



United States  
Department of  
Agriculture



Natural Resources  
Conservation  
Service

# Oregon Basin Outlook Report

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## April 1<sup>st</sup>, 2016



**Lumpy spring snowpack makes over-snow travel to monitoring sites challenging** *Photo courtesy of Bill Overman (NRCS Oregon)*

April 1<sup>st</sup> is typically the end of snow accumulation and the beginning of snowmelt runoff in Oregon's mountains. Early March brought a cooler and wetter period, while sunny and warmer weather dominated the last half of the month. Conditions depicted in the above photo are typical across the state during this transitional period of the snow measurement season. April 1<sup>st</sup> snowpack conditions are near normal for most basins and summer streamflow forecasts are calling for near normal to above normal volumes across much of the state.

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# General Outlook

April 1<sup>st</sup>, 2016

## SUMMARY

March was characterized by a brief return of winter, which boosted snowpacks in most of Oregon's basins. In addition, precipitation for the month was above normal, with the majority occurring during the first half of the month. Wet conditions, combined with a colder, winter-like pattern in the middle of the month, caused many snow monitoring sites to reach or surpass their normal snowpack peak for the season. As of April 1<sup>st</sup>, summer streamflow forecasts are generally higher than March 1<sup>st</sup> forecasts due to the improved snowpack conditions and the above normal March precipitation.

Current snowpack conditions and streamflow forecasts continue to provide an optimistic summer water supply outlook for most of Oregon. March precipitation and snowmelt improved reservoir storage, especially in the areas of the state hit hardest by the 2015 drought. While this is good news, it does not necessarily mean an end to the impacts of a multi-year drought. The US Drought Monitor (<http://droughtmonitor.unl.edu>) still has most of eastern Oregon listed in the moderate drought category as of April 1<sup>st</sup>. Currently, NOAA's Climate Prediction Center (CPC) is calling for above normal temperatures for the next three months: <http://www.cpc.ncep.noaa.gov/>. The timing of snowmelt and subsequent runoff over the next month will provide additional information as to the final water supply outlook for streamflows this summer and into the early fall.

## SNOWPACK

March brought Oregon periods of varying weather types, beginning with a cool, wet succession of storms that deposited significant precipitation at all elevations and extensive mountain snow at mid and high elevations. The month ended with a warm, sunny period that consolidated the snowpack and revved up the snowmelt engine. The snowpack on April 1<sup>st</sup> ranges from slightly below normal to slightly above normal across the basins in the state, with a statewide value of 102% of normal. The Klamath basin currently exhibits the best percent of normal snowpack in the state at 112% of normal. Conversely, the combined Owyhee and Malheur basins, and the Willamette basin have the lowest April 1<sup>st</sup> snowpack at 91% of normal.

April 1<sup>st</sup> often signals end of the snow accumulation season and the beginning of the spring snowmelt in earnest. Because of the significant snow that fell in 1<sup>st</sup> half of March, most snow monitoring sites above 5500 ft have reached or surpassed their average annual peak snow levels. Sites across the southern half of Oregon, even at the lower elevations, also achieved near normal snowpack peaks this winter. In contrast, all sites in the Willamette and Hood/Sandy basins have, so far, fallen well short of their typical annual peak levels. Most of these sites have reached only 50-90% of typical peak levels and are starting spring snowmelt. Snowpack is quite dense and consolidated throughout the state, and most sites have started to melt with the warm spring weather. Many low elevation sites across the state have already melted out as of April 1<sup>st</sup>.

## **PRECIPITATION**

Following a dry February, the month of March was significantly wetter than normal across Oregon. The 1<sup>st</sup> half of March brought two to three times the normal amount of precipitation, while the 2<sup>nd</sup> half of March was relatively sunny and dry in comparison. Water year precipitation (Oct 1<sup>st</sup> – April 1<sup>st</sup>) has been above average for all basins. This has led to slightly above normal April 1<sup>st</sup> snowpack in areas where temperatures remained cold enough to keep the precipitation in the form of snow.

All of Oregon's basins have above normal precipitation for both the month of March and the water year. The Rogue and Umpqua basins were the highest in the state for both water year precipitation (124% of average) and precipitation in the month of March (164% of average). The driest area has been the southeastern region of the state, with the Harney Basin receiving 103% of average precipitation for the water year and 108% of average for the month of March.

## **RESERVOIRS**

Reservoir storage across the state benefitted from the wet month of March. Many reservoirs that were well below normal as of March 1<sup>st</sup> saw significant improvements during the month. While this improvement in reservoir storage is key to drought recovery, there are many reservoirs that are still lagging behind normal as of April 1<sup>st</sup>. Key basins where reservoir storage remains below normal include the Owyhee, Malheur, Powder, Rogue and Klamath basins.

## **STREAMFLOW**

Snowpack accumulation and ample precipitation in March improved the April 1<sup>st</sup> streamflow forecast outlook for many forecast points in the state. Most rivers experienced near average to above average streamflow volumes during March. Based on the current snowpack and precipitation conditions, summer streamflows are expected to be near normal to above normal for most regions of the state. Some streams and rivers in southeastern Oregon are forecast to be slightly below to well below normal due to the early melt-out of low and mid-elevation snowpack in that region. As is continually advised, if extended periods of dry and warm weather occur during the month of April, water users may consider using the 70% chance of exceedance forecasts (less streamflow) provided in this report.

A summary of streamflow forecasts for Oregon follows:

<b>STREAM</b>	<b>Median Forecast (April through September)</b>	
	<b>Volume (Acre-Feet)</b>	<b>Percent of Average</b>
Owyhee Reservoir Inflow	415,000	102%
Grande Ronde R at Troy	1,470,000	112%
Umatilla R at Pendleton	177,000	116%
Deschutes R at Benham Falls	515,000	106%
Willamette R at Salem	5,020,000	106%
Rogue R at Raygold	935,000	116%
Upper Klamath Lake Inflow	430,000	90%
Silvies R nr Burns	72,000	78%

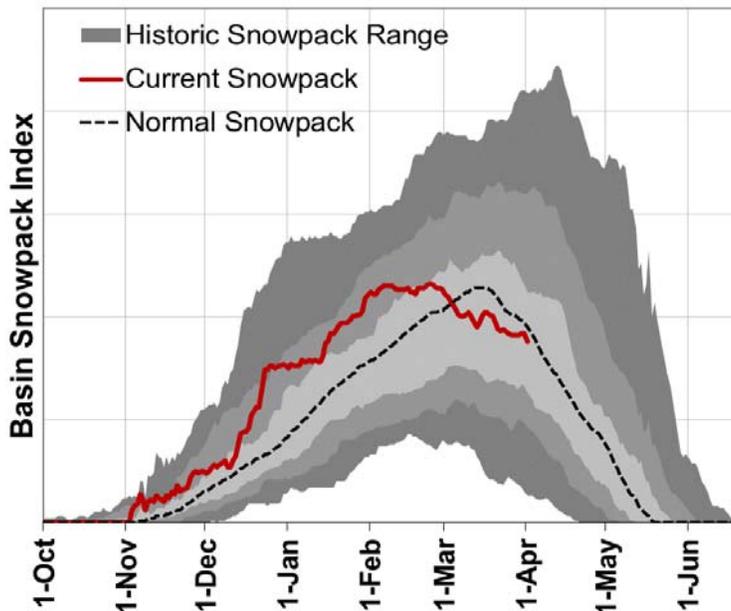
Some of these forecasts assume that normal weather conditions will occur from now to the end of the forecast period. This report contains data furnished by the Oregon Department of Water Resources, U.S. Geological Survey, NOAA National Weather Service and other cooperators. This report will be updated monthly, January through June.



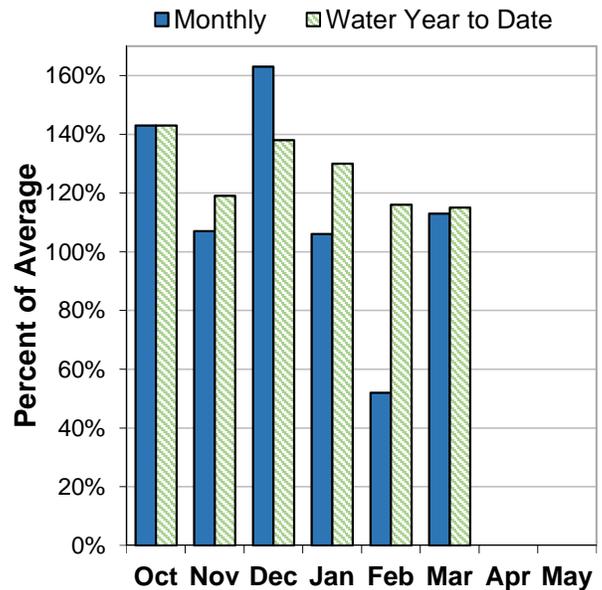
# Owyhee and Malheur Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 91% of normal. This is significantly lower than last month when the snowpack was 104% of normal. In general, SNOTEL sites in the basin peaked around 80% to 120% of normal peak snowpack levels. Current snowpack conditions in the basin are among the lowest in the state.

### PRECIPITATION

March precipitation was 113% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 115% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 73% of average at Warm Springs Reservoir to 121% of average at Beulah Reservoir. Storage at Beulah, Owyhee and Warm Springs reservoirs increased significantly since March 1, gaining 25-40 % of average.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 80% to 105% of average. Overall, forecasts decreased slightly from last month's report. Early snowmelt in the basin has likely caused a number of streams and rivers to experience their seasonal peak flows. Without additional precipitation, rivers will likely continue into recession flows. Water managers in the basin should expect below normal to near normal streamflows this summer.

## Owyhee And Malheur Basins Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Owyhee R nr Rome	APR-JUL	215	305	365	106%	425	515	345
	APR-SEP	230	320	385	105%	445	535	365
Owyhee R bl Owyhee Dam <sup>2</sup>	APR-JUL	255	330	385	103%	445	540	375
	APR-SEP	285	360	415	102%	475	570	405
Malheur R nr Drewsey	APR-JUL	31	46	58	77%	71	93	75
	APR-SEP	32	47	59	80%	72	94	74
NF Malheur R at Beulah	APR-JUL	34	43	49	88%	56	67	56

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume  
 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Beulah	52.7	38.1	43.5	121%	59.2
Bully Creek	23.4	15.7	23.8	98%	23.7
Lake Owyhee	404.8	192.5	495.8	82%	715.0
Warm Springs	82.7	46.7	113.8	73%	169.6

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
East Little Owyhee Basin	7	95%	18%
South Fork Owyhee Basin	7	93%	24%
Upper Malheur Basin	8	84%	5%
Upper Owyhee Basin	5	107%	24%

