

Natural Resources Conservation Service

Nevada Water Supply Outlook Report

April 1, 2016



Photo – 3/17/2016 Snowmelt runoff in the West Fork of the Carson River. Hope Valley, California

Statewide Snowpacks Peak Near-to-Above Normal in 2016

The [Carson River basin snowpack](#) reached its maximum snow water content on March 25th with 108% of its normal peak amount. Across the region, basin snow water amounts reached 96-126% of their median peak amounts. This is the first winter since 2011 that most basins across Northern Nevada and the Eastern Sierra reached or exceeded normal peak snow water amounts. As snow accumulation transitions to snow melt, expect 85-125% of average streamflow based on April 1 forecasts.

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 2006-2015.

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

April 1, 2016

SUMMARY

After failing grades for the last four years, this winter scores an “A”. So far this water year we’ve had better than average precipitation across Nevada. Snowpacks peaked at near, to well above, their normal amounts; and streamflow forecasts are the highest we’ve seen since 2011. Unfortunately, averaging four poor grades with one good one doesn’t make for a high cumulative grade point average. This year’s lack of carry-over storage in our reservoirs is evidence of the last four drought years. On the positive side, drought deficits did not get any worse in 2016. Also reservoirs have room to store the runoff, and water users will have more water to work with than last year. While the water allocations across the state are improving, there will still be some shortfalls due to the effects of long term drought conditions. The [U.S. Drought Monitor](#) shows improvement in drought intensity categories comparing this year to the same time last year. A year ago, 80% of Nevada was classified as experiencing severe to exceptional drought, currently that area has dropped to 36% of the state. Most of the improvement was in the eastern half of Nevada. The areas still experiencing extreme drought include Pershing, Churchill, Lyon, Mineral, Storey, Washoe, Carson City and Douglas counties. These lingering drought effects are, in part, due to low reservoir storage. Looking ahead, weather forecasts are encouraging for more precipitation in the first half of April and perhaps beyond. This could add snow in the mountains, precipitation in the valleys, and delay irrigation demand. Such a scenario would help managers stretch water supplies later into the growing season.

SNOWPACK

March delivered enough new snow to help nearly all basins match or exceed their normal peak snow water amounts for the first time since 2011. Basin-wide peak snow water amounts ranged from 96-126% the normal. This year, basins reached their peak snow between February 27, in the Owyhee Basin, and March 31, in Eastern Nevada. For more information about basin-wide peak amounts, see the “Snow Survey Product Highlight” later in this report. An “inside slider” storm surprised flowering trees in Reno and Sparks with 7-12 inches of snow on March 28. The same storm covered much of northern Nevada and produced 6 inches in Elko. In the mountains, most SNOTELs in the Sierras got less snow than parts of Reno. That was not true outside of Elko in the Ruby Mountains, where [Lamoille #3 SNOTEL](#) got 37 inches of new snow. April 1 snowpacks are near median across the state ranging from 84% in the Owyhee to nearly 120% in the Upper Humboldt and Clover Valley - Franklin River basins. Just a few low elevation sites are already melted out. Sites with snow are melting at the rate of 0.5 to 1 inch of snow water a day.

PRECIPITATION

Water year precipitation amounts since October 1 are 102-131% of average. Despite having better monthly precipitation in March, the eastern Sierra has the lowest water year precipitation in the state at 102-115% of average. The greatest water year precipitation is found further east; the Humboldt River has recorded 120%, Clover Valley 126%, the Snake River 129% and Eastern Nevada 131%. Averaging all SNOTEL sites together monthly precipitation in March was 135% of average statewide. The Truckee and Lake Tahoe basins did significantly better with 150% of average precipitation for the month. Until the

middle of the month the Sierra basins were on track to produce another “Miracle March”, but there were enough dry days, and enough high elevation rain during the storms, that 2016 won’t join the “Miracle March” club like 1991, 1995 or 2011. Those years saw 200-300% of average March precipitation and snowpack percentages increase 60-70% between March 1 and April 1.

SOIL MOISTURE

Soil moisture continues to be above average in all basins. Thanks to March rain and snowmelt April 1 soil moisture levels are near the highest recorded for this time of year in the following basins: Truckee, Carson, Walker, Northern Great Basin, Upper and Lower Humboldt, Clover Valley - Franklin River, Snake, Owyhee and Spring Mountains. It should be noted that this statistic is based on SNOTEL data that only goes back to 2006. Nonetheless, hopefully this comparatively high soil moisture will lead to an efficient runoff.

RESERVOIRS

Reservoirs continue to rebound. Lake Tahoe rose over 7 inches (0.62 feet) in March and on March 31 was less than 2 inches (0.14 feet) below its natural rim. Forecasts predict Lake Tahoe will rise another 1.3 feet this spring. Reservoir storage along the Truckee River continues to climb and is now 36% of capacity, up from 25% last month. Walker River storage in Topaz and Bridgeport is 31% of capacity, similar to last month. Lahontan Reservoir continues to make gains and contains over 84,000 acre-feet, 29% of capacity. Rye Patch Reservoir stored about 70% of the water that flowed past the Imlay gage in March; it contains 29,040 acre-feet, 15% of capacity.

STREAMFLOW FORECASTS

Streamflow forecasts range from 85-125% of average flow for the April-July period. The highest forecasts are in Eastern Nevada and for points along the upper Humboldt River. The lowest forecasts are for the lower Carson River and the East Walker River. The Truckee River at Farad is forecast at 106% of average, while the Humboldt River near Imlay is forecast near average. The West Fork of the Carson River is forecast slightly above average at 104%, while the East Fork is slightly below at 91%. With Lake Tahoe forecast to rise above its natural rim, there will be adequate water to get the Truckee River below Tahoe City flowing again. With that in mind, now might be a good time to check your inner tubes for leaks.

UPCOMING EVENTS

Western Snow Conference, April 18-21, 2016, Seattle, WA <http://www.westernsnowconference.org>

Humboldt River Basin Water Authority (HRBWA) Meeting

The NRCS will provide a presentation and answer questions on the 2016 snowpack and streamflow outlook within the Humboldt River Basin. The meeting is open to the public.

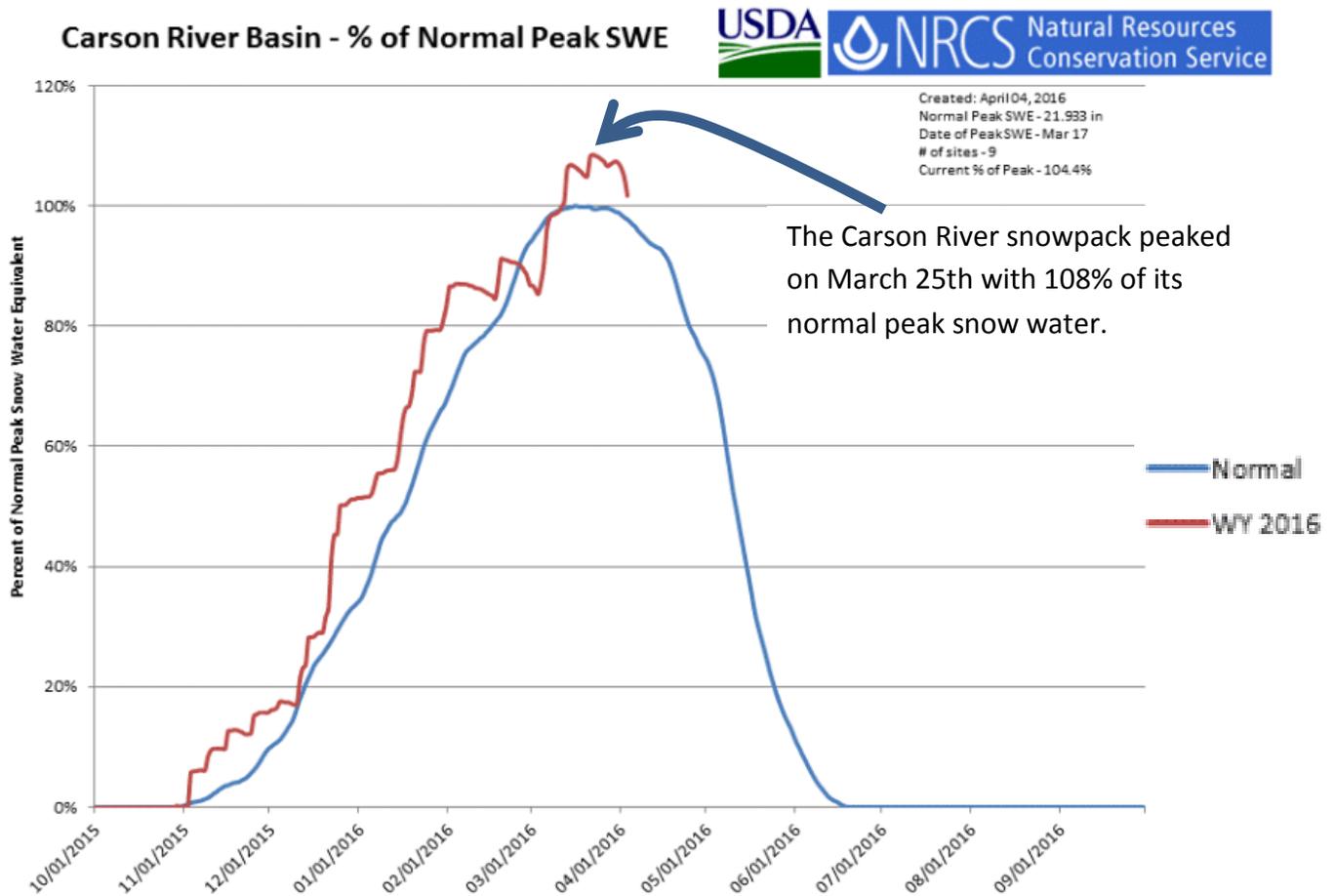
When: Friday, May 13, 2016, 10am-4pm, NRCS will present at about 11:15am.

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

SNOW SURVEY PRODUCT HIGHLIGHT

This section highlights products that are linked from the [Nevada Snow Survey Program website](#). This month the **Snowpack Percent of Peak Graphs** are the focus. These graphs can be found at the bottom of the [Basin Snowpack Graphs](#) webpage. These graphs display the current year snowpack as a percent of the basin's normal peak snow water amount.

In 2016, nearly all basin across Northern Nevada and the Eastern Sierra reached or exceeded their normal peak snow water amounts (the red line reached higher than the top of the blue line).



Below is a summary of how other basins did relative to their normal snow water peaks.

