

*Natural Resources Conservation Service*

# Nevada Water Supply Outlook Report

## March 1, 2015



Photo – Jim Gifford

### **Finally, some snow at lake level.**

#### **Crystal Bay, Nevada along the north shore of Lake Tahoe on March 3, 2015**

Snow down to the shore of Lake Tahoe has been a rare sight this winter. With the exception of a little snow on the ground between Christmas and New Year's the lake shore was bare until the very end of February. The Lake Tahoe Basin snowpack is currently 23% of normal based on measurements made for the March 1 survey. Tahoe's snowpack has been at or near record low amounts since late January based on daily SNOTEL data. The last time we had a snowpack similar to this year was 1991. Record low snow conditions exist all around Nevada, see page 5 for details.

# Water Supply Outlook Reports

## Federal - State – Private Cooperative Snow Surveys

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For more water supply and resource management information:

Internet: [www.nv.nrcs.usda.gov/snow/](http://www.nv.nrcs.usda.gov/snow/)

Contact: Jeff Anderson, Water Supply Specialist, [jeff.anderson@nv.usda.gov](mailto:jeff.anderson@nv.usda.gov) or 775-857-8500 x152  
Natural Resources Conservation Service, Nevada Snow Survey, 1365 Corporate Blvd, Reno, NV 89502

To join a free email subscription list please email: [jeff.anderson@nv.usda.gov](mailto:jeff.anderson@nv.usda.gov)

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### *How forecasts are made*

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when the snow melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to produce runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, 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, for which 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. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertainty is in the forecast. 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. 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, 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, 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 for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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# ***Nevada Water Supply Outlook Report***

***March 1, 2015***

## **SUMMARY**

Just as last month's report was published the leading edge of a double barreled, atmospheric river storm system arrived in western Nevada. That system produced a five inch rise in Lake Tahoe and up to eight inches of precipitation at SNOTEL sites in the Sierra. Although rain caused snow totals from that storm to be disappointing the sheer volume of moisture it dropped over the weekend was exactly what our region's water supply needs more of. The drought we face is due to the lack of these types of storms over the past four winters. When the current drought breaks, more than likely it will be because a series of atmospheric rivers deliver moisture from the Pacific to our mountains. The current snowpack in the Sierra is near record low and very similar to 1991. From here on out if 2015 continues to mimic 1991 we'll all be delighted by April 1 considering where we stand now. That is because in addition to a dire March 1 snowpack, 1991 is more remembered for its "Miracle March". The snowpack in the Sierra went from 15-20% of normal on March 1 to 60-80% of normal by April 1. That precipitation brought relief during another drought and dramatically improved water supplies that summer. Looking forward weather models predict dry conditions until about March 11<sup>th</sup>, after that our chances for an atmospheric river making it into Nevada look hopeful. The second half of March may be our last chance for drought relief this year as later months are historically not known for significant recovery. The rain in February increased soil moisture which remains much better than last year across the state. This could help a greater amount of snowmelt make it into rivers, but let's just hope March produces a lot more snow first.

## **PRECIPITATION**

Back-to-back warm atmospheric river storms between February 6<sup>th</sup> and 9<sup>th</sup>, followed by a cold, end-of-month storm helped the eastern Sierra basins record near average or better precipitation in February. Monthly precipitation was 106% of average in the Lake Tahoe Basin while the Truckee, Carson and Walker basins had around 90% of average. As of March 1 water year to date precipitation since October 1<sup>st</sup> ranges from just over 50% of average in the Walker and Carson basins to 60% in the Truckee and Lake Tahoe basins. Elsewhere precipitation was well below average in February ranging from 71% in Clover Valley to 27% in Eastern Nevada, other northern Nevada basins recorded 43% to 56% of their average February amounts. Ranked low to high, water year to date precipitation across northern Nevada stands at 57% in Eastern Nevada, 74% in the Upper Humboldt, 79% in the Lower Humboldt, 83% in the Snake, 86% in the Owyhee, 87% in the N. Great Basin and 90% in Clover Valley.

## **SNOWPACK**

Based on SNOTEL data March 1 snowpacks are at or near historic minimum values in the Lake Tahoe, Lower Humboldt, Upper Humboldt, Eastern Nevada and the Owyhee basins. Statewide snowpack percentages range from 23% of median in the Lake Tahoe Basin to 74% in the Snake River Basin. Percentages are up slightly from last month for most of the Sierra, however north-central and eastern Nevada saw double digit declines in snow percentages. The largest declines were in the Owyhee basin (-36%) followed by Eastern Nevada (-28%), Upper Humboldt (-24%), Snake (-23%), and Lower Humboldt (-13%). With only a couple of exceptions most of Nevada and the eastern Sierra have

snowpacks less than 50% of the 1981-2010 median. Snow in the Sierra is vying with 1991 as the lowest on record with 24 measuring sites at their lowest or second lowest amount on record. Ten more lowest or second lowest sites are found across other mountain ranges including: Diamond Peak near Eureka and Ward Mountain near Ely, as well as, Lamance Creek and Buckskin Lower in the Santa Rosa Range north of Winnemucca, and six sites around Elko including Laurel Draw in the Independence Mountains, Jakes Creek Aerial Marker in the Snake Mountains, and Big Bend northeast of Wildhorse Reservoir, and Harrison Pass #1, Green Mountain and Lamoille #3 which are all in the Ruby Mountains.

## **SOIL MOISTURE**

February rain and some mid-winter snowmelt at some stations increased soil moisture across the Sierra and western Nevada. Soil moisture is near or above average for all areas except Eastern Nevada. The Truckee basin has its highest March 1 soil moisture based on 10 years of data. One correction from last month is worth mentioning, the drop in soil moisture seen in February in the Upper Humboldt basin was due to a sensor malfunction. Those data have been corrected in this month's graphic on page 18. Soil moisture has actually been improving over the past two month in the Upper Humboldt.

## **RESERVOIRS**

Rain helped most reservoirs make modest gains in February, but volumes remain low. Lake Tahoe's water surface elevation increased about five inches in February and is now 6222.85 feet which is still 0.15 feet below its rim. Storage downstream in the Truckee River reservoirs is up 3% from last month and stands at 29% of capacity. Lahontan Reservoir increased from 8% to 14% of capacity in February, and now contains 42,500 acre-feet. Volumes increased somewhat in Bridgeport Reservoir and Topaz Lake which are both 16% of capacity. Rye Patch storage has increased just 1,070 acre-feet since the start of the water year. Rye Patch storage remains only 5% of capacity.

## **STREAMFLOW FORECASTS**

Streamflow will be far less than normal this summer across Nevada. Forecasts remained similar to February values in the Truckee, Carson and Walker basins ranging from 12% to 38% of average for the March through July period. Forecasts in the Upper Humboldt Basin and Eastern Nevada fell by an average of 20% since last month. Forecasts in the Upper Humboldt range from 26% to 47%, while those in the Eastern Nevada are 11% to 22%. A round-up of a few important forecasts shows the Truckee River at Farad forecast at 36%, the Carson River at Fort Churchill at 12%, the West Walker River near Coleville at 38% and the Humboldt River at Imlay at 17%.

## **UPCOMING EVENTS**

### ***Northern Nevada Water Forecast Meeting***

March 20, 2015, 10am, Tahoe Hearing Room, Nevada Division of Water Resources, Carson City  
Presentations will be made by the Natural Resource Conservation Service, the National Weather Service, and the Bureau of Reclamation regarding the upcoming water supply season in the Truckee, Carson, Walker, and Humboldt river drainages. The meeting is open to the public.

Contact Reed Cozens to be put on a notification list: (775) 684-2800, rcozens@water.nv.gov

### ***Western Snow Conference, April 20-23, 2015, Grass Valley, CA***

<http://www.westernsnowconference.org/>

## SNOW SURVEY PRODUCTS HIGHLIGHT

This section highlights products that are linked from the Nevada Snow Program website:

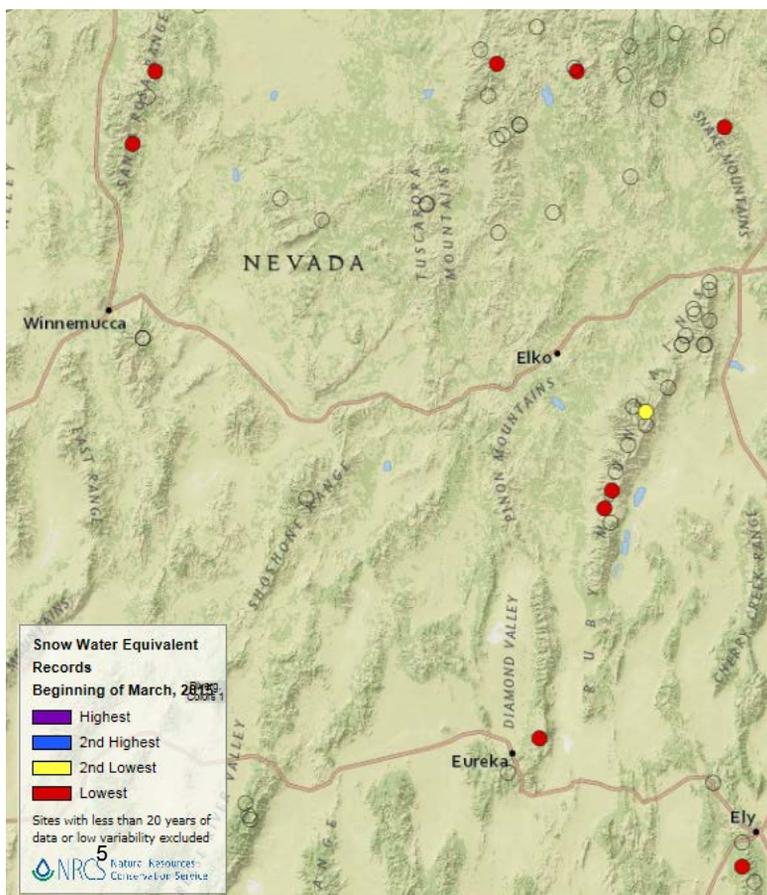
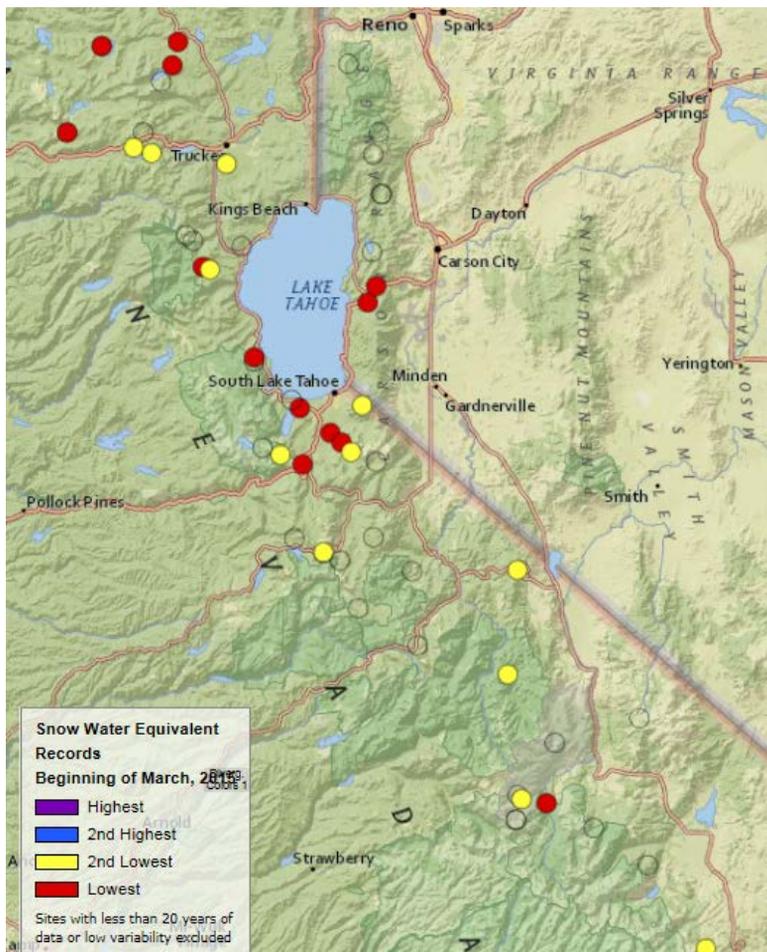
[www.nv.nrcs.usda.gov/snow/](http://www.nv.nrcs.usda.gov/snow/).

