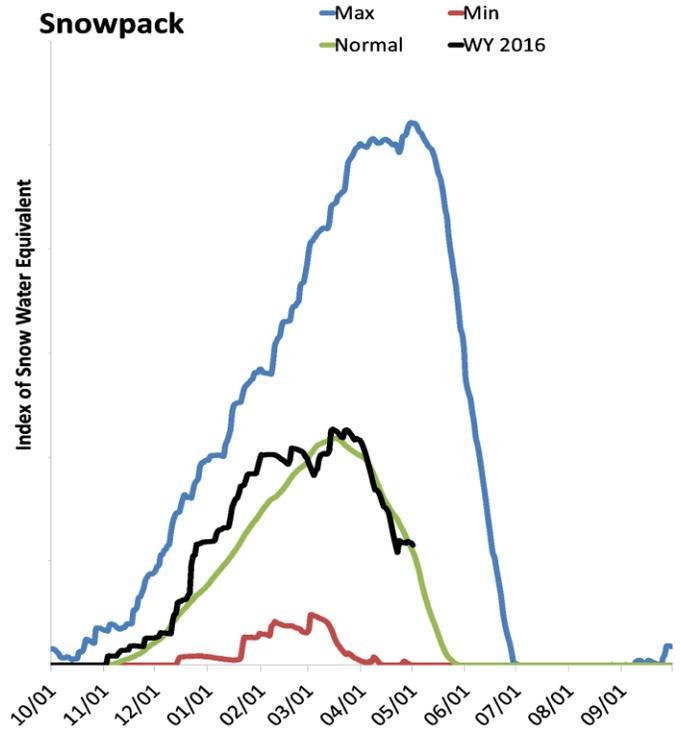
Map data based water year to date precipitation for the first of the month at selected SNOTEL sites in or near the basin compared to the average value for those sites. SNOTEL data based on the first reading of the day (typically midnight). A table based, station-by-station, report of the underlying data 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

5/1/2016

Snowpack in the Lake Tahoe Basin is near normal at 106% of median, compared to 0% last year. Precipitation in April was above average at 118%, which brings the seasonal accumulation (Oct-Apr) to 116% of average. Soil moisture is 78% compared to 69% last year. Lake Tahoe's water elevation is 6223.4 ft, which is 0.4 ft above the lake's natural rim and equals a storage of approximately 49 thousand acre-feet. Last year the elevation was 6222.86 ft which equaled a storage deficit of approximately 17 thousand acre-feet. Lake Tahoe is forecast to rise 0.76 feet from May 1 to its highest elevation.



### Lake Tahoe Basin Streamflow Forecasts - May 1, 2016

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast
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Lake Tahoe Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Marlette Lake Inflow <sup>2</sup>	APR-JUL	350	640	840	101%	1050	1340	830
	MAY-JUL	30	310	500	93%	690	970	540
Lake Tahoe Rise Gates Closed <sup>1</sup>	APR-HIGH	0.8	1.11	1.2	92%	1.3	1.51	1.31
	MAY-HIGH	0.47	0.67	0.76	70%	0.85	1.05	1.08

- 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

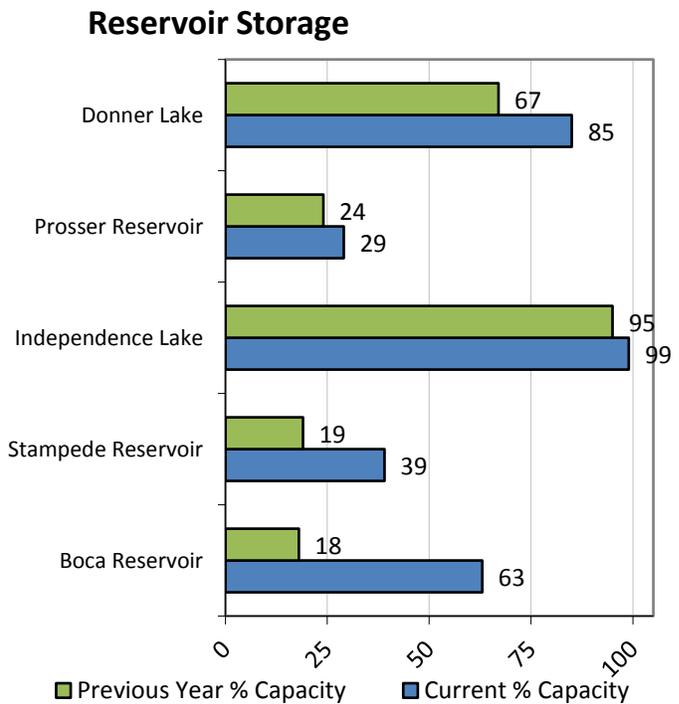
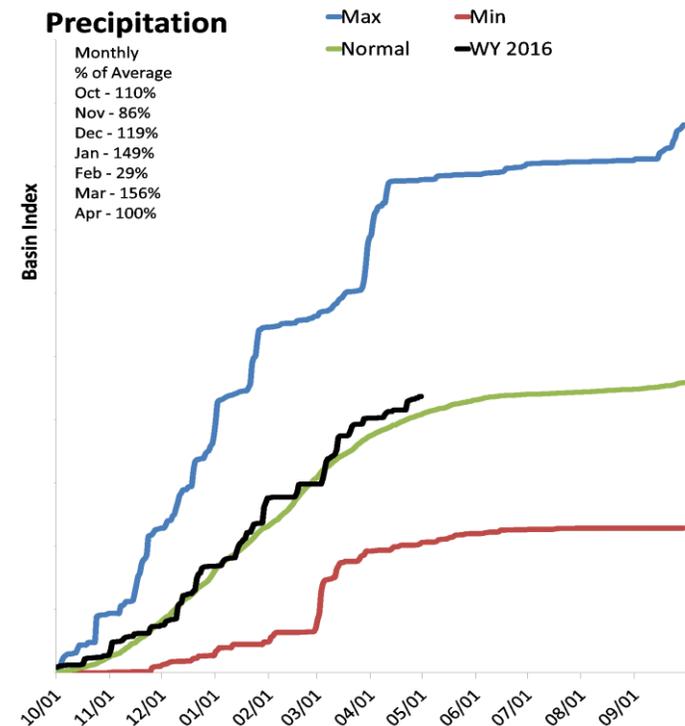
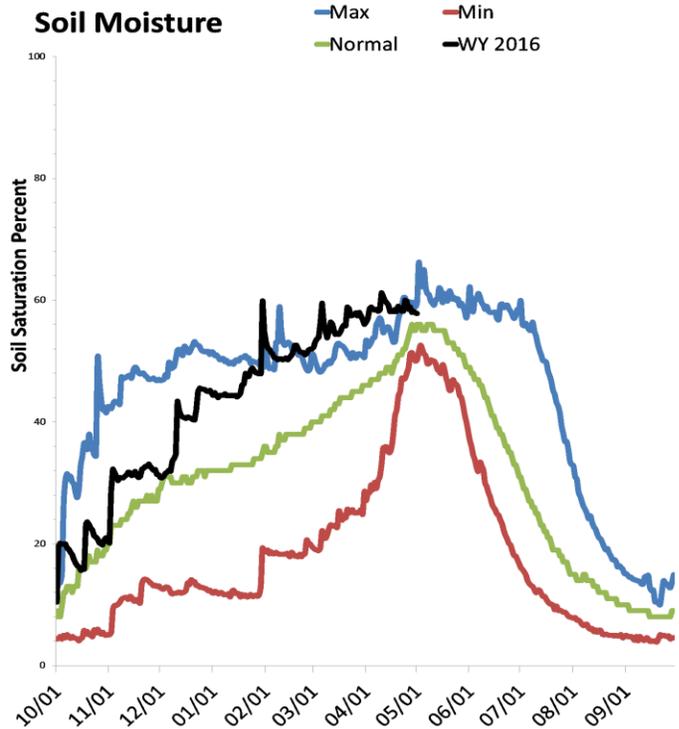
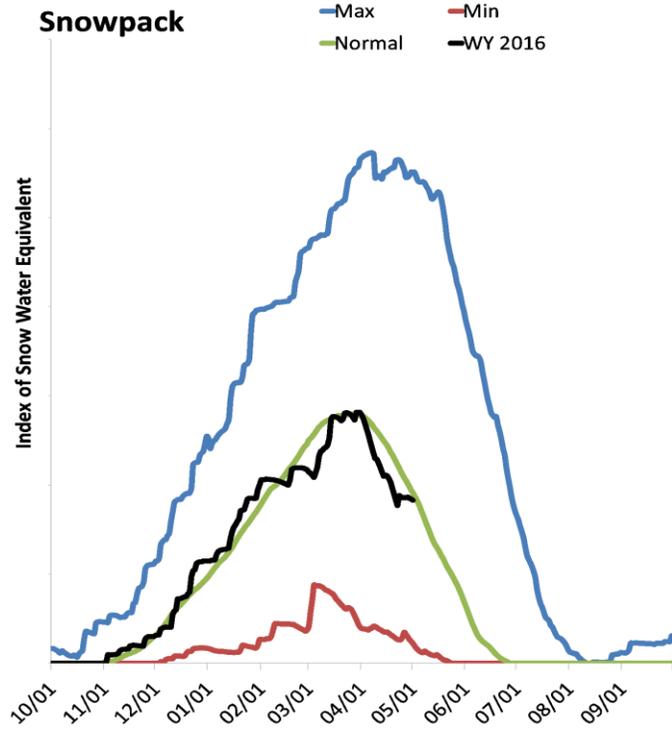
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Tahoe	48.6	0.0	334.7	744.6
Marlette Lk nr Carson City, NV	11.9	11.2	11.9	11.8
Basin-wide Total	60.5	11.2	346.6	756.4
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Lake Tahoe Basin	9	106%	0%

# Truckee River Basin

5/1/2016

Snowpack in the Truckee River Basin is near normal at 98% of median, compared to 9% last year. Precipitation in April was near average at 100%, which brings the seasonal accumulation (Oct-Apr) to 107% of average. Soil moisture is 58% compared to 52% last year. Combined reservoir storage is 46% of capacity, compared to 25% last year. Forecast streamflow volumes range from 90% to 107% of average.