## Owyhee And Malheur Basins Summary for April 1, 2016

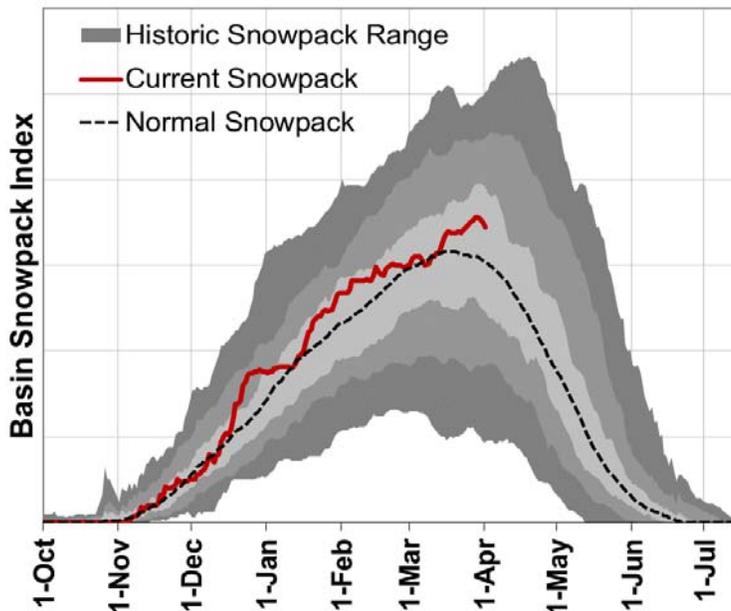
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Apr	61	25.0	6.7	21.2	118%
Trout Creek AM	7890	1-Apr	32	15.0	0.0	12.7	118%
Toe Jam SNOTEL	7700	1-Apr	42	18.7	3.7		
Govt Corrals AM	7400	1-Apr	32	15.0	0.0	15.0	100%
Jack Creek Upper SNOTEL	7250	1-Apr	47	18.3	7.9	16.7	110%
Dobson Creek Snow Course	7084	1-Apr	69	28.5	13.0	27.2	105%
Reynolds-Dobson Divide Snow Course	7064	1-Apr	61	25.8	7.6	24.2	107%
Fawn Creek SNOTEL	7000	1-Apr	45	20.0	4.2	15.8	127%
Merritt Mountain AM	7000	29-Mar	3	0.7	0.0	5.5	13%
Buckskin Lower SNOTEL	6915	1-Apr	21	10.0	0.0	8.5	118%
Jack Creek Lower Snow Course	6800	29-Mar	6	0.6	0.0	0.8	75%
Reynolds West Fork #2 Snow Course	6798	1-Apr	61	25.1	11.6	23.9	105%
Gold Creek Snow Course	6707	29-Mar	0	0.0	0.0	2.0	0%
Big Bend SNOTEL	6700	1-Apr	18	9.5	0.0	7.7	123%
Fry Canyon SNOTEL	6700	1-Apr	0	0.0	0.0		
Fry Canyon Snow Course	6700	29-Mar	9	2.0	0.0	4.8	42%
Laurel Draw SNOTEL	6697	1-Apr	16	7.2	0.0	8.6	84%
Columbia Basin AM	6650	29-Mar	6	1.3	0.0	7.6	17%
Red Canyon AM	6600	1-Apr	0	0.0	0.0	4.1	0%
Louse Canyon AM	6530	1-Apr	0	0.0	0.0	3.2	0%
South Mtn. SNOTEL	6500	1-Apr	24	11.3	0.0	17.3	65%
Succor Creek AM	6310	1-Apr	3	1.4	0.0	8.0	18%
Quinn Ridge AM	6270	1-Apr	0	0.0	0.0	0.0	
Taylor Canyon SNOTEL	6200	1-Apr	0	0.0	0.0	1.3	0%
Blue Mountain Spring SNOTEL	5870	1-Apr	36	16.4	1.2	15.9	103%
Vaught Ranch AM	5850	1-Apr	0	0.0	0.0	0.0	
Barney Creek (New) Snow Course	5830	31-Mar	26	9.8	0.0		
Buck Pasture AM	5740	31-Mar	0	0.0	0.0	0.0	
Lookout Butte AM	5740	1-Apr	0	0.0	0.0	0.0	
Mud Flat SNOTEL	5730	1-Apr	0	0.0	0.0	2.5	0%
Battle Creek AM	5710	1-Apr	0	0.0	0.0	0.0	
Boulder Creek AM	5710	1-Apr	0	0.0	0.0	0.5	0%
Democrat Creek Snow Course	5686	1-Apr	2	0.9	2.0	6.2	15%
Reynolds Creek SNOTEL	5600	1-Apr		0.0	0.0	0.1	0%
Bull Basin AM	5460	1-Apr	0	0.0	0.0	0.0	
Dooley Mountain Snow Course	5440	31-Mar	0	0.0	0.0	8.0	0%
Call Meadows AM	5380	1-Apr	0	0.0	0.0	1.2	0%
Bully Creek AM	5300	1-Apr	0	0.0	0.0	0.0	
Rock Springs SNOTEL	5290	1-Apr	0	0.0	0.0	0.9	0%
Lake Creek R.S. SNOTEL	5240	1-Apr	14	6.0	0.0	8.6	70%
Flag Prairie AM	4720	1-Apr	0	0.0	0.0	0.0	
Eldorado Pass Snow Course	4630	31-Mar	0	0.0	0.0	0.0	



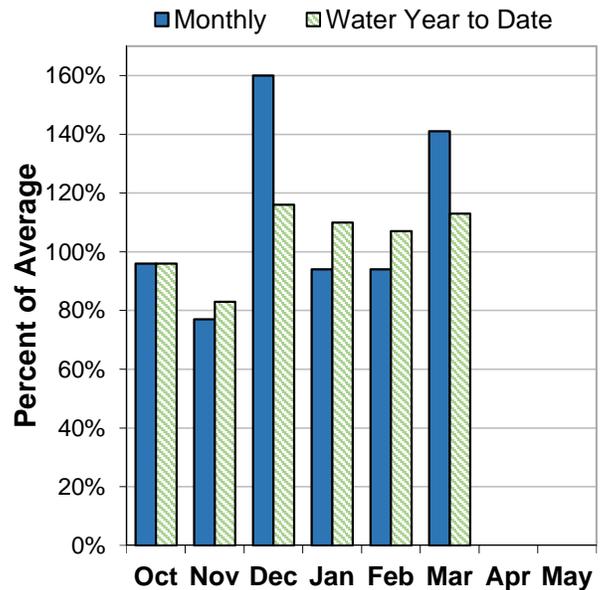
# Grande Ronde, Powder, Burnt and Imnaha Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 108% of normal. This is significantly higher than last month when the snowpack was 99% of normal. In general, SNOTEL sites in the basin peaked around 80% to 110% of normal peak snowpack levels. This is the only region in the state where snowpack continued to build as of the 1st of April.

### PRECIPITATION

March precipitation was 141% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 113% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 50% of average at Phillips Lake to 121% of average at Wallowa Lake. Storage at Phillips Lake and Unity reservoirs increased significantly since last month, gaining 25 and 32 percent of average respectively.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 102% to 122% of average. Overall, forecasts increased slightly from last month's report. Water managers in the basin should expect near normal to well above normal streamflows this summer.

## Grande Ronde, Powder, Burnt And Imnaha Basins Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Burnt R nr Hereford	APR-JUL	22	32	39	118%	46	56	33
	APR-SEP	23	34	41	117%	48	59	35
Deer Ck nr Sumpter	APR-JUL	11.5	14.3	16.2	105%	18.1	21	15.4
Powder R nr Sumpter	APR-JUL	51	59	65	123%	70	78	53
	APR-SEP	51	60	66	122%	72	81	54
Wolf Ck Reservoir Inflow <sup>2</sup>	APR-JUN	12.1	15.2	17.4	110%	19.5	23	15.8
Pine Ck nr Oxbow	APR-JUL	118	143	160	102%	177	200	157
	APR-SEP	124	149	166	102%	183	210	163
Imnaha R at Imnaha	APR-JUL	215	255	285	112%	310	350	255
	APR-SEP	235	280	305	109%	335	375	280
Catherine Ck nr Union	APR-JUL	56	63	69	115%	74	81	60
	APR-SEP	60	68	73	114%	78	86	64
Lostine R nr Lostine	APR-JUL	99	107	112	106%	118	125	106
	APR-SEP	106	115	121	105%	127	136	115
Bear Ck nr Wallowa	APR-SEP	57	63	67	103%	72	78	65
Grande Ronde R at Troy <sup>1</sup>	APR-JUL	1070	1250	1370	112%	1490	1670	1220
	APR-SEP	1160	1340	1470	112%	1590	1770	1310

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

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

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Phillips Lake	20.8	30.0	42.0	50%	73.5
Thief Valley	14.0	13.8	13.9	101%	13.3
Unity	22.4	24.9	20.6	109%	25.5
Wallowa Lake	20.6	31.2	17.0	121%	37.5
Wolf Creek	3.7	6.2	5.3	70%	11.1

## Grande Ronde, Powder, Burnt And Imnaha Basins Summary for April 1, 2016

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Burnt Basin	5	107%	10%
Imnaha Basin	5	107%	71%
Lower Grande Ronde Basin	5	108%	37%
Powder Basin	11	107%	50%
Upper Grande Ronde Basin	8	113%	38%
Wallowa Basin	7	107%	66%

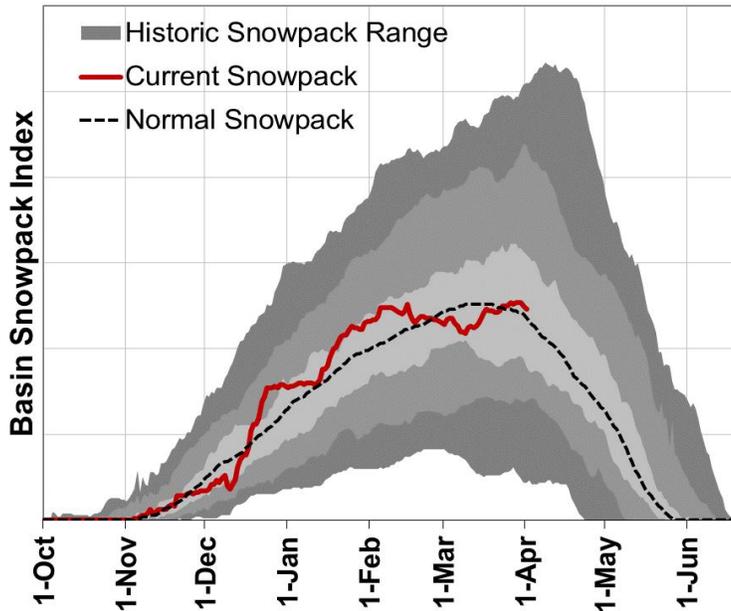
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Mirror Lake AM	8120	31-Mar	187	67.3	60.2	64.9	104%
Mt. Howard SNOTEL	7910	1-Apr	50	16.8	12.2	15.5	108%
Aneroid Lake #2 SNOTEL	7400	1-Apr	70	25.1	13.7	24.1	104%
Standley AM	7360	31-Mar	105	37.8	23.4	32.4	117%
Anthony Lake (Rev) Snow Course	7160	31-Mar	73	29.8	18.1	24.5	122%
TV Ridge AM	7050	1-Apr	43	15.5	5.2	17.8	87%
Bald Mtn AM	6600	31-Mar	86	33.3		25.8	129%
Little Alps Snow Course	6360	31-Mar	42	13.4	4.4	13.6	99%
Big Sheep AM	6230	1-Apr	62	25.4	10.8	24.2	105%
Bear Saddle SNOTEL	6180	1-Apr	59	25.9	5.4	22.3	116%
Placer Creek Snow Course	5860	31-Mar	51	20.8	7.9	16.4	127%
Bourne SNOTEL	5850	1-Apr	34	15.1	0.3	14.7	103%
Barney Creek (New) Snow Course	5830	31-Mar	26	9.8	0.0		
Moss Springs SNOTEL	5760	1-Apr	69	28.7	13.5	25.1	114%
Taylor Green SNOTEL	5740	1-Apr	45	21.5	2.5	19.6	110%
Boulder Creek AM	5710	1-Apr	0	0.0	0.0	0.5	0%
Spruce Springs SNOTEL	5700	1-Apr	30	12.0	0.0	13.8	87%
Wolf Creek SNOTEL	5630	1-Apr	47	16.8	4.9	16.8	100%
Milk Shakes SNOTEL	5580	1-Apr	108	45.1	17.1		
West Branch SNOTEL	5560	1-Apr	53	20.8	4.5	21.0	99%
Touchet SNOTEL	5530	1-Apr	77	36.4	6.2	30.1	121%
Eilertson Meadows SNOTEL	5510	1-Apr	17	7.6	0.0	6.7	113%
Dooley Mountain Snow Course	5440	31-Mar	0	0.0	0.0	8.0	0%
Gold Center SNOTEL	5410	1-Apr	21	10.0	0.2	3.9	256%
Schneider Meadows SNOTEL	5400	1-Apr	68	31.1	12.6	26.5	117%
Beaver Reservoir SNOTEL	5150	1-Apr	25	10.7	0.0	8.6	124%
Tipton SNOTEL	5150	1-Apr	35	15.7	2.3	11.6	135%
High Ridge SNOTEL	4920	1-Apr	58	28.1	7.3	20.7	136%
County Line SNOTEL	4830	1-Apr	0	0.0	0.0	0.5	0%
Eldorado Pass Snow Course	4630	31-Mar	0	0.0	0.0	0.0	
Little Antone (Alt.) Snow Course	4560	31-Mar	14	6.1	0.0	6.8	90%
Bowman Springs SNOTEL	4530	1-Apr	3	1.4	0.0	5.5	25%
East Eagle Snow Course	4400	3-Apr	53	24.0		20.9	115%
Sourdough Gulch SNOTEL	4000	1-Apr	0	0.0	0.0	0.0	



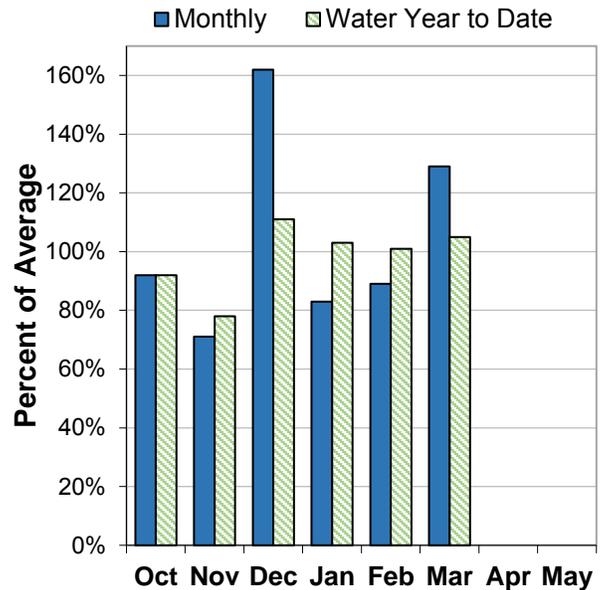
# Umatilla, Walla Walla and Willow Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 104% of normal. This is significantly higher than last month when the snowpack was 93% of normal. In general, SNOTEL sites in the basin peaked around 70% to 110% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 129% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 105% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 87% of average at Cold Springs Reservoir to 108% of average at Mckay Reservoir.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 93% to 116% of average. Overall, forecasts increased slightly from last month's report.