This month points out a new feature being added to the interactive map.

This feature will allow users to visualize data on the map. Its not quite ready for public release so consider this a preview. There will be a number of different options but one that is particularly meaningful this month is the “records” feature.

The maps to the right display “Snow Water Equivalent Records for March 1, 2015.” Red dots indicate that the current snowpack is the lowest on record at that SNOTEL or snow course location. Yellow dots indicate second lowest snow water on record. Added together there are 32 stations across our region that have record low or near record low snow.

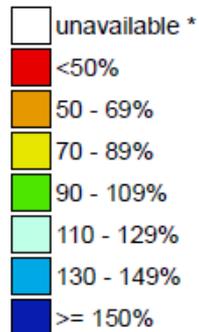
Sites with less than 20 years of data or those with low data variability have been excluded, so these are all significant records. One of the most notable is Echo Summit snow course which was measured after the end of February storm and still recorded its lowest March 1 amount going back to 1942. In that time only three March measurements were missed. Echo Summit is located at 7,500 feet just outside the Tahoe Basin along Route 50.



# Nevada/California SNOTEL Current Snow Water Equivalent (SWE) % of Normal

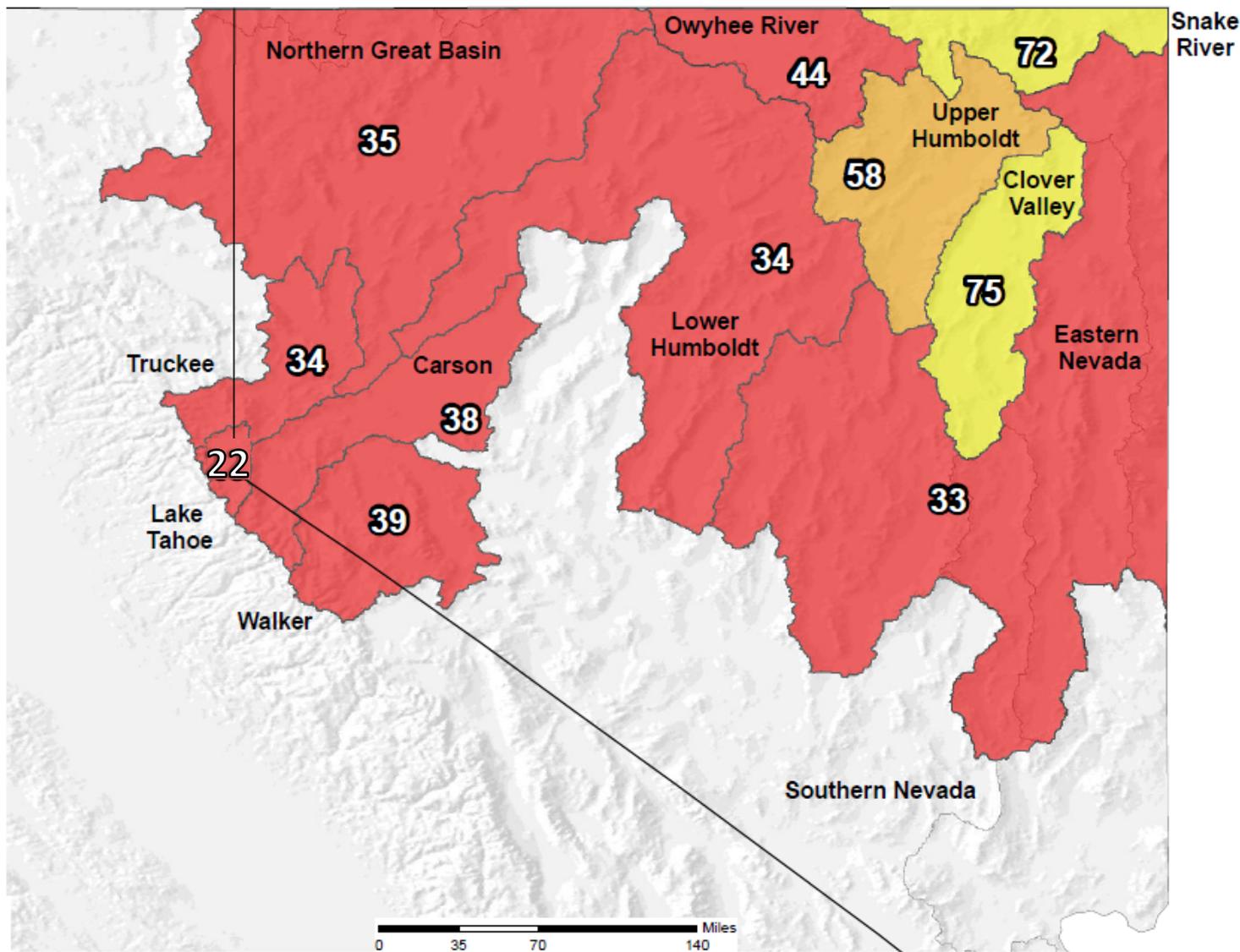
Mar 05, 2015

Current Snow Water Equivalent Basin-wide Percent of 1981-2010 Median



\* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision



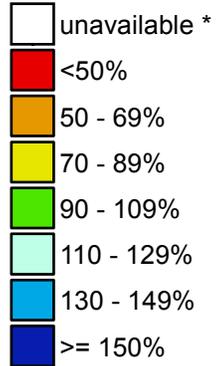
The current snow water equivalent percent of normal represents the snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# Nevada/California SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal

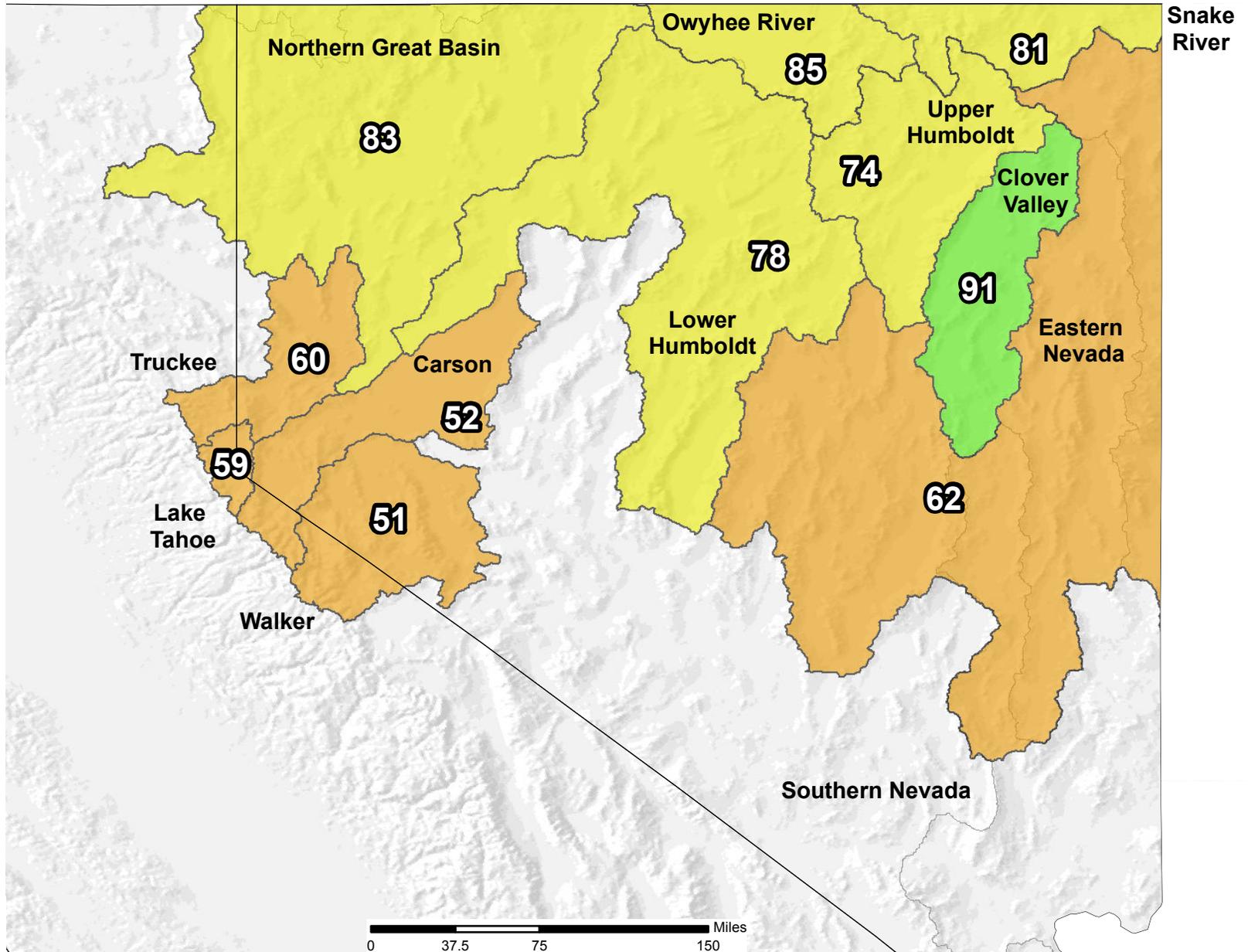
Mar 05, 2015

Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average



\* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision



The water year to date precipitation percent of normal represents the accumulated precipitation found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00). 7

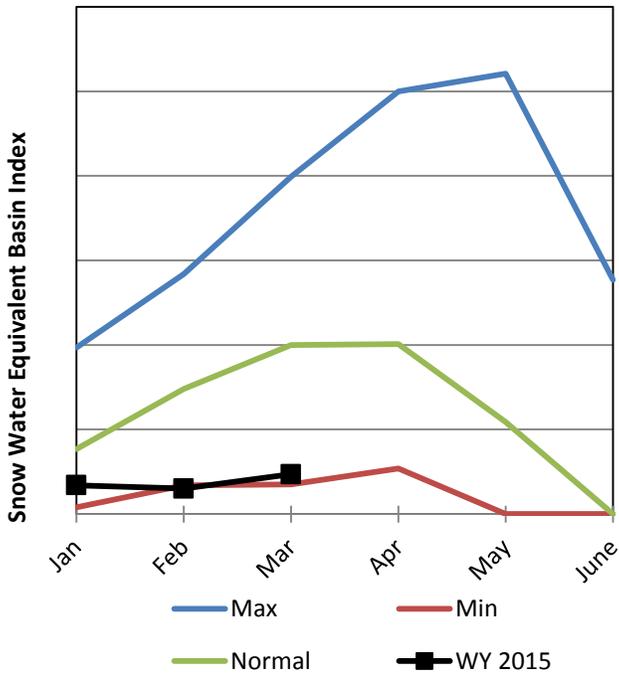
Prepared by:  
 USDA/NRCS National Water and Climate Center  
 Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# Lake Tahoe Basin

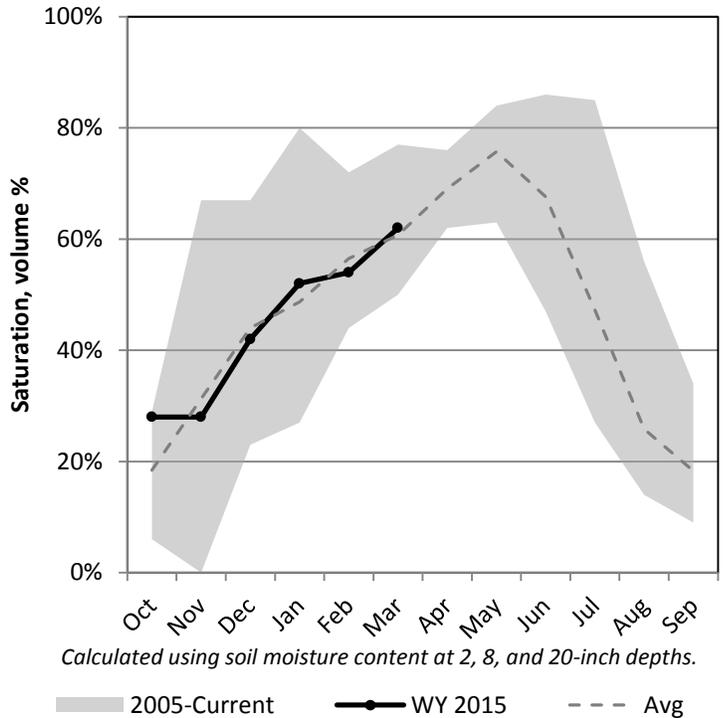
3/1/2015

Snowpack in the Lake Tahoe Basin is much below average at 23% of normal, compared to 41% last year. Precipitation in February was near average at 106%, which brings the seasonal accumulation (Oct-Feb) to 60% of average. Soil moisture is at 62% compared to 55% last year. Lake Tahoe's water elevation is 6222.85 ft, which is 0.15 feet below the lake's natural rim and equals a storage deficit of about 18,190 acre-feet. Last year the elevation was 6224.11 ft and the useable storage equaled 136,000 acre-feet. Lake Tahoe is forecast to rise 0.45 feet from March to its high elevation.