## Truckee River Basin Streamflow Forecasts - May 1, 2016

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	APR-JUL	4.7	5.2	5.6	100%	6	6.6	5.6
	MAY-JUL	2.7	3.1	3.4	81%	3.7	4.2	4.2
L Truckee R ab Boca Reservoir <sup>2</sup>	APR-JUL	80	86	90	107%	97	110	84
	MAY-JUL	38	52	62	98%	72	86	63
Truckee R at Farad <sup>2</sup>	APR-JUL	235	255	265	104%	275	305	255
	MAY-JUL	141	164	180	98%	196	220	183
Galena Ck at Galena Ck State Pk	APR-JUL	2.8	3.6	4.2	96%	4.8	5.6	4.37
	MAY-JUL	2.4	3.1	3.5	96%	3.9	4.6	3.65
Steamboat Ck at Steamboat	APR-JUL	3	5	6.9	90%	9.2	13.4	7.7
	MAY-JUL	2.7	4.7	6.6	112%	8.9	13.1	5.9
Pyramid Lake Elevation Change <sup>1</sup>	LOW-HIGH	-1.05	0.64	1.4	82%	2.2	3.9	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

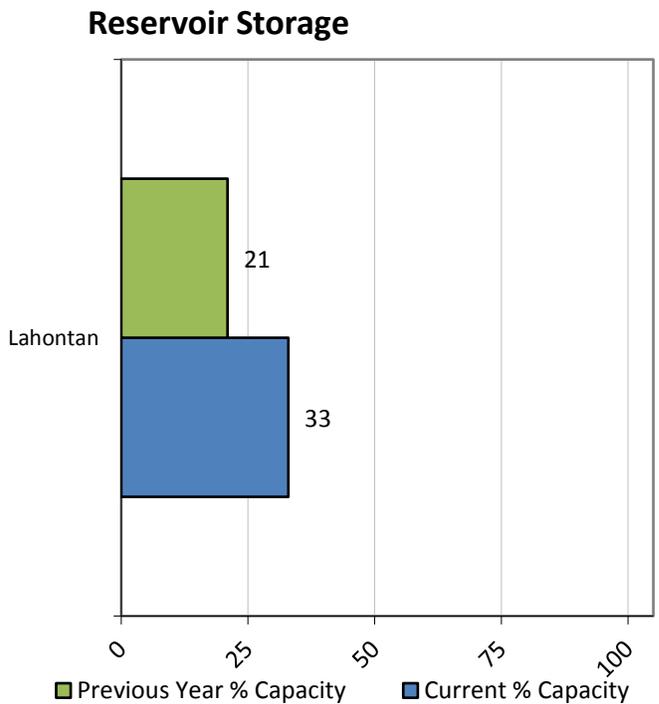
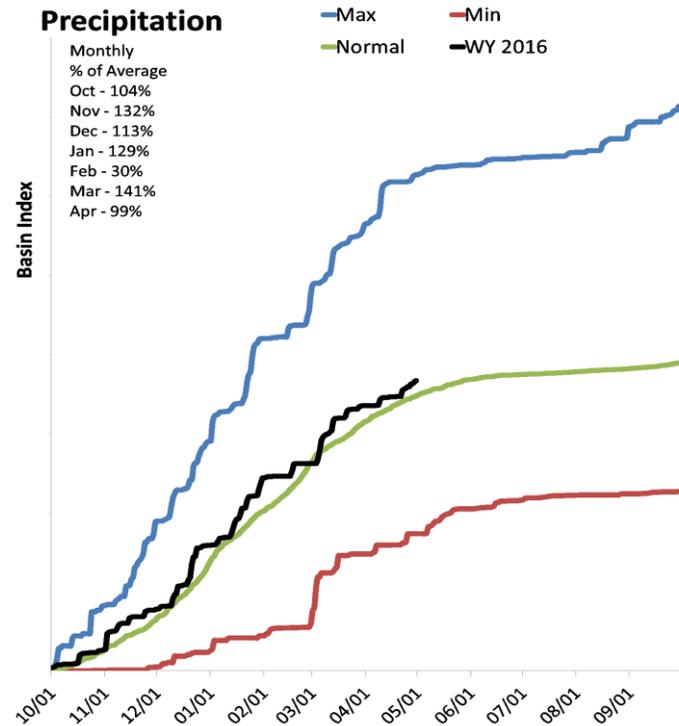
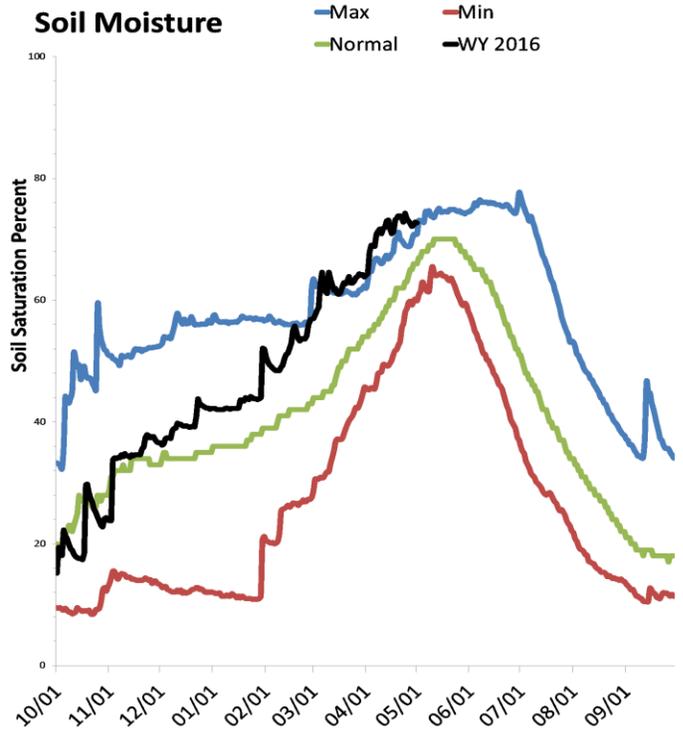
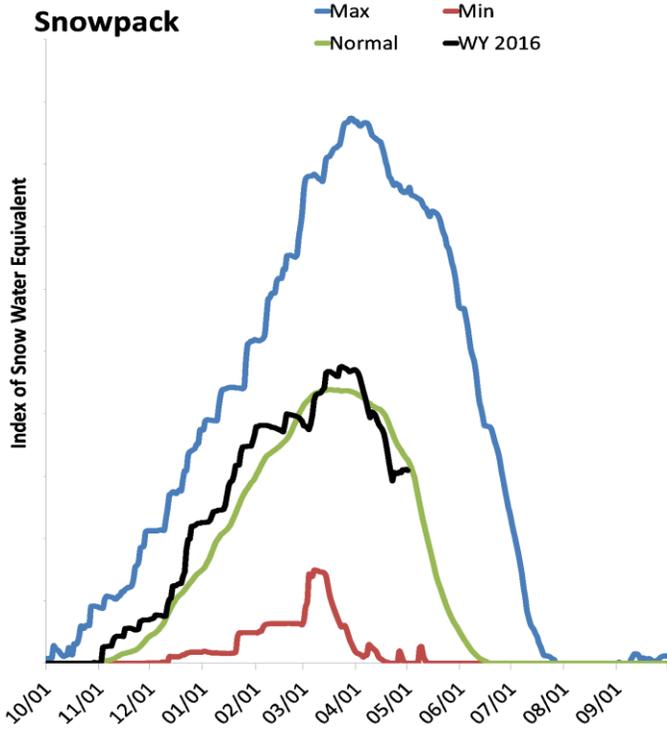
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Boca Reservoir	25.8	7.3	26.7	40.9
Donner Lake	8.0	6.3	6.5	9.5
Independence Lake	17.1	16.5	15.0	17.3
Prosser Reservoir	8.3	6.9	14.1	28.6
Stampede Reservoir	88.5	42.3	155.6	226.5
Basin-wide Total	147.7	79.3	217.9	322.8
# of reservoirs	5	5	5	5

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Truckee River Basin	10	98%	9%
Little Truckee River	3	109%	29%
Sagehen & Independence Creeks	3	109%	29%
Galena Creek	1	96%	12%
Steamboat Creek	1	96%	12%
Truckee River above Pyramid Lake	19	100%	6%

# Carson River Basin

5/1/2016

Snowpack in the Carson River Basin is near normal at 98% of median, compared to 0% last year. Precipitation in April was near average at 99%, which brings the seasonal accumulation (Oct-Apr) to 106% of average. Soil moisture is 72% compared to 66% last year. Storage in Lahontan Reservoir is 33% of capacity, compared to 21% last year. Forecast streamflow volumes range from 89% to 109% of average.



### Carson River Basin Streamflow Forecasts - May 1, 2016

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	APR-JUL	120	156	180	97%	205	240	186
	MAY-JUL	98	120	135	89%	150	172	151
	200 cfs	01 Jul	09 Jul	14 Jul		19 Jul	27 Jul	
	500 cfs	07 Jun	16 Jun	22 Jun		28 Jun	07 Jul	
WF Carson R nr Woodfords	APR-JUL	45	53	59	109%	65	73	54
	MAY-JUL	28	37	43	102%	49	57	42
Carson R nr Carson City	APR-JUL	149	174	192	107%	210	245	179
	MAY-JUL	101	129	150	104%	173	210	144
King Canyon Ck nr Carson City	APR-JUL	0.02	0.16	0.34	89%	0.52	0.78	0.38
	MAY-JUL	0.02	0.15	0.3	111%	0.45	0.67	0.27
Ash Canyon Ck nr Carson City	APR-JUL	0.68	0.96	1.15	103%	1.34	1.62	1.12
	MAY-JUL	0.57	0.8	0.96	105%	1.12	1.35	0.91
Carson R at Ft Churchill	APR-JUL	120	140	155	91%	182	205	171
	MAY-JUL	73	98	118	86%	140	178	138