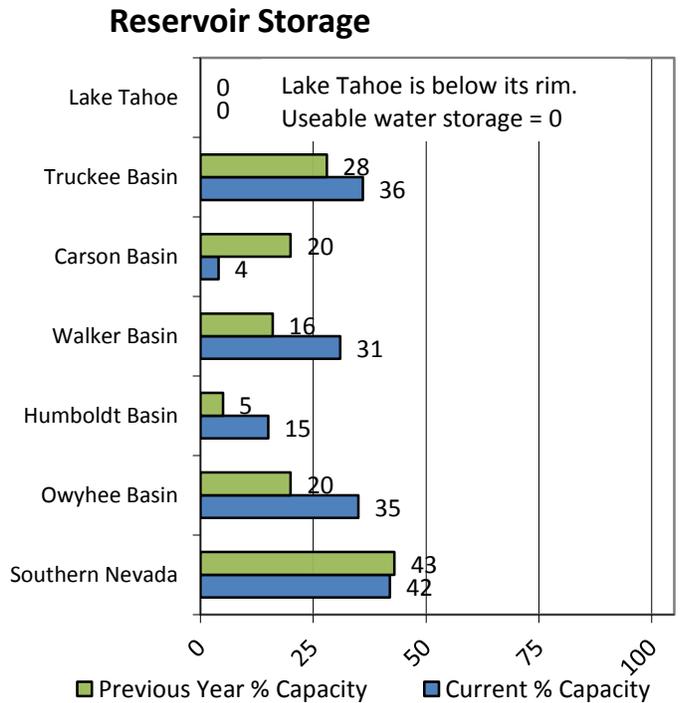
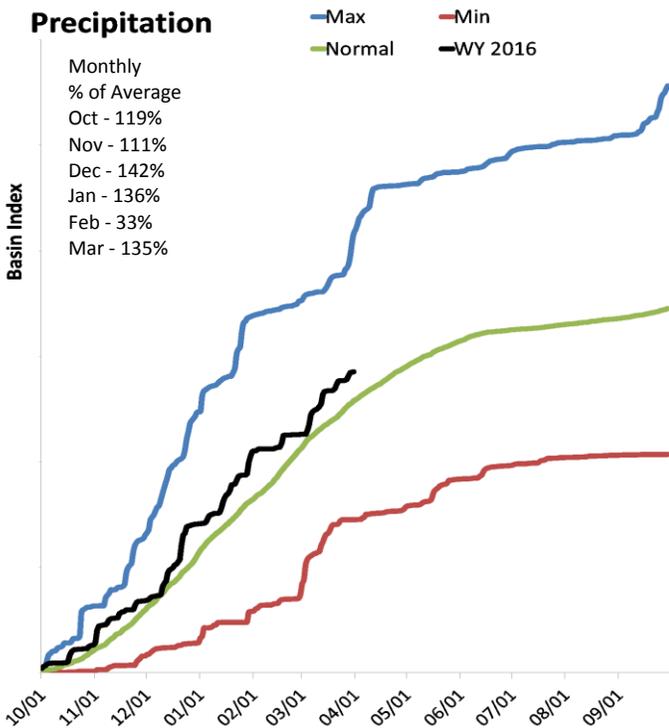
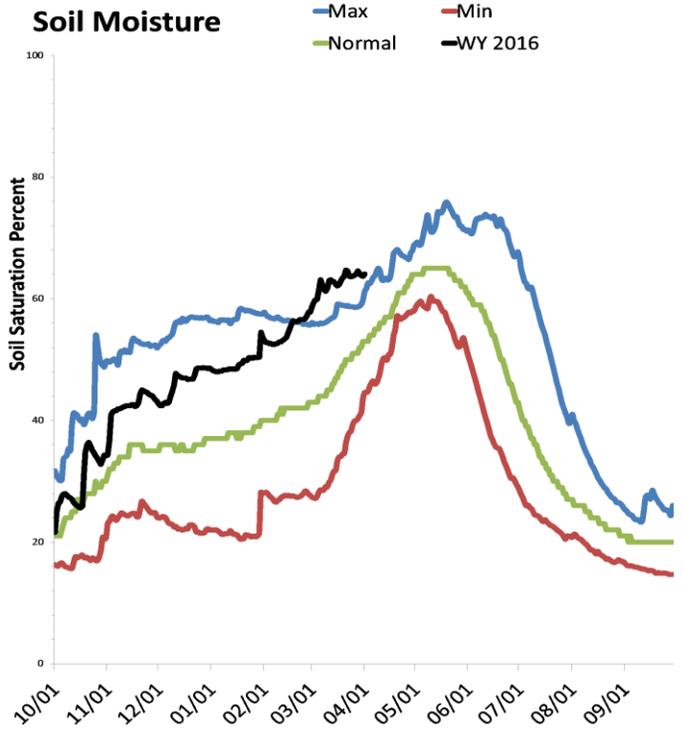
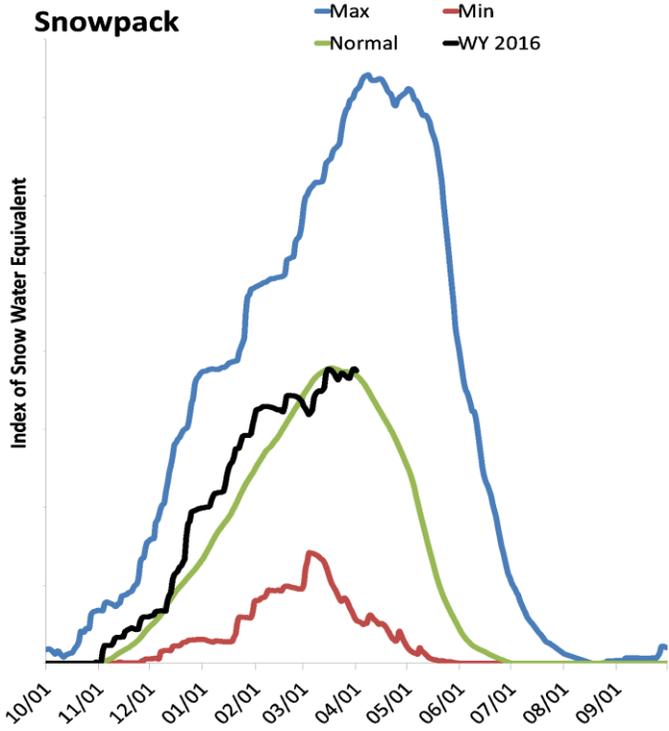
Basin / Region	2016 Peak Snow Water as a Percent of Normal Peak	Date of 2016 Peak Snow Water
Lake Tahoe	104%	15-Mar
Truckee	100%	30-Mar
Carson	108%	23-Mar
Walker	96%	15-Mar
Northern Great Basin	104%	14-Mar
Upper Humboldt	116%	30-Mar
Lower Humboldt	105%	15-Mar
Snake Basin	126%	30-Mar
Owyhee	111%	27-Feb
Eastern Nevada	105%	31-Mar
State of Nevada (including Eastern Sierra)	103%	30-Mar

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State of Nevada & Eastern Sierra

4/1/2016

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is near normal at 107% of median, compared to 16% last year. Precipitation in March was much above average at 135%, which brings the seasonal accumulation (Oct-Mar) to 113% of average. Soil moisture is 63% compared to 58% last year. Reservoir storage ranges from 0% of useable capacity in Lake Tahoe to 42% of capacity in Southern Nevada.

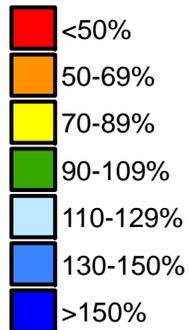


Nevada & Eastern Sierra

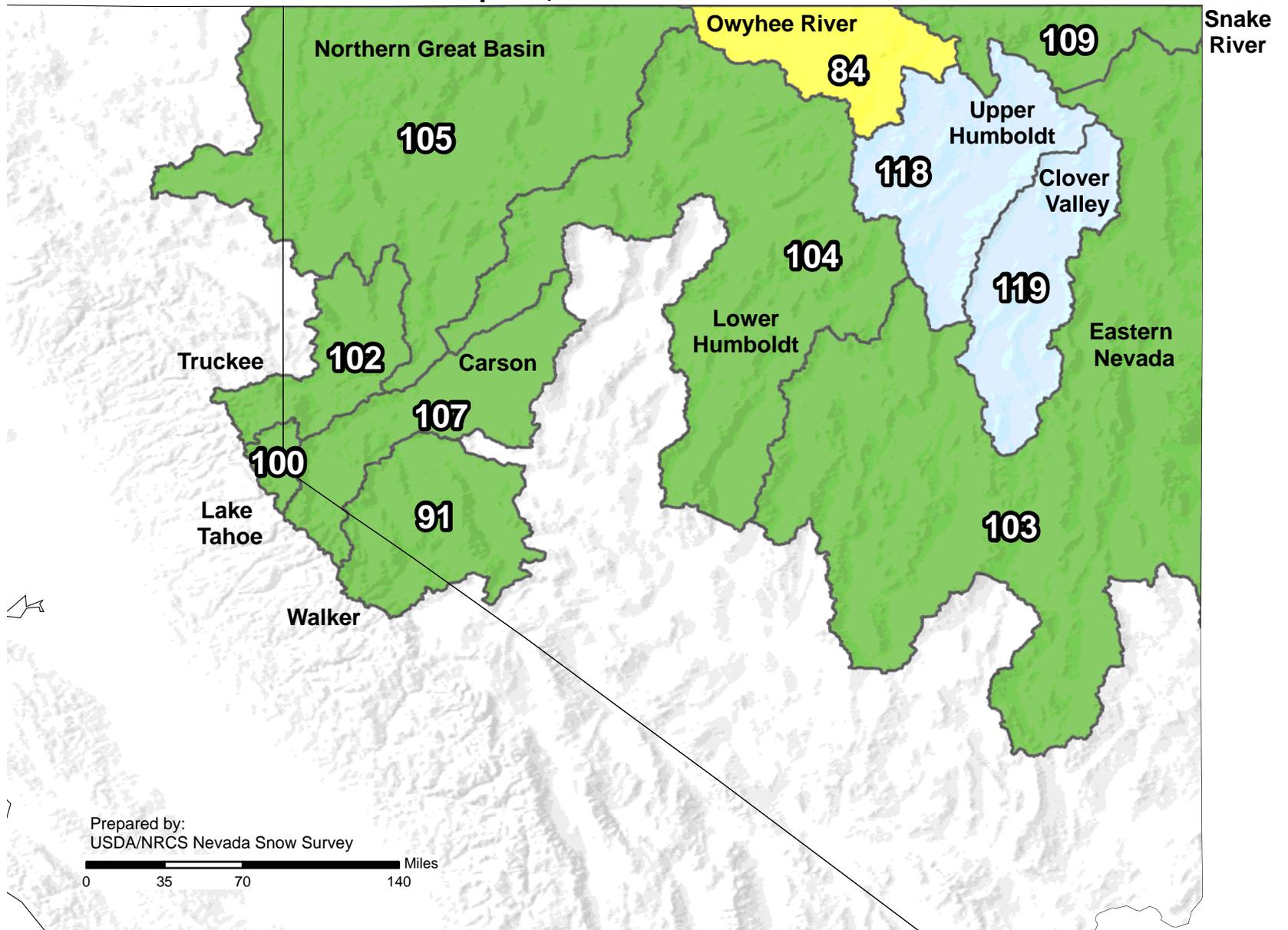
Percent of Median Snowpack

April 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

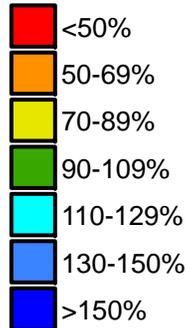


Map data based on the first of month snow water equivalent found at selected SNOTEL and snow course sites in or near the basin compared to the median value for those sites. SNOTEL data based on the first reading of the day (typically midnight). Snow course data based on measurements taken within the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