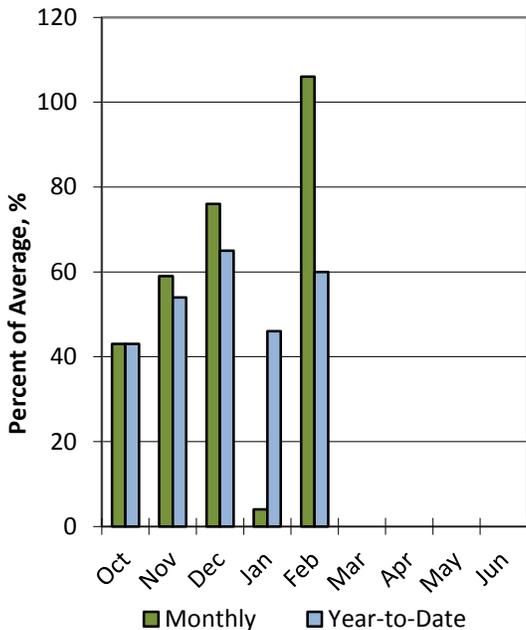
## Snowpack



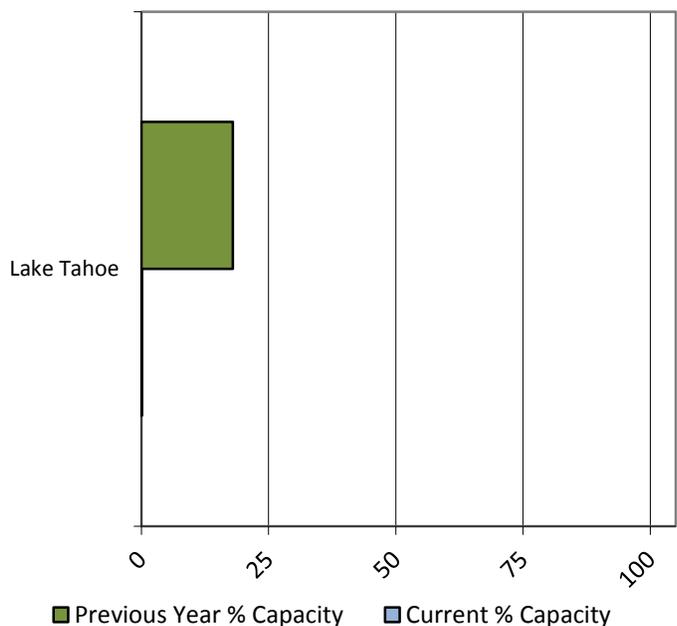
## Soil Moisture



## Precipitation



## Reservoir Storage



### Lake Tahoe Streamflow Forecasts - March 1, 2015

Lake Tahoe	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
<b>Marlette Lake Inflow</b>								
	MAR-JUL	-739	-195	175	14%	545	1089	1213
	APR-JUL	-694	-233	80	9%	393	854	911
<b>Lake Tahoe Rise Gates Closed<sup>1</sup></b>								
	MAR-HIGH	0.035	0.13	0.45	26%	0.77	1.49	1.73
	APR-HIGH	0.1	0.21	0.4	31%	0.61	1.1	1.31

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Tahoe	0.0	136.0	296.7	744.6
Basin-wide Total		136.0	296.7	744.6
# of reservoirs	1	1	1	1

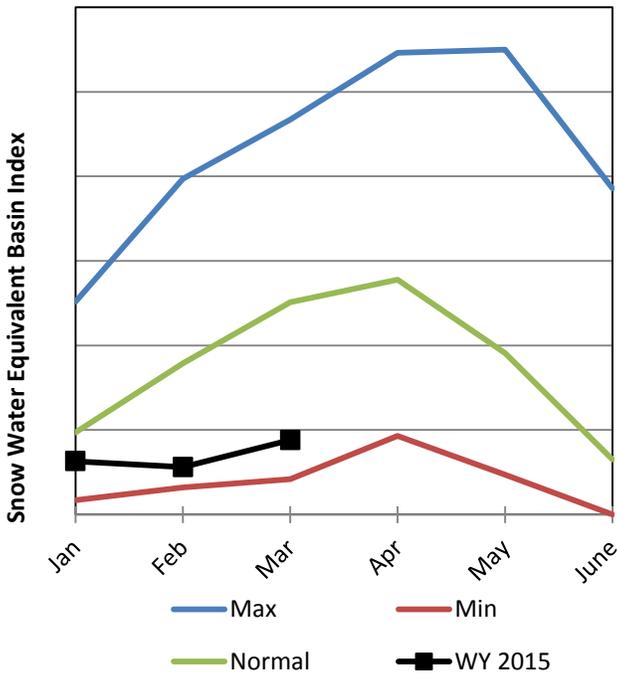
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Lake Tahoe Basin	16	23%	41%

# Truckee River Basin

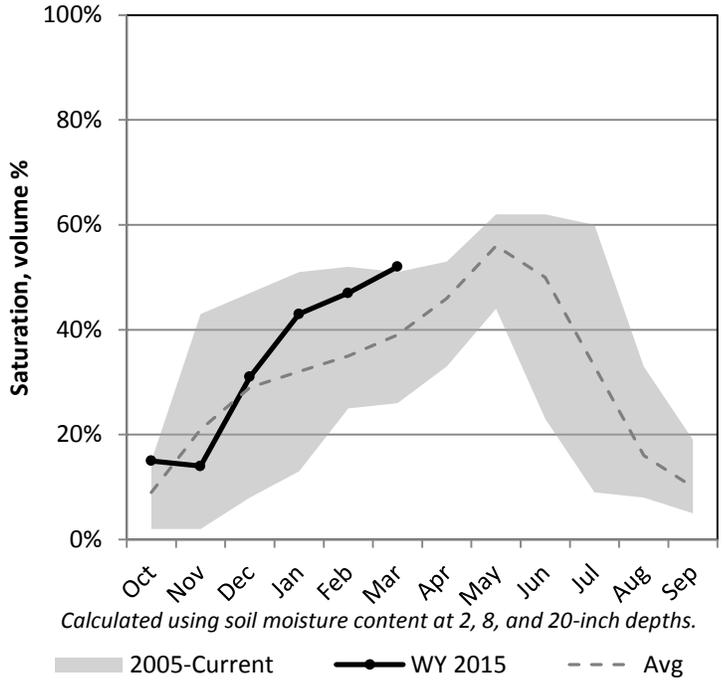
3/1/2015

Snowpack in the Truckee River Basin is much below average at 28% of normal, compared to 28% last year. Precipitation in February was near average at 90%, which brings the seasonal accumulation (Oct-Feb) to 61% of average. Soil moisture is at 52% compared to 39% last year. Reservoir storage is at 29% of capacity, compared to 45% last year. Forecast streamflow volumes range from 13% to 37% of average.

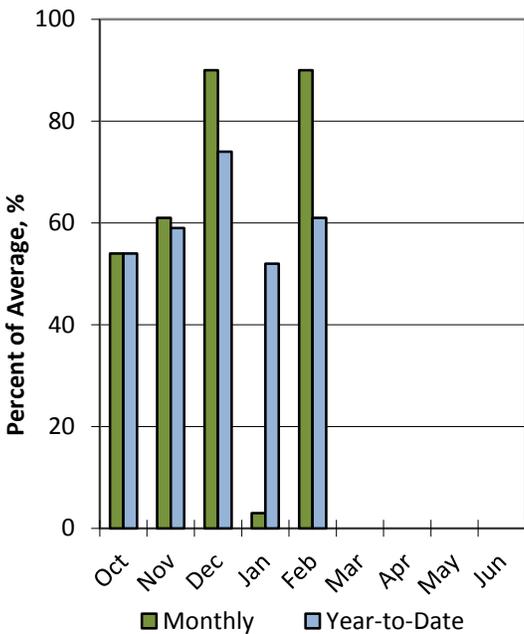
## Snowpack



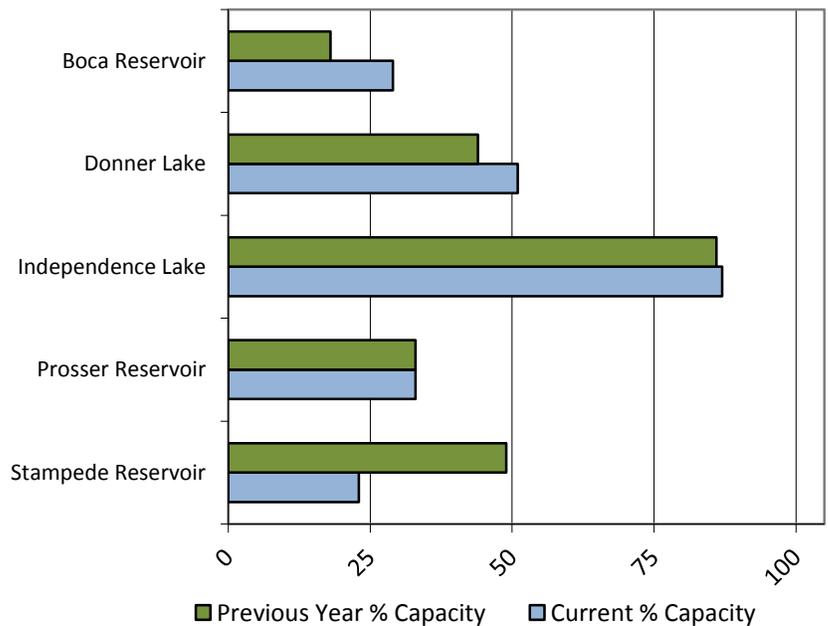
## Soil Moisture



## Precipitation



## Reservoir Storage



## Truckee River Streamflow Forecasts - March 1, 2015

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

Truckee River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Sagehen Ck nr Truckee	MAR-JUL	0.77	1.05	1.3	20%	1.61	2.2	6.4
	APR-JUL	0.056	0.28	1	18%	1.27	1.8	5.6
L Truckee R ab Boca Reservoir	MAR-JUL	1.98	15.8	34	34%	52	79	99
	APR-JUL	17	23	28	33%	50	72	84
Truckee R at Farad	MAR-JUL	6.1	57	110	36%	163	241	307
	APR-JUL	55	75	95	37%	145	220	255
Steamboat Ck at Steamboat	APR-JUL	0.07	0.45	1	13%	1.89	4	7.9
Galena Ck at Galena Ck State Pk	MAR-JUL	0.097	1.07	1.8	37%	2.5	3.6	4.85
	APR-JUL	0.13	0.78	1.5	34%	2.2	3.3	4.37
Pyramid Lake Elevation Change <sup>1</sup>	LOW-HIGH	-3	-1.01	0.2	12%	1.41	3.1	1.7

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Boca Reservoir	12.0	7.5	16.7	40.9
Prosser Reservoir	9.5	9.4	9.7	28.6
Basin-wide Total	21.5	16.9	26.4	69.5
# of reservoirs	2	2	2	2