- 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

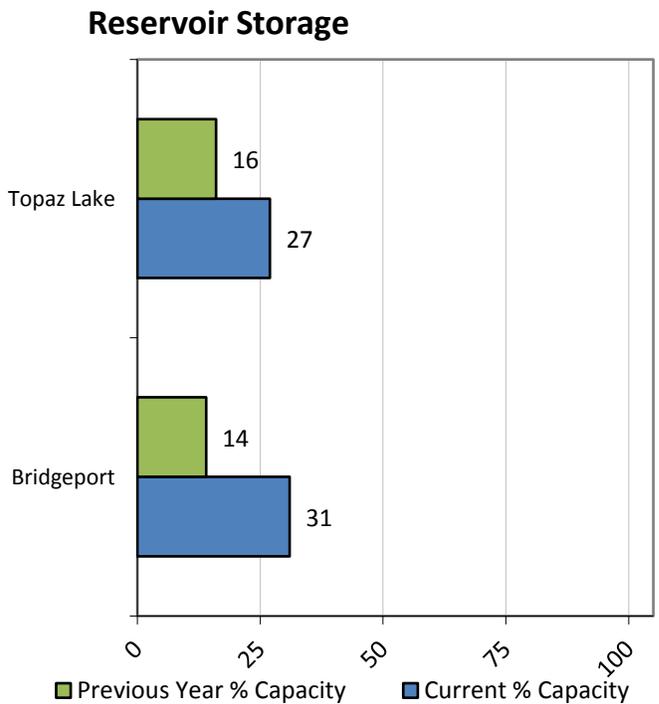
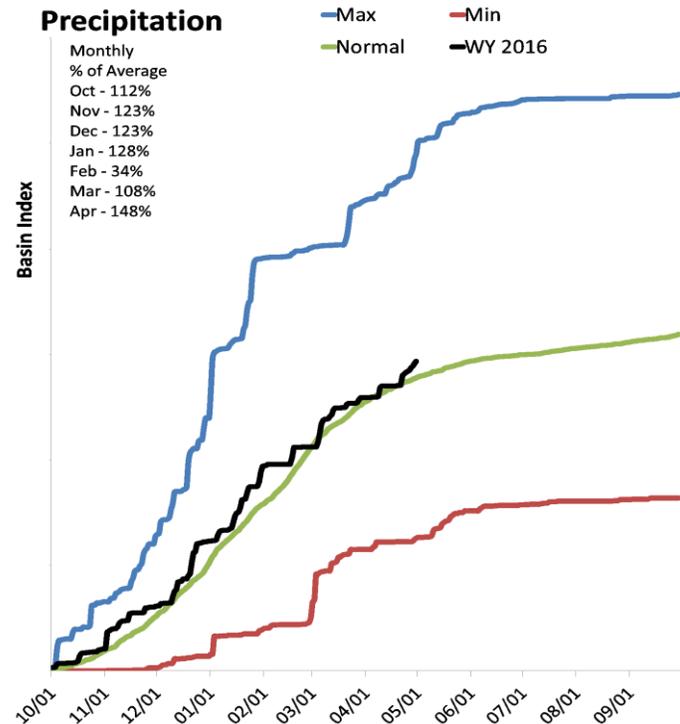
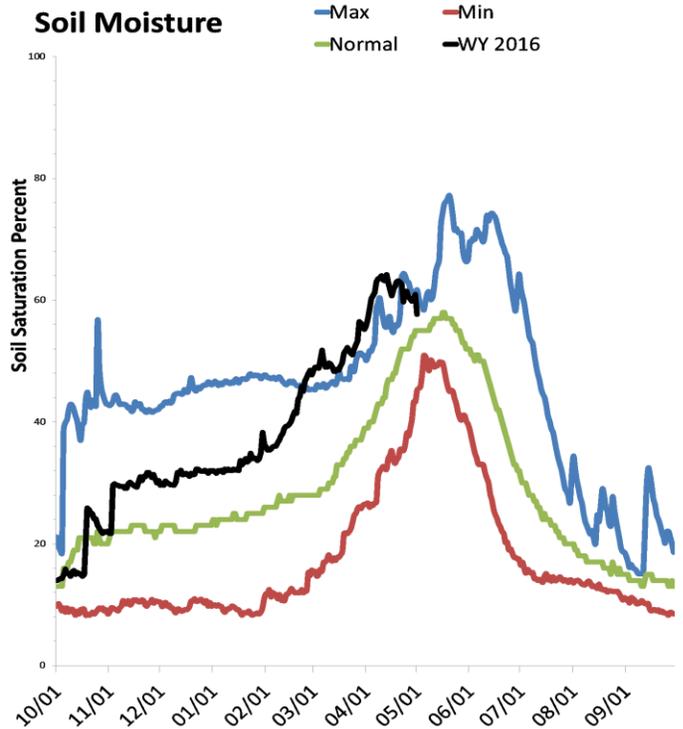
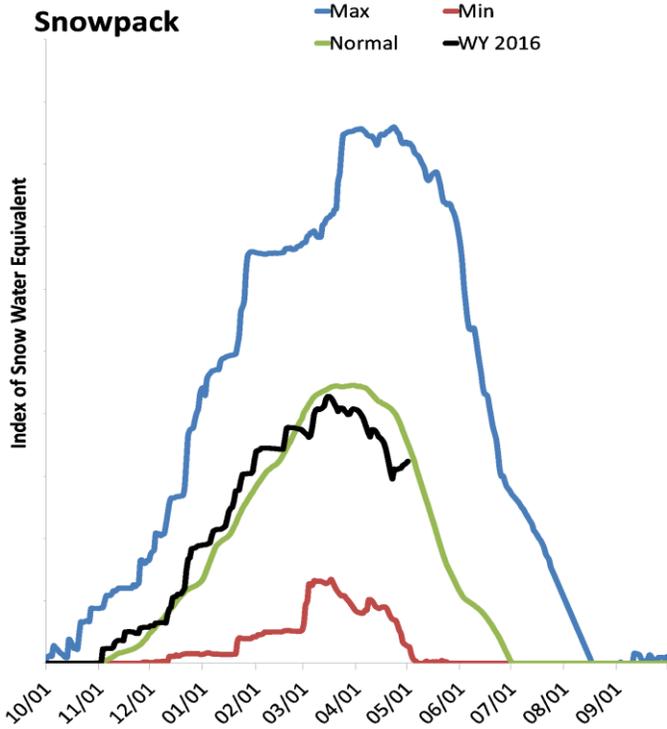
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lahontan Reservoir, NV	96.1	61.3	204.2	295.1
Basin-wide Total	96.1	61.3	204.2	295.1
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Carson River Basin	10	98%	0%
East Fork Carson River	6	92%	0%
West Fork Carson River	7	101%	0%

# Walker River Basin

5/1/2016

Snowpack in the Walker River Basin is near normal at 92% of median, compared to 16% last year. Precipitation in April was much above average at 149%, which brings the seasonal accumulation (Oct-Apr) to 106% of average. Soil moisture is 61% compared to 54% last year. Combined reservoir storage is 29% of capacity, compared to 15% last year. Forecast streamflow volumes range from 91% to 102% of average.



## Walker River Basin Streamflow Forecasts - May 1, 2016

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 <sup>2</sup>	APR-AUG	11.6	42	62	91%	82	112	68
	MAY-AUG	16.4	42	59	107%	76	102	55
W Walker R bl L Walker nr Coleville	APR-JUL	132	150	162	100%	174	192	162
	MAY-JUL	104	124	137	96%	151	171	142
W Walker R nr Coleville	APR-JUL	136	154	166	102%	178	196	163
	MAY-JUL	50	105	143	100%	181	235	143
Walker Lake Elevation Change <sup>1</sup>	LOW-HIGH	0.04	0.33	1.3	92%	2.3	4.4	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

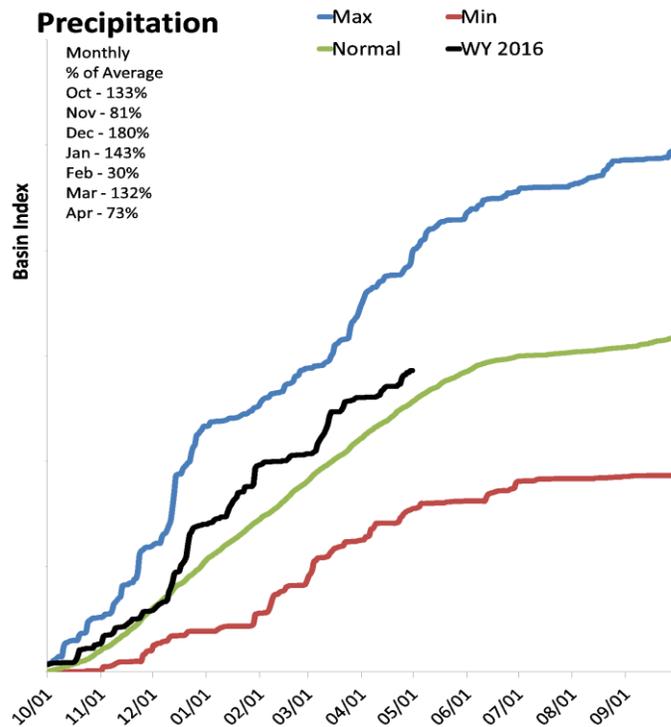
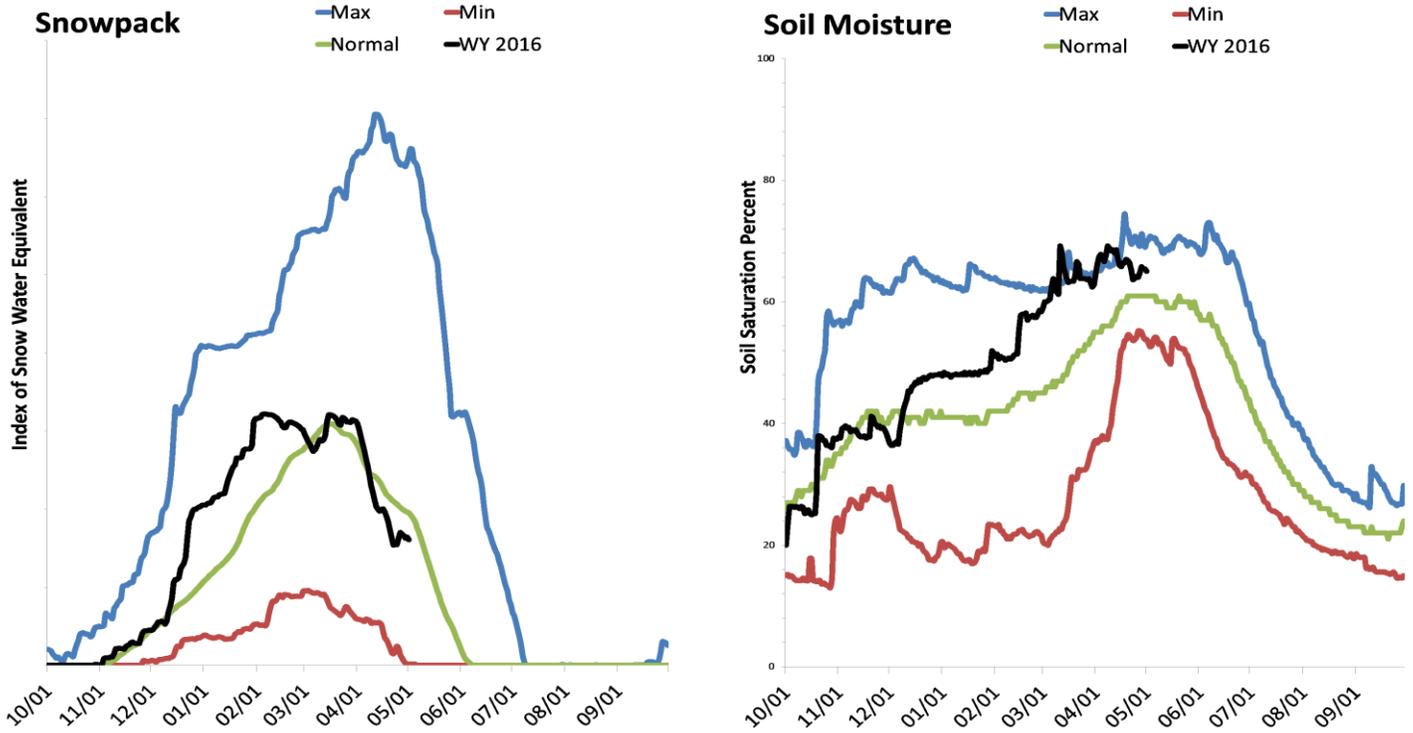
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	13.4	5.9	23.9	42.5
Topaz Lk nr Topaz, CA	16.1	9.8	29.3	59.4
Basin-wide Total	29.4	15.7	53.2	101.9
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Walker River Basin	8	92%	16%
East Walker River above Bridgeport	2	98%	0%
West Walker River above Coleville	6	95%	18%