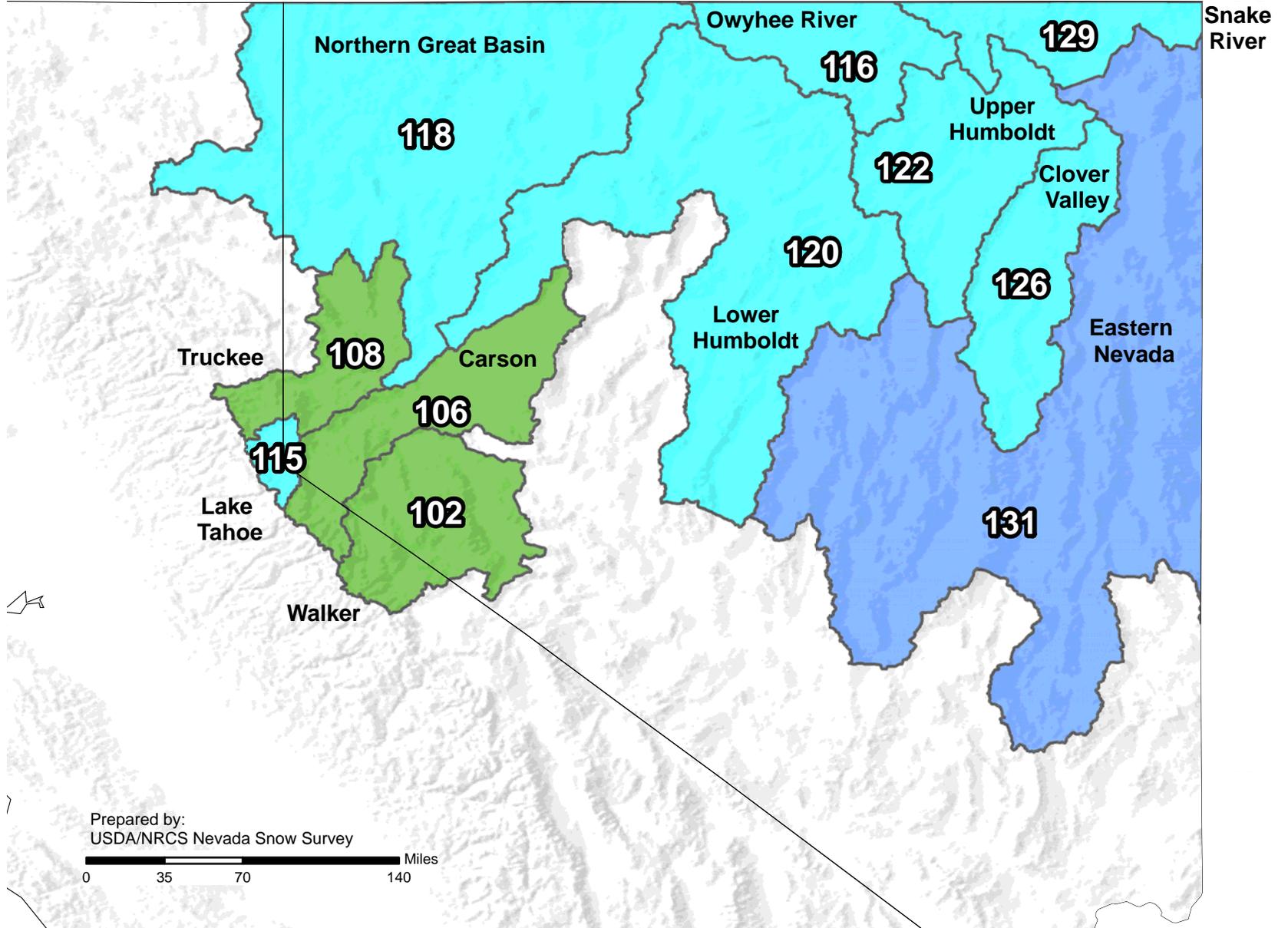


Nevada & Eastern Sierra Water Year to Date Precipitation April 1, 2016

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



*Provisional data
subject to revision*



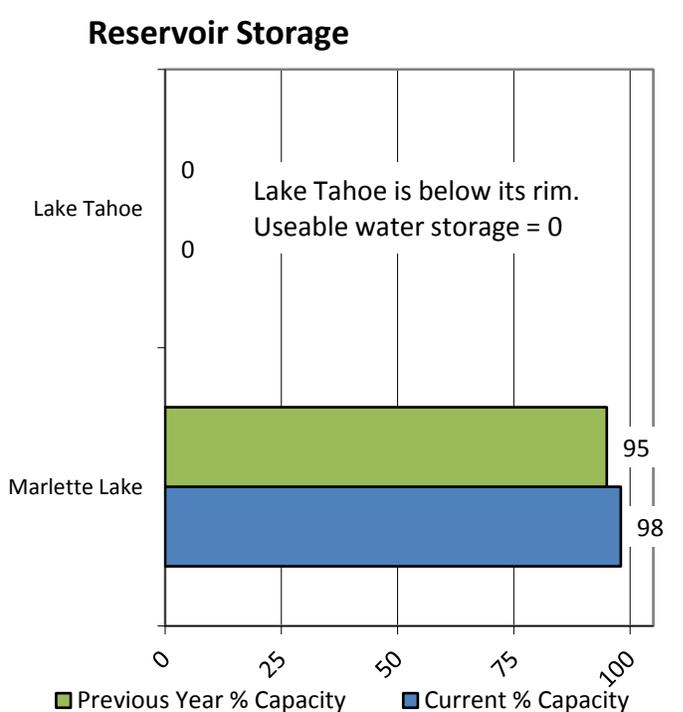
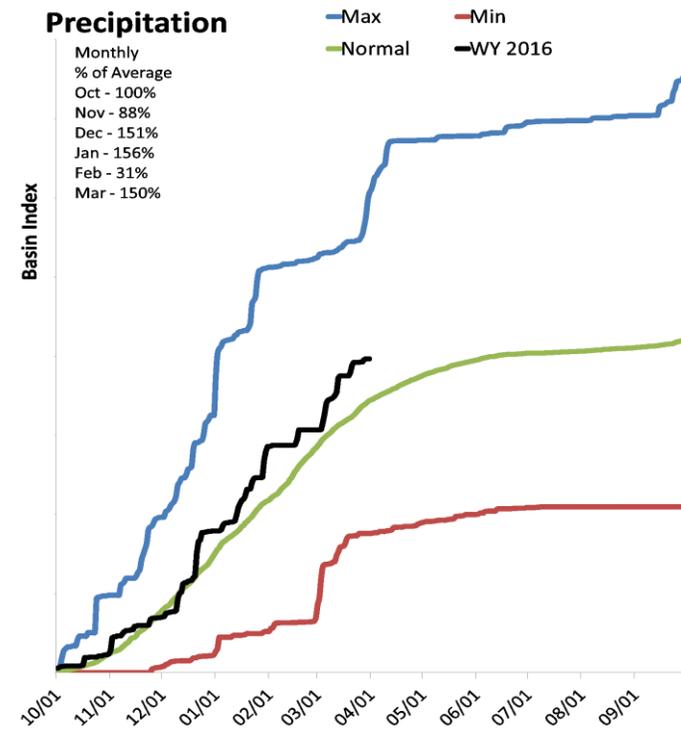
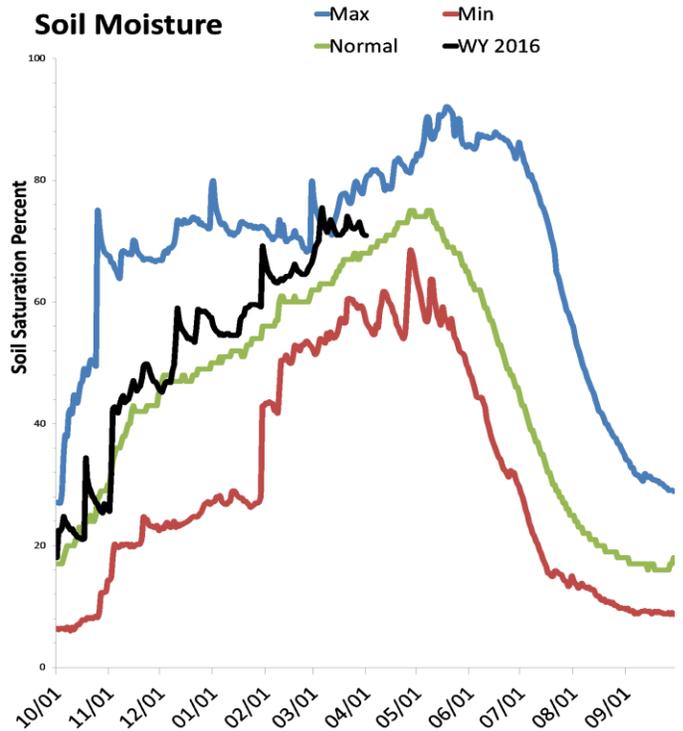
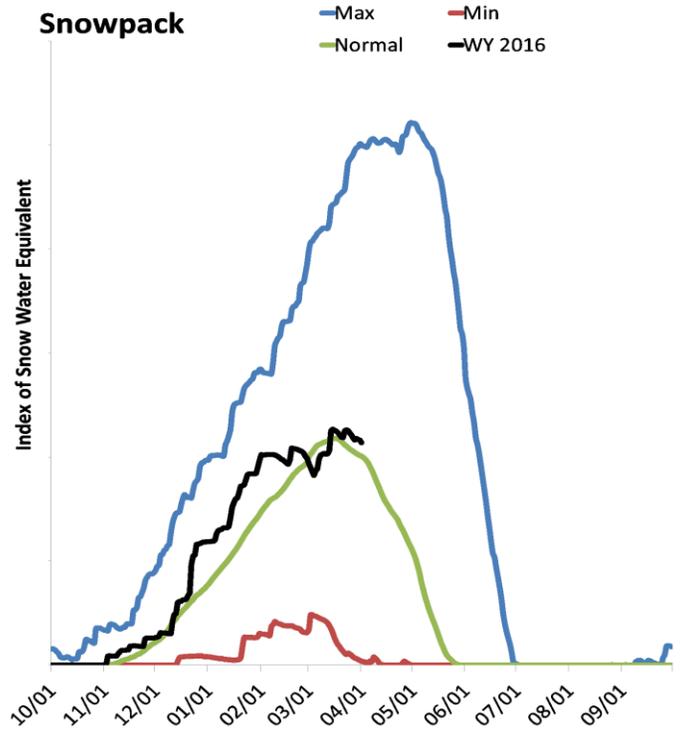
Map data based water year to date precipitation for the first of the month at selected SNOTEL sites in or near the basin compared to the average value for those sites. SNOTEL data based on the first reading of the day (typically midnight). A table based, station-by-station, report of the underlying data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

4/1/2016

Snowpack in the Lake Tahoe Basin is near normal at 100% of median, compared to 11% last year. Precipitation in March was much above average at 150%, which brings the seasonal accumulation (Oct-Mar) to 115% of average. Soil moisture is 71% compared to 62% last year. Lake Tahoe's water elevation is 6222.86 ft, which is 0.14 ft below the lake's natural rim and equals a storage deficit of approximately 17 thousand acre-feet. Last year the elevation was 6222.81 ft which equaled a storage deficit of approximately 23 thousand acre-feet. Lake Tahoe is forecast to rise 1.3 feet from April 1 to its highest elevation.



Lake Tahoe Basin Streamflow Forecasts - April 1, 2016

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	APR-JUL	144	505	750	90%	995	1360	834
	MAY-JUL	-81	270	510	94%	750	1100	540
Lake Tahoe Rise Gates Closed ¹	APR-HIGH	0.87	1.1	1.3	99%	1.48	1.8	1.31
	MAY-HIGH	0.423	0.82	1	93%	1.18	1.577	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

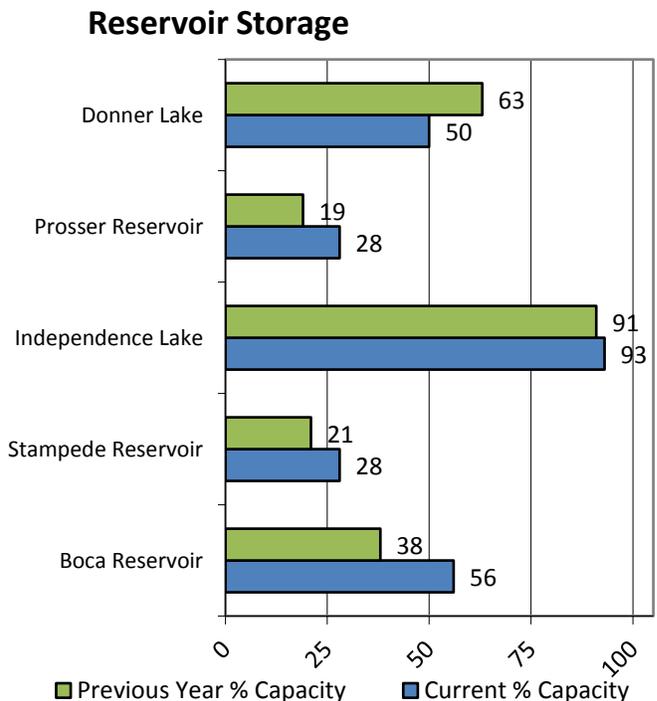
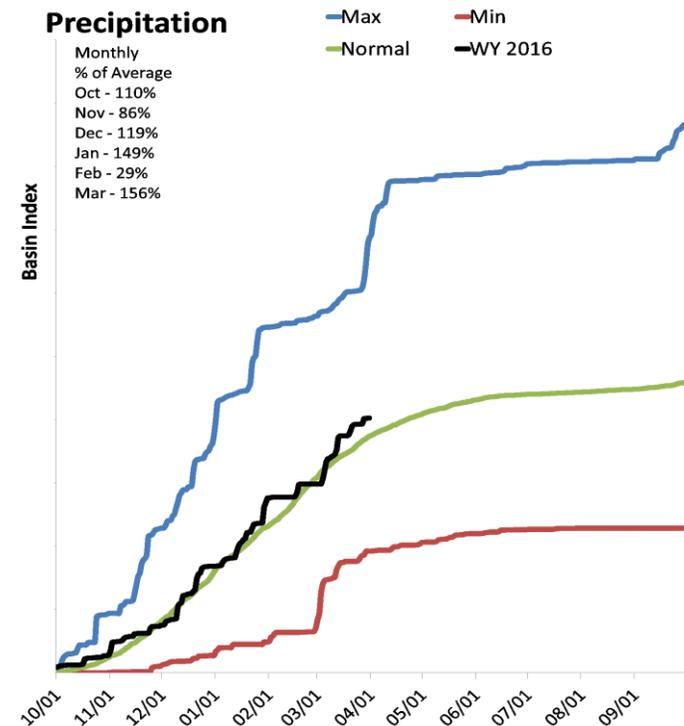
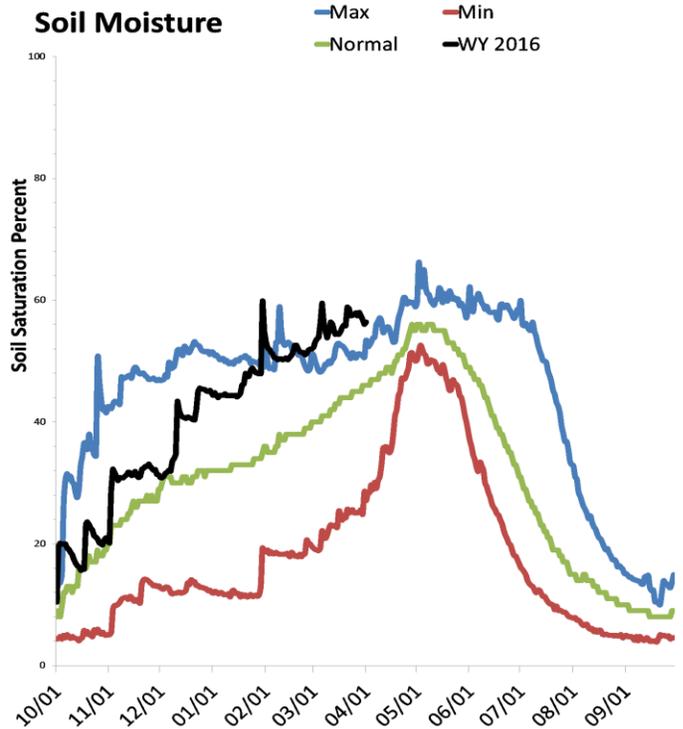
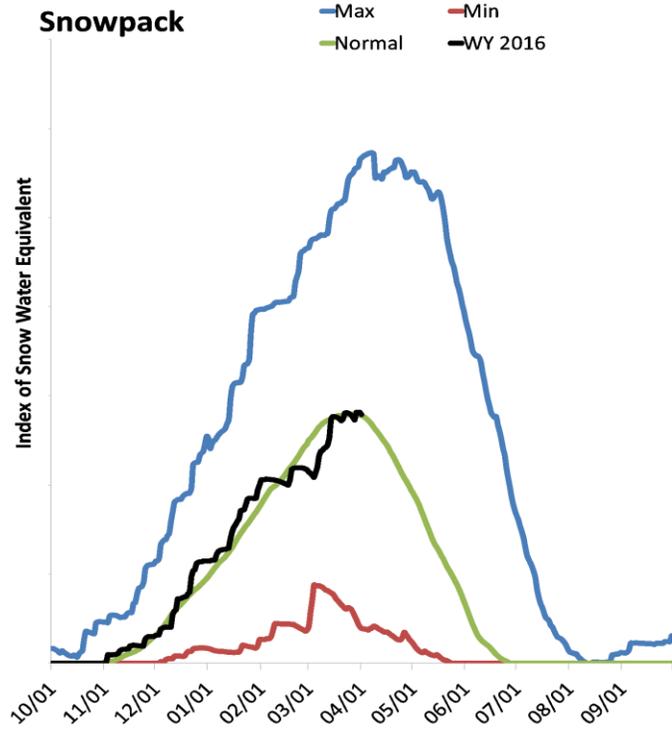
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Tahoe	0.0	0.0	312.8	744.6
Marlette Lk nr Carson City, NV	11.5	11.1	11.9	11.8
Basin-wide Total	11.5	11.1	324.7	756.4
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Lake Tahoe Basin	16	100%	11%

Truckee River Basin

4/1/2016

Snowpack in the Truckee River Basin is near normal at 102% of median, compared to 15% last year. Precipitation in March was much above average at 156%, which brings the seasonal accumulation (Oct-Mar) to 108% of average. Soil moisture is 56% compared to 50% last year. Combined reservoir storage is 36% of capacity, compared to 28% last year. Forecast streamflow volumes range from 82% to 107% of average.