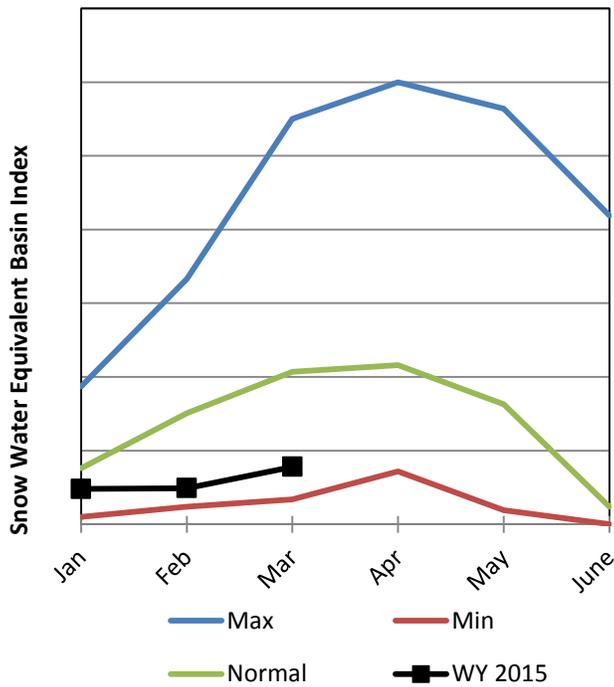
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Truckee River Basin	15	28%	28%
Little Truckee River	5	31%	29%
Sage Hen Creek	3	32%	29%
Galena Creek	1	52%	41%
Steamboat Drainage	1	52%	41%
Pyramid Lake	30	25%	33%

# Carson River Basin

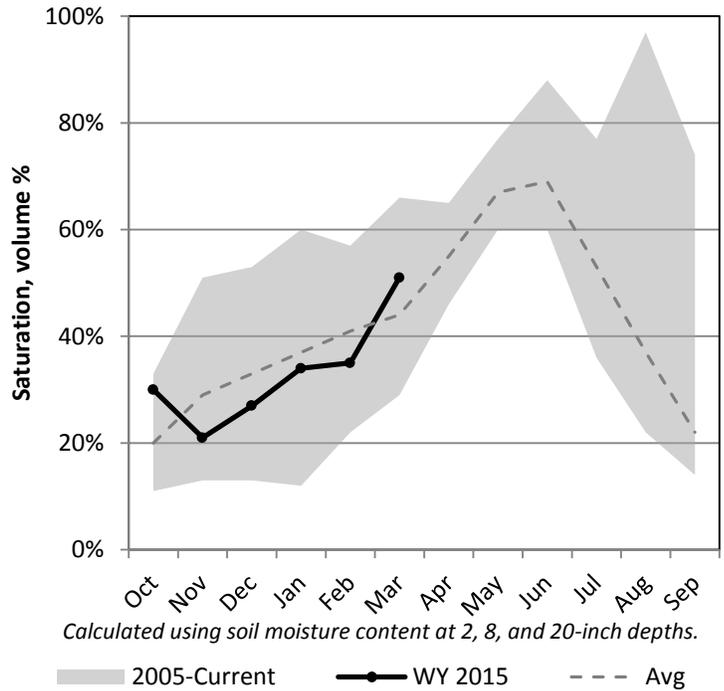
3/1/2015

Snowpack in the Carson River Basin is much below average at 36% of normal, compared to 55% last year. Precipitation in February was near average at 92%, which brings the seasonal accumulation (Oct-Feb) to 53% of average. Soil moisture is at 51% compared to 33% last year. Storage in Lahontan Reservoir is 14% of capacity, compared to 25% last year. Forecast streamflow volumes range from 12% to 33% of average.

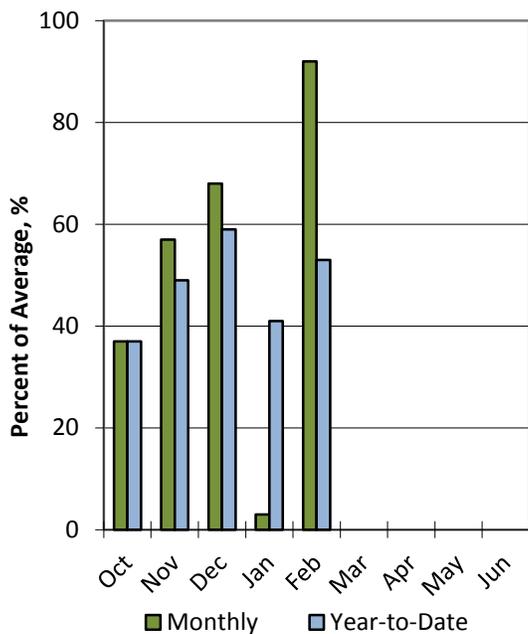
## Snowpack



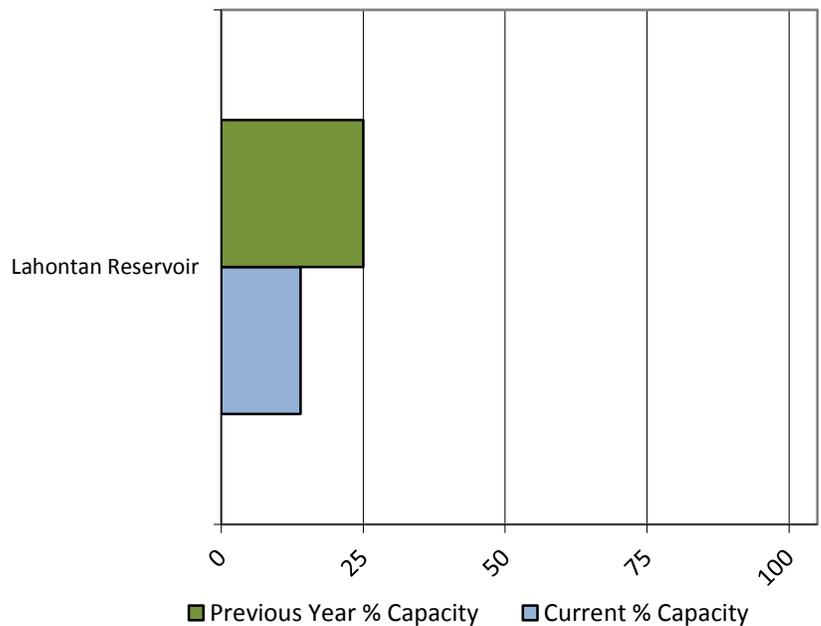
## Soil Moisture



## Precipitation



## Reservoir Storage



### Carson River Streamflow Forecasts - March 1, 2015

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

Carson River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
EF Carson R nr Gardnerville	MAR-JUL	6.2	30	68	33%	106	162	205
	APR-JUL	3.7	17.9	56	30%	94	150	186
	200 cfs	14 May	31 May	12 Jun		24 Jun	11 Jul	25 Jul
	500 cfs	29 Apr	15 May	25 May		04 Jun	20 Jun	01 Jul
WF Carson R nr Woodfords	MAR-JUL	1.18	7.1	18	31%	29	45	59
	APR-JUL	1.62	5.9	17	31%	28	44	54
Carson R nr Carson City	MAR-JUL	3.7	19.8	38	18%	62	108	210
	APR-JUL	1.79	12.4	28	16%	50	94	179
Marlette Lake Inflow	MAR-JUL	-739	-195	175	14%	545	1089	1213
	APR-JUL	-694	-233	80	9%	393	854	911
King Canyon Ck nr Carson City	MAR-JUL	0.004	0.011	0.1	26%	0.29	0.58	0.38
	APR-JUL	0.004	0.011	0.12	32%	0.29	0.54	0.38
Carson R at Ft Churchill	MAR-JUL	5.2	13.8	23	12%	36	62	200
	APR-JUL	1	5	18	11%	45	70	171
Ash Canyon Ck nr Carson City	MAR-JUL	0.028	0.18	0.4	28%	0.62	0.94	1.41
	APR-JUL	0.011	0.15	0.34	30%	0.54	0.82	1.12

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lahontan Reservoir	42.5	74.0	170.8	295.1
Basin-wide Total	42.5	74.0	170.8	295.1
# of reservoirs	1	1	1	1

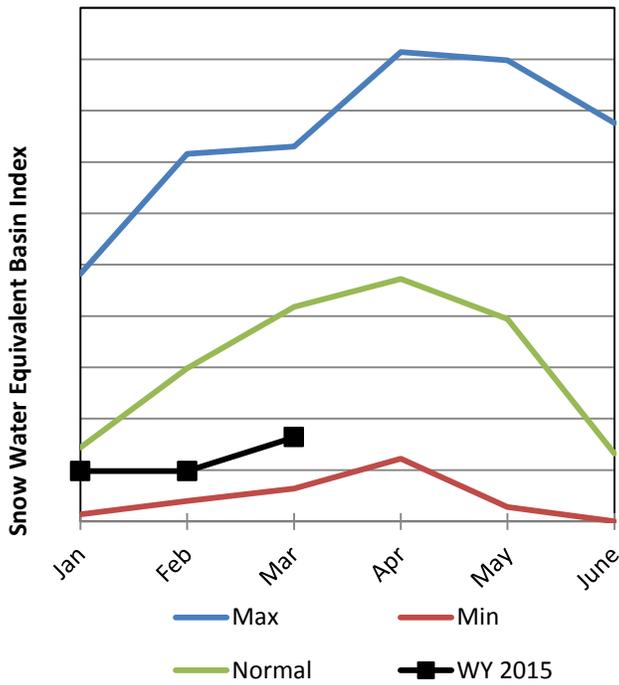
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Carson River Basin	9	36%	55%
E.F. Carson River	4	38%	50%
W.F. Carson River	9	36%	55%

# Walker River Basin

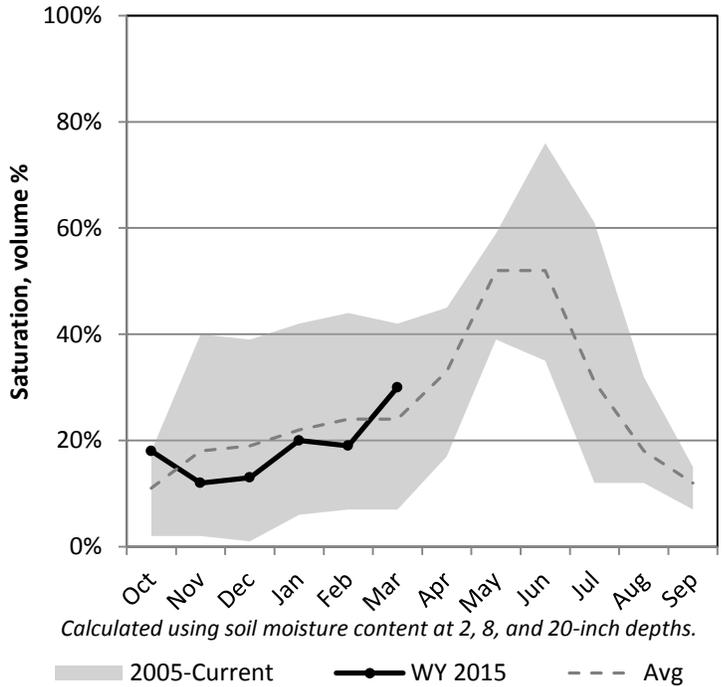
3/1/2015

Snowpack in the Walker River Basin is much below average at 39% of normal, compared to 45% last year. Precipitation in February was below average at 89%, which brings the seasonal accumulation (Oct-Feb) to 52% of average. Soil moisture is at 30% compared to 7% last year. Combined reservoir storage is at 16% of capacity, compared to 18% last year. Forecast streamflow volumes range from 30% to 38% of average.