# Northern Great Basin

5/1/2016

Snowpack in the Northern Great Basin is below normal at 82% of median, compared to 8% last year. Precipitation in April was below average at 74%, which brings the seasonal accumulation (Oct-Apr) to 112% of average. Soil moisture is 65% compared to 56% last year. Forecast streamflow volumes range from 82% to 95% of average.



## Northern Great Basin Streamflow Forecasts - May 1, 2016

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	3900	5000	5900	82%	7000	9000	7233
	APR-SEP	4400	5600	6600	83%	7700	9700	7991
Bidwell Ck nr Fort Bidwell	APR-JUL	7.8	9.7	11	92%	12.3	14.2	12
Eagle Ck nr Eagleville	APR-JUL	2.3	3.4	4.1	95%	4.8	5.9	4.3
McDermitt Ck nr McDermitt	MAR-JUN	7	11.8	15	86%	18.2	23	17.5
	APR-JUL	4	8.2	11	85%	13.8	18	13

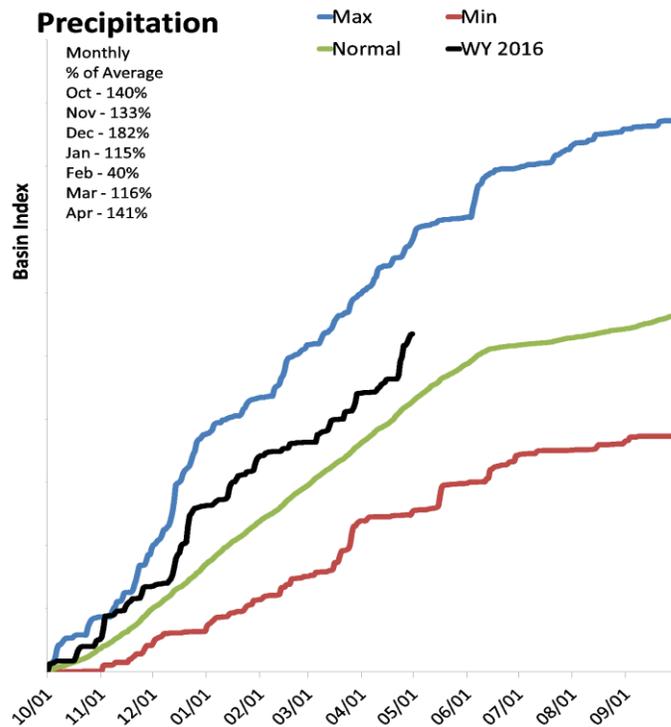
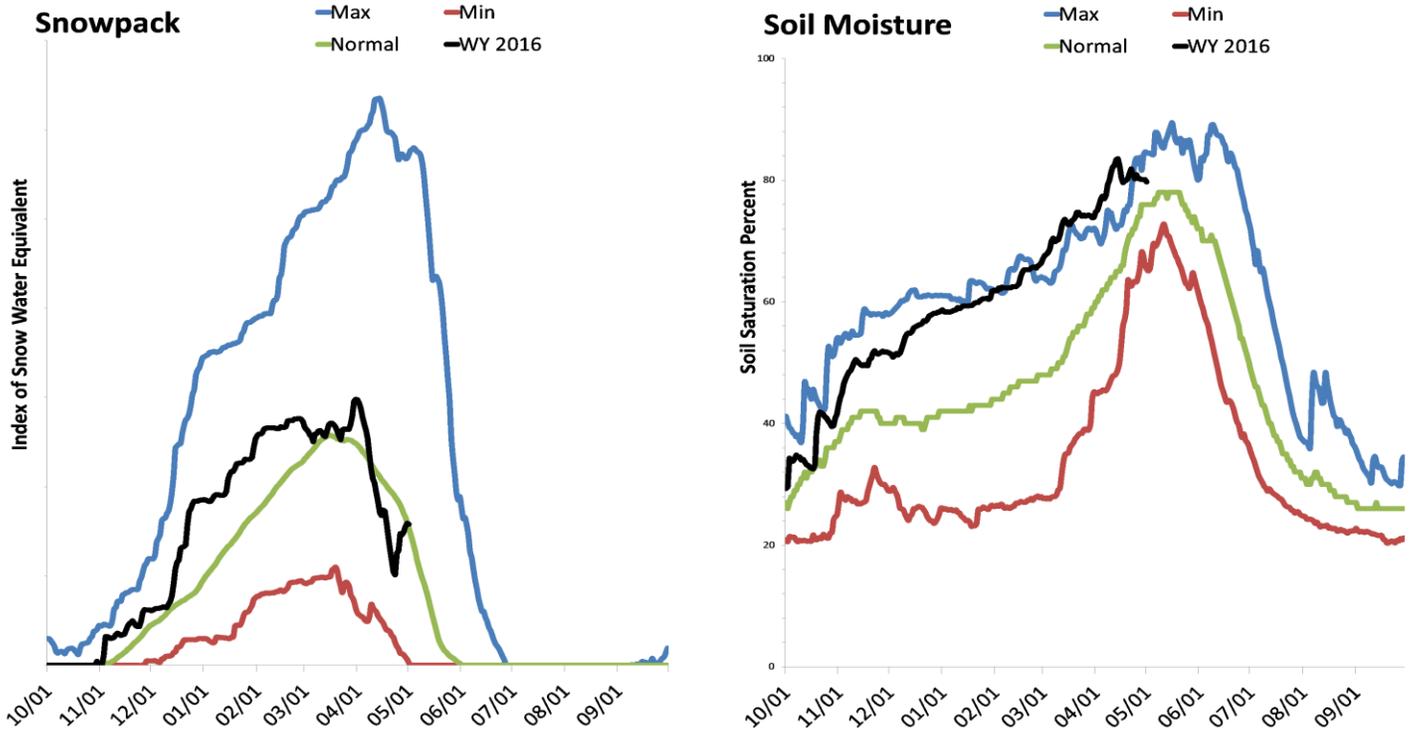
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Northern Great Basin	7	82%	8%
Surprise Valley - Warner Mtns	2	81%	12%
McDermitt Creek	1		
Quinn River	4	84%	0%

# Upper Humboldt River Basin

5/1/2016

Snowpack in the Upper Humboldt River Basin above Palisade is near normal at 103% of median, compared to 2% last year. Precipitation in April was much above average at 141%, which brings the seasonal accumulation (Oct-Apr) to 125% of average. Soil moisture is 78% compared to 71% last year. Forecast streamflow volumes range from 109% to 136% of average.