Truckee River Basin Streamflow Forecasts - April 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	3.6	4.2	4.6	82%	5.1	5.8	5.6
	MAY-JUL	2.5	2.9	3.2	76%	3.5	4	4.2
L Truckee R ab Boca Reservoir ²	APR-JUL	75	85	90	107%	100	116	84
	MAY-JUL	36	53	65	103%	77	94	63
Truckee R at Farad ²	APR-JUL	230	255	270	106%	290	330	255
	MAY-JUL	116	154	180	98%	205	245	183
Galena Ck at Galena Ck State Pk	APR-JUL	3	3.7	4.2	96%	4.7	5.4	4.37
	MAY-JUL	2.2	3	3.5	96%	4	4.8	3.65
Steamboat Ck at Steamboat	APR-JUL	2.5	4.8	6.9	90%	9.6	14.8	7.7
	MAY-JUL	2.1	3.7	5.1	86%	6.9	10.2	5.9
Pyramid Lake Elevation Change ¹	LOW-HIGH	-1.358	0.607	1.5	88%	2.4	4.4	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

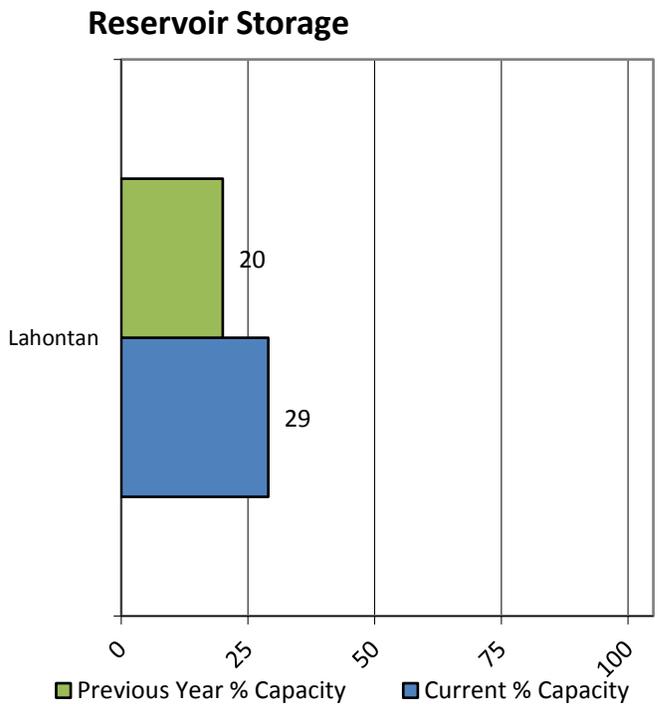
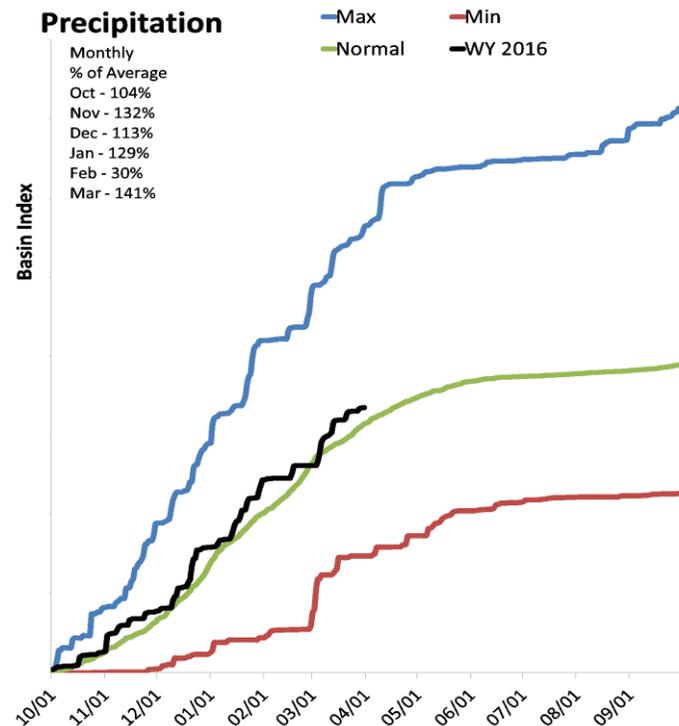
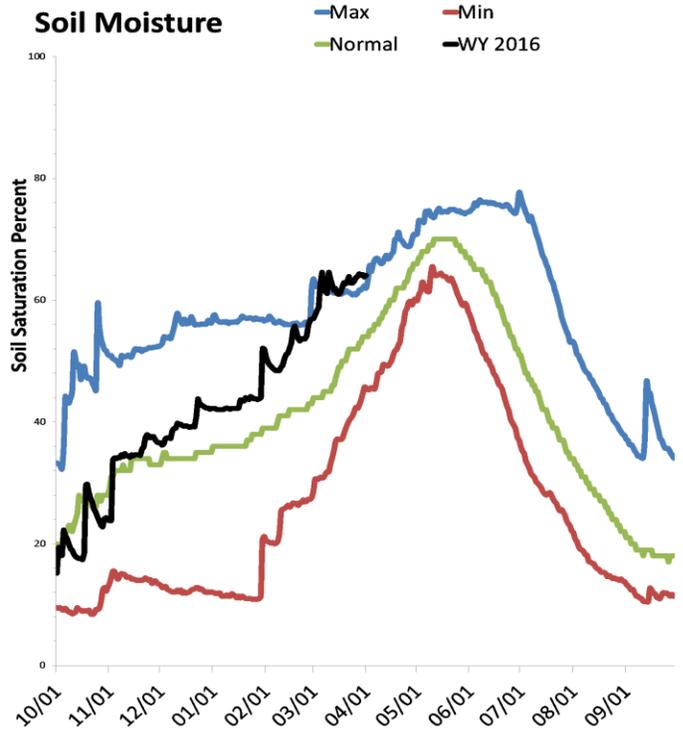
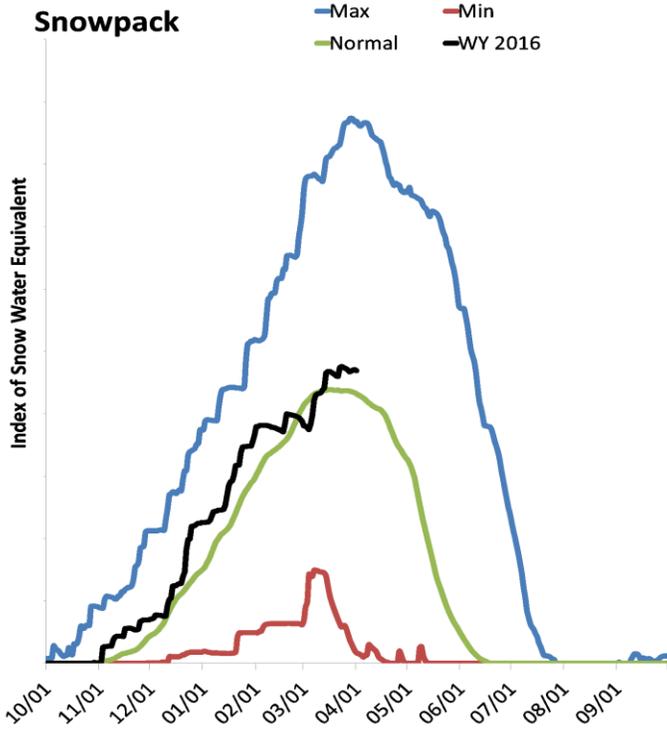
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Boca Reservoir	22.7	15.6	22.1	40.9
Donner Lake	4.7	5.9	4.5	9.5
Independence Lake	16.1	15.8	14.2	17.3
Prosser Reservoir	8.0	5.4	10.2	28.6
Stampede Reservoir	63.2	46.8	151.1	226.5
Basin-wide Total	114.7	89.5	202.1	322.8
# of reservoirs	5	5	5	5

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Truckee River Basin	15	102%	15%
Little Truckee River	5	97%	16%
Sagehen & Independence Creeks	3	90%	23%
Galena Creek	2	120%	38%
Steamboat Creek	3	115%	37%
Truckee River above Pyramid Lake	30	101%	12%

Carson River Basin

4/1/2016

Snowpack in the Carson River Basin is near normal at 107% of median, compared to 3% last year. Precipitation in March was much above average at 141%, which brings the seasonal accumulation (Oct-Mar) to 106% of average. Soil moisture is 64% compared to 62% last year. Storage in Lahontan Reservoir is 29% of capacity, compared to 20% last year. Forecast streamflow volumes range from 87% to 107% of average.



Carson River Basin Streamflow Forecasts - April 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	121	150	170	91%	190	220	186
	MAY-JUL	97	126	130	86%	164	193	151
	200 cfs	27 Jun	07 Jul	14 Jul		21 Jul	31 Jul	25 Jul
	500 cfs	05 Jun	15 Jun	21 Jun		27 Jun	07 Jul	01 Jul
WF Carson R nr Woodfords	APR-JUL	39	49	56	104%	63	73	54
	MAY-JUL	21	34	42	100%	50	63	42
Carson R nr Carson City	APR-JUL	109	135	155	87%	177	210	179
	MAY-JUL	76	100	120	83%	142	179	144
King Canyon Ck nr Carson City	APR-JUL	0.03	0.23	0.4	105%	0.57	0.83	0.38
	MAY-JUL	0.02	0.14	0.28	104%	0.42	0.64	0.27
Ash Canyon Ck nr Carson City	APR-JUL	0.69	0.99	1.2	107%	1.41	1.71	1.12
	MAY-JUL	0.55	0.79	0.95	104%	1.11	1.35	0.91
Carson R at Ft Churchill	APR-JUL	110	135	150	88%	178	220	171
	MAY-JUL	64	92	115	83%	141	187	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

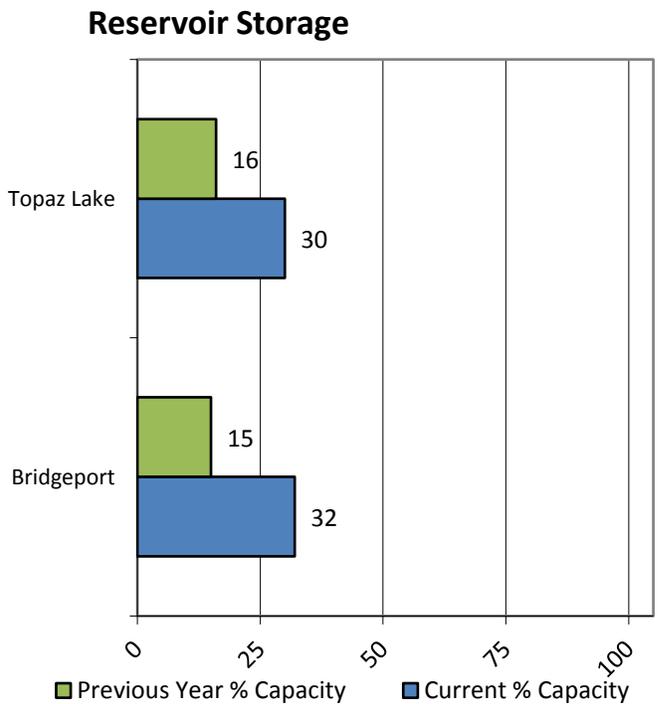
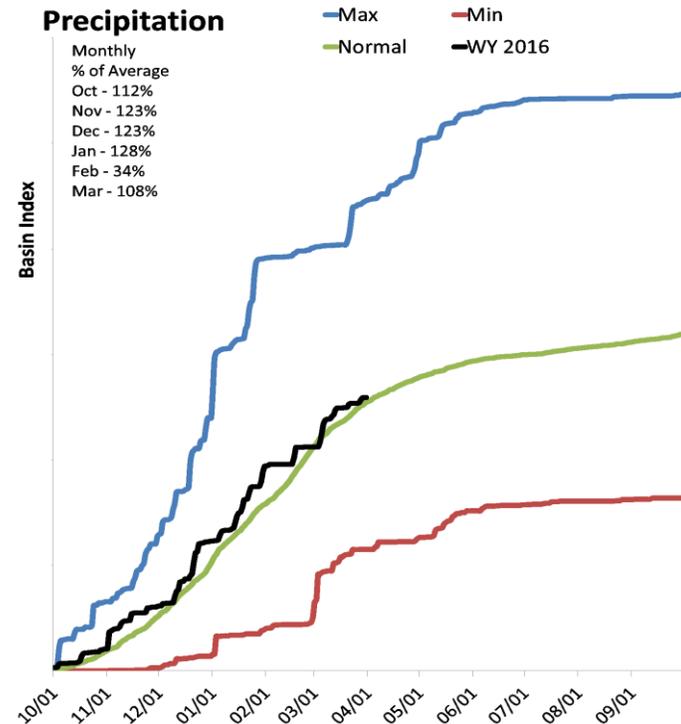
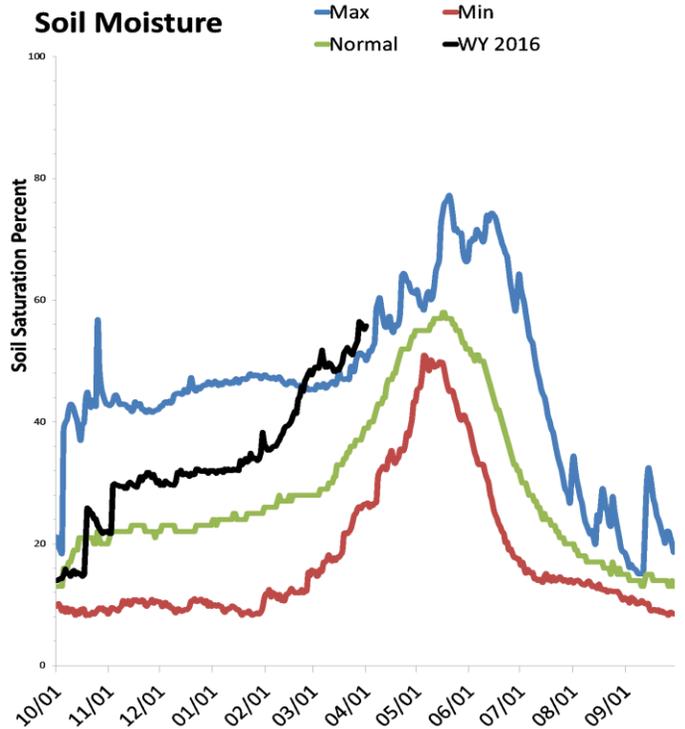
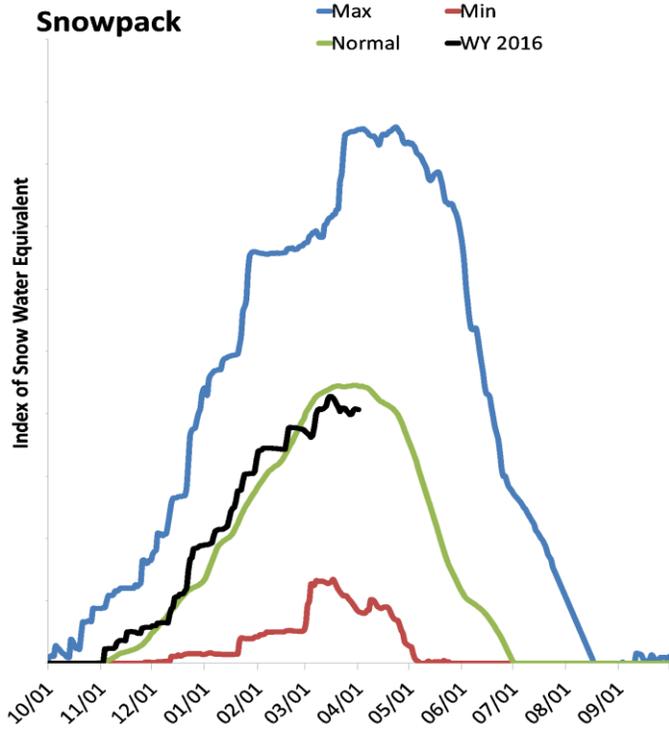
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lahontan Reservoir, NV	84.3	58.1	198.8	295.1
Basin-wide Total	84.3	58.1	198.8	295.1
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Carson River Basin	11	107%	3%
East Fork Carson River	6	107%	0%
West Fork Carson River	8	108%	4%