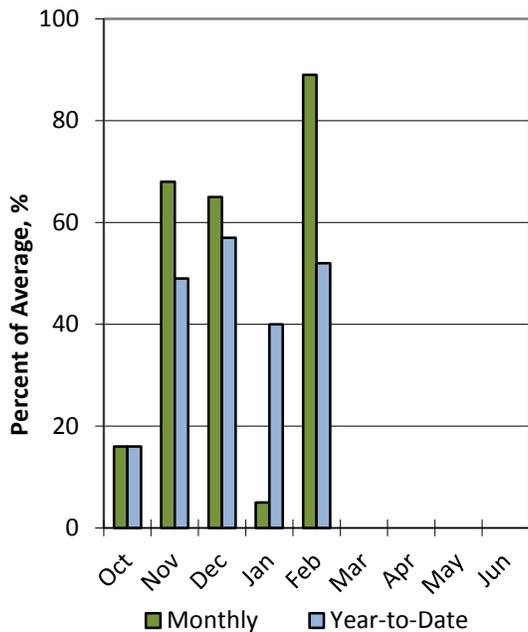
## Snowpack



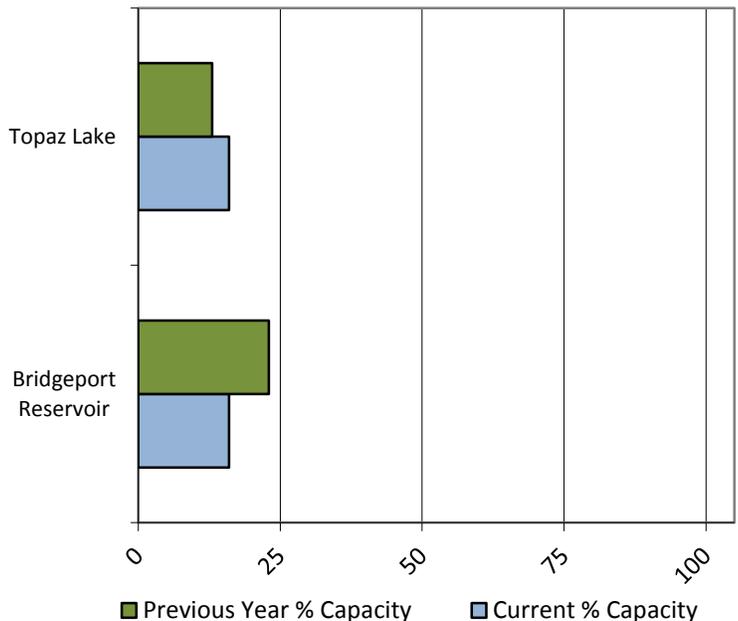
## Soil Moisture



## Precipitation



## Reservoir Storage



### Walker River Streamflow Forecasts - March 1, 2015

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

Walker River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
E Walker R nr Bridgeport	MAR-AUG	0.76	5.8	23	30%	40	66	76
	APR-AUG	0.67	3.2	18	27%	33	55	67
W Walker R bl L Walker nr Coalville	MAR-JUL	3.8	40	65	38%	90	126	170
	APR-JUL	2.3	38	62	38%	86	122	162
W Walker R nr Coalville	MAR-JUL	56	62	65	38%	68	74	172
	APR-JUL	54	59	62	38%	65	70	163
Walker Lake Elevation Change <sup>1</sup>	LOW-HIGH	-5.7	-2.9	-1.7	-121%	-0.46	2.3	1.41

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	6.6	9.8	24.4	42.5
Topaz Lake	9.7	7.7	28.6	59.4
Basin-wide Total	16.3	17.5	53.0	101.9
# of reservoirs	2	2	2	2

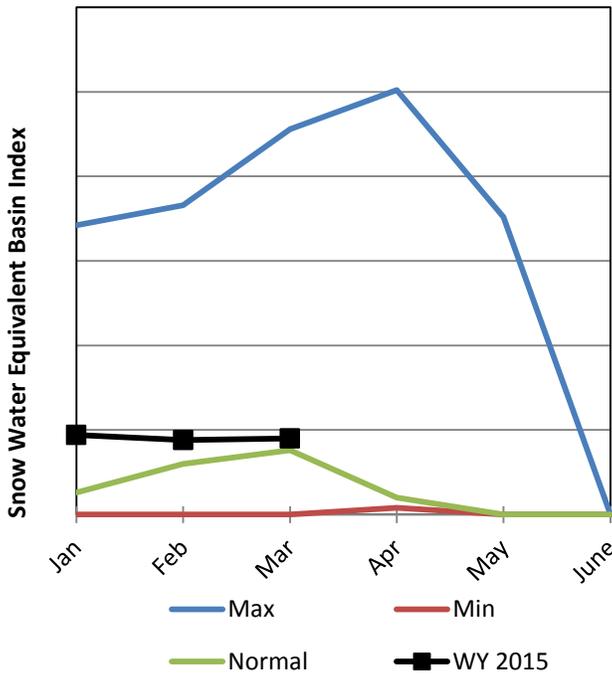
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Walker River Basin	6	39%	45%
E. Walker Rv. Nr Bridgeport	2	32%	47%
W. Walker Rv. Nr Coleville	5	40%	44%

# Northern Great Basin

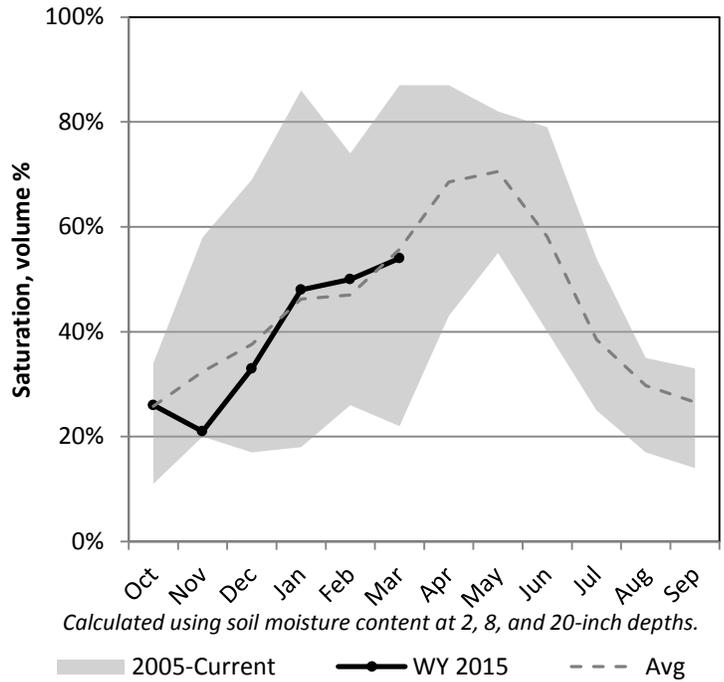
3/1/2015

Snowpack in the Northern Great Basin is much below average at 34% of normal, compared to 33% last year. Precipitation in February was much below average at 57%, which brings the seasonal accumulation (Oct-Feb) to 87% of average. Soil moisture is at 54% compared to 28% last year. Forecast streamflow volumes range from 30% to 44% of average.

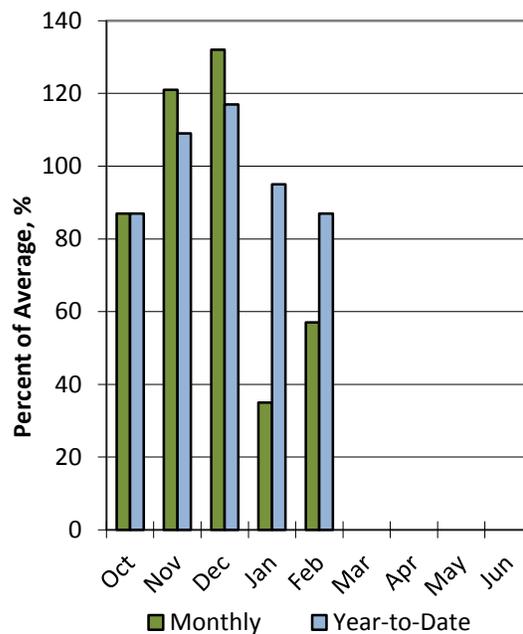
## Snowpack



## Soil Moisture



## Precipitation



## Northern Great Basin Streamflow Forecasts - March 1, 2015

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)
Eagle Ck nr Eagleville	APR-JUL	0.086	0.69	1.9	44%	3.1	4.9	4.3
Bidwell Ck nr Fort Bidwell	APR-JUL	0.24	2.7	4.6	38%	6.5	9.4	12
McDermitt Ck nr McDermitt	MAR-JUN	0.18	0.41	5.2	30%	10	17	17.5
	APR-JUL	0.14	0.84	3.6	26%	7.4	13.1	14
Davis Ck	APR-JUL	1780	2500	3160	44%	4000	5640	7233
	APR-SEP	2080	2880	3600	45%	4490	6220	7991

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

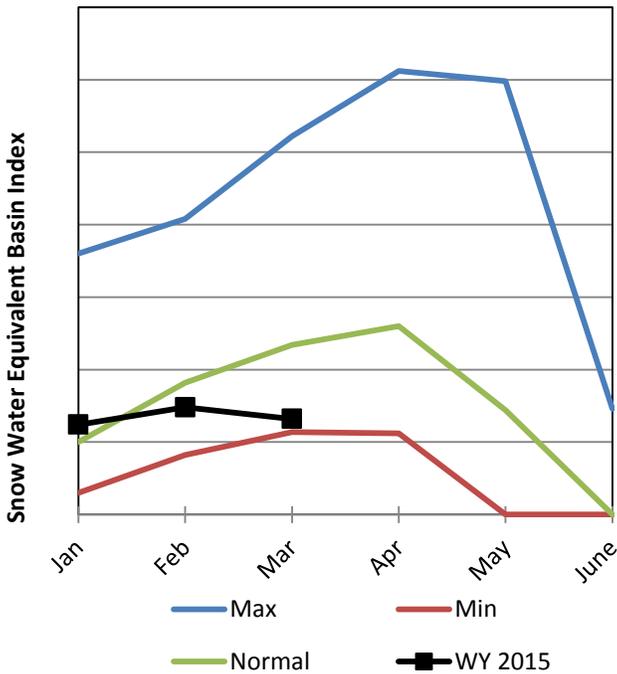
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
N Great Basin	7	34%	33%
Quinn River	2	4%	0%
McDermitt Creek	2	4%	0%

# Upper Humboldt River Basin

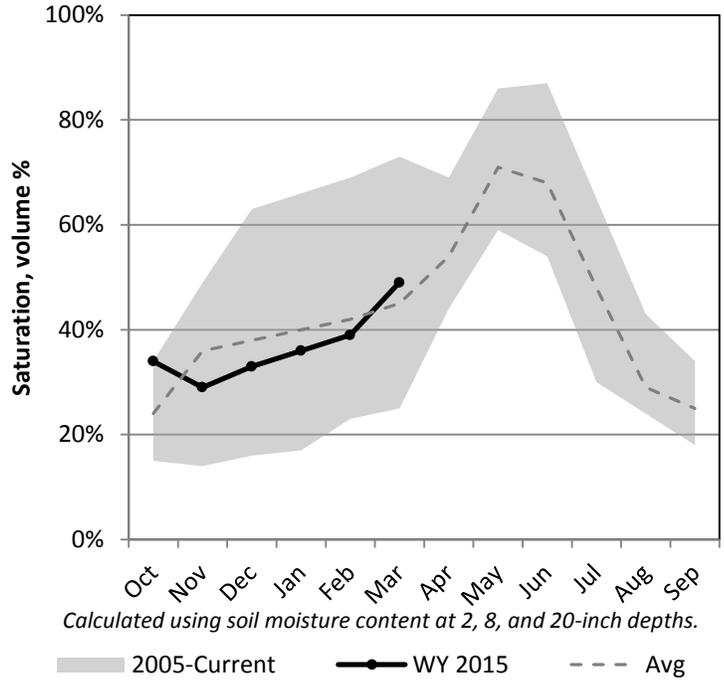
3/1/2015

Snowpack in the Upper Humboldt River Basin is much below average at 48% of normal, compared to 75% last year. Precipitation in February was much below average at 44%, which brings the seasonal accumulation (Oct-Feb) to 74% of average. Soil moisture is at 49% compared to 39% last year. Forecast streamflow volumes range from 27% to 47% of average.