## Upper Humboldt River Basin Streamflow Forecasts - May 1, 2016

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	APR-JUL	21	34	43	119%	52	65	36
	MAY-JUL	16.5	25	31	119%	37	46	26
Lamoille Ck nr Lamoille	APR-JUL	21	28	33	114%	38	45	29
	MAY-JUL	16.7	24	29	107%	34	41	27
NF Humboldt R at Devils Gate	APR-JUL	16.4	26	35	109%	48	75	32
	MAY-JUL	10	16.4	23	119%	32	53	19.3
Humboldt R nr Elko	APR-JUL	107	141	165	124%	189	223	133
	MAY-JUL	82	113	133	132%	153	184	101
SF Humboldt R at Dixie	APR-JUL	66	80	90	136%	100	114	66
	MAY-JUL	51	66	76	133%	86	101	57
Humboldt R nr Carlin	APR-JUL	210	240	260	126%	280	310	206
	MAY-JUL	155	185	205	127%	225	255	161
Humboldt R at Palisade	APR-JUL	197	250	285	127%	320	375	225
	MAY-JUL	144	193	225	132%	260	310	171

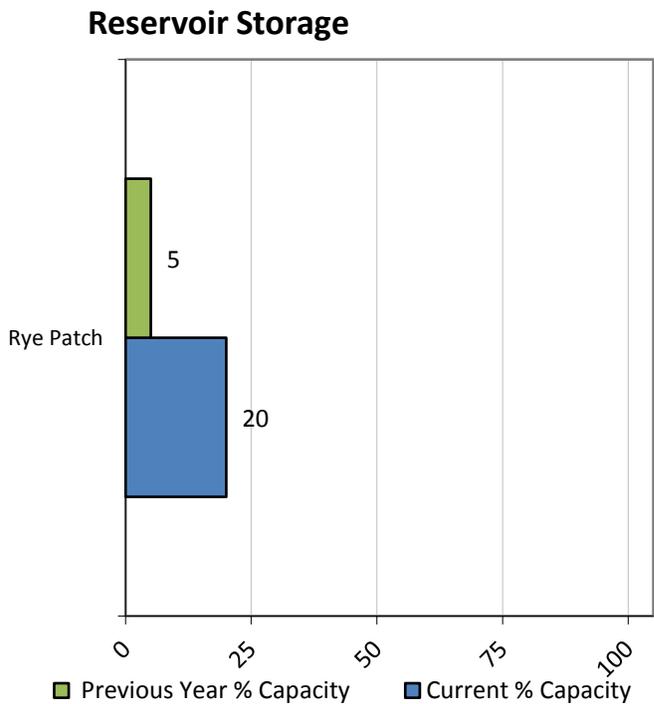
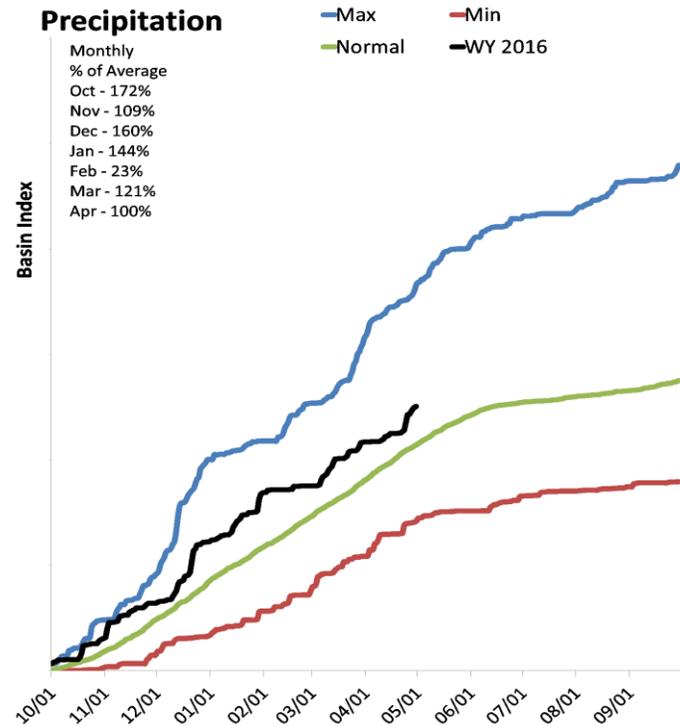
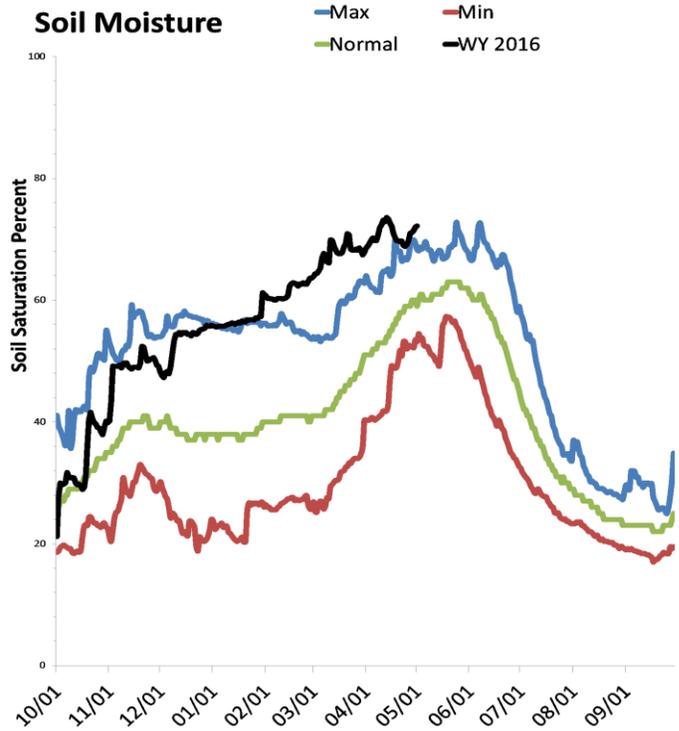
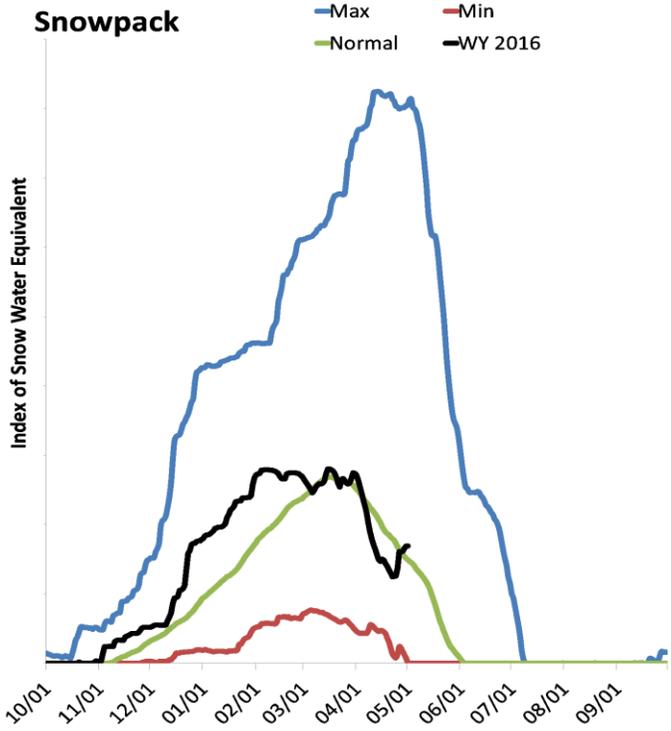
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
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- 3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Upper Humboldt River Basin	9	103%	2%
Mary's River	3	106%	5%
Lamoille Creek	1	46%	0%
North Fork Humboldt River	2	83%	0%
South Fork Humboldt River	2	142%	3%

# Lower Humboldt River Basin

5/1/2016

Snowpack in the Lower Humboldt River Basin below Palisade is above normal at 113% of median, compared to 1% last year. Precipitation in April was near average at 100%, which brings the seasonal accumulation (Oct-Apr) to 117% of average. Soil moisture is 70% compared to 69% last year. Storage in Rye Patch Reservoir is 20% of capacity, compared to 5% last year. Forecast streamflow volumes range from 91% to 108% of average.



### Lower Humboldt River Basin Streamflow Forecasts - May 1, 2016

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	APR-JUL	12.3	15.4	17.5	96%	19.6	23	18.2
	MAY-JUL	7.5	10.6	12.7	130%	14.8	18.2	9.8
Humboldt R at Comus	APR-JUL	142	194	230	108%	265	320	213
	MAY-JUL	116	159	188	121%	215	260	156
L Humboldt R nr Paradise	APR-JUL	6.7	8.7	10	103%	11.3	13.2	9.7
	MAY-JUL	4.3	6.3	7.6	100%	8.9	10.8	7.6
Martin Ck nr Paradise	APR-JUL	7.9	12.7	16	91%	19.3	24	17.5
	MAY-JUL	3.6	8.4	11.7	96%	15	19.7	12.2
Humboldt R nr Imlay	APR-JUL	60	134	185	104%	235	310	178
	MAY-JUL	46	115	162	122%	210	280	133

- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
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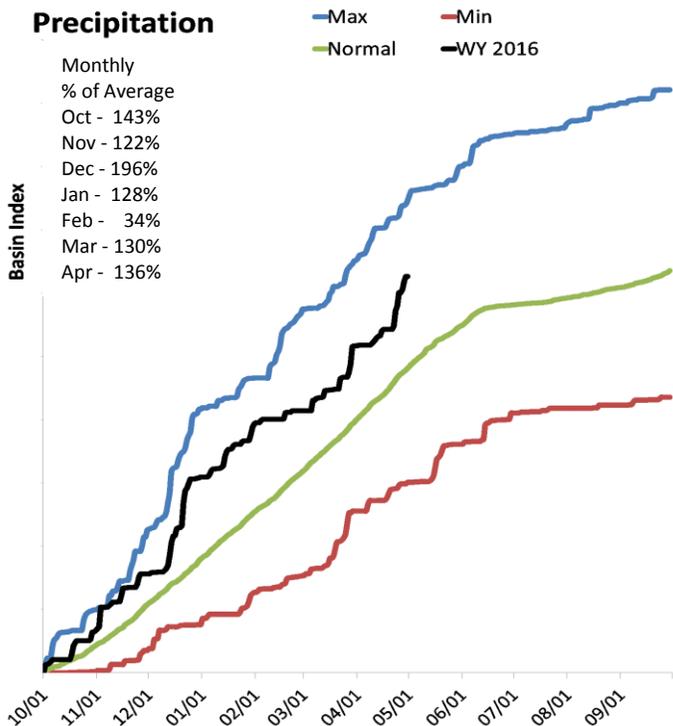
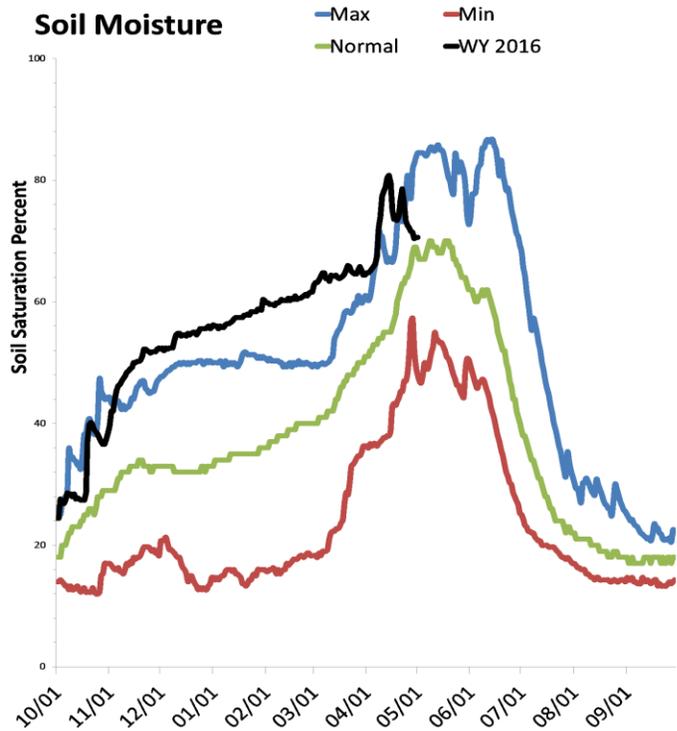
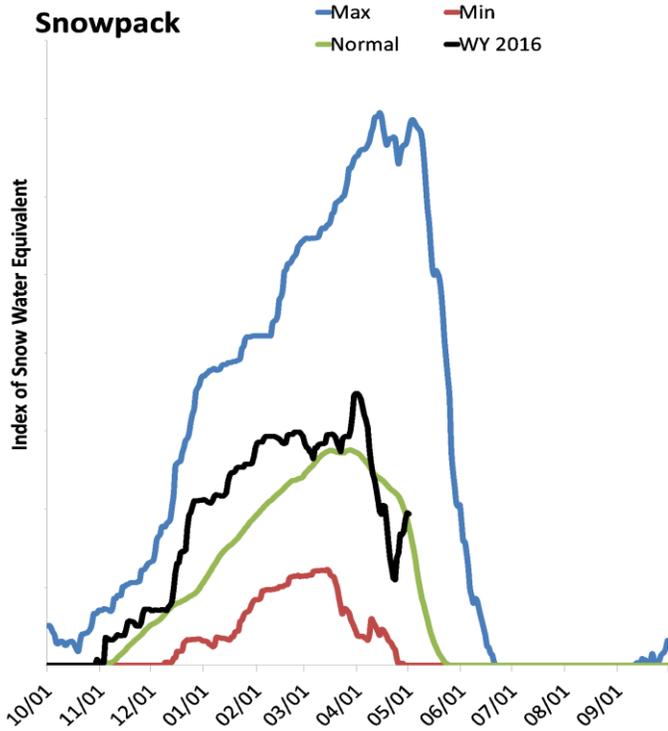
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Rye Patch Re nr Rye Patch, NV	39.7	9.6	93.1	194.3
Basin-wide Total	39.7	9.6	93.1	194.3
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Lower Humboldt River Basin	5	113%	1%
Rock Creek	0		
Reese River	2	146%	2%
Martin Creek	3	84%	0%
Little Humboldt River	3	84%	0%
Humboldt River above Imlay	14	107%	2%

# Clover Valley & Franklin River Basin

5/1/2016

Snowpack in the Clover Valley and Franklin River Basin is above normal at 119% of median, compared to 1% last year. Precipitation in April was much above average at 136%, which brings the seasonal accumulation (Oct-Apr) to 128% of average. Soil moisture is 70% compared to 64% last year. The forecast streamflow volume for the Franklin River is 109% of average.



## ATTENTION WATER USERS:

On December 23, 2015 Hole-in-Mountain SNOTEL was destroyed by an avalanche. That site's data has been removed from the graphs in this report. As such graphs in this report are based the remaining sites listed in the update report. Snow surveyors will continue to visit the Hole-in-Mountain location to make manual snow tube measurements to allow data editors to estimate first of month snow. First of month precipitation will be estimated using statistical relationships with nearby sites. These estimates are reflected in data presented in the paragraph above and the following page's snowpack analysis. Hole-in-Mountain SNOTEL will hopefully be relocated next summer to a safer location and new averages will be developed in the coming years.

## Clover Valley & Franklin River Basin Streamflow Forecasts - May 1, 2016

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	5.9	6.8	7.5	109%	8.2	9.1	6.9

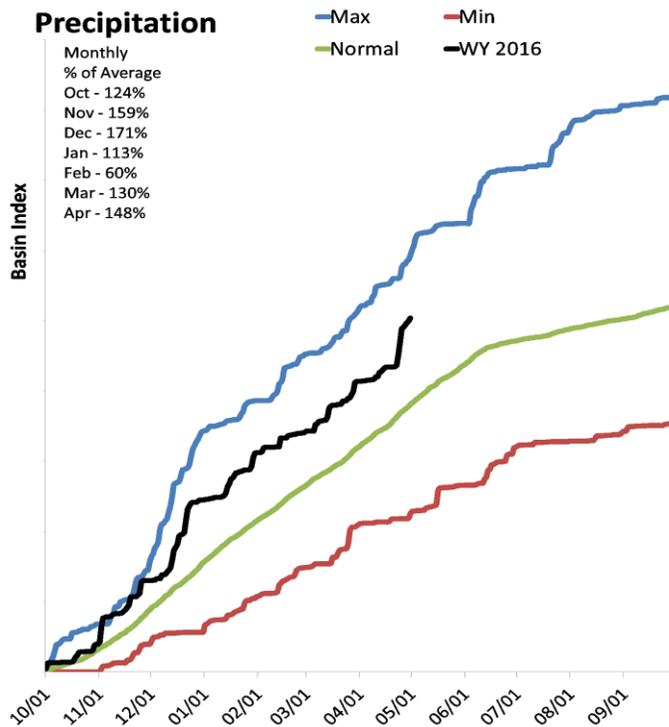
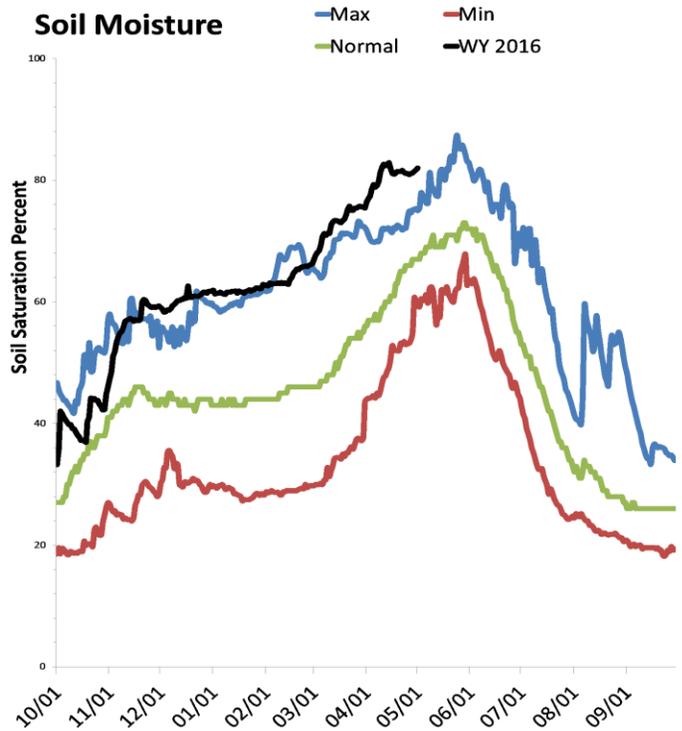
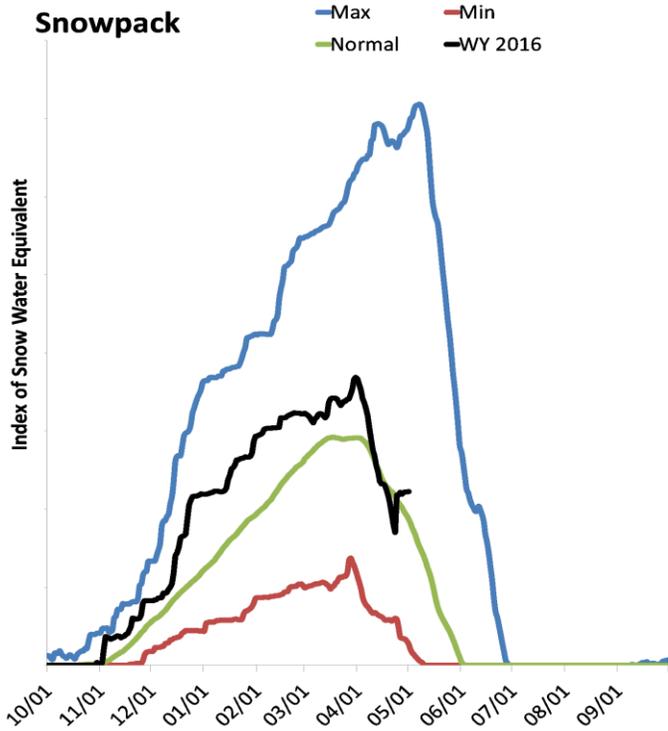
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
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<b>Watershed Snowpack Analysis May 1, 2016</b>	# of Sites	% Median	Last Year % Median
Clover Valley & Franklin River Basin	5	119%	1%
Clover Valley	2	118%	0%
Franklin River	4	109%	2%

# Snake River Basin

5/1/2016

Snowpack in the Snake River Basin is above normal at 119% of median, compared to 21% last year. Precipitation in April was much above average at 147%, which brings the seasonal accumulation (Oct-Apr) to 132% of average. Soil moisture is 76% compared to 70% last year. The forecast streamflow volume for Salmon Falls Creek is 100% of average.