Walker River Basin

4/1/2016

Snowpack in the Walker River Basin is near normal at 91% of median, compared to 14% last year. Precipitation in March was near average at 108%, which brings the seasonal accumulation (Oct-Mar) to 102% of average. Soil moisture is 56% compared to 50% last year. Combined reservoir storage is 31% of capacity, compared to 16% last year. Forecast streamflow volumes range from 85% to 93% of average.



Walker River Basin Streamflow Forecasts - April 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 ²	APR-AUG	15.6	38	58	85%	70	92	68
	MAY-AUG	15.4	34	46	84%	58	77	55
W Walker R bl L Walker nr Coleville	APR-JUL	109	134	150	93%	166	191	162
	MAY-JUL	90	114	130	92%	146	170	142
W Walker R nr Coleville	APR-JUL	109	134	150	92%	166	191	163
	MAY-JUL	81	113	135	94%	157	189	143
Walker Lake Elevation Change ¹	LOW-HIGH	-2.3	0.1	1.2	85%	2.3	4.7	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

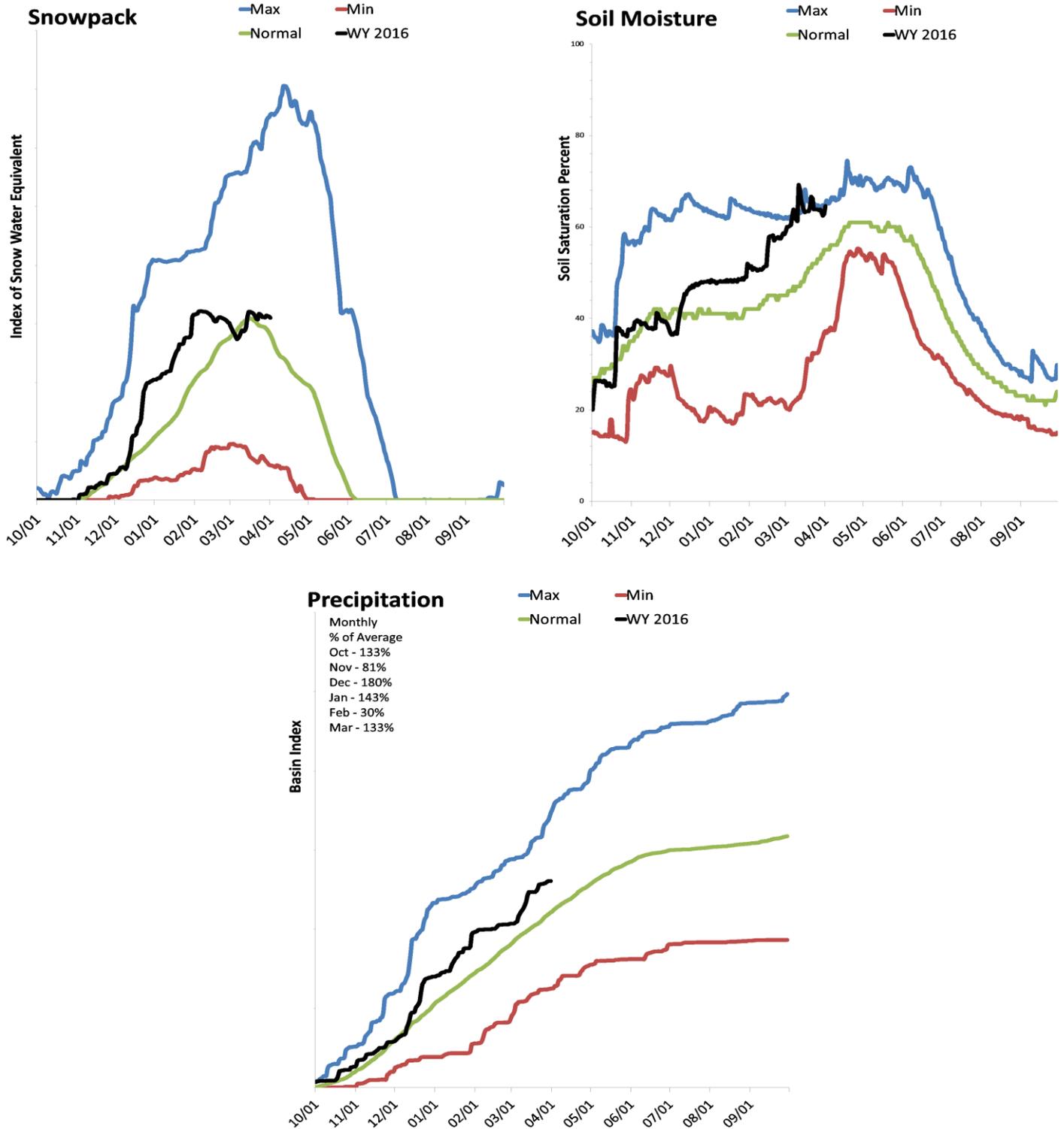
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	13.5	6.5	27.2	42.5
Topaz Lk nr Topaz, CA	17.7	9.8	32.1	59.4
Basin-wide Total	31.3	16.2	59.3	101.9
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Walker River Basin	10	91%	14%
East Walker River above Bridgeport	4	85%	4%
West Walker River above Coleville	6	92%	18%

Northern Great Basin

4/1/2016

Snowpack in the Northern Great Basin is near normal at 105% of median, compared to 13% last year. Precipitation in March was much above average at 135%, which brings the seasonal accumulation (Oct-Mar) to 118% of average. Soil moisture is 65% compared to 60% last year. Forecast streamflow volumes range from 88% to 98% of average.



Northern Great Basin Streamflow Forecasts - April 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	4000	5200	6400	88%	7700	10300	7233
	APR-SEP	4600	5900	7100	89%	8500	11100	7991
Bidwell Ck nr Fort Bidwell	APR-JUL	7.1	9.2	10.6	88%	12	14.1	12
Eagle Ck nr Eagleville	APR-JUL	1.89	3.3	4.2	98%	5.1	6.5	4.3
McDermitt Ck nr McDermitt	MAR-JUN	5.8	11.9	16	91%	20	26	17.5
	APR-JUL	3	8.3	12	92%	15.7	21	13

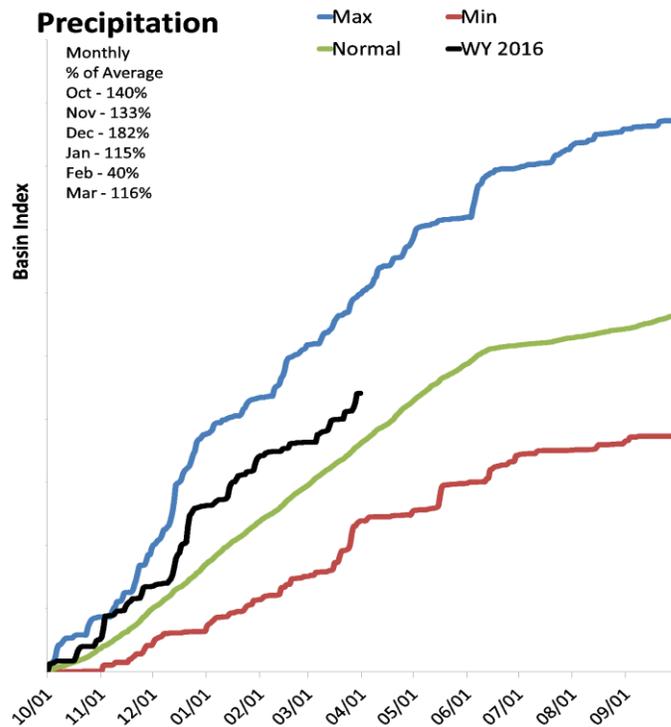
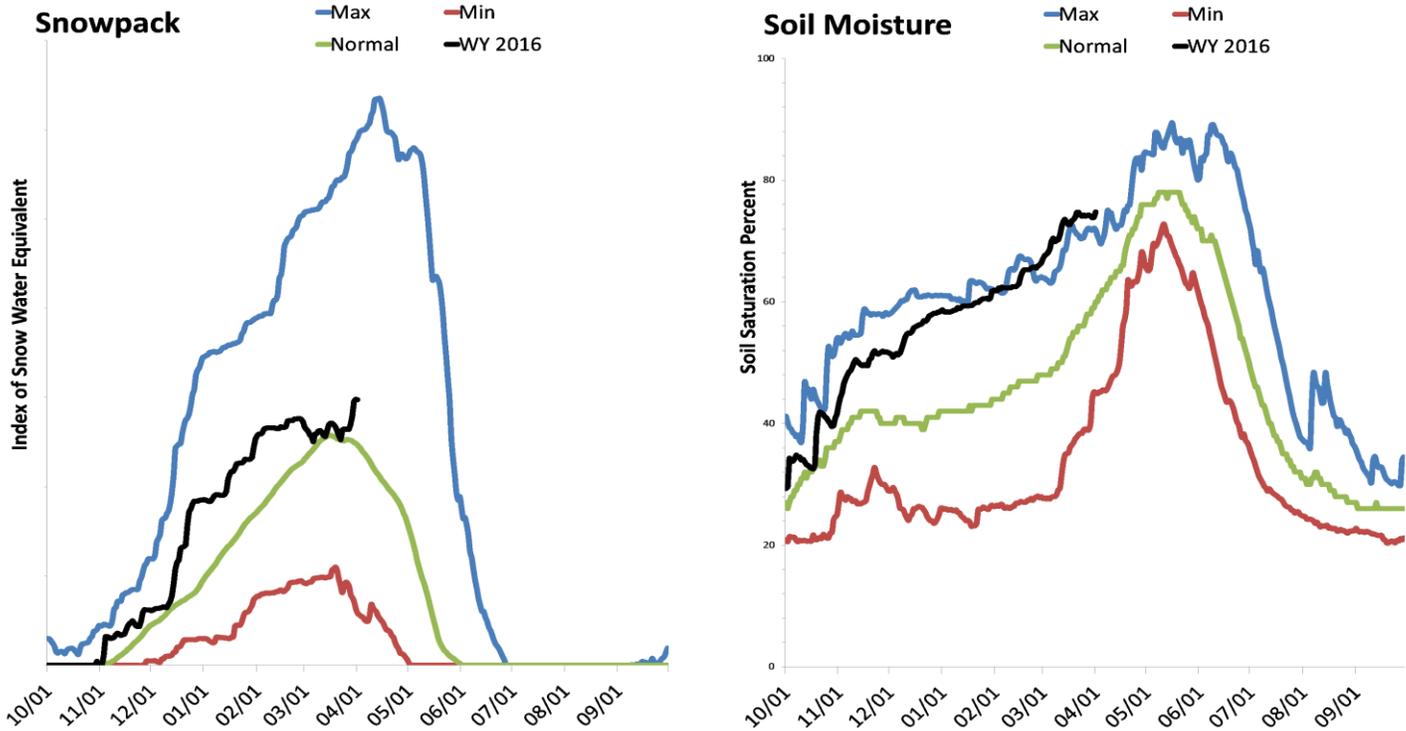
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Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Northern Great Basin	16	105%	13%
Surprise Valley - Warner Mtns	2	124%	24%
McDermitt Creek	3	85%	0%
Quinn River	8	89%	12%

Upper Humboldt River Basin

4/1/2016

Snowpack in the Upper Humboldt River Basin above Palisade is above normal at 118% of median, compared to 30% last year. Precipitation in March was above average at 117%, which brings the seasonal accumulation (Oct-Mar) to 122% of average. Soil moisture is 74% compared to 70% last year. Forecast streamflow volumes range from 103% to 124% of average.