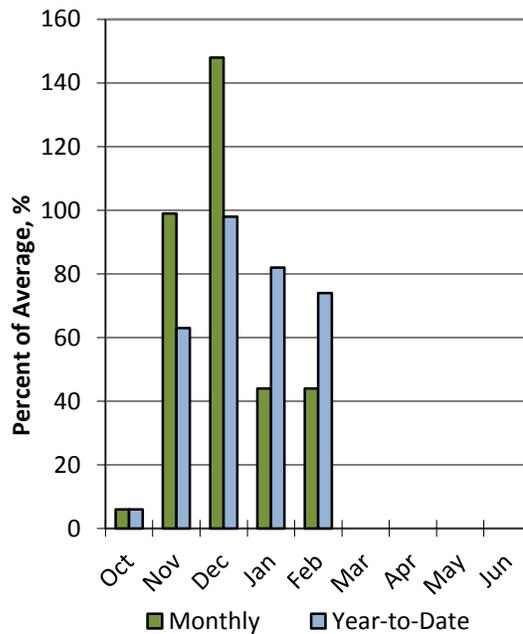
## Snowpack



## Soil Moisture



## Precipitation



## Upper Humboldt River Streamflow Forecasts - March 1, 2015

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

Upper Humboldt River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Marys R nr Deeth	MAR-JUL	2.8	11.9	18	44%	24	33	41
	APR-JUL	0.72	7.5	14.4	40%	21	31	36
Lamoille Ck nr Lamoille	MAR-JUL	2.2	9.2	14	47%	18.8	26	30
	APR-JUL	1.41	8.3	13	45%	17.7	25	29
NF Humboldt R at Devils Gate	MAR-JUL	-5.8	7.2	16	36%	25	38	44
	APR-JUL	0.34	2.1	12	35%	22	37	34
Humboldt R nr Elko	MAR-JUL	1.82	13.1	50	27%	87	141	182
	APR-JUL	3.1	9.2	40	26%	77	131	154
SF Humboldt R at Dixie	MAR-JUL	1.44	6.9	27	38%	47	77	72
	APR-JUL	1.32	5.1	24	36%	43	71	66
Humboldt R nr Carlin	MAR-JUL	13	67	104	38%	141	195	274
	APR-JUL	9.5	39	78	33%	117	174	238
Humboldt R at Palisades	MAR-JUL	2.7	57	100	37%	143	207	270
	APR-JUL	2.2	37	80	36%	123	187	225

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

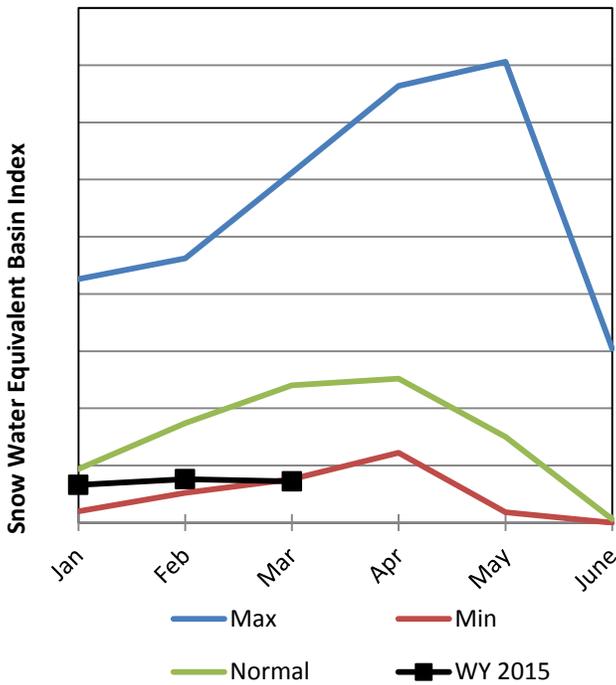
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Upper Humboldt R ab Palisades	18	48%	75%
Lamoille Creek	3	62%	84%
S. Fork Humboldt	5	43%	91%
Mary's River	1	63%	59%
N. Fork Humboldt	2	10%	28%

# Lower Humboldt River Basin

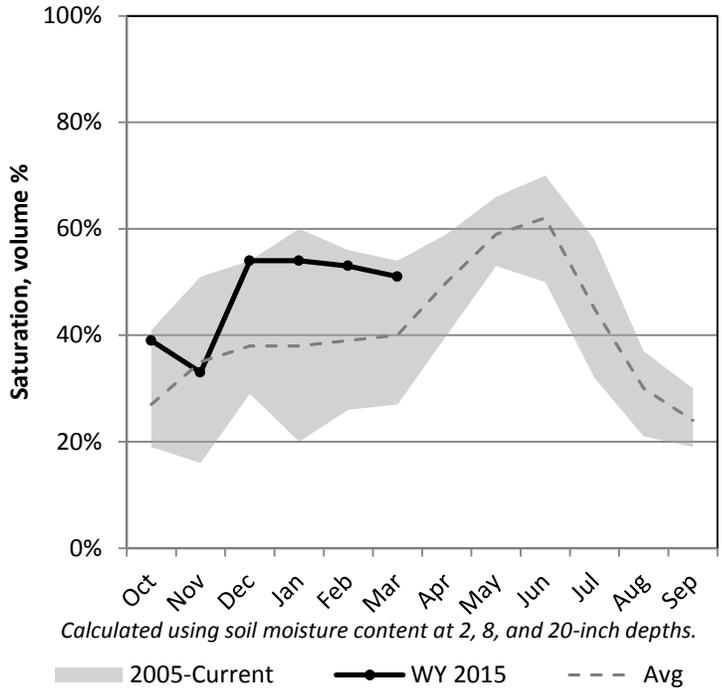
3/1/2015

Snowpack in the Lower Humboldt River Basin is much below average at 29% of normal, compared to 44% last year. Precipitation in February was much below average at 54%, which brings the seasonal accumulation (Oct-Feb) to 79% of average. Soil moisture is at 51% compared to 45% last year. Storage in Rye Patch Reservoir is 5% of capacity, compared to 4% last year. Forecast streamflow volumes range from 17% to 30% of average.

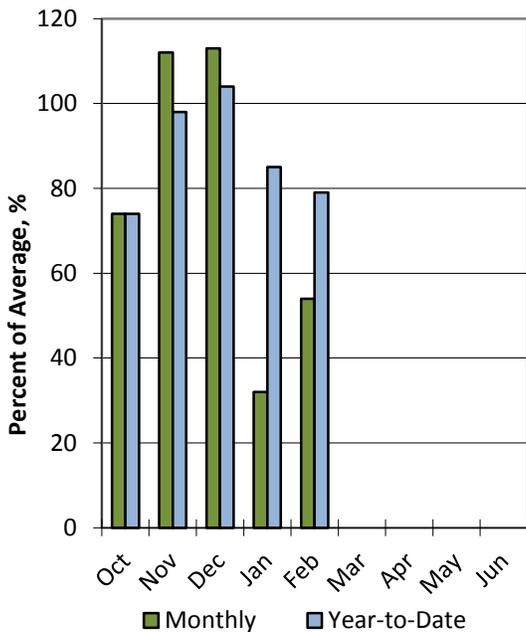
## Snowpack



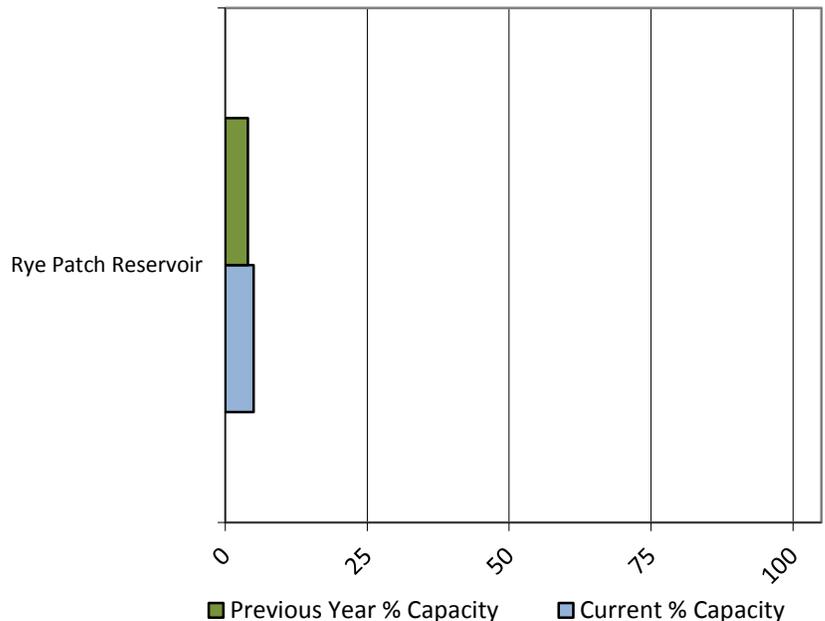
## Soil Moisture



## Precipitation



## Reservoir Storage



## Lower Humboldt River Streamflow Forecasts - March 1, 2015

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

Lower Humboldt River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Rock Ck nr Battle Mtn	MAR-JUL	0.54	2.6	6.5	24%	10.4	16.1	27
	APR-JUL	0.36	1.12	3.7	20%	6.3	10.1	18.2
Humboldt R at Comus	MAR-JUL	2.6	19.4	75	29%	131	212	255
	APR-JUL	2.2	11.8	60	28%	108	179	215
L Humboldt R nr Paradise	MAR-JUL	0.105	0.84	2.9	28%	6.3	9.6	10.5
	APR-JUL	0.097	0.58	2.5	26%	5.7	9.1	9.7
Martin Ck nr Paradise	MAR-JUL	0.22	1.76	6.6	30%	12.7	22	22
	APR-JUL	0.18	1.23	4.7	27%	8.9	15.9	17.5
Humboldt R nr Imlay	MAR-JUL	2.2	11.1	38	17%	100	198	222
	APR-JUL	1.88	7.5	30	16%	81	180	188

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- 3) Median value used in place of average

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Rye Patch Reservoir	9.7	8.5	76.7	194.3
Basin-wide Total	9.7	8.6	76.7	194.3
# of reservoirs	1	1	1	1

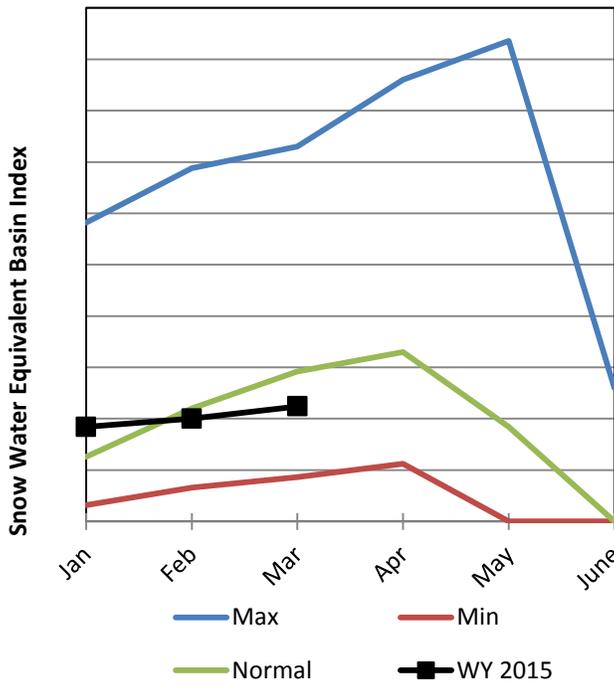
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Lower Humboldt River Basin	6	29%	44%
Little Humboldt River	4	35%	45%
Martin Creek	3	29%	34%
Reese River	2	32%	62%
Rock Creek	1	7%	37%

# Clover Valley & Franklin River Basin

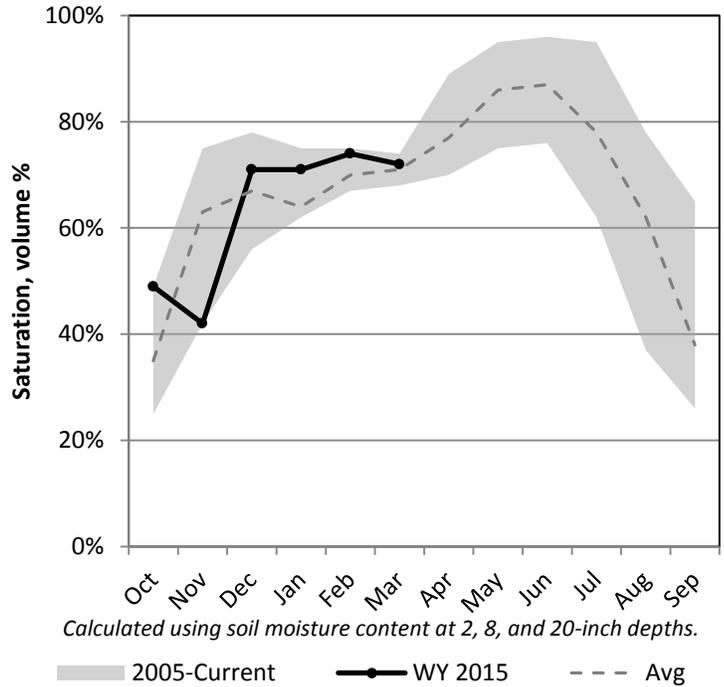
3/1/2015

Snowpack in the Clover Valley & Franklin River Basin is much below average at 66% of normal, compared to 79% last year. Precipitation in February was below average at 71%, which brings the seasonal accumulation (Oct-Feb) to 90% of average. Soil moisture is at 72% compared to 74% last year. The forecast streamflow volume for the Franklin River is 38% of average.