## Umatilla, Walla Walla And Willow Basins Summary for April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
SF Walla Walla R nr Milton-Freewater	APR-JUL	47	53	57	106%	61	68	54
	APR-SEP	59	66	70	106%	75	82	66
Umatilla R ab Meacham Ck Gibbon	APR-JUL	60	73	82	111%	91	104	74
	APR-SEP	66	79	88	110%	96	109	80
Umatilla R at Pendleton	APR-JUL	120	150	170	116%	190	220	147
	APR-SEP	126	156	177	116%	197	230	153
McKay Ck nr Pilot Rock	APR-SEP	13.2	23	30	97%	37	47	31
Butter Ck nr Pine City	APR-JUL	4.7	7.1	8.7	93%	10.3	12.6	9.4
	APR-SEP	5.2	7.5	9.1	93%	10.7	13.1	9.8
Willow Ck ab Willow Lk nr Heppner	APR-JUL	2.4	4.8	6.4	91%	7.9	10.3	7.0
Rhea Ck nr Heppner	APR-JUL	2.3	4.9	6.7	94%	8.5	11.2	7.1

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Cold Springs	25.5	25.1	29.4	87%	38.6
Mckay	54.6	49.5	50.8	108%	71.5
Willow Creek	5.6	5.8	5.4	103%	9.8

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Umatilla Basin	5	97%	18%
Walla Walla Basin	7	104%	19%

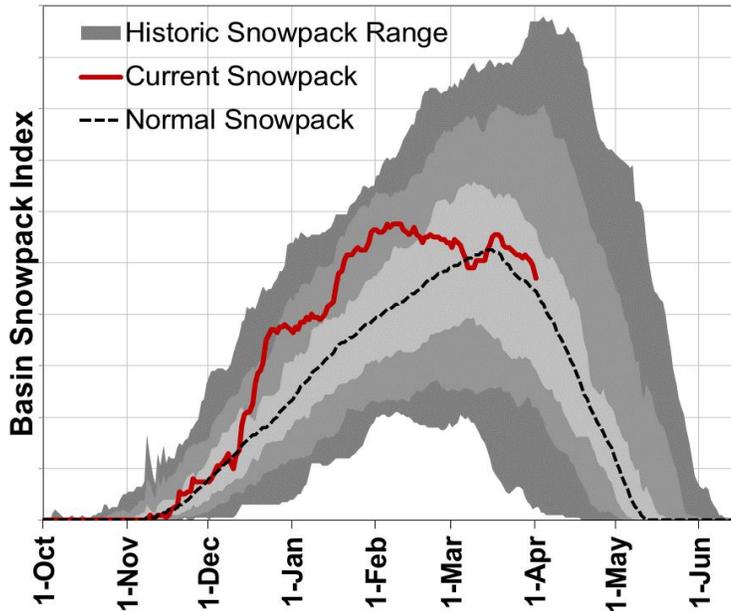
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Arbuckle Mtn SNOTEL	5770	1-Apr	43	18.2	2.0	18.8	97%
Spruce Springs SNOTEL	5700	1-Apr	30	12.0	0.0	13.8	87%
Milk Shakes SNOTEL	5580	1-Apr	108	45.1	17.1		
Touchet SNOTEL	5530	1-Apr	77	36.4	6.2	30.1	121%
Madison Butte SNOTEL	5150	1-Apr	0	0.0	0.0	1.2	0%
Lucky Strike SNOTEL	4970	1-Apr	5	1.8	0.0	6.2	29%
High Ridge SNOTEL	4920	1-Apr	58	28.1	7.3	20.7	136%
Indian Ridge Snow Course	4908	31-Mar	69	26.9	3.0		
Bowman Springs SNOTEL	4530	1-Apr	3	1.4	0.0	5.5	25%
Emigrant Springs SNOTEL	3800	1-Apr	0	0.0	0.0	0.0	



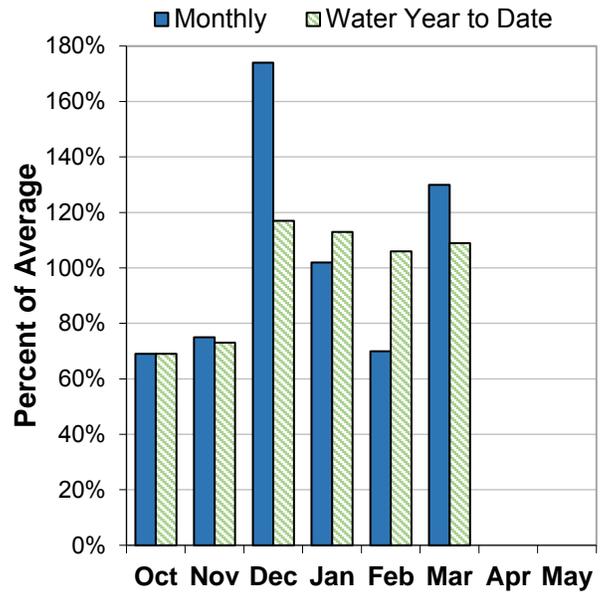
# John Day Basin

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 105% of normal. Conditions remain similar to last month when the snowpack was 106% of normal. In general, SNOTEL sites in the basin peaked around 90% to 130% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 130% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 109% of average.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 91% to 112% of average. Overall, forecasts remain similar to last month's report.

## John Day Basin Summary for April 1, 2016

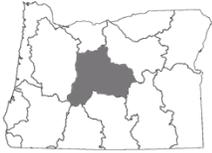
<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Strawberry Ck nr Prairie City	APR-JUL	6.2	7.7	8.7	107%	9.7	11.2	8.1
	APR-SEP	6.8	8.4	9.4	107%	10.5	12.1	8.8
Mountain Ck nr Mitchell	APR-JUL	3.4	4.5	5.3	110%	6.1	7.2	4.8
	APR-SEP	3.5	4.7	5.5	112%	6.3	7.5	4.9
Camas Ck nr Ukiah	APR-JUL	18.7	26	31	91%	36	43	34
	APR-SEP	19.3	27	32	91%	37	44	35
MF John Day R at Ritter	APR-JUL	87	111	127	105%	143	167	121
	APR-SEP	91	115	132	105%	149	173	126
NF John Day R at Monument	APR-JUL	430	530	600	103%	670	775	580
	APR-SEP	445	550	620	103%	690	795	600

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
Lower John Day Basin	6	103%	0%
North Fork John Day Basin	8	111%	28%
Upper John Day Basin	6	110%	2%

## John Day Basin Summary for April 1, 2016

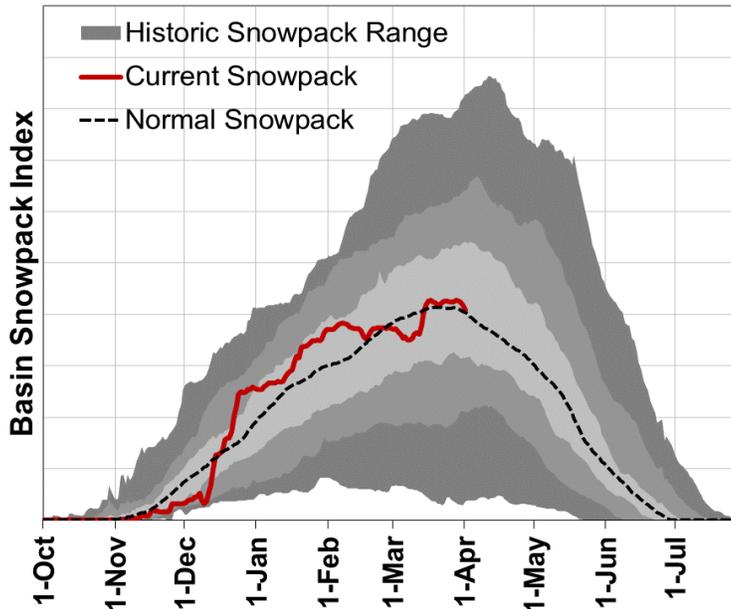
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Anthony Lake (Rev) Snow Course	7160	31-Mar	73	29.8	18.1	24.5	122%
Little Alps Snow Course	6360	31-Mar	42	13.4	4.4	13.6	99%
Snow Mountain SNOTEL	6230	1-Apr	29	13.3	0.0	12.2	109%
Blue Mountain Spring SNOTEL	5870	1-Apr	36	16.4	1.2	15.9	103%
Derr Snow Course	5860	1-Apr	18	7.3	0.0	7.6	96%
Bourne SNOTEL	5850	1-Apr	34	15.1	0.3	14.7	103%
Derr. SNOTEL	5850	1-Apr	41	18.9	0.0	12.0	158%
Barney Creek (New) Snow Course	5830	31-Mar	26	9.8	0.0		
Arbuckle Mtn SNOTEL	5770	1-Apr	43	18.2	2.0	18.8	97%
Ochoco Meadows SNOTEL	5430	1-Apr	14	6.9	0.0	9.5	73%
Gold Center SNOTEL	5410	1-Apr	21	10.0	0.2	3.9	256%
Starr Ridge SNOTEL	5250	1-Apr	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Apr	14	6.0	0.0	8.6	70%
Ochoco Meadows Snow Course	5190	1-Apr	17	7.0	0.0	8.8	80%
Ochoco Meadows Snow Course	5190	1-Apr	17	7.0	0.0	8.8	80%
Madison Butte SNOTEL	5150	1-Apr	0	0.0	0.0	1.2	0%
Tipton SNOTEL	5150	1-Apr	35	15.7	2.3	11.6	135%
Lucky Strike SNOTEL	4970	1-Apr	5	1.8	0.0	6.2	29%
County Line SNOTEL	4830	1-Apr	0	0.0	0.0	0.5	0%
Marks Creek Snow Course	4580	1-Apr	0	0.0	0.0	0.0	
Little Antone (Alt.) Snow Course	4560	31-Mar	14	6.1	0.0	6.8	90%



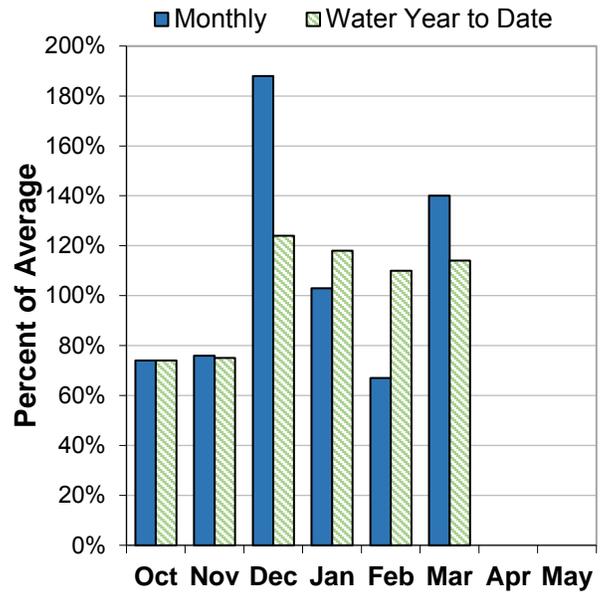
# Upper Deschutes and Crooked Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 106% of normal. This is significantly higher than last month when the snowpack was 97% of normal. In general, SNOTEL sites in the basin peaked around 80% to 120% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 140% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 114% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 93% of average at Wickiup Reservoir to 131% of average at Ochoco Reservoir.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 96% to 136% of average. Overall, forecasts remain similar to last month's report. Water managers in the basin should expect near normal to well above normal streamflows this summer.