Upper Humboldt River Basin Streamflow Forecasts - April 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	26	35	42	117%	49	58	36
	MAY-JUL	13.1	24	31	119%	38	49	26
Lamoille Ck nr Lamoille	APR-JUL	19.6	27	32	110%	37	44	29
	MAY-JUL	16.3	24	29	107%	34	42	27
NF Humboldt R at Devils Gate	APR-JUL	19.2	27	33	103%	39	47	32
	MAY-JUL	6	14.6	20	104%	26	35	19.3
Humboldt R nr Elko	APR-JUL	72	124	160	120%	196	248	133
	MAY-JUL	38	87	120	119%	153	202	101
SF Humboldt R at Dixie	APR-JUL	40	64	80	121%	96	120	66
	MAY-JUL	31	54	70	123%	86	109	57
Humboldt R nr Carlin	APR-JUL	173	220	255	124%	290	335	206
	MAY-JUL	123	169	200	124%	230	275	161
Humboldt R at Palisade	APR-JUL	200	260	280	124%	340	400	225
	MAY-JUL	139	195	215	126%	270	330	171

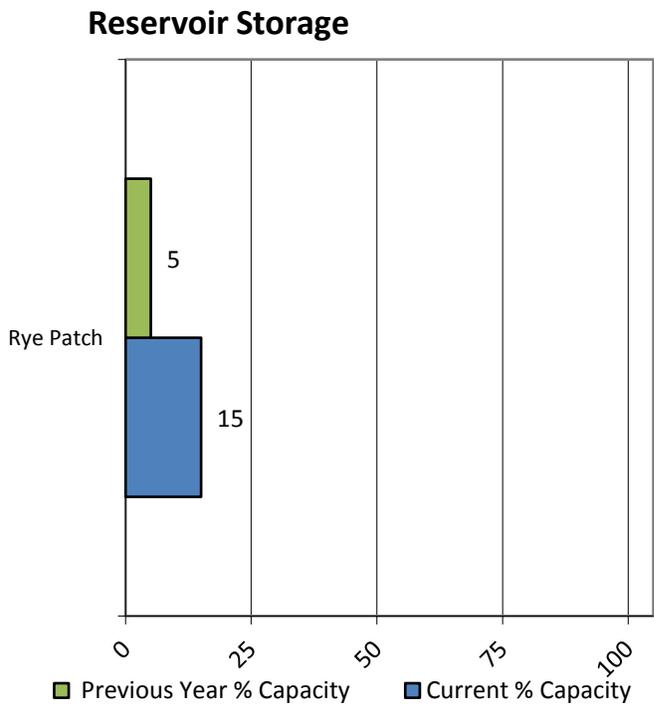
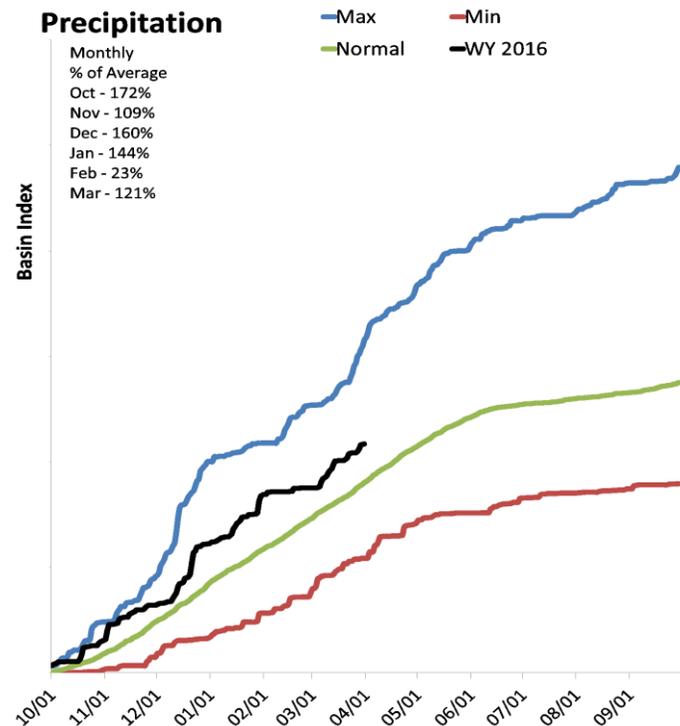
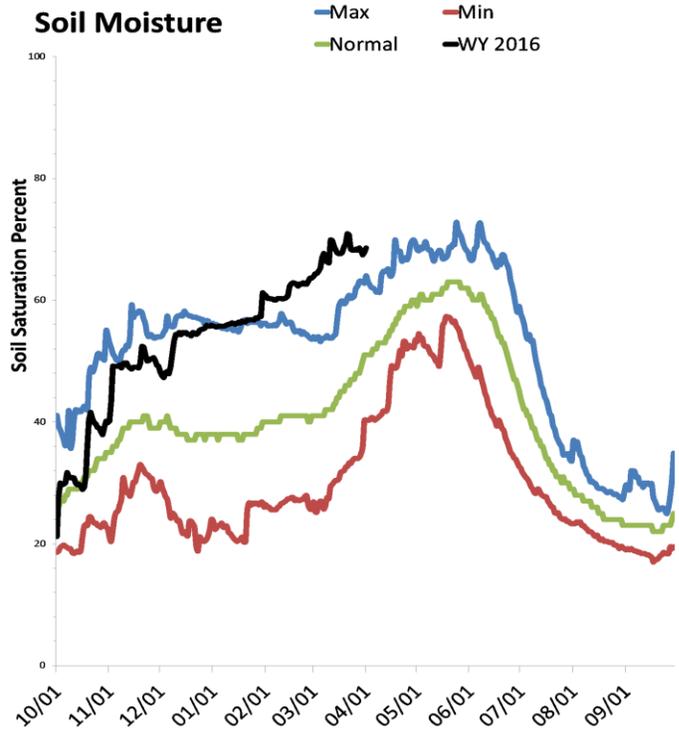
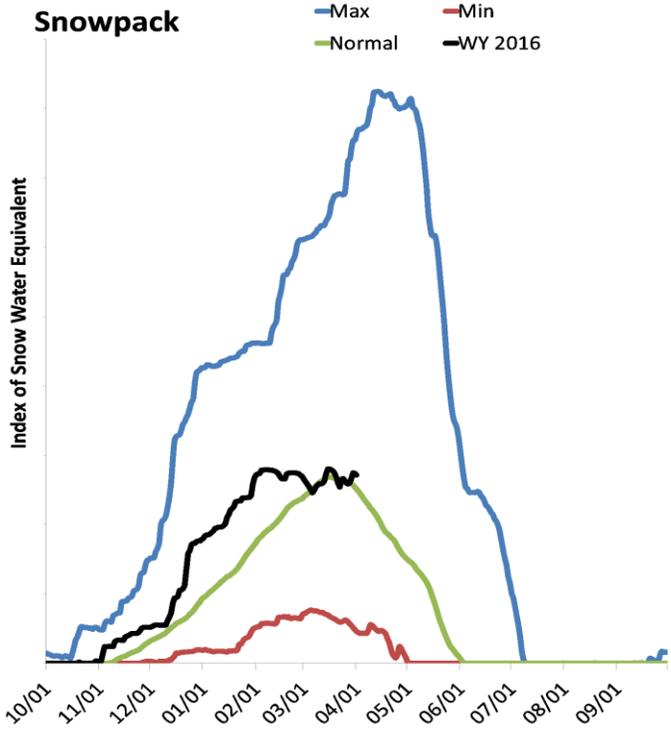
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Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Upper Humboldt River Basin	24	118%	30%
Mary's River	5	108%	23%
Lamoille Creek	3	113%	30%
North Fork Humboldt River	5	86%	29%
South Fork Humboldt River	5	127%	18%

Lower Humboldt River Basin

4/1/2016

Snowpack in the Lower Humboldt River Basin below Palisade is near normal at 104% of median, compared to 14% last year. Precipitation in March was above average at 122%, which brings the seasonal accumulation (Oct-Mar) to 120% of average. Soil moisture is 66% compared to 65% last year. Storage in Rye Patch Reservoir is 15% of capacity, compared to 5% last year. Forecast streamflow volumes range from 96% to 106% of average.



Lower Humboldt River Basin Streamflow Forecasts - April 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	16.4	19.3	106%	22	26	18.2
	MAY-JUL	4.1	7.6	10	102%	12.4	15.9	9.8
Humboldt R at Comus	APR-JUL	109	178	225	106%	270	340	213
	MAY-JUL	75	129	165	106%	200	255	156
L Humboldt R nr Paradise	APR-JUL	0.27	5.6	9.3	96%	13	18.3	9.7
	MAY-JUL	0.8	4.5	7	92%	9.5	13.2	7.6
Martin Ck nr Paradise	APR-JUL	5.6	13	18	103%	23	30	17.5
	MAY-JUL	0.37	7.3	12.2	100%	17.1	24	12.2
Humboldt R nr Imlay	APR-JUL	7.8	110	180	101%	250	350	178
	MAY-JUL	6.6	73	130	98%	187	270	133

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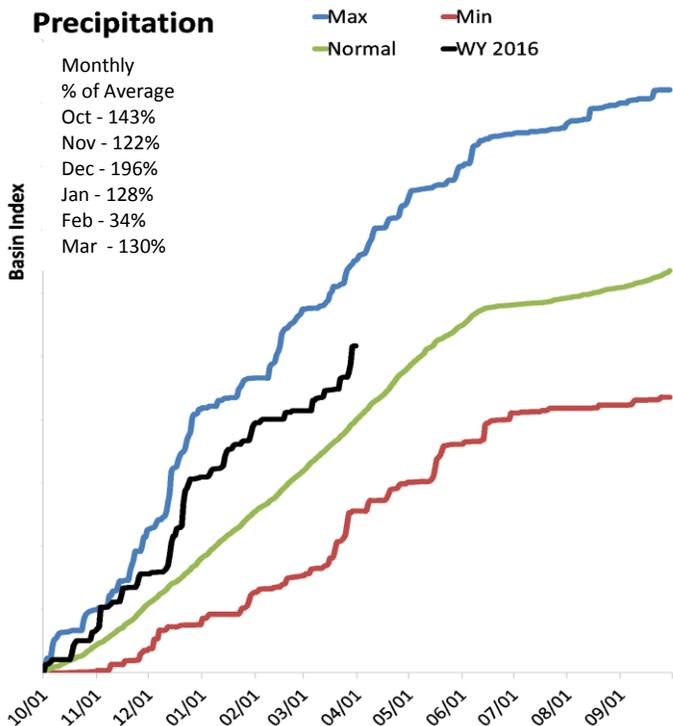
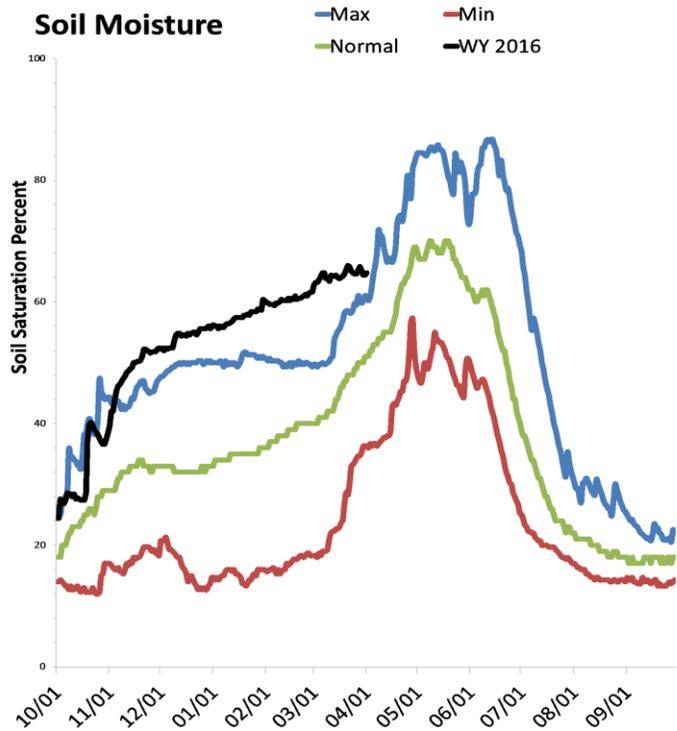
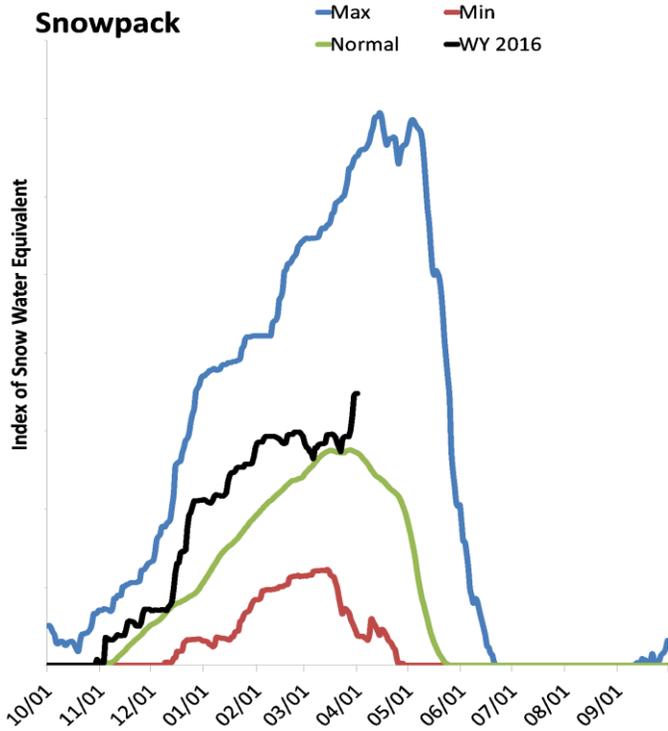
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Rye Patch Re nr Rye Patch, NV	29.0	9.7	87.6	194.3
Basin-wide Total	29.0	9.7	87.6	194.3
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Lower Humboldt River Basin	9	104%	14%
Rock Creek	1		
Reese River	4	117%	16%
Martin Creek	3	99%	18%
Little Humboldt River	5	96%	14%
Humboldt River above Imlay	33	115%	26%