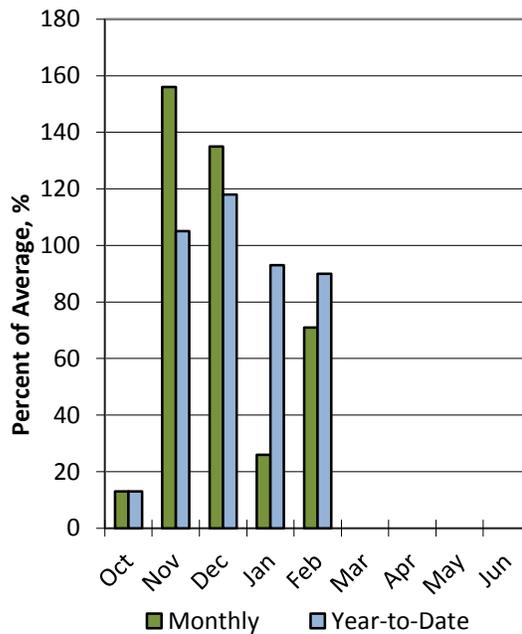
## Snowpack



## Soil Moisture



## Precipitation



### Clover Valley & Franklin River Streamflow Forecasts - March 1, 2015

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

Clover Valley & Franklin River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Franklin Ck nr Arthur	APR-JUL	0.62	1.8	2.6	38%	3.4	4.6	6.9

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

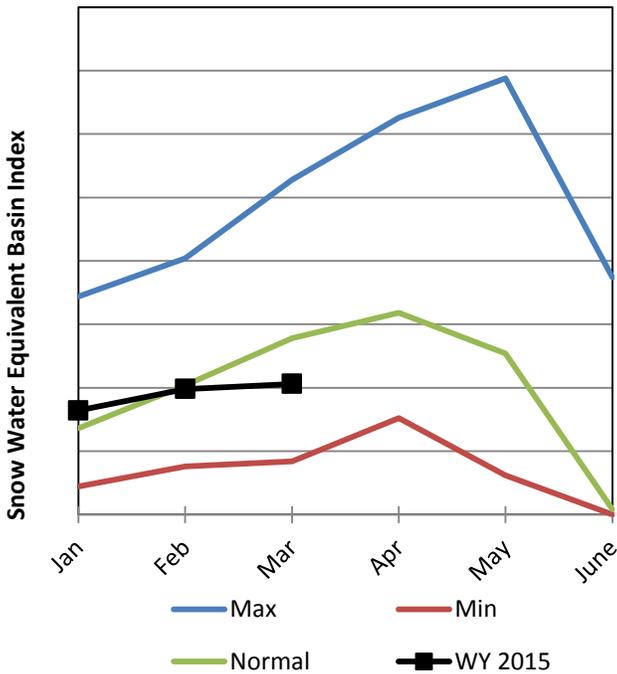
<b>Watershed Snowpack Analysis March 1, 2015</b>	# of Sites	% Median	Last Year % Median
Clover Valley and Franklin River	3	66%	79%
Franklin River	2	62%	75%
Clover Valley	1	77%	90%

# Snake River Basin

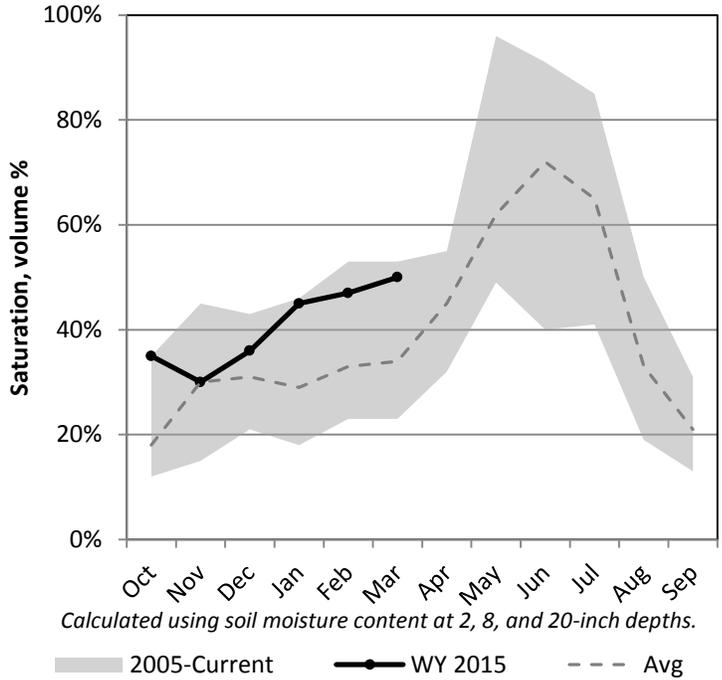
3/1/2015

Snowpack in the Snake River Basin is below average at 74% of normal, compared to 60% last year. Precipitation in February was much below average at 54%, which brings the seasonal accumulation (Oct-Feb) to 83% of average. Soil moisture is at 50% compared to 25% last year. The forecast streamflow volume for Salmon Falls Creek is 65% of average.

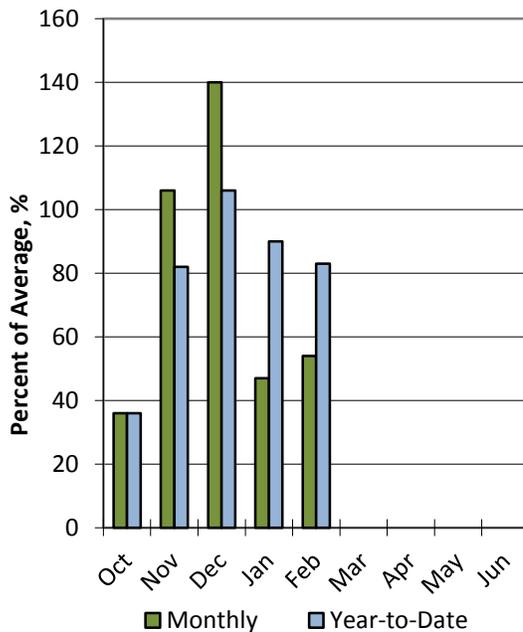
## Snowpack



## Soil Moisture



## Precipitation



## Snake River Basin Streamflow Forecasts - March 1, 2015

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

Snake River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Salmon Falls Ck nr San Jacinto	MAR-JUL	29	42	53	65%	64	82	81
	MAR-SEP	32	45	56	66%	67	86	85

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

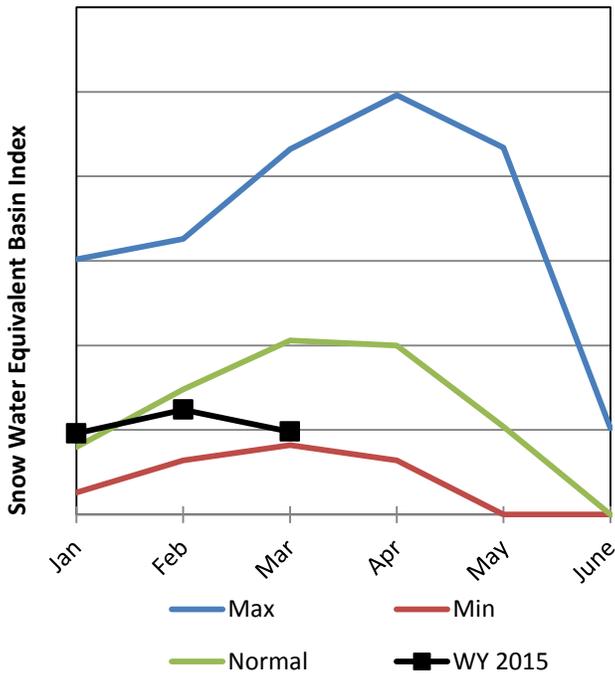
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Snake River Basin	3	74%	60%
Salmon Falls Creek	8	73%	72%

# Owyhee River Basin

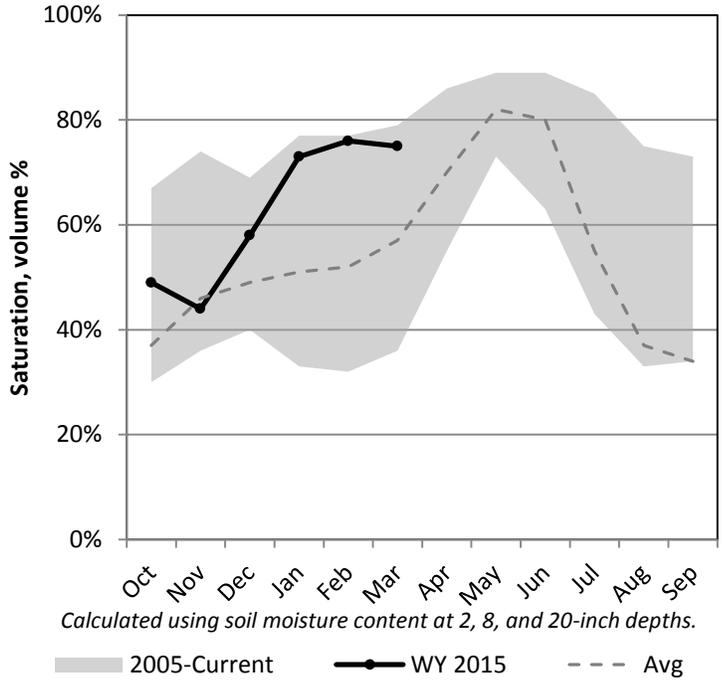
3/1/2015

Snowpack in the Owyhee River Basin is much below average at 34% of normal, compared to 45% last year. Precipitation in February was much below average at 49%, which brings the seasonal accumulation (Oct-Feb) to 86% of average. Soil moisture is at 75% compared to 62% last year. Storage in Wildhorse Reservoir is 19% of capacity, compared to 20% last year. The forecast streamflow volume for the Owyhee River near Gold Creek is 36% of average.

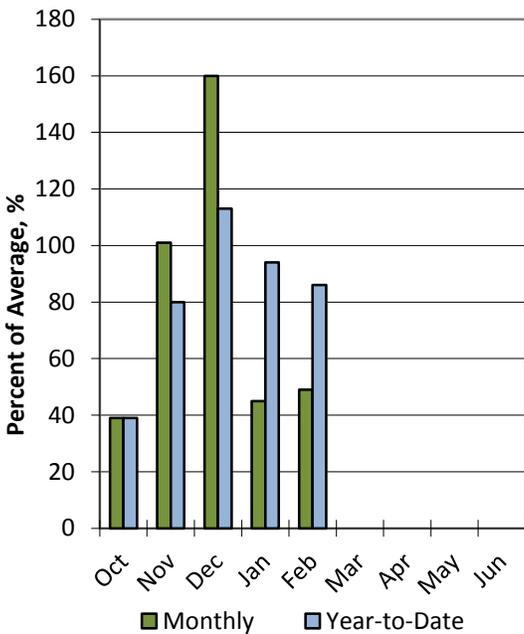
## Snowpack



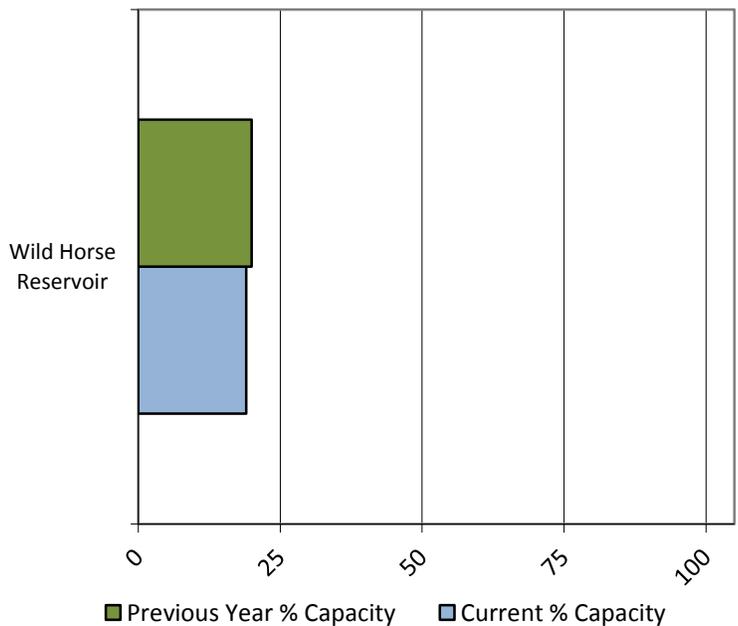
## Soil Moisture



## Precipitation



## Reservoir Storage



## Owyhee River Streamflow Forecasts - March 1, 2015

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

Owyhee River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Owyhee R nr Gold Ck <sup>2</sup>	MAR-JUL	4.3	7.4	10.1	36%	13.4	19.5	28
	MAR-SEP	3.7	6.1	8.3	31%	10.9	15.7	27
	APR-JUL	1	3.2	5.9	27%	9.7	17.8	22