## Upper Deschutes And Crooked Basins Summary for April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Deschutes R bl Snow Ck	APR-JUL	22	29	33	110%	38	44	30
	APR-SEP	46	54	59	113%	64	72	52
Crane Prairie Reservoir Inflow <sup>2</sup>	APR-JUL	49	58	63	113%	69	77	56
	APR-SEP	81	91	98	111%	104	115	88
Crescent Lake Inflow <sup>2</sup>	APR-JUL	11.7	15.7	18.4	123%	21	25	15.0
	APR-SEP	16.0	19.9	22	126%	25	29	17.4
Little Deschutes R nr La Pine	APR-JUL	72	80	85	135%	90	98	63
	APR-SEP	80	88	94	136%	100	108	69
Deschutes R at Benham Falls <sup>2</sup>	APR-JUL	325	335	345	108%	350	365	320
	APR-SEP	490	505	515	106%	525	540	485
Wychus Ck nr Sisters	APR-JUL	30	32	34	97%	36	38	35
	APR-SEP	40	43	45	96%	47	50	47
Prineville Reservoir Inflow <sup>2</sup>	APR-JUL	64	97	119	117%	142	174	102
	APR-SEP	63	97	120	118%	142	176	102
Ochoco Reservoir Inflow <sup>2</sup>	APR-JUL	14.3	21	25	119%	29	36	21
	APR-SEP	14.6	21	25	125%	29	36	20

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

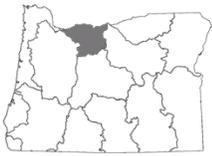
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Crane Prairie	41.6	54.9	42.1	99%	55.3
Crescent Lake	53.9	75.4	48.4	111%	86.9
Ochoco	39.5	33.6	30.2	131%	44.2
Prineville	141.6	123.9	130.4	109%	148.6
Wickiup	176.1	199.0	189.2	93%	200.0

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Little Deschutes Basin	4	124%	17%
Upper Crooked Basin	5	106%	0%
Upper Deschutes Basin	12	102%	15%

## Upper Deschutes And Crooked Basins Summary for April 1, 2016

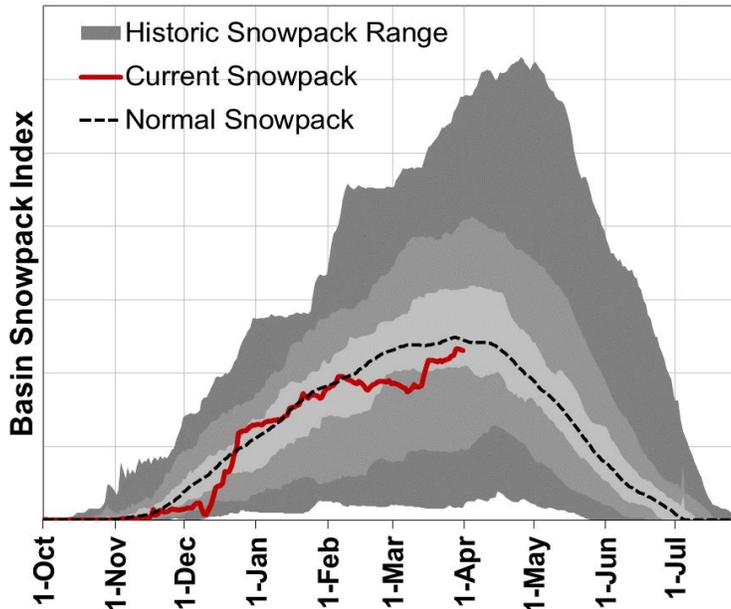
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
New Dutchman #3 Snow Course	6320	31-Mar	116	50.6	17.0	44.8	113%
Snow Mountain SNOTEL	6230	1-Apr	29	13.3	0.0	12.2	109%
Derr Snow Course	5860	1-Apr	18	7.3	0.0	7.6	96%
Derr. SNOTEL	5850	1-Apr	41	18.9	0.0	12.0	158%
Three Creeks Meadow SNOTEL	5690	1-Apr	37	16.1	0.0	18.4	88%
Summit Lake SNOTEL	5610	1-Apr	98	43.9	10.4	37.1	118%
Irish Taylor SNOTEL	5540	1-Apr	86	36.1	8.8	37.2	97%
Tangent Snow Course	5470	31-Mar	40	17.2	0.0	18.1	95%
Ochoco Meadows SNOTEL	5430	1-Apr	14	6.9	0.0	9.5	73%
Ochoco Meadows Snow Course	5190	1-Apr	17	7.0	0.0	8.8	80%
Cascade Summit SNOTEL	5100	1-Apr	73	31.9	2.6	31.0	103%
Roaring River SNOTEL	4950	1-Apr	56	26.6	0.5	26.0	102%
New Crescent Lake SNOTEL	4910	1-Apr	38	9.4	0.0	5.4	174%
Chemult Alternate SNOTEL	4850	1-Apr	19	9.0	0.0	2.5	360%
Hogg Pass SNOTEL	4790	1-Apr	39	16.1	0.8	26.0	62%
McKenzie SNOTEL	4770	1-Apr	76	34.2	1.1	37.4	91%
Marks Creek Snow Course	4580	1-Apr	0	0.0	0.0	0.0	
Hungry Flat Snow Course	4400	31-Mar	0	0.0	0.0	0.0	
Salt Creek Falls SNOTEL	4220	1-Apr	38	18.0	0.3	17.5	103%
Santiam Jct. SNOTEL	3740	1-Apr	10	4.5	0.5	9.8	46%



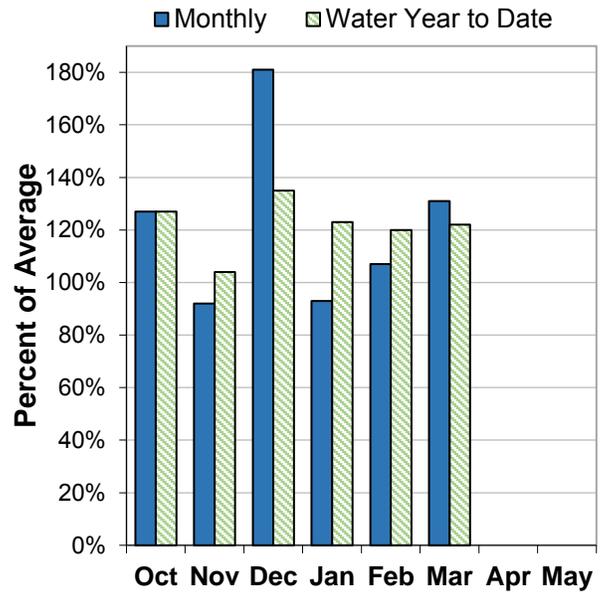
# Hood, Sandy and Lower Deschutes Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 93% of normal. This is significantly higher than last month when the snowpack was 84% of normal. In general, SNOTEL sites in the basin peaked around 60% to 90% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 131% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 122% of average.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 97% to 111% of average. Overall, forecasts increased slightly from last month's report. Water managers in the basin should expect near normal to above normal streamflows this summer.

## Hood, Sandy And Lower Deschutes Basins Summary for April 1, 2016

### Forecast Exceedance Probabilities for Risk Assessment \*

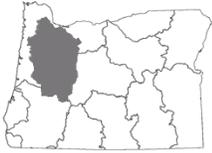
Streamflow Forecasts April 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
WF Hood River nr Dee	APR-JUL	82	102	116	97%	129	149	120
	APR-SEP	100	121	135	97%	150	171	139
Hood R at Tucker Bridge	APR-JUL	205	230	250	111%	270	295	225
	APR-SEP	245	275	295	111%	315	340	265
Sandy R nr Marmot				0%				

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Clear Lake	3.9	5.4	4.4	89%	13.1

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Lower Columbia - Sandy Basin	7	93%	10%
Lower Deschutes Basin	5	89%	17%
Middle Columbia - Hood Basin	8	99%	12%

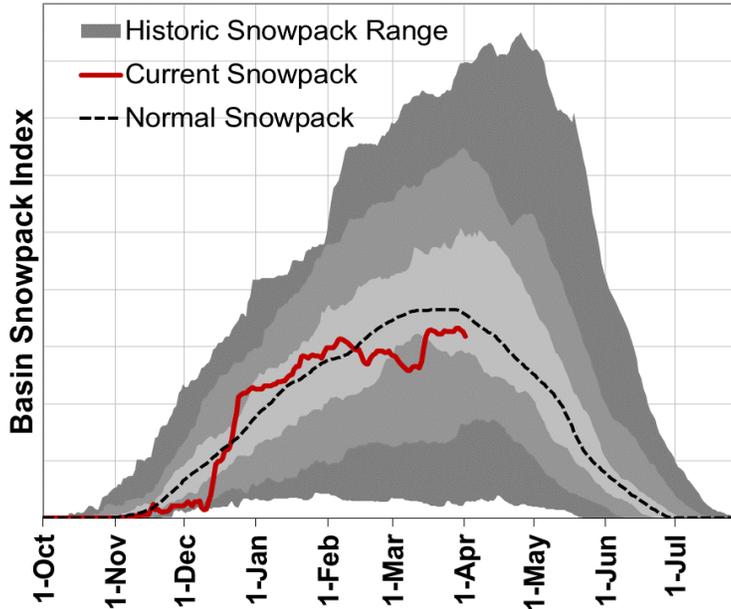
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
High Prairie Snow Course	6080	2-Apr	102	43.4	9.4	42.2	103%
Mt Hood Test Site SNOTEL	5370	1-Apr	118	49.8	14.9	60.2	83%
Red Hill SNOTEL	4410	1-Apr	89	46.8	1.6	45.7	102%
Mill Creek Meadow Snow Course	4400	2-Apr	11	4.9	0.0	10.8	45%
Surprise Lakes SNOTEL	4290	1-Apr	111	56.4	5.1	45.5	124%
Mud Ridge SNOTEL	4070	1-Apr	54	21.8	0.4	23.4	93%
Clear Lake SNOTEL	3810	1-Apr	19	7.8	0.0	10.4	75%
Blazed Alder SNOTEL	3650	1-Apr	57	25.5	0.9	25.6	100%
Clackamas Lake SNOTEL	3400	1-Apr	15	6.7	0.0	8.6	78%
Greenpoint SNOTEL	3310	1-Apr	36	16.6	0.0	15.6	106%
North Fork SNOTEL	3060	1-Apr	32	14.6	0.1	14.4	101%
South Fork Bull Run SNOTEL	2690	1-Apr	0	0.0	0.2	0.0	



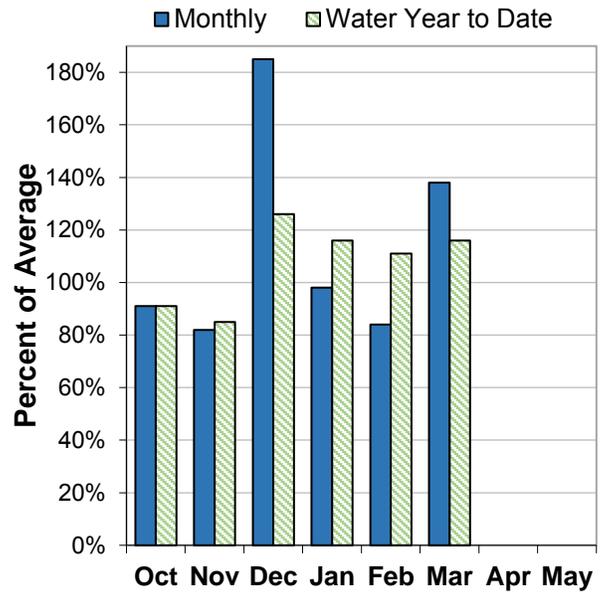
# Willamette Basin

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 91% of normal. This is significantly higher than last month when the snowpack was 82% of normal. In general, SNOTEL sites in the basin peaked around 50% to 90% of normal peak snowpack levels. Snowpack conditions in the basin are among the lowest in the state.

### PRECIPITATION

March precipitation was 138% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 116% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 70% of average at Foster Reservoir to 113% of average at Lookout Point Reservoir.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 89% to 116% of average. Overall, forecasts increased slightly from last month's report.