Clover Valley & Franklin River Basin

4/1/2016

Snowpack in the Clover Valley and Franklin River Basin is above normal at 119% of median, compared to 34% last year. Precipitation in March was above average at 130%, which brings the seasonal accumulation (Oct-Mar) to 126% of average. Soil moisture is 65% compared to 66% last year. The forecast streamflow volume for the Franklin River is 100% 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 - April 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	5.1	6.2	6.9	100%	7.6	8.7	6.9

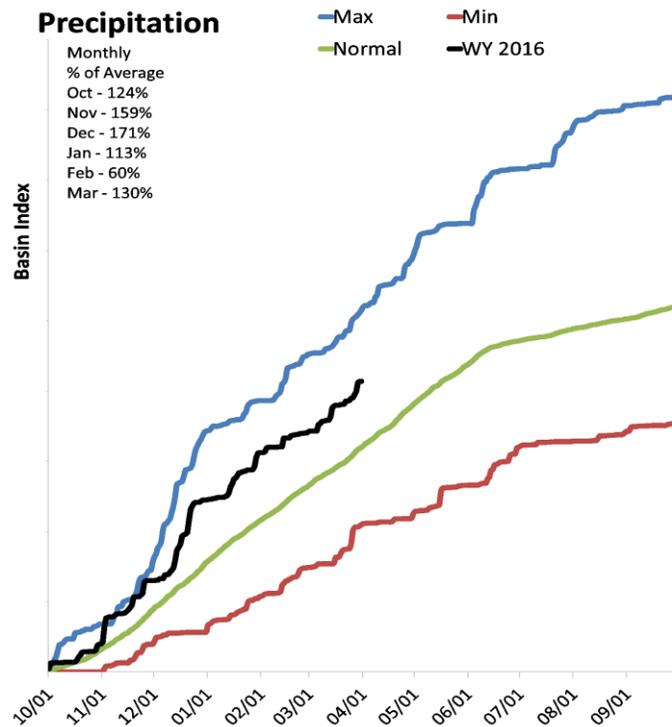
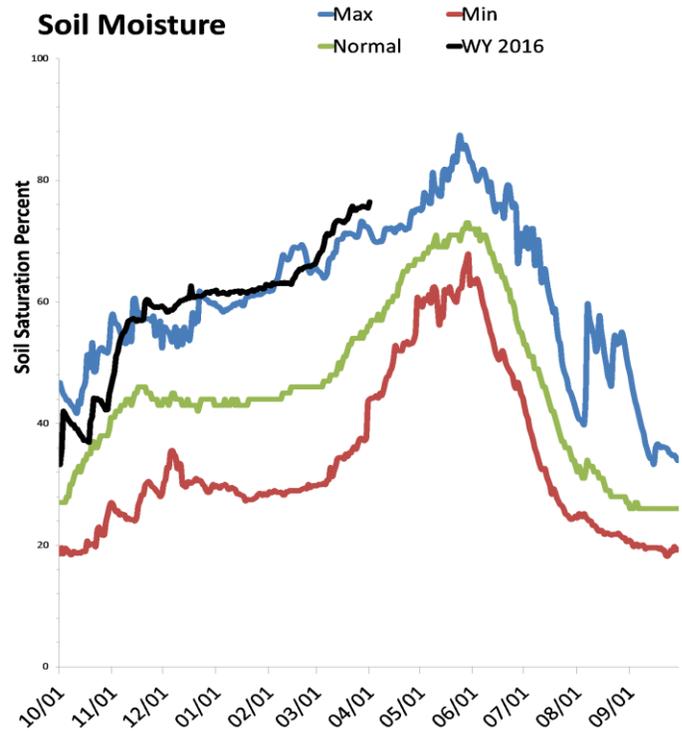
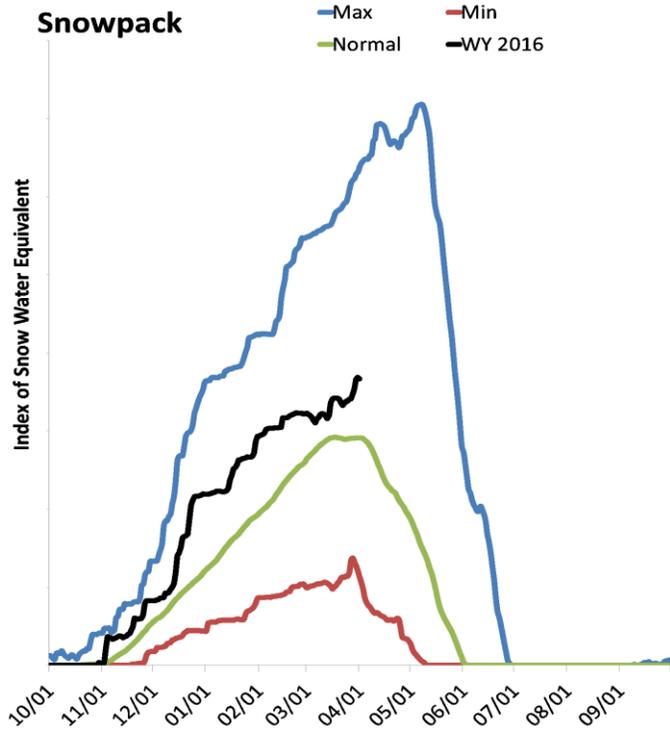
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Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Clover Valley & Franklin River Basin	8	119%	34%
Clover Valley	4	114%	21%
Franklin River	7	121%	34%

Snake River Basin

4/1/2016

Snowpack in the Snake River Basin is near normal at 109% of median, compared to 38% last year. Precipitation in March was above average at 129%, which brings the seasonal accumulation (Oct-Mar) to 129% of average. Soil moisture is 68% compared to 65% last year. The forecast streamflow volume for Salmon Falls Creek is 134% of average.



Snake River Basin Streamflow Forecasts - April 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	APR-JUL	69	84	94	134%	105	120	70
	APR-SEP	73	88	99	134%	109	124	74

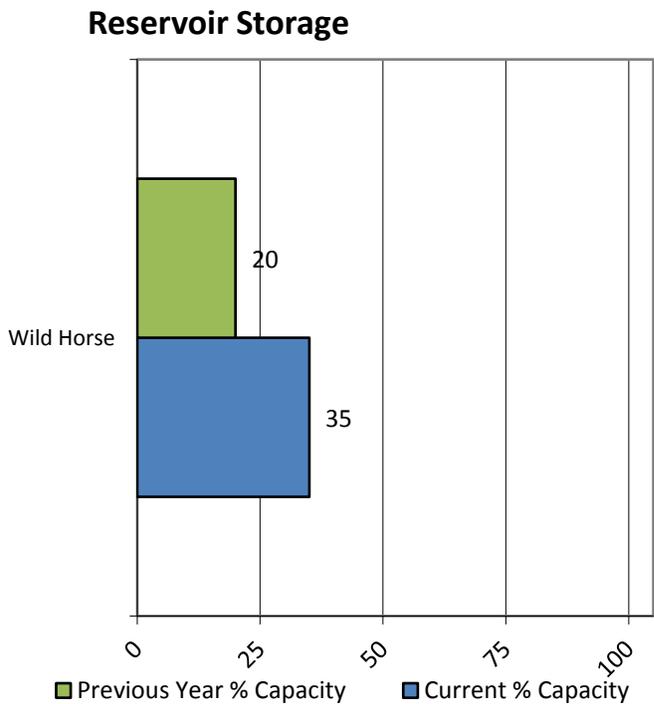
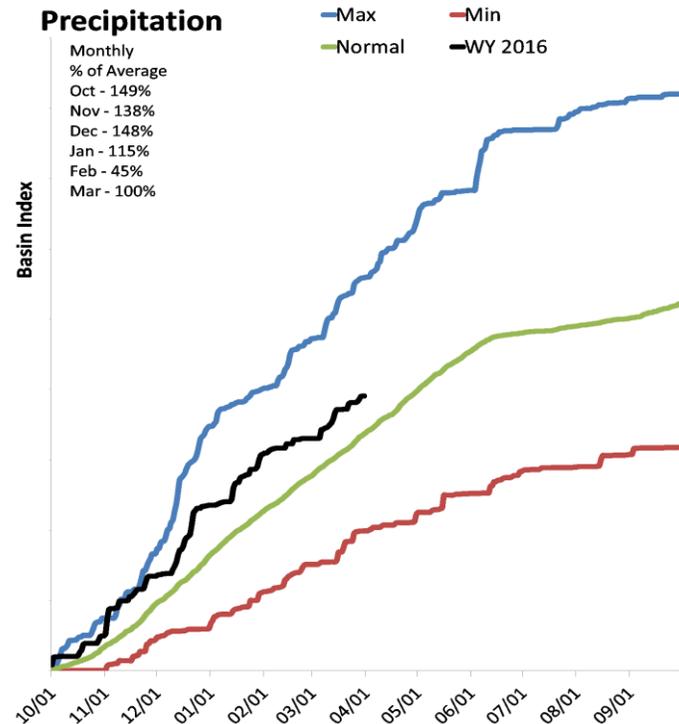
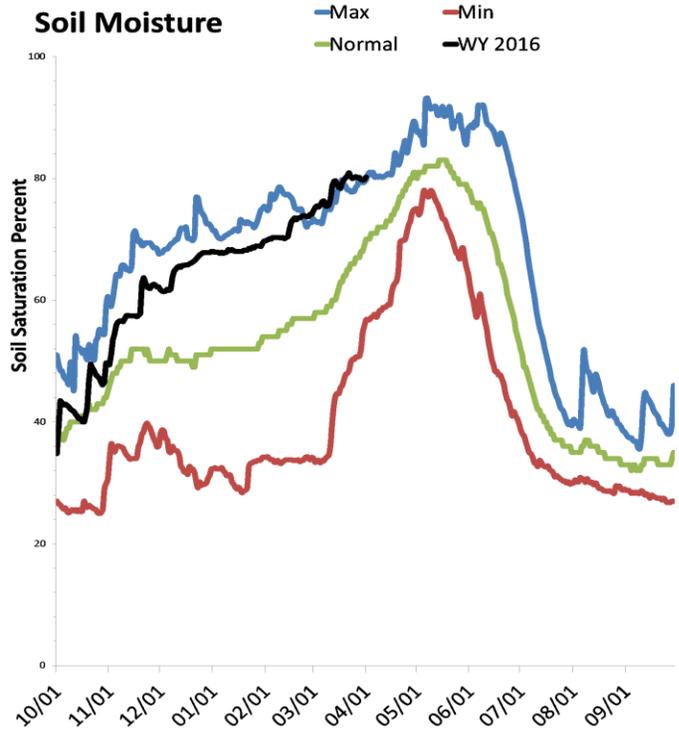
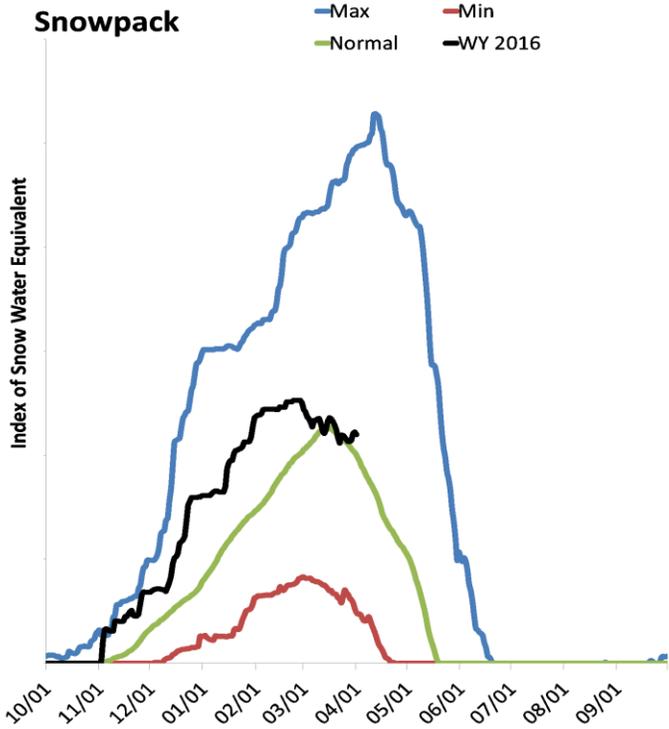
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Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Snake River Basin	13	109%	38%
Bruneau River	8	113%	33%
Jarbidge River	3	131%	49%
Salmon Falls Creek	8	120%	50%

Owyhee River Basin

4/1/2016

Snowpack in the Owyhee River headwaters is below normal at 84% of median, compared to 17% last year. Precipitation in March was near average at 99%, which brings the seasonal accumulation (Oct-Mar) to 116% of average. Soil moisture is 78% compared to 80% last year. Storage in Wildhorse Reservoir is 35% of capacity, compared to 20% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 109% of average.