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Wild Horse Reservoir	13.5	14.4	34.5	71.5
Basin-wide Total	13.5	14.4	34.5	71.5
# of reservoirs	1	1	1	1

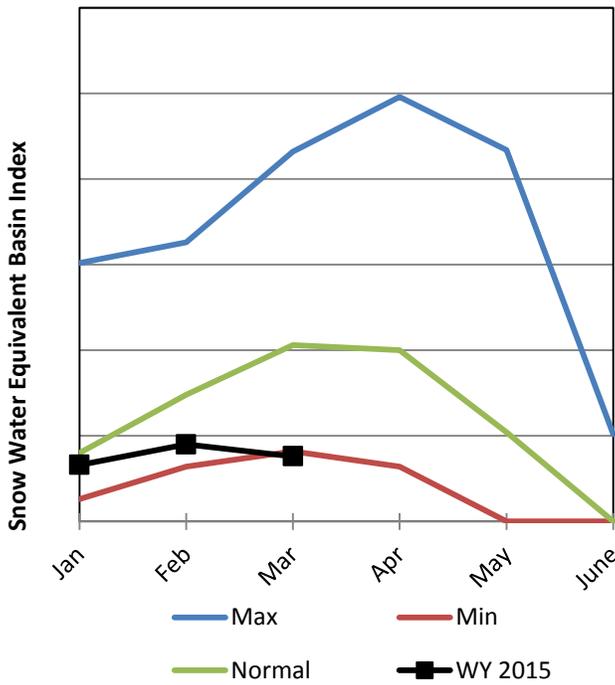
Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Owyhee River Basin	8	34%	45%
Owyhee River nr Owyhee	4	39%	53%
Owyhee R. nr Gold Creek	2	23%	52%
S. Fork Owyhee River	3	35%	36%

# Eastern Nevada

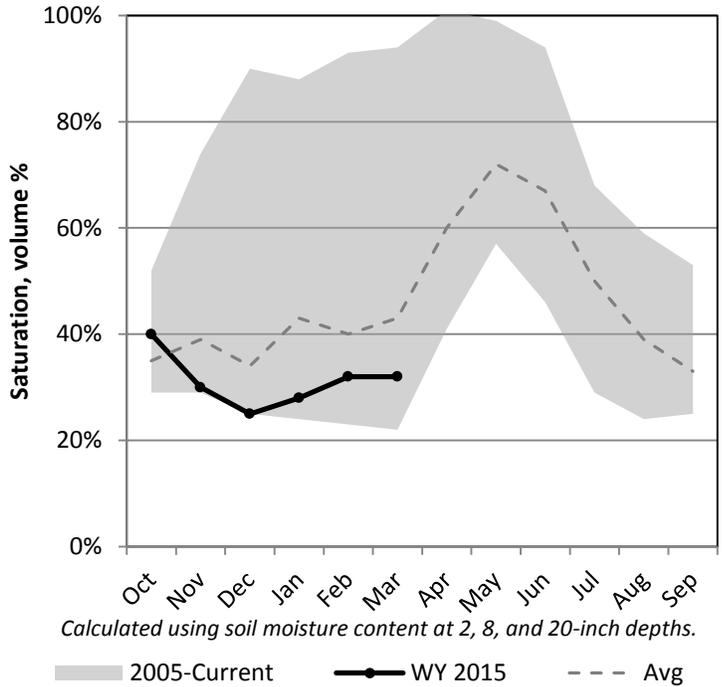
3/1/2015

Snowpack in the Eastern Nevada is much below average at 40% of normal, compared to 71% last year. Precipitation in February was much below average at 27%, which brings the seasonal accumulation (Oct-Feb) to 57% of average. Soil moisture is at 32% compared to 38% last year. Forecast streamflow volumes range from 11% to 22% of average.

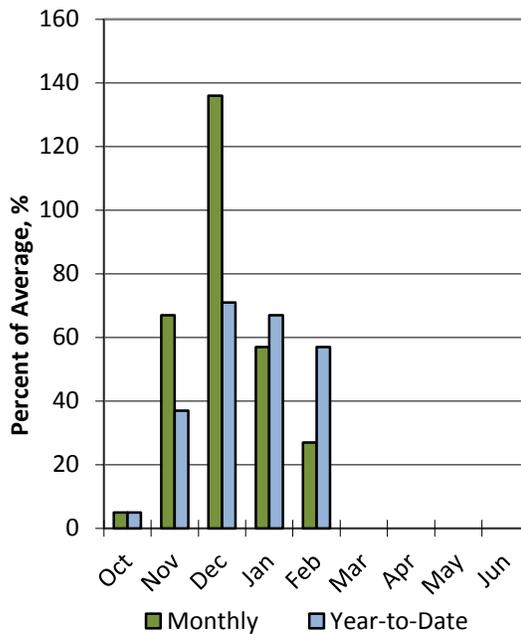
## Snowpack



## Soil Moisture



## Precipitation



**Eastern Nevada  
Streamflow Forecasts - March 1, 2015**

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast
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<b>Eastern Nevada</b>	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Kingston Ck nr Austin	APR-JUL	0.036	0.144	0.8	22%	2.1	3.3	3.6
Lehman Ck nr Baker	APR-JUL	0.027	0.082	0.3	11%	1.13	2.3	2.72
Cleve Ck nr Ely	APR-JUL	0.044	0.132	0.7	16%	1.79	3.4	4.41
Steptoe Ck nr Ely	APR-JUL	0.027	0.081	0.4	15%	0.92	1.69	2.7

- 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

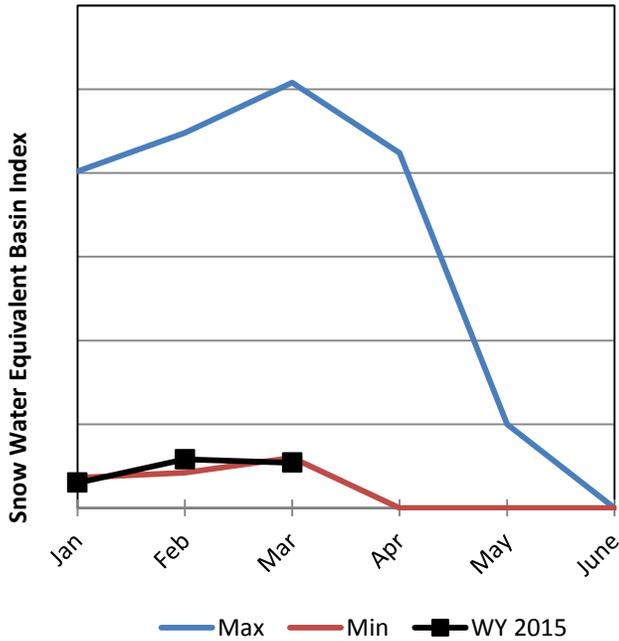
<b>Watershed Snowpack Analysis March 1, 2015</b>	# of Sites	% Median	Last Year % Median
Eastern Nevada	3	40%	71%
Kingston Creek	1	49%	78%
Steptoe Valley	3	44%	58%

# Lower Colorado River Basin

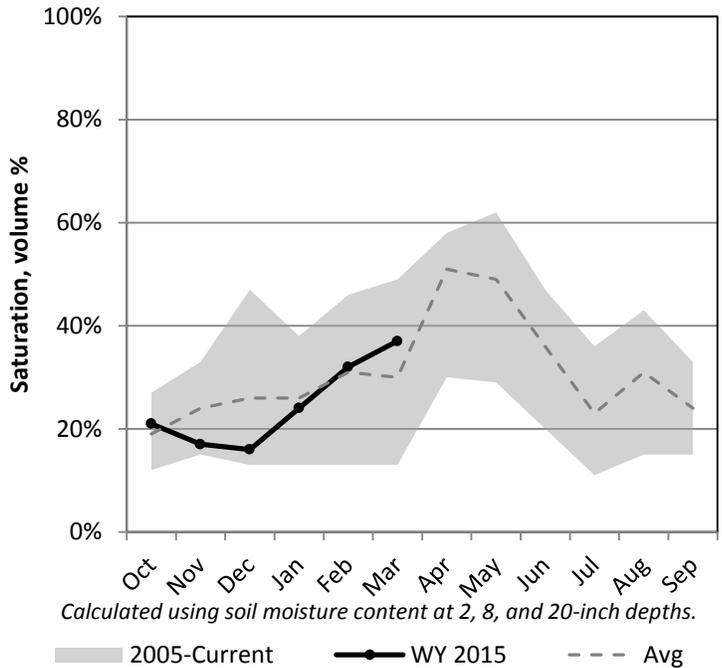
3/1/2015

Precipitation at SNOTEL stations within the Lower Colorado River Basin in February averaged 1.1 inches, which brings the average SNOTEL seasonal accumulation within the basin (Oct-Feb) to 7.4 inches. Soil moisture is at 37% compared to 32% last year. Combined reservoir storage is at 44% of capacity, compared to 51% last year. Forecast streamflow volumes range from 34% to 68% of average.

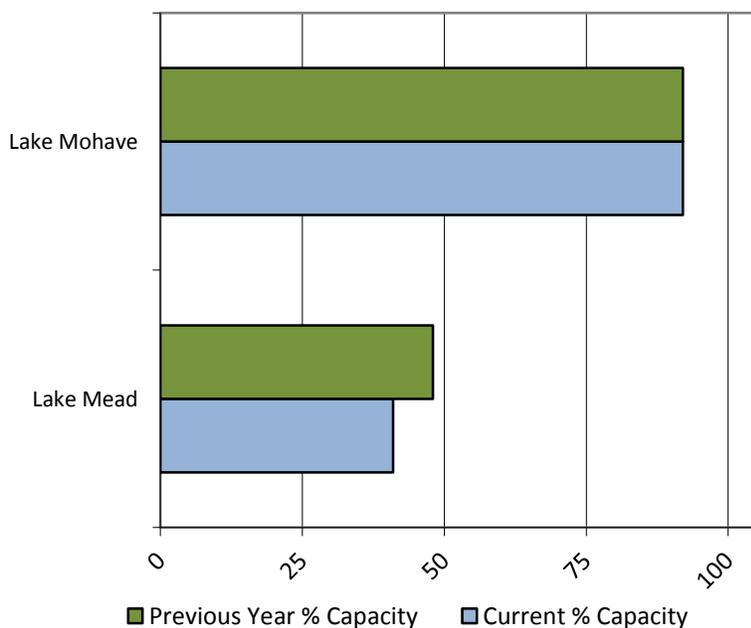
## Snowpack



## Soil Moisture



## Reservoir Storage



### Lower Colorado River Basin Streamflow Forecasts - March 1, 2015

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

Lower Colorado River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Virgin R at Littlefield	APR-JUL	2.5	11.8	22	34%	35	61	65
Lake Powell Inflow <sup>2</sup>	APR-JUL	2750	3960	4900	68%	5940	7660	7160
Virgin R nr Hurricane	APR-JUL	3.5	12.6	22	35%	34	57	63

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

Reservoir Storage End of February, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Mead	10768.0	12456.0	20575.0	26159.0
Lake Mohave	1658.1	1670.5	1673.0	1810.0
Basin-wide Total	12426.1	14126.5	22248.0	27969.0
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis March 1, 2015	# of Sites	% Median	Last Year % Median
Lower Colorado River Basin	2	19%	N/A
Spring Mountains	5	27%	N/A



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