## Willamette Basin Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Hills Creek Reservoir Inflow <sup>1,2</sup>	APR-JUN	188	255	285	116%	315	385	245
	APR-JUL	215	285	320	116%	350	425	275
	APR-SEP	255	330	365	116%	400	475	315
MF Willamette R bl NF nr Oakridge <sup>1,2</sup>	APR-JUN	485	645	715	114%	790	950	625
	APR-JUL	555	725	805	116%	885	1060	695
	APR-SEP	650	830	910	115%	995	1170	790
Lookout Point Reservoir Inflow <sup>1,2</sup>	APR-JUN	490	665	745	115%	820	995	650
	APR-JUL	560	750	835	115%	920	1110	725
	APR-SEP	665	855	945	115%	1030	1220	825
Fall Creek Reservoir Inflow <sup>1,2</sup>	APR-JUN	48	94	115	112%	135	181	103
	APR-JUL	50	99	121	111%	143	191	109
	APR-SEP	56	104	126	112%	148	196	113
Cottage Grove Lake Inflow <sup>1,2</sup>	APR-JUN	18.6	35	45	113%	55	82	40
	APR-JUL	19.7	37	47	115%	57	85	41
	APR-SEP	21	39	49	114%	59	87	43
Dorena Lake Inflow <sup>1,2</sup>	APR-JUN	68	120	148	114%	180	260	130
	APR-JUL	74	126	154	113%	185	265	136
	APR-SEP	78	131	159	114%	191	270	139
McKenzie R bl Trail Bridge	APR-JUL	215	235	250	96%	270	290	260
	APR-SEP	290	315	335	97%	355	380	345
Cougar Lake Inflow <sup>1,2</sup>	APR-JUN	123	167	189	102%	210	270	185
	APR-JUL	140	186	210	102%	235	295	205
	APR-SEP	164	215	240	102%	265	325	235
Blue Lake Inflow <sup>1,2</sup>	APR-JUN	44	69	83	104%	97	133	80
	APR-JUL	46	72	86	102%	101	138	84
	APR-SEP	50	76	90	105%	105	141	86
McKenzie R nr Vida <sup>1</sup>	APR-JUN	595	755	835	101%	920	1120	830
	APR-JUL	700	875	960	99%	1050	1260	970
	APR-SEP	910	1100	1190	100%	1290	1510	1190
Detroit Lake Inflow <sup>1,2</sup>	APR-JUN	290	380	425	90%	465	555	470
	APR-JUL	335	435	480	91%	520	620	530
	APR-SEP	410	515	560	92%	610	715	610
Little North Santiam R nr Mehama <sup>1</sup>	APR-JUN	56	96	114	91%	132	171	125
	APR-JUL	59	101	121	91%	140	182	133
	APR-SEP	67	109	128	91%	147	189	141
North Santiam R at Mehama <sup>1</sup>	APR-JUN	425	545	595	89%	650	770	665
	APR-JUL	475	605	665	90%	725	850	740
	APR-SEP	560	690	750	89%	810	945	840

## Willamette Basin Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Green Peter Lake Inflow <sup>1,2</sup>	APR-JUN	156	225	260	98%	295	385	265
	APR-JUL	170	240	275	98%	315	410	280
	APR-SEP	187	260	295	100%	335	425	295
Foster Lake Inflow <sup>1,2</sup>	APR-JUN	280	420	490	98%	570	760	500
	APR-JUL	300	445	520	98%	600	800	530
	APR-SEP	335	485	560	99%	645	845	565
South Santiam R at Waterloo <sup>2</sup>	APR-JUN	340	440	520	99%	600	735	525
	APR-JUL	365	470	550	99%	635	770	555
	APR-SEP	405	510	590	100%	675	810	590
Willamette R at Salem <sup>1,2</sup>	APR-JUN	2660	3730	4270	108%	4850	6260	3950
	APR-JUL	2930	4050	4620	107%	5230	6700	4310
	APR-SEP	3290	4440	5020	106%	5640	7120	4730
Scoggins Reservoir Inflow <sup>2</sup>	APR-JUL	5.1	10.0	13.2	100%	16.5	21	13.2
Oak Grove Fk ab Powerplant	APR-JUL	101	114	123	107%	132	145	115
	APR-SEP	132	148	159	103%	169	185	155
Clackamas R above Three Lynx	APR-JUL	335	390	425	94%	460	515	450
	APR-SEP	415	470	510	95%	545	600	535
Clackamas R at Estacada	APR-JUL	445	525	580	93%	635	720	625
	APR-SEP	545	630	685	94%	745	830	730

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

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

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Blue River	56.3	34.9	56.4	100%	82.3
Cottage Grove	19.2	16.6	19.3	99%	31.8
Cougar	5.5	60.3	118.6	5%	174.9
Detroit	351.8	242.5	335.5	105%	426.8
Dorena	45.1	30.4	44.4	102%	72.1
Fall Creek	82.1	44.8	81.6	101%	116.0
Fern Ridge	79.5	69.5	73.1	109%	97.3
Foster	21.6	21.6	30.9	70%	46.2
Green Peter	336.7	278.9	332.6	101%	402.8
Hills Creek	225.0	174.4	205.6	109%	279.2
Lookout Point	335.3	165.0	296.7	113%	433.2
Timothy Lake	57.6	58.0	52.7	109%	63.6
Henry Hagg Lake	51.4	50.9	50.0	103%	53.3

## Willamette Basin Summary for April 1, 2016

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Clackamas Basin	11	93%	11%
McKenzie Basin	17	106%	13%
Middle Fork Willamette Basin	7	103%	14%
North Santiam Basin	4	71%	2%
South Santiam Basin	4	70%	2%

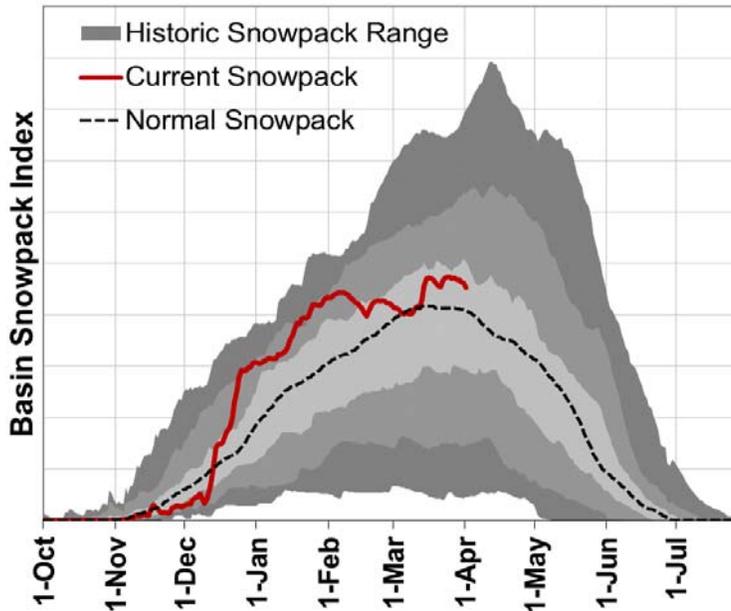
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summit Lake SNOTEL	5610	1-Apr	98	43.9	10.4	37.1	118%
Irish Taylor SNOTEL	5540	1-Apr	86	36.1	8.8	37.2	97%
Cascade Summit SNOTEL	5100	1-Apr	73	31.9	2.6	31.0	103%
Roaring River SNOTEL	4950	1-Apr	56	26.6	0.5	26.0	102%
Holland Meadows SNOTEL	4930	1-Apr	39	18.5	0.4	21.1	88%
McKenzie SNOTEL	4770	1-Apr	76	34.2	1.1	37.4	91%
Bear Grass SNOTEL	4720	1-Apr	93	47.3	0.6		
Salt Creek Falls SNOTEL	4220	1-Apr	38	18.0	0.3	17.5	103%
Mud Ridge SNOTEL	4070	1-Apr	54	21.8	0.4	23.4	93%
Little Meadows SNOTEL	4020	1-Apr	52	25.4	0.4	23.3	109%
Clear Lake SNOTEL	3810	1-Apr	19	7.8	0.0	10.4	75%
Santiam Jct. SNOTEL	3740	1-Apr	10	4.5	0.5	9.8	46%
Daly Lake SNOTEL	3690	1-Apr	7	3.0	0.0	7.7	39%
Marys Peak (Rev.) Snow Course	3580	1-Apr	0	0.0	0.0	2.5	0%
Jump Off Joe SNOTEL	3520	1-Apr	8	2.5	0.5	7.8	32%
Peavine Ridge SNOTEL	3420	1-Apr	11	5.1	0.0	8.9	57%
Clackamas Lake SNOTEL	3400	1-Apr	15	6.7	0.0	8.6	78%
Smith Ridge SNOTEL	3270	1-Apr	0	0.0	0.0		
Saddle Mountain SNOTEL	3110	1-Apr	0	0.0	0.0		
Railroad Overpass SNOTEL	2680	1-Apr	0	0.0	0.0	0.0	
Marion Forks SNOTEL	2590	1-Apr	0	0.0	0.0	5.4	0%
Seine Creek SNOTEL	2060	1-Apr	0	0.0	0.0	0.0	
Miller Woods SNOTEL	420	1-Apr	0	0.0	0.0		



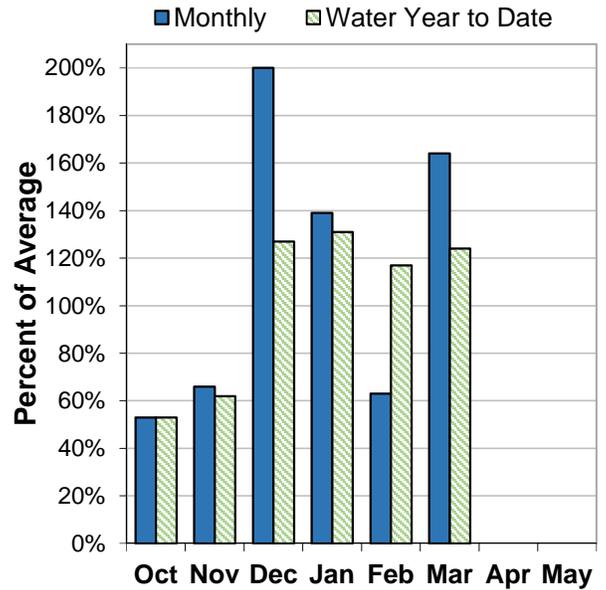
# Rogue and Umpqua Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 110% of normal. This is slightly higher than last month when the snowpack was 103% of normal. In general, SNOTEL sites in the basin peaked around 90% to 130% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 164% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 124% of average. Basin precipitation for the month and for the water year (% of normal) are the highest in state.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 67% of average at Fourmile Lake to 112% of average at Applegate Reservoir. Storage at Howard Prairie and Hyatt Prairie reservoirs increased significantly since last month, each gaining 28 percent of average.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 112% to 132% of average. Overall, forecasts increased significantly from last month's report. Water managers in the basin should expect above normal to well above normal streamflows this summer.

## Rogue And Umpqua Basins Summary for April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Hyatt Reservoir Inflow <sup>2</sup>	APR-JUL	1.78	3.2	4.1	114%	5.1	6.5	3.6
South Umpqua R at Tiller	APR-JUL	146	195	230	119%	260	310	193
	APR-SEP	155	205	240	120%	275	325	200
Cow Ck nr Azalea <sup>2</sup>	APR-JUL	9.5	15.5	19.6	133%	24	30	14.7
	APR-SEP	10.9	17.1	21	132%	25	32	15.9
South Umpqua R nr Brockway	APR-JUL	285	405	490	126%	570	690	390
	APR-SEP	305	430	510	124%	595	720	410
North Umpqua R at Winchester	APR-JUL	670	805	900	116%	995	1130	775
	APR-SEP	800	940	1040	117%	1130	1270	890
Lost Creek Lk Inflow <sup>2</sup>	APR-JUL	495	550	585	113%	625	675	520
	APR-SEP	620	685	725	112%	765	830	645
Rogue R at Raygold <sup>2</sup>	APR-JUL	585	705	785	116%	865	985	675
	APR-SEP	725	850	935	116%	1020	1140	805
Rogue R at Grants Pass <sup>2</sup>	APR-JUL	620	760	850	117%	945	1080	725
	APR-SEP	745	890	990	117%	1090	1240	845
Applegate Lake Inflow <sup>2</sup>	APR-JUL	102	121	134	123%	146	165	109
	APR-SEP	109	128	141	123%	154	172	115
Sucker Ck bl Ltl Grayback Ck nr Holland	APR-JUL	45	60	70	127%	80	95	55
	APR-SEP	50	65	75	127%	85	99	59
Illinois R nr Kerby	APR-JUL	117	178	220	117%	260	325	188
	APR-SEP	124	185	225	117%	270	330	193

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Reservoir Storage	Current (KAF)	Last Year (KAF)	Average (KAF)	% of Average	Useable Capacity (KAF)
Applegate	49.2	37.3	44.0	112%	75.2
Emigrant Lake	35.9	30.4	33.6	107%	39.0
Fish Lake	4.2	4.6	5.2	80%	7.9
Fourmile Lake	5.0	7.4	7.5	67%	15.6
Howard Prairie	36.6	26.2	41.9	87%	62.1
Hyatt Prairie	9.5	6.5	12.1	79%	16.2
Lost Creek	266.8	276.1	266.7	100%	315.0