Owyhee River Basin Streamflow Forecasts - April 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 ²	APR-JUL	6.6	15.1	24	109%	35	58	22

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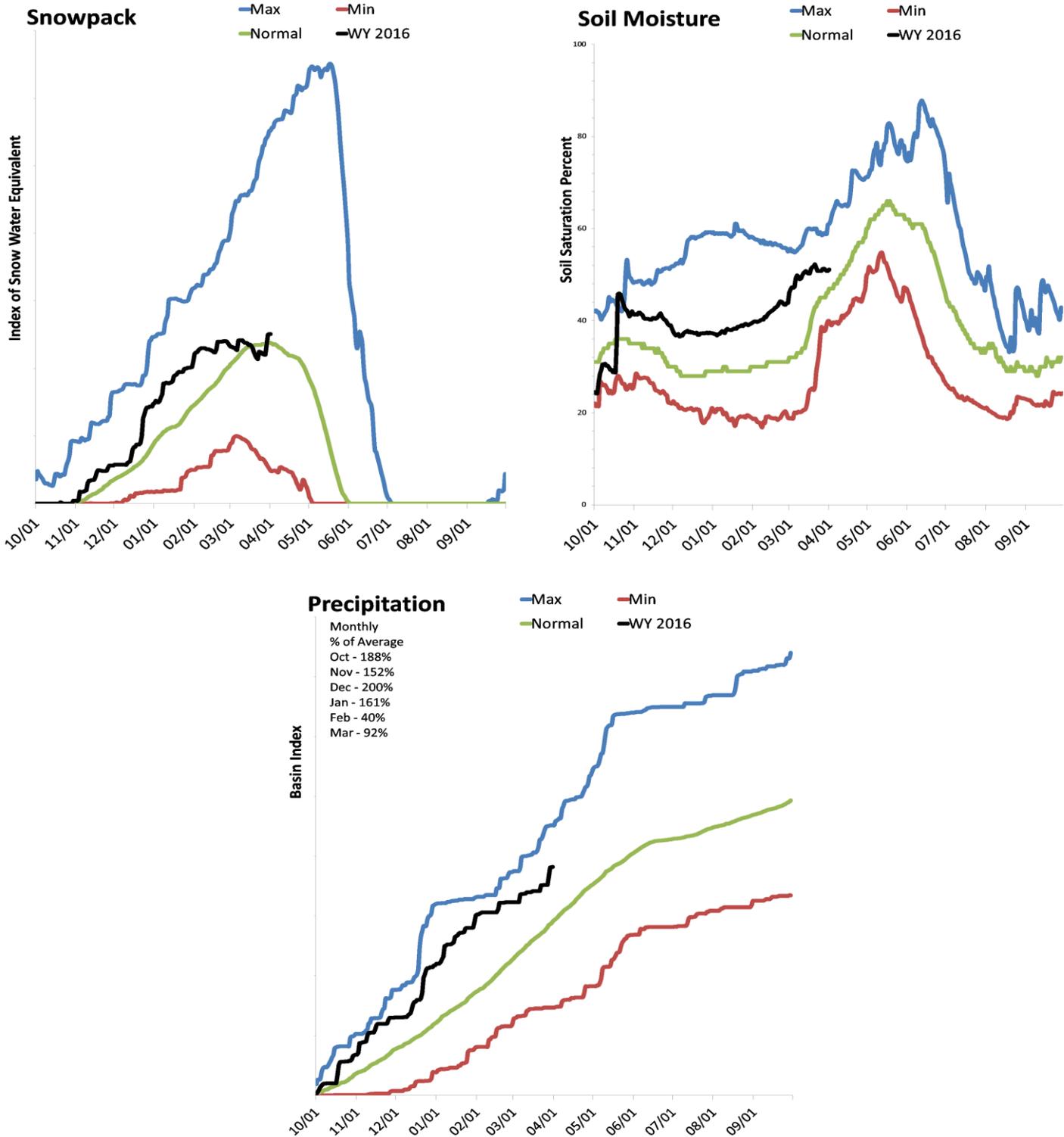
Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Wild Horse Reservoir	25.0	14.2	39.2	71.5
Basin-wide Total	25.0	14.2	39.2	71.5
# of reservoirs	1	1	1	1

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Owyhee River Basin	11	84%	17%
Owyhee River above Owyhee	8	86%	18%
Owyhee River above Gold Creek	4	96%	25%
South Fork Owyhee River	4	77%	30%

Eastern Nevada

4/1/2016

Snowpack in Eastern Nevada is near normal at 103% of median, compared to 27% last year. Precipitation in March was near average at 93%, which brings the seasonal accumulation (Oct-Mar) to 131% of average. Soil moisture is 50% compared to 42% last year. Forecast streamflow volumes range from 110% to 125% of average.



Eastern Nevada Streamflow Forecasts - April 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	0.84	3	4.4	122%	5.8	8	3.6
Steptoe Ck nr Ely	APR-JUL	1.93	2.6	3	125%	3.4	4.1	2.4
Cleve Ck nr Ely	APR-JUL	2.8	4.2	5.1	116%	6	7.4	4.41
Lehman Ck nr Baker	APR-JUL	1.54	2.4	3	110%	3.6	4.5	2.72

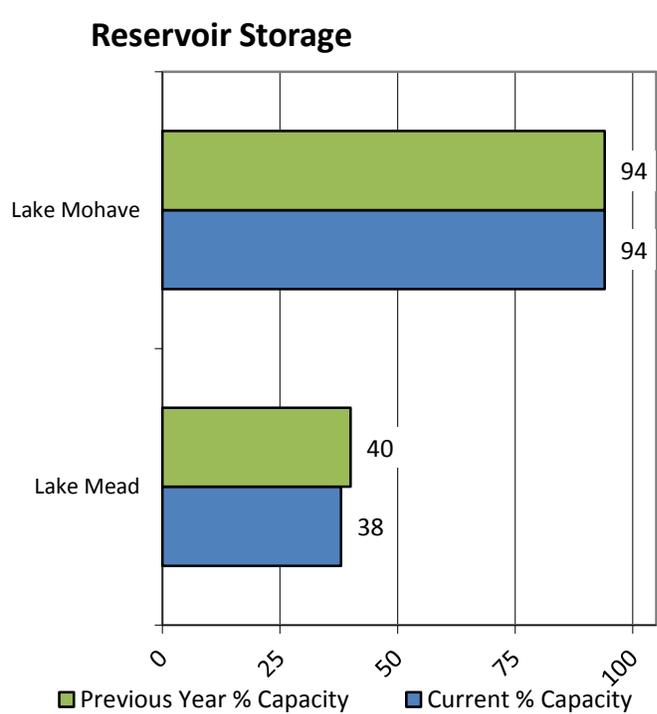
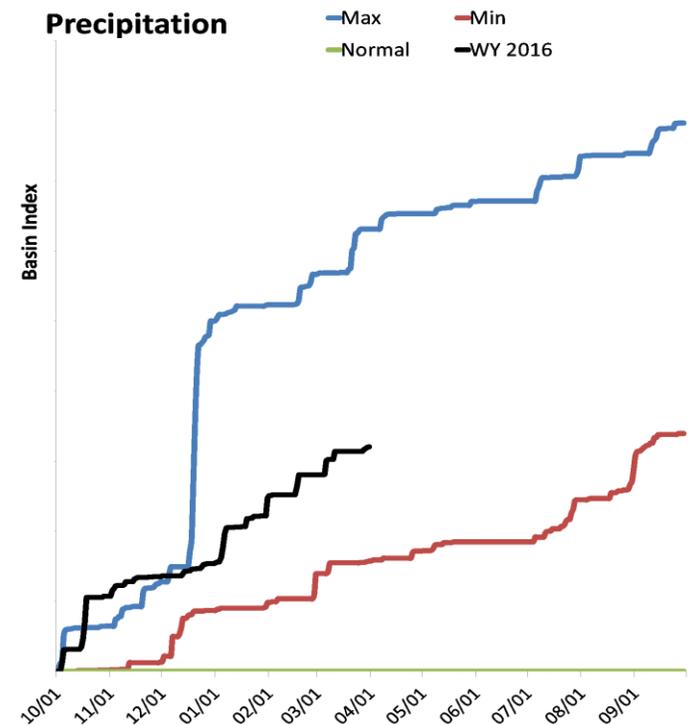
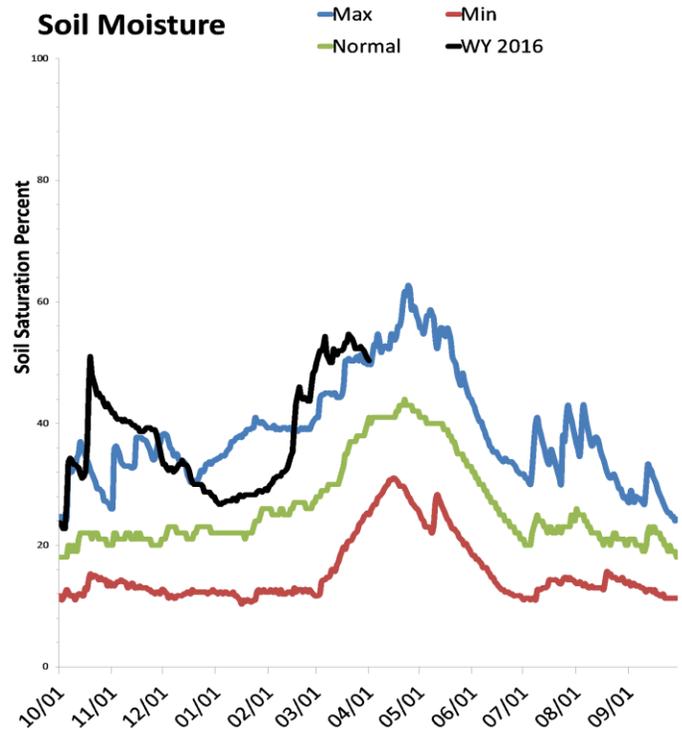
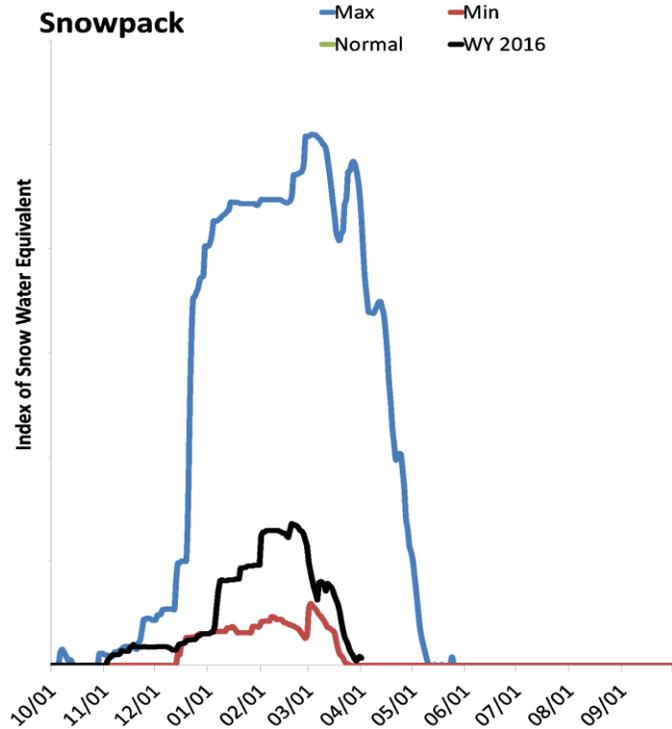
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- 3) Median value used in place of average

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Eastern Nevada	14	103%	27%
Kingston Creek	2	120%	23%
Steptoe Valley	5	111%	29%
Baker & Lehman Creeks	3	77%	34%

Spring Mountains & Southern Nevada

4/1/2016

The snowpack in the Spring Mountains is much below normal at 13% of median, compared to 0% last year. The average snow water content at SNOTEL sites in the Spring Mountains is 0.3 inches. Precipitation in March averaged 2 inches, which brings the seasonal accumulation (Oct-Mar) to 16 inches. Soil moisture is 50% compared to 49% last year. Storage in Lake Mead is 38% of capacity, compared to 40% last year, while Lake Mohave storage is 94% of capacity, compared to 94% last year. Streamflow forecasts range from 75% to 82% 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 - April 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	24	38	49	78%	62	83	63
Virgin R at Littlefield	APR-JUL	25	40	53	82%	67	92	65
Lake Powell Inflow ²	APR-JUL	3500	4580	5400	75%	6290	7710	7160

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Reservoir Storage End of March, 2016	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	10034.0	10419.0	20450.0	26159.0
Lake Mohave	1707.0	1700.0	1687.0	1810.0
Basin-wide Total	11741.0	12119.0	22137.0	27969.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2016	# of Sites	% Median	Last Year % Median
Spring Mountains	3	13%	0%
White River	4	103%	25%
Virgin River	8	96%	46%
Colorado R above Glen Canyon Dam	104	98%	62%

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Questions?

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