## Snake River Basin Streamflow Forecasts - May 1, 2016

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	MAY-JUL	31	42	49	100%	56	67	49
	MAY-SEP	34	45	52	98%	59	70	53

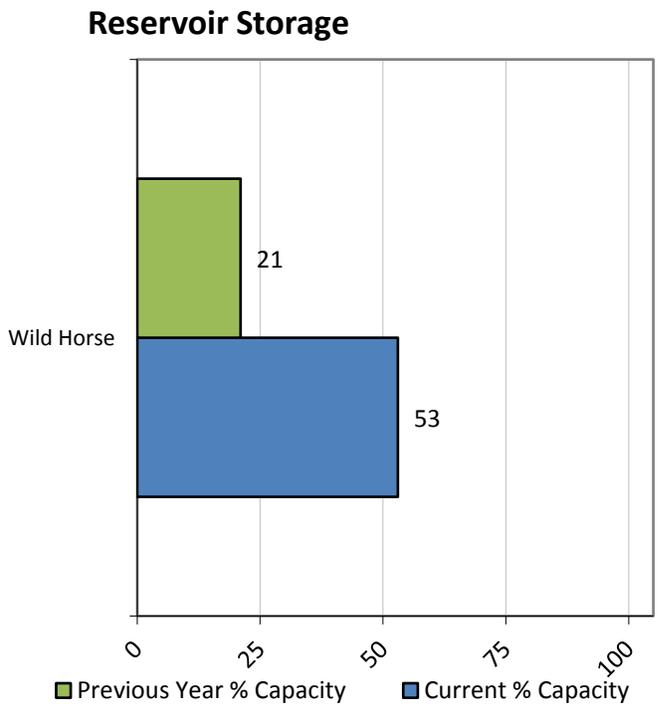
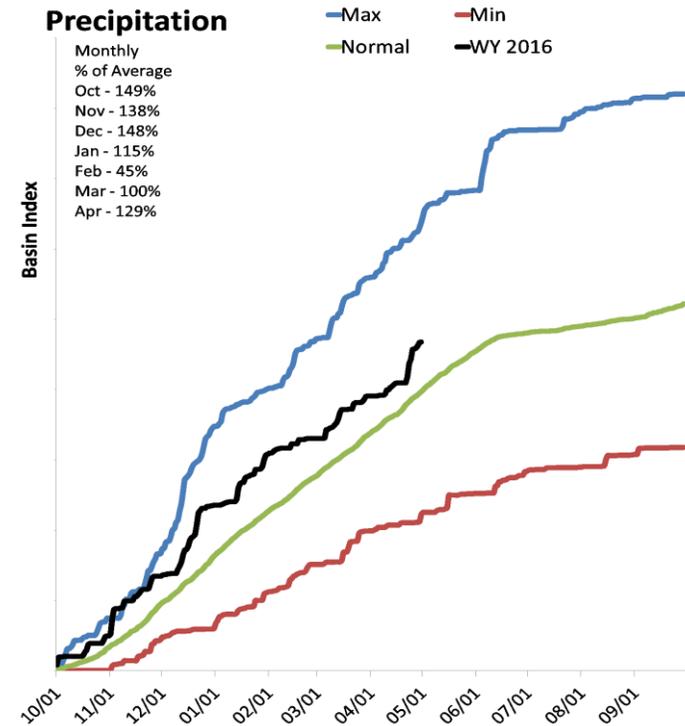
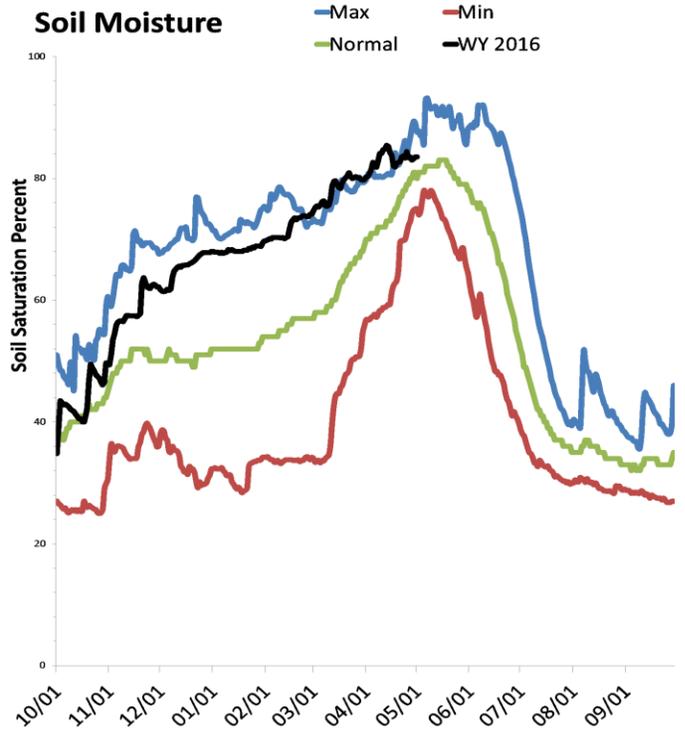
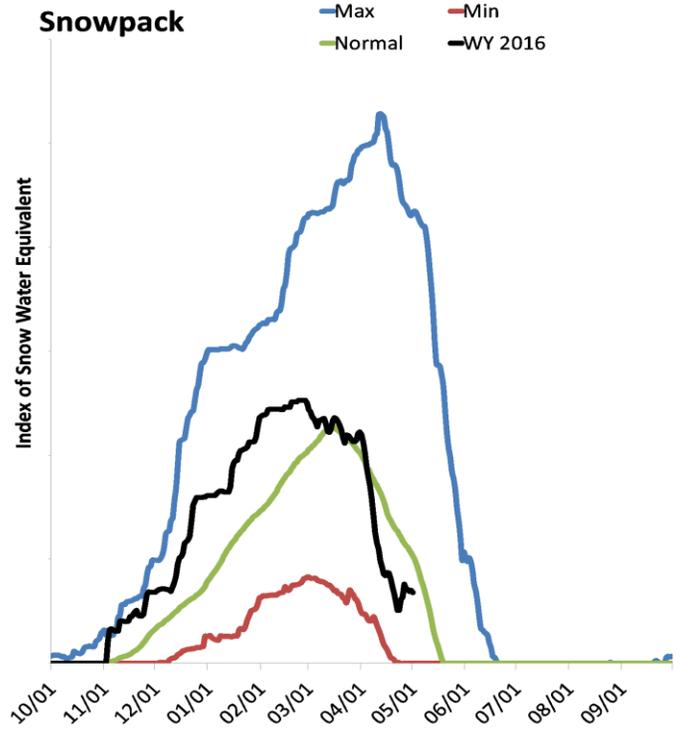
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- 3) Median value used in place of average

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Snake River Basin	7	119%	21%
Bruneau River	5	122%	30%
Jarbidge River	3	134%	36%
Salmon Falls Creek	5	119%	21%

# Owyhee River Basin

5/1/2016

Snowpack in the Owyhee River headwaters is much below normal at 66% of median, compared to 0% last year. Precipitation in April was above average at 130%, which brings the seasonal accumulation (Oct-Apr) to 118% of average. Soil moisture is 82% compared to 66% last year. Storage in Wildhorse Reservoir is 53% of capacity, compared to 21% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 92% of average.



## Owyhee River Basin Streamflow Forecasts - May 1, 2016

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 <sup>2</sup>	MAY-JUL	0.23	3.2	8.8	92%	18.7	44	9.6
	MAY-SEP	0.06	2.5	8	96%	18.6	47	8.3

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- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
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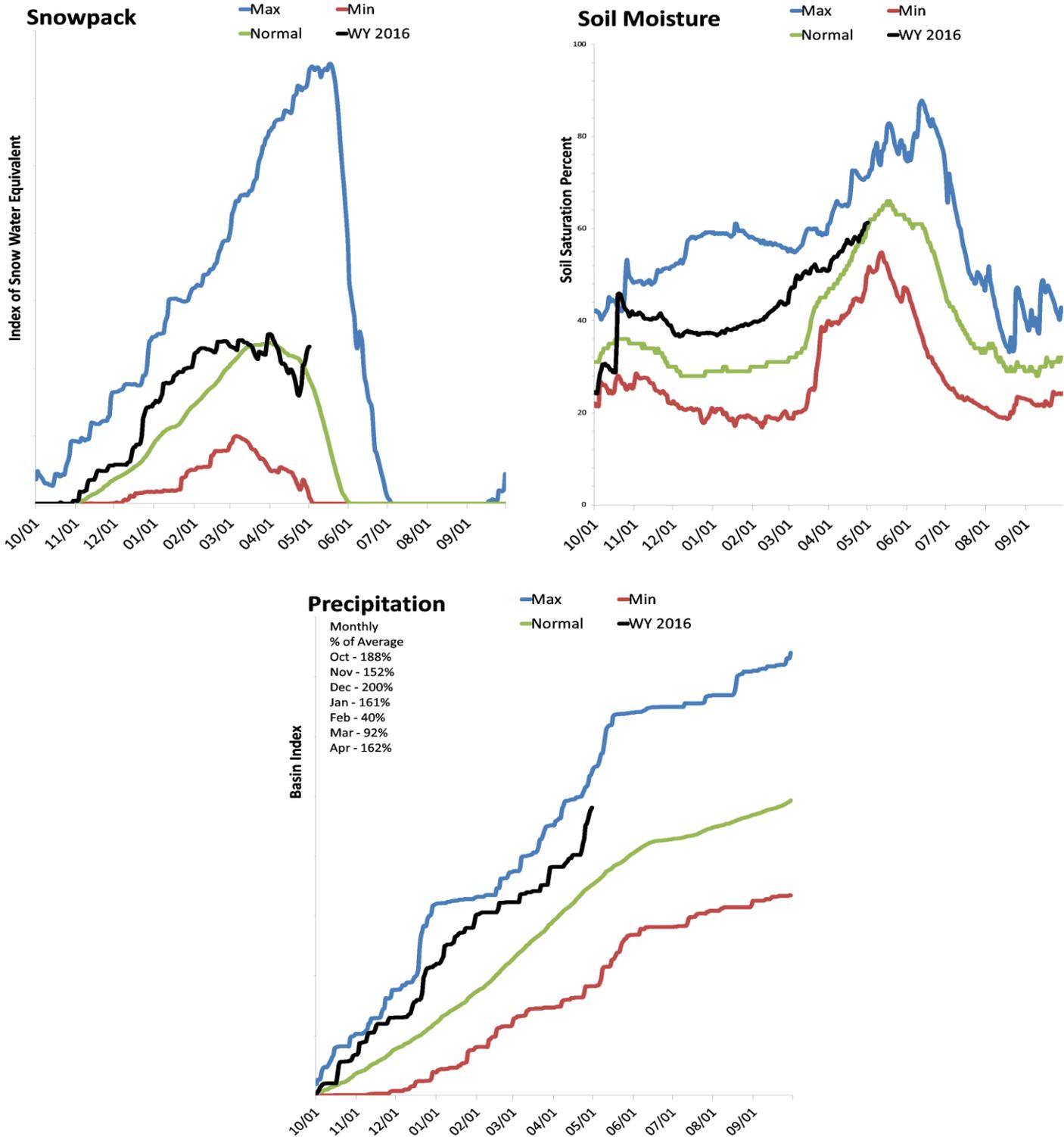
Reservoir Storage End of April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Wild Horse Reservoir	37.5	14.7	49.4	71.5
Basin-wide Total	37.5	14.7	49.4	71.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Owyhee River Basin	5	66%	0%
Owyhee River above Owyhee	4	66%	0%
Owyhee River above Gold Creek	2	83%	0%
South Fork Owyhee River	2	83%	0%

# Eastern Nevada

5/1/2016

Snowpack in Eastern Nevada is above normal at 127% of median, compared to 5% last year. Precipitation in April was much above average at 161%, which brings the seasonal accumulation (Oct-Apr) to 137% of average. Soil moisture is 56% compared to 51% last year. Forecast streamflow volumes range from 113% to 136% of average.