## Rogue And Umpqua Basins Summary for April 1, 2016

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Applegate Basin	5	101%	8%
Middle Rogue Basin	8	102%	6%
North Umpqua Basin	9	130%	16%
South Umpqua Basin	10	131%	1%
Upper Rogue Basin	11	111%	15%

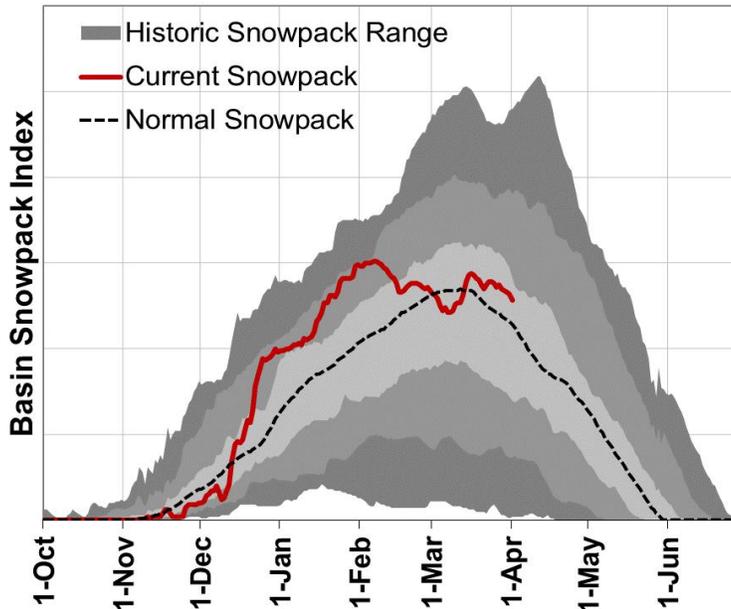
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Park H.Q. Rev Snow Course	6570	31-Mar	146	70.6	23.3	59.6	118%
Caliban (Alt.) Snow Course	6500	31-Mar	78	32.6	4.2	30.6	107%
Mt. Ashland Switchback Snow Course	6430	31-Mar	74	31.0	1.3	32.4	96%
Ski Bowl Road Snow Course	6070	31-Mar	59	25.2	0.0	23.6	107%
Big Red Mountain SNOTEL	6050	1-Apr	68	29.1	4.2	27.8	105%
Annie Springs SNOTEL	6010	1-Apr	105	47.5	11.5	41.0	116%
Fourmile Lake SNOTEL	5970	1-Apr	77	33.0	0.8	28.9	114%
Cold Springs Camp SNOTEL	5940	1-Apr	57	25.6	0.2	28.8	89%
Sevenmile Marsh SNOTEL	5700	1-Apr	73	32.7	0.3	31.8	103%
Summit Lake SNOTEL	5610	1-Apr	98	43.9	10.4	37.1	118%
Billie Creek Divide SNOTEL	5280	1-Apr	53	26.1	0.0	21.2	123%
Diamond Lake SNOTEL	5280	1-Apr	27	14.6	0.0	10.2	143%
Bigelow Camp SNOTEL	5130	1-Apr	21	8.8	0.0	10.8	81%
Beaver Dam Creek Snow Course	5120	1-Apr	14	6.9	0.0	8.0	86%
King Mountain 1 Snow Course	4760	1-Apr	11	4.5	0.0	3.2	141%
Deadwood Junction Snow Course	4660	1-Apr	3	1.2	0.0	3.0	40%
Fish Lk. SNOTEL	4660	1-Apr	27	10.4	0.0	6.8	153%
Howard Prairie SNOTEL	4580	1-Apr	0	0.0	0.0		
Howard Prairie Snow Course	4580	1-Apr	2	1.1	0.0	4.2	26%
Siskiyou Summit Rev. Snow Course	4560	31-Mar	3	1.3	0.0	2.5	52%
Red Butte 1 Snow Course	4460	31-Mar	21	9.2	0.2	7.2	128%
King Mountain SNOTEL	4340	1-Apr	0	0.0	0.0	0.5	0%
North Umpqua Snow Course	4200	1-Apr	19	9.0	0.0	5.4	167%
Red Butte 2 Snow Course	4050	31-Mar	0	0.0	0.0	1.0	0%
Trap Creek Snow Course	3830	1-Apr	21	8.5	0.0	4.5	189%
Silver Burn Snow Course	3680	31-Mar	26	11.8	0.0	7.5	157%
King Mountain 3 Snow Course	3680	1-Apr	0	0.0	0.0	0.0	
Red Butte 3 Snow Course	3500	31-Mar	0	0.0	0.0	0.0	
Toketee Airstrip SNOTEL	3240	1-Apr	0	0.0	0.0	0.0	
King Mountain 4 Snow Course	3050	1-Apr	0	0.0	0.0	0.0	
Red Butte 4 Snow Course	3000	31-Mar	0	0.0	0.0	0.0	



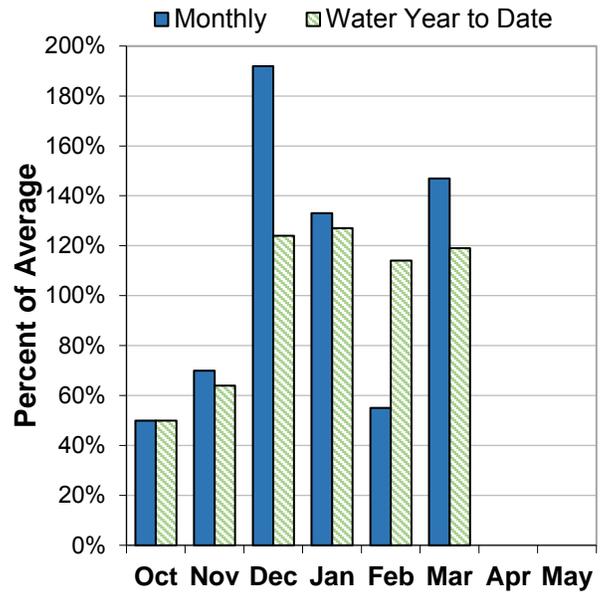
# Klamath Basin

April 1, 2016

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 112% of normal. This is significantly higher than last month when the snowpack was 101% of normal. Snowpack conditions vary greatly across the basin: high-elevation sites (>6000 ft in elev) and those on the west side of the basin (Cascade Mtns) are near normal to above normal while most measurement sites in the rest of the basin are snow-free as of April 1.

### PRECIPITATION

March precipitation was 147% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 119% of average.

### RESERVOIR

As of April 1, storage at major reservoirs in the basin ranges from 50% of average at Clear Lake to 113% of average at Upper Klamath Lake.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 81% to 93% of average. Overall, forecasts increased slightly from last month's report. Water managers in the basin should expect below normal streamflows this summer.

## Klamath Basin Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Gerber Reservoir Inflow <sup>2</sup>	APR-MAY	0.52	5.6	10.7	83%	15.8	23	12.9
	APR-JUL	0.84	6.2	11.1	79%	16.0	23	14.0
	APR-SEP	0.72	6.8	11.6	81%	16.4	23	14.4
Sprague R nr Chiloquin	APR-JUL	121	153	174	93%	195	225	188
	APR-SEP	142	173	195	93%	215	250	210
Williamson bl Sprague nr Chiloquin	APR-JUL	220	255	275	93%	295	330	295
	APR-SEP	270	305	330	93%	355	390	355
Upper Klamath Lake Inflow <sup>1,2</sup>	APR-JUL	260	330	360	90%	390	460	400
	APR-SEP	325	395	430	90%	465	535	480

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

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

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Clear Lake	122.6	45.9	245.0	50%	513.3
Gerber	48.4	16.1	62.5	77%	94.3
Upper Klamath Lake	479.7	483.9	424.5	113%	523.7

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
Lost Basin	5	0%	0%
Sprague Basin	8	96%	3%
Upper Klamath Lake Basin	8	112%	16%
Williamson River Basin	5	122%	30%

## Klamath Basin Summary for April 1, 2016

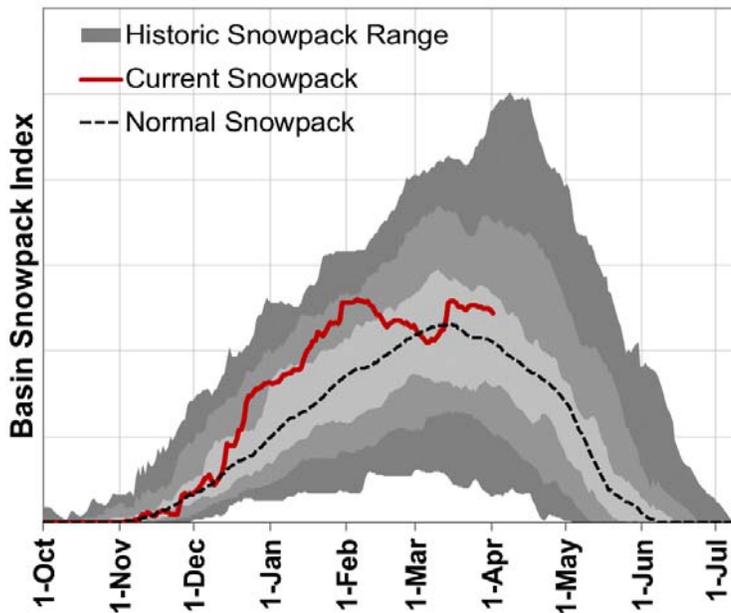
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Summer Rim SNOTEL	7080	1-Apr	40	19.1	1.4	16.4	116%
Swan Lake Mtn SNOTEL	6830	1-Apr	64	31.2	0.0		
Park H.Q. Rev Snow Course	6570	31-Mar	146	70.6	23.3	59.6	118%
Colvin Creek AM	6520	1-Apr	0	0.0	0.0	0.0	
Crazyman Flat SNOTEL	6180	1-Apr	31	16.6	0.0	13.1	127%
Ski Bowl Road Snow Course	6070	31-Mar	59	25.2	0.0	23.6	107%
Annie Springs SNOTEL	6010	1-Apr	105	47.5	11.5	41.0	116%
Finley Corrals AM	6000	1-Apr	23	10.4	0.0	13.0	80%
Fourmile Lake SNOTEL	5970	1-Apr	77	33.0	0.8	28.9	114%
Cold Springs Camp SNOTEL	5940	1-Apr	57	25.6	0.2	28.8	89%
Strawberry SNOTEL	5770	1-Apr	0	0.0	0.0	1.2	0%
Cox Flat AM	5750	1-Apr	0	0.0	0.0	0.2	0%
Silver Creek SNOTEL	5740	1-Apr	12	5.0	0.0	7.2	69%
Quartz Mountain SNOTEL	5720	1-Apr	0	0.0	0.0	0.0	
Sevenmile Marsh SNOTEL	5700	1-Apr	73	32.7	0.3	31.8	103%
State Line AM	5690	1-Apr	0	0.0	0.0	0.7	0%
State Line SNOTEL	5680	1-Apr	0	0.0	0.0		
Sycan Flat AM	5580	1-Apr	0	0.0	0.0	0.4	0%
Sun Pass SNOTEL	5400	1-Apr	46	20.9	0.0		
Billie Creek Divide SNOTEL	5280	1-Apr	53	26.1	0.0	21.2	123%
Diamond Lake SNOTEL	5280	1-Apr	27	14.6	0.0	10.2	143%
Crowder Flat SNOTEL	5170	1-Apr	0	0.0	0.0	0.0	
Beaver Dam Creek Snow Course	5120	1-Apr	14	6.9	0.0	8.0	86%
Taylor Butte SNOTEL	5030	1-Apr	0	0.0	0.0	3.0	0%
Dog Hollow AM	4920	1-Apr	0	0.0	0.0	0.0	
Gerber Reservoir SNOTEL	4890	1-Apr	0	0.0	0.0	0.0	
Chemult Alternate SNOTEL	4850	1-Apr	19	9.0	0.0	2.5	360%
Deadwood Junction Snow Course	4660	1-Apr	3	1.2	0.0	3.0	40%
Fish Lk. SNOTEL	4660	1-Apr	27	10.4	0.0	6.8	153%
Howard Prairie SNOTEL	4580	1-Apr	0	0.0	0.0		
Howard Prairie Snow Course	4580	1-Apr	2	1.1	0.0	4.2	26%
Siskiyou Summit Rev. Snow Course	4560	31-Mar	3	1.3	0.0	2.5	52%



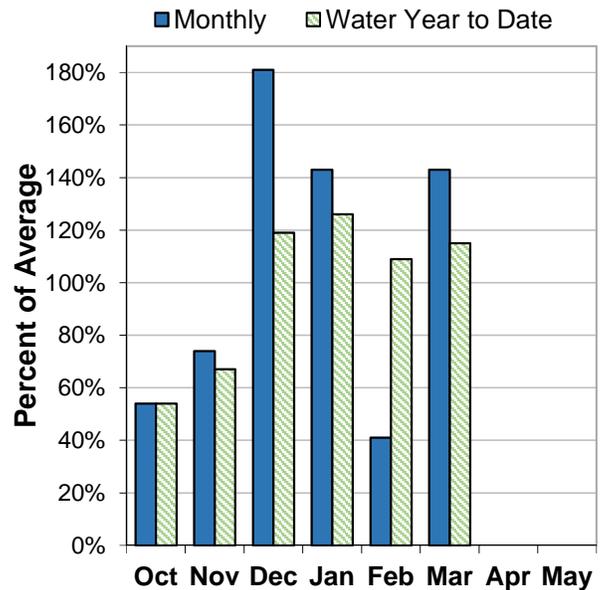
# Lake County and Goose Lake Basins

April 1, 2016

### Mountain Snowpack



### Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 104% of normal. This is significantly higher than last month when the snowpack was 95% of normal. In general, SNOTEL sites in the basin peaked around 90% to 120% of normal peak snowpack levels.

### PRECIPITATION

March precipitation was 143% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 115% of average.

### RESERVOIR

Reservoir storage across the basin is currently above average. As of April 1, storage at major reservoirs in the basin ranges from 102% of average at Drews Reservoir to 125% of average at Cottonwood Reservoir. Storage at Cottonwood and Drews reservoirs increased significantly since last month, gaining 51 and 35 percent of average respectively.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 91% to 117% of average. Overall, forecasts remain similar to last month's report.

## Lake County And Goose Lake Basins Summary for April 1, 2016

<b>Forecast Exceedance Probabilities for Risk Assessment *</b>								
<b>Streamflow Forecasts April 1, 2016</b>	<b>Forecast Period</b>	←-----Drier-----Future Conditions-----Wetter-----→						<b>Average (KAF)</b>
		<b>90% (KAF)</b>	<b>70% (KAF)</b>	<b>50% (KAF)</b>	<b>% Avg</b>	<b>30% (KAF)</b>	<b>10% (KAF)</b>	
Twentymile Ck nr Adel	APR-JUL	4.9	13.0	18.6	109%	24	32	17.0
	APR-SEP	5.2	13.4	19.0	109%	25	33	17.4
Deep Ck ab Adel	APR-JUL	57	67	74	117%	81	92	63
	APR-SEP	59	69	76	117%	84	94	65
Honey Ck nr Plush	APR-JUL	6.5	10.1	12.6	90%	15.1	18.7	14.0
	APR-SEP	6.7	10.3	12.8	91%	15.3	18.9	14.1
Chewaucan R nr Paisley	APR-JUL	48	58	65	92%	72	82	71
	APR-SEP	51	61	68	91%	75	85	75

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

<b>Reservoir Storage</b>	<b>Current (KAF)</b>	<b>Last Year (KAF)</b>	<b>Average (KAF)</b>	<b>% of Average</b>	<b>Useable Capacity (KAF)</b>
Cottonwood	7.9	4.2	6.3	125%	9.3
Drews	42.9	12.5	42.0	102%	63.5

<b>Snowpack Summary by Basin</b>	<b>Basin Snowpack % of Median</b>		
	<b># of Sites</b>	<b>Current Yr</b>	<b>Last Yr</b>
Goose Lake Basin	8	96%	14%
Lake Abert Basin	7	81%	2%
Summer Lake Basin	13	104%	9%
Upper Pit Basin	3	126%	0%

## Lake County And Goose Lake Basins Summary for April 1, 2016

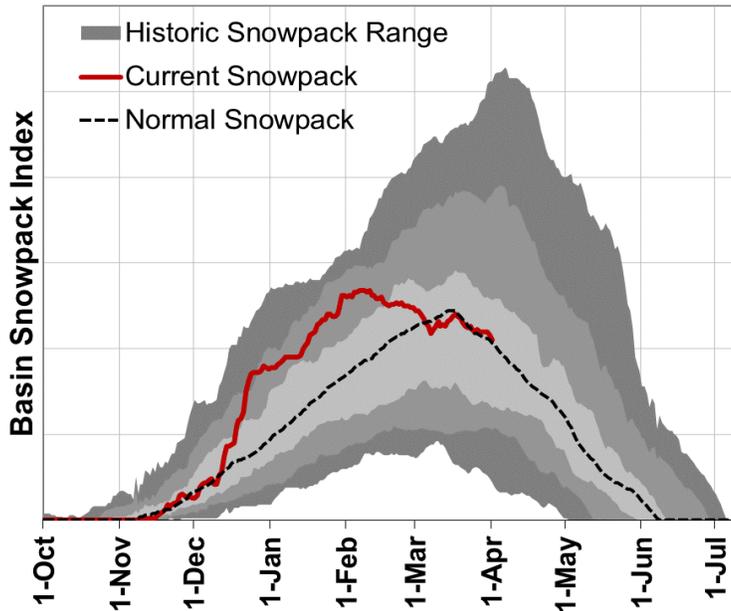
Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Dismal Swamp SNOTEL	7360	1-Apr	87	36.5	11.0	28.4	129%
Summer Rim SNOTEL	7080	1-Apr	40	19.1	1.4	16.4	116%
Cedar Pass SNOTEL	7030	1-Apr	45	20.8	0.0	17.9	116%
Barley Camp AM	6890	31-Mar	45	18.9	0.0	16.1	117%
Patton Meadows AM	6800	1-Apr	35	14.7	0.0	16.0	92%
Sherman Valley AM	6640	1-Apr	15	6.3	0.0	13.0	48%
Colvin Creek AM	6520	1-Apr	0	0.0	0.0	0.0	
Hart Mountain AM	6430	1-Apr	0	0.0	0.0	0.0	
Rogger Meadow AM	6360	1-Apr	16	6.7	0.0	8.8	76%
Adin Mtn SNOTEL	6190	1-Apr	32	15.9	0.0	11.3	141%
Crazyman Flat SNOTEL	6180	1-Apr	31	16.6	0.0	13.1	127%
Finley Corrals AM	6000	1-Apr	23	10.4	0.0	13.0	80%
Camas Creek #3 Snow Course	5860	31-Mar	27	12.1	0.0	11.0	110%
Sheldon SCAN	5860	1-Apr	0	0.0	0.0	0.0	
Strawberry SNOTEL	5770	1-Apr	0	0.0	0.0	1.2	0%
Cox Flat AM	5750	1-Apr	0	0.0	0.0	0.2	0%
Silver Creek SNOTEL	5740	1-Apr	12	5.0	0.0	7.2	69%
State Line AM	5690	1-Apr	0	0.0	0.0	0.7	0%
State Line SNOTEL	5680	1-Apr	0	0.0	0.0		
Sycan Flat AM	5580	1-Apr	0	0.0	0.0	0.4	0%
Crowder Flat SNOTEL	5170	1-Apr	0	0.0	0.0	0.0	



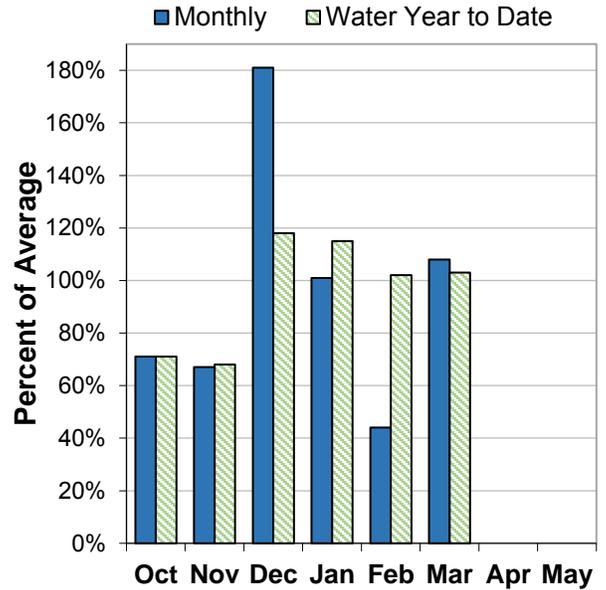
# Harney Basin

April 1, 2016

## Mountain Snowpack



## Basin Precipitation



## Summary of Water Supply Conditions

### SNOWPACK

As of April 1, the basin snowpack was 102% of normal. This is slightly lower than last month when the snowpack was 107% of normal. Snowpack conditions vary greatly across the basin: high-elevation sites (>6500 ft in elev) and those on the north side of the basin (Ochoco Mtns) are near normal to above normal while the snowpack in the rest of the basin is well below normal or are snow-free as April 1st.

### PRECIPITATION

March precipitation was 108% of average. Precipitation since the beginning of the water year (October 1 - April 1) has been 103% of average. Basin precipitation for the month and for the water year (% of normal) are the lowest in state.

### STREAMFLOW FORECAST

As of April 1, summer streamflow forecasts in the basin range from 78% to 104% of average. Overall, forecasts decreased significantly from last month's report due to the early meltout of snowpack at the lower and middle elevations in the basin. This early snowmelt has also likely caused a number of rivers to experience their seasonal peak flows already and without additional precipitation, rivers like Silvies will continue into recession flows. Water managers in the basin should expect well below normal to near normal streamflows this summer.

## Harney Basin Summary for April 1, 2016

Forecast Exceedance Probabilities for Risk Assessment *								
Streamflow Forecasts April 1, 2016	Forecast Period	←-----Drier-----Future Conditions-----Wetter-----→						Average (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Silvies R nr Burns	APR-JUL	26	52	70	79%	88	114	89
	APR-SEP	27	54	72	78%	90	117	92
Donner Und Blitzen R nr Frenchglen	APR-JUL	33	47	56	90%	65	79	62
	APR-SEP	38	52	62	91%	72	86	68
Trout Ck nr Denio	APR-JUL	3.2	6.0	7.9	104%	9.8	12.6	7.6
	APR-SEP	3.5	6.3	8.3	104%	10.3	13.1	8.0

\* 90%, 70%, 50%, 30% & 10% exceedance probabilities are the chance that observed streamflow volume will exceed the forecasted volume

Snowpack Summary by Basin	Basin Snowpack % of Median		
	# of Sites	Current Yr	Last Yr
Alvord Lake Basin	7	107%	27%
Donner und Blitzen River Basin	5	105%	35%
Silvies River Basin	4	89%	0%
Upper Quinn Basin	6	98%	10%

Basin Snowpack Measurement Sites	Elevation (ft)	Date Measured	Depth (in)	Snow Water Equivalent (in)			
				Current SWE	Last Yr SWE	Median	% of Median
Granite Peak SNOTEL	8543	1-Apr	61	25.0	6.7	21.2	118%
Trout Creek AM	7890	1-Apr	32	15.0	0.0	12.7	118%
Fish Creek SNOTEL	7660	1-Apr	64	36.0	17.0	27.4	131%
Govt Corrals AM	7400	1-Apr	32	15.0	0.0	15.0	100%
Oregon Canyon AM	7050	31-Mar	0	0.0	0.0	3.0	0%
Silvies SNOTEL	6990	1-Apr	26	12.6	0.0	15.6	81%
Pueblo Summit AM	6970	31-Mar	0	0.0	0.0	0.0	
Buckskin Lower SNOTEL	6915	1-Apr	21	10.0	0.0	8.5	118%
V Lake AM	6600	1-Apr	3	1.5	0.0	4.9	31%
Louse Canyon AM	6530	1-Apr	0	0.0	0.0	3.2	0%
Disaster Peak SNOTEL	6500	1-Apr	0	0.0	0.0	1.9	0%
Hart Mountain AM	6430	1-Apr	0	0.0	0.0	0.0	
Quinn Ridge AM	6270	1-Apr	0	0.0	0.0	0.0	
Snow Mountain SNOTEL	6230	1-Apr	29	13.3	0.0	12.2	109%
Lamance Creek SNOTEL	6000	1-Apr	2	0.8	0.0	6.6	12%
Blue Mountain Spring SNOTEL	5870	1-Apr	36	16.4	1.2	15.9	103%
Sheldon SCAN	5860	1-Apr	0	0.0	0.0	0.0	
Buck Pasture AM	5740	31-Mar	0	0.0	0.0	0.0	
Call Meadows AM	5380	1-Apr	0	0.0	0.0	1.2	0%
Rock Springs SNOTEL	5290	1-Apr	0	0.0	0.0	0.9	0%
Starr Ridge SNOTEL	5250	1-Apr	0	0.0	0.0	0.0	
Lake Creek R.S. SNOTEL	5240	1-Apr	14	6.0	0.0	8.6	70%
Buckskin Lake AM	5190	31-Mar	0	0.0	0.0	0.0	

# Recession Forecasts for Oregon

Recession flow forecasts are presented below for key streamflow sites where reliable daily streamflow data are available. The recession flow forecasts use exceedance probabilities in a format similar to the standard water supply forecasts presented in this document. Each forecast provides a range of possible outcomes representing the uncertainty of forecasting models.