### Eastern Nevada Streamflow Forecasts - May 1, 2016

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	1.56	3.4	4.7	131%	6	7.8	3.6
Steptoe Ck nr Ely	APR-JUL	1.75	2.3	2.7	113%	3	3.5	2.4
	MAY-JUL	1.55	2.1	2.5	119%	2.8	3.3	2.1
Cleve Ck nr Ely	APR-JUL	3.4	4.6	5.4	122%	6.2	7.4	4.41
	MAY-JUL	2.9	4.1	4.9	134%	5.7	6.9	3.66
Lehman Ck nr Baker	APR-JUL	2.7	3.3	3.7	136%	4.2	4.8	2.72
	MAY-JUL	2.6	3.2	3.6	138%	4.1	4.7	2.61

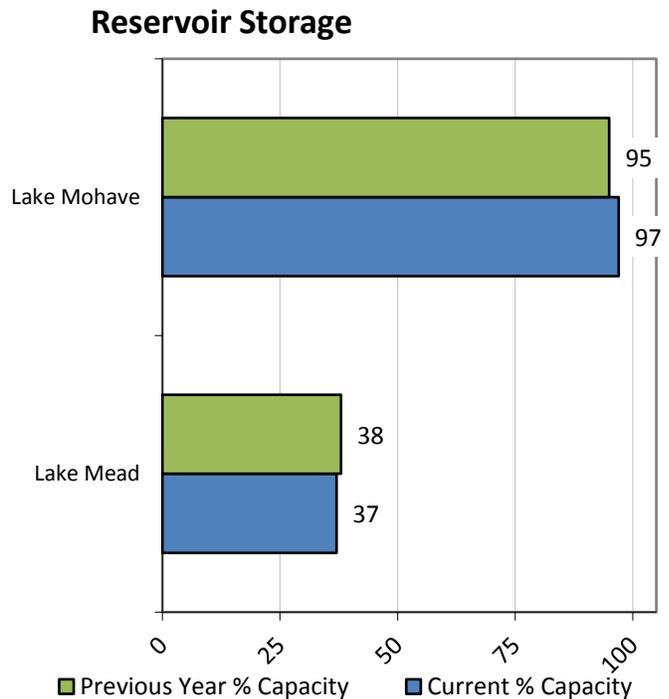
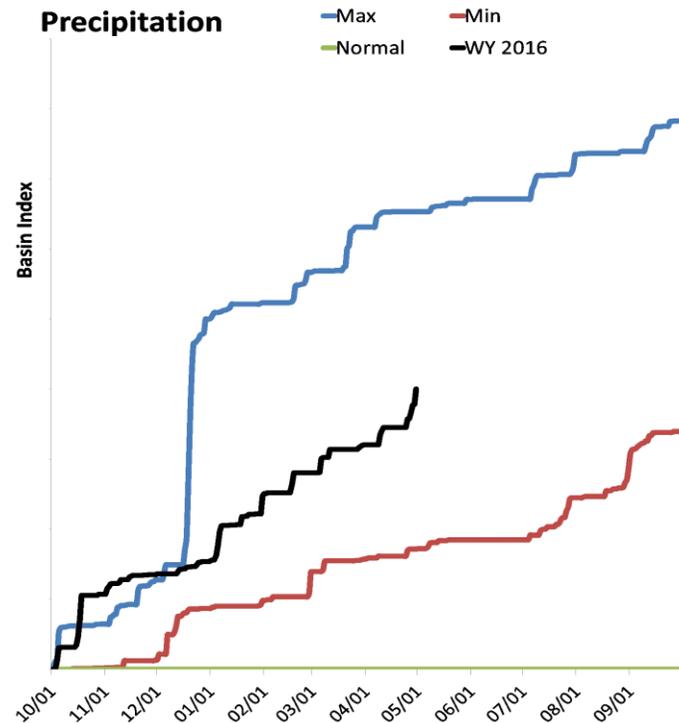
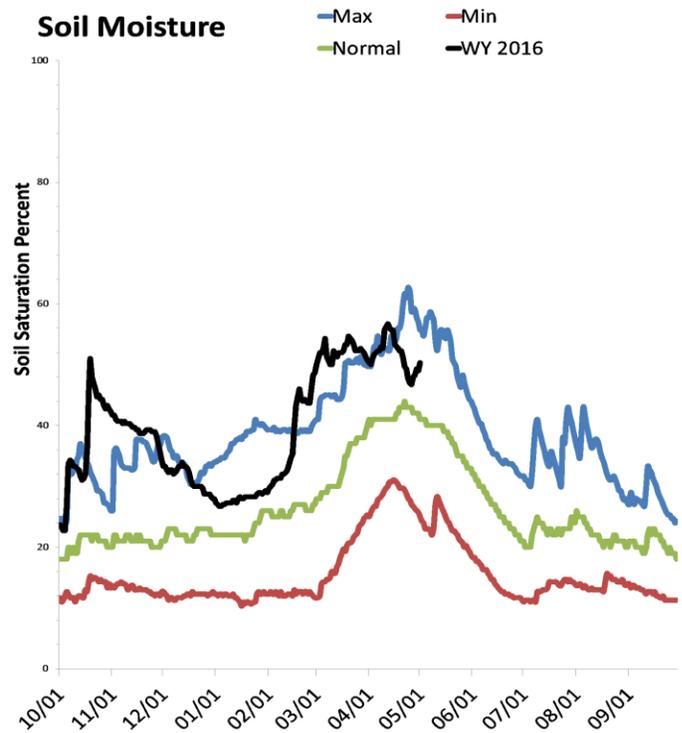
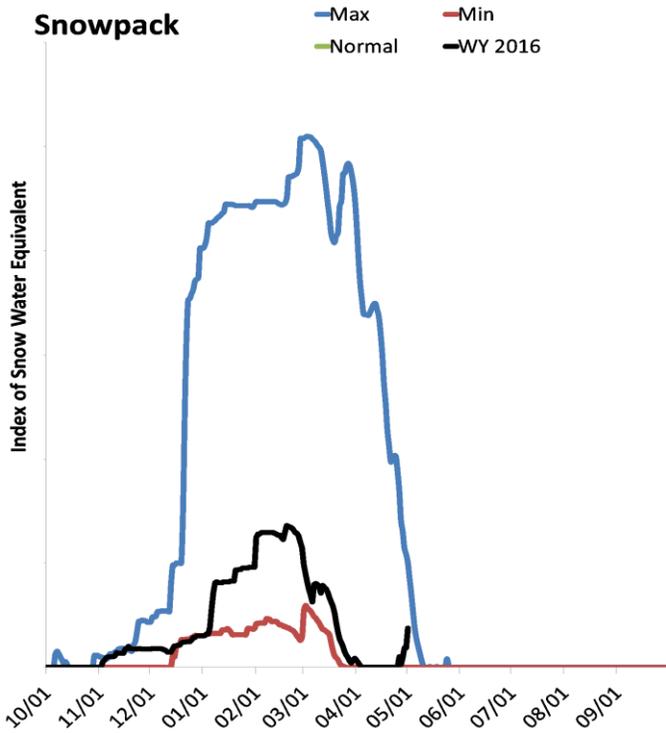
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Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Eastern Nevada	4	127%	5%
Kingston Creek	1	148%	2%
Steptoe Valley	2	100%	8%
Baker & Lehman Creeks	0		

# Spring Mountains & Southern Nevada

5/1/2016

The average snow water content at SNOTEL sites in the Spring Mountains is 1.9 inches. Precipitation in April averaged 4 inches, which brings the seasonal accumulation (Oct-Apr) to 20 inches. Soil moisture is 50% compared to 37% last year. Storage in Lake Mead is 37% of capacity, compared to 38% last year, while Lake Mohave storage is 97% of capacity, compared to 95% last year. Streamflow forecasts range from 68% to 77% of average for the Virgin River and Lake Powell inflow.



\*\*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 2009-2015, same goes for the soil moisture normal line.

### Spring Mountains & Southern Nevada Streamflow Forecasts - May 1, 2016

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	30	37	43	68%	49	58	63
	MAY-JUL	20	27	33	80%	39	48	41
Virgin R at Littlefield	APR-JUL	36	40	44	68%	48	54	65
	MAY-JUL	22	26	30	70%	34	40	43
Lake Powell Inflow <sup>2</sup>	APR-JUL	4250	4970	5500	77%	6060	6950	7160
	MAY-JUL	3440	4160	4690	77%	5250	6140	6100

- 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 April, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	9690.0	9917.0	20158.0	26159.0
Lake Mohave	1747.0	1725.0	1678.0	1810.0
Basin-wide Total	11437.0	11642.0	21836.0	27969.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis May 1, 2016	# of Sites	% Median	Last Year % Median
Spring Mountains	0		
White River	1	89%	0%
Virgin River	8	133%	42%
Colorado R above Glen Canyon Dam	105	103%	51%



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## Questions?

For more snow and water supply information visit:

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### **Thank you to all our snow surveyors!**

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