The types of forecasts in the table below are:

- 1) Threshold flow -- Date that the daily streamflow rate falls below the given threshold flow
- 2) Peak flow -- Maximum daily flow
- 3) Date of peak flow -- Date of occurrence of maximum daily flow
- 4) Average daily flow on a given date

<b>OWYHEE AND MALHEUR BASINS</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Owyhee R nr Rome	2000 cfs	** Observed	Mar 21	**	<b>May 6</b>
Owyhee R nr Rome	1000 cfs	Apr 9	Apr 21	Jun 1	<b>May 18</b>
Owyhee R nr Rome	500 cfs	Apr 28	May 19	Jun 10	<b>Jun 2</b>

<b>UPPER JOHN DAY BASIN</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
John Day R at Service Creek	Average Daily Flow on Aug. 1st	80	290	500	<b>271</b>

<b>UPPER DESCHUTES AND CROOKED BASINS</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE</i> ----- <i>CHANCE OF EXCEEDING</i> ----- -----			<i>LONG-TERM AVERAGE VALUE</i>
		90%	50%	10%	
Crane Prairie Inflow *	Date of Peak	May 7	May 23	Jun 8	<b>May 25</b>
Crane Prairie Inflow	Peak Flow	300	425	555	<b>403</b>
Crane Prairie Inflow	Average Daily Flow on Oct. 1st	250	280	315	<b>269</b>
Prineville Reservoir Inflow	113 cfs	May 16	Jun 6	Jun 27	<b>May 30</b>
Prineville Reservoir Inflow	75 cfs	May 22	Jun 12	Jul 3	<b>June 7</b>
Whychus Creek nr Sisters	100 cfs	Jul 28	Aug 17	Sep 11	<b>August 16</b>

\*\*Observed dates and flow values are based on provisional data and subject to change.

<b>ROGUE AND UMPQUA BASINS</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
South Umpqua R nr Brockway *	90 cfs	Aug 2	Aug 22	Sep 6	<b>August 8</b>
South Umpqua R at Tiller	140 cfs	Jul 3	Jul 23	Aug 12	<b>July 11</b>
South Umpqua R at Tiller	90 cfs	Jul 23	Aug 12	Sep 6	<b>August 1</b>
South Umpqua R at Tiller	60 cfs	Aug 22	Sep 16	Oct 11	<b>August 28</b>

\*Dates are based on streamflow data adjusted for releases from Galesville Reservoir to reflect natural flow conditions and do not match observed gage data. There is an approximately 20% chance in any given year that the flow will not recede below 90 cfs; the dates given here are for the event that the flow does recede below 90 cfs.

<b>LAKE COUNTY AND GOOSE LAKE BASINS</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
Deep Ck ab Adel	100 cfs	Jun 6	Jun 23	Jul 10	<b>June 17</b>
Honey Ck nr Plush	100 cfs	Apr 16	May 17	Jun 17	<b>May 16</b>
Honey Ck nr Plush	50 cfs	May 6	Jun 2	Jun 29	<b>June 4</b>
Twentymile Ck nr Adel	50 cfs	May 6	Jun 3	Jul 1	<b>May 30</b>
Twentymile Ck nr Adel	10 cfs	Jun 13	Jul 11	Jul 28	<b>July 7</b>

<b>HARNEY BASIN</b>					
<i>FORECAST POINT</i>	<i>FORECAST THRESHOLD</i>	<i>FORECAST VALUE ----- CHANCE OF EXCEEDING ----- -----</i>			<i>LONG-TERM AVERAGE VALUE</i>
		<i>90%</i>	<i>50%</i>	<i>10%</i>	
Silvies R nr Burns	400 cfs	Apr 17	May 8	May 29	<b>May 21</b>
Silvies R nr Burns	200 cfs	Apr 29	May 22	Jun 14	<b>June 2</b>
Silvies R nr Burns	100 cfs	May 13	Jun 6	Jun 30	<b>June 13</b>
Silvies R nr Burns	50 cfs	Jun 3	Jun 29	Jul 23	<b>July 3</b>
Donner Und Blitzen R nr Frenchglen	200 cfs	May 30	Jun 18	Jul 7	<b>June 20</b>
Donner Und Blitzen R nr Frenchglen	100 cfs	Jun 22	Jul 8	Jul 23	<b>July 9</b>

# Basin Outlook Reports: How Forecasts Are Made

## Federal – State – Private Cooperative Snow Surveys

*For more water supply and resource management information, contact:*

**USDA, Natural Resources Conservation Service**  
**Snow Survey Office**  
**1201 NE Lloyd Suite 900**  
**Portland, OR 97232**  
**Phone: (503) 414-3271**  
**Web site <http://www.or.nrcs.usda.gov/snow>**

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 it 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 prepare 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.

# Interpreting Water Supply Forecasts

Each month, five forecasts are issued for each forecast point and each forecast period. Unless otherwise specified, all streamflow forecasts are for streamflow volumes that would occur naturally without any upstream influences. Water users need to know what the different forecasts represent if they are to use the information correctly when making operational decisions. The following is an explanation of each of the forecasts.

**90 Percent Chance of Exceedance Forecast.** There is a 90 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 10 percent chance that the actual streamflow volume will be less than this forecast value.

**70 Percent Chance of Exceedance Forecast.** There is a 70 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 30 percent chance that the actual streamflow volume will be less than this forecast value.

**50 Percent Chance of Exceedance Forecast.** There is a 50 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 50 percent chance that the actual streamflow volume will be less than this forecast value. Generally, this forecast is the middle of the range of possible streamflow volumes that can be produced given current conditions.

**30 Percent Chance of Exceedance Forecast.** There is a 30 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 70 percent chance that the actual streamflow volume will be less than this forecast value.

**10 Percent Chance of Exceedance Forecast.** There is a 10 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 90 percent chance that the actual streamflow volume will be less than this forecast value.

\*Note: There is still a 20 percent chance that actual streamflow volumes will fall either below the 90 percent exceedance forecast or above the 10 percent exceedance forecast.

These forecasts represent the uncertainty inherent in making streamflow predictions. This uncertainty may include sources such as: unknown future weather conditions, uncertainties associated with the various prediction methodologies, and the spatial coverage of the data network in a given basin.

**30-Year Average.** The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance forecast would be greater than the 30-year average streamflow.

AF - Acre-feet, forecasted volume of water are typically in thousands of acre-feet.

These forecasts are given to users to help make risk-based decisions. Users can select the forecast corresponding to the level of risk they are willing to accept in order to minimize the negative impacts of having more or less water than planned for.

**To Decrease the Chance of Having Less Water than Planned for:** A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive less than this amount). To reduce the risk of having less water than planned for, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded such as the 90 or 70 percent exceedance forecasts.

**To Decrease the Chance of Having More Water than Planned for:** A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive more than this amount). To reduce the risk of having more water than planned for, users can base their operational decisions on one of the forecasts with a lesser chance of being exceeded such as the 30 or 10 percent exceedance forecasts.

## Using the Forecasts - an Example

**Using the 50 Percent Exceedance Forecast.** Using the example forecasts shown on the next page, there is a 50% chance that actual streamflow volume at the Mountain Creek near Mitchell will be less than 4.4 KAF between April 1 and Sept 30. There is also a 50% chance that actual streamflow volume will be greater than 4.4 KAF.

**Using the 90 and 70 Percent Exceedance Forecasts.** If an unexpected shortage of water could cause problems (such as irrigated agriculture), users

might want to plan on receiving 3.3 KAF (from the 70 percent exceedance forecast). There is a 30% chance of receiving *less* than 3.3 KAF.

Alternatively, if users determine the risk of using the 70 percent exceedance forecast is too great, then they might plan on receiving 1.7 KAF (from the **90** percent exceedance forecast). There is 10% chance of receiving less than 1.7 KAF.

**Using the 30 or 10 Percent Exceedance Forecasts.** If an unexpected excess of water could cause problems (such as operating a flood control

reservoir), users might plan on receiving 5.5 KAF (from the 30 percent exceedance forecast). There is a 30% chance of receiving *more* than 5.5 KAF.

Alternatively, if users determine the risk of using the 30 percent exceedance forecast is too great, then they might plan on receiving 7.1 KAF (from the 10 percent exceedance forecast). There is a 10% chance of receiving more than 7.1 KAF.

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**JOHN DAY BASIN**

**Streamflow Forecasts - February 1, 2013**

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Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>				30-Yr Avg. (1000AF)		
		===== Chance Of Exceeding * =====						
		90% (1000AF)	70% (1000AF)	50% (1000AF) (% AVG.)	30% (1000AF)		10% (1000AF)	
Strawberry Ck nr Prairie City	MAR-JUL	5.0	6.6	7.6	89	8.6	10.2	8.5
	APR-SEP	5.2	6.8	7.9	90	9.0	10.6	8.8
Mountain Ck nr Mitchell	FEB-JUL	3.2	5.4	6.9	99	8.4	10.6	7.0
	APR-SEP	1.7	3.3	4.4	90	5.5	7.1	4.9

=====

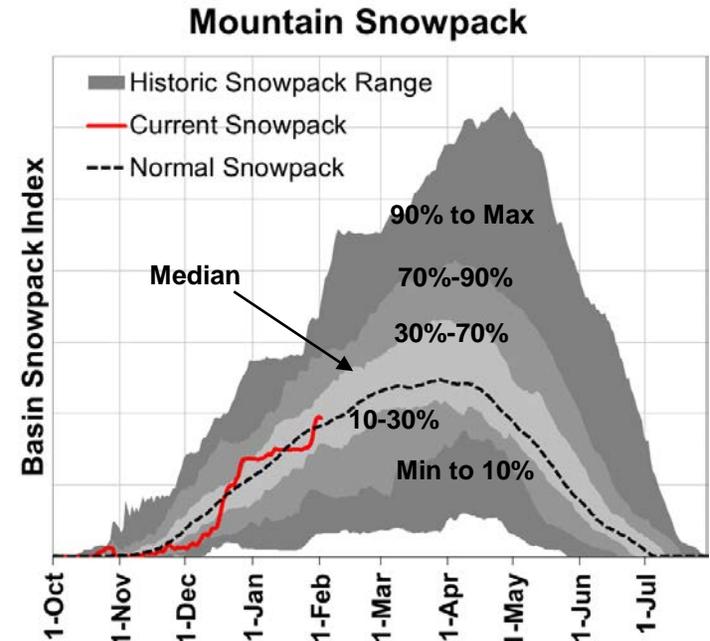
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

## Interpreting Snowpack Plots

The basin snowpack plots display an index calculated using daily SNOTEL data for many sites in each basin. They show how the current year's snowpack data compares to historical data in the basin. The "Current Snowpack" line can be compared with the "Normal Snowpack" (median) line, as well as the historic range for the basin. This gives users important context about the current year and historic variability of snowpack in the basin.

The grey shaded areas represent different percentiles of the historical range of the snowpack index for each day. The dark grey shading indicates the extreme lows and highs in the SNOTEL record (minimum to the 10<sup>th</sup> percentile and the 90<sup>th</sup> percentile to maximum). The medium grey shading indicates the range from the 10<sup>th</sup> to 30<sup>th</sup> percentiles and the 70<sup>th</sup> to 90<sup>th</sup> percentiles. The light grey shading indicates the range between the 30<sup>th</sup> to 70<sup>th</sup> percentiles, while the median is the 50<sup>th</sup> percentile. A percentile is the value of the snowpack index below which the given percent of historical years fall. For instance, the 90<sup>th</sup> percentile line indicates that the snowpack index has been below this line for 90 percent of the years of record.

\*\* Please note: These plots only use daily data from SNOTEL sites in the basin. Because snow course data is collected monthly, it cannot be included in these plots. The official snowpack percent of normal for the basin incorporates both SNOTEL and snow course data, so occasionally there might be slight discrepancies between the plot and official basin percent of normal (stated in basin summary below each plot).



Official Business



This publication may be found online at:  
<http://www.or.nrcs.usda.gov/snow